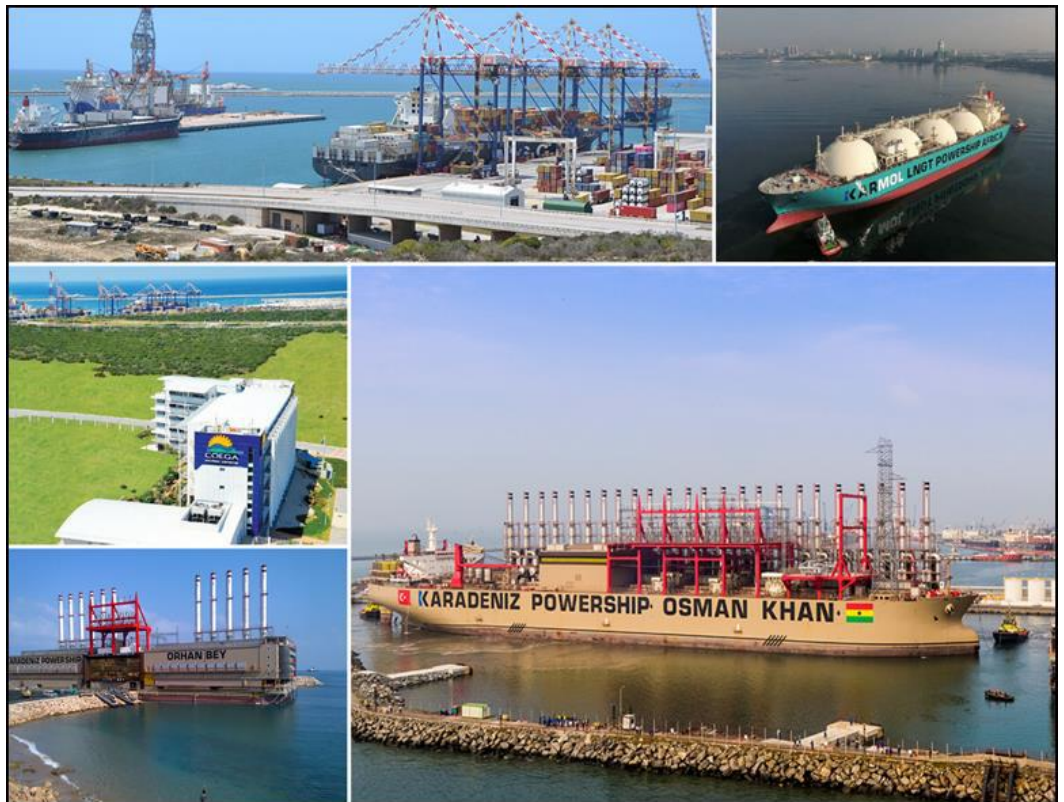


DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) FOR THE PROPOSED GAS TO POWER VIA POWERSHIP PROJECT AT THE PORT OF RICHARDS BAY AND ASSOCIATED EVACUATION ROUTE WITHIN UMHLATHUZE LOCAL MUNICIPALITY, KING CETSHWAYO DISTRICT, KWAZULU-NATAL

DFFE REF NO: 14/12/16/3/3/2/2007

A Project for Karpowership SA (PTY) Ltd



09 NOVEMBER 2022

DOCUMENT



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GLOSSARY OF TERMS

Alien invasive species

A plant or animal that is a listed invasive species in terms of Section 70 of National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA); or a weed or invader plant listed under the Conservation of Agricultural Resources Act 43 of 1983.

Bunding

An impervious containment system for potential spillages from tanks / containers stored on site. The banded area shall have a capacity greater than 110% of the total tankage contained. The bunding shall be constructed of a material impermeable and resistant to the stored material.

Clearing

The clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified.

Contract

The written agreement between the Contractor and the Project Developer for any construction activities required for the Project.

Contractors Camp Area

The area temporarily allocated for the establishment of equipment, repair area, ablution facilities, lie down and rest areas, etc. for the construction period. It also serves as the central point for the storage of fuel, construction materials and contractor offices.

Contractor

Persons or companies appointed by the Project Developer to undertake the construction of the Project.

Environmental Authorisation

Environmental Authorisation obtained in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the associated EIA Regulations 2014 (as amended).

Environmental Control Officer (ECO)

Individual appointed by the Project Developer responsible for monitoring compliance with the implementation of the Environmental Authorisation and the EMPr, ensuring liaison between the Project Developer, the Contractor and relevant authorities and reporting on the verified compliance with the EMPr.

Environmental Site Officer (ESO)

An environmentally knowledgeable or qualified person nominated by the Contractor to assist with and monitor the day-to-day implementation of the EMPr on site.

Environment

The surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination thereof and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;

Environmental Aspect

An environmental aspect is any component of the construction activity that is likely to interact with and on the environment.

Environmental Audit

An audit conducted at intervals specified in the Environmental Authorisation by an independent person with the relevant environmental auditing expertise as required by Regulation 34 of the EIA Regulations, 2014 to determine compliance with the conditions of the Environmental Authorisation and the EMPr.

Environmental Impact

An 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 an activity.

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.

Environmental Audit Report

The report prepared by an independent person with the relevant environmental auditing expertise containing the findings of the Environmental Audit as set out in Appendix 7 of the EIA Regulations, 2014 and submitted to the Competent Authority within the timeframe specified in the Environmental Authorisation.

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

Hazardous Substance

Any substance that poses a significant risk to health and safety, property or the environment. These substances have been classified under the SABS Code 0228: *'The Identification and Classification of Dangerous Goods and Substances'*. Hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic. Some examples of hazardous substances / materials:

- a. diesel, petroleum, oil, bituminous products;
- b. cement;
- c. chemicals such as solvent based acids, alkalines;
- d. lubricants such as oil and greases;
- e. pesticides, herbicides; and
- f. LP gas.

Hazardous Waste Landfill Site

A waste disposal site that is designed managed and permitted by DWS or the Department of Forestry, Fisheries and the Environment (DFFE) to allow for the disposal of hazardous waste.

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. Such an incident may qualify as an incident as defined by Section 30 of NEMA and/or Section 20 of the National Water Act 36 of 1998 (NWA). If it does, the requirements in the respective provisions under these sections apply.

Land owner

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

Method Statements

A written submission by the Contractor to the Project Manager in response to this EMP or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification.

The method statement must cover as a minimum applicable details with regard to:

- a. Construction procedures;
- b. Plant, materials and equipment to be used;
- c. Transporting the equipment to and from site;
- d. How the plant/ material/ equipment will be moved while on site;
- e. How and where the plant/ material/ equipment will be stored;
- f. The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- g. Timing and location of activities;
- h. Compliance/ non-compliance; and
- i. Any other information deemed necessary by the Project Manager.

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.

Project

This refers to the construction activities associated with the Gas to Power Projects as approved in the Environmental Authorisation.

Project Developer

The Karpowership is the Project Developer and holder of the Environmental Approval.

Project Manager (PM)

Representative of the Project Developer, responsible for overall management of the construction phase of the Project. Duties also include the management of all Contractors.

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

Servitude

A right which Local Municipality, District Municipality or Port Authority holds over another property for a rite of passage, pipeline or storm water servitude. The servitude is registered against the title deeds and binding on successive owners in perpetuity.

Slope

The inclination of a surface expressed as one unit of rise or fall for so many horizontal units.

Social Environment

Persons and built environment likely to be directly or indirectly affected by construction activities during the Project.

Solid Waste

Means all solid waste, including domestic and office waste (food, paper, plastic), waste from construction and operational activities e.g. empty chemical containers, excess cement/concrete, inert building rubble, packaging, timber, tins and cans.

Spoil material

Excavated material which is unsuitable for use as fill material in the construction works or is material which is surplus to the requirements of the construction works.

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.

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.

Watercourse

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.

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.

Workforce

The entire project team including people permanently or temporarily employed or contracted by the Project Developer, the Contractor and sub-contractors who are involved in the construction of the Project.

Works

The works to be executed in terms of the Contract.

LIST OF ABBREVIATIONS

BARESG	Birds and Renewable Energy Specialist Group
BOG	Boil Off Gas
CA	Competent Authority
CBA	Critical Biodiversity Areas
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
EMPr	Environmental Management Programme
ESO	Environmental Site Officer
FSRU	Floating Storage Regasification Unit
HCS	Hazardous Chemical Substance
I&AP	Interested and Affected Parties
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IRP	Integrated Resource Plan
ISO	International Organization for Standardization
LNG	Liquefied Natural Gas
LNGC	Liquefied Natural Gas Carrier
MARPOL	The International Convention for the Prevention of Pollution from Ships
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NFEPA	National Freshwater Ecosystem Priority Areas
NGOs	Non-Governmental Organization
NPA	National Protected Area
OCIMF	Oil Companies International Marine Forum
PLEM	Pipeline End Manifold
PoS	Plan of Study
RMIPPPP	Risk Mitigation IPP Procurement Programme
SAELIP	South African Atmospheric Emission Licencing and Inventory Portal.
SAHRA	South African Heritage Resources Agency
SEZ	Special Economic Zone
SDF	Spatial Development Framework
SIGTTO	Society of International Gas Tanker and Terminal Operators
TNPA	Transnet National Ports Authority
UNCLOS	United Nations Convention of the Law of the Sea

1. INTRODUCTION

1.1. PROJECT DESCRIPTION

1.1.1 Overview

The Karpowership 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 (as per the RMI4P requirements-Appendix 7.2). A Liquefied Natural Gas Carrier (LNGC) will deliver Liquefied 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, which will be measured at the Point of Utility Connection and cannot be exceeded under the terms of the RMI4P. Electricity will be generated on the two Powerships by 27 reciprocating engines, each having a heat input in excess of 10MW (design capacity of 18.32MW each at full capacity). Heat generated by operation of the reciprocating engines is captured, and that energy is used to create steam to drive three steam turbines that each have a heat input of circa 15.45MW.

The electricity 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 electricity 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.

There are two alternative transmission line routes from the Powership to the proposed switching station – see Chapter **Error! Reference source not found.** for the assessment of these alternatives.

Refer to table of figures below, showing project layout.

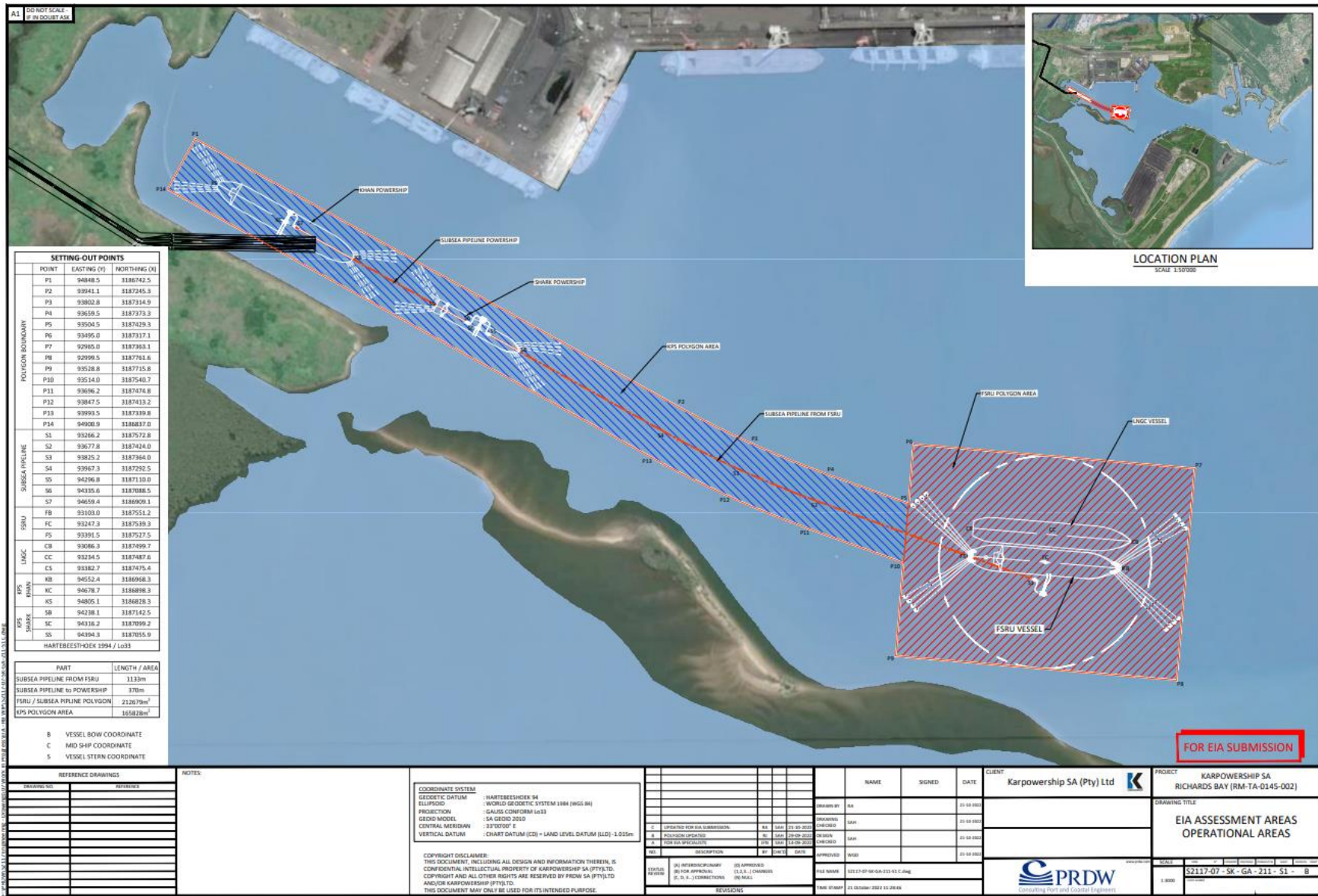


Figure 1-1: Overall Project Layout (Marine)



Figure 1-2: Overall Project Layout showing alternative corridors routes (Transmission line)

Table 1-1: Images of various Powerships

<p>Image 1: Powership – Shark Class</p>	<p>Image 2: Powership – Khan Class</p>
<p>Image 3: Floating Storage & Regasification Unit (FSRU)</p>	<p>Image 4: Project Concept</p>

The sub-chapters which follow provide details related to the proposed activity, and its various components. Chapter 3, which follows, provides an assessment of the proposed activities, with a focus on alternatives.

1.1.2 Location

The proposed project is situated within the Port of Richards Bay, and in proximity to the Richards Bay Industrial Development Zone (RBIDZ), which was designated Special Economic Zone (SEZ) status in July 2017 in terms of the Special Economic Zones Act 16 of 2014. The Port of Richards Bay, located within Ward 2 of the uMhlatuze Local Municipality, is state-owned and managed by Transnet National Ports Authority (TNPA) in a landlord capacity. The Powerships and FSRU are to be moored in the protected waters within the Port of Richards Bay (Figures 2-1). The transmission line route (2 alternatives) will be installed from the Richards Bay Port to the tie in point to the Eskom line, at a connection point (including a new switching station) in proximity to the existing Bayside Substation, within properties owned by TNPA, uMhlatuze Municipality and South32 Aluminium (Figure 2-2).

Please refer to Chapter 2.3 for further detail on the project location and Chapter 3 for details on the alternatives considered which include two alternative Powership positions, the gas line route associated with each Powership position, alternative transmission line routes, connections and switching station position.

1.1.3 Berthing, Mooring of the Powerships and FSRU

Berthing and mooring will be conducted as per the Ports' approved maintenance plans, procedures and requirements, and ships will be located where adequate depths exist and in acceptable positions to the port operator so as not to impact the safety of marine traffic and other port operations.

The operational requirements at the Port cannot accommodate the use of existing berthing infrastructure, and therefore the vessels will be positioned in unused areas of the Port and will utilise their own mooring system comprising catenary mooring chains and anchors, which are designed to secure the vessels taking into consideration all local conditions. The Khan Class and Shark Class Powerships will use piled anchors. Each Powership will have 16 mooring legs each consisting of a catenary mooring chain connected to an anchor pile with a padeye connector. The anchor piles will be installed using vibro-piling to drive the casing to refusal and then the Reverse Circulation Drilling method (RCD) to drill the pile to depth. The FSRU will be anchored using 16 mooring legs each consisting of a catenary mooring chain connected to a Vertical Load Anchor (VLA) which is dragged by anchor handling tug down to its embedment depth. No marine structures are planned, and the mooring system for the vessels will be heavy chain lying on the seabed attached to anchor piles or vertical load anchors. The vertical load anchors are by design buried during the installation. The intention is to install the anchor piles such they are flush or below the surrounding seabed.

No dredging is envisaged for the mooring locations.

The Sandspit area in the Port has been identified as sensitive and a minimum 170m distance from the water line to the moored vessels is maintained, as shown in figures 2-3 and 2-4 below.

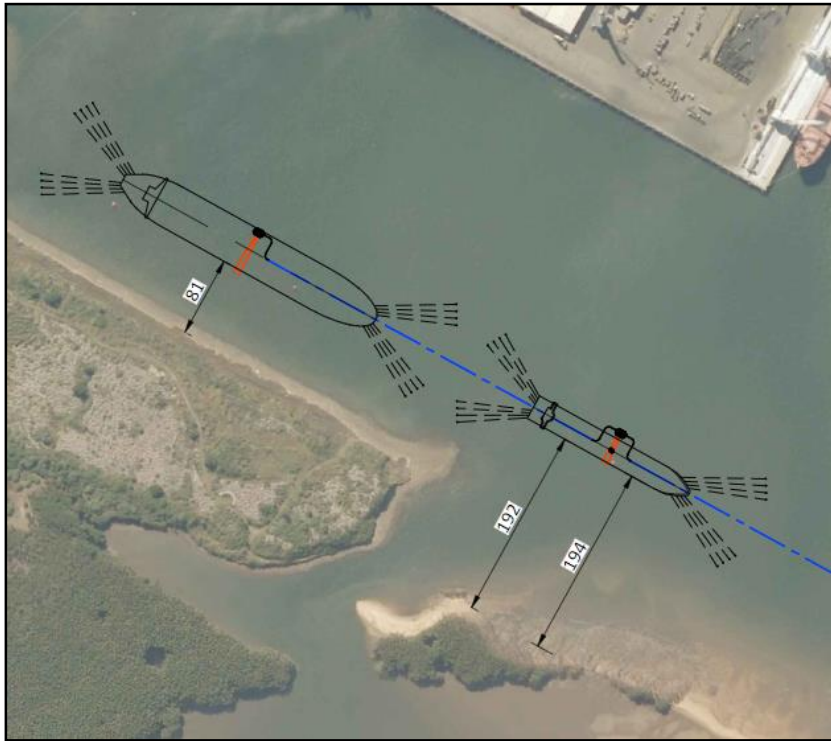


Figure 1-3: Powerships' distance from the sandspit /shore (in meters)

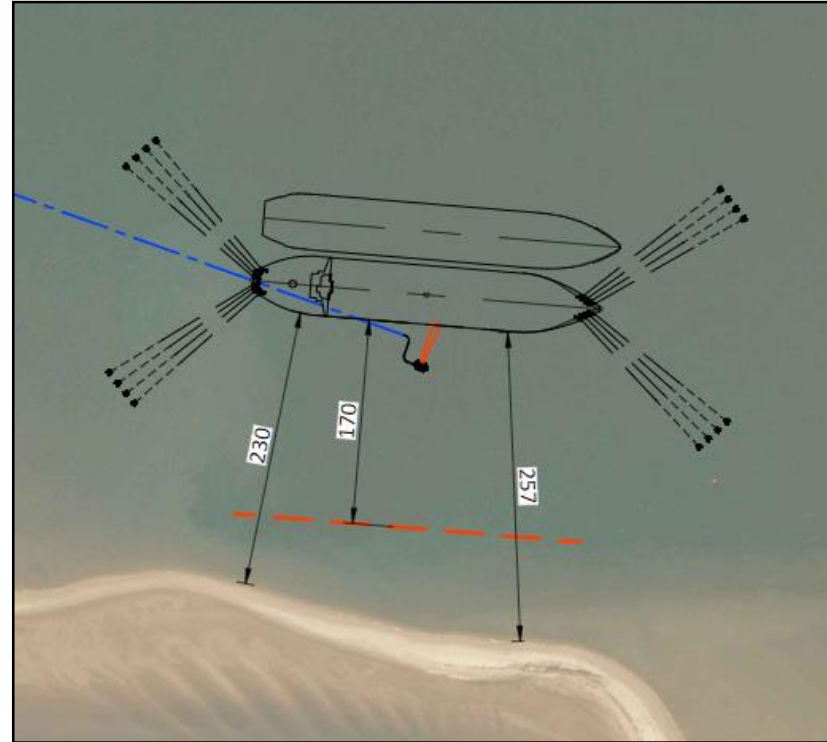


Figure 1-4: FSRU distance from the sandspit (in meters)

1.1.4 Gas Lines

A gas line is required between the FSRU and Powerships to ensure gas supply for power generation.

The FSRU discharges gas via 2no flexible risers to the FSRU pipeline end manifolds (PLEM) on the seabed next to the FSRU. The FSRU PLEM incorporates shutoff valves and pigging connections for maintenance. The gas is then transported from the FSRU PLEM to the Shark class Powership PLEM via a 24" steel pipeline with 50mm concrete weight coating, installed on the seabed. The Shark class Powership PLEM positioned adjacent to the Shark class Powership manifold, incorporates shutoff valves, expansion spools and 2no 12" flexible risers delivering gas to the Shark class Powership manifold flange. The gas supply then continues from the Shark class Powership PLEM to the Khan class Powership PLEM via a 24" steel pipeline with 50mm concrete weight coating, installed on the seabed. The Khan class Powership PLEM positioned adjacent to the Shark class Powership manifold, incorporates shutoff valves, pigging connection, an expansion spool and 2no 12" flexible risers delivering gas to the Khan class Powership manifold.

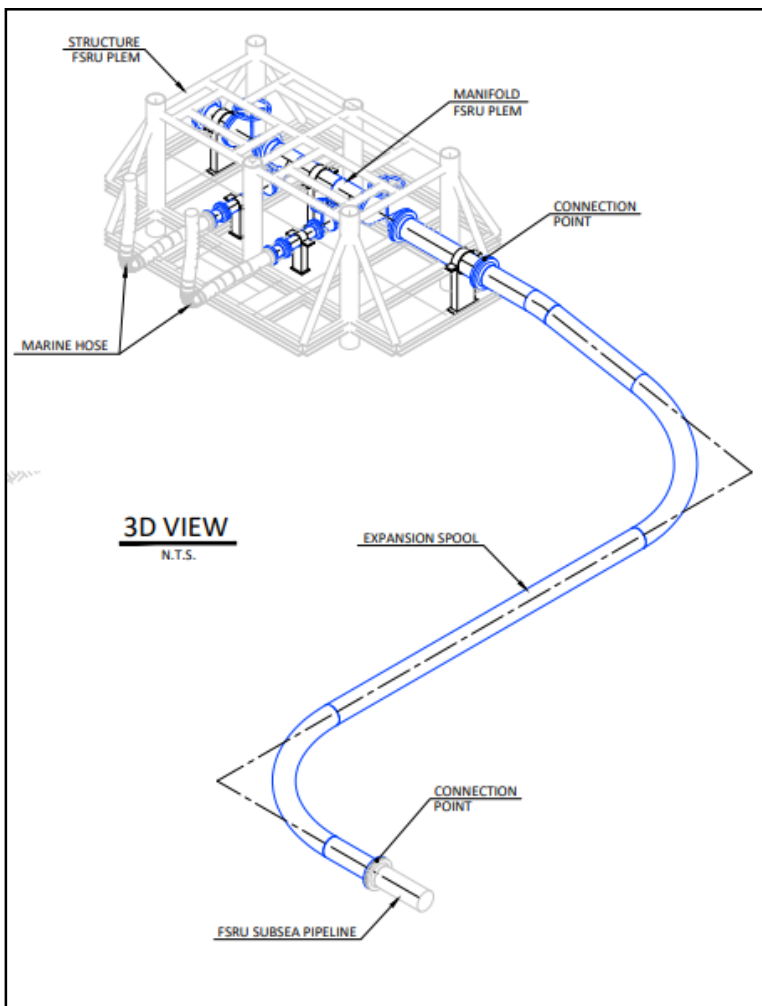


Figure 1-5 Typical PLEM and Tie-in Detail

For the gas pipeline, including the pipeline end manifolds (PLEM), there may need to be minor route rectification works along the subsea pipe route to limit the free span length of any section of the pipeline, over the undulating

seabed. This will comprise flattening high spots or building up support under the pipe at low points. Due to the minor nature of this work, it will likely be undertaken by divers as the pipeline is installed.

The subsea gas pipeline connecting the FSRU to the Powerships will be installed on the seabed

It is anticipated that the subsea pipeline will have a servitude of approximately 50m either side of the pipe centre line.

The recommended routes identified by the EIA process will be included in the commercial agreement to be entered into with Transnet National Port Authority (TNPA). Please refer to Appendix 10. for further details on this technical aspect.

1.1.5 Transmission line

The proposed transmission line will be constructed of either monopole or lattice steel construction based on the final engineering design requirements, the topography and geotechnical survey results. The available space will further influence the specific tower designs. The span lengths between towers will vary. Average spans lengths will be approximately 200m however based on the ground profile shorter spans of less than 100m or larger spans of greater than 300m can be constructed.

There are two potential routes being considered for connection from the Powership to the National Grid, both with the same start and end point:

Alternative 1 - from the start point, the route run towards the existing Harbour arterial road, crossing the road and towards the existing powerline servitude to the west through crossing of an open grassland/scrubland and unchannelled valley bottom wetland, then running along the exiting servitude along Manzanmyama Canal, before heading north and finally in a westerly direction before reaching its end point.

The route offers a shorter route to the end point (Approx. 3.6km, estimated 16 towers) and is in accordance with the proposed 2015 Transnet Evacuation Route

Access for construction and maintenance of the transmission line will be via the existing powerline servitude for the majority of the route, and an additional access / working servitude will be required for the portion of the route between the port and the Manzanmyama Canal, as well as from the start point to the Harbour arterial road.

Alternative 2 - begins at the same start point, the route joins into the harbour arterial road, and before the lower Bhizolo Canal, it cuts west across the lower Manzanmyama Canal, passing through the mangroves, traversing the smelter site, before heading north through mixed mangrove and wetland habitat on the western boundary of this site.

The route is approximately 4km long, requiring 19 towers.

For both alternatives, each tower will cover a maximum footprint of 2.75m by 2.75m for monopoles which will necessitate the clearing of vegetation to allow for these structures to be erected.

Routes options for the transmission lines are presented in the layout alternatives, section 3.2.3 of this report.

1.1.6 Switching Station

The electricity generated on the ship is required to be integrated into the Eskom National grid via a switching station. The location of the switching station is on shore. The switching station is part of the Eskom self-build process and will be built by Karpowership and handed to Eskom for their ownership and operation. The switching station will facilitate the control of the incoming lines from the Powership and the outgoing lines to the existing Impala – Bayside network line.

The switching station will measure approximately 17 898m² in size and will comprise of an incoming circuit for the lines from the ship, a busbar system to distribute the electricity and an outgoing circuit for the electricity to Eskom. The switching station further comprises of landing gantries, breakers, isolators, current transformers, voltage transformers and a control room for the monitoring, measurement and control of the power.

1.1.7 Operational Processes and Associated Measures

Powerships are equipped with cutting-edge modular medium speed reciprocating engine technology for generation, enabling reliable supply of electricity with minimal impacts from load profile and number of starts and stops. For all practical purposes, Powerships can maintain the same high efficiency even at partial loads by operation of a subset of the engines at full load and also offer the shortest response times for load variations. This modular technology and built-in redundancy allows that, even if one or more engines are taken off-line for any reason, it is most likely that the Powerships can continue operating and meeting the full contracted capacity requirements. The Powerships themselves have an effective operating lifespan of more than 25 years, more than covering the 20-year PPA provided for under the RMI4P.

Powerships store onboard all key spare parts that may be required to keep the generation running, essentially eliminating the risk of down-time caused by sourcing of necessary parts during the lifespan of a project, either related to routine maintenance or unplanned maintenance that may be required.

Another benefit of Karpowership over land-based solutions is that, in the highly unlikely event that a Powership falls completely out of commission, or if the buyer's requirements change, vessels can be quickly replaced with another suitable Powership from Karpowership's fleet to minimise any disruption to the power delivery.

1.1.7.1 Water Usage

The Powership uses seawater and potable water for cooling the reciprocating engines, condensers and other auxiliaries.

Part of the cooling seawater intake is processed into potable water through a vaporization process for steam generation (on-board water treatment unit) and non-process water consumption. In this way, seawater is primarily used for steam generation, make up water and for domestic use. Water supply for domestic use (cleaning, crew hygiene, etc.) is produced using the on-board water treatment unit whereby seawater is treated via freshwater generators and sea water reverse osmosis systems. Potable water for drinking purposes will be sourced as bottled water from local service providers. The Powerships have onboard sewage treatment units and oily bilge separators to be utilized while sailing, but the vessel will be moored for the duration of the Project and during this term wastewater disposal will be contracted to a licenced local service provider.

The Powership operates a once through cooling system, which abstracts seawater directly for cooling and then discharges it into the sea with no chemicals or other additives used. The total intake/outlet flow rates at 100% load are 8.49 m³/s. The temperature of the discharged seawater (ΔT) ranges from 10.0 to 15.0°C within the Powerships process water. A smaller footprint of ΔT is achieved when discharging at a depth 8 m below the water surface. The largest ΔT 's are generally found at or near the surface, while the bottom is much less affected by the temperature

change due to the buoyancy of the discharge. The thermal plume exceeds the 1°C ΔT guidance by 0.2°C . Nevertheless, the plume's absolute temperature did not exceed any of the biological thresholds assessed by the specialists. The conceptual process flow diagram (PFD) for the project's operational water balance is shown in Figure 2-6 below.

Water supply for domestic use is produced using the onboard water treatment unit. Drinking water for the crew will, where required, be provided by local suppliers. No bulk water supply will be necessary from the uMhlatuze Local Municipality or the King Cetshwayo District Municipality for operations. The Powership also has a sewage treatment unit and oily bilge separator to be utilized while sailing to the Port for installation. During the operational phase, the sewage will be taken off the vessels for treatment by a licensed service provider.

The following volume of water required daily is anticipated:

- 300 litres of drinking water will be required for onboard crew utilisation;
- 20 000 litres for potable water will be required for on-board utilisation;
- 15000 litres technical water for continuous Steam Turbine Generators (STG) operation (5000 litres per STG) (processed from sea water intake); and
- 25-30 litres of water per engine is required.

No chemicals whatsoever, including chlorine, are discharged with the cooling water. No biocides and no other additives are necessary to control bio-fouling in seawater pumping and temperature exchange systems.

Further details are captured in the Water Balance Report, attached as Appendix 9-A5.

