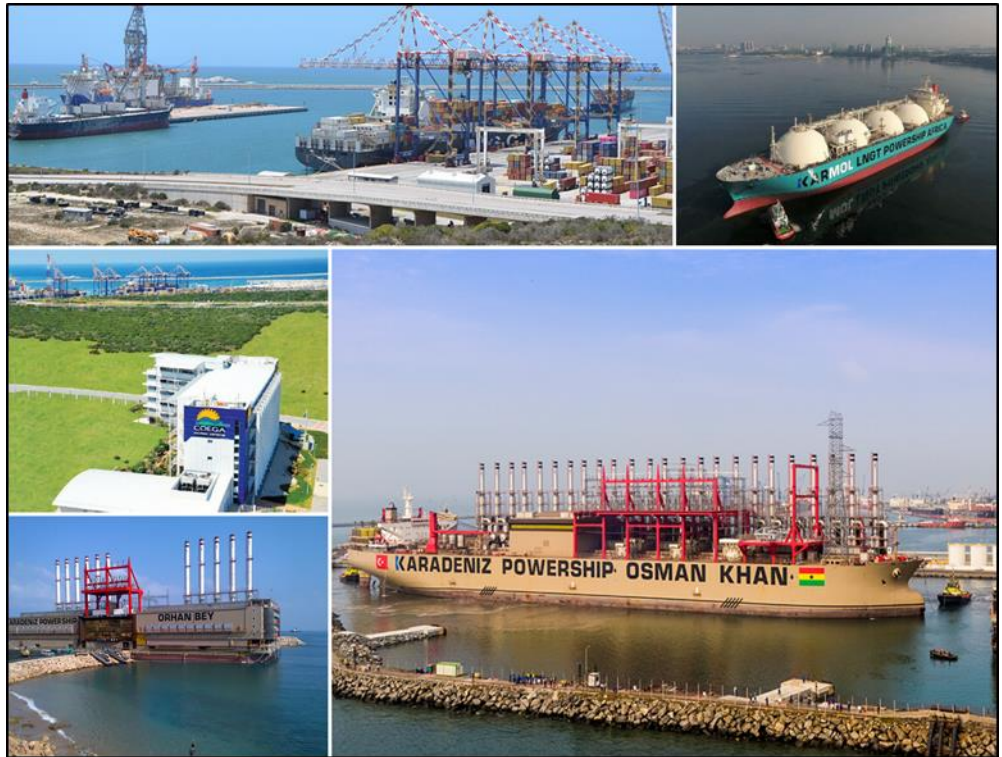


# ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) FOR THE GAS TO POWER VIA POWERSHIP PROJECT AT PORT OF RICHARDS BAY AT UMHLATHUZE LOCAL MUNICIPALITY, KING CETSHWAYO DISTRICT, KWAZULU-NATAL

A Project for Karpowership



FEBRUARY 2021



## DESCRIPTION

**Client / Applicant:** Karpowership SA (Pty) Ltd

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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.

### **Construction camp**

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 material 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 EMP, ensuring liaison between the Project Developer the Contractor and relevant authorities and reporting on the verified compliance with the EMP.

### **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 EMP 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 EMP.

**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 Environmental Affairs, Forestry & Fisheries (DEFF) 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 Statement**

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***

Excavated material which is unsuitable for use as 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

CA	Competent Authority
CBA	Critical Biodiversity Areas
DEFF	Department of Environmental Affairs, Forestry & Fisheries
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
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
MARPOL	The International Convention for the Prevention of Pollution from Ships
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
PoS	Plan of Study
SAELIP	South African Atmospheric Emission Licencing and Inventory Portal.
SAHRA	South African Heritage Resources Agency
SEZ	Special Economic Zone
SDF	Spatial Development Framework
TNPA	Transnet National Ports Authority
UNCLOS	United Nations Convention of the Law of the Sea

# 1. INTRODUCTION

## 1.1. PROJECT DESCRIPTION

The Karpowership project generates electricity from two floating mobile Powerships moored in the Port of Richards Bay. Three ships will be berthed at any one time, during the project's 20 year lifespan (as per the RMIPPPP requirements) - a Floating Storage Regasification Unit (FSRU) and two Powerships. A Liquefied Natural Gas Carrier will supply the Liquefied Natural Gas (LNG) to the FSRU over a 1-to-2 day period approximately every 20 to 30 days. The LNG is then converted to Natural Gas (NG) and pumped from the FSRU to the Powership via a gas pipeline. The design capacity for the Powerships is 540MW, which comprises 27 gas reciprocating engines having an approximate heat input of over 10MW each. The 3 steam turbines have a heat input of 15.45MW each. The power that is generated is then converted by the on-board High Voltage substation and the electricity evacuated via a 132kV transmission line over a distance of approximately 3km to the tie in point to the Eskom line, at a connection point (necessitating a new switching station) in proximity to the existing Bayside Substation, which feeds into the national grid.

The project is anticipated to make a notable contribution towards the national and local economy. There will be a significant number of local employees for both the construction and operation period which will exceed the Economic Development criteria that must be reached under the terms of the RMIPPPP.

The Powerships and FSRU are to be moored in the protected waters within the Port of Richards Bay. 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. No marine structures are planned, and the mooring system for the vessels will be heavy chain lying on the seabed attached to anchors (anchor piles or vertical load anchors) which will become buried in a very short time. The vertical load anchors are by design buried during the installation and the intention is to install the anchor piles such they are flush or below the surrounding sea bed.

The key criteria for the mooring site are sufficient space for turning the LNG Carrier (LNGC) as well as the approach channel shared with the container terminal to allow the safe passing of other traffic including container vessels, cargo vessels and tugs, and maintain the safety exclusion zone required for the ship-to-ship transfer of the LNG to the FSRU.

In terms of alternatives, two alternative mooring sites for the Powerships were being considered. The first option is to position the two Powerships in a closer position to the transmission line on land. The second is to position the two Powerships further away from the land and the connection to the transmission line. The depth of the water in which the ships will be positioned is approximately 14m. The gas pipeline that connects from the FSRU to the Powerships will be routed along the seabed and the length of the pipeline route alternatives is in direct relations to the positions of the Powerships alternatives. From the Powerships, transmission line will connect to a new switching station and into the national grid and two alternatives were assessed for the transmission line route.

As the Powerships, FSRU and LNG carrier arrive in South African waters fully equipped and ready for operation, construction is limited to the transmission and gas supply lines and associated infrastructures.

The aspects of the activity that are covered by the EMPr:

- Two Powerships;
- FSRU;
- LNGC for refuelling;
- Gas pipeline;
- 132 kV Transmission Lines;
- Switching Station; and
- Temporary laydown area for the installation of the gas pipeline

The Powerships and FSRU are to be moored in the protected waters within the Port of Richards Bay. The preferred positions alternative for the Powerships is supported from the engineering design perspective, as the Powerships are positioned within the dead-end basin adjacent to the break bulk quay /multi-purpose terminal, and thus located closer to the first tower of the transmission line, positioned on the main land 'promontory' adjacent to the large mangrove stand, and positioned further away from the sensitive sand bank (a 200m offset from the water line to the moored vessels maintained). This alternative position was approved by TNPA in Richards Bay for the power barges in the 2015 study, and thus in line with their port planning. This alternative was assessed by the specialists and no fatal flaws were identified.

A subsea gas pipeline will be installed along the toe of the existing dredged slopes between the floating storage regasification unit (FSRU) and Powerships to ensure gas supply for power generation. The preferred route alternative for the gas pipeline is directly influenced by the preferred position of the Powerships in relation to the position of the FSRU. The route is approx. 1700 meters in length, and is preferred from an engineering perspective, as it is in line with the preferred position of the Powerships and the FSRU within the port, positioning the Powerships in closer proximity to the land and the transmission line. From the marine ecology perspective, both alternatives for the gas pipeline route were assessed to have the same impacts during the operational phase, and no fatal flaws were identified by the other specialists.

The power from the Powership will be evacuated by means of a double circuit twin Tern conductor 132kV line. This line will interconnect the Powership to the National Grid utilising the existing Impala – Bayside network via a new 132kV on shore switching station. The preferred transmission line route runs from the moored Powerships to the first tower, then 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 Manzamnyama Canal, before heading north and finally in a westerly direction before reaching its end point. The location of the route is in transformed areas or in highly degraded areas adjacent to transformed areas, and a large portion of this alternative follows the route of the existing powerline servitude. The existing servitude will be used for access for the majority of this route, and an additional access / working servitude will be required between the port and the Manzamynama Canal as well as from the start point to the Harbour arterial road. Relevant specialists' studies (e.g. terrestrial assessment and wetland assessment) are in supported of the preferred transmission line route.

Figures 1-1, 1-2 and 1-3 below present the various components of the project as well as the sensitivities on site and existing structures and infrastructure within the site and adjacent area.