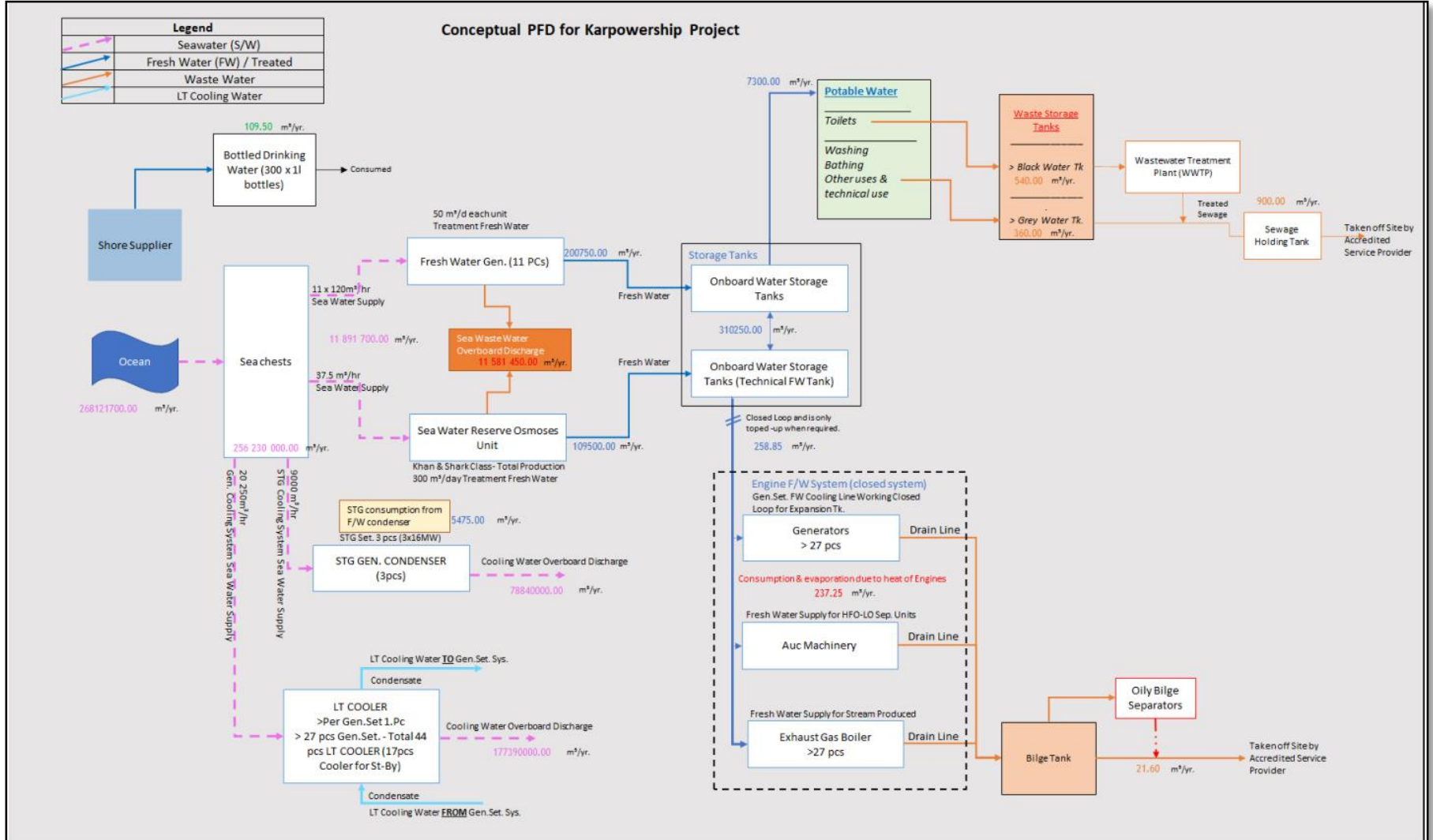


Figure 1-6: Conceptual Process Flow Diagram for the Project's Operational Water Balance

1.1.7.2 *Water Temperature*

As above, the Powerships will use seawater for cooling the gen-sets and optionally processed for the steam turbine generators and fresh water uses. The total intake/outlet flow rates at 100% load are 8.49 m³/s. The temperature of the discharged seawater (ΔT) ranges from 10.0 to 15.0°C within the Powerships process water. A smaller footprint of ΔT is achieved when discharging at a depth 8m below the water surface. The largest ΔT 's are generally found at or near the surface, while the bottom is much less affected by the temperature change due to the buoyancy of the discharge. The thermal plume exceeds the 1°C ΔT guideline by 0.2°C. Nevertheless, the plume's absolute temperature did not exceed any of the biological thresholds. No chemicals such as chlorine are discharged with the cooling water.

The dispersion of the resulting thermal plume depends on the flow rate, ΔT , discharge geometry, bathymetry, currents, winds and water column stratification.

A calibrated 3D hydrodynamic model was used to predict the extent of the thermal plume generated by the Powerships considered at Port of Richards Bay running at 100% load.

The results show that a smaller footprint of ΔT is achieved when discharging at a deeper depth below the water surface. Discharging at a deeper depth allows the thermal plume to entrain colder sub-surface ambient water as it rises to the surface, reducing the temperature of the plume.

To reduce the risk of recirculation of the discharge back to the intakes, based on recommendations the discharge pipeline running down the vessel hull will have a second elbow to discharge horizontally away from the vessel, and that the discharge pipes be positioned as far from the intakes as possible.

Further details are captured in the Integrated Dispersion Modelling of Thermal Plume Report, attached as Appendix 10.2, and the Marine Ecology Report, attached as Appendix 9-B4.

1.1.7.3 *Risk and Possible Explosions*

Safety performance is focused on risk and on the safe operation of the vessels as well as the containment of the LNG within the containment systems, including the pipeline. It is important to note that Powerships and FSRUs are operated by global leaders in a highly safety conscious industry, and that international best practices are adhered to at all times with respect to design, operations, procedures and training.

The gas lines between the FSRU and the Powerships are equipped with gas detectors in circuit which will identify any leak, so that the fuel gas can be immediately isolated and shut off, allowing the leak cause to be identified and the necessary repairs or replacements made. However, should there be a minor leakage of LNG, it will disperse quickly and rapidly rise into the atmosphere.

In the event of a lightning strike, the high conductivity of the large quantities of metal, with hundreds of square yards of hull in direct contact with the water, causes rapid dissipation of the electrical charge. The Powership, FSRU and LNG carriers are designed to meet stringent lightning protection standards required by the Ship Classification Society. FSRU operations are safeguarded through 100% containment with no LNG interface with the atmosphere. Lightning strikes are easily dissipated by the steel structures without affecting the normal operational aspects of the FSRU, however, in potential lightning situations, it is normal practice to cease STS (Ship-To-Ship) transfer operations if they are underway and make safe the transfer hoses through an inerting procedure and maintaining the cargo containment without oxygen.

Fire can be extinguished in the Powerships by means of various methods which include permanently installed systems in the Powerships that are able to fill the affected area with CO₂ or hot foam and portable extinguishing systems. Each chamber in the Powership is also equipped with fire detection and alarm equipment (fire detectors, manual call points, alarms, sounders, and bells) in order to detect & locate the origin of the fire.

In addition to using the fixed firefighting systems and portable firefighting equipment, personnel protection equipment is available and used throughout all areas of the Powership to ensure maximum protection from fire related accidents. Approved drawings on firefighting plans are located throughout the Powership in fireboxes and hung in different locations. In the event of fire drills or actual fire these plans are carried out rigorously.

1.1.7.4 Safety and Security Measures

Powership are equipped with advanced CCTV systems monitoring all areas, inside and out. To protect the Powership against unauthorized entry to the project site from land, the Powership site is surrounded by fencing and razor wire. A dedicated professional security team is responsible for monitoring and constantly patrolling the vessels to prevent any un-authorized entry or attacks. In addition, prior to deployment of the Powership to the operating location, an independent security risk assessor visits the location, meets local authorities (including port authorities and armed security forces) and provides detailed advice on any additional security measures that should be implemented before or during the operation over and above the proposed Security Plan specific to the project site.

The same independent security advisors visit the vessels shortly after their arrival, immediately after mooring arrangements are completed, to follow up and assess actual operation of the security systems and team. Regular follow up visits and assessments continue, and adaptation of systems and protocols would be made if the project site security risk status is deemed by security advisors to have changed in the area over time.

In addition, a vessel can be moved relatively quickly with TNPA approval in the event that South Africa becomes exposed to terrorist activities and the risk becomes severe. Access to these facilities is also more easily controlled than land-based facilities, by natural virtue of their position in the ocean.

In terms of Emergency Plans, the Major Hazard Installation (MHI) Risk Assessor had recommended that an Emergency Plan be developed and sent to the City's Disaster Management for them to comment and formulate action plans during the MHI application. The MHI application will be made to the District Municipality, and be assessed based on their disaster management capacity. This MHI application can only be made upon completion of the EIA process, once the EA has been granted (refer to the Major Hazard Installation Risk Assessment, Appendix 9 – D3). The attached procedures (Appendix 11) are examples of internally developed procedures utilised at Karpowership operations. Karpowership SA will develop and implement procedures aligned with relevant standards, legislative and key stakeholder (e.g. TNPA) requirements. These procedures will be updated as required throughout the full project lifespan to ensure the procedures remain current and applicable.

1.1.7.5 Occupation Health and Safety

Oxygen Twenty one undertook a comprehensive legal compliance review for KSA to comply with all legal requirements and applicable international norms and best practices that include the following but will not be limited to:

- Compensation for Occupational Injuries and Diseases Act 130 of 1993;
- Occupational Health and Safety Act 85, 1993 and all applicable regulations;
- Government Gazette notice No 1235 – Code of Practice Inshore Diving;
- Basic Conditions of Employment Act 75, 1997;
- Maritime Occupational Safety Regulations, 1994, R 1904;
- SAMSA Acts, Regulations and Codes

A comprehensive HSEQ management manual which underpins the HSEQ Policy of Karadeniz Holding and Group Companies Management, was developed. The HSEQ management system is aligned to international norms and standards such as ISO9001 and ISO 45001. The policy of Karadeniz Holding and Group Companies Management and existing procedures or amendments thereof will be implemented where required for Karpowership SA. These will include but not be limited to:

- Emergency Response Plan

- Fire Safety Plan
- Fire Alarm System
- Tanks Integrated Management Plan
- House Keeping and Leak Emergency on Board
- Technical Periodic Inspection Procedure
- Fugitive Emissions Management Plan

Please refer to Appendix 11 - Policy & Procedures.

1.1.7.6 Lighting

The project is proposed within the operational Port and there is therefore an existing level of light associated with the Port activities. Lighting is critical for the safe and secure operations of the Powerships as well as the Port operation at nights. The lighting aspects of the project was considered to ensure appropriate management in accordance with the Port's requirements where navigational vessels must display lights as directed by the Harbour Master. Minimum illumination levels, expressed in lux, that would ensure a safe working environment as per SANS 10389-1: Exterior lighting, Part 1: Artificial lighting of exterior areas for work and safety and the OHS Act of South Africa will be applicable to reduce risks and ensure that accidents are prevented. Excessively light levels and colour differences, where the distinction of colours are critical to ensure tasks are performed safely, must also be avoided in terms of environmental pollution and disruption of Port shipping and guidance activities.

Light pollution is the alteration of natural light levels in the night environment by artificial lighting where it may cause environmental harm or nuisance. Light pollution may arise from:

- Glare from excessive brightness of a light source;
- Over-illumination;
- Light clutter from excessive grouping of light sources;
- Light trespass from the unwanted direct lighting of an area;
- High energy, short wavelength UV/violet/blue light that is strongly detected by wildlife; and
- Areas requiring lighting must not be over lit and lighting trespass must be avoided.

Lighting will be provided during the construction phase at the respective working areas to provide a safe working environment. All effort will be made to limit the illumination to effective and safe levels and reduce the timeframe of exposures where possible.

The Powership and FSRU lighting will be carefully arranged to minimise lighting pollution and lighting effects on the natural environment. Light intensity and light trespass will be reduced by:

- Mounting lighting fixtures as low as possible;
- Dimming lights where possible and turning off lights when areas are not in use or lighting is not required;
- Where fixed lighting may not adequate for ship operations, portable or temporary lighting will be used to ensure safe operations and navigation on the ship.
- Directing light to the task by reducing the mounting height, repositioning lighting fixtures and adjusting the angle of lighting;
- Using shields on lighting fixtures to prevent light spill outside the footprint area.

High energy, short wavelength UV/violet/blue light which may be detected by nocturnal species will be minimised and avoided at the side of the Powership facing the sensitive natural receptors.

1.1.7.7 Air Emissions & Filtration Systems

Natural Gas (NG) will be the fuel used for the generation of electricity in the proposed Karpowership Project. The pollutants that are emitted using this type of fuel include oxides of nitrogen (NO_x), low sulphur dioxide (SO₂) and low particulate matter (PM₁₀) but in small quantities and within the thresholds allowed by South African law. This is fully disclosed in the AEL and is closely monitored during the lifetime of the Project.

The Powerships' Charge Air Systems are designed and equipped with both wet and dry filtration systems, so that Powerships can continue to operate in extreme environments, including the locations where high levels of organic or inorganic dusts exist, such as coal dust. Charge air filtering system day-to-day workmanship or its maintenance intervals may be affected by the pollutant intensity, but operations can continue. The Charge Air Filtering system has proved itself at other locations, for example at Guinea Conakry, where the Applicant is operating next to an iron ore exporting harbour.

1.1.7.8 *Storage of Hazardous Goods*

The LNG stored on the FSRU at any given time will not exceed 175 000m³. The FSRU is made up of a series of pressurised and cooled containers to store the LNG. Storage of Natural Gas (i.e. gaseous form) on the Powership is of very small quantities and can be assumed as zero. The reason for this is because LNG is regassified on the FSRU and is then sent to the Powership as gas on demand from the generation engines and it is used in its entirety. Health and Safety protocols and requirements are ensured for the storage of hazardous goods such as small quantities of lubricating oil stored for equipment maintenance purposes.

1.1.7.9 *Fueling of the Powership*

The fuel is supplied to the Powerships by a separate vessel, a FSRU, which stores the LNG and converts it to a gaseous state for delivery to the Powership through a gas pipeline on demand based on the generation requirement. The FSRU has an overall length of approximately 300m with an approximate breadth of 50m and incorporates a series of pressurised containers and regassification equipment.

The FSRU is refuelled through vessels specially fitted for the purpose of carrying LNG – a Liquid Natural Gas Carrier or LNGC. Refuelling would be required approximately every 20 to 30 days, depending on the power generation demand from Eskom and output of the Powerships. This LNGC will temporarily moor alongside the FSRU over a 1 to 2 day period, while offloading the LNG cargo via STS transfer to the FSRU. The LNG delivered by the LNGC will be sourced from the global market through the Project's contracted fuel supplier, Shell SA, and therefore does not form part of the Karpowership application.

The location of the LNGC, when re-fuelling, will be immediately adjacent to the FSRU. The LNGC will stay in this location within the Port only during the re-fuelling process which takes one to two days including all mooring, connection work, safety checks, offloading, disconnection, and preparation for safe transit out of the port. The FSRU can hold enough LNG to allow the Project to operate for approximately 40 days; expected arrival dates of the LNG Carriers transporting the LNG from the overseas market will be aligned (taking account of the prevailing weather conditions) with the expected usage profile, whilst ensuring that sufficient reserves are maintained on the FSRU in case of any short notice delays. This contingency is to avoid interrupting the supply of LNG to the Powership and thus, to ensure continuously reliable power generation.

The ship-to-ship transfer of LNG will be managed in accordance with STS operation, the applied standard is Ship-to-Ship Transfer Guide (Liquefied Gases) - 2nd edition (OCIMF/SIGTTO) via trained personnel to ensure compliance to this standard and with all quality, health and safety requirements.

The FSRU regasifies the required amount of LNG and sends this to the Powership in gaseous form Natural Gas (NG) continuously on demand through a connecting pipeline. The FSRU is specifically designed, constructed and equipped to supply the fuel gas required, at the designated pressure and flow rates for the power generator engines installed on the Powerships.

For daily operations, standard port limits will apply. For LNG STS (ship-to-ship) operation, an approximate 250-300m meters radius from the STS manifold will be defined as no-go zone and 500 meters radius as controlled traffic zone.

Natural gas boil-off of LNG (Boil Off Gas (BOG)) on board the FSRU is not flared or vented. The BOG is used as fuel for the operation of the FSRU and if in excess, is prioritised for export to the Powership for use in the generation of electrical power. In the event that BOG is in excess of the base load demand, then

arrangements are provided on-board the FSRU for this excess BOG to be burnt in a specialised internal process as a last resort so as to avoid any discharge of natural gas to the atmosphere. All BOG management shall be performed in accordance with operating procedures in the approved FSRU Barge Operating Manual. The FSRU has a chromatograph and a metering system from which the data recorded will be provided in real time and formally reported to the Powership in accordance with established procedures.

Under normal operations it is anticipated that the demand for gas will be significantly in excess of the natural boil off resulting in LNG being re-gasified for export to the Powerships for supply to the engines. The engines in operation drive the corresponding generator shaft to generate electricity, and the heat generated by the engines may be captured and used by additional steam turbines for increased efficiency. The electricity generated is transmitted through the overhead transmission line to the switching station and to the national grid.

For further detail on fuelling please refer to Appendix 11.

The Powership is designed to use Natural Gas, a cleaner burning fuel for the cost-effective generation of power, as opposed to coal or diesel-fired power generation. Compared to coal, natural gas emits between 45 and 55% fewer greenhouse gas emissions and less than one-tenth of the air pollutants when used to generate electricity (Shell SA, Media Release, 2020).

Karpowership SA is partnering with Shell SA to supply LNG to the Projects. Shell is one of the global leaders in LNG supply. They are able to leverage economies of scale and their robust networks to secure LNG from the global market. There is a fuel supply management team in place and LNG procurement will be arranged based on COD date and demand during the Project terms. The gas will be sourced from Shell SA with relevant licenses and permissions for the supplier's full supply/value chain. The applicant has also indicated that they have received assurances from the LNG supplier that the gas will not be sourced from fracking.

According to Shell SA, "Natural gas is the cleanest-burning hydrocarbon, producing around half the carbon dioxide (CO₂) and just one tenth of the air pollutants of coal when burnt to generate electricity. LNG is a clear, colourless and non-toxic liquid which forms when natural gas is cooled to -162°C (-260°F). The cooling process shrinks the volume of the gas 600 times, making it easier and safer to store and ship. In its liquid state, LNG is not explosive and cannot burn.

If consumption remained at today's levels, there would be enough recoverable gas resources to last around 230 years. It is versatile. A gas-fired power station takes much less time to start and stop than a coal-fired plant. This flexibility makes natural gas a good partner to renewable energy sources like solar and wind power, which are only available when the sun shines and the wind blows." (<https://www.shell.co.za/energy-and-innovation/natural-gas.html>).

1.1.7.10 Global LNG Market

The market for Liquefied Natural Gas has existed since 1958 when the first tanker shipment of LNG took place from Lake Charles, USA bound for Canvey Island in the UK.

Today, more than 40 countries import LNG from 21 exporting nations around the world. Imports are dominated by the Asia Pacific region, with Japan, China and South Korea dominating demand.

On the supply side, Qatar has been the world's largest supplier of LNG for a number of years. However, both Australia and the USA are expected to surpass Qatar as the world's largest LNG suppliers since both nations have rapidly expanded their liquefaction capacity in recent years.

1.1.7.11 LNG Supply Sources

Given the complexity of different sources of LNG and different customers for LNG and the fact that demand for LNG in a country can change from year to year as well as within the market, this market is suited to very

large and well prepared companies who can manage the complexity of changing import demand combined with the requirement to serve the customers' demands.

LNG Supply is a mature market with approximately 30 larger companies, capable of supplying LNG to the project. Shell SA was selected after a competitive selection process as they offered the best value for this Project. Any well-established company would have to supply LNG from within their total global portfolio. Therefore, the LNG will not be sourced from a dedicated source(s) continuously, but rather from the best fit supply location taking the market and logistics, in particular, into account at any given time also allowing the switch to indigenous or regional gas supply if it becomes available and feasible at any time in the project term. This global supply portfolio also adds to supply security, because if any shipping route or supply location becomes inaccessible, it can be substituted logistically.

The RMI4P also specifies termination clauses within the international LNG supply agreements, which can be executed if a suitable local or regional gas supply becomes available at any time through the Project term.

The market for the supply of LNG will continue to grow for the next 40 years, and therefore there is no risk associated with the physical supply of this fuel for the term of the project.

1.1.7.12 Waste Generation and Management

Due to daily activities, the Powership and FSRU will require regular maintenance and repairs which will produce waste. Approximately 75m³ of sewage (black water) as well as grey water (washing and kitchen) will be generated monthly. All effluent and solid (general and hazardous) waste will be removed by authorised service providers in terms of legislation and TNPA and MARPOL requirements and will be treated and disposed of in authorised land-based treatment and disposal sites.

In terms of energy waste, Powerships operate with a lean waste philosophy. Every type of energy generated from the fuel is used in a specific way to reduce waste energy. While engines burn fuel, heat is ejected from the engines via exhaust gasses. In order to utilise this waste heat, Powerships use Exhaust Gas Boiler Equipment to convert waste heat to superheated steam which is redirected to the Steam Turbine Generators to generate electricity.

1.1.7.13 Hull Cleaning

Hull cleaning equipment to be used by Karpowership involves 'Brushcart' technology which is a diver-steered, hydraulically powered unit with twin / triple rotating discs that can be fitted with either brushes or blades, depending on the application. For niche areas, (fewer regular surfaces) shrouded hand tools and a containment box have been designed.

Each cleaning tool has a suction shroud that connects separately to the central, fully enclosed suction system through which debris is pumped to the surface support system for treatment. Extracted water and debris is then processed through a multi-staged, modular filtration and treatment system where the fouling debris and particles are removed, and then the filtrate passed through an automated UV disinfection unit. No chemical biofouling agents are used for the hull cleaning process, which will be done in accordance with TNPA approved operational procedures.

1.1.8 Construction of the Powerships and FSRU

The Powerships are assembled off-site and will be delivered fully equipped and functional to the Port of Richards Bay. Powerships, through their modular generation capability, allow for greater technical flexibility for load cycling and shedding. The Khan Class Powerships are approximately 289m in length with an approximate breadth of 45m and Shark Class Powerships are approximately 180m in length with an approximate breadth of 26m. The gas reciprocating engines for power generation allow a reliable supply of electricity with minimal impacts from load profile and number of start and stops. They are essentially ships which have been fitted with the necessary gas fuelled generation equipment, including reciprocating engines

and steam turbines, as well as a high voltage substation and all necessary equipment to transmit electricity to the grid.

1.1.9 Construction of the Gas Pipeline

1.1.9.1 Site Access

The subsea pipeline is to be brought onto site in 18m lengths by road truck, concrete weight coated and welded together in a pipe stringing yard near the launch site. The trucks used to deliver the pipeline sections will therefore require road access to the stringing yard and laydown area.

1.1.9.2 Pipeline Assembly

Sufficient space for a temporary onshore construction site / laydown area near the launch site will therefore be required to undertake the assembly of the pipeline. An area within the Port with sufficient space near the launch site has been selected in order to reduce new impacts. The estimated size for the stringing yard for the installation of the gas pipeline is 10 000m².

The proposed location of the stringing yard and launchway is proposed as shown on the drawings. The final selection of the site will only be finalised once a preferred marine contractor has been selected. A launchway will be constructed with rollers to transfer the pipeline from the stringing yard to the sea. The launchway typically will consist of concrete or steel pedestals supporting rollers at approximately 10 to 20m centres, over which the pipeline will move, allowing the completed pipeline to be pulled into the sea. This area will be fully rehabilitated after the completion of the installation of the pipeline.



Figure 1-7: Typical Stringing Yard



Figure 1-8 Typical Launchway across beach

1.1.9.3 Pipeline Installation

The pipeline is to be installed by pulling it from the shore fitted with floatation units, towing it into position using tugs or workboats and lowering it onto the seabed. The pipeline is lowered with minimal disturbance to the seabed and weighted with a 50 mm thick concrete weight coating to ensure the on-bottom stability of the pipeline during operation. Although no dredging is required prior to installation of the pipeline, some seabed preparation in the form of levelling of high spots or placing of crushed stone founding material in low spots may be necessary prior to installing the pipeline.

Minor seabed preparation works are anticipated to receive the pipe and the PLEMs, with the intention to place both directly on the seabed. In cases where there may be a high point, some material might need to be moved to keep the PLEM level or the span lengths within limits.

Once the pipeline installation is complete, the laydown site will be rehabilitated to the topographical and environmental condition prior to the disturbance during the construction phase of this project.

The above methodology for the gas pipeline is captured in **Appendix 10.10 – Technical Information**. The methodology will also need to be approved by TNPA prior to construction start.

1.1.9.4 Pipeline Maintenance

The gas pipeline infrastructure is designed to require little to no maintenance during its design life. Furthermore, the maintenance of the gas pipeline will be managed by the Operation and Maintenance Contractor that will be appointed by the applicant. Relevant design features include the following:

- the subsea pipeline will be protected with a factory applied external coating as well as sacrificial anodes;
- the external coating will be protected by a concrete weight coating which is designed to provide abrasion resistance, which is especially important during pipeline installation; and
- the pipeline is designed to remain stable on the seabed, thereby mitigating against seabed abrasion and material fatigue.

2. SCOPE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

This EMPr addresses the following phases of the development:

(a) Planning and Design Phase

The best practical environmental option is being implemented following the assessment of aspects and impacts, to prevent or reduce environmental impacts within acceptable limits. These include: administrative and legal requirements, roles and responsibilities for environmental management, environmental awareness, training and induction, protection of flora, worker conduct on site, preparation of construction servitude, equipment, vehicle maintenance yard and secured storage areas, water management and drainage areas and security and lighting.

(b) The Construction Phase

Proper implementation during this phase will ensure that the likelihood and/or severity of certain impacts taking place, is prevented or minimised and/or mitigated where prevention is not possible. The majority of the impacts which may occur during the construction phase will have immediate and a short term effect (e.g. noise, dust and pollution / waste generation). If the site is monitored on a continual basis during the construction phase, it is possible to identify and prevent, minimise or mitigate these impacts as they (may) occur. These impacts will then be mitigated through the implementation of the measures prescribed in the EMPr.

(c) The Rehabilitation and post construction activities

Following the construction of the Karpowership Project, this section of the EMPr provides management principles for the post-construction activities including rehabilitation of the site.

(d) The Operational Phase (including ongoing maintenance)

This section of the EMPr provides management principles for the maintenance and operational phases. This will include best practice, procedures and responsibilities as required for various associated activities.

2.1. RESPONSIBILITY FOR ENVIRONMENTAL MANAGEMENT

Karpowership is the owner of this project. The details of the project Owner are as per Table 3.1

Table 2-1: Details of the Project Owner

Name of Owner	Karpowership SA Proprietary Limited
Contact Person	Mehmet Katmer

Telephone Number	+90 212 295 47 37 - 121	Fax Number	-
Mobile number	-	Email	Mehmet.Katmer@karpowership.com

INDEPENDENT ENVIRONMENTAL ASSESSMENT PRACTITIONER

Triplo4 Sustainable Solutions was appointed by Karpowership as Independent Environmental Assessment Practitioner (EAP) to compile the EMPr. Table 3.2 indicates the details of the EAP:

Table 2-2: Environmental Assessment Practitioner

Name of Consultancy	Triplo4 Sustainable Solutions		
Contact Person	Hantie Plomp		
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The Management Authority responsible for environmental authorisation and compliance is the Department of Forestry, Fisheries and the Environment (DFFE).

2.2. AUTHORS OF THE EMPr

This document was compiled by:

Ms. Chen Read – Post Graduate in Environmental Management

Chen Read, Senior Environmental Consultant of Triplo4 Sustainable Solutions has an post graduate Degree in Environmental Management, and she is a registered EAP with EAPASA since 2019. She is an accredited professional (AP) with the Green Building Council of South Africa (GBCSA) as well as certified Carbon Footprint Analyst (SETA accredited). Chen is responsible for conducting environmental impact assessments as well as Water Use License Applications for a wide variety of development projects, including road infrastructure and Industrial projects as well as waste, water and coastal management projects. Chen is also actively involved in conducting compliance auditing services, as well as developing and implementing audit protocol and programmes for compliance to environmental legal requirements, and assisting with the development of corrective and preventative action plans to address non-compliance.

This document was reviewed by:

Ms Shanice Singh- Honours in Environmental Management

Shanice is registered with Environmental Assessment Practitioners Association of South Africa (EAPASA). She has experience in conducting Water Use License Applications (WULA), Environmental Management Programmes (EMPr), Basic Assessment Reports (BA), Environmental Impact Assessments (EIA) as well as Section 24G applications for the rectification of unlawful projects. Furthermore, she is responsible for conducting Environmental Control Officer (ECO) duties which include site visits, surface water monitoring and report compilation at Triplo4 Sustainable Solutions. She is an Institute of Environmental Management & Assessment (IEMA) certified Carbon Footprint Analyst and has undertaken several Carbon Footprint analysis since 2015. Her undergraduate degree was completed in the year 2014 at University of KwaZulu-Natal with a Bachelor of Science: Environmental and Life Sciences. She has completed her postgraduate degree in the year 2017 at the University of South Africa with a Bachelor of Science (Honours): Environmental Management. She is the Past-President of the Rotaract Club of Verulam (2014-2015) which is affiliated with Rotary International

Mrs. Hantie Plomp - Master's Degree in Environmental Management

The Managing Director, Hantie Plomp, has a Master's Degree in Environmental Management and has been professionally registered with the South African Council for Natural Scientific Professions (SACNASP) since

2001 and EAPASA since 2019. She is also an Assessor for EAPASA. She is an accredited professional (AP) with the Green Building Council of South Africa (GBCSA) and a registered member of the Institute of Directors South Africa (IODSA) and the International Association of Impact Assessment, South Africa (IAIASa). She has more than 20 years environmental experience which includes legal compliance and internal systems audits, waste management, water management, air quality management, environmental training and awareness and the management and execution of environmental authorizations.

Hantie has been involved in EIA's since the first Regulation 1182 and 1183 of the Environmental Conservation Act. She was also involved in the CONNEP process (stakeholder process in the formulation of the NEMA Act). She compiled and managed the compilation of EIA's during the different applicable regulations under NEMA (2006, 2010, 2014 and amended 2017).

Hantie previously worked at Royal Haskoning DHV previously known as SSI Engineers & Environmental Consultants where she established the environmental sector within KZN and was the Regional Environmental Manager for 5 years. Prior to this she was at AngloGold Ashanti for 20 years where she headed up the Environmental Systems Section comprising EMS, Audits and Environmental Assessments within the Environmental Management Department and acted as Head of the Environmental Management Department on a number of occasions. She has successfully assisted approximately 7 different AngloGold Ashanti (South Africa and Ghana based) mining sectors (mines, metallurgy, engineering, rehabilitation, properties (high and low density), procurement and human resources), with the design, development and implementation of a certified EMS, in accordance with the ISO 14001:2004 standard. These EMS's included original policy development, gap analysis, EMS planning, implementation and review, including environmental training, assessment, non-conformance and environmental incident management, system and operational procedure development and auditing of the EMS systems. Hantie has extensive experience in the compilation and implementation of environmental management programmes.

The Curriculum Vitae of compilers can be provided on request.

Table 2-3: DFFE Environmental Authority Contact Detail

Name of Authority	Department of Forestry, Fisheries and Environmental		
Contact Person	Minky Chauke - Director compliance		
Telephone Number	012 399 9422	Fax Number	012 359 3625
Mobile number	-	Email	MLChauke@environment.gov.za

3. ENVIRONMENTAL MANAGEMENT PROGRAMME METHODOLOGY

The methodology adopted is that of an Environmental Management Programme (EMPr) as described in Appendix 4 of the EIA Regulations, 2014 (as amended).

The EMPr has been structured to include:

- a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development;
- a description of proposed impact management actions, identifying the manner in which the impact management outcomes will be achieved;
- the method and frequency of monitoring the implementation of the impact management actions;
- the persons responsible for the implementation of the impact management actions;
- the time periods within which the impact management actions must be implemented;
- the mechanism for monitoring compliance with the impact management actions;
- a program for reporting on compliance; and
- an environmental awareness plan.

The EMPr specifies the minimum requirements to be implemented as per the scope of works and scope of the EMPr, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices.

The provisions of this EMPr are binding on Karpowership for the period during which the environmental authorisation and EMPr remain valid. It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time.

4. MANAGEMENT AND COMPLIANCE MONITORING

4.1. ORGANISATIONAL STRUCTURE AND RESPONSIBILITIES

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Developer, Project Manager, Contractor, Environmental Site Officer and Environmental Control Officer are as detailed below.

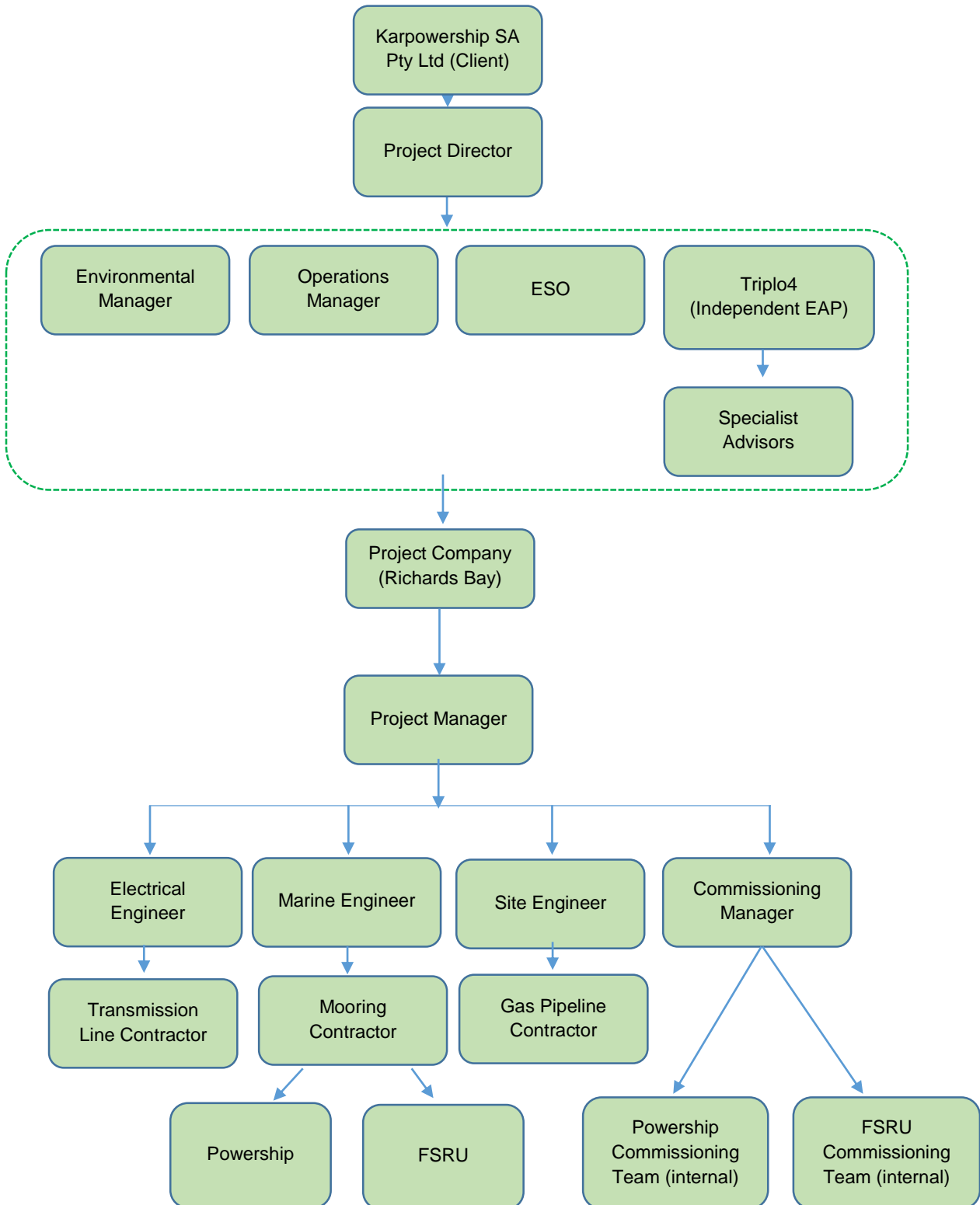


Figure 4-1: Organogram of formal responsibilities and reporting structure for the implementation of the gas to energy project

Table 4-1: Roles and Responsibilities

PROJECT DIRECTOR
<p>Role: Responsible for overseeing all aspects of transmission lines, gas pipeline, mooring and all other aspects of site preparation prior to vessel arrival, quality control, health & safety and time and cost management for all project sites.</p> <p>Responsibilities: <i>The Project Director must:</i></p> <ul style="list-style-type: none"> • Be fully conversant with the EA and EMPr for the project and all other environmentally-related licences and permits; • Make provision for monitoring the implementation of the EMPr throughout the project by means of site inspections and meetings.
ENVIRONMENTAL MANAGER
<p>Role: Responsible for all aspects of environmental compliance, management and monitoring. The Environmental Manager is ultimately responsible for ensuring compliance with the environmental specification and all relevant legislation and is accountable for any non-compliances with this EMPr and any other conditions of approval or non-compliances with legislation.</p> <p>Responsibilities: <i>The Environmental Manager must:</i></p> <ul style="list-style-type: none"> • Be fully conversant with the EA and EMPr for the project and all other environmentally-related licences and permits; • Ensure that all stipulations within the EMPr are communicated and adhered to by the Project Developer and its Contractor(s); • Make provision for monitoring the implementation of the EMPr throughout the project by means of site inspections and meetings. • Overall management of the project and EMPr implementation; and • Ensure that periodic site inspections are undertaken on the project implementation.
OPERATIONS MANAGER
<p>Role: Responsible for commissioning teams and plant management.</p> <p>Responsibilities: <i>The Operations Manager must:</i></p> <ul style="list-style-type: none"> • Be fully conversant with the EA and EMPr for the project and all other environmentally-related licences and permits; • Ensure that all stipulations within the EMPr are communicated and adhered to by the project teams and its Contractor(s).
PROJECT MANAGER (PM) or (Developer’s Engineering Representative on Site)
<p>Role: The Project Manager is responsible for site specific engineering management. The PM reports directly to the Developer, oversees site works and liaises with the Contractor(s) and the ECO.</p> <p>Responsibilities: <i>The PM must:</i></p> <ul style="list-style-type: none"> • Enforce the environmental specification on site; • Be fully conversant with the conditions of the EA, EMPr and all other environmentally-related licences and permits;

- Ensure the EA, approved EMPr and all other relevant licences and permits are in the tender documentation issued to prospective Contractors;
- Request for, review and approve the method statements prepared by the Contractor;
- Review and comment on environmental assessments and / or reports produced by the Contractor and ECO;
- Undertake regular site visits and ensure environmental specifications are implemented;
- Monitor compliance with the requirements of the specification;
- Assess the Contractor's environmental performance in consultation with the ECO from which a brief monthly report of environmental performance is drawn up for record purposes and to be reported on within project meetings; and
- Ensure the documentation, in conjunction with the Contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video records.

ENVIRONMENTAL CONTROL OFFICER (ECO)

Role:

The ECO must be appointed by the Project Developer for the duration of the Project. The ECO must report to the relevant authorities as required by the conditions of approval. The ECO must monitor compliance against the environmental specification and report on such.

Responsibilities:

The Environmental Control Officer must:

- Be aware of the findings and conclusions of the EA related to the development;
- Be familiar with the recommendations and mitigation measures of this EMPr;
- Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them;
- Undertake regular and comprehensive site inspections and monitoring of the construction site according to the EMPr and applicable licenses in order to monitor compliance as required;
- Educate the construction team about the management measures contained in the EMPr and environmental permits/licenses;
- Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective;
- Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions. These monthly reports are to be submitted to the Client, PM, DFFE, DWS and uMhlathuze Municipality;
- Conduct once-off training with the Contractor on the EMPr and general environmental awareness;
- In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as a non-compliance;
- Maintenance, update and review of the EMPr;
- Communication of all modifications to the EMPr to the relevant stakeholders.

It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the PM and the ESO.

CONTRACTOR (including Sub-Contractors, Service Providers and Suppliers)

The Contractor must:

- Be fully conversant with the conditions of the EA and the EMPr;
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the Contract Document.

- Supply method statements for all activities requiring special attention as specified and / or requested by the Project Manager, ECO and/or Engineer prior to the commencement of such activities, for the full duration of project.
- Be conversant with the requirements of this environmental specification/ EMPr. Brief all staff and sub-contractors and their staff about the requirements of the environmental specification;
- Comply with requirements of the ECO in terms of this specification and the project specification, as applicable, within the time period specified.
- Ensure any Sub-Contractors/Suppliers who are utilised within the context of the contract comply with the environmental requirements of the project specifications. The Main Contractor will be accountable for all non-compliances.
- Bear the cost of any delays, with no extension of time granted, should the Main Contractor, Sub-Contractors / Suppliers contravene the said specifications such that the Project Manager orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected.
- Bear the costs of any damages / compensation resulting from non-adherence to the said specifications or written site instructions.
- Comply with all applicable legislation.
- Inform the Engineer timeously of any foreseeable activities which will require input from the ECO.
- The Contractor will conduct all activities in a manner that minimises disturbance to the natural environment as well as directly affected residents and the public in general.

ENVIRONMENTAL SITE OFFICER (Contractor's Representative)

Role:

Each Contractor must have a dedicated Environmental Site Officer (ESO) to ensure the day to day implementation of the environmental specification on site and to report to the PM and ECO.

Responsibilities:

The ESO must:

- Be fully conversant and assist the Contractor in complying with the EA, approved EMPr and all other relevant licences and permits;
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compile environmental method statements on behalf of the Contractor that will specify how potential environmental impacts will be managed in line with the requirements of the EA, approved EMPr and other relevant licences and permits and where relevant environmental best practice, and how they will practically ensure that the objectives of the EMPr are achieved;
- Convey the contents of the EA, approved EMPr and other relevant licences and permits to the Contractor, sub-contractors and suppliers. Ensure all relevant information is relayed to construction site-staff in a manner that is easily understandable;
- Undertake daily and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EA, approved EMPr and other relevant licences and permits;
- Take appropriate action if the specifications contained in the EA, approved EMPr and other relevant licences and permits are not followed. This must include reporting transgressions to the Project Manager, Engineer and Contractor, and may include the recommendation for penalties to be imposed on the Contractor;
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible;
- Ensure that the Written Warning Notification and Incidents Register is available on request; and
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction.

4.2. TRAINING AND ENVIRONMENTAL AWARENESS

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. Training needs should be identified based on the available and existing capacity of site personnel (including the Contractors and Sub-contractors) to undertake the required EMP management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- promoting environmental awareness;
- informing the Contractor of all environmental procedures, policies and programmes applicable;
- providing generic training on the implementation of environmental management specifications; and
- providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

Training will be done in a verbal format and be conducted in person. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimised and environmental compliance maximized.

During the construction phase, Safety, Health and Environmental (SHE) Tool Box Talks must be held on a regular basis (the norm is to do this weekly or every fortnight) to discuss to address potential environmental risks, near misses or incidents and how they can be avoided in future. Regular drills are to be held to ensure that all staff are aware of the spill contingency and other environmental emergency procedures as applicable and can perform these procedures in reasonable timeframes.

5. ENVIRONMENTAL MANAGEMENT COMPLIANCE, MONITORING AND REPORTING

5.1. EMPr COMPLIANCE MONITORING AND AUDITING

Environmental compliance monitoring is the continual evaluation of the status of the environment and condition of environmental elements. Its purpose is to detect activities that may have a negative impact on the environment as well as change that takes place in the environment over time. It therefore involves the checking and correcting of onsite activities as well as the measuring of physical, social and economic variables associated with development impacts. Monitoring will be ensured in terms of the Permits, Licenses and EMPr as per conditions and relevant authority requirements by the Holder of the Authorisation (Project Developer) as undertaken by the Project Developer and Contractor ESO and ECO appointments.

The timeframes for monitoring are specified as per the relevant conditions of the various phases i.e. planning and design, construction and post construction with rehabilitation and operational. The specific conditions related to the monitoring requirements per timeframe have been specified as per relevant condition and must be ensured e.g. water quality monitoring during the construction within wetlands are different to water quality monitoring during the operational phase. Where the phase (timeframe) had been indicated e.g. “during construction” and no specific frequency was stipulated, it means that the condition must be complied with through-out the phase e.g. every day and all day as long as activities are taking place or the phase is active.

The ESO shall monitor the site activities on a daily basis during the construction phase and submit proof of site inspections with findings and corrections to the ECO for consideration during the ECO visits to be conducted during the construction phase.

Compliance Monitoring of the activities and implementation of the EMPr will also be undertaken by the ECO. The findings and outcomes of these monitoring events will be recorded in a monthly monitoring report and kept in the site Environmental File. These reports must be provided to the Environmental Auditor at the time of the Environmental Audit and must also be made available to the Competent Authority on request, alternatively as indicated in the EA and/or Water Use Licence.

The ECO's monthly monitoring report will be circulated to the Project Manager and filed in the EMPr file, and further submitted to the competent authority as required in the EA and/or Water Use Licence. At a minimum the monthly report is to cover the following:

- a) Weekly Environmental Checklists;
- b) Deviations and non-compliances with the checklists;
- c) Non-compliances issued;
- d) Completed and reported corrective actions;
- e) Environmental Monitoring;
- f) General environmental findings and actions; and
- g) Minutes of the Bi-monthly Environmental Site Meetings.

On final completion of the Project, the ECO is required to prepare a final inspection report. The report is to be submitted to the CA for acceptance and approval. The environmental report must comply with Appendix 7 of the EIA Regulations, 2014.

The Contractor is deemed not to have complied with the Environmental Specification / EMPr if:

- There is evidence of contravention of clauses within the boundaries of the site and wetlands;
- Environmental damage ensues due to negligence;
- The Contractor ignores or fails to comply with corrective or other instructions issued by the Project Manager within a specified time; and
- The Contractor fails to respond adequately to complaints from the public.

5.2. COMPLAINTS AND ENVIRONMENTAL INCIDENTS

Identifying, recording and reporting complaints and environmental incidents further ensures the monitoring and auditing of environmental compliance and assessment of performance against the actual and perceived environmental aspects and impacts on site.

DOCUMENTATION

The following documentation must be kept on site in order to record compliance with the EMPr:

- Record of Complaints;
- Non-conformance Reports;
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

The following inspection sheet and report templates are recommended and included in **Appendices B-E** respectively.

- Project Start Up Inspection Sheet;
- Routine Site Inspection Sheet;
- Construction Site Decommissioning Inspection Sheet; and
- Site Inspection Report Structure.

COMPLAINT RECORDS

The Contractor must record any complaints received. The lodged complaint must be brought to the attention of the ECO/PM who will respond accordingly. The following information will be recorded:

- Details of complainant;
- Time, date and nature of the complaint;
- Response and investigation undertaken; and
- Actions taken and by whom.

The complaints must be communicated to the Site Manager and ECO who will respond accordingly. An investigation must ensue and a response to the complainant must be provided within seven working days.

All environmental incidents occurring on the site will be recorded by the Contractor / ECO and submitted to the PM and copied to the Department of Fisheries, Forestry and Environment (DFFE). The following information will be documented:

- Time, date, location and nature of the incident;
- Actions taken and by whom;
- Response to complainant; and
- Close Out.

The ECO, in conjunction with the Project Manager and Contractor, will identify and authorise remediation action where necessary.

The following additional information may be added to the complaints and incident records:

- Party/parties responsible for causing complaint/incident;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented;
- Copies of all correspondence received regarding complaints/incidents; and

- Section 20 & 30 of NEMA.

As mentioned, EMPr compliance is the responsibility of all the parties that make up the project team. Similarly all these parties have a role to play in EMPr compliance monitoring and reporting in accordance with the authority structure. For example, sub-contractors must monitor their own compliance and report any discrepancies, non-compliances or incidents to the contractor, while the contractor must in turn monitor the sub-contractor compliance. In turn, the Engineer must monitor the Contractor's EMPr compliance on a day-to-day basis while the ECO has the role to undertake regular site inspections and audits and prepare internal audit reports.

The above records will form an integral part of the Contractors' Records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the Client or Project Manager.

Outlined below are steps relating to increasing severity of environmental problems, which will be implemented. The principle is to keep as many issues within the first few steps as possible.

- **Step 1**

The ECO discusses the problem with the contractor or guilty party, and they work out a solution together. The ECO records the discussion and the solution implemented.

- **Step 2**

The ECO or Client observes a more serious infringement, and notifies the guilty party in writing, with a deadline by which the problem must be rectified. All costs will be borne by the contractor.

- **Step 3**

The ECO shall order the contractor to suspend part, or all, the works. The suspension will be enforced until such time as the offending party/parties, procedure or equipment is corrected and/or remedial measures put in place if required. No extension of time will be granted for such delays and all cost will be borne by the contractor.

- **Step 4**

Breach of contract - One of the possible consequences of this is the removal of a contractor and/or equipment from the site and/or the termination of the contract, whether a construction contract or an employment contract. Such measures will not replace any legal proceedings that the Project Developer may institute against the contractor.

EMERGENCY RESPONSE

According to Section 30 of NEMA, - "incident" means an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion that causes, has caused or may cause significant harm to the environment, human life or property.

According to Section 20 of the National Water Act 36 of 1998, "incident" includes any incident or accident in which a substance - (a) pollutes or has the potential to pollute a water resource; or (b) has, or is likely to have, a detrimental effect on a water resource.

The Contractor's environmental emergency procedures must enforce responses to unexpected / accidental actions / incidents that could cause environmental impacts. Such incidents include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically: oil, petrol, and diesel);
- Accidental damage to existing utilities e.g. sewer and water pipelines; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

An Environmental Emergency Response Action Plan must be prepared aimed at responding specifically to environmental incidents and must enforce and include the following:

- Fulfilment with the reporting and incident management requirements prescribed by Section 30 of NEMA and Section 20 of NWA if an incident qualifies as a NEMA Section 30 or NWA Section 20 incident as defined.
- Construction employees shall be trained in terms of incidents and emergency situations;
- Details of the organisation (i.e. manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department / on-site fire detail, spill clean-up services) shall be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Main Contractor, sub-contractor(s), service providers and suppliers must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.

5.3. NON-COMPLIANCE, PENALTIES AND 'SUSPENDED WORK' ORDERS

The Project Manager, in consultation or on the advice of the ECO, shall issue penalties ('spot fines') if the Contractor infringes environmental specifications set out in this EMP. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall take the necessary steps (e.g. training) to prevent a recurrence of the infringement.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. Further details on the value of spot fines will be agreed upon with the Main Contractor, once appointed, prior to commencement of construction. Fines range between R500.00 and R20 000.00, but not limited to, depending upon the severity of the infringement, amongst other considerations. For each subsequent similar offence, the penalty may, at the discretion of the Engineer or ECO be doubled in value to the maximum value to be determined by the Engineer and ECO.

This below list indicates the type of infringements that may attract a fine. The decision on when to impose a penalty will be at the discretion of the Engineer or ECO and will be final. In addition to the spot fine, the Contractor shall be required to make good any damage caused as a result of the infringement, at his own expense.

LIST OF INFRINGEMENTS THAT RESULT IN SPOT-FINES

A preliminary list of infringements for which spot fines can be imposed is as follows:

- Using or entering any areas outside the working areas without permission;
- Clearing and/or levelling areas outside of the working areas;
- Spillage onto the ground or water bodies of oil, diesel, etc;
- Picking/damaging plant material;
- Damaging/killing animals/birds;
- Untidiness and litter at contractors camp area;
- Inappropriate use of bins and poor waste management on site;
- Making fires on site;

- Discharging effluent and/or storm water onto the ground or into surface water;
- Repeated contravention of the specifications or failure to comply with instructions;
- Damage to any identified heritage sites.
- Additional fines as determined by the ECO and added to this list

The Engineer shall retain records for spot fines issued. The penalty imposed will be per incident. Unless otherwise stated in the project specification, the penalties imposed per incident or violation will be a set amount.

The Project Manager at his/her own discretion, or on recommendation from the ECO, may also order the Contractor to place on hold or suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor. Work may also be placed on hold if a heritage artefact or feature or grave is uncovered or to prevent a potential significant incident from occurring or spreading.

5.4. METHOD STATEMENTS

Method Statements indicate how the Contractor will achieve compliance with environmental legislation, good management practice and the Environmental Specifications during the construction phase. Method Statements may be required for any identified specific activity or group of activities for which it is considered necessary to implement a detailed method to mitigate potential environmental impacts. In addition to the Method Statements identified in this EMPr, the Contractor, Engineer and/or ECO may require additional Method Statements for effective environmental management and as the project unfolds.

PROCEDURES AND CONTENT

The Contractor shall submit a written Method Statement to the Engineer for approval. Method Statements may only be implemented once approved by the Project Manager in writing. On receipt of a Method Statement the Engineer shall forward a copy thereof to the ECO. Both the Engineer and ECO shall review the Method Statement and come to an agreement as to whether the Method Statement is acceptable or requires amendments.

The Method Statement shall state clearly:

- Timing of activities;
- Materials to be used;
- Equipment and staffing requirements;
- Proposed construction procedure designed to implement the relevant environmental specifications;
- The system to be implemented to ensure compliance with the above; and
- Other information deemed necessary by the Contractor, Engineer and/or ECO.

The Method Statement shall be submitted at least 14 working days prior to the projected commencement of work on an activity.

Once a Method Statement is approved it is binding and the Contractor must therefore ensure that all activities to which the approved Method Statement applies are carried out accordingly.

Due to changing circumstances, it may be necessary to modify Method Statements. In such cases, the proposed modifications must be reviewed by the Engineer and ECO. The Contractor may only implement a revised Method Statement once he receives formal written approval from the PE to do so. The Contractor must also obtain approval from the Engineer for any deviation from a Method Statement.

The ECO and Engineer must retain records of any amendments to any Method Statement and ensure that the most current version of all Method Statements are being used.

REQUIRED METHOD STATEMENTS

Method Statements that are identified and required from the Contractor in terms of this EMPr includes the following activities:

- Location, layout and preparation of the contractors camp area and materials storage areas
- Location, layout and preparation of cement/concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas;
- Storm water management plan;
- Contaminated water management plan, including the containment of runoff and polluted water;
- Incident Response Method Statements (including details of methods for fuel spills and clean-up operations);
- Waste management and removal of waste from site;
- Erosion Control Method Statement; and
- Traffic diversions (only to be done in consultation with Traffic Authority).
- Alien Invasive Vegetation control

As mentioned, additional Method Statements may be identified and required by the Contractor, Engineer and/or ECO as the project unfolds.

5.5. LIMITATIONS AND ASSUMPTIONS REGARDING ASSESSMENT AND MITIGATING OF IMPACTS

The assumption is that all significant issues have been identified during the development of the EMPr.

Environmental issues, concerns and development constraints were identified using professional judgement, project information, experience of similar projects, a review of available literature, site visits and consultation with the authorities.

The significance of environmental issues was evaluated and mitigation and management measures were identified as part of the EMPr development.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in this report by the Project Developer and the various contractors and agents acting on behalf of the Project Developer.

It is further assumed that compliance with the EMPr will be monitored and audited on a regular basis as set out in the EMPr. It should also be noted that this EMPr is a dynamic document that must be continually updated, as and when required. Also, all other documents from the Project Developer must be referred to in addition to this EMPr.

6. SUMMARY OF ACTIVITIES AND ASPECTS CAUSING IMPACTS

The construction and operation of the Karpowership Projects can potentially impact on the receiving environment as a result of the following aspects:

- Site layout and design;
- Site establishment, including set up of the contractors camp area and stockpiling;
- Clearing of indigenous vegetation;
- Clearing of alien invasive plants;
- Levelling out the ground;
- Installation of stormwater drains;
- Installation of temporary sewerage system / chemical toilets
- Installation of electrical conduits, overhead powerlines and equipment;
- Installation of communication systems;
- Improving the access road to site and establishment of working corridor;
- Erecting fencing;
- Planting and watering of revegetated areas; and
- Temporary storage of waste.
- Hydrocarbon spills from construction vehicles

The above-mentioned aspects of the Project can potentially cause the following negative environmental impacts, but not limited to:

- Pollution of the marine environment;
- Disturbance to the estuarine environment;
- Impact to CBA areas;
- Disturbance of the benthic environment;
- Change in temperature of the water;
- Loss of biodiversity through clearance of vegetation and disturbance of topsoil;
- Soil and water pollution from hazardous chemicals and waste;
- Degradation of air quality through increased dust, noise and odour levels and disturbance of neighbouring residents and animals;
- Increased runoff, erosion and downstream sedimentation of water courses;
- Increased colonisation of alien invasive vegetation; and
- Increased traffic on local roads as a result of construction vehicles

In order to prevent and/or minimise these impacts, care must be taken when embarking on activities throughout all phases of the project lifecycle.

This can be achieved by effective implementation of the necessary mitigation measures as stipulated in this EMPr. With adequate management, the associated risks and significant negative impacts of the proposed project can be minimised and/or entirely negated. These will all be dealt with in this EMPr.

7. DETAILED ENVIRONMENTAL MANAGEMENT PROGRAMME

This Section provides environmental specifications that must be adhered to all phases of the project. It is essential that all listed specifications are considered and incorporated into the project's contractual and other documentation, and adhered to during the respective phases of the project.

The environmental specifications must be regarded as the minimum environmental controls to be implemented for the project. They must not be regarded as exhaustive. The EMPr is a dynamic document and changes may be required, if instructed by the relevant environmental authority or upon request by interested and affected parties. Such amendments to the EMPr will follow a formal process prior to publishing a revised version of this EMPr.

Environmental specifications have been listed in tables below as per the following phases:

- Planning and Pre-Construction phase;
- Construction phase
- Post-Construction and Rehabilitation Phase
- Operational Phase

For each specification the responsibility and frequency of monitoring is indicated, where applicable.

7.1. PART A: ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE DEVELOPMENT OF OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE

The following section will provide environmental specifications for the proposed Overhead Electricity Transmission and Distribution Infrastructure which has been drawn up in accordance to the DEA (2019) EMPr relevant to an application for Overhead Electricity Transmission and Distribution Infrastructure which require environmental authorisation as identified in terms of Section 24(2) of the Act.

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7.2. Planning and Design Phase & Pre-Construction Activities

7.2.1 Environmental Training Awareness					
Impact Management Outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMP.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. All staff must receive environmental awareness training prior to commencement of work at the project. 2. All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this. 3. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited 4. The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; 5. Refresher environmental awareness training must be done 	ECO & Contractor	Weekly toolbox talks and awareness training	ECO	Monthly	Record of attendance to the toolbox talks and awareness training must be filed in the Site Environmental File

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>periodically.</p> <p>6. All staff must be aware of the conditions and controls linked to the EA and the EMPr and be aware of individual roles and responsibilities in achieving compliance with the EA and EMPr;</p> <p>7. The Contractor must procure and display environmental information posters as part of site establishment.</p> <p>8. Environmental awareness training must include as a minimum the following:</p> <ul style="list-style-type: none"> a) Description of significant environmental impacts related to the project / construction activities b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Procedures to be followed when working near or within sensitive areas; e) Wastewater management procedures; f) Water usage and conservation; g) Solid waste management procedures; h) Fire prevention; and i) Disease prevention. <p>9. Records must be retained for all environmental training that takes place for the full duration of the project, including attendance registers;</p> <p>10. Educate workers that form part of the pre construction team on the dangers of fires;</p> <p>11. Course material must be available and presented in appropriate languages that all staff can understand.</p> <p>12. 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-</p>	<p>ECO & Contractor</p>	<p>Weekly toolbox talks and awareness training</p>	<p>ECO</p>	<p>Monthly</p>	<p>Record of attendance to the toolbox talks and awareness training must be filed in the Site Environmental File</p>
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

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.

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7.2.2. Access restricted areas

Impact Management Outcome: Impact on No-Go areas are avoided through effective demarcation and management of these areas

Impact Management Actions

	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. No go or restricted access areas will be informed by the environmental assessment and pre construction site walk. Additional areas may be indicated by the ECO during construction 2. A temporary barrier with clear signage must be in place around the perimeter of any no go or access restricted area at all times. 3. Unauthorized access or construction related activity inside access restricted areas is prohibited. 4. A full site walk-through should be conducted in the summer prior to any construction activities to list all SCC and associated permits should be obtained for their removal or transplantation. 5. All SCC must be compensated for at a ratio of at least 3:1 either in gardens or as part of restoration and conservation efforts within the Richards Bay IDZ. 	Ecologist ECO	Demarcation of sensitive areas with danger tape or barrier netting and identification of floral species of conservation concern	ESO ECO	Daily Fortnightly	Site Inspection

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

7.2.3. Access routes

Impact Management Outcome: Dedicated and approved routes identified for future access roads

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Access to the corridor and tower positions must be negotiated (by the client and construction manager) with the relevant landowner and must fall within the assessed and authorised area; 2. An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities; 3. Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads; 4. In circumstances where private roads needs to be used, the said roads must be recorded and agreed by the landowner, the DPM, and the contractor; 5. Installation of new gates to be discussed with affected landowners to ensure that safety of access is taken into consideration and maintained. 6. The use of existing servitudes/corridors must be discussed with the relevant landowners before construction commences. 7. Any new access roads must only be established after discussion with the relevant landowners before access to site. 8. Installation of new gates to be discussed with affected landowners to ensure that safety of access is discussed and maintained. 9. Any damage to an existing fence must be repaired to the satisfaction of the landowner. 	ECO		ECO		Access agreement with landowners

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>10. No off-road driving should be allowed, and only designated roads used for site and monopole access.</p> <p>11. As per the wetlands specialist recommendations:</p> <p>12. Soft engineering (grassed swales (Teff Grass or Red Grass ideal for this climate)) instead of hard gutters should be used where possible.</p> <p>13. Crossing structures utilised must be wide enough to allow diffuse, unhindered through-flow of the wetland systems and avoid impoundment upslope.</p> <p>14. Cut and fill must be avoided where possible during the set-up of the construction camp. The utilisation of the already heavily disturbed areas should be encouraged.</p>					
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7.3. Construction Phase Activities

7.3.1. Site Establishment					
Impact Management Outcome: Impacts relating to site establishment are minimised.					
Impact Management Actions	Implementation		Monitoring		
1. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.</p> <ol style="list-style-type: none"> 2. Use environmentally friendly cleaning and dust suppressant products. 3. Site Establishment method statement must be provided by the contractor prior to any onsite activity. This method statement must include the following as applicable: <ul style="list-style-type: none"> - Construction area layout / plan showing the location of key infrastructure and services, offices, overnight vehicle parking areas, hazardous and general materials stores, workshop, stockpile and lay down areas, batching plant, designated access routes, equipment cleaning areas, proposed placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; 4. Location of construction areas must be within the approved area to ensure that the site does not impact on sensitive areas 5. Camp establishment must take place where possible on previously disturbed areas; 6. The construction area must be fenced in accordance with Section: Fencing and gate installation; and 7. The use of existing accommodation for contractor staff is encouraged. 8. No contaminated runoff or grey water is allowed to be discharged from the construction camp, this must be planned for when establishing site. 9. 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. 	Contractor and ESO	Method Statement and layout of construction camps / laydown areas to be compiled and approved by the ECO	ECO	Once-off	Approved Method Statement and Layout Plan
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

10. Water used on site must be from an approved source.					
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7.3.2. Access roads					
Impact Management Outcome: Construction vehicle movement are restricted to approved routes to minimise disturbance					
Impact Management Actions	Implementation		Monitoring		
1. Access roads must fall within the authorized areas only, all contractors must be made aware of these approved	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>access routes.</p> <ol style="list-style-type: none"> 2. Where possible, existing access routes and walking paths must be made use of. 3. The access roads to tower positions must be signposted before the commencement of the activities; 4. All existing roads used for access to the corridor must be maintained by the contractor 5. Any access route deviations will be considered non-compliance with the EMPr; 6. In circumstances where private roads needs to be used, approval must be sought via the ECO and the said roads must be recorded, prior to doing so. 7. Access roads on level land must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands 8. The use of access roads and private roads must comply with all road legislation pertaining to driving including adhering to road safety standards. 9. Installation of new gates to be discussed with affected landowners to ensure that safety of access is considered and maintained. 10. Any damage to an existing fence must be repaired by the contractor to the satisfaction of the landowner. 	-Contractor	Access routes must be mapped prior to construction	ESO ECO	Fortnightly	Site Inspection
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

7.3.3. Fencing and gate installation

Impact Management Outcome: Construction of fencing and gate should not occur within sensitive environments

Impact Management Actions

	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Use existing gates provided to gain access to all parts of the area authorised for development, where possible; 2. The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this. 3. Existing and new gates to be recorded and documented 4. All gates must be fitted with locks and be kept locked at all times, unless otherwise agreed with the landowner; 5. At points where the line crosses a fence in which there is no suitable gate within the extent of the line corridor, on the instruction of the DPM, a gate must be installed at the approval of the landowner; 6. Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; 7. Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; 8. Original tension must be maintained in the fence wires; 9. All gates installed in electrified fencing must be re-electrified; 10. All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities; 11. Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause 	Contractor	Access routes must be mapped prior to construction	ESO ECO	Fortnightly	Site Inspection

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

harm to the sensitive flora; 12. Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner. 13. All fencing must be developed of high quality material bearing the SABS mark; 14. The use of razor wire as fencing must be avoided; 15. Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; 16. On completion of the construction phase all temporary fences are to be removed; 17. The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.					
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7.3.4. Water Supply Management					
Impact Management Outcome: Water for construction is compliant with the requirements of the National Water Act (Act No. 36 of 1998).					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. Ensure water conservation is being practiced by: <ul style="list-style-type: none"> a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training (Toolbox Talks). The use of grey water is encouraged. 	Contractor	Water abstraction from municipal sources or licenced sources	ECO	Fortnightly	Site inspection Proof of water use authorisation for the abstraction of water (if applicable).

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

7.3.5. Storm and waste water management					
Impact Management Outcome: Avoid, prevent and manage impacts related to storm and waste water.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Runoff from concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at an appropriately registered disposal site. 2. All hydrocarbon spills must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; 3. Natural storm water runoff not contaminated during construction, and clean water, can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; 4. Water that has been contaminated with suspended solids must be treated by means of settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO. 5. It is recommended that sandbags and temporary berms be used, to manage stormwater runoff (if storms do occur). Temporary stormwater systems must be sufficient to manage the stormwater at the site during construction. 6. Ensure that eroded areas are re-vegetated, to ensure reduced sedimentation risk and reduced runoff volumes to the streams. 7. The impoundment of water upslope due to the proposed development must be avoided. This is specifically relevant 	Project Manager	Detailed SWMP, if any	ECO	Fortnightly	Approval of SWMP, if any

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<p>at the points where the proposed development will cross wetlands as per the current design (preferred alternative) and following wetlands: FP03 and UVB04.</p> <p>8. 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.</p>					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

7.3.6. Solid and hazardous waste management

Impact Management Outcome: The management of hazardous substances is undertaken in accordance with the Hazardous Substances Act (Act No. 15 of 1973).