Figure 1-1: Google image showing the Gas to Power via Powership Project (preferred alternatives) – Port of Richards Bay

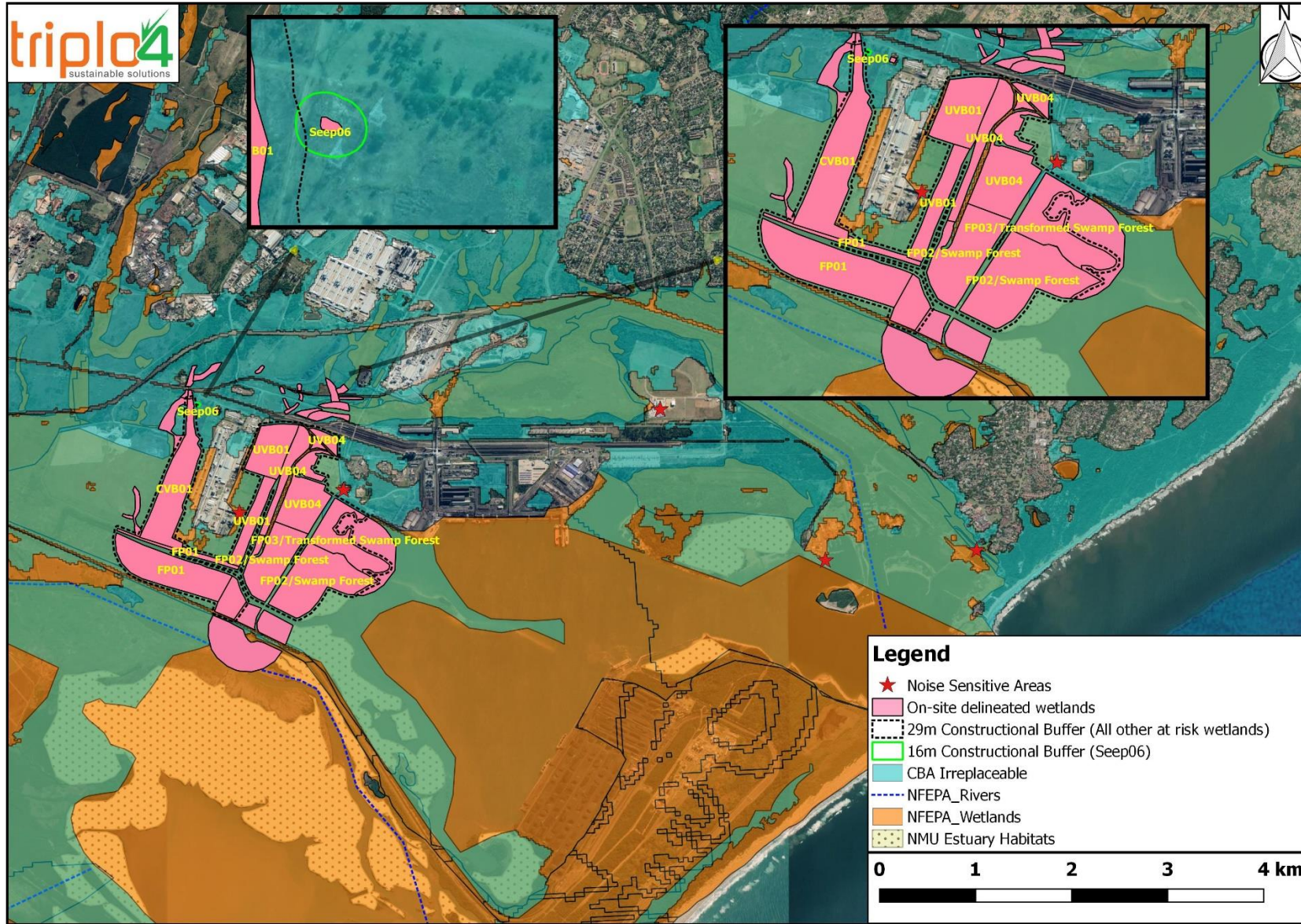


Figure 1-2: Sensitivity map for the Gas to Power via Powership Project – Port of Richards Bay

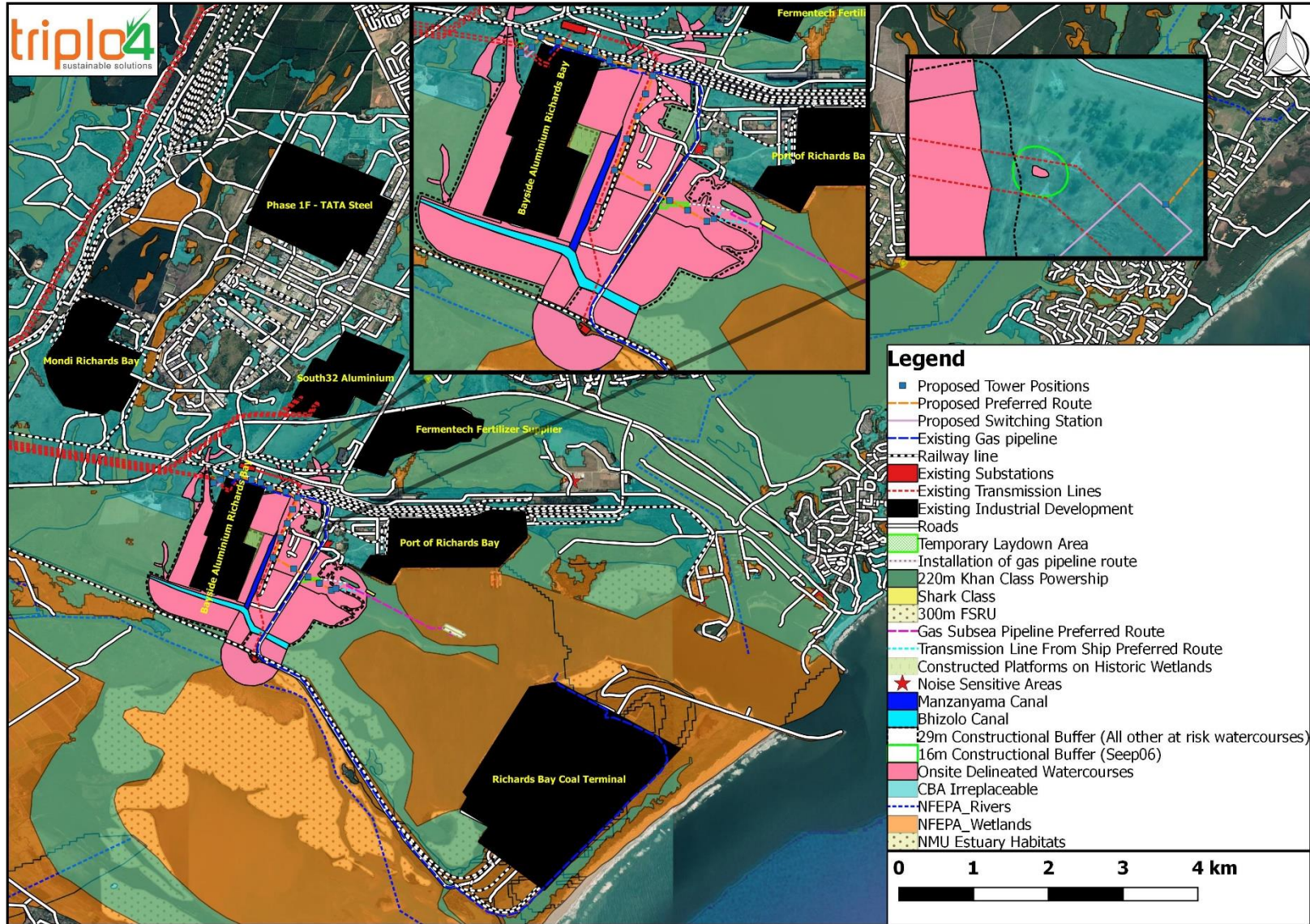


Figure 1-3: Cumulative map for the Gas to Power via Powership Project – Port of Richards Bay



The Powership engine technology provides for dual fuel usage and is capable of utilizing both Liquid Natural Gas (LNG) and Heavy Fuel Oils (HFO) as primary fuel sources. As indicated in the accepted Final Scoping Report, the HFO is not being considered further as an alternative fuel due to the significant advantages of the LNG. The operating fuel for power generation will be from LNG only and will not consume HFO for any part of the generation process. All relevant licenses, permits and approvals are for the consumption and use of LNG only. Specialists' studies had assessed the fuel alternatives and identified that the use of LNG will have less potential impacts than the HFO, in terms of impacts on air quality and the marine environment.

The Powership's 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 locations where high levels of organic or inorganic dusts exist. 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.

The FSRU regasifies the required amount of LNG and sends this to the Powership in gaseous form (NG) continuously through a connecting pipeline. The NG is supplied to the engines. The engines in operation drive the 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 proposed switching station and into the national grid.

The FSRU is specifically designed, constructed and equipped to supply the fuel gas required for the power generator engines installed on the Powerships.

A subsea gas pipeline will be installed along the toe of the existing dredged slopes between the floating storage regasification unit (FSRU) and Powerships to ensure gas supply for power generation and connected to the vessels via a flexible marine hose riser. It is anticipated that subsea gas pipeline will have a servitude of approximately 10m to allow for mounting and protection, as well as the foundations of the three PLEMs (Pipeline end manifolds). The pipelines will be made of steel, engineered to meet the standards for natural gas pipelines with a diameter of approximately 60cm.

The temporary laydown area for the installation of the gas pipeline is adjacent to the existing harbour arterial and within a historically transformed area due to previous disturbance. This area will be rehabilitated after the completion of the installation of the pipeline.

The proposed connection point of the 132kV powerline from the Powership into the existing Eskom electricity grid is a new 132kV switching station situated alongside the Bayside substation

## 2. SCOPE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

This EMPr addresses the following phases of the development:

### (a) Planning, Design and Pre-construction 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 described 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

### **7.2.1 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
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Contact Person	Hantie Plomp		
Telephone Number	032 946 3213	Fax Number	032 946 0826
Mobile number	083 308 8003	Email	<a href="mailto:hantie@triplo4.com">hantie@triplo4.com</a>

The Management Authority responsible for environmental authorisation and compliance is the Department of Environment, Forestry and Fisheries.

## 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.

### **Mr Suheil Malek Hoosen - Masters in Environmental Science**

Suheil Malek Hoosen is a Wetland Specialist with Triplo4 Sustainable Solutions, who holds a Master's Degree in Environmental Science with over 5 years of environmental experience in Wetland Ecology. He has been responsible for conducting Wetland Delineation and Functional Assessments, Wetland Rehabilitation Plans and Vegetation Impact Assessments. He has previously worked as a Wetland Specialist at KSEMS Environmental Consulting and Aeon Nexus, being involved in overseeing over 75 specialist projects. He is a fully registered SACNASP professional (*Pr.Sci.Nat.*) within the Environmental Science field of practice.