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. All measures regarding waste management must be undertaken using an integrated waste management approach; 2. Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided; 3. A suitably positioned and clearly demarcated waste collection site must be identified and provided; 4. The waste collection site must be maintained in a clean and orderly manner; 5. Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal; 6. Staff must be trained in waste segregation; 7. Bins must be emptied regularly; 8. General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company; 9. Hazardous waste must be disposed of at a registered waste disposal site; 10. Safe disposal records must be maintained for all waste types.	Contractor	Bunding of hazardous storage sites	ESO ECO	Ongoing	Site inspection of hazardous storage areas and inspection of drip trays and impervious surfaces

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

7.3.7. Protection of watercourses and estuaries

Impact Management Outcome: Impact to watercourses and estuaries are managed in adherence to legislation and specialist recommendations

Impact Management Actions

	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; 2. In the event of a spill, prompt action must be taken to clear the polluted or affected areas; 3. No construction equipment must traverse any seasonal or permanent wetland. <ol style="list-style-type: none"> 1. No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur; 2. Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; 3. There must not be any impact on the long term morphological dynamics of watercourses or estuaries; 4. Existing crossing points must be favored over the creation of new crossings (including temporary access). 5. Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching. 	Contractor	Demarcation of watercourses and sensitive areas maintaining the specified buffers	ECO	Fortnightly	Watercourses and sensitive areas are marked as No-Go areas

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<p>6. Placing a suitable geotextile in areas near or on-top of watercourses/wetlands, before placement of the soils, may help maintain some sub-surface soil processes.</p> <p>7. Temporary stormwater channels and preferential flow paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion.</p> <p>8. Mangrove and swamp forest habitat must be avoided.</p> <p>9. When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken:</p> <ul style="list-style-type: none"> a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c) Where earthworks is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows. <p>10. Temporary stormwater channels and preferential flow</p>					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion.</p> <ol style="list-style-type: none"> 11. If long periods of flow obstruction may be required, during periods of flow, intermitted releases of water, for a few hours every few days should be allowed for. 12. Water quality monitoring of the nearby river if there are visual signs of any sedimentation or surface pollution. 13. Install a temporary cut off trench to contain poor quality runoff. 14. Construction within and in the nearby vicinity of all watercourses or wetlands must proceed mainly during the dry, winter months where possible in order to minimize soil erosion linked to high runoff rates 15. Surface water monitoring if there are visual signs of soil pollution. 16. During the constructions of transmission lines within wetland areas, a Wetland Specialist must be present to ensure that construction are not entering sensitive environments (e.g: Mangrove Forest) and to ensure mitigation measures outlined in the Wetland Report are being followed. 17. In wetland areas including reed beds, the construction of berms should be avoided as far as possible. Construction measures must consist of the least impactful individual erection of monopole structures. No linear 3m corridors should be cleared of vegetation in these areas but individual drilled foundations used. 					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

7.3.8. Vegetation clearance

Impact Management Outcome: Vegetation clearance and associated impacts are minimised

Impact Management Actions	Implementation		Monitoring		
General:	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Erosion control and alien invasive management plan must be compiled. 2. Indigenous vegetation which does not interfere with the development must be left undisturbed; 3. Protected or endangered species may occur on or near the construction site. Special care should be taken not to damage such species; 4. Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Clearing beneath transmission lines should be avoided. 5. Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any construction or clearing; 6. Relevant Permits must be obtained prior to the cutting or clearing of the affected species, and they must be filed on the site Environmental File; 7. The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; 8. Trees felled due to construction must be documented and form part of the Environmental Audit Report; 	Contractor	Working within demarcated areas AIP eradication and control	ESO ECO	Weekly Fortnightly	Site Inspection
	Ecologist	Once off	Ecologist	Quarterly (per year)	

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<p>9. Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;</p> <p>10. Only a registered pest control operator may apply herbicides on a commercial basis;</p> <p>11. A daily register must be kept of all relevant details of herbicide usage;</p> <p>12. No herbicides must be used in estuaries;</p> <p>13. All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to <i>Section: Access restricted areas</i>.</p> <p>14. The land beneath the transmission line, and any other areas required for construction, but not for the operational phase, should be rehabilitated with indigenous species to retain connectivity within the system.</p> <p>15. Construction measures must consist of the least impactful individual erection of monopole structures and all protected species avoided where possible.</p> <p>16. A full site walk-through should be conducted prior to any construction activities to list all SSC and associated permits should be obtained for their removal or transplantation.</p> <p>17. Restoration of areas utilised during construction, but not operation, should be considered in conjunction with the respective land owners.</p> <p>Corridor:</p> <p>1. Vegetation that does not grow high enough to cause interference with overhead transmission and distribution infrastructures, or cause a fire hazard to any plantation, must not be cut or trimmed unless it is growing in the road access area, and then only at the discretion of the Project Manager;</p>					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> 2. Where clearing for access purposes is essential, the maximum width to be cleared within the corridor must be in accordance to distance as agreed between the land owner and the EA holder 3. Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility; 4. Vegetation must be trimmed where it is likely to intrude on the minimum vegetation clearance distance (MVCD) or will intrude on this distance before the next scheduled clearance. MVCD is determined from SANS 10280; 5. Debris resulting from clearing and pruning must be disposed of at a recognised waste disposal facility, unless the landowners wish to retain the cut vegetation; 6. In the case of the development of new overhead transmission and distribution infrastructures, a one metre “trace-line” must be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along the “trace-line”. Alternative methods of stringing which limit impact to the environment must always be considered. 7. A walk through of the site prior to any construction to determine the presence of any Species of Conservation Concern (this is currently underway). 8. Application for permits for removal of any SCC where required (this is currently underway). 9. All working areas must be demarcated with safety tape and site construction disturbances be limited to within the demarcated area to prevent disturbing a wider area. 10. Felled trees must be stockpiled and not prevent movement 					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>off vehicles, people and drainage lines.</p> <p>11. Landowners are to be notified about wood stockpiles and for the wood to be given away or taken to a dedicated vegetation waste collection site.</p> <p>12. Notifying the landowner about wood stockpiles prevents contractors being sued in case of fire which the stockpile can be biomass fuel of the rampant fire.</p> <p>13. A record of notification from the landowner with regards to wood stockpiling must be kept at the construction site.</p> <p>14. The use of herbicides to treat stumps must be in line with the approved Eskom Vegetation Management standard.</p> <p>15. In natural areas, the construction of a corridor should be avoided wherever possible. Construction measures must consist of the least impactful individual erection of monopole structures. No linear 3m corridors should be cleared of vegetation in these areas but individual drilled foundations used.</p>					
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7.3.9. Protection of fauna					
Impact Management Outcome: Impacts on fauna are minimized through adherence to EMP requirements.					
Impact Management Actions	Implementation		Monitoring		
1. Monitoring is to take place monthly for 1 year pre-construction and then monthly for 1 year post construction so that mitigation measures can be adapted to ensure the	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>development does not have a long-term impact on the SCCs and migratory waders in the area. A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year after the facility has been in operation and should be repeated every 3-5 years. A monitoring plan has been developed for the site and monitoring is currently ongoing. Information obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins et al., 2017.</p> <ol style="list-style-type: none"> 2. All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. 3. No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; 4. A walk-through must be done prior to construction to locate any nests, especially of any Species of Conservation Concern, which then should be dealt with on a case-by-case basis by an avifauna specialist. 5. The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the construction programme; 6. Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present; 7. Nesting sites on existing parallel lines must be documented; 8. Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; 9. Bird guards and diverters must be installed on the new line as per the recommendations of the Avifauna specialist; 	Contractor	Awareness Training Injuring, capturing, killing of animals identified on site must be reported as an environmental incident and investigated	ECO Ecologist	Fortnightly Quarterly (per year)	Training material relating to wildlife management
	Ecologist	Once off	Avian Specialist	Monthly, for a minimum of 12 months	

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<ol style="list-style-type: none"> 10. No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; 11. No killing of fauna is allowed; 12. No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations /permits. 13. Restoration of areas utilised during construction, but not operation, should be considered in conjunction with the respective landowners. 14. Add bird diverters to all sections of the line as it goes up. 15. Design the over-water line to stop birds perching on it and to stop them colliding with it (via diverters). 16. All new overhead pylons must be made bird-friendly to avoid electrocutions. 17. The use of static or dynamic marking devices can make the lines more conspicuous (particularly earth-wires). Various marking devices (spirals, bird flappers) have been used globally, and those tested reduce collisions between 50% and 92% relative to un-mitigated controls. 18. All pylons must follow the approved bird-friendly design to avoid electrocution of any species. 19. Avoid any active nests (some ground-nesters may be found on the beach). 20. Avoid polluting the area with plastics or human waste – all material to be disposed of in suitable receptacles. 21. Reduce the extent of human disturbance around the transmission line. 22. Speed limits should be posted and not exceed 40km/hr, 					
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<p>especially at night when nocturnal and crepuscular species tend to rest on roads.</p> <p>23. The monitoring must include the following (as per BARESG guidelines):</p> <ol style="list-style-type: none"> a. Construction monitoring should be started as the lines are erected; b. All carcasses should be photographed with a GPS, in situ, and identified and recorded. c. The search area should be defined and consistently applied throughout the monitoring period; <p>24. Where avian fatalities are found to occur (i) to Red Data species, or (ii) at unacceptably high levels, to priority species, then the mitigation measures in the monitoring BARESG guidelines must occur.</p> <p>25. Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) motion detection lights should be used wherever possible.</p>					
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7.3.10. Protection of heritage resources					
Impact Management Outcome: Impacts on heritage resources are minimised through adherence to EMP requirements.					
Impact Management Actions	Implementation		Monitoring		
1. In terms of the heritage aspect, no sites were recorded for possible finds.	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance

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<p>2. No heritage sites have been recorded in the study area. The project should be exempt from further HIA mitigation, especially for the maritime aspect since the harbour dredging removed all potential heritage deposits. A Chance Find protocol will be initiated during construction.</p> <p>3. As a precaution, the following mitigation measures must be noted, in the case of a heritage find on site.</p> <p>4. The rescue of fossils during earth works critically depends on spotting this material immediately as it is uncovered. The contractor must carry out general monitoring of excavation activity for potential fossils, artefacts and material of heritage importance;</p> <p>5. All work must cease immediately, if any human remains and/or other archaeological, paleontological and historical material are uncovered. Such a find must be reported to the ECO.</p> <p>6. The subsequent process to be followed in the case of a find is: It must be reported to the nearest museum, archaeologist/ paleontologist (or the South African Police Services). Sufficient time must be allowed to remove/collect such material before construction recommences.</p> <p>7. Identify and appoint stand-by paleontologist should paleontological finds be uncovered by earthworks.</p> <p>8. Construction personnel to be alert for rare fossil bones and follow a Fossil Finds Procedure.</p> <p>9. Exposed fossiliferous sections in earthworks must be recorded and sampled by appointed paleontologist.</p> <p>10. The Environmental Control Officer (ECO) and contractor</p>	Contractor	Awareness Training Injuring, capturing, killing of animals identified on site must be reported as an environmental incident and investigated	ECO	Fortnightly	Training material relating to wildlife management
<p>6. The subsequent process to be followed in the case of a find is: It must be reported to the nearest museum, archaeologist/ paleontologist (or the South African Police Services). Sufficient time must be allowed to remove/collect such material before construction recommences.</p> <p>7. Identify and appoint stand-by paleontologist should paleontological finds be uncovered by earthworks.</p> <p>8. Construction personnel to be alert for rare fossil bones and follow a Fossil Finds Procedure.</p> <p>9. Exposed fossiliferous sections in earthworks must be recorded and sampled by appointed paleontologist.</p> <p>10. The Environmental Control Officer (ECO) and contractor</p>	Paleontologist/ Archeologist	Once off			

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<p>must inform staff of the need to watch for potential fossil occurrences as part of the Environmental Awareness training.</p> <p>11. In the case of a significant find, a paleontologist must undertake the recording of the stratigraphic context and sedimentary geometry of the exposure and the compilation of the report to Heritage KZN.</p>					
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7.3.11. Safety of the public					
Impact Management Outcome: All precautions are taken to minimise the risk of injury, harm or complaints.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; 2. All unattended open excavations must be adequately fenced or demarcated; 3. Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; 4. Ensure structures vulnerable to high winds are secured; 5. Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged. 	Contractor	Awareness Training Injuries and complaints on site must be reported as an environmental incident and investigated	ECO	Fortnightly	Training material relating to health and safety for the public

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7.3.12. Sanitation

Impact Management Outcome: No pollution or disease arises in terms of poorly maintained ablution / sanitation facilities or lack thereof.

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Mobile chemical toilets are installed onsite if no municipal sewer services are available; 2. The indiscriminate use of the veld / construction site for the purposes of ablutions must be forbidden under all circumstances; 3. Where mobile chemical toilets are required, the following must be ensured: <ol style="list-style-type: none"> a) Toilets are located no closer than 100m from any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling over; c) No spillage occurs when the toilets are serviced and the contents are disposed by a registered service provider; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; g) A copy of the waste disposal certificates must be retained on the Environmental File 	Contractor	Provision of ablution facilities during construction Management of facilities	ESO ECO	Daily Fortnightly	Proof of servicing and safe disposal

7.3.13. Preventative health factors

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.

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Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. Undertake environmentally-friendly pest control in the camp area; 2. Ensure that the workforce is sensitised to the effects of sexually transmitted diseases such as HIV / AIDS; 3. The Contractor must ensure that information posters on HIV / AIDS are displayed in the Contractor Camp area; 4. Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable; 5. Free condoms must be made available to all staff on site at central points; 6. Medical support must be made available; 7. Provide access to Voluntary HIV Testing and Counselling Services.	Contractor	Provision of services during pre- and construction phase	ESO	Daily Fortnightly	Proof of services on site

7.3.14. Emergency procedures					
Impact Management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project which must					

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<p>be submitted to Transnet Port Authority and DFFE for approval.</p> <p>2. The Emergency Plan must refer to accidents, potential spillages and fires in line with relevant legislation;</p> <p>3. All staff must be made aware of emergency procedures as part of environmental awareness training;</p> <p>4. The relevant local authority must be made aware of any major fire incident as soon as it starts;</p> <p>5. In the event of an environmental emergency necessary mitigation measures to contain the spill or leak must be implemented (see Hazardous Substances, Section 8.3.15).</p>	Contractor	Provision of emergency procedures during pre- and construction phase	ESO	Daily Fortnightly	Proof of emergency procedures on site
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7.3.15. Hazardous substances

Impact Management outcome: Safe storage, handling, use and disposal of hazardous substances.

Impact Management Actions

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<p>1. Access to storage area for hazardous substances should be controlled.</p> <p>2. The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible;</p> <p>3. All hazardous substances must be stored in suitable containers as defined in the relevant Method Statement;</p> <p>4. Containers must be clearly marked to indicate contents, quantities and safety requirements;</p> <p>5. All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;</p> <p>6. Bunded areas to be suitably lined with a SABS approved</p>	Contractor	Bunding of hazardous storage sites	ESO ECO	Daily Fortnightly	Site inspection of hazardous storage areas and inspection of drip trays and impervious surfaces

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<p>liner;</p> <ol style="list-style-type: none"> 7. An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis on the site Environmental File 8. All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); 9. All employees working with HCS must be trained in the safe use of the substance and according to the MSDS and appropriate personal protective equipment must be made available to them 10. The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; 11. The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall); 12. The floor of the bund must be sloped, draining to an oil separator. The bund must have a lockable outlet valve. 13. Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Appropriate dispensing equipment and a drip tray must be used to ensure small spills are contained; 14. All empty externally dirty drums must be stored on a drip tray or within a banded area or the dedicated hazardous waste skip on site 15. No unauthorised access into the hazardous substances 					
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<p>storage areas must be permitted;</p> <p>16. No smoking must be allowed within the vicinity of the hazardous storage areas;</p> <p>17. Adequate fire-fighting equipment must be made available at all hazardous storage areas;</p> <p>18. An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times;</p> <p>19. The responsible operator must have the required training to make use of the spill kit in emergency situations;</p> <p>20. An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; and</p> <p>21. In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to Section 8.3.6 for solid and hazardous waste management.</p>					
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7.3.16. Workshop, equipment maintenance and storage					
Impact Management outcome: Soil, surface water and groundwater contamination is minimised.					
Impact Management Actions	Implementation		Monitoring		
1. All maintenance of vehicles and equipment must take place in the dedicated workshop area; alternatively at the	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance

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<p>respective contractor's own office workshop area</p> <ol style="list-style-type: none"> 2. During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. 3. Leaking equipment must be repaired immediately or be removed from site to facilitate repair; 4. Workshop areas must be monitored for oil and fuel spills; The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil/water separator where maintenance work on vehicles and equipment can be performed; and 5. Water drainage from the workshop must be contained and managed in accordance Section: storm water management. 6. Strictly no washing of vehicles along local streams or rivers. Vehicles should preferably washed off site at a dedicated vehicle wash bay area. 7. As per the Hydrology specialist report, it is recommended that all vehicles are in good working order when entering the site (i.e., visual observations of any leakages that may emanate from the vehicle accessing the site) and parked in designated areas with drip trays. Weekly inspection of vehicles should be sufficient. 	Contractor	Bunding of storage sites and inspection of equipment	ESO ECO	Daily Fortnightly	<p>Site inspection of hazardous storage area, inspection of drip trays and impervious surfaces; and inspection and maintenance of onsite equipment</p>
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7.3.17. Concrete Batching Plants

Impact Management outcome: Minimise spillages and contamination of soil, surface water and groundwater.

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Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Concrete mixing must be carried out on an impermeable surface; 2. Batching plants areas must be fitted with a containment facility for the collection of cement laden water. 3. Dirty water from the batching plant must be contained to prevent soil and groundwater contamination 4. Bagged cement must be stored in an appropriate facility and at least 10m away from any water courses, gullies and drains; 5. A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted; 6. Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licensed disposal facility; 7. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site; 8. Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to Section 8.3.18: Dust emissions) 9. Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility; 10. Temporary fencing must be erected around batching plants in accordance with Section: Fencing and gate installation. 	Contractor	Identification of area that is not sensitive and set-up batching plant	ESO ECO	Daily Fortnightly	Site inspection of batching plant area to ensure no contamination is occurring to environment

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7.3.18. Dust emissions

Impact Management outcome: Dust prevention measures are applied to minimise the generation of dust.

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; 2. Clearance of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; 3. Environmentally friendly dust suppressants need to be utilised 4. Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; 5. During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether work will cease altogether until the wind speed drops to an acceptable level; 6. Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; 7. Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; 8. Vehicle speeds must not exceed 40 km/h along dust roads or 	Contractor	Regular dust suppression techniques conducted.	ESO ECO	Daily Fortnightly	Site inspection of areas susceptible to dust and ensure suppression techniques are conducted.

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20 km/h when traversing unconsolidated and non-vegetated areas; 9. For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.					
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7.3.19. Noise					
Impact Management Outcome: Noise management is undertaken in accordance with SANS 10103 and the Occupational Health and Safety Act (Act No. 85 of 1993)					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. The Contractor must keep noise levels within acceptable limits, and restrict the use of sound amplification equipment for communication and emergencies only; 2. All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; 3. Any complaints received by the Contractor regarding noise must be recorded and communicated. Records must be retained on the site Environmental File. 4. The Contractor must Develop a Code of Conduct for the construction phase in terms of acceptable conduct of construction staff on site. 5. Operating hours as determined by the environmental authorisation must be adhered to during the construction phase. 6. All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region.	Contractor	Compliance with SANS 10103 and OHS Act Use of appropriate PPE	ESO ECO	Daily Fortnightly	Inspection of Complaints Register Site inspection

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<p>7. All construction operations should only occur during daylight hours if possible. Should the construction programme necessitate night shift work, permission must be sought via the ECO and Engineer.</p> <p>8. No construction piling may occur at night. Piling must only occur during the day to take advantage of unstable atmospheric conditions.</p> <p>9. Construction staff must receive “noise sensitivity” training such as switching off vehicles when not in use, as part of the Environmental Awareness training / Toolbox Talks.</p> <p>10. An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase.</p>					
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7.3.20. Fire prevention					
Impact Management Outcome: Fire prevention measures are carried out in accordance with the relevant legislation.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<p>1. A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.</p> <p>2. Designate smoking areas where the fire hazard could be regarded as insignificant;</p> <p>3. Designated smoking areas must prevent accidental spread of fire by either clearing 1m buffer of vegetation or locate smoking on concrete ground.</p> <p>4. Cooking at the construction campsite must be done at designated cooking area. All fire safety equipment must be provided at cooking areas.</p> <p>5. Firefighting equipment must be available on all vehicles located on site;</p>	Contractor	Awareness Training	ECO	Fortnightly	Site Inspection

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6. The local Fire Protection Agency (FPA) must be informed of construction activities; 7. Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site; 8. In the case of larger capacity above ground fuel storage tanks, the local Fire Chief must inspect the bunded area and issue a certificate to verify it's safe.					
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7.3.21. Stockpiling and stockpiling areas					
Impact Management outcome: Erosion and sedimentation as a result of stockpiling are reduced.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. All material that is excavated during the project construction phase (during piling or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses and waterbodies; 2. All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular de-weeding and control methods; Topsoil stockpiles must not exceed 2m in height; 3. During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. hessian cloth or tarpaulin); 4. Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.	Contractor	Bunding of stockpiling areas	ESO ECO	Daily Fortnightly	Site inspection of stockpiling areas.

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7.3.22. Finalising tower position					
Impact Management outcome: No environmental degradation occurs as a result of the survey and pegging operations.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. No new access roads must be developed to facilitate access for survey and pegging purposes; 2. Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas; 3. The surveyor is to demarcate (peg) access roads/tracks in consultation with ECO. No deviations will be allowed without the prior written consent from the ECO. 4. Add bird diverters or spirals (diurnal and nocturnal) to all new lines, to reduce fatality rates by 50% 5. Ensure all electrical infrastructure is bird-friendly to avoid electrocutions. 6. Marking, with bird diverters, all new overhead power lines that cannot run parallel with the existing lines.	Contractor Ecologist	Preventative measures adhered to Once off	ECO	Fortnightly	Site inspections

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<p>7. Micro siting of the monopole structures and construction footprint should be done to ensure no protected species are affected wherever practicable.</p> <p>8. The existing pylon servitude adjacent to the Manzamnyama Canal and the existing berms must be used as the preferred route to minimise the disturbance footprint to the adjacent intertidal sand/mudflats of the canal.</p> <p>9. The design of the proposed transmission line must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins et al., 2017).</p> <p>10. Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.</p> <p>11. All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution.</p> <p>12. Any exposed parts must be covered (insulated) to reduce electrocution risk.</p>					
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7.3.23. Excavation and installation of foundations		
Impact Management outcome: No environmental degradation occurs as a result of excavation or installation of foundations.		
Impact Management Actions	Implementation	Monitoring

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Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance	
<ol style="list-style-type: none"> 1. All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a recognized disposal site, if not used for backfilling purposes; 2. Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; 3. Work area for establishing foundations for tower legs must be demarcated to limit disturbance within the demarcated areas thus minimizing rehabilitation cost. 4. Hazardous substances spills from equipment must be managed in accordance with Section 8.3.15: Hazardous substances. 5. Batching of cement to be undertaken in accordance with Section 8.3.17: Batching plants; 6. Residual cement must be disposed of in accordance with Section 8.3.6: Solid and hazardous waste management. 	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections

7.3.24. Assembly and erecting towers					
Impact Management outcome: No environmental degradation occurs as a result of assembly and erecting of towers.					
Impact Management Actions		Implementation		Monitoring	
<ol style="list-style-type: none"> 1. Prior to erection, assembled towers and tower sections must 	Responsible person	Method of implementat	Responsible Person	Frequency of	Mechanism for monitoring

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	ion		monit ing	compliance
<p>be stored on an elevated surface (suggest wooden blocks) to minimise damage to the underlying vegetation;</p> <ol style="list-style-type: none"> 2. In sensitive areas, tower assembly must take place off-site or away from sensitive positions; 3. The crane used for tower assembly must be operated in a manner which minimises impact to the environment; 4. The number of crane trips to each site must be minimised; 5. Wheeled cranes must be utilised in preference to tracked cranes; 6. Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of environmental impact; 7. Access to tower positions to be undertaken in accordance with access requirements in specified in Section : Access Roads; 8. Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in Section : Vegetation clearing; 9. No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor; 10. Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites; 11. Topsoil must be stored in heaps not higher than 1m to prevent destruction of the seed bank within the topsoil; 12. Excavated slopes must be no greater than 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes; 13. Fly rock from blasting activity must be minimised and any pieces greater than 150mm falling beyond the Working Area, must be collected and removed; 	Contractor	Preventative measures adhered to	ECO	Fortnightly Site inspections

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<p>14. Only existing disturbed areas are utilised as spoil areas;</p> <p>15. Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fines is kept to a minimum;</p> <p>16. Surface water runoff is appropriately channeled through or around spoil areas;</p> <p>17. During backfilling operations, care must be taken not to dump the topsoil at the bottom of the foundation and then put spoil on top of that;</p> <p>18. The surface of the spoil is appropriately rehabilitated in accordance with the requirements specified in Section 8: Landscaping and rehabilitation;</p> <p>19. The retained topsoil must be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion as soon as construction activities on the site is complete. Spreading of topsoil must not be undertaken at the beginning of the dry season.</p> <p>20. Use alternating black and white static pigtail flight diverters on the remaining transmission line spans as per Eskom guidelines.</p> <p>21. Boundaries should be strictly maintained, and impacts retained within the boundary of the site.</p>					
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7.3.25. Stringing
Impact Management outcome: No environmental degradation occurs as a result of stringing.

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Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Where possible, previously disturbed areas must be used for the siting of winch and tensioner stations. In all other instances, the siting of the winch and tensioner must avoid Access restricted areas and other sensitive areas; 2. The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks; 3. Refueling of the winch and tensioner stations must be undertaken in accordance with Section 8.3.15: Hazardous substances; 4. In the case of the development of overhead transmission and distribution infrastructure, a one metre “trace-line” may be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along “trace-lines”. Vegetation clearing must be undertaken by hand, using chainsaws and hand held implements, with vegetation being cut off at ground level. No tracked or wheeled mechanised equipment must be used; 5. Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter; 6. Where the stringing operation crosses a public or private road or railway line, the necessary scaffolding/ protection measures must be installed to facilitate access. If, for any reason, such access has to be closed for any period(s) during development, the persons affected must be given reasonable notice, in writing; 7. No services (electrical distribution lines, telephone lines, roads, railways lines, pipelines fences etc.) must be damaged because of stringing operations. Where disruption to services is unavoidable, persons affected must be given 	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections

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reasonable notice, in writing. 8. Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 work days minimum), in writing, must be provided to the landowner;					
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7.3.26. Temporary closure of site					
Impact Management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
1. Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in section: management of hazardous substances. 2. Hazardous storage areas must be well ventilated; 3. Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service; 4. Emergency and contact details displayed must be displayed; 5. Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel; 6. Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; 7. Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; 8. Structures vulnerable to high winds must be secured;	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>9. Wind and dust mitigation must be implemented;</p> <p>10. Cement and materials stores must have been secured;</p> <p>11. Toilets must have been emptied and secured;</p> <p>12. Refuse bins must have been emptied and secured;</p> <p>13. Drip trays must have been emptied and secured.</p>					
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7.3.27. Landscaping, rehabilitation, and monitoring

Impact Management Outcome: Post-construction and rehabilitation activities are undertaken in accordance with EMPR requirements

Impact Management Actions

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<p>1. Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.</p> <p>2. Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.</p> <p>3. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.</p> <p>4. All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed to a registered waste site and certificates of disposal provided;</p> <p>5. All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the</p>	Contractor	Clean rehabilitated site free of litter and construction material	ECO	Fortnightly	Site Inspection, Record Keeping and ECO Reports
	Ecologist	Once off	Ecologist	Monthly (until closure of rehab)	
			Avian Specialist	Monthly, minimum of 12months	

TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>Conservation of Agricultural Resources Act, No 43 of 1983</p> <ol style="list-style-type: none"> 6. All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act 43 of 1983; 7. Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition; 8. Rehabilitation of tower sites and access roads outside of farmland; 9. Indigenous species and/grasses must be used to compliment or match the original condition; 10. Stockpiled topsoil must be used for rehabilitation (refer to Section 8.3.21: Stockpiling and stockpiled areas); 11. Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; 12. Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; 13. Subsoil must be ripped before topsoil is placed; 14. The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; 15. Where impacted through construction related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled ; 16. Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; 17. Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. 18. Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: 					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>a) Annual and perennial plants are chosen;</p> <p>b) Pioneer species are included;</p> <p>c) Species chosen must be indigenous to the area with the seeds used coming from the area;</p> <p>d) Root systems must have a binding effect on the soil;</p> <p>e) The final product must not cause an ecological imbalance in the area</p> <p>19. Development and implementation of an alien invasive plant species management plan, which would remove and control the alien vegetation within and bordering the site.</p> <p>20. The land beneath the transmission line, and any other areas required for construction, but not for the operational phase, should be rehabilitated with indigenous species to retain connectivity within the system.</p> <p>21. The development of a rehabilitation plan in line with port expansion plans and in conjunction with Transnet and the IDZ.</p> <p>22. Monitoring plan of alien invasive plants must be implemented to prevent streamflow reduction on the Mhlatuze River.</p> <p>23. Management interventions: Where avian fatalities are found to occur (i) to Red Data species, or (ii) at unacceptably high levels, to priority species, then the mitigation measures detailed above, should be brought into play.</p> <p>24. We encourage the developers to release the results of the annual monitoring to the Endangered Wildlife Trust-Eskom partnership to be collated and assessed. In this way cumulative impacts assessments, currently crudely estimated, can be refined, region by region.</p> <p>25. Disturbance around tower establishment and erection areas must be rehabilitated.</p>					
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TRANSMISSION LINE – CONSTRUCTION AND POST CONSTRUCTION PHASE ACTIVITIES

<p>26. Rehabilitation must include application of stored topsoil to not more than 30mm to support growth.</p> <p>27. Indigenous grass seed mixture can be applied onto the topsoil and raked into soil.</p> <p>28. The topsoil must be slightly compacted to encourage adherence of soil material thus preventing potential erosion.</p> <p>29. In terms of rehabilitation, this must be done with local supplier.</p> <p>30. 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.</p> <p>31. 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.</p> <p>32. 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.</p>					
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TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

7.3.28. Socio-economic					
Impact Management outcome: Socio-economic development is enhanced					
Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> 1. Develop and implement communication strategies to facilitate public participation; 2. Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; 3. Sustain continuous communication and liaison with neighboring owners and residents 4. Create work and training opportunities for local stakeholders; and 5. Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers. 6. A social development and economic development programme should be devised by the developer throughout the project's lifespan. 7. The plan should be developed in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits. 8. These plans should be reviewed on an annual basis and, where necessary, updated. 9. When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises. 10. In devising the programmes to be implemented, the developer should consider the priorities set out in the local IDP. 11. Use of local community for labour is encouraged, where 	Operations Manager, Project Manager and Engineer	Interview process	Operations Manager	Fortnightly	Site inspections

TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

possible. 12. Access into office, camp site and work area must be controlled to prevent accidents. 13. A register of visitors must be kept. 14. All health standards must be adhered to. 15. New temporary workers must be trained on environmental issues and management as well as on safety standards.					
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7.3.29. Monitoring, Reporting, Record Keeping & Compliance					
Impact Management Outcome: Impact to the operational site and surrounding areas are minimal as result of adherence to the authorisations and EMPr.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Compliance must be ensured with all monitoring, auditing, reporting and record keeping requirements as per approved environmental authorisations e.g. (EA, permits, licenses and amendments there to), programmes and plans (e.g. monitoring programmes). 2. Environmental monitoring must be undertaken by the ECO on a fortnightly basis. 3. An Environmental Audit Report to be completed by an external auditor, in accordance with the requirements of regulation 34 of the NEMA EIA Regulations, 2014 (as amended). 4. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and Environmental Authorisations. 5. The noise impact from the proposed project should be measured during the operational phase, to ensure that the impact is within the required legal limit.	Operations Manager and Project Manager	Establish registers, record of receipts, environmental file	ECO	Fortnightly	Site inspections

TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>6. Management interventions: Where avian fatalities are found to occur (i) to Red Data species, or (ii) at unacceptably high levels, to priority species, then the following mitigation measures should be brought into effect:</p> <ul style="list-style-type: none"> a. Construction monitoring should be started as the lines are erected; b. Post-construction monitoring should estimate bird mortalities along the entire 4.5-km of power line c. All carcasses should be photographed with a GPS, in situ, and identified and recorded. d. The search area should be defined and consistently applied throughout the monitoring period; e. Post-construction monitoring of bird abundance and movements and fatality surveys should span a minimum of 12 months. <p>7. Monitoring must be done to determine the rate of electrocution, as well as which species are affected.</p> <p>8. Monopoles and lines must be regularly checked for any faults that may result in increased risk of electrocution.</p> <p>9. New lines should be monitored monthly for a year to determine avifaunal mortality as a result of collisions and adaptive management techniques put in place to reduce impacts, or confirmation of low mortality levels.</p> <p>10. The use of registered landfill sites must be utilised and waste disposal volumes must be recorded and documented proof kept on the site Environmental File.</p> <p>11. Monitoring of noise levels at the sandspit is recommended at least monthly during operation so these can be compared to the changes in bird populations, if any.</p>					
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TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>12. 16. An avifauna monitoring plan must be developed and implemented for both the ship and transmission lines.</p> <p>13. 17. All lighting should be downlighting.</p> <p>14. 18. No lights should be directed at the sandspit or Kabeljous flats.</p> <p>15. 19. Light monitoring should be done monthly both pre- and post-construction along with avifaunal monitoring to determine change over time.</p>					
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TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

7.4. Operational Phase Activities – Transmission Line

The following will provide environmental specifications for the proposed development of the Transmission Line for Richards Bay. The post construction and operational phase activities and impacts relating to the Operations of the transmission line, is grouped together in the section below. This section will largely apply to ESKOM who will take ownership of the Transmission Line and associated infrastructure post construction.

7.4.1. Maintenance of servitude and related infrastructure					
Impact Management Outcome: Environmental impacts during the Operation & Maintenance Phase for the Transmission Line will be effectively mitigated					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. 2. All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this. 3. Use environmentally friendly cleaning and dust suppressant products. 4. All maintenance, refurbishment or related activities during operation must comply with ESKOM's Environmental Standards, Policies and Procedures. 5. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. 	Operations Manager and Project Manager and Engineer	Standard Operating Procedures	ECO	Fortnightly	Site inspections

TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

<p>Speed limits must still be enforced to ensure that road killings and erosion is limited.</p> <p>6. Erosion control and alien invasive management plan must be compiled.</p> <p>7. Where possible, existing access routes and walking paths must be made use of.</p> <p>8. Report erosion around towers around tower bases and along authorised corridors to landowners and Eskom</p> <p>9. Regular (monthly or during maintenance runs) visual assessments of the transmission line and switching station must be conducted to identify signs of oil spills, sediment runoff, switching station leakages etc. to monitor potential pollution.</p> <p>10. Report litter along authorised corridors to landowners. Eskom will however not be held liable for litter on landowner's property, unless it is as a result of Eskom activity. Waste management remains the responsibility of the landowner.</p> <p>11. No dedicated buffer areas were identified as part of this hydrogeology assessment, as the predicted impacts associated with the proposed activity on the hydrogeological environment are deemed low to neutral. It is however proposed to maintain the operational phase buffer (working servitude) for any vehicles servicing the transmission line.</p> <p>12. In accordance with the Hydrology report, no dedicated groundwater monitoring is required. Regular (monthly or during maintenance runs) visual assessments of the transmission lines and switching station should be however be conducted (i.e. signs of oil spills, sediment runoff, switching station leakages etc.) to monitor potential pollution.</p>					
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TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

<p>13. Sampling the non-perennial, wetlands and perennial streams downstream of the site will help to determine if the repair/maintenance activities are impacting the surface water quality (only if visual observations support potential pollution).</p> <p>14. A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.</p>					
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7.4.2. Access control & Socio Economic					
Impact Management Outcome: Environmental impacts during the Post Construction and Operation & Maintenance Phase for the Transmission Line will be effectively mitigated.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Access roads and servitudes will be maintained as per Eskom's Servitude Maintenance Policy. It must be inspected as per the internal roster predetermined by ESKOM.</p> <p>2. The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.</p> <p>3. Environmentally friendly dust suppressants need to be utilised.</p> <p>4. Where possible, local labour must be considered for employment to increase the positive impact on the local economy.</p>	Operations Manager and Project Manager and Engineer	Standard Operating Procedures	ECO	Fortnightly	Site inspections

TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

5. As far as possible, local small and medium enterprises must be approached to investigate the opportunities for supply inputs required for operational phase of the Transmission Line. This could be in the form of a local landscaping firm to maintain vegetation or training local community as snake catchers.					
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7.4.3.Fauna					
Impact Management Outcome: Environmental impacts during the Post Construction and Operation & Maintenance Phase for the Transmission Line will be effectively mitigated					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Monitoring is to take place monthly for 1 year pre-construction and then monthly for 1 year post construction so that mitigation measures can be adapted to ensure the development does not have a long-term impact on the SCCs and migratory waders in the area. A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year after the facility has been in operation and should be repeated every 3-5 years. A monitoring plan has been developed for the site and monitoring is currently ongoing. Information	Operations Manager and Project Manager and Engineer	Standard Operating Procedures	ECO	Fortnightly	Site inspections

TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

<p>obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins <i>et al.</i>, 2017.</p> <ol style="list-style-type: none"> 2. All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. 3. All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. 4. All pylons must be monitored for being bird-friendly (conductors slung below the towers) to avoid electrocution. 5. The 6km of overhead power line's diurnal-nocturnal diverters (night time solar bird diverters) must remain in place. 6. Post construction monitoring should be undertaken by competent ornithologists familiar with the area's threatened species. 7. Monthly avifaunal monitoring of the sandspit and Kabeljous flats should continue for at least the next 3 years. 8. The monitoring plan for the avifauna should speak to the existing monitoring plans of the port, if no such documents are available, Karpowership can contribute to them. 9. Monitoring must be done in conjunction with all port users and the TNPA as cumulative impacts are likely to be the most detrimental to such habitats. 10. 				
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TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

7.4.4. Flora

Impact Management Outcome: Environmental impacts during the Post Construction and Operation & Maintenance Phase for the Transmission Line will be effectively mitigated.

Impact Management Actions:

Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Development and implementation of an alien invasive plant species management plan. Any existing and new alien species must be removed as soon as possible after emergence. 2. Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Clearing beneath transmission lines should be avoided. 3. The land beneath the transmission line, which must be rehabilitated with indigenous species post construction, must be maintained to retain connectivity within the system. 4. No use of the surrounding vegetation will be allowed. This includes use as a toilet facility, for hunting, harvesting of indigenous plants, making fires etc. Although this impact largely applies to construction, it must also be reported should the above be observed during operational phase. 5. Some Species of Conservation Concern are present just outside the Transmission Line route(s). Although a higher risk during construction, care must be taken that they are not damaged / removed during maintenance to infrastructure. 	Operations Manager and Project Manager and Engineer	Standard Operating Procedures	ECO	Fortnightly	Site inspections

TRANSMISSION LINE – POST CONSTRUCTION AND OPERATIONAL PHASE ACTIVITIES

<p>6. Report growth of trees threatening safety on the electrified conductors to local CNC.</p> <p>7. Ongoing maintenance of powerline servitudes and clearing of alien vegetation as per safety protocols to reduce combustible biomass and lower the risk of wildfires.</p> <p>8. The relevant specialist recommends Conservation of the sandspit and Kabeljous flats, and that no development should take place in these areas. An adaptively managed conservation plan should be developed for these areas in particular that aligns with the existing TNPA conservation management plan for the port. If no such document exists, KPS partnership with SANPARKS and EZEMVELO should have input into its development.</p> <p>9. 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.</p>					
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PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

7.5. PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE DEVELOPMENT FOR GAS LINES, POWERSHIP AND FSRU'

The following will provide environmental specifications for the proposed development of the gas pipeline, the Powership and the FSRU. Since the Powership and FSRU are assembled off-site and will be delivered to the port fully equipped and ready to operate, the construction and post-construction phases activities are deemed not relevant for these components, and are then related to the installation of the gas pipeline only. The planning and design phase, as well as the operational and decommissioning phases are related to all components of this section, namely the gas pipeline, the Powership and the FSRU.

7.6. Planning and Design Phase & Pre-Construction Activities – Gas Lines

7.6.1. Administrative and Legal Requirements					
Impact Management Outcome: All construction work must comply with the conditions of the relevant authorisations, licences and permits.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All environmental legal requirements must be considered such as Environmental Authorisation, licenses (water use licences, atmospheric emissions licenses, waste management licenses) and must be authorized prior to the commencement of the gas to power project. 2. Appoint an EAP and conduct the required environmental processes in terms of the NEMA, NEM:WA & NEM:AQA to ensure legal compliance, when relevant. 3. Confirm that changes to the original design / layout do not trigger additional activities that were not applied for nor authorised. 4. Consider and implement where feasible environmentally responsible layout and sustainable designs to reduce resource consumption (water) and prevent potential pollution and /or environmental degradation during the operational phase of the project. 	Project Developer	Obtaining authorisations, permit and licences prior to construction	ECO	Once-off	All authorisations, licences and permits must be filed in the Site Environmental File

PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ol style="list-style-type: none"> 5. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. 6. Consider and implement where feasible favourable socio-economic options / solution, including but not limited to low maintenance infrastructure, incorporation with existing facilities and infrastructure and logistical arrangements and implementation of low energy or renewable energy options. 7. Adhere to Karpowership's Emergency Response Plan which deals with accidents, potential spillages and fires in line with relevant legislation 8. Include the EMPr in all tender documentation and ensure that environmental requirements for the construction are budgeted for by all contractors and sub-contractors. 9. It is recommended that all activities within the area coordinate the mitigation measures to ensure that an Open Space Management Plan, Rehabilitation Plan and Alien Invasive Plant Management Plan are developed and implemented for the area as a whole as these kinds of management measures should not be attempted in isolation. 10. Strict adherence to TNPA pollution, emergency, and health and safety protocols, MARPOL and other applicable maritime legislation and policies. 11. A Spill Prevention and Management Plan must be compiled and implemented. In the event of any significant spill the TNPA must be notified. 					
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PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<p>12. A method statement in respect to the use, handling, storage and disposal of all chemicals as well as anticipated generated waste, must be compiled and submitted as part of any Environmental Management Programme.</p> <p>13. Ensure correct handling, storage and disposal procedures are followed (e.g. bunded storage areas to contain 110% of volume).</p> <p>14. Only specialist personnel who are well trained on the standard protocols for preparation, coupling and decoupling of the gas pipeline between vessels, may undertake these operations. All applicable certificates of conformance must be on site.</p> <p>15. An emergency plan that is compliant with the Major Hazardous Installation Regulations must be compiled and implemented.</p> <p>16. Areas required to be restricted outside of the confines of the Port, as a result of health, safety and security concerns must be properly cordoned off with signage installed indicating the reason for such restriction.</p>					
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7.6.2.Roles and Responsibilities for Environmental Management					
Impact Management Outcome: The implementation of the environmental management plan and environmental management on-site.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. The overall responsibility for ensuring the implementation of this environmental management plan rests with the Project Manager and Project Developer (Karpowership). This environmental responsibility is also in line with Karpowership’s Environmental and Social Management Plan.	Karpowership	Environmental Authorisation, EMPPr, licences and permits	ECO	Fortnightly	Agreements and Appointment

PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ol style="list-style-type: none"> 2. Responsibility for on-site implementation of environmental management as well as the associated cost with the implementation of the EMPr rests with all appointed contractors, sub-contractors and suppliers. 3. Karpowership and appointed contractors must ensure that all permanent and temporary staff, sub-contractors and suppliers adhere to this EMPr. 4. Karpowership must appoint a senior staff member directly involved in the site construction activities as the Environmental Site Officer (ESO) before commencement of activities. This person will ensure the implementation of and adherence to the EMPr in the contractor's execution of the day-to-day construction activities. 5. The environmental responsibility of the ESO must be specified in this person's duties, which will also include: <ol style="list-style-type: none"> a. Liaison with the appointed ECO; b. Ensuring environmental awareness among members of the workforce; c. Ensuring that the Contractor/s and members of the construction workforce are aware of the requirements of the EMPr; d. The on-site implementation of the EMPr; e. Monitoring inappropriate behaviour, environmental impacts, including pollution and environmental incidents; and f. The implementation of corrective action. 6. The Project Developer must appoint a person with a qualification in environmental management as the ECO. The ECO will be the responsible person for monitoring and reporting on compliance in respect of the implementation of the EMPr. Requirements include: <ol style="list-style-type: none"> a. Monthly monitoring of activities to ensure compliance with the EMPr; 		<p>must be included in the tender documents and the Contractor</p>			
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PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ul style="list-style-type: none"> b. Liaison and ongoing communication with the Environmental Site Officer; c. Ensuring the Implementation of preventative and corrective actions in accordance with the requirements of the EMPr and outcomes of environmental monitoring / auditing; d. Reporting of environmental incidents that may occur on site in accordance with the requirements of the EMPr and environmental legislation; <p>7. Monitoring and reporting on compliance with this EMPr to Karpowership and the competent authority.</p> <p>8. The contractor and ESO must inform the ECO prior to the commencement of any significant construction activity.</p> <p>9. Karpowership has a responsibility to protect the environment within the development site and adjacent areas. No flora or fauna must be damaged or harmed in any way, apart from areas authorised for development. Failure to adhere to this requirement may result in the removal of staff from the site by Karpowership</p>					
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7.6.3.Environmental Awareness, Training and Induction					
Impact Management Outcome: Environmental impacts are minimised through effective awareness and training for all construction staff including sub-contractors, service providers and suppliers					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. In terms of section 2 (h) and (j) of the NEMA, the contractor has the responsibility to ensure all personnel involved in the project are aware of, and familiar with, the EMPr, the key environmental issues and consequences of non-compliance to the EMPr			ECO	Fortnightly	

PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ol style="list-style-type: none"> 2. The Contractor has the responsibility to ensure all personnel involved in the project are aware of, and familiar with, the EMPr, the key environmental issues and consequences of non-compliance to the EMPr. 3. All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this. 4. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. 5. The use of pictures and real-life examples must be incorporated in the training and awareness material. 6. Contract employees must be educated about the value of wild animals and the importance of their conservation. 7. The Contractor's environmental awareness training must be site specific and address all findings raised by the ECO. 8. Training must be done via Toolbox Talks and records of the training (attendance registers and content notes) must be kept within the Site Environmental File. 9. Provide an inventory of waste produced and the nature of waste being produced and cooperate with the Transnet National Ports Authority in every way. 10. A requirement to report environmental accidents and emergencies immediately they occur, to the port captain. 11. A Formal Failure Analysis (FFA) must be conducted to conclude each incident investigation in order to inform preventative measures to be taken in future. 	<p>Contractor</p>	<p>Weekly toolbox talks and awareness training</p>			<p>Record of attendance to the toolbox talks and awareness training must be filed in the Site Environmental File</p>
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<p>12. Training of emergency response teams to deal with environmental implications of an emergency in addition to the safety implications.</p>					
<p>1. The ECO must undertake the initial environmental induction with the project management team prior to the commencement of construction.</p> <p>2. All contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance record.</p> <p>3. To ensure compliance to the EMPr by contractors, sub-contractors and employees, Karpowership must ensure that the EMPr forms part of the formal site induction for all contractors, sub-contractors and casual labourers. The ESO must prepare and submit the training material to the ECO for approval. The induction training must, as a minimum, include the following:</p> <ul style="list-style-type: none"> a) The environmental impacts, actual or potential, of their work activities; b) Why the environment needs to be protected; c) Their roles and responsibilities in achieving compliance with the EMPr, including emergency preparedness and response requirements; and d) The potential consequences of departure from specified operating procedures and any environmental risk which may result from their work; and e) The risks that must be dealt with in order to avoid pollution or the degradation of the environment. 	<p>ECO</p>	<p>On-site environmental induction</p>	<p>ECO</p>	<p>Once-off</p>	<p>Record of attendance to the induction must be filed in the Site Environmental File</p>
<p>1. Environmental awareness training must include as a minimum the following:</p> <ul style="list-style-type: none"> a) Description of significant environmental impacts, actual or potential, related to their work activities; 	<p>Contractor</p>	<p>Weekly toolbox talks and awareness training</p>	<p>ECO</p>	<p>Once-off</p>	<p>Record of attendance to the toolbox talks and</p>

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<ul style="list-style-type: none"> b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. <p>2. A record of all environmental awareness training courses undertaken as part of the EMPr must be available; Educate workers on the dangers of open and/or unattended fires;</p> <p>3. A staff attendance register of all staff to have received environmental awareness training must be available.</p> <p>4. Course material must be available and presented in appropriate languages that all staff can understand.</p>					<p>awareness training must be filed in the Site Environmental File</p>
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7.6.4. Worker Conduct on Site					
Impact Management Outcome: Appropriate social and ecological well-being of the site and community					
Impact Management Actions:	Implementation		Monitoring		
1. A general regard for the social and ecological well-being of the site and community is expected of the site staff. Workers must be made aware of the following general rules:	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance

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<p>a) No alcohol / drugs to be present on site;</p> <p>b) No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel);</p> <p>c) Prevent unsocial behaviour;</p> <p>d) No harvesting of firewood from the site or from the areas adjacent to it;</p> <p>e) Construction staff must make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g.: fires for cooking);</p> <p>f) Driving under the influence of alcohol is prohibited.</p> <p>2. In the event that construction staff be approached by members of the public or other stakeholders, they must assist them in locating the Project Developer or Contractor, or provide a number on which they may contact the Project Developer or Contractor.</p>	Contractor	On-site monitoring	ESO	Weekly	Contractor Agreements and Appointment
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7.6.5.No-Go Areas / Restricted Areas					
Impact Management Outcome: Impact on No-Go areas are avoided through effective demarcation and management of these areas					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Construction of the Powerships including any piling on the land adjacent to the planned Powerships or within 200 m of the sandpit or Kabeljous flats, should be limited to the period from mid-April to mid-September to avoid disturbance to breeding and migratory species	Ecologist and ECO	Demarcation of sensitive areas with danger tape or barrier netting and identification of floral species	ESO	Daily	Site Inspection
2. Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development.			ECO	Fortnightly	
3. A full site walk-through should be conducted prior to any construction activities to list all species of conservation					

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<p>concern, and associated permits should be obtained for their removal or transplantation, as applicable.</p> <p>4. The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.</p> <p>5. Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate.</p> <p>6. Unauthorised access and development related activity inside access restricted areas is prohibited,</p>		<p>of conservation concern</p>			
<p>1. No-go areas must be demarcated. Should there be any other areas to be added, these must be agreed to in consultation between the ECO, Engineer and Karpowership prior to construction. These will include but not be limited to the sensitivity areas excluded from the development footprint, adjacent properties and other sensitive environments.</p> <p>2. It must be ensured that all identified highly sensitive areas are adequately protected prior to construction by demarcating “no-go areas” through fencing or other means. All “no go” areas must be clearly marked on a construction site layout plan.</p> <p>3. Unauthorised access onto/into private properties is strictly prohibited.</p> <p>4. The assembly basin area and the sandspit must not be disturbed or utilised during construction or during mooring activities. These are no-go areas. Mooring of the FSRU must maintain a minimum distance of 230 m from the sandspit.</p>	<p style="text-align: center;">Ecologist and ECO</p>	<p style="text-align: center;">Demarcation of no-go areas with danger tape or barrier netting</p>	<p style="text-align: center;">ESO ECO</p>	<p style="text-align: center;">Daily Fortnightly</p>	<p style="text-align: center;">Site Inspection</p>

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7.6.6. Materials Management – Sourcing					
Impact Management Outcome: Ensure environmentally sustainable and responsible use of materials					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Use environmentally friendly cleaning and dust suppressant products.</p> <p>2. Ensure that materials to be used during construction are legally sourced. Source materials locally where possible.</p> <p>3. Water or sand must not be extracted from watercourses; should this be a requirement, then the required permits and approvals has to be obtained from authorities before construction commences. It is recommended that filling and levelling material be sourced from a local commercial quarry.</p> <p>4. Only commercial sources will be used e.g. material from the local quarry. No borrow-pits will be created or used for source material.</p> <p>5. Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc.) and submit these to the project manager, engineer and ECO for approval prior to commencement of any work. Where applicable, a signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with the relevant legislation.</p>	Project Manager and Engineer	Letter from supplier confirming legal source of materials	ECO	Fortnightly	Records of materials purchased

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7.6.7.Socio-Economic Management					
Impact Management Outcome: Socio-economic development is enhanced					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. The developer should encourage the contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies. 2. The developer should engage with local authorities and business organisations to investigate the possibility of procuring construction materials, goods and products from local suppliers where feasible. 3. Organise local community meetings to advise the local labour force about the project that is planned to be established and the jobs that can potentially be applied for. 4. Establish a local skills desk (in uMhlatuze Local Municipality) to determine the potential skills that could be sourced in the area. 5. Employment of labour-intensive methods in construction where feasible. 6. Sub-contract to local construction companies particularly SMME's and BBBEE compliant and women-owned enterprises where possible. 7. Use local suppliers where feasible and arrange with the local SMME's to provide transport, catering and other services to the construction crews. 	Project Developer	Designated Human Resource / social facilitation team and associated procedures and policies	ESO ECO	weekly Monthly	Review of procurement documentations and records

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<ol style="list-style-type: none"> 8. Facilitate knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases. 9. Set up apprenticeship programmes to build onto existing skill levels or develop new skills amongst construction workers especially those from local communities. 10. Recruit local labour as far as feasible to increase the benefits to the local households. 11. Set up a recruitment office in Richards Bay and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in the hope of finding temporary employment. 12. Control the movement of workers between the site and areas of residence to minimise loitering around the site. This should be achieved through the provision of scheduled transportation services between the construction site and area of residence. 13. Employ locals as far as feasible through the creation of a local skills database. 14. Establish a management forum comprising key stakeholders to monitor and identify potential problems that may arise due to the influx of job seekers to the area. 15. Ensure that any damages or losses to nearby buildings that can be linked to the conduct of construction workers are adequately reimbursed. 16. Assign a dedicated person to deal with complaints and concerns of affected parties. 					
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<p>17. Provide adequate signage along relevant road networks to warn the motorists of the construction activities taking place on the site.</p> <p>18. Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations.</p> <p>19. The mitigation measures proposed by noise specialist should be adhered to.</p> <p>20. During Construction the small fisherman should be engaged to reduce negative impacts on their operations.</p> <p>21. As far as possible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the Powership and related infrastructure.</p> <p>22. A financial allocation over the lifespan of the project to be allocated towards skills development contributions.</p> <p>23. The developer must consider establishing vocational training programmes for the local labour force to promote the development of skills required by the Powership and related infrastructure and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere.</p>					
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7.7. Construction Phase Activities

7.7.1. Administrative and Legal Requirements					
Impact Management Outcome: All construction work must comply with the conditions of the relevant authorisations, licences and permits.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. All contractors, sub-contractors or agents and their employees will be responsible for the implementation of the EMPr and adherence to the conditions of the EMPr and Environmental Authorisation.	Developer	Obtaining authorisations, permit and licences prior to construction	ECO	Once-off	All authorisations, licences and permits must be filed in the Site Environmental File
2. The ECO will be the responsible person for monitoring and reporting on compliance in respect of the implementation of the EMPr.					
3. The ESO will be responsible for on-site implementation and daily monitoring of implementation of the EMPr. The ESO will provide evidence to the ECO that the EMPr is being implemented and adhered to (either through inspections sheets or audit reports).					
1. Fines / penalties will be issued by the Project Developer for wilful negligence or non-compliance to the EMPr resulting in environmental degradation or pollution. The fine will be determined by ECO based on the severity of the incident and potential action by Project Developer. These costs will not be recoverable from the project and will be utilised to rectify the environmental degradation caused.	Developer	Implementation of Incidents Incurring Penalties.	ECO	Fortnightly	Site Inspections and Record Keeping
1. Fortnightly monitoring must be conducted by the ECO. The ESO must assist the ECO during the audit.	Developer	Appointment of ECO	ECO	Fortnightly	Monthly ECO Reports

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2. ECO must submit audit reports to the Compliance section of the competent authority section on a monthly basis as a minimum or as per the timeframes stipulated in the environmental authorisation.					
1. The ECO and ESO must consult and review compliance and performance against the EMPr and resolve inter alia environmental concerns, non-compliance (including environmental incidents) and any complaints.	Developer	Monthly monitoring reports	ESO ECO	Weekly Monthly	All authorisations, licences and permits must be filed in the Site Environmental File

7.7.2. Site Establishment					
Impact Management Outcome: Impacts relating to site establishment are minimised.					
Impact Management Actions:					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Location of camp sites must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through.					
2. The site selected for a construction camp must ensure potential negative impacts on the biophysical environment are kept to a minimum. The location must be within the perimeter of the proposed site.					
3. Sites must be located where possible on previously disturbed areas. The use of existing accommodation for contractor staff, where possible, is encouraged					
4. No construction camps / laydown areas must be established in sensitive areas or associated buffers.					

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<p>5. A Site Establishment Method Statement must be provided by the Contractor prior to any on-site activity that includes the layout of the construction camps / lay-down-areas in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to stockpile areas, hazardous materials storage areas (including fuels), equipment cleaning areas, cooking and ablution facilities, waste and wastewater management etc.</p> <p>6. The location of the construction camps and laydown areas must be approved by the ECO and Avifauna specialist prior to implementation.</p> <p>7. All site camps must be fenced off to limit any accidental vegetation disturbance outside the approved area.</p> <p>8. Eating areas must be serviced and cleaned on a daily basis to ensure the highest possible standards of hygiene and cleanliness.</p> <p>9. On-site accommodation will not be allowed. No persons, other than a night-watchman / security guard, may stay overnight at the construction camp</p> <p>10. Drainage at the camps must be designed to prevent the standing ponding of water or sheet erosion from taking place.</p> <p>11. Signage must be placed in the area where construction will take place informing the public of the activities taking place.</p> <p>12. The construction camp(s) must be kept in an orderly state at all times, to the satisfaction of the ECO. The Contractor must allow at least 15 minutes prior to close of business for site house-keeping.</p> <p>13. Ensuring that a suitable drainage system is in place before construction on a site takes place is important to keep the</p>	Contractor, Avifauna Specialist and ESO	Method Statement and layout of construction camps / laydown areas to be compiled and approved by the ECO	ECO	Once-off	Approved Method Statement and Layout Plan
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<p>area as dry as possible and thereby reducing the amount of erosion.</p> <p>14. The area where water disperses out of a drain must be suitable for such and must not be susceptible to erosion.</p> <p>15. A grass-lined channel conveys storm water runoff through a stable conduit. Vegetation lining the channel slows down concentrated runoff.</p> <p>16. Direct discharges of runoff from developed/ disturbed areas to receiving waters should be avoided wherever possible. This involves the use of collection/conveyance through closed conduits. Runoff should be routed through one or a combination of runoff treatment practices.</p> <p>17. The surrounding area must be surveyed prior to construction/laydown area establishment to determine the presence of nesting birds and sensitive fauna, and these must cordoned off where possibly or be safely relocated if necessary.</p>					
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7.7.3. Access to Construction Site					
Impact Management Outcome: Construction vehicle movement are restricted to approved routes					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. An access agreement must be formalised and signed by the PM / PE, contractor and landowner before commencing with the activities.					
2. Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense.	Contractor	Access routes must be mapped prior to construction	ESO ECO	Fortnightly	Site Inspection

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<ol style="list-style-type: none"> 3. A stabilised site access must be established and limited to one point only. The access allows for the construction vehicles to enter the work area of while preventing the unnecessary tracking of sediment onto the nearby environment from multiple locations. A stabilised entry/exit point normally consists of a stabilised rock pad. 4. Sufficient parking must be provided for site staff and visitors at the construction camp. 5. The liberation of dust into the surrounding environment must be effectively controlled by the use of water sprays, fabric containment, where required. 6. If required, staff must be employed to clean spilt material onto the access roads. 7. Pedestrian and vehicle access must be restricted during construction so as to control access to otherwise potential dangerous excavations and materials. 8. Secure and ensure safe passage for components and materials between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, must have proper cover to prevent it from spilling over the side of the vehicle during transit. 9. If a spillage occurs resulting from the failure by staff or supplier to properly secure materials to be transported (as per previous condition) then the contractor is responsible for remediation and cleaning-up measures. 					
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7.7.4. No-go Areas					
Impact Management Outcome: Impact on No-Go areas are avoided through effective demarcation and management of these areas.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Construction of the Powerships including any piling on the land adjacent to the planned Powerships or within 200 m of the sandpit or Kabeljous flats, should be limited the period from mid-April to mid-September to avoid disturbance to breeding and migratory species 2. The construction / work corridor must accommodate all construction-related activities, including materials storage and soil stockpiles. 3. Access must be confined to the existing road infrastructure and disturbed areas. 4. Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste outside the project boundaries is strictly prohibited. 5. Gathering of firewood, fruit, plants or any other natural material on site or in areas adjacent to construction sites is prohibited. 6. Unauthorised access onto/into private properties is strictly prohibited. 7. Activities in the surrounding open undeveloped areas must be strictly regulated and managed. 8. No entry or dumping into / onto the sensitive areas or buffer zones is allowed. 	Contractor, Avifauna Specialist and ESO	Demarcation of sensitive areas and staying within approved areas for construction	ESO ECO	Daily Fortnightly	Site inspection of sensitive No- Go areas and photographic evidence

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<p>9. Personnel must not be allowed into indigenous vegetation, especially Mangrove Forest and Swamp Forest:</p> <p>10. No picking any indigenous plant</p> <p>11. Only provided portable toilets should be used</p> <p>12. No lighting of fires</p> <p>13. No catching or shooting of any wildlife</p> <p>14. No trampling of vegetation</p>					
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7.7.5. Protection of Flora and Fauna					
Impact Management Outcome: Impacts on flora and fauna are minimised through adherence of EMP requirements.					
Impact Management Actions:	Implementation		Monitoring		
Flora	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. A full site walk-through must be conducted prior to any construction activities to list all SCC and associated permits should be obtained for their removal or transplantation.</p> <p>2. Erosion control and alien invasive management plan must be compiled.</p> <p>3. The initial clearing phase must take place under the supervision of the ECO for the duration of the clearing. The Environmental Audit Report must confirm that all identified plant species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals.</p> <p>4. The majority of the indigenous vegetation must be maintained as a part of the open space and managed for</p>	Contractor	Awareness Training Injuring, capturing, killing of animals identified on site must be reported as an environmental incident and investigated	ECO	Fortnightly	Training material relating to wildlife management