This document was reviewed by:

### **Mrs. Melissa Gopaul (nee Padayachee) - Honours in Environmental Management**

Melissa Gopaul is a Senior Environmental Consultant and Project Manager with Triplo4 Sustainable Solutions with more than 7 years of environmental consulting experience. She is registered as professional natural scientist with the South African Council for Natural Scientific Professions (SACNASP) and as an EAP with EAPASA. Melissa has formed part of the Risk Committee with monthly reporting since 2019 and is in charge of evaluating any potential future risks to the company's operations. She has been conducting environmental impact assessments, 24G rectification processes as well as water use licenses for various projects such as mixed-use developments, commercial, coastal developments, industrial townships and associated infrastructure, and filling stations. Melissa's experience includes compilation of environmental management programmes (Elaleni Coastal Forest Estate, Hyde Park Estate, Malachite Park, Jozini Filling Station, Tugela Filling Station, Mpophomeni Shopping Centre, etc.). Melissa is also responsible as a Project Manager for coordinating the project and resource planning, progress reporting and troubleshooting for projects. She also conducts public participation processes, develop and distribute reports, liaise with clients, NGO's and departmental authorities. She is able to identify practical and achievable mitigation and management strategies and the development of appropriate management plans. She has gained the ability to conduct compliance evaluation inspections (environmental control officer duties) for the purpose of

achieving environmental goals. She holds her Honours in Environmental Management which was attained in 2016 through University of South Africa.

**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 HaskoningDHV 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: DEFF Environmental Authority Contact Detail**

Name of Authority	Department of Environment, Forestry and Fisheries		
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 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 the 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.

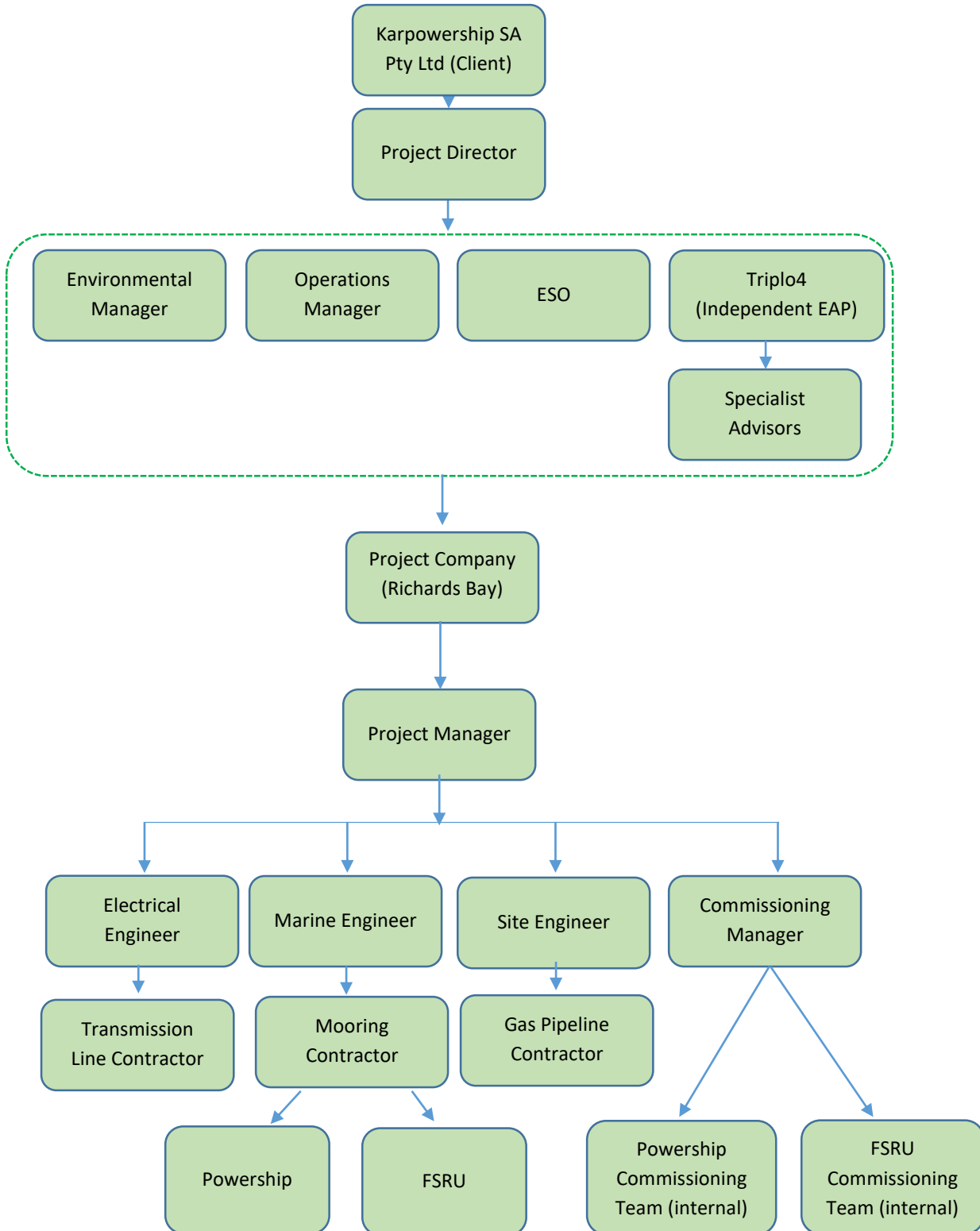


Figure 4-1. Organogram of formal responsibilities and reporting structure for the implementation of the gas to energy project.

**Table 4-1: Roles and Responsibilities**

<b>PROJECT DIRECTOR</b>
<p><b>Role:</b> 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 &amp; safety, time and cost management for all project sites.</p> <p><b>Responsibilities:</b> <i>The Project Director must:</i></p> <ul style="list-style-type: none"> <li>• Be fully conversant with the EA and EMPr for the project and all other environmentally-related licences and permits;</li> <li>• Make provision for monitoring the implementation of the EMPr throughout the project by means of site inspections and meetings.</li> </ul>
<b>ENVIRONMENTAL MANAGER</b>
<p><b>Role:</b> 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><b>Responsibilities:</b> <i>The Environmental Manager must:</i></p> <ul style="list-style-type: none"> <li>• Be fully conversant with the EA and EMPr for the project and all other environmentally-related licences and permits;</li> <li>• Ensure that all stipulations within the EMPr are communicated and adhered to by the Project Developer and its Contractor(s);</li> <li>• Make provision for monitoring the implementation of the EMPr throughout the project by means of site inspections and meetings.</li> <li>• Overall management of the project and EMPr implementation; and</li> <li>• Ensure that periodic site inspections are undertaken on the project implementation.</li> </ul>
<b>OPERATIONS MANAGER</b>
<p><b>Role:</b> Responsible for commissioning teams and plant management.</p> <p><b>Responsibilities:</b> <i>The Operations Manager must:</i></p> <ul style="list-style-type: none"> <li>• Be fully conversant with the EA and EMPr for the project and all other environmentally-related licences and permits;</li> <li>• Ensure that all stipulations within the EMPr are communicated and adhered to by the project teams and its Contractor(s).</li> </ul>
<b>PROJECT MANAGER (PM) or (Developer’s Engineering Representative on Site)</b>
<p><b>Role:</b> 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><b>Responsibilities:</b> <i>The PM must:</i></p> <ul style="list-style-type: none"> <li>• Enforce the environmental specification on site;</li> <li>• Be fully conversant with the conditions of the EA, EMPr and all other environmentally-related licences and permits;</li> </ul>

- 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 record.

### 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 all 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 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 and the PM;
- 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 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 timeously for all activities requiring special attention as specified and / or requested by the Project Manager, ECO and/or Engineer during the duration of the Contract.



- Be conversant with the requirements of this environmental specification/ EMPr. Brief all his/ her 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 utilized within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf.
- Bear the cost of any delays, with no extension of time granted, should he or his 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.
- Ensure that he informs the Engineer timeously of any foreseeable activities which will require input from the ECO.
- The Contractor will conduct all activities in a manner that minimizes 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;
- Ensuring 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. The training will be a once-off event. 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 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 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 is 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 inspections with findings and corrections to the ECO for consideration during the ECO visits to be conducted during the construction phase.

Monitoring of the activity 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 EMPr 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 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.

### 7.2.2 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.

### 7.2.3 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 Environmental Affairs (DEFF). 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.

#### **7.2.4 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 should 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 Contractor and their sub-contractor(s), service providers and supplies 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 EMPr. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his responsibility to recover the fine from the relevant employee. The Contractor shall also 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. Spot fines shall

be between R100.00 and R20 000.00, but not limited to, depending upon the severity of the infringement. 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 list may be amended provided it is formally issued to the Contractor prior to an incident for which a penalty is imposed. 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.

#### **7.2.5 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 camp;
- 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;
- Additional fines as determined by the ECO and added to this list; and
- Damage to any identified heritage sites.

The Engineer shall retain records for spot fines issued. Monies for the spot fines will be deducted from the Contractor's monthly certificate. 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 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.

### **7.2.6 PROCEDURES AND CONTENT**

The Contractor shall submit a written Method Statement to the Engineer for approval, and shall only implement a Method Statement once s/he has received the Project Manager's approval 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, to allow the Engineer and ECO time to study and approve the Method Statement. The Engineer shall strive to review and approve the Method Statement within 7 working days of receipt thereof.

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.

### **7.2.7 REQUIRED METHOD STATEMENTS**

Method Statements that are identified and required from the Contractor in terms of this EMPr may cover, for example, the following activities:

- Location, layout and preparation of the construction camp(s) 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;
- Incidence Response Method Statements (including details of methods for fuel spills and clean-up operations);
- Solid waste management and removal of waste from site;
- Erosion Control Method Statement; and
- Traffic diversions (only to be done in consultation with Traffic Authority).