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<p>conservation, if possible, in partnership with the respective landowners.</p> <ol style="list-style-type: none"> 5. The area of construction and operation must be demarcated, and personnel not allowed to use the surrounding natural vegetation. 6. Contractors must ensure that no protected tree species are removed or trimmed without the required permit from the Department of Agriculture, Forestry and Fisheries. 7. Care must be taken to prevent the introduction of alien plant species to the site and surrounding areas by removing the invasive plants onsite. 8. Trees and shrubs to be conserved must be clearly marked. No natural vegetation is to be collected for use as firewood. 9. Damaging or removing of trees which have been marked for conservation must be a transgression of the environmental specifications for which a penalty may be imposed. 10. Corridors to be at 30m in width or as per agreement with Eskom. Clearance of vegetation and habitat to be restricted within the corridor. Vegetation that will not grow within the safety clearance of the powerline to be preserved in as far as possible. Protected and indigenous vegetation to be cleared with the required permits 11. Invader plant species and weeds must be removed and disposed of in accordance with existing legislation (as listed in the Conservation of Agricultural Resources Act, No. 43 of 1983 and National Environmental Management: Biodiversity Act). 12. Although removal of alien species will mostly require removal by hand and the use of saws, the use of 					
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<p>herbicides and pesticides may be required. Only specified and approved herbicides and pesticides must be used for control of alien and invasive species. Manufacturer's instructions must be followed when using chemical methods, especially in terms of quantities, time of application etc.</p> <p>13. Applications of herbicides and pesticides must be applied by certified, approved and trained employees or contractors.</p> <p>14. Any construction and infrastructure occurring within the dune environment must be rehabilitated immediately after construction with the help of a qualified dune rehabilitation specialist. The rehabilitation must then be monitored and any impacts adaptively managed.</p> <p>15. No additional infrastructure or use of the surrounding vegetation within the dunes should be allowed and includes placement of portable toilets, use of the beach for recreational purposes, fishing, hunting or removal of indigenous plant species.</p> <p>Fauna</p> <p>16. Monitoring is to take place monthly for 1 year pre-construction and then monthly for 1 year post construction so that mitigation measures can be adapted to ensure the development does not have a long-term impact on the SCCs and migratory waders in the area. A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year after the facility has been in operation and should be repeated every 3-5 years. A monitoring plan has been developed for the site and</p>					
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<p>monitoring is currently ongoing. Information obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins et al., 2017..</p> <p>17. A qualified specialist should be called out to assist during construction to safely remove all slow-moving (chameleons and tortoises) and burrowing (moles, lizards and snakes) species from the path of the excavator and relocated to a conservation area, should it be necessary. For the sake of acting timeously, the ESO can also assist in this regard.</p> <p>18. Some burrowing species may be affected by any excavation activities. Reptiles and amphibians may fall into holes, which they then cannot get out of. Any large holes must be monitored, and trapped fauna carefully removed.</p> <p>19. A qualified snake catcher must be called out to safely relocate any snakes found.</p> <p>20. Slow-moving animals such as tortoises can be relocated just outside the footprint by hand when encountered. Induction should include information on safe faunal relocation and rules on hunting.</p> <p>21. Initial Environmental Training must include sending a dedicated employee from site on a snake handling course in order to fulfil the above task, should there not already be a qualified person on the team.</p> <p>22. Disturbance to birds, animals and reptiles and their habitats must however be minimised by avoiding any interference or contact where possible. Animals may only be trapped or caught for conservation and relocation purposes.</p>					
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<p>23. Noise pollution must be minimized to ensure faunal inhabitants are not stressed.</p> <p>24. The enclosed intertidal area where Zostera occurs, must be demarcated as a no-go area and a minimum distance of 100 m must be maintained for all construction related activities and movements.</p> <p>25. In the unlikely event that Zostera is discovered within project area (i.e. Berth 600 Basin), an offset is proposed replacing like with like should it be affected by the powerships and associated infrastructure.</p> <p>26. Disturbance must be kept to a minimum by confining the pipeline laying activity, working barge and/ or excavation/levelling equipment to within the project area and designated access routes/paths.</p> <p>27. The assembly basin area and the sandspit must not be disturbed or utilised during construction or during mooring activities. These are no-go areas.</p> <p>28. Mooring of the FSRU must maintain a minimum distance of 230m from the sandspit.</p> <p>29. Construction activities must be restricted to daylight hours.</p> <p>30. No animals (birds, fish, reptiles, mammals) are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason.</p> <p>31. A comprehensive environmental awareness programme must be conducted amongst contracted construction personnel about sensitive estuarine and coastal habitats and fauna.</p> <p>32. Management of all site activities and site camp/laydown area must be undertaken in accordance with a site specific EMPr and audited by an ECO.</p> <p>33. In the unlikely event that Zostera is discovered within project area (i.e., 600 Berth Basin), an offset is proposed replacing like-with-like should it be affected by the powerships and associated infrastructure.</p>					
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<p>34. In order to ensure that the noise levels produced by construction are not higher than predicted in this report, the equipment used should be similar or less powerful than the equipment used as a model by Subacoustech Environmental (2022). No unnecessary production of noise should take place, to minimise the exposure of the estuarine/marine biota to noise and help to avoid disturbances and potential harm to estuarine/marine organisms. If a marine mammal is observed in the near vicinity of the construction activity, construction should be halted until the marine mammal is outside the range of hundreds of metres from the noise source, as a precaution. These measures will reduce the probability of the estuarine/marine biota being impacted by construction noise but does not reduce it enough to change the score.</p> <p>35. A noise impacts monitoring programme should be implemented to validate the predictions made of the impacts of the noise produced by the construction operations on the marine ecology. Monitoring of the ecology in the immediate vicinity of the project should be undertaken following a before-after-control-impact (BACI) approach. This should include monitoring of the local macrofauna, and video surveys and fish sampling to understand the fish community in the area of the port where the powerships will be moored, as well as use of the project area by marine mammals. Monitoring of the distribution and behaviour of diving seabirds in the vicinity of the powerships should also be undertaken.</p> <p>36. These surveys should be ongoing and following a sampling methodology that is robust when assessing the impacts of the noise produced by construction on the distributions of benthic macrofauna, fish, seabirds, and marine mammals. The results of such monitoring will be valuable in informing other developments and contributing</p>					
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<p>to the international understanding of the effects of noise from construction activities on marine biota.</p> <p>37. Mitigating the effect on terrestrial fauna (including avifauna) as a result of construction activities:</p> <ol style="list-style-type: none"> a. Select alternative transmission route 1. b. Do not place transmission lines or access routes for their construction in functional natural habitat, Intact indigenous vegetation must be avoided. c. Do not clear natural vegetation in the process of construction of project infrastructure. No linear 3m footprints should be cleared of vegetation in these areas but individual drilled foundations used. d. Construction measures must consist of the least impactful individual erection of monopole structures. e. No use of the surrounding vegetation will be allowed. This includes use as a toilet facility, for hunting, harvesting of indigenous plants, making fires etc. f. No animals (birds, reptiles, and mammals) are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught/hunted for any reason. g. A qualified specialist should be on site during construction to safely remove all slow-moving (chameleons and tortoises) and burrowing (moles, lizards and snakes) species from the path of the excavator and relocated to a conservation area. h. Construction activities, specifically excavation and moving/transporting of large components, must be restricted to daylight hours to prevent potential disturbance to roosting bird populations i. Restrict vehicles to clearly demarcated access routes, construction areas and contractor areas only. 				
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<p>j. Keep vehicle access to the shoreline to a minimum. Only allocated access points to the beach be used.</p> <p>k. The surrounding area must be surveyed prior to construction/laydown area establishment to determine the presence of nesting birds and sensitive fauna, and these must be cordoned off.</p> <p>l. Regarding the African Fish Eagle nest on site, construction activities should be initiated during winter, when the nest is not in use, and after which the breeding pair will hopefully relocate their next nest to a safer area.</p> <p>m. Beyond the headland of the 600 Berth Basin, movement of supporting vessels must be restricted to the main channels only.</p> <p>n. The sandspit and Kabeljous Flat must be designated no-go areas, i.e. these areas may not be utilised in any way to support or facilitate construction/mooring activities, storing of materials, etc.</p> <p>o. Laying of the gas pipeline and mooring legs of the FSRU must be undertaken during the winter months to reduce disturbance of birds utilising the sandspit.</p> <p>p. Construction vehicles, plant and machinery must be well maintained and fitted with silencers.</p> <p>q. Regular maintenance on vehicle and equipment must be undertaken.</p>					
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7.7.6. Preparation of Construction Camp / Laydown area for gas pipes

Impact Management Outcome: Construction activities are restricted to the demarcated construction camp / laydown area

Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Natural features must be considered and potential impacts must be minimised and/or prevented where possible. 2. Boundaries should be strictly maintained, and impacts retained within the boundary of the site. 3. Ensure that materials to be used during construction are from a legal and licensed source. Water or sand is not extracted from watercourses. In the event this be a requirement, then the required permits and approvals have to be obtained from authorities before construction is to commence. It is recommended that filling and levelling material be sourced from the local quarry or supplier. 4. Existing services infrastructure must be identified and clearly demarcated. 5. The construction area must be clearly demarcated considering the sensitive environmental areas (in particular wetlands and open areas) and no extension of the permitted construction footprint (as authorised and specified in the engineering construction methodology) must be allowed. 6. All areas outside of the demarcated construction camp / laydown area must be considered No-Go areas. Any Contractors found working inside the No-Go areas must be fined as per fining schedule / system setup for the project. 7. The demarcation work must be signed off by the ECO before any work commences. 	Contractor	Demarcation of construction corridor prior to site clearing	ECO	Once-off	Photographic record. Clearly marked construction corridor Pre-construction photographic records

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<p>8. Adherence to port safety regulations and emergency procedures, particularly during construction/installation.</p> <p>9. Quality and safety checks undertaken immediately after connection to ensure that connection point is secure.</p> <p>10. Regular inspection on the quality and integrity of the pipeline and connections to prevent fugitive emissions.</p> <p>11. Pipe laying and anchorage operations should not take place during spring high tides and very strong south-westerly winds or storm weather conditions.</p> <p>12. Laying of the pipeline and the anchor legs must be undertaken with as little disturbance of the seabed as possible.</p> <p>13. Laying of the gas pipeline and mooring legs of the FSRU should be undertaken during the winter months reduce disturbance birds utilising the sandspit.</p> <p>14. Pipe laying and anchorage operations should not take place during storm weather conditions where risk of disturbance to adjacent areas would be greater.</p>					
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7.7.7. Vegetation Clearance					
Impact Management Outcome: Vegetation clearance and associated impacts are minimised through adherence of EMPr vegetation clearance requirements.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Clearing beneath transmission lines should be avoided.	Contractor	Working within demarcated areas IAP eradication	ESO ECO	Weekly Fortnightly	Site Inspection

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<ol style="list-style-type: none"> 2. All cut vegetation must be disposed of onsite as mulch and use in rehabilitation efforts or to chip and compost. 3. There must be no burning on site under any circumstances. 4. Indigenous vegetation clearing must be kept to a minimum and undertaken under proper supervision. 5. Vegetation clearing activities must only be undertaken during agreed working times and permitted weather conditions. 6. Any vegetation clearing must be done immediately before construction activities to avoid prolonged exposure of the soil to weather elements. 7. It is recommended that alternatives be considered for the placement of the gas pipelines and laydown area infrastructure within, in order of preference, already transformed, degraded or disturbed areas. 8. If alternatives are not possible, then any and all excavations must be rehabilitated immediately after construction with the help of a qualified dune rehabilitation specialist. The rehabilitation must then be monitored and any impacts adaptively managed. 9. No additional infrastructure or use of the surrounding vegetation should be allowed and includes placement of portable toilets, use of the beach for recreational purposes, fishing, hunting or removal of indigenous plant species. 		<p style="margin: 0;">and control</p>			
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CONSTRUCTION PHASE ACTIVITIES

7.7.8. Earthworks including Demolition or Construction

Impact Management Outcome: Impacts resulting from earthworks are managed and guided by specifications and material sourced from authorised sites.

Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All cut and fill earthworks must be carried out in accordance with the current SANS/SABS 1200 series. 2. Earthworks must be completed in accordance with the scope of works and designs. 3. Construction areas must be cordoned off and demarcated to prevent incidental public access. 4. Micro siting of the monopole structures and construction footprint must be done to ensure no protected species are affected wherever practicable. 5. Materials that will be used during construction must be legally sourced. A sourcing register must be maintained on the Site Environmental file for record keeping purposes. 6. Only commercial sources will be used e.g. material from the local quarry. No borrow-pits will be created or used for source material. 7. Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc.) and submit these to the project manager, engineer and ECO for approval prior to commencement of any work. Where applicable, a signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with the relevant legislation. 8. The enclosed intertidal area where <i>Zostera</i> occurs, must be demarcated as a no-go area and a minimum distance 	Contractor	Earthworks undertaken according to specifications and material obtained from approved sources	Engineer ECO	Monthly Monthly	Earthworks undertaken according to specifications Proof of approved borrow pits / quarries where material is sourced from.

CONSTRUCTION PHASE ACTIVITIES

of 100 m must be maintained for all construction related activities and movements.					
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7.7.9. Fire Management					
Impact Management Outcome: Fire prevention measures are carried out in accordance with the relevant legislation.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas. 2. Fires will only be allowed in facilities or equipment specially constructed for this purpose at the construction camp. 3. No open fires or uncontrolled fires are permitted on site. 4. Ensure that there is basic firefighting equipment available on-site. Firefighting equipment must be in working order and serviced to-date. 5. The workforce must be made aware of fire prevention and firefighting measures. 6. Any flammable material must be stored in areas where it does not present a fire hazard to surrounding vegetation and people. This includes bitumen, thinning agents, petrol, LPG containers, fuels and oils. 	Contractor	Awareness Training	ECO	Fortnightly	Site Inspection

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<p>7. Burning of fire breaks is to be carefully planned and managed with the assistance of the local Fire Department.</p> <p>8. Set smoking areas must be designated. Smoking outside these designated areas is prohibited.</p> <p>9. The Contractor must ensure that the telephone number of the local Fire and Emergency Service are displayed at the site offices.</p>					
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7.7.10. Soil Management					
Impact Management Outcome: Impact on soils are minimised or avoided through implementation of mitigation measures					
Impact Management Actions:					
	Implementation		Monitoring		
<ol style="list-style-type: none"> 1. Stockpiles must not be located where natural drainage pathways will be obstructed / impeded. 2. Stockpiles must not exceed 2m in height unless otherwise permitted by the PM upon advice from the ECO. 3. Stockpiles exposed to windy conditions must be wetted to prevent windblown particles or in the case of heavy rain, must be covered/provided with containment to prevent contaminated run-off. Rocks can be stacked as walls to prevent the loss of top and subsoil on cut or fill banks. 4. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding. 5. Do not allow stockpiling of any material within 20m of any "no go" area. 	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
	Contractor and ESO	Method Statement to be compiled for soil stockpile management	ESO ECO	Daily Fortnightly	Site inspection and compliance with Method Statement

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<ol style="list-style-type: none"> 1. The topsoil obtained (i.e. the top 30-50 cm of soil) from site clearing must be stored in stockpiles no higher than 1m and used during rehabilitation. 2. Stockpiles must be within an earthen bund of approximately 0.5m and covered with a geofabric material or similar e.g. a tarp to prevent wind deflation and runoff when not in use. 3. Undertake the stripping of topsoil in a manner that minimises erosion by wind or runoff. 4. Subsoil and topsoil must not be mixed with other soils during stripping, excavation, reinstatement and rehabilitation. 5. Minimise the amount of exposed ground and stockpiles of building material to prevent suspended solid transport loads and leaching of rocks/materials. Stockpiles can be seeded or covered and sediment fences constructed from a suitable geotextile. 6. Where possible, plants should be cut down to ground level instead of being removed completely to stabilise the soil during land-clearing operations. 7. Excavations must be undertaken carefully incorporating proper drainage and considering weather conditions. If heavy rains are expected excavations must be put on hold. 8. Excavated and imported material must be stockpiled/stored away from areas of concentrated flow to limit the risk of sediment wash to downstream areas. 9. Dumping of excavated material into the sensitive and no-go areas is prohibited. 10. Water from any dewatering process, if applicable, must be stored and re-used where possible, e.g. for dust suppression 					
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CONSTRUCTION PHASE ACTIVITIES

<p>11. 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.</p> <p>12. Stockpiles must be seeded with indigenous grasses or stabilised with geotextiles to reduce erosion potential.</p>					
<p>1. Suitable erosion control measures must be implemented in areas sensitive to erosion i.e. storm water discharge points, exposed areas and embankments. These measures could include:</p> <ul style="list-style-type: none"> a) The suitable use of sand bags or soil saver; b) The prompt rehabilitation of exposed embankment areas (e.g. with indigenous vegetation); c) The removal of vegetation, only as it becomes required for work to proceed; d) Taking suitable precautions in terms of design, construction and earthworks. <p>2. Soil stockpiling areas must be situated at least 50m away from any sensitive areas.</p> <p>3. No surface storm water generated as a result of the development may be directed directly into any natural drainage system.</p> <p>4. The ECO must perform visual inspection during the fortnightly site visits of surface water in order to identify any rapid increase in erosion and erosional features in the area and remedy where essential.</p> <p>5. Sandbags must be utilized as a temporary diverting barrier downslope of excavation areas. The sandbags must be</p>	<p>Contractor and ESO</p>	<p>Method Statement to be compiled for erosion control and sedimentation</p>	<p>ESO ECO</p>	<p>Daily Fortnightly</p>	<p>Site inspection and compliance with Method Statement</p>

CONSTRUCTION PHASE ACTIVITIES

<p>placed in order to minimize surface runoff ensuring the sensitive areas situated downslope does not incur any impacts as a result of sedimentation and erosion.</p> <p>6. Soil stockpiles must be protected from erosion, surrounded by suitable earthen buns and covered by erosion control blanket.</p> <p>7. Site engineers must regularly inspect the erosion control measures to confirm their appropriateness and integrity</p>					
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7.7.11. Waste Management					
Impact Management Outcome: Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Waste must be dealt with in accordance with the National Waste Management Strategy namely reduce, re-use and recycling, with disposal to landfill being a last resort, in line with an integrated waste management approach.</p> <p>2. Solid waste generated must be disposed of at the nearest registered landfill site on a weekly basis and disposed to suitable waste receptacles for disposal to the registered waste disposal site. Records of disposal to be kept in the environmental file on site.</p> <p>3. Different waste bins, for different waste streams, must be provided to ensure correct waste separation.</p>	Contractor	<p>General camp house-keeping</p> <p>Provision of bins</p> <p>Awareness training on waste minimisation and re-use</p>	<p>ESO</p> <p>ECO</p>	<p>Daily</p> <p>Fortnightly</p>	<p>Provision of waste disposal facilities (bins & skips)</p>

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<ol style="list-style-type: none"> 4. All non-recyclable solid waste must be disposed of at a permitted landfill site, and proof must be available and presented to the ECO during site audits or for any other auditing purposes. 5. Littering is prohibited and dumping of any waste is not allowed in undeveloped, open areas or neighbouring properties. 6. No waste material is to be burned, buried or disposed of in any area that is not a licensed landfill site. 7. A number of waste receptacles must be available for waste disposal and prevention of littering. 8. Waste bins must be cleaned out when full or at least one a weekly basis to prevent windblown waste and/or visual or odour disturbance. 9. The Contractor must ensure that all litter is collected from the work and camp areas daily. 10. Bins and/or skips must be emptied weekly and waste must be disposed of at a registered landfill site. Waybills for all such disposals are to be kept by the Contractor in the Environmental file on site for review by the ECO or any other auditors. 11. Any effluent containing oil, grease, or other industrial substances must be collected in a container with a leak-proof lid and removed from the site, either for resale or for disposal at a hazardous waste facility. Proof of sale disposal must be obtained from the service provider and kept in the environmental file on site. 12. No grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent or nearby water bodies will be permitted. 					
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<p>13. Prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or stormwater infrastructure.</p> <p>14. No waste material must be burned, buried or disposed of in any area that is not a licensed landfill site.</p> <p>15. Littering is prohibited and dumping of any waste must not be allowed anywhere on site, including undeveloped or open areas.</p> <p>16. Recycling and the provision of separate waste receptacles for different types of waste must be encouraged.</p> <p>17. The storage of waste must comply with the norms and standards as stipulated in the National Environmental Management: Waste Act.</p> <p>18. Management of all site activities and site camp/laydown area must be undertaken in accordance with a site specific EMPr.</p> <p>19. Strict adherence to TNPA pollution, emergency, and health and safety protocols, MARPOL and other applicable maritime legislation and policies</p> <p>20. Construction workers and operational staff to adopt best practice waste minimisation procedures.</p> <p>21. Implement the correct handling and disposal procedures for general and hazardous waste.</p> <p>22. Reduce the amount of waste generated from the construction phase by means of efficient operations and recycling of general waste.</p> <p>23. Good housekeeping to be done daily of the intertidal area and surrounding port waters.</p> <p>24. No mixing of concrete in the intertidal zone.</p> <p>25. No dumping of construction materials or excess concrete in the intertidal and subtidal zones.</p>					
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<p>26. Wind screening (e.g., fine mesh shade cloth fencing, or solid fencing) must be installed to prevent excessive wind-blown sand and light-weight solid waste (e.g., litter) entering the estuary; and</p> <p>27. Conduct a comprehensive environmental awareness programme amongst contracted construction personnel about sensitive estuarine/marine habitats and good house-keeping.</p>					
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7.7.12. Pollution Control Measures					
Impact Management Outcome: Impacts to the environment soils, surface and groundwater is avoided (where possible) or managed.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Material Safety Data Sheets (MSDS) for on-site chemicals, hydrocarbon materials and / or waste and hazardous substances must be readily available onsite.</p> <p>2. The Contractor must prepare an emergency procedure and a procedure for the management e.g. storage, decanting and disposal of hazardous substances.</p> <p>3. The contractor must store, handle and transport all materials that could adversely affect the environment, in accordance with material safety data sheet.</p> <p>4. In the case of a spill of hydrocarbons, chemicals or bituminous material the spill must be contained and the material together with any contaminated soil collected and disposed of as hazardous waste.</p>	tractor	Provision of sanitation facilities and bunding / impervious surfaces for activities that may lead to soil	ESO ECO	Weekly Fortnightly	Site inspection Inspection of Environmental Incident Register Compliance with Spill Contingency

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<p>5. In the event of a pollution incident on site the Site Environmental Officer and ECO must:</p> <ol style="list-style-type: none"> a. Ensure the immediate implementation of reasonable measures to contain and minimise the impacts of the incident; b. Notify all persons as per legal requirements (NEMA, NEMWA & NEM:AQA) if applicable and approved communication / incident procedure; c. Undertake clean up procedures immediately; d. Record the incident in the Environmental Incident Register; and e. Implement measures to prevent similar incidents from occurring in the future. <p>6. The Contractor will be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.</p> <p>7. The Contractor (and suppliers) must ensure that all materials are correctly secured to ensure safe passage between destinations.</p> <p>8. Spillages within bunds containing hazardous liquids must be cleared by an approved specialist waste contractor. The ESO must inform the ECO of all spillages as well as the means used to clean them up.</p> <p>9. Storage areas that contain liquids, that could be hazardous to the environment, must be bunded with an approved impermeable liner. Bunds must have the capacity to hold 130% of the quantity of liquid stored (110% statutory requirement plus an allowance for rainfall).</p>		<p>and groundwater pollution Construction staff to be trained in spill management</p>			<p>Plan Provision of spill kits</p>
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<p>10. The quality of the surface water downstream must be monitored, in monthly frequencies at a minimum.</p> <p>11. The quality of marine water near and surrounding the gas pipeline must be monitored, in monthly frequencies at a minimum.</p> <p>12. Wind screening (e.g. fine mesh shade cloth fencing, or solid fencing) must be installed to prevent excessive windblown sand and light-weight solid waste (e.g. litter) entering the Estuary.</p> <p>13. Pollution control measures will be adequately controlled in the Port of Richards bay in terms of the existing rules, port reception facilities, vessel management practices, oil spill contingency plans and other relevant domestic laws.</p>				
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7.7.13. Hazardous Substances Management					
Impact Management Outcome: The management of hazardous substances is undertaken in accordance with the Hazardous Substances Act (Act No. 15 of 1973).					
Impact Management Actions:		Implementation		Monitoring	
<p>1. All hazardous substances must be stored within a secured storage area, with impervious lining and bunding. Drip trays must be used where suitable.</p> <p>2. The choice of location for storage areas must be located more than 50m away from watercourses and sensitive areas. Storage areas must be on level ground.</p> <p>3. Plant and equipment must be maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor</p>	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
	Contractor	Bunding of hazardous storage sites	ESO ECO	Daily Fortnightly	Site inspection of hazardous storage areas and inspection of drip trays and impervious

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<p>must repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.</p> <ol style="list-style-type: none"> 4. Suitably covered receptacles must be available at all times and frequently placed for the disposal of waste oils and greases. All used oils, grease or hydraulic fluids must be placed therein and these receptacles must be removed on a consistent basis for recycling. 5. No smoking is allowed in the vicinity of storage or dispensing areas. 6. Fuel decanting and refuelling must take place within the construction camp only. 50kg of hydrocarbon absorbent must be placed at the construction camp for the handling of accidental spillage. 7. Spill kits must be kept on site and all spills must be immediately cleaned up, treated accordingly and reported to the PM, ESO and ECO. 8. All waste must be stored in designated areas which are isolated from surface drains. Waste storage facilities must be covered to prevent potential contaminant migration. 9. Waste storage facilities must be regularly inspected and replaced when full 10. All concrete mixing must take place at designated areas with an impermeable surface e.g. concrete, tarpaulin. 11. Hazardous storage areas must be 110% bunded with an impermeable liner to protect groundwater quality. 12. Excess concrete, bituminous product, etc. may not be dumped on site in within vacant areas. These must be disposed to a licensed waste disposal site or re-used where feasible. 				surfaces
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CONSTRUCTION PHASE ACTIVITIES

<p>13. No vehicles transporting concrete to or compacting asphalt or any other bituminous product on the site may be washed on site without proper waste water management.</p> <p>14. Lime and other powders must not be mixed during excessively windy conditions.</p> <p>15. All hazardous substances required for vehicle maintenance and repair must be stored in sealed containers for disposal to a registered waste disposal site.</p> <p>16. Drums / tanks must be safely and securely stored in the construction camp in a location as far as possible from any watercourse.</p> <p>17. Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the container must be covered with a lid).</p> <p>18. Transportation of hazardous materials must be in accordance with the National Road Traffic Act and relevant SANS Codes of Practice. Requirements including transporting the hazardous materials in sealed containers or bags, as well as using suitable cover to prevent the materials from spilling over the side of the vehicle during transit.</p> <p>19. Hazardous waste is to be disposed of at a Permitted Hazardous Waste Landfill Site. The contractor must provide proof of disposal.</p> <p>20. The establishment and operation of the site office complex, laydown area and stringing yard must follow a stringent Environmental Management Programme, monitored by an ECO.</p>				
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<p>21. Sufficient ablution facilities must be provided for construction personnel and sited away from high-risk areas. These must be frequently cleared (preferably every two weeks depending on the number of staff).</p> <p>22. The laydown area must be adequately protected against adverse weather conditions, particularly the chemical storage areas, to prevent erosion and run-off of contaminants into the port.</p> <p>23. Strict adherence to TNPA pollution, emergency, and health and safety protocols, MARPOL and other applicable maritime legislation and policies.</p> <p>24. A Spill Prevention and Management Plan must be compiled and implemented. In the event of any significant spill the TNPA must be notified.</p> <p>25. A method statement in respect to the use, handling, storage and disposal of all chemicals as well as anticipated generated waste, must be compiled and submitted as part of any Environmental Management Programme.</p> <p>26. Correct handling, storage and disposal procedures must be followed (e.g., bunded storage areas to contain 110% of volume).</p> <p>27. Maintain vehicles and equipment - no leaking vehicles or equipment to be permitted on site. All vehicles and machinery must be parked or stored on an impervious surface.</p> <p>28. A comprehensive environmental awareness programme must be conducted amongst contracted construction personnel about sensitive estuarine and marine habitats and the need for careful handling and management of chemical substances.</p>					
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29. In the event of a spill, a penalty must be issued and the 'Polluter Pays' principle must be applied for clean-up operations and rehabilitation, if necessary.					
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7.7.14. Sanitation / Ablution Management					
Impact Management Outcome: No pollution or disease arises in terms of poorly maintained ablution / sanitation facilities or lack thereof.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Portable toilets must be maintained in a clean state. Provide portable toilets at the ratio of 1 toilet per 15 workers. All temporary/portable toilets must be secured to the ground to the satisfaction of the PM to prevent them from toppling over or being blown over by wind. 2. No spillage must occur when the toilets are cleaned or emptied and that the contents are removed from the site. The contractor/service provider is to provide proof that the toilets' contents are disposed of at a registered facility. 3. Under no circumstances may open areas or the surrounding bush be used as a toilet facility. 4. Temporary toilet facilities and sanitation facilities must be serviced weekly and locked from casual access by local communities and general public. 5. Ablution facilities must not cause any pollution to any water resource and it must not be a health hazard to the general public.	Contractor	Provision of ablution facilities during construction Management of facilities	ESO ECO	Daily Fortnightly	Proof of servicing and safe disposal

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6. Temporary toilets must not be located closer than 100m from any watercourses. Should these need to be moved closer, the location must be discussed with and approved by the ESO and ECO.					
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7.7.15. Water Management					
Impact Management Outcome: Water for construction is compliant with the requirements of the National Water Act (Act No. 36 of 1998).					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Only municipal or other approved / licenced sources of water must be used for construction on the construction site and in the construction camps. 2. Water for human consumption must be available at the site offices and at other convenient locations on site where work occurs. 3. Washing of clothes, equipment or machinery within any watercourse is prohibited. 4. Site staff are not permitted to use any stream, river, open water body or natural water source adjacent to or within the designated site for any purpose including: bathing, washing of clothing or for any construction or related activities. 5. If any abstraction points or boreholes are to be used, these must be registered and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis. 	Contractor	Water abstraction from municipal sources or licenced sources	ECO	Fortnightly	Site inspection Proof of water use authorisation for the abstraction of water (if applicable).

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<p>6. All polluted run-off must be prevented or treated to acceptable water quality before being discharged into the storm water system.</p> <p>7. Ensure water conservation is being practiced by:</p> <ul style="list-style-type: none"> a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged. 					
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7.7.16. Stormwater Management					
Impact Management Outcome: Avoid, prevent and manage impacts related to stormwater					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
1. Temporary cut off drains and berms must be implemented where required to capture storm water and promote infiltration.					
2. Proper drainage must be in place to channel storm water to prevent soil erosion and the deposition of water into sensitive areas.	Project Manager	Detailed SWMP, if any	ECO	Fortnightly	Approval of SWMP, if any
3. Earth, stone and rubble is to be disposed of so as not to obstruct natural water pathways over the site. i.e.: these					

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<p>materials must not be placed in stormwater channels, drainage lines or rivers.</p> <ol style="list-style-type: none"> 4. An authorised storm water management plan (SWMP) is to be developed and adhered to, so that the stormwater generated on site does not adversely affect the natural watercourses nearby. 5. Storm water runoff must be minimised so that the soil within the area is not subjected to erosion. 6. Ensure that eroded areas are re-vegetated, to ensure reduced sedimentation risk and reduced runoff volumes to streams. 7. Suitable material storage areas must be located up-slope of the main sediment barrier (e.g. sediment fence). 8. Stockpiles kept on site for more than two weeks will require an impervious cover (e.g. builder's plastic or geofabric) to protect against raindrop impact. Stockpiles of sandy material located behind a sediment fence will only need a protective cover if the stockpiles are likely to be exposed to strong winds. 9. Ensure no waste disposal to marine environment. 10. Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; Concrete mixing must be carried out on an impermeable surface; 11. Batching plants areas must be fitted with a containment facility for the collection of cement laden water. 					
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CONSTRUCTION PHASE ACTIVITIES

<p>12. Dirty water from the batching plant must be contained to prevent soil and groundwater contamination</p> <p>13. A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;</p> <p>14. Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;</p> <p>15. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site.</p> <p>16. All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility.</p>					
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7.7.17. Air Quality					
Impact Management Outcome: Minimal dust, emissions and odour due to adherence of management actions					
Impact Management Actions:					
	Implementation		Monitoring		
<ol style="list-style-type: none"> 1. No burning of waste, such as plastic bags, cement bags and litter, is permitted. 2. Use of dust controls methods such as controlling vehicle speed, wetting or screening of stockpiles and the mixing of chemicals must be ensured to minimise excessive dust liberation. 3. Should excessive vehicle emissions be observed, the required maintenance must be done or the equipment removed from site. 	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
	Contractor	Regular dust suppression Maintaining a dust suppression register	ESO ECO	Daily Fortnightly	Site inspection Dust suppression register

CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> 4. A speed limit of 40km/hr must be set for all vehicles travelling over exposed areas or near stockpiles. 5. A complaints register must be provided to report any excessive dust incidents. 6. Contractors must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed. 7. Prevent the excavation, handling and transport of erodible materials under high wind conditions. 		Plant and equipment must be in good working order Ablutions / toilets cleaned weekly				Inspection of Complaints Register relating to dust complaints
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7.7.18. Noise Management					
Impact Management Outcome: Noise management is undertaken in accordance with SANS 10103 and the Occupational Health and Safety Act (Act No. 85 of 1993)					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. 2. Construction activities must be undertaken according to working hours approved by local municipality. Night shift work is not recommended. As a precautionary measure, noisy activities such as vibro-piling (if required) must not occur at night. 3. Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance. 					

CONSTRUCTION PHASE ACTIVITIES

<p>4. Construction vehicles and equipment generating excessive noise must be fitted with suitable noise abatement measures and maintenance undertaken or replaced.</p> <p>5. Construction workers must be provided with proper PPE i.e. ear plugs at activity areas where excessive noise is generated.</p> <p>6. Noise levels must be kept within prescribed limits. All noise and sounds generated must adhere to SANS 10103 specifications for maximum allowable noise levels for rural areas.</p> <p>7. Noise pollution must be minimised to ensure faunal inhabitants are not stressed. Incorporation of suitable sound proofing material within the development may help to minimise noise and limit human interference in the system.</p> <p>8. Proper signage must clearly indicate construction activities and advise landowners of blasting, drilling or other potential sources of disturbance. Any blasting activity must be conducted by a suitably licensed blasting contractor. Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on site.</p> <p>9. A complaints register must be provided to record any complaints regarding excessive noise.</p> <p>10. Periodic terrestrial noise measurements are taken during the construction and operational phases.</p> <p>11. A long-term hydrophone system is installed in the vicinity of the FSRU, LNGC berth, harbour entrance and other</p>	Contractor	Compliance with SANS 10103 and OHS Act Use of appropriate PPE	ESO ECO	Daily Fortnightly	Inspection of Complaints Register Site inspection
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CONSTRUCTION PHASE ACTIVITIES

<p>sensitive areas in Richards Bay to determine the current underwater noise environment.</p> <p>12. A noise impacts monitoring programme must be implemented to validate the predictions made of the impacts of the noise produced by the FPP on the marine ecology. The results of such monitoring must form part of the Site Environmental File, will be valuable in providing understanding of the effects of noise from large vessels on marine biota.</p>					
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7.7.19. Protection of watercourses & estuaries					
Impact Management Outcome: Impact to watercourses and estuaries are managed in adherence to legislation and specialist recommendations					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities. 2. In the event of a spill, prompt action must be taken to clear the polluted or affected areas. 3. Where possible, no development equipment must traverse any seasonal or permanent wetland. 	Contractor	Demarcation of watercourses and sensitive areas maintaining the specified buffers	ECO	Fortnightly	watercourses and sensitive areas are marked as No-Go areas

CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> 4. No return flow into the estuaries must be allowed and no disturbance of the estuarine functional zone should occur apart from the authorised activities. 5. Watercourse or estuary crossings can only be undertaken as per approved site layout plan. 6. There must not be any impact on the long term morphological dynamics of watercourses or estuaries. 7. Existing crossing points must be favoured over the creation of new crossings (including temporary access). 8. The contractors laying the pipes and anchors should minimise the area of seabed disturbed. 9. When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: <ol style="list-style-type: none"> a. Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b. During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c. Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d. Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be 					
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CONSTRUCTION PHASE ACTIVITIES

<p>appropriately and incrementally stabilised as soon as development allows.</p> <p>10. The contractors laying the pipes and anchors should minimise the area of seabed disturbed.</p> <p>11. Construction periods to be scheduled avoiding heavy rain and storm seasons. Historical data must be used for best time period allocation.</p> <p>12. Construction should be scheduled to avoid local species breeding seasons.</p> <p>13. The 200m offset from the water line to the moored vessels to be maintained from the Sand-spit area that has been identified as sensitive.</p> <p>14. No vehicles and machinery shall be refuelled within sensitive coastal areas.</p> <p>15. Disturbance must be kept to a minimum by confining the pipeline laying activity, working barge and/ or excavation/levelling equipment to within the project area.</p> <p>16. Duration of pipe laying and anchorage operations must be minimised as much as possible to reduce suspended sediment loads.</p> <p>17. The sandspit must not be disturbed or utilised during mooring activities. This is a no-go area.</p> <p>18. Mooring must maintain a distance of 200 m from the sandspit.</p> <p>19. No mixing of concrete in the intertidal zone.</p> <p>20. No dumping of construction materials or excess concrete in the intertidal and subtidal zones.</p> <p>21. Water quality monitoring should occur monthly at strategic positions around the gas pipeline and mooring ships.</p>				
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CONSTRUCTION PHASE ACTIVITIES

<p>22. Beyond the headland of the 600 Berth Basin, movement of supporting vessels must be restricted to the main channel only. No vessels may access the Kabeljous Flats.</p> <p>23. Disturbance must be kept to a minimum by confining the pipeline laying activity, working barge and/ or excavation/levelling equipment to within the project area.</p> <p>24. Duration of pipe laying and anchorage operations must be minimised as much as possible to reduce suspended sediment loads.</p> <p>25. Pipe laying and anchorage operations should not take place during inclement weather conditions where risk of disturbance to adjacent areas would be greater.</p> <p>26. The sandspit must not be disturbed or utilised during mooring activities. This is a no-go area.</p> <p>27. Mooring of the FSRU must maintain a minimum distance of 230 m from the sandspit.</p> <p>28. Laying of the pipeline and the anchor legs must be undertaken with as little disturbance of the seabed as possible.</p> <p>29. Monitoring of turbidity levels must be undertaken daily during the pipe laying and anchorage operations. TSS levels may not exceed 20 mg/l.</p> <p>30. Management of all construction activities and site camp/laydown area must be undertaken in accordance with a site specific EMP.</p>					
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7.7.20. Heritage - Areas of Specific Importance		
Impact Management Outcome: Impact to heritage and palaeontological resources are managed in terms of the National Heritage Act		
Impact Management Actions:	Implementation	Monitoring

CONSTRUCTION PHASE ACTIVITIES

1. In terms of the heritage aspect, no sensitive heritage sites were recorded / identified by the relevant specialist. The following are however precautionary measures that should be taken into consideration.	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
2. No heritage sites have been recorded in the study area. The project should be exempt from further HIA mitigation, especially for the maritime aspect since the harbour removed all potential heritage deposits. A Chance Find protocol will be initiated during construction.	Contractor	Demarcation of heritage sites maintaining the specified buffers	ECO	Fortnightly	Heritage sites including graves are marked as No-Go areas
3. If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately.					
4. Contractors must prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the PM or ECO of such discovery.	Palaeontologist/ Archaeologist	Once of	Palaeontologist/ Archaeologist	Duration of construction	
5. Approval must be obtained from the provincial heritage authority, should there be the need to demolish any sites of archaeological and cultural significance. Demolition / construction work must only commence once the provincial heritage authority's approval has being obtained.					
6. Work may only resume once clearance is given in writing by an archaeologist.					
7. If a grave is uncovered on site all work in the immediate vicinity of the graves must be stopped and the PM and ECO informed of the discovery.					
8. The provincial heritage authority must be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial.					
9. An archaeologist must be appointed for the duration of the construction phase of the project.					

CONSTRUCTION PHASE ACTIVITIES

<p>10. The appointed archaeologist must have the requisite experience and knowledge to recognise maritime cultural heritage that may be found in the beach/dune area.</p> <p>11. The appointed archaeologist must do a short induction to familiarise the contractors and workers, including divers, to the potential heritage material artefacts that may be exposed during work. This includes Stone Age, Early Farming Communities, Colonial Period and Shipwreck artefacts and burials.</p> <p>12. Should any heritage artefacts be exposed during marine excavations, work in the immediate area where the artefacts were discovered, shall cease immediately and the on-site archaeologist shall be notified as soon as possible.</p> <p>13. All discoveries shall be reported immediately to the on-site archaeologist so that an investigation and evaluation of the finds can be made. The archaeologist will advise the necessary actions to be taken, including notifying SAHRA and if the artefacts are below the high-water mark, SAHRA's MUCH Unit must be contacted.</p> <p>14. Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and</p> <p>15. Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).</p> <p>16. The preferred alternative from a coastal access perspective is to follow existing servitudes to minimise disruption to coastal access during the operation phase.</p>					
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CONSTRUCTION PHASE ACTIVITIES

7.7.21. Monitoring, Reporting and Record Keeping					
Impact Management Outcome: Impact to the construction site and surrounding areas are minimal as result of adherence to the authorisations and EMPr.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Environmental monitoring must be undertaken by the ESO on a daily basis and by the ECO on a fortnightly basis. 2. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and other environmental authorisations. 3. Contractors must provide proof of disposal of building rubble, domestic waste, industrial waste and hazardous waste to licensed waste disposal or recycling facilities. 4. Complaints received from the community or other I&AP's must be registered and recorded by the Environmental Site Officer and brought to the attention of the ECO and contractors. All relevant parties must respond accordingly. The following information must be recorded in the case of any complaint/incident: <ol style="list-style-type: none"> a. Time, date and nature of complaint; b. Response and investigation undertaken; and c. Corrective and preventative actions taken and by whom. 	ESO Contractor	Establish registers, record of receipts,, environmental file	ESO ECO	Daily Monthly	Proof of registers, receipts and environmental file

CONSTRUCTION PHASE ACTIVITIES

5. All complaints received must be investigated and a response given to the complainant within 7 days.					
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POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

7.8. Post Construction Phase and Rehabilitation Activities

7.8.1. Construction Camp, Construction Areas and Rehabilitation					
Impact Management Outcome: Post-construction and rehabilitation activities are undertaken in accordance with EMPR requirements					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. 2. All remaining construction infrastructure and material / consumables must be removed. 3. The working corridor must be rehabilitated / reinstated once all planting of vegetation has been completed to rectify any damage that may have been caused by heavy machinery. 4. All spillage areas must be cleaned and/or remediated. 5. All remaining waste and litter must be collected and recycled and /or disposed to reputable contractors / licensed facilities. 6. The Contractor must arrange for the cancellation of all temporary services, including but not limited to chemical toilets and waste removal and disposal services. 7. Temporary fences, barriers and demarcations associated with the construction phase are to be removed from the site, unless stipulated otherwise by the Project Developer. 8. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 9. The Contractor must repair any damage that the construction works has caused to neighbouring properties. 	Contractor	Clean rehabilitated site free of litter and construction material	ECO	Fortnightly	Site Inspection, Record Keeping and ECO Reports

POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

<p>10. The Contractor is to check that all watercourses are free from building rubble, spoil materials, debris and waste materials.</p> <p>11. No temporary works, stockpiles or other circumstances that could impede natural water movements or act to concentrate run-off must be removed.</p>					
<p>1. Rehabilitation of vegetation and land areas must be undertaken concurrently with construction activities where possible. Where concurrent rehabilitation is not possible, rehabilitation of relevant areas must be commenced with immediately on completion of construction activities and deconstruction of the construction contractor's camp.</p> <p>2. The undeveloped areas must be rehabilitated to its pre-establishment condition or agreed alternative i.e. hardened areas ripped and vegetated.</p> <p>3. All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation and the vegetation must be disposed to a registered waste disposal site or re-use facilities.</p> <p>4. On completion of all operations, the construction site must be cleared of any contaminated soil accordance with the soil management procedure.</p> <p>5. All excavations and test pits must be backfilled with in-situ material and the areas monitored for subsidence, which must be addressed if detected.</p> <p>6. Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.</p>	Contractor	Clean rehabilitated site free of litter and construction material	ECO	Fortnightly	Site Inspection, Record Keeping and ECO Reports

POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

<p>7. All alien vegetation is to be removed and disposed of. Removal will, to a large extent, be done by hand. Saws may be required in certain cases and specific herbicides may be required (if used, the use of these must be strictly controlled).</p> <p>8. Regular monitoring of the rehabilitated areas must be conducted. Areas that show signs of erosion or where the vegetation has not established successfully must be repaired and / or re-vegetated.</p>				
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7.8.2.Rehabilitation of Watercourses, Estuary and Coastal Environment					
Impact Management Outcome: Post-construction and rehabilitation activities are undertaken in accordance with EMPR requirements					
Impact Management Actions:					
	Implementation		Monitoring		
1. Monitoring is to take place monthly for 1 year pre-construction and then monthly for 1 year post construction so that mitigation measures can be adapted to ensure the development does not have a long-term impact on the SCCs and migratory waders in the area. A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year after the facility has been in operation and should be repeated every 3-5 years. A monitoring plan has been developed for the site and monitoring is currently ongoing. Information obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins et al., 2017.	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
	Contractor	Clean rehabilitated site	ECO	Fortnightly	Site Inspection, Record Keeping and ECO Reports

POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

<ol style="list-style-type: none"> 2. Rehabilitation of vegetation and land areas must be undertaken concurrently with construction activities where possible. Where concurrent rehabilitation is not possible, rehabilitation of relevant areas must be commenced with immediately on completion of construction activities and deconstruction of the construction contractor's camp. 3. Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. 4. Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion. 5. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. 6. The undeveloped areas must be rehabilitated to its pre-establishment condition or agreed alternative i.e. hardened areas ripped and vegetated. 7. All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation and the vegetation must be disposed to a registered waste disposal site or re-use facilities. 8. On completion of all operations, the construction site must be cleared of any contaminated soil accordance with the soil management procedure. 9. All excavations and test pits must be backfilled with in-situ material and the areas monitored for subsidence, which must be addressed if detected. 10. Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural 					
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POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

<p>depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.</p> <p>11. All alien vegetation is to be removed and disposed of. Removal will, to a large extent, be done by hand. Saws may be required in certain cases and specific herbicides may be required (if used, the use of these must be strictly controlled).</p> <p>12. Regular monitoring of the rehabilitated areas must be conducted. Areas that show signs of erosion or where the vegetation has not established successfully must be repaired and / or re-vegetated.</p> <p>13. The assembly basin area and the sandspit must not be disturbed or utilised during construction or during mooring activities. These are no-go areas. Mooring of the FSRU must maintain a minimum distance of 230 m from the sandspit.</p> <p>14. In the unlikely event that <i>Zostera</i> is discovered within project area (i.e., 600 Berth Basin), an offset is proposed replacing like-with-like should it be affected by the powerships and associated infrastructure.</p> <p>15. 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.</p> <p>16. 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.</p> <p>17. Rehabilitation is not confined to physical structures, and rehabilitation may include interventions such as reducing</p>					
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POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

<p>livestock grazing-pressure or reducing the frequency of burning.</p> <p>18. All post-construction building material and waste must be cleared in accordance with the EMPr, before any re-vegetation may take place.</p> <p>19. 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.</p> <p>20. Water utilised for irrigation must be free of any chlorine or contaminants that may negatively affect the plant species.</p> <p>21. 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.</p> <p>22. 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.</p>					
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7.8.3. Monitoring, Reporting, Record Keeping & Compliance and Close-out Audit of Construction and Post Construction Activities		
Impact Management Outcome: Impact to the construction site and surrounding areas are minimal as result of adherence to the authorisations and EMPr.		
Impact Management Actions:	Implementation	Monitoring

POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

1. Environmental monitoring must be undertaken by the Environmental Site Officer on a daily basis and by the ECO on a fortnightly basis.	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>2. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and Environmental Authorisation.</p> <p>3. A close-out inspection must be conducted by the ECO following the post-construction and rehabilitation activities.</p> <p>4. Karpowership must not sign-off on the project and make payment of the final invoice to the Contractor until the close-out inspection is conducted by the ECO and 100% compliance to the EMPr has been achieved.</p> <p>5. Construction and post-construction monitoring is recommended to ensure that any line-related fatalities are documented and addressed immediately.</p>	<p style="text-align: center;">ESO</p> <p style="text-align: center;">Contractor</p>	<p style="text-align: center;">Establish registers, record of receipts, environmental file</p>	<p style="text-align: center;">ESO</p> <p style="text-align: center;">ECO</p> <p style="text-align: center;">Avian Specialist</p>	<p style="text-align: center;">Daily</p> <p style="text-align: center;">Fortnightly</p> <p style="text-align: center;">Monthly, lifespan of project</p>	<p style="text-align: center;">Proof of registers, receipts and environmental file</p>

OPERATION PHASE AND RELATED ACTIVITIES

7.9. Operational Phase and Related Activities

The aim of the Operational Environmental Management Plan (OEMP) is to provide an appropriate mechanism for the Karpowership's environmental management throughout the operational phase of the project. This OEMP therefore stipulates the components of the operational phase that will require ongoing management from an environmental perspective. To achieve this, the OEMP specifies the environmental management actions that Karpowership and all its agents must abide by during the operational phase of the development.

7.9.1. Legislative Requirements					
Impact Management Outcome: Compliance with all environmental legislative requirements during the operational phase of the project.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Compliance with all environmental authorisations and legislative requirements. 2. Compliance with all MARPOL Convention requirements such as the prohibition of discharge of oil, noxious liquid substances, and sewage from vessels into the marine environment. 3. Should any scope changes or amendments to the development, facilities and / or operational activities be considered, an environmental opinion by a qualified EAP or environmental lawyer must be obtained and environmental compliance ensured prior to commencement with the changes. 4. Any changes to the EMPr must be consulted with an independent EAP prior to implementation. 5. All environmental requirements should be reviewed annually to ensure legal compliance. 6. An environmental audit must be undertaken annually by an independent environmental practitioner and the EMPr must be updated as required. 7. A dedicated person must be appointed who will be mandated with ensuring compliance with any Environmental Authorisations granted as well as the supplementary requirements, and any other 	Operations Manager and Project Manager	Appointment of an EAP	EAP ECO	Annually Fortnightly	Site Inspections, Review of Documentation, Annual Report

OPERATION PHASE AND RELATED ACTIVITIES

<p>documentation that will be required to ensure that the proposed works are carried out and maintained into perpetuity.</p> <ol style="list-style-type: none"> 8. All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this. 9. Adherence to port safety regulations and emergency procedures during mooring/operation. 10. The Gas to Power operation must be aware of Transnet National Ports Authority Environmental Management Systems as well as emergency preparedness and response procedures and apply such on an ongoing basis and in the event of emergencies, for example, tidal surge, dust storms and other extreme events. 11. Areas required to be restricted outside of the confines of the Port, as a result of health, safety and security concerns, must be properly cordoned off with signage installed indicating the reason for such restriction. 12. Provide an inventory of waste produced and the nature of waste being produced and cooperate with the Transnet National Ports Authority in every way. 13. A requirement to report environmental accidents and emergencies immediately they occur, to the port captain. 14. A Formal Failure Analysis (FFA) must be conducted to conclude each incident investigation in order to inform preventative measures to be taken in future. 15. Training of emergency response teams to deal with environmental implications of an emergency in addition to the safety implications. 					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>16. Karpowership SA will develop and implement procedures aligned with relevant standards, legislative and key stakeholder (e.g: TNPA) requirements. These procedures will be updated as required during the project lifespan to ensure the procedures remain current and applicable.</p> <p>17. The ship-to-ship transfer of LNG must be managed under an internationally-accredited process via trained personnel to ensure compliance and within clear quality, health and safety regulations.</p> <p>18. Strict adherence to port safety regulations and emergency procedures during mooring and operation.</p> <p>19. Areas required to be restricted outside of the confines of the Port, as a result of health, safety and security concerns, must be properly cordoned off with signage installed indicating the reason for such restriction.</p> <p>20. Shipping:</p> <ul style="list-style-type: none"> a. Provide an inventory of waste produced and the nature of waste being produced and cooperate with the Transnet National Ports Authority in every way. b. A requirement to report environmental accidents and emergencies immediately they occur, to the port captain. c. A Formal Failure Analysis (FFA) must be conducted to conclude each incident investigation in order to inform preventative measures to be taken in future. d. Training of emergency response teams to deal with environmental implications of an emergency in addition to the safety implications. 					
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OPERATION PHASE AND RELATED ACTIVITIES

7.9.2. Marine Environment					
Impact Management Outcome: Minimised impact to the benthic and marine environment from the establishment of the Karpowership.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. 2. Construction of the Powerships including any piling on the land adjacent to the planned Powerships or within 200 m of the sandpit or Kabeljous flats, should be limited to the period from mid-April to mid-September to avoid disturbance to breeding and migratory species 3. Long term monitoring of the receiving water body and marine ecology should be implemented during construction and operation of the proposed FPP facility. 4. Monitoring should follow a BACI (before/after control/impact) approach. At a minimum the temperature of the receiving water body in the vicinity of the discharge should be monitored to validate the modelling results and to ensure compliance with the stipulated water quality guidelines. 5. Intake velocities should be kept as close to 0.15 m/s to ensure that fish and other mobile organisms can escape the intake current. Intake velocities can be reduced through the use of footer values. 	Operations Manager and Project Manager and Engineer	Operation of the Karpowership, FSRU and Gas Pipeline	ECO Marine Specialist	Fortnightly Monthly, lifespan of project	Site inspections

OPERATION PHASE AND RELATED ACTIVITIES

<ol style="list-style-type: none"> 6. Intake structures should not draw in water from the upper meter of the water column. 7. Intake structures should ensure the horizontal intake of water. 8. Cooling water is discharged into the sea at a depth of 8m, as recommended in the modelling report (PRDW 2022). 9. To reduce the risk of recirculation of the discharge back to the intakes, it is recommended that the discharge pipeline running down the vessel hull has a second elbow to discharge horizontally away from the vessel, and that the discharge pipes be positioned as far from the intakes as possible 10. A water quality monitoring programme should be implemented to validate the predictions of the hydrodynamic modelling study and monitor constituents of the effluent. Adaptive management, informed by monitoring results must be implemented to ensure compliance with water quality guidelines. 11. The Powership shall not be operational for 24 hours a day, to reduce chronic exposure of noise to marine organisms. The Powership will operate for a maximum 16.5 hours a day. 12. Maximum power output from the Powership should be avoided. Noise levels produced by the Powership are proportional to the amount of power output, so lower noise levels will be achieved with lower power capacity. 13. In the case that a marine mammal, especially a baleen whale, is in the near vicinity i.e., within 290 m of the FPP, the Powership should not operate at maximum power output, to reduce the noise level produced and thus the chances of disturbing the animal. 					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>14. When moving in and out of the port, the LNGC should not move at maximum speed, so as to reduce the amount of noise produced by its engines.</p> <p>15. A noise impacts monitoring programme must be implemented to validate the predictions made of the impacts of the noise produced by the FPP on the marine ecology. A baseline study of the ecology in the immediate vicinity of the FPP should be undertaken following a before-after-control-impact (BACI) approach. This should include an assessment of the local macrofauna and video surveys and fish sampling to understand the fish community in the nearshore region associated with the Powership. An assessment of the distribution and behaviour of diving seabird in the context of the Powership must also be undertaken. These surveys must be ongoing and following a sampling methodology that is robust when assessing the impacts of the noise produced by the Powership on the distributions of benthic macrofauna, fish, seabirds, and marine mammals.</p> <p>16. The benthic communities surrounding the proposed Powership, FSRU and pipeline locations must be monitored using visual survey techniques, with a focus on extending bathymetric mapping of the calcrete reef.</p> <p>17. Monitoring of infrastructure and general maintenance is required.</p> <p>18. Access of infrastructure and maintenance of infrastructure and services corridor as per port's approvals and procedures.</p> <p>19. Noise level monitoring must performed to measure the ambient noise from the ship. The 50 dBA at 100m levels are to be maintained.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>20. Point source emissions are to be monitored and submitted annually to SAAELIP.</p> <p>21. Plume modelling and managing of the mixing zone to remain within the 1 degree Celsius within 100m radius.</p> <p>22. Discharging from the powership must be as per the environmental authorisation, preferably within the deep water and/or where water circulation by tidal flushing would be maximised.</p> <p>23. To reduce the risk of recirculation of the discharge back to the intakes, it is recommended that the discharge pipeline running down the vessel hull has a second elbow to discharge horizontally away from the vessel, and that the discharge pipes be positioned as far from the intakes as possible.</p> <p>24. Discharges must be compliant with the South African Water Quality Guidelines for Coastal and Marine Waters (DWAF, 1995; DEA, 2018b)</p> <p>25. All effluent and solid (general, hazardous and domestic) waste to be disposed through registered and certified service providers as per the NPA and MARPOL requirements.</p> <p>26. Implementation of awareness, inspections, contingency plans, compliance with port protocols and reporting of environmental incidents.</p> <p>27. An Operations Manual for each operation, including the gas transfer process must be developed and implemented.</p> <p>28. Operational and Emergency procedures must be implemented and adhered to.</p> <p>29. The Emergency Plan must be approved by the Port Authorities and must comply with the MHI Regulations.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>30. The visiting Ship Captains must provide Port Management with their detailed Ship to Ship Cargo Transfer Operations Manual before offloading.</p> <p>31. Only suitably qualified people must be used for all operations. All applicable certificates of conformance must be on site.</p> <p>32. Security measures must be implemented to prevent any unauthorised access.</p> <p>33. Environmental incident reporting to the Port & Authorities must be undertaken as per required timeframes.</p> <p>34. The Port Fire Department will handle all fire-fighting and emergencies.</p> <p>35. Risk reduction programmes must be continually investigated to reduce the impact from accidental fires and explosions on surrounding communities.</p> <p>36. The noise impact from the operating Powerships and FSRU should be measured during the operational phase, to ensure that the impact is within the required legal limit.</p> <p>37. A baseline study of the underwater noise climates in the Port of Richards Bay is initiated.</p> <p>38. Install acoustic enclosures around all major noise emitting components to suppress the noise emissions from equipment such as engines.</p> <p>39. Install Silencers on equipment such as exhaust stacks and turbo chargers.</p> <p>40. The FPP operator must ensure that water temperatures at 100 m from the discharge points are compliant with the Water Quality guideline ecological threshold. This will confirm the performance of the discharge system and the numerical model predictions.</p> <p>41. Disturbance of the seabed should be limited to the minimum area required for construction of the pipeline</p>				
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OPERATION PHASE AND RELATED ACTIVITIES

<p>fixtures. The pipeline or other materials should not be dragged across the seabed.</p> <p>42. The powership attenuates the sound propagation to minimise any residual noise pollution issues.</p> <p>43. Long term monitoring of the receiving water body and marine ecology should be implemented during construction and operation of the proposed FPP facility. Monitoring should follow a BACI (before/after control/impact) approach.</p> <p>44. The benthic communities surrounding the proposed powership, FSRU and pipeline locations should also be monitored using visual survey techniques.</p> <p>45. Participation in and contribution of data to external, long-term monitoring programmes currently being undertaken in the Port is encouraged.</p> <p>46. Consideration must be given to potential sea-level rise and increased storm intensity (refer to Section of Climate Change Impact Assessment) when designing and installing any permanent, non-floating infrastructure.</p> <p>47. Disturbance of the seabed should be limited to the minimum area required for construction of the pipeline fixtures. The pipeline or other materials should not be dragged across the seabed.</p> <p>48. The sandspit and Kabeljous Flat must be designated no-go areas, i.e. these areas may not be utilised in any way to support or facilitate construction/mooring activities, storing of materials, etc.</p> <p>49. Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) motion detection lights should be used wherever possible.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>50. Intake velocities must be kept as close to 0.15 m/s to ensure that fish and other mobile organisms can escape the intake current. Intake velocities can be reduced through the use of footer values.</p> <p>51. Intake structures must not draw in water from the upper meter of the water column; and</p> <p>52. Intake structures must ensure the horizontal intake of water.</p> <p>53. Cooling water is discharged into the sea at a depth of 8m, as recommended in the modelling report (PRDW 2022).</p> <p>54. To reduce the risk of recirculation of the discharge back to the intakes, it is recommended that the discharge pipeline running down the vessel hull has a second elbow to discharge horizontally away from the vessel, and that the discharge pipes be positioned as far from the intakes as possible.</p> <p>55. A water quality monitoring programme should be implemented to validate the predictions of the hydrodynamic modelling study and monitor constituents of the effluent. Adaptive management, informed by monitoring results must be implemented to ensure compliance with water quality guidelines.</p> <p>56. The Powerships must not be operational for 24 hours a day, to reduce chronic exposure of noise to marine organisms. It is expected that the Powerships will operate for 16.5 hours a day.</p> <p>57. Maximum power output from the Powerships must be avoided – contracted capacity of 450MW must be complied with). Noise levels produced by the Powerships are proportional to the amount of power output, so lower noise levels will be achieved with lower power capacity.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>58. In the case that a marine mammal, especially a baleen whale, is in the near vicinity i.e., within hundreds of metres of the Gas to Power project, the Powerships should not operate at maximum power output, to reduce the noise level produced and thus the chances of disturbing the animal.</p> <p>59. When moving in and out of the port, the LNGC must not move at maximum speed, so as to reduce the amount of noise produced by its engines.</p> <p>60. A noise impacts monitoring programme should be implemented to validate the predictions made of the impacts of the noise produced by the Gas to Power project on the marine ecology. Monitoring of the ecology in the immediate vicinity of the Gas to Power project should be undertaken following a before-after-control-impact (BACI) approach. This should include monitoring of the local macrofauna, and video surveys and fish sampling to understand the fish community in the region associated with the Powerships, as well as use of the project area by marine mammals.. Monitoring of the distribution and behaviour of diving seabirds in the vicinity of the Powerships should also be undertaken.</p> <p>61. These surveys should be ongoing and following a sampling methodology that is robust when assessing the impacts of the noise produced by the Powerships on the distributions of benthic macrofauna, fish, seabirds, and marine mammals. If an effect is observed, adaptive management informed by monitoring results must be implemented. The results of such monitoring will be valuable in informing other developments and contributing to the international understanding of the effects of noise from large vessels on marine biota.</p> <p>62. With regard to lighting:</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<ul style="list-style-type: none"> a. Only add light for specific purposes. Remove excess/unnecessary lights, and turn off lights in areas not in use. b. Restrict uplighting and water illumination. c. Use adaptive light controls to manage light timing, intensity and colour. d. Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill. e. Use the lowest intensity lighting appropriate for the task. f. Use non-reflective, dark-coloured surfaces. g. Use lights with reduced or filtered blue, violet and ultra-violet wavelengths. Avoid high intensity light of any colour. h. Implement actions when birds are likely to be present. This includes peak migration periods (flyway locations). i. No light source should be directly visible from foraging or nocturnal roost habitats, or from migratory pathways. j. Install screening/shielding with appropriate materials along the starboard side of the vessels. k. Do not install fixed light sources in nocturnal foraging or roost areas. l. Use curfews to manage lighting near nocturnal foraging and roosting areas in coastal habitats. For example, manage artificial lights using motion sensors and timers from 7pm until dawn. m. Use flashing/intermittent lights instead of fixed beam. n. Use motion sensors to turn lights on only when needed. 					
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OPERATION PHASE AND RELATED ACTIVITIES

<ul style="list-style-type: none"> o. Reduce deck lighting to minimum required for human safety on vessels moored near nocturnal foraging and roost areas. p. Prevent indoor lighting reaching migratory shorebird habitat, by using blinds, curtains, or shutters. q. In facilities requiring intermittent night inspections, turn lights on only during the time operators are moving around the facility. r. Use appropriate wavelength, explosion proof LEDs with smart lighting controls and/or motions sensors. LEDs have no warmup or cool down limitations so can remain off until needed and provide instant light when required for routine nightly inspections or in the event of an emergency. s. Industrial site/plant operators to use personal head torches. t. Undertake a night light audit on a moonless night and 24-hour noise audits in accordance with SANS 10103:2008 on the sandspit and Kabeljous Flats before operations commence to determine the baseline, once operations start and annually thereafter. <p>63. For the transmission lines and ancillary infrastructure:</p> <ul style="list-style-type: none"> a. Approach and general access to the ships should be from the north side. b. No activities (post construction) must occur between the ships and the sandspit, other than activities in direct contact with the vessels, such as ship maintenance. c. Align transmission lines with existing transmission lines d. Mark the lines for visibility. 					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>e. Remove any nests built on powerline structures when not in use, to discourage their re-use.</p> <p>64. The following must be adhered to for noise and lighting:</p> <ul style="list-style-type: none"> a. In respect to noise impacts, layout option 1 must be selected to reduce noise and vibration impacts to surrounding avifauna b. Essential lighting is on at night c. Lumens are kept to a minimum d. Lights are installed as low as possible e. Lit up windows are shuttered at night. <p>65. Only specialist personnel who are well trained on the standard protocols for preparation, coupling and decoupling of the gas pipeline between vessels, may undertake these operations.</p> <p>66. Strict adherence to TNPA pollution, emergency, and health and safety protocols, MARPOL and other applicable maritime legislation and policies for the storage and handling of LNG, and power generation processes.</p> <p>67. A Spill Prevention and Emergency Response Plan must be compiled and implemented. In the event of any significant spill the TNPA must be notified.</p> <p>68. A method statement in respect to the use, handling, storage and disposal of all chemicals as well as anticipated generated waste, must be compiled and submitted as part of any Environmental Management Programme;</p> <p>69. Correct handling, storage and disposal procedures must be followed.</p> <p>70. Conduct a comprehensive environmental awareness programme amongst contracted construction personnel about sensitive estuarine and marine habitats and the</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>need for careful handling and management of chemical substances.</p> <p>71. In response to possible pollution as a result of Shipping activities:</p> <ul style="list-style-type: none"> a. Provide an inventory of waste produced and the nature of waste being produced and cooperate with the TNPA in every way. b. A requirement to report environmental accidents and emergencies immediately they occur, to the port captain; o A Formal Failure Analysis (FFA) must be conducted to conclude each incident investigation in order to inform preventative measures to be taken in future; o Training of emergency response teams to deal with environmental implications of an emergency in addition to the safety implications. <p>72. In the event of a spill, a penalty must be issued.</p> <p>73. To prevent catastrophic accidents impacting on estuarine/marine ecology, avifauna and ecosystem services:</p> <ul style="list-style-type: none"> a. All mitigation measures provided in the Risk Assessment for Major Hazard Installations (MHR, 2022) must be adopted. b. Only specialist personnel who are well trained on the standard protocols for preparation, coupling and decoupling of the gas pipeline between vessels, may undertake these operations. All applicable certificates of conformance must be on site. c. An emergency plan that is compliant with the Major Hazardous Installation Regulations must be compiled and implemented. d. Strict adherence to TNPA pollution, emergency, and health and safety protocols, MARPOL and other applicable maritime legislation and policies for the 					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>storage and handling of LNG, and power generation processes.</p> <ul style="list-style-type: none"> e. Comprehensive safety checks frequently undertaken of all project components and processes. f. Frequent risk assessments and adaptive management where required. g. Good housekeeping to be done daily. <p>74. Monitoring of noise levels at the sandspit and the Kabeljous Flats is recommended at least monthly during operation so these can be compared to the changes in bird populations, if any. In any instance of detectable change, additional means of reducing airborne noise from the powerships must be implemented to prevent lasting impacts on the birdlife.</p> <p>75. Long term monitoring of the receiving water body and estuarine ecology must be implemented during construction and operation of the proposed Gas to Power project. Monitoring must follow a BACI (before/after control/impact) approach. The following monitoring programmes are recommended:</p> <ul style="list-style-type: none"> a. Monitoring of turbidity levels must be undertaken daily during the pipe laying and anchorage operations. Total suspended solid levels may not exceed 20 mg/l. b. Undertake a night light audit on a moonless night and 24-hour noise audits in accordance with SANS 10103:2008 on the sandspit and Kabeljous Flats before operations commence to determine the baseline, once operations start and annually thereafter. c. A water quality monitoring programme must be implemented to validate the predictions of the hydrodynamic modelling study and monitor constituents of the effluent. 					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>d. At a minimum the temperature of the receiving water body in the vicinity of the discharge must be monitored to validate the modelling results and to ensure compliance with the stipulated water quality guidelines.</p> <p>e. A noise impacts monitoring programme must be implemented to validate the predictions made of the impacts of the noise produced by the proposed project on the estuarine ecology. Benthic macrofauna, fish, birds and megafauna communities surrounding the proposed powerships, FSRU and pipeline locations must be monitored (e.g. using grab survey techniques for benthic macrofauna, video monitoring and fish sampling, visual observation) to provide pre-, during, and post- operation scenarios. This must also include areas on the Kabeljous Flats, sandspit and adjacent mangroves.</p> <p>f. Monitoring of the distribution and behaviour of diving seabirds in the context of the powerships should also be undertaken.</p> <p>g. The long-term monitoring of underwater noise in Richards Bay must be conducted.</p> <p>h. Avifauna monitoring is to take place monthly for one (1) year pre-construction and then monthly for one (1) year post construction so that mitigation measures can be adapted to ensure the development does not have a long-term impact on the avifauna Species of Conservation Concern and migratory waders in the area.</p> <p>i. A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>after the facility has been in operation and should be repeated every 3-5 years.</p> <p>j. A monitoring plan has been developed for the site and monitoring is currently ongoing. Information obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins et al., 2017.</p> <p>k. A comprehensive monitoring programme must be implemented to ensure that operation, as well as maintenance, of the Gas to Power project and its various components comply with relevant standards and all environmental, health and safety regulations. All records of discharge volumes and quality are to be kept for auditing purposes.</p> <p>76. These surveys should be ongoing and following a sampling methodology that is robust when assessing the impacts produced by the powerships on the distributions of estuarine biotic communities. Importantly, adaptive management, informed by monitoring results must be implemented to reduce negative impacts and also to ensure compliance with applicable guidelines (e.g. water quality guidelines). Participation in and contribution of data to external, long-term monitoring programmes currently being undertaken in Richards Bay is encouraged.</p> <p>77. During construction, general environmental compliance monitoring must be undertaken by a suitably qualified environmental control officer (ECO) on a weekly basis as a minimum to ensure that basic environmental best practices are followed and that conditions of the environmental authorisation are observed. The presence</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

of an on-site environmental officer is essential to monitor daily activities.					
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7.9.3.Waste Management					
Impact Management Outcome: Environmental impacts during the Operation and Maintenance Phase are managed in terms of Operational Maintenance Management Plan requirements.					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. A procedure and system for the separation, recycling and management of general waste must be adhere to by all operational staff. 2. Waste that cannot reasonably be re-used or recycled must be disposed of via the Municipality’s waste disposal system or disposed to the registered waste disposal site. 3. Oil and grease collected from the on-board kitchens must be disposed of at a reputable recycling company and maintenance records must be kept on file. 4. A hazardous waste collection point must be established to collect all hazardous waste. 5. Hazardous substances spills e.g. oils, grease etc., will have to be monitored and cleaned up on discovery, in accordance with the Oil Spill Emergency Response Plan (OSERP). 6. Contingency measures must be in place to ensure quick detection and repair of leakage or breakage to the sanitation systems, etc. 7. Keep sewage infrastructure plans available for management and maintenance purposes. 8. Leaking systems must be monitored for any pollution of the surrounding environment and repaired as soon as possible. 	Operations Manager and Project Manager	Procedures, Plans and records	ECO	Fortnightly	Site inspections