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 construction camp and stockpiling;
- Clearing of indigenous vegetation;
- Clearing of alien invasive plants;
- Levelling out the ground;
- Installation of stormwater drains;
- Installation of sewerage system;
- Installation of electrical conduits, overhead powerlines and equipment;
- Installation of communication systems;
- Improving the access road to site and establishment of working servitude;
- Erecting fencing;
- Planting and watering of revegetated areas; and
- Generation and temporary storage of waste.

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

- Disturbance to the sandbar;
- Pollution of the marine environment;
- Disturbance to the estuarine environment;
- Impact to CBA Irreplaceable area;
- Destruction 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 with, *inter alia*, the disposal of waste, spillage, storage, noise and dust control, selection of sites, preservation and re-establishment of indigenous vegetation, sediment management, the demarcation of sensitive areas and management of the different phases of construction and operation.

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

## 7. DETAILED ENVIRONMENTAL MANAGEMENT PROGRAMME

This Section provides environmental specifications that must be adhered to during the planning, pre-construction, construction, post-construction (with rehabilitation activities) and operational phases of the Project. It is essential that all listed specifications are considered and appropriately incorporated into the planning, design and/or contract documentation, and adhered to during the respective phases of the project.

The listed environmental specifications must be regarded as the minimum range of environmental constraints, controls, procedures and/or standards. They must not be regarded as exhaustive and therefore improvements and/or amendments must be made where reasonable and required.

Such requirements may be identified by stakeholders and/or other interested and affected parties, upon which the EMPr and the relevant environmental specifications may require revision. Environmental specifications have been listed in tables in the sub-sections as per the following phases:

- Planning, Design and Pre-Construction phase;
- Construction phase
- Post-Construction Phase and Rehabilitation Activities
- Operational Phase

For each phase and specification the responsible monitoring party/parties and frequency, where relevant, is indicated.

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

The following will provide environmental specifications for the 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.

## TRANSMISSION LINE - PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

### 7.2. Planning, Design & Pre-Construction Activities

<b>7.2.1 Environmental Training Awareness</b>					
<b>Impact Management Outcome:</b> All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.					
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"> <li>1. All staff must receive environmental awareness training prior to commencement of the activities;</li> <li>2. The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;</li> <li>3. Refresher environmental awareness training is available as and when required;</li> <li>4. All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;</li> <li>5. The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum:                             <ol style="list-style-type: none"> <li>a) Safety notifications; and</li> <li>b) No littering.</li> </ol> </li> <li>6. Environmental awareness training must include as a minimum the following:                             <ol style="list-style-type: none"> <li>a) Description of significant environmental impacts, actual or potential, related to their work activities; and</li> <li>b) Mitigation measures to be implemented when carrying out specific activities;</li> <li>c) Emergency preparedness and response procedures;</li> <li>d) Emergency procedures;</li> </ol> </li> </ol>	ECO & Contractor	Weekly toolbox talks and awareness training	ECO	Fortnightly	Record of attendance to the toolbox talks and awareness training must be filed in the Site Environmental File

## TRANSMISSION LINE - PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<p>e) Procedures to be followed when working near or within sensitive areas;</p> <p>f) Wastewater management procedures;</p> <p>g) Water usage and conservation;</p> <p>h) Solid waste management procedures;</p> <p>i) Sanitation procedures;</p> <p>j) Fire prevention; and</p> <p>k) Disease prevention.</p> <p>7. A record of all environmental awareness training courses undertaken as part of the EMP must be available;</p> <p>8. Educate workers on the dangers of open and/or unattended fires;</p> <p>9. A staff attendance register of all staff to have received environmental awareness training must be available.</p> <p>10. Course material must be available and presented in appropriate languages that all staff can understand.</p> <p>11. Prior to any clearance of vegetation comprising indigenous elements, this be walked over by a qualified botanist in the summer period to ensure no SSC are present. This must be done as removal or destruction of any SSC required permits from the relevant authorities.</p> <p>12. 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 Port / Harbour Zone.</p>					
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<b>7.2.2 Access restricted areas</b>					
<b>Impact Management Outcome:</b> Impact on No-Go areas are avoided through effective demarcation and management of these areas					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
1. Identification of access restricted areas is to be informed by	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring</b>

## TRANSMISSION LINE - PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<p>the environmental assessment, site walk through and any additional areas identified during development;</p> <p>2. 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; and</p> <p>3. Unauthorized access and development related activity inside access restricted areas is prohibited.</p>	<p>Ecologist and ECO</p>	<p>Demarcation of sensitive areas with danger tape or barrier netting and identification of floral species of conservation concern</p>	<p>ESO ECO</p>	<p>Daily Fortnightly</p>	<p><b>compliance</b>  Site Inspection</p>
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## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

### 7.3. Construction Phase Activities

<b>7.3.1 Site Establishment</b>					
<b>Impact Management Outcome:</b> Impacts relating to site establishment are minimised.					
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"> <li>1. A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;</li> <li>2. Location of camps 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;</li> <li>3. Sites must be located where possible on previously disturbed areas;</li> <li>4. The camp must be fenced in accordance with <b>Section 7.3.3: Fencing and gate installation</b>; and</li> <li>5. The use of existing accommodation for contractor staff, where possible, is encouraged.</li> </ol>	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

<b>7.3.2 Access roads</b>
<b>Impact Management Outcome:</b> Construction vehicle movement are restricted to approved routes

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

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"> <li>1. Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorized area;</li> <li>2. An access agreement must be formalized and signed by the DPM, Contractor and landowner before commencing with the activities;</li> <li>3. The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities;</li> <li>4. All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition</li> <li>5. All contractors must be made aware of all these access routes.</li> <li>6. Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense;</li> <li>7. Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads;</li> <li>8. In circumstances where private roads must be used, the condition of the said roads must be recorded; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor;</li> <li>9. Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands</li> <li>10. Access roads must only be developed on pre-planned and approved roads.</li> </ol>	Contractor	Access routes must be mapped prior to construction	ESO ECO	Fortnightly	Site Inspection



## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<b>7.3.3 Fencing and gate installation</b>					
<b>Impact Management Outcome:</b> Construction of fencing and gate should not occur within sensitive environments					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>
<ol style="list-style-type: none"> <li>1. Use existing gates provided to gain access to all parts of the area authorised for development, where possible;</li> <li>2. Existing and new gates to be recorded and documented;</li> <li>3. All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner;</li> <li>4. At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;</li> <li>5. 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;</li> <li>6. Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate;</li> <li>7. Original tension must be maintained in the fence wires;</li> <li>8. All gates installed in electrified fencing must be re-electrified;</li> <li>9. All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities;</li> <li>10. Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause harm to the sensitive flora;</li> <li>11. Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner.</li> <li>12. All fencing must be developed of high quality material bearing the SABS mark;</li> </ol>	Contractor	Access routes must be mapped prior to construction	ESO ECO	Fortnightly	Site Inspection

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>13. The use of razor wire as fencing must be avoided;</p> <p>14. 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;</p> <p>15. On completion of the development phase all temporary fences are to be removed;</p> <p>16. The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.</p>					
<b>7.3.4 Water Supply Management</b>					
<b>Impact Management Outcome:</b> Water for construction is compliant with the requirements of the National Water Act (Act No. 36 of 1998).					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
<p>1. All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis;</p> <p>2. The Contractor must ensure the following:</p>	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river;</p> <p>b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and</p> <p>c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented.</p> <p>3. Ensure water conservation is being practiced by:</p> <p>a. Minimising water use during cleaning of equipment;</p> <p>b. Undertaking regular audits of water systems; and</p> <p>c. Including a discussion on water usage and conservation during environmental awareness training. The use of grey water is encouraged.</p>	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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<b>7.3.5 Storm and waste water management</b>					
<b>Impact Management Outcome:</b> Avoid, prevent and manage impacts related to storm and waste water.					
Impact Management Actions	Implementation		Monitoring		
1. 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;	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>2. 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;</li> <li>3. Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO;</li> <li>4. Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in 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.</li> </ol>	Project Manager	Detailed SWMP	ECO	Fortnightly	Approval of SWMP
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### 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
<ol style="list-style-type: none"> <li>1. All measures regarding waste management must be undertaken using an integrated waste management approach;</li> <li>2. Sufficient, covered waste collection bins (scavenger and</li> </ol>					

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>weatherproof) must be provided;</p> <p>3. A suitably positioned and clearly demarcated waste collection site must be identified and provided;</p> <p>4. The waste collection site must be maintained in a clean and orderly manner;</p> <p>5. Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;</p> <p>6. Staff must be trained in waste segregation;</p> <p>7. Bins must be emptied regularly;</p> <p>8. General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company;</p> <p>9. Hazardous waste must be disposed of at a registered waste disposal site;</p> <p>10. Certificates of safe disposal for general, hazardous and recycled waste must be maintained.</p>	Contractor	Bundling 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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### 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
<p>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;</p> <p>2. In the event of a spill, prompt action must be taken to clear the polluted or affected areas;</p> <p>3. Where possible, no development equipment must traverse any seasonal or permanent wetland</p>					

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>4. No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur;</p> <p>5. Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available;</p> <p>6. There must not be any impact on the long term morphological dynamics of watercourses or estuaries;</p> <p>7. Existing crossing points must be favored over the creation of new crossings (including temporary access).</p> <p>8. 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.</p> <p>9. 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>10. 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>11. Mangrove and swamp forest habitat must be avoided.</p> <p>12. 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"> <li>a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse</li> <li>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;</li> <li>c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be</li> </ul>	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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## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and</p> <p>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>					
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<b>7.3.8 Vegetation clearance</b>					
<b>Impact Management Outcome:</b> Vegetation clearance and associated impacts are minimised through adherence of EMPr vegetation clearance requirements.					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
<b>General:</b>	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>
1. Indigenous vegetation which does not interfere with the development must be left undisturbed;					

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>2. Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species;</li> <li>3. 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 development or clearing;</li> <li>4. Permits for removal must be obtained from the Department of Agriculture, Forestry and Fisheries prior to the cutting or clearing of the affected species, and they must be filed;</li> <li>5. 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;</li> <li>6. Trees felled due to construction must be documented and form part of the Environmental Audit Report;</li> <li>7. Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;</li> <li>8. Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained;</li> <li>9. A daily register must be kept of all relevant details of herbicide usage;</li> <li>10. No herbicides must be used in estuaries;</li> <li>11. All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to <b>Section 7.2.2: Access restricted areas</b>.</li> <li>12. 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.</li> </ol>	Contractor	Working within demarcated areas AIP eradication and control	ESO ECO	Weekly Fortnightly	Site Inspection
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## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p><b>Servitude:</b></p> <ol style="list-style-type: none"> <li>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;</li> <li>2. Where clearing for access purposes is essential, the maximum width to be cleared within the servitude must be in accordance to distance as agreed between the land owner and the EA holder</li> <li>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;</li> <li>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;</li> <li>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;</li> <li>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.</li> </ol>					
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<b>7.3.9      Protection of fauna</b>		
<b>Impact Management Outcome:</b> Impacts on fauna are minimised through adherence of EMPr requirements.		
<b>Impact Management Actions</b>	<b>Implementation</b>	<b>Monitoring</b>

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> <li>1. No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present;</li> <li>2. The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme;</li> <li>3. 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;</li> <li>4. Nesting sites on existing parallel lines must be documented;</li> <li>5. Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds;</li> <li>6. Bird guards and diverters must be installed on the new line as per the recommendations of the specialist;</li> <li>7. 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;</li> <li>8. No deliberate or intentional killing of fauna is allowed;</li> <li>9. In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages;</li> <li>10. 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.</li> <li>11. As frogs can be excellent indicators of habitat quality and disturbance, it is recommended that regular amphibian surveys be conducted as part of a monitoring plan for the Karpowership site and Transnet port area as a whole.</li> <li>12. A walk-through must be done prior to construction to locate any nests, especially of any Species if Conservation</li> </ol>	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

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>Concern, which then should be dealt with on a case-by-case basis by an avifauna specialist.</p> <p>13. Construction should be timed to avoid breeding periods and movement times of fauna.</p> <p>14. Speed limits should be posted and not exceed 40km/hr, especially at night when nocturnal and crepuscular species tend to rest on roads.</p>					
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<b>7.3.10 Protection of heritage resources</b>					
<b>Impact Management Outcome:</b> Impacts on heritage resources are minimised through adherence of EMPr requirements.					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
<ol style="list-style-type: none"> <li>1. Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in <b>Section 7.2.2: Access restricted areas</b>;</li> <li>2. Carry out general monitoring of excavations for potential</li> </ol>	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

fossils, artefacts and material of heritage importance; 3. All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/paleontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.	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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### 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

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
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; 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

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<b>7.3.12 Sanitation</b>					
<b>Impact Management Outcome:</b> 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"> <li>1. Mobile chemical toilets are installed onsite if no other ablution facilities are available;</li> <li>2. The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances;</li> <li>3. Where mobile chemical toilets are required, the following must be ensured:                             <ol style="list-style-type: none"> <li>a) Toilets are located no closer than 100 m to any watercourse or water body;</li> <li>b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause;</li> <li>c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr;</li> <li>d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out;</li> <li>e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours;</li> <li>f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards;</li> <li>g) A copy of the waste disposal certificates must be maintained.</li> </ol> </li> </ol>	Contractor	Provision of ablution facilities during construction Management of facilities	ESO  ECO	Daily  Fortnightly	Proof of servicing and safe disposal

<b>7.3.13 Prevention of disease</b>
<b>Impact Management outcome:</b> All necessary precautions linked to the spread of disease are taken.

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

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"> <li>1. Undertake environmentally-friendly pest control in the camp area;</li> <li>2. Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS;</li> <li>3. The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area;</li> <li>4. Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;</li> <li>5. Free condoms must be made available to all staff on site at central points;</li> <li>6. Medical support must be made available;</li> <li>7. Provide access to Voluntary HIV Testing and Counselling Services.</li> </ol>	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
<ol style="list-style-type: none"> <li>1. Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the project;</li> <li>2. The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;</li> </ol>					

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<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 a fire as soon as it starts;</p> <p>5. In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see <b>Hazardous Substances section 7.3.15</b>).</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. The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible;</p> <p>2. All hazardous substances must be stored in suitable containers as defined in the Method Statement;</p> <p>3. Containers must be clearly marked to indicate contents, quantities and safety requirements;</p> <p>4. 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>5. Bunded areas to be suitably lined with a SABS approved liner;</p> <p>6. An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;</p> <p>7. All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);</p> <p>8. All employees working with HCS must be trained in the safe use of the substance and according to the safety data</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

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>sheet;</p> <p>9. Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;</p> <p>10. The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;</p> <p>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);</p> <p>12. The floor of the bund must be sloped, draining to an oil separator;</p> <p>13. Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;</p> <p>14. All empty externally dirty drums must be stored on a drip tray or within a banded area;</p> <p>15. No unauthorised access into the hazardous substances 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. Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;</p> <p>19. 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>					
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## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>20. The responsible operator must have the required training to make use of the spill kit in emergency situations;</p> <p>21. An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; and</p> <p>22. 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 <b>Section 7.3.5 for procedures concerning storm and waste water management and 7.3.6 for solid and hazardous waste management.</b></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		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<p>1. Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area;</p> <p>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. The relevant local authority must be made aware of a fire as soon as it starts;</p> <p>3. Leaking equipment must be repaired immediately or be removed from site to facilitate repair;</p> <p>4. Workshop areas must be monitored for oil and fuel spills;</p> <p>5. Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;</p> <p>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</p>	Contractor	Bunding of storage sites and inspection of equipment	ESO ECO	Daily Fortnightly	Site inspection of hazardous storage area, inspection of drip trays and impervious surfaces; and inspection and maintenance of onsite equipment

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

6. Water drainage from the workshop must be contained and managed in accordance <b>Section 7.3.5: storm and waste water management.</b>					
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### 7.3.17 Batching Plants

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

Impact Management Actions	Implementation		Monitoring		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
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 10 m 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 licenced 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 <b>Section 7.3.18: Dust emissions</b> )	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

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>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;</p> <p>10. Temporary fencing must be erected around batching plants in accordance with <b>Section 7.3.3: Fencing and gate installation.</b></p>					
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<b>7.3.18 Dust emissions</b>					
<b>Impact Management outcome:</b> Dust prevention measures are applied to minimise the generation of dust.					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>
<p>1. Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO;</p> <p>2. Removal 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;</p> <p>3. Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;</p> <p>4. During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level;</p> <p>5. Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;</p> <p>6. Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of</p>	Contractor	Regular dust suppression techniques conducted.	ESO ECO	Daily Fortnightly	Site inspection of areas susceptible to dust and ensure suppression techniques are conducted.

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

the ECO; 7. Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas; 8. Straw stabilisation must be applied at a rate of one bale/10 m <sup>2</sup> and harrowed into the top 100 mm of top material, for all completed earthworks; 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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<b>7.3.19 Noise</b>					
<b>Impact Management Outcome:</b> 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 level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency 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. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers; 4. Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities	Contractor	Compliance with SANS 10103 and OHS Act Use of appropriate PPE	ESO ECO	Daily Fortnightly	Inspection of Complaints Register Site inspection

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>must still meet the impact management outcome related to noise management.</p> <p>5. Construction staff should receive “noise sensitivity” training including the switching off vehicles when not in use and the location of noise sensitive areas.</p> <p>6. 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

<b>Impact Management Outcome:</b> Fire prevention measures are carried out in accordance with the relevant legislation.					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
<ol style="list-style-type: none"> <li>1. Designate smoking areas where the fire hazard could be regarded as insignificant;</li> <li>2. Firefighting equipment must be available on all vehicles located on site;</li> <li>3. The local Fire Protection Agency (FPA) must be informed of construction activities;</li> <li>4. Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site; Two way swop of contact details between ECO and FPA.</li> </ol>	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>
	Contractor	Awareness Training	ECO	Fortnightly	Site Inspection

### 7.3.21 Stockpiling and stockpiling areas

<b>Impact Management outcome:</b> Erosion and sedimentation as a result of stockpiling are reduced.		
<b>Impact Management Actions</b>	<b>Implementation</b>	<b>Monitoring</b>

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>1. All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies;</li> <li>2. All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods; Topsoil stockpiles must not exceed 2 m in height;</li> <li>3. During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.);</li> <li>4. Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.</li> </ol>	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
	Contractor	Bunding of stockpiling areas	ESO ECO	Daily Fortnightly	Site inspection of stockpiling areas.

### 7.3.22 Finalizing tower position

**Impact Management outcome:** No environmental degradation occurs as a result of the survey and pegging operations.

Impact Management Actions	Implementation		Monitoring		
<ol style="list-style-type: none"> <li>1. No vegetation clearing must occur during survey and pegging operations;</li> <li>2. No new access roads must be developed to facilitate access for survey and pegging purposes;</li> <li>3. Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas;</li> <li>4. 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.</li> <li>5. The existing pylon servitude adjacent to the Manzanymama Canal and the existing berms must be used as the preferred</li> </ol>	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

route to minimise the disturbance footprint to the adjacent intertidal sand/mudflats of the canal.					
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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		
	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> <li>1. All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a recognised disposal site, if not used for backfilling purposes;</li> <li>2. Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;</li> <li>3. Management of equipment for excavation purposes must be undertaken in accordance with <b>Section 7.3.16: Workshop equipment maintenance and storage</b>; and</li> <li>4. Hazardous substances spills from equipment must be managed in accordance with <b>Section 7.3.15: Hazardous substances</b>.</li> <li>5. Batching of cement to be undertaken in accordance with <b>Section 7.3.17 : Batching plants</b>;</li> <li>6. Residual cement must be disposed of in accordance with <b>Section 7.3.6: Solid and hazardous waste management</b>.</li> </ol>	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.