OPERATION PHASE AND RELATED ACTIVITIES

<p>9. Waste disposal records must be maintained at all times.</p> <p>10. Utilize existing early-warning systems and international standard operating procedures for vessels operating in inclement weather, including evasive action where appropriate. Adherence to port safety regulations and emergency procedures.</p> <p>11. All waste must be removed to an appropriate licensed disposal facility.</p>					
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7.9.4. Socio-Economic Management					
Impact Management Outcome: Socio-economic development is enhanced					
Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. The operator of the Powerships and related infrastructure should be encouraged to, as far as possible, procure materials, goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy.</p> <p>2. Where possible, local labour should be considered for employment to increase the positive impact on the local economy.</p> <p>3. As far as possible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the Powerships and related infrastructure.</p> <p>4. The developer should consider establishing vocational training programmes for the local labour force to promote the development and transfer of skills required by the Powerships and their related infrastructure and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere.</p>	Project Developer	Designated Human Resource / social facilitation team and associated procedures and policies	ESO ECO	weekly Monthly	Review of procurement documentations and records

OPERATION PHASE AND RELATED ACTIVITIES

<ol style="list-style-type: none"> 5. Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy. 6. As far as feasible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the Powerships and their related infrastructure. 7. A social development and economic development programmes should be devised by the developer throughout the project's lifespan. 8. The plan should be developed in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits. 9. These plans should be reviewed on an annual basis and, where necessary, updated. 10. When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises. 11. In devising the programmes to be implemented, the developer should take into account the priorities set out in the local IDP. 12. Consult fishermen during operation to discuss concerns/ issues, such as through an environmental management committee 				
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7.9.5.Maintenance, Refurbishment & Management of the Infrastructure		
Impact Management Outcome: Environmental impacts during the Operation and Maintenance Phase are managed in terms of an Operational Maintenance Management Plan requirements.		
Impact Management Actions:	Implementation	Monitoring

OPERATION PHASE AND RELATED ACTIVITIES

	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> 1. Karpowership must ensure adequate budget, labour and the maintenance and management of the facilities to ensure appropriate aesthetics, surrounding health and the prevention of environmental pollution and degradation. Requirements must include, but not limited to, regular collection of litter and removal of domestic waste and water management. 2. Karpowership must ensure that services infrastructures for water, electricity, sewage, waste and storm water are adequately implemented and maintained in adherence to environmental requirements. 3. All maintenance, refurbishment or related activities during operation must comply with the construction measures detailed in the construction phase of the EMPr. 4. Use environmentally friendly cleaning and dust suppressant products. 5. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. 6. All operation components must be regularly inspected and any structural failures must immediately be reported and the necessary steps must be taken to ensure continued safety. 7. Operating, monitoring / auditing, reporting, emergency and preventative and corrective action procedures must be available and all staff trained in accordance thereto. 8. Inspection of powerlines must occur on a bi-annual basis. 	Operations Manager and Project Manager and Engineer	Standard Operating Procedures	ECO	Fortnightly	Site inspections

OPERATION PHASE AND RELATED ACTIVITIES

<p>9. Maintenance and refurbishment of powerlines must occur when required.</p> <p>10. Any dead bird carcasses must be identified and reported to TNPA and Eskom Environmental Unit</p> <p>11. Access roads must be inspected on a bi-annual basis and reported if quality is deteriorating.</p> <p>12. Limit driving to towers along vehicle tracks to limit disturbance to open areas.</p> <p>13. Report erosion around towers around tower bases and along authorised corridors to landowners and Eskom</p> <p>14. Report litter along authorised corridors to landowners and Eskom.</p> <p>15. All refurbishment waste to be removed, recycled or disposed at a registered landfill site.</p> <p>16. Report growth of trees threatening safety on the electrified conductors to Eskom.</p> <p>17. Quality and safety checks should be undertaken immediately after connection between the LNGCs, FSRUs, and the Powerships to ensure that connection points are secure. Regular inspection of the quality and integrity of the pipeline and connections is recommended to prevent fugitive emissions.</p> <p>18. The fuel lines between the FSRU and the Powership should be double-walled with annular space. Fuel lines should be continuously purged with Nitrogen to render them inert.</p> <p>19. Ongoing maintenance of powerline servitudes and clearing of alien vegetation as per safety protocols to reduce combustible biomass and lower the risk of wildfires.</p> <p>20. The ship-to-ship transfer of LNG must be managed under an internationally-accredited process via trained</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>personnel to ensure compliance and within clear quality, health and safety regulations.</p> <p>21. Quality and safety checks should be undertaken immediately after connection between the LNGCs, FSRUs, and the Powerships to ensure that connection points are secure. Regular inspection of the quality and integrity of the pipeline and connections is recommended to prevent fugitive emissions.</p> <p>22. The fuel lines between the FSRU and the Powership should be double-walled with annular space. Fuel lines should be continuously purged with Nitrogen to render them inert.</p> <p>23. The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.</p> <p>24. Erosion control and alien invasive management plan must be compiled.</p> <p>25. A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.</p> <p>26. Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Clearing beneath transmission lines should be avoided.</p>					
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7.9.6. Monitoring, Reporting, Record Keeping & Compliance
Impact Management Outcome: Impact to the operational site and surrounding areas are minimal as result of adherence to the authorisations and EMPr.

OPERATION PHASE AND RELATED ACTIVITIES

Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Compliance must be ensured with all monitoring, auditing, reporting and record keeping requirements as per approved environmental authorisations e.g. (EA, AEL, permits, licenses and amendments there to), programmes and plans (e.g. monitoring programmes).</p> <p>2. Monitoring data must be assessed and actions must be determined and implemented where a decline in performance is detected e.g. increased consumption may indicate infrastructure leakage, water quality decline may indicate disposal of pollutants to the watercourse or alien invaders spread may indicate control and rehabilitation failures.</p> <p>3. Environmental monitoring must be undertaken by the ECO on a fortnightly basis.</p> <p>4. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and Environmental Authorisations.</p> <p>5. Environmental Audit Report to be completed by an external auditor, in accordance with the requirements of regulation 34 of the NEMA EIA Regulations, 2014 (as amended).</p> <p>6. The noise impact from the proposed project should be measured during the operational phase, to ensure that the impact is within the required legal limit.</p> <p>7. Install acoustic enclosures around all major noise emitting components to suppress the noise emissions from equipment such as engines, exhaust stacks.</p> <p>8. Install silencers on equipment such as exhaust stacks outlets and all air outlets and inlets.</p>	<p>Operations Manager and Project Manager</p>	<p>Establish registers, record of receipts, environmental file</p>	<p>ECO</p> <p>Noise Specialist</p> <p>Marine Specialist</p>	<p>Fortnightly</p> <p>Monthly, for 12 months minimum</p> <p>Monthly, lifespan of project</p>	<p>Site inspections</p>

OPERATION PHASE AND RELATED ACTIVITIES

<p>9. All records of discharge volumes and quality are to be kept for auditing purposes.</p> <p>10. The operator must ensure that water temperatures at 100 m from the discharge points are compliant with the Water Quality guideline ecological threshold. This will confirm the performance of the discharge system and the numerical model predictions.</p> <p>11. All records of discharge volumes and quality are to be kept for auditing purposes.</p> <p>12. There must be an Operations Manual for the transfer process.</p> <p>13. The operations site must be considered an MHI.</p> <p>14. The Emergency Plan must be approved by the Port Authorities. The risks will not impact on any other neighbouring flammable installations.</p> <p>15. Only suitably qualified people must be used for all operations. The visiting Ship Captains must provide Port Management with their detailed STS Operations Manual before offloading.</p> <p>16. All equipment, including radios used within the operations area, must be intrinsically safe.</p> <p>17. Service Logbooks must be kept for all hoses and pipelines and checked regularly.</p> <p>18. The Port Fire Department will handle all fire-fighting and emergencies.</p> <p>19. At a minimum the temperature of the receiving water body in the vicinity of the discharge should be monitored to validate the modelling results and to ensure compliance with the stipulated water quality guidelines.</p> <p>20. The benthic communities surrounding the proposed Powership, FSRU and pipeline locations should also be monitored using visual survey techniques.</p>				
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OPERATION PHASE AND RELATED ACTIVITIES

<p>21. Participation in and contribution of data to external, long-term monitoring programmes currently being undertaken in the Port is encouraged.</p> <p>22. All records of discharge volumes and quality are to be kept for auditing purposes.</p> <p>23. Quality and safety checks undertaken immediately after connection to ensure that connection point is secure. Regular inspection on the quality and integrity of the pipeline and connections to prevent fugitive emissions.</p> <p>24. Where feasible and reasonable, consideration could be given to the purchasing of carbon credits or contribution to carbon capture and storage initiatives to offset some of the project's emissions and account for value-chain emissions/embedded carbon.</p> <p>25. Consideration must be given to potential sea-level rise and increased storm intensity (refer to Section: Climate Change Impact Assessment) when designing and installing any permanent, non-floating infrastructure.</p> <p>26. Project infrastructure located in low-lying areas (i.e., below the 10m elevation contour) and potentially exposed to future extreme events such as coastal storm surges should adopt a precautionary approach to detailed design and location. Similarly, the subsea pipeline, marine hoses, and associated infrastructure located outside of the sheltered port area should be appropriately designed to withstand extreme events under medium- to long-term scenarios, i.e., storms with 1:20 and 1:50 year return periods.</p> <p>27. Existing early-warning systems and international standard operating procedures for vessels operating in inclement weather should be employed and strictly adhered to, including evasive action where appropriate.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>28. Parameters relevant to climate change impacts should be actively tracked, monitored and reported throughout the life of the project. Such measures include but are not limited to: i) GHG emissions meters to ensure efficiency and safety; ii) gas leak detectors so that fuel can be immediately isolated and shut off, the leak identified, and the necessary repairs or replacements made; and iii) air and water temperature monitors to ensure that potentially rising sea-surface and ambient air temperatures do not negatively impact operations and pose a safety hazard.</p> <p>29. A climate change risk register should be developed and periodically updated. The downscaled climate trend analysis (Section 3.3 Climate Change Impact Assessment Report) of this report can be used as a baseline to determine the scope and scale of anticipated climate change impacts at the project site level and inform the climate change risk register. Site-specific safety protocols must cross-reference relevant aspects of the climate risk register.</p> <p>30. Strict adherence to port safety regulations and emergency procedures during mooring and operation.</p> <p>31. During operation, a comprehensive monitoring programme must be implemented to ensure that operation, as well as maintenance, of the Gas to Power project and its various components comply with relevant standards and all environmental, health and safety regulations. This must include water quality monitoring sites around sensitive areas, specifically the Kabeljous Flats and along the sandspit, to verify the outcomes of the thermal plume modelling, as well as monitor any water temperature changes not initially modelled within the 'assembly cove'.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

<p>32. The long-term ecological monitoring of port must be expanded to include sites within sensitive areas, i.e. the Kabeljous Flats and along the sandspit, to detect possible community changes in response to the proposed project, and to establish the possible presence of <i>Z. capensis</i>, as this will add to the habitat complexity and biodiversity of this area.</p> <p>33. Scheduled / routine inspections of the avifauna utilising the sandspit, the adjacent shoreline and shrubland vegetation must be undertaken, including the transmission line route to assess the real impacts on bird populations and to apply adaptive management strategies. Should monitoring detect an emerging problem, recommendations made by the avifaunal expert must be implemented, which may include an offset agreement with the rehabilitation of alternate habitat for birds.</p> <p>34. Usage of the project area by marine megafauna must be monitored during both construction/installation and operation phase to ensure that adaptive management can be applied to reduce negative impacts.</p>					
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OPERATION PHASE AND RELATED ACTIVITIES

PART C: MAINTENANCE MANAGEMENT PLAN FOR THE GAS PIPELINE, THE POWERSHIPS AND THE FSRU

Part C of the EMP is to be used to ensure that maintenance is undertaken for the lifespan of the project.

The objectives of the MMP are:

- To be aligned with the conditions of the EA and approved EMP;
- To recommend appropriate controls and mitigation measures to avoid or minimise the impacts from construction and maintenance activities;
- To ensure successful rehabilitation of the site to pre-construction conditions.

Due consideration has been given to the development in terms of the construction, rehabilitation and operational phases whilst considering the environment. Mitigation measures are provided to ensure:

- Minimising the extent of environmental impact during the life of the project, commencing from planning through to closure.
- Ensuring appropriate rehabilitation of areas affected by construction and operation.
- Preventing and remediating long term environmental degradation.

The MMP will be considered when the proposed maintenance activities constitute any one of the following listed activities identified and applied for in terms of the NEMA EIA Regulations, 2014 (as amended):

LISTED NOTICES	
LISTING NOTICE 1	
Activity No.	Activity Description
Activity 18	<i>The planting of vegetation or placing of any material on dunes or exposed sand surfaces of more than 10 square metres, within the littoral active zone, for the purpose of preventing the free movement of sand, erosion or accretion, excluding where (i) the planting of vegetation or placement of material relates to restoration and maintenance of indigenous coastal vegetation undertaken in accordance with a maintenance management plan</i>
Activity 19	<i>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i> <i>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i> <i>(a) will occur behind a development setback;</i> <i>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</i>
Activity 19A	<i>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—</i> <i>(i) the seashore;</i> <i>(ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or</i> <i>(iii) the sea; —</i>

OPERATION PHASE AND RELATED ACTIVITIES

LISTED NOTICES

LISTING NOTICE 1

Activity No.	Activity Description
	<p><i>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i></p> <p><i>(f) will occur behind a development setback;</i></p> <p><i>(g) is for maintenance purposes undertaken in accordance with a maintenance management plan;</i></p>

LISTING NOTICE 3

Activity No.	Activity Description
Activity 12	<p><i>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><i>i. KZN</i></p> <p><i>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</i></p> <p><i>ii. Within critical biodiversity areas identified in bioregional plans;</i></p> <p><i>iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</i></p>

This Maintenance Management Plan (MMP) is submitted with the agreement to a Maintenance Management Plan in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), and the Environmental Impact Assessment Regulations, 2014 (as amended).

7.9.7. Personal Details

Name of person/authority who will undertake responsibility for the activity:	Karpowership SA (Pty) Ltd		
Contact person (if other):	Mehmet Katmer		
Postal address:	P.O Box 619 Pretoria, Gauteng		
Telephone:	+90 212 295 47 37	Postal Code:	001
Fax:	+90 212 295 47 43	Cell:	083 787 8600
Email:	Mehmet.Katmer@karpowership.com		
Name of person who has prepared the MMP:	Triplo4 Sustainable Solutions (Pty) Ltd		
Contact person (if other):	Hantie Plomp		
Postal address:	P.O Box 6595, Zimbali		

OPERATION PHASE AND RELATED ACTIVITIES

Telephone:	(032) 946 3213	Postal Code:	4418
Fax:	(032) 946 0826	Cell:	083 308 8003
Email:	hantie@triplo4.com		
Name of landowner(s)	Refer to Appendix J		
Contact person (if other):			
Postal address:			
Telephone:			
Fax:			
Email:			
Municipality for proposed project:	Richards Bay Local Municipality		
Farm name(s), erf(s) and portion number(s) etc*:	Remaining Extent of Erf 223 UMhlathuze No. 16230 Portion 45 of Erf 5333 Richards Bay Reminder of Erf 5333 (previously Erf 397) Richards Bay Portion 21 of Erf 5333 Richards Bay Portion 8 of Erf 5333 Richards Bay Reminder of Erf 6363 (previously Erf 6362)		
Magisterial District or Town:	King Cetshwayo District		
Name(s) of watercourse(s) in question:	One artificial dam, one estuary/port waters, three channelled valley bottom (CVB) wetlands, one depression wetland, five floodplain (FP) wetlands, four unchannelled valley bottom (UVB) wetlands, six hillslope seepage wetlands and four river riparian systems. The riverine systems were classified as B channel streams i.e. streams that have presumable flow six to nine months of the year and those that sometimes have baseflow. Refer to Figure 1-2: Sensitivity Map		
*In instances where there is more than one landowner, please attach a list of landowners with their full names, contact details, farm name, farm number, portion number, Erf number, coordinates and signed declaration confirming approval for development and responsibility of the MMP.			

N.B: Appendix J to be included into the final EIR submission.

7.9.8. Authority & Stakeholder Engagement

The following authorities and stakeholders have been consulted to provide input based on the proposed maintenance activities:

Authority	Required involvement
Department of Water and Sanitation	Comment on EIAR and EMPPr, Issuing Water Use Authorisation
Department of Forestry, Fisheries and Environmental (DFFE)	Comment on EIAR and EMPPr, Issuing Environmental Authorisation

OPERATION PHASE AND RELATED ACTIVITIES

Department of Forestry, Fisheries and Environmental (DFFE) – Climate Change; Oceans and Coast; Biodiversity and Protected Areas Directorates	Comment on EIAR and EMPr
Department of Mineral Resources (DMR)	Comment on EIAR and EMPr
Department of Energy (DoE)	Comment on EIAR and EMPr
KZN Department of Economic Development, Environmental Affairs, and Tourism (EDTEA)	Comment on EIAR and EMPr
KZN Provincial Department of Transport	Comment on EIAR and EMPr
KZN Provincial Department of Agriculture	Comment on EIAR and EMPr
uMhlathuze Local Municipality	Comment on EIAR and EMPr
King Cetshwayo District Municipality	Comment on EIAR and EMPr
South African Heritage Resource Agency (SAHRA)	Comment on EIAR and EMPr
Amafa Heritage KZN	Comment on EIAR and EMPr
South African National Roads Agency (SANRAL)	Comment on EIAR and EMPr
Department of Rural Development and Land Reform (DRDLR)	Comment on EIAR and EMPr
Transnet National Port Authority (TNPA)	Comment on EIAR and EMPr
Richards Bay Industrial Development Zone (RBIDZ)	Comment on EIAR and EMPr
Ezemvelo KZN Wildlife	Comment on EIAR and EMPr
South African Maritime Safety Authority (SAMSA)	Comment on EIAR and EMPr
National Energy Regulator of South Africa (NERSA)	Comment on EIAR and EMPr
South Africa Gas Development Corporation (SOC) Limited	Comment on EIAR and EMPr
Department of Human Settlements	Comment on EIAR and EMPr

7.9.9. Public Participation

This MMP is an outcome of the Environmental Impact Assessment Process undertaken for the proposed development. The Public Participation Process was carried out in compliance with the Regulations set out in Chapter 6 of Government Notice No. R. 326 of the National Environmental Management Act (NEMA) (Act No.107 of 1998). Steps were taken to allow opportunity for members of the public and key stakeholders to be involved and participate in the environmental process.

The authorities indicated in the table above will all provided with a copy of the Environmental Impact Assessment Report and given 33 days from 10 November 2022 to 13 December 2022 in which to provide comment. A summary of the public participation will be included in the submission of the final EIR.

7.9.10. Management Specifications

7.9.10.1. Infrastructure Maintenance

The infrastructure corridors must be kept in a stable, sound and serviceable condition in order to maintain safety of users and minimise risk of loss of infrastructure during storm/high tides.

The Construction EMP management specifications contained within this EMPr shall be applicable to any construction work required as part of maintenance work. An ECO shall be appointed for maintenance

OPERATION PHASE AND RELATED ACTIVITIES

construction work only if the work scope is longer than 2 weeks. A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.

7.9.10.2. Alien Invasive Plant Management

The area within 2 metre width of the infrastructure corridors must be kept free of alien invasive plants as listed in the Alien Invasive Species Regulations (2016 and any subsequent amendments) of the National Environmental Management: Biodiversity Act (of 2004). These shall be pulled out by hand as seedlings and the plants removed from the area for disposal. Erosion control and alien invasive management plan must be compiled.

Erosion control and alien invasive management plan must be compiled.

Vegetation clearance must be done in accordance with the approved EMPr.

Clearance of Vegetation

7.9.10.3. No-go areas

The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this. Maintenance workers and staff shall not access private properties at any time and signage must be installed and maintained to discourage public access into private properties from the corridors and trampling of vegetation. All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.

7.9.10.4. Rehabilitation

The objectives of rehabilitation are to ensure that the cleared/disturbed areas along the pipeline route are returned to their pre-construction conditions. This must be achieved through implementing the rehabilitation requirements outlined in this document. Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Clearing beneath transmission lines should be avoided.

7.9.10.5. Safety

Safety/indemnity signage is recommended to make users aware of safety risks due to terrain and location within the HWM of the sea.

7.9.10.6. Local Labour

Wherever possible, local labour shall be used for maintenance work.

OPERATION PHASE AND RELATED ACTIVITIES

7.9.10.7. *Interpretative Signage*

Interpretative signage, encouraging environmental/conservation awareness is encouraged.

7.9.10.8. *Aesthetics*

Signage and infrastructure shall be aesthetically pleasing (and thus maintained in good condition).

Litter shall be controlled – through periodic litter clean ups and/or provision of litter bins.

7.9.11. Method Statements

Method Statements indicate how the Contractor will achieve compliance with environmental legislation, good management practice and the MMP. A site-specific Method Statement will be compiled by all appointed contractors to ensure that all work is undertaken in a practical, efficient and safe manner. Examples of typical construction methodologies has been developed for the purpose of the Draft EIR submission (Refer to Appendix G).

The Method Statement must be developed and detailed for all activities triggering maintenance requirements in terms of NEMA, 2014 (as amended) in order to mitigate potential environmental impacts.

The Contractor must submit any required written Method Statement to the Engineer for approval and must only implement the Method Statement once he has received the Engineer's approval in writing. On receipt of the Method Statement the Engineer must forward a copy thereof to the ECO. Both the Engineer and ECO must review the Method Statement and come to an agreement as to whether the Method Statement is acceptable or requires amendments.

The Method Statement must state clearly:

- Purpose;
- Timing of activities;
- Materials to be used;
- Equipment and staffing requirements;
- Proposed construction procedure designed to implement the relevant environmental specifications;
- The system to be implemented to ensure compliance with the above; and
- Other information deemed necessary by the Contractor, Engineer and/or ECO.

Once a Method Statement is approved it is binding and the Contractor must therefore ensure that all activities, to which the approved Method Statement applies, are carried out accordingly.

7.9.12. Limitations and Assumptions Regarding the Assessment of Impacts

The assumption is that all significant issues have been identified during the development of the MMP as part of the EIR.

Environmental issues, concerns and development constraints were identified using professional judgement, project information, experience of similar projects, a review of available literature, specialist reports, site visits and consultation with the authorities.

The significance of environmental issues was evaluated and mitigation and management measures were identified as part of the MMP development for the Draft EIR.

OPERATION PHASE AND RELATED ACTIVITIES

The effectiveness of the MMP is limited by the level of adherence to the conditions set forth in this report by the Client and the various contractors and agents acting on behalf of the Client.

It is further assumed that compliance with the MMP will be monitored and audited on a regular basis as set out in the MMP. Furthermore, the MMP will form part of the contract document(s) and will be legally binding.

7.10. Decommissioning / Closure Phase and Related Activities

The Karpowership project has a potential lifetime of approximately 20 years. At the end of the Power Purchase Agreement (PPA), the ship will depart the harbour and all pipelines and grid connections which are classified as own built will be decommissioned and the infrastructure subsequently removed. The decommissioning process will begin at the end of the PPA. Prior to commencing decommissioning, the Project will be shut down, de-energised and disconnected from the national grid. The Applicant will give landowners sufficient notice prior to the commencement of the decommissioned activities.

It is not anticipated that the proposed Karpowership project will be decommissioned in the foreseeable future. When decommissioning takes place, the legislation applicable at that time should be complied with, and relevant environmental processes and practices implemented. Therefore, an assessment of impacts for this phase is not applicable at this stage.

In the unlikely event that decommissioning occurs in the foreseeable future, the impacts and associated mitigation measures are expected to be similar to those that take place during the construction phase.

8. CONCLUSION

This EMPr has been compiled using various inputs including the EAPs, specialists, relevant Authorities and I&APs. These inputs facilitated the identification of relevant and implementable mitigation measures, which are to be used by Karpowership, project management, engineers and appointed construction teams upon obtaining of the environmental authorisation and the commencement of the project. Fines / Penalties to be imposed for the transgression of environmental specifications / requirements of this EMPr. In order to ensure compliance, all parties undertaking the planning, construction and operation of this gas to power project must be fully acquainted with the contents of the EMPr. This will ensure that potential negative impacts are identified, avoided or mitigated.

APPENDIX A

ENVIRONMENTAL CODE OF CONDUCT

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on site activities. This environmental code of conduct provides the basic rules that should be strictly adhered to. It is the responsibility of the Environmental Site Officer and ECO to ensure that each contractor, sub-contractor and workforce understand and adhere to the Code of Conduct.

ALL PERSONS ARE OBLIGED TO KEEP TO THE RULES OF THIS CODE OF CONDUCT

ENVIRONMENTAL CODE OF CONDUCT

- Do not waste electricity, water or consumables;
- Only use authorised accesses;
- Do not litter;
- Dispose of solid waste to the correct waste containers provided;
- Prevent pollution;
- Use the toilet facilities provided;
- Do not dispose contaminated waste water to the storm water or the environment;
- Immediately report any spillage from containers, plant or vehicles;
- Do not burn or bury any waste;
- Do not trespass onto private properties;
- Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal;
- Never damage or remove any trees, shrubs or branches unless it forms part of working instructions;
- Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area;
- Know the firefighting procedure and locations of firefighting equipment; and
- Know the environmental incident procedures.

PROJECT START UP INSPECTION SHEET

PROJECT START UP INSPECTION SHEET

PROJECT: _____
CONTRACT NO.: _____
CONTRACTOR: _____

DATE: _____
COMPLETED BY: _____

ES	ENVIRONMENTAL ASPECT	YES NO N/A	COMMENTS	ACTION
PLANNING				
ESTABLISHMENT				
CLEARANCE				

ROUTINE SITE INSPECTION SHEET

ROUTINE SITE INSPECTION SHEET

PROJECT: _____
 CONTRACT NO.: _____
 CONTRACTOR: _____

DATE: _____
 COMPLETED BY: _____

ES	ENVIRONMENTAL ASPECT	YES NO N/A	COMMENTS	ACTION
HOUSEKEEPING				
CONSTRUCTION ACTIVITIES				
REINSTATEMENT AND REHABILITATION				

SITE DECOMMISSIONING INSPECTION SHEET

SITE DECOMMISSIONING INSPECTION SHEET

PROJECT: _____
CONTRACT NO.: _____
CONTRACTOR: _____

DATE: _____
COMPLETED BY: _____

ES	ENVIRONMENTAL ASPECT	YES NO N/A	COMMENTS	ACTION
DECOMMISSIONING OF THE SITE				



APPENDIX E

SITE INSPECTION REPORT STRUCTURE

Purpose of the Site Inspection Report

The purpose of the Site Inspection Report is to describe the results of the site inspections undertaken by the Environmental Control Officer (ECO) or delegated responsible person so that the level of compliance with the Environmental Management Programme (EMPr) can be monitored throughout the contract.

In particular, it will be expected to summarise the following:

- The key results
- Trends observed
- Key issues observed
- Problems encountered
- Actions required and response taken or to be taken
- Recommendations.

The Site Inspection Report should conclude with a commentary on the overall performance of the Contractor in terms of meeting the requirements of individual/groups of Environmental Specifications and/or EMPr as a whole.

Preparation of the Site Inspection Reports

Site Inspection Reports are expected to be prepared regularly throughout a given construction contract, including (but not limited to) the following:

- Prior to the handover of the site to the Contractor
- At regular stages throughout the construction works, and particularly with the commencement of particularly significant activities
- At the decommissioning of the site and prior to the handover of the site to the Employer/Operator.

Recommended Structure for the Site Inspection Reports

The following report structure is suggested for the Site Inspection Report:

Introduction

By way of setting the context for the Site Inspection Report, this section should outline the following:

- The need for the Site Inspections, and reporting.
- Purpose of the Site Inspection Report.
- The scope of coverage of the Site Inspection

Environmental Management Requirements

This section should summarise the environmental requirements for the contract and for the construction works, and against which environmental performance is assessed.

Methodology

This should describe the activities undertaken during the particular site inspection, such as:

- A site walkabout with the Project Manager (PM).
- A review of documents and records, such as complaints records and/or incidents reports maintained by the Contractor and/or ECO.
- Consultations with pertinent parties on site.

APPENDIX E

Findings of the Site Inspection

This should contain reference to the following:

- A commentary on the level of compliance with key aspects of the Environmental Specifications, as listed in the checklist(s).
- Details of issues, infringements, problems and non-compliances encountered.
- Recommendations on actions to be undertaken to address any issues, infringements and/or non-compliances.

Conclusions

This should include an overall statement on the level of compliance observed during the site inspection.

Annexures

Annexures should be used to store supporting information to the main document, such as:

- Photographs.
- A quick reference, summary table of issues of concern and the necessary corrective measures required to address these issues

APPENDIX F

GENERIC CONSTRUCTION METHOD STATEMENTS

APPENDIX G

ENVIRONMENTAL AUTHORISATION AND AMENDMENTS