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

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"> <li>1. Prior to erection, assembled towers and tower sections must be stored on elevated surface (suggest wooden blocks) to minimise damage to the underlying vegetation;</li> <li>2. In sensitive areas, tower assembly must take place off-site or away from sensitive positions;</li> <li>3. The crane used for tower assembly must be operated in a manner which minimises impact to the environment;</li> <li>4. The number of crane trips to each site must be minimised;</li> <li>5. Wheeled cranes must be utilised in preference to tracked cranes;</li> <li>6. Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of environmental impact;</li> <li>7. Access to tower positions to be undertaken in accordance with access requirements in specified in Section 8.4: Access Roads;</li> <li>8. Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in Section 8.10: Vegetation clearing;</li> <li>9. No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor;</li> <li>10. Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites;</li> <li>11. Topsoil must be stored in heaps not higher than 1m to prevent destruction of the seed bank within the topsoil;</li> <li>12. Excavated slopes must be no greater than 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes;</li> <li>13. Fly rock from blasting activity must be minimised and any pieces greater than 150mm falling beyond the Working Area,</li> </ol>	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections



## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>must be collected and removed;</p> <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 5.29: 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. Power lines must be marked with flags to increase the likelihood that at risk species will see the lines.</p> <p>21. Bird guards should be placed on monopoles where there is a risk of electrocution through shorting circuits.</p>					
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<b>7.3.25 Stringing</b>		
<b>Impact Management outcome:</b> No environmental degradation occurs as a result of stringing.		
<b>Impact Management Actions</b>	<b>Implementation</b>	<b>Monitoring</b>

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

	Responsible person	Method of implementation	Responsible Person	Frequency of monitoring	Mechanism for monitoring compliance
<ol style="list-style-type: none"> <li>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;</li> <li>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;</li> <li>3. Refueling of the winch and tensioner stations must be undertaken in accordance with Section 5.17: Hazardous substances;</li> <li>4. In the case of the development of overhead transmission and distribution infrastructure, a one meter "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;</li> <li>5. Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter;</li> <li>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;</li> <li>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 reasonable notice, in writing;</li> <li>8. Where stringing operations cross cultivated land, damage</li> </ol>	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections

## TRANSMISSION LINE - CONSTRUCTION PHASE ACTIVITIES

<p>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;</p> <p>9. Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries.</p>					
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## TRANSMISSION LINE – POST-CONSTRUCTION AND REHABILITATION PHASE ACTIVITIES

<b>7.3.26 Temporary closure of site</b>					
<b>Impact Management outcome:</b> 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
<ol style="list-style-type: none"> <li>1. Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in <b>sections 7.3.6: management of hazardous substances</b> and <b>7.3.16 workshop, equipment maintenance and storage</b>;</li> <li>2. Hazardous storage areas must be well ventilated;</li> <li>3. Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;</li> <li>4. Emergency and contact details displayed must be displayed;</li> <li>5. Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;</li> <li>6. Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;</li> <li>7. Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;</li> <li>8. Structures vulnerable to high winds must be secured;</li> <li>9. Wind and dust mitigation must be implemented;</li> <li>10. Cement and materials stores must have been secured;</li> <li>11. Toilets must have been emptied and secured;</li> <li>12. Refuse bins must have been emptied and secured;</li> <li>13. Drip trays must have been emptied and secured.</li> </ol>	Contractor	Preventative measures adhered to	ECO	Fortnightly	Site inspections

## TRANSMISSION LINE – POST-CONSTRUCTION AND REHABILITATION PHASE ACTIVITIES

<b>7.3.27 Landscaping and rehabilitation</b>					
<b>Management Objective:</b> Activities post-construction and rehabilitation are in line environmental best practice					
<b>Management Outcome:</b> Post-construction and rehabilitation activities are undertaken in accordance with EMPR requirements as well as Rehabilitation Plans.					
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"> <li>1. 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;</li> <li>2. Wetland Rehabilitation Plan (Appendix F) must be adhere to and implemented.</li> <li>3. All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983</li> <li>4. 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, No 43 of 1983;</li> <li>5. 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;</li> <li>6. Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners;</li> <li>7. Rehabilitation of tower sites and access roads outside of farmland;</li> <li>8. Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;</li> <li>9. Stockpiled topsoil must be used for rehabilitation (refer to Section <b>7.3.21 Stockpiling and stockpiled areas</b>);</li> <li>10. Stockpiled topsoil must be evenly spread so as to facilitate</li> </ol>	Contractor	Clean rehabilitated site free of litter and construction material	ECO	Fortnightly	Site Inspection, Record Keeping and ECO Reports

## TRANSMISSION LINE – POST-CONSTRUCTION AND REHABILITATION PHASE ACTIVITIES

<p>seeding and minimise loss of soil due to erosion;</p> <ol style="list-style-type: none"> <li>11. Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;</li> <li>12. Subsoil must be ripped before topsoil is placed;</li> <li>13. The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;</li> <li>14. Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled ;</li> <li>15. 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;</li> <li>16. Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil.</li> <li>17. 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:             <ol style="list-style-type: none"> <li>a) Annual and perennial plants are chosen;</li> <li>b) Pioneer species are included;</li> <li>c) Species chosen must be indigenous to the area with the seeds used coming from the area;</li> <li>d) Root systems must have a binding effect on the soil;</li> <li>e) The final product must not cause an ecological imbalance in the area</li> </ol> </li> <li>18. An alien invasive plant management plan needs to be compiled and implemented post rehabilitation to control current invaded areas and prevent the growth of invasive plants on cleared areas.</li> <li>19. Monitoring plan of alien invasive plants must be implemented to prevent streamflow reduction on the Mhlatuze River.</li> </ol>					
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## TRANSMISSION LINE – POST-CONSTRUCTION AND REHABILITATION PHASE ACTIVITIES

20. Karpowership should, in conjunction with Transnet, develop and implement a rehabilitation plan for the modified habitat areas where these will be left natural in the future even after planned port expansion.					
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## TRANSMISSION LINE – POST-CONSTRUCTION AND REHABILITATION PHASE ACTIVITIES

<b>7.3.28 Socio-economic</b>					
<b>Impact Management outcome:</b> Socio-economic development is enhanced.					
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible person</b>	<b>Method of implementation</b>	<b>Responsible Person</b>	<b>Frequency of monitoring</b>	<b>Mechanism for monitoring compliance</b>
<ol style="list-style-type: none"> <li>1. Develop and implement communication strategies to facilitate public participation;</li> <li>2. Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;</li> <li>3. Sustain continuous communication and liaison with neighboring owners and residents</li> <li>4. Create work and training opportunities for local stakeholders; and</li> <li>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.</li> </ol>	Operations Manager, Project Manager and Engineer	Interview process	Operations Manager	Fortnightly	Site inspections

<b>7.3.29 Monitoring, Reporting, Record Keeping &amp; Compliance</b>					
<b>Impact Management Outcome:</b> Impact to the operational site and surrounding areas are minimal as result of adherence to the authorisations and EMPr.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>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. rehabilitation plan, monitoring programmes).</li> <li>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</li> </ol>	Operations Manager and Project Manager	Establish registers, record of receipts, environmental file	ECO	Fortnightly	Site inspections



## TRANSMISSION LINE – POST-CONSTRUCTION AND REHABILITATION PHASE ACTIVITIES

<p>watercourse or alien invaders spread may indicate control and rehabilitation failures.</p> <ol style="list-style-type: none"> <li>3. Environmental monitoring must be undertaken by the ECO on a fortnightly basis.</li> <li>4. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and Environmental Authorisations.</li> <li>5. Installation of piezometric seepage boreholes only if major pollution is evident and after liaison and permission from the Department of Water Affairs. The boreholes can be positioned downstream of the transmission lines.</li> <li>6. Monitoring must be done to determine the rate of electrocution, as well as which species are affected.</li> <li>7. Monopoles and lines must be regularly checked for any faults that may result in increased risk of electrocution.</li> <li>8. New lines should be monitored monthly for a year to determine avifaunal mortality as a result of collisions and adaptive management techniques put in play to reduce impacts, or confirmation of low mortality levels.</li> </ol>					
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## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

### 7.4. PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE DEVELOPMENT OF THE GAS PIPELINE, THE POWERSHIPS AND THE FSRU

The following will provide environmental specifications for the development of the gas pipeline, the Powerships 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 powerships and the FSRU.

### 7.5. Planning and Design Phase & Pre-Construction Activities

<b>7.5.1. Administrative and Legal Requirements</b>					
<b>Impact Management Outcome:</b> All construction work must comply with the conditions of the relevant authorisations, licences and permits.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. All environmental legal requirements must be identified and 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.</li> <li>2. Appoint an EAP and conduct the required environmental processes in terms of the NEMA, NEM:WA &amp; NEM:AQA to ensure legal compliance, when relevant.</li> <li>3. Confirm that in a case of any changes to the original design / layout, that these do not trigger additional activities that were not applied for nor authorised.</li> <li>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.</li> <li>5. Consider and implement where feasible favourable socio-economic options / solution, including but not limited to low maintenance infrastructure, incorporation with existing</li> </ol>	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

facilities and infrastructure and logistical arrangements and implementation of low energy or renewable energy options. 6. Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the project. 7. The ERAP must deal with accidents, potential spillages and fires in line with relevant legislation. An Oil Spill Emergency Response Plan (OSERP) must be developed. 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.					
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### ***7.5.2.Roles and Responsibilities for Environmental Management***

**Impact Management Outcome:** The implementation of the environmental management plan and environmental management on-site.

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
(i) 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. (ii) 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. (iii) Karpowership and appointed contractors must ensure that all permanent and temporary staff, sub-contractors and suppliers adhere to this EMPr. (iv) Karpowership must appoint a senior staff member directly involved in the site construction activities as the <b>Environmental Site Officer (ESO)</b> before commencement of activities. This person will ensure the implementation of and adherence to the EMPr in the	Karpowership	Environmental Authorisation, EMPr, licences and permits must be included in the tender documents and the Contractor	ECO	Fortnightly	Agreements and Appointment

**PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES**

<p>contractor's execution of the day-to-day construction activities.</p> <p>(v) The environmental responsibility of the ESO must be specified in this person's duties, which will also include:</p> <ul style="list-style-type: none"> <li>a. Liaison with the appointed ECO;</li> <li>b. Ensuring environmental awareness among members of the workforce;</li> <li>c. Ensuring that the Contractor/s and members of the construction workforce are aware of the requirements of the EMPr;</li> <li>d. The on-site implementation of the EMPr;</li> <li>e. Monitoring inappropriate behaviour, environmental impacts, including pollution and environmental incidents; and</li> <li>f. The implementation of corrective action.</li> </ul> <p>(vi) 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:</p> <ul style="list-style-type: none"> <li>a. Monthly monitoring of activities to ensure compliance with the EMPr;</li> <li>b. Liaison and ongoing communication with the Environmental Site Officer;</li> <li>c. Ensuring the Implementation of preventative and corrective actions in accordance with the requirements of the EMPr and outcomes of environmental monitoring / auditing;</li> <li>d. Reporting of environmental incidents that may occur on site in accordance with the requirements of the EMPr and environmental legislation;</li> </ul> <p>7. Monitoring and reporting on compliance with this EMPr to Karpowership and the competent authority.</p>					
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## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<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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### **7.5.3. 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

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>1. In terms of section 2 (h) and (j) of the NEMA, the contractor has the responsibility to ensure <b>all</b> 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</p> <p>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.</p> <p>3. The use of pictures and real-life examples must be incorporated in the training and awareness material.</p> <p>4. Contract employees must be educated about the value of wild animals and the importance of their conservation.</p> <p>5. The Contractor’s environmental awareness training must be site specific and address all findings raised by the ECO.</p> <p>6. 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.</p>	Contractor	Weekly toolbox talks and awareness training	ECO	Fortnightly	Record of attendance to the toolbox talks and awareness training must be filed in the Site Environmental File

## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ol style="list-style-type: none"> <li>1. The ECO must undertake the initial environmental induction with the project management team prior to the commencement of construction.</li> <li>2. All contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance record.</li> <li>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:             <ol style="list-style-type: none"> <li>a) The environmental impacts, actual or potential, of their work activities;</li> <li>b) Why the environment needs to be protected;</li> <li>c) Their roles and responsibilities in achieving compliance with the EMPr, including emergency preparedness and response requirements; and</li> <li>d) The potential consequences of departure from specified operating procedures and any environmental risk which may result from their work; and</li> <li>e) The risks that must be dealt with in order to avoid pollution or the degradation of the environment.</li> </ol> </li> </ol>	ECO	On-site environmental induction	ECO	Once-off	Record of attendance to the induction must be filed in the Site Environmental File
<ol style="list-style-type: none"> <li>1. Environmental awareness training must include as a minimum the following:             <ol style="list-style-type: none"> <li>a) Description of significant environmental impacts, actual or potential, related to their work activities;</li> <li>b) Mitigation measures to be implemented when carrying out specific activities;</li> <li>c) Emergency preparedness and response procedures;</li> </ol> </li> </ol>	Contractor	Weekly toolbox talks and awareness training	ECO	Once-off	Record of attendance to the toolbox talks and awareness training must be filed in the Site

## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ul style="list-style-type: none"> <li>d) Emergency procedures;</li> <li>e) Procedures to be followed when working near or within sensitive areas;</li> <li>f) Wastewater management procedures;</li> <li>g) Water usage and conservation;</li> <li>h) Solid waste management procedures;</li> <li>i) Sanitation procedures;</li> <li>j) Fire prevention; and</li> <li>k) Disease prevention.</li> </ul> <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>					Environmental File
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<b>7.5.4. Worker Conduct on Site</b>					
<b>Impact Management Outcome:</b> Appropriate social and ecological well-being of the site and community					
<b>Impact Management Actions:</b>					
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:	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>

## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<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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<b>7.5.5.No-Go Areas / Restricted Areas</b>					
<b>Impact Management Outcome:</b> Impact on No-Go areas are avoided through effective demarcation and management of these areas					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
1. Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development.					
2. A full Ecological study, inclusive of a site visit, must be conducted prior to any construction activities to list all species of conservation concern, and associated permits should be obtained for their removal or transplantation, as applicable.	Ecologist and 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
3. 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.					



## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

4. Unauthorised access and development related activity inside access restricted areas is prohibited,					
<p>1. The authorised development layout plan must be adhere to, inclusive of the laydown area for the gas pipeline, and 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>	Ecologist and ECO	Demarcation of no-go areas with danger tape or barrier netting	ESO  ECO	Daily  Fortnightly	Site Inspection

### ***7.5.6. Materials Management – Sourcing***

**Impact Management Outcome:** Ensure environmentally sustainable and responsible use of materials

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>1. Ensure that materials to be used during construction are legally sourced. Source materials locally where possible.</p> <p>2. Water or sand must not be extracted from watercourses; should this be a requirement, then the required permits and approvals have to be obtained from authorities before construction commences. It is recommended that filling and levelling material be sourced from a local commercial quarry.</p>	Project Manager and Engineer	Letter from supplier confirming legal source of materials	ECO	Fortnightly	Records of materials purchased

## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<p>3. 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>4. 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>					
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### **7.5.7. Socio-Economic Management**

**Impact Management Outcome:** Socio-economic development is enhanced

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>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.</p> <p>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.</p> <p>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.</p> <p>4. Establish a local skills desk (in uMhlathuze LM) to determine the potential skills that could be sourced in the area.</p> <p>5. Employment of labour-intensive methods in construction where feasible.</p>	Project Developer	Designated Human Resource / social facilitation team and associated procedures and policies	ESO  ECO	weekly  Monthly	Review of procurement documentations and records

## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<ol style="list-style-type: none"> <li>6. Sub-contract to local construction companies particularly SMME's and BBBEE compliant and women-owned enterprises where possible.</li> <li>7. Use local suppliers where feasible and arrange with the local SMME's to provide transport, catering and other services to the construction crews.</li> <li>8. Facilitate knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases.</li> <li>9. Set up apprenticeship programmes to build onto existing skill levels or develop new skills amongst construction workers especially those from local communities.</li> <li>10. Recruit local labour as far as feasible to increase the benefits to the local households.</li> <li>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.</li> <li>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.</li> <li>13. Employ locals as far as feasible through the creation of a local skills database.</li> <li>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.</li> <li>15. Ensure that any damages or losses to nearby buildings that can be linked to the conduct of construction workers are adequately reimbursed.</li> <li>16. Assign a dedicated person to deal with complaints and concerns of affected parties.</li> </ol>					
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## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

<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. Engage with local authorities and inform them of the development as well as discuss with them their ability to meet the additional demands on social and basic services created by the in migration of workers.</p> <p>19. 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>20. The mitigation measures proposed by noise specialist should be adhered to.</p> <p>21. 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>22. Where possible, local labour should be considered for employment to increase the positive impact on the local economy.</p> <p>23. 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>24. 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> <p>25. A social development and economic development programme should be devised by the developer throughout the project's lifespan.</p>				
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## PLANNING AND DESIGN PHASE & PRE-CONSTRUCTION ACTIVITIES

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| <p>26. 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 and should be reviewed on an annual basis and, where necessary, updated.</p> <p>27. When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises.</p> <p>28. In devising the programmes to be implemented, the developer should take into account the priorities set out in the local IDP.</p> |  |  |  |  |  |
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## CONSTRUCTION PHASE ACTIVITIES

### 7.6. Construction Phase Activities – Gas pipeline and Temporary Laydown area / Construction Camp

<b>7.6.1. Administrative and Legal Requirements</b>					
<b>Impact Management Outcome:</b> All construction work must comply with the conditions of the relevant authorisations, licences and permits.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
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. 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).	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
1. A fine will be issued by the Project Developer for wilful negligence or non-compliance 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. 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.	Developer	Appointment of ECO	ECO	Fortnightly	Monthly ECO Reports

## CONSTRUCTION PHASE ACTIVITIES

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
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### 7.6.2. 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 site / laydown area must be within approved area (as specified in the authorised site development plan) 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. 3. 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. 4. The location of the construction camps and laydown areas must be approved by the ECO prior to implementation. 5. All site camps must be fenced off to limit any accidental vegetation disturbance outside the approved area.	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

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>6. Eating areas must be serviced and cleaned on a daily basis to ensure the highest possible standards of hygiene and cleanliness.</li> <li>7. On-site accommodation will not be allowed. No persons, other than a night-watchman / security guard, may stay overnight at the construction camp</li> <li>8. Drainage at the camps must be designed to prevent the standing ponding of water or sheet erosion from taking place.</li> <li>9. Signage must be placed in the area where construction will take place informing the public of the activities taking place.</li> <li>10. 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.</li> <li>11. Ensuring that a suitable drainage system is in place before construction on a site takes place is important to keep the area as dry as possible and thereby reducing the amount of erosion.</li> <li>12. The area where water disperses out of a drain must be suitable for such and must not be susceptible to erosion.</li> <li>13. A grass-lined channel conveys storm water runoff through a stable conduit. Vegetation lining the channel slows down concentrated runoff.</li> <li>14. 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.</li> <li>15. The surrounding area must be surveyed prior to construction/laydown area establishment to determine the presence of nesting birds and sensitive fauna, and these</li> </ol>					
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## CONSTRUCTION PHASE ACTIVITIES

must cordoned off where possibly or be safely relocated if necessary.					
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<b>7.6.3. Access to Construction Site</b>					
<b>Impact Management Outcome:</b> Construction vehicle movement are restricted to approved routes					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. An access agreement must be formalised and signed by the PM / PE, contractor and Transnet before commencing with the activities.</li> <li>2. Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense. Further, the deviation will be deemed as a non-compliance to the Environmental Authorisation and its approved development layout plan.</li> <li>3. Sufficient parking must be provided for site staff and visitors at the construction camp.</li> <li>4. The liberation of dust into the surrounding environment must be effectively controlled by the use of water sprays, fabric containment, where required.</li> <li>5. If required, staff must be employed to clean spilt material onto the access roads.</li> <li>6. Pedestrian and vehicle access must be restricted during construction so as to control access to otherwise potential dangerous excavations and materials.</li> <li>7. 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.</li> </ol>	Contractor	Access routes must be mapped prior to construction	ESO  ECO	Fortnightly	Site Inspection

## CONSTRUCTION PHASE ACTIVITIES

8. 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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<b>7.6.4. No-go Areas</b>					
<b>Impact Management Outcome:</b> Impact on No-Go areas are avoided through effective demarcation and management of these areas.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
1. The construction / work servitude must accommodate all construction-related activities, including materials storage and soil stockpiles. 2. Access must be confined to the existing road infrastructure. 3. Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste outside the project boundaries is strictly prohibited. 4. Gathering of firewood, fruit, plants or any other natural material on site or in areas adjacent to construction sites is prohibited. 5. Unauthorised access onto/into private properties is strictly prohibited. 6. Activities in the surrounding open undeveloped areas must be strictly regulated and managed. 7. No entry or dumping into / onto the sensitive areas or buffer zones is allowed. 8. Personnel must not be allowed into indigenous vegetation especially Mangrove Forest and Swamp Forest (unless within the authorised layout plan), and the following activities are prohibited: <ul style="list-style-type: none"> <li>• No picking any indigenous plant</li> <li>• Only provided portable toilets should be used</li> </ul>	Contractor 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

## CONSTRUCTION PHASE ACTIVITIES

<ul style="list-style-type: none"> <li>No lighting of fires</li> <li>No catching or shooting of any wildlife</li> <li>No trampling of vegetation</li> </ul>					
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<b>7.6.5. Protection of Flora and Fauna</b>					
<b>Impact Management Outcome:</b> Impacts on flora and fauna are minimised through adherence of EMP requirements.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
1. 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 if any identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals.	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
2. Some Species of Conservation Concern include the Swamp Forest dominant tree <i>Ficus trichopoda</i> , as well as the mangrove trees, all of which are on the National List of Protected. <i>Sideroxylon inerme</i> , also a protected tree, was also recorded from the site. Contractors must ensure that no protected tree species are removed or trimmed without the required permit from the Department of Agriculture, Forestry and Fisheries.					
3. Care must be taken to prevent the introduction of alien plant species to the site and surrounding areas by removing the invasive plants onsite.					
4. All large indigenous plant and sedge species must be conserved wherever possible.					
5. Any indigenous tree that is removed, cut or pruned will require permit if form part of "natural forest", to be consulted with the ECO.					
6. Trees and shrubs to be conserved must be clearly marked.					

## CONSTRUCTION PHASE ACTIVITIES

<p>7. 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.</p> <p>8. Disturbance to birds, animals and reptiles and their habitats must be minimised by avoiding any interference or contact where possible.</p> <p>9. No natural vegetation is to be collected for use as firewood.</p> <p>10. No animals are to be disturbed unnecessarily and no animals are allowed to be shot. No faunal species must be trapped, hunted or harmed in any way. Any fauna directly threatened by the development must be removed to a safe location with the guidance of the ECO. Animals may only be trapped or caught for conservation and relocation purposes.</p> <p>11. Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds.</p> <p>12. Noise pollution must be minimised to ensure faunal inhabitants are not stressed.</p> <p>13. Clearance of vegetation and habitat to be restricted within the authorised layout for the laydown area. Protected and indigenous vegetation to be cleared with the required permits</p> <p>14. 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).</p> <p>15. Although removal of alien species will mostly require removal by hand and the use of saws, the use of herbicides and pesticides may be required. Only specified</p>				
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## CONSTRUCTION PHASE ACTIVITIES

<p>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>16. Applications of herbicides and pesticides must be applied by certified, approved and trained employees or contractors.</p> <p>17. Construction activities, specifically excavation and moving/transporting of large components, to be restricted to daylight hours to prevent potential disturbance to roosting bird populations</p> <p>18. Biannual bird monitoring of species utilising the sandpit and Kabeljous Flats must be undertaken to assess any level of disturbance.</p> <p>19. Installation of high visibility (day and night) bird flight diverters and perching deterrents along the entire transmission line route or known flight paths.</p>				
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<b>7.6.6. Preparation of Construction Camp / Laydown area for gas pipes</b>					
<b>Impact Management Outcome:</b> Construction activities are restricted to the demarcated construction camp / laydown area					
<b>Impact Management Actions:</b>		<b>Implementation</b>		<b>Monitoring</b>	
1. Natural features must be considered and potential impacts must be minimised and/or prevented where feasible.	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>2. 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.</li> <li>3. Existing services infrastructure must be identified and clearly demarcated.</li> <li>4. 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.</li> <li>5. 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.</li> <li>6. The demarcation work must be signed off by the ECO before any work commences.</li> <li>7. Duration of pipe laying and anchorage operations must be minimised as much as possible to reduce suspended sediment loads.</li> <li>8. Pipe laying and anchorage operations should not take place during spring high tides and very strong south-westerly winds or storm weather conditions.</li> <li>9. Laying of the pipeline and the anchor legs must be undertaken with as little disturbance of the seabed as possible.</li> <li>10. Laying of the gas pipeline and mooring legs of the FSRU should be undertaken during the winter months reduce disturbance birds utilising the sandspit.</li> </ol>	Contractor	Demarcation of construction servitude prior to site clearing	ECO	Once-off	Photographic record. Clearly marked construction servitude Pre-construction photographic records
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## CONSTRUCTION PHASE ACTIVITIES

<b>7.6.7. Vegetation Clearance</b>					
<b>Impact Management Outcome:</b> Vegetation clearance and associated impacts are minimised through adherence of EMPr vegetation clearance requirements.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. All cut vegetation must be disposed of onsite as mulch and use in rehabilitation efforts or to chip and compost.</li> <li>2. There must be no burning on site under any circumstances.</li> <li>3. Indigenous vegetation clearing must be kept to a minimum and undertaken under proper supervision.</li> <li>4. Vegetation clearing activities must only be undertaken during agreed working times and permitted weather conditions.</li> <li>5. Any vegetation clearing must be done immediately before construction activities to avoid prolonged exposure of the soil to weather elements.</li> </ol>	Contractor	Working within demarcated areas IAP eradication and control	ESO  ECO	Weekly  Fortnightly	Site Inspection

<b>7.6.8. Earthworks including Demolition or Construction</b>					
<b>Impact Management Outcome:</b> Impacts resulting from earthworks are managed and guided by specifications and material sourced from authorised sites.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. All cut and fill earthworks, if required, must be carried out in a manner to promote the stable development of the site, in accordance with the current SANS/SABS 1200 series.</li> <li>2. Earthworks must be completed in accordance with the scope of works and designs.</li> <li>3. Construction areas must be cordoned off and demarcated to prevent incidental public access.</li> <li>4. Earthworks must commence shortly after vegetation clearing to prevent erosion runoff.</li> </ol>	Contractor	Earthworks undertaken according to specifications and material obtained from	Engineer  ECO	Monthly  Monthly	Earthworks undertaken according to specifications Proof of approved

## CONSTRUCTION PHASE ACTIVITIES

<p>5. 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>6. 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>		approved sources			borrow pits / quarries where material is sourced from.
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<b>7.6.9. Fire Management</b>						
<b>Impact Management Outcome:</b> Fire prevention measures are carried out in accordance with the relevant legislation.						
<b>Impact Management Actions:</b>						
		<b>Implementation</b>		<b>Monitoring</b>		
		<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>1. Fires will only be allowed in facilities or equipment specially constructed for this purpose at the construction camp.</p> <p>2. No open fires or uncontrolled fires are permitted on site.</p> <p>3. Ensure that there is basic firefighting equipment available on-site. Firefighting equipment must be in working order and serviced to-date.</p> <p>4. The workforce must be made aware of fire prevention and firefighting measures.</p> <p>5. 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.</p> <p>6. Burning of fire breaks is to be carefully planned and managed with the assistance of the local Fire Department.</p>		Contractor	Awareness Training	ECO	Fortnightly	Site Inspection



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<p>7. Set smoking areas must be designated. Smoking outside these designated areas is prohibited.</p> <p>8. 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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<b>7.6.10. Soil Management</b>					
<b>Impact Management Outcome:</b> Impact on soils are minimised or avoided through implementation of mitigation measures					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
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.	Contractor and ESO	Method Statement to be compiled for soil stockpile management	ESO ECO	Daily Fortnightly	Site inspection and compliance with Method Statement
4. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.					
5. Do not allow stockpiling of any material within the “no go” area.					
6. 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.	Contractor and ESO	Method Statement to be compiled for erosion control and sedimentation	ESO ECO	Daily Fortnightly	Site inspection and compliance with Method Statement
7. 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.					
8. Undertake the stripping of topsoil in a manner that minimises erosion by wind or runoff.					

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<p>9. Subsoil and topsoil must not be mixed with other soils during stripping, excavation, reinstatement and rehabilitation.</p> <p>10. 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.</p> <p>11. Where possible, plants should be cut down to ground level instead of being removed completely to stabilise the soil during land-clearing operations.</p> <p>12. Excavations must be undertaken carefully incorporating proper drainage and considering weather conditions. If heavy rains are expected excavations must be put on hold.</p> <p>13. Excavated and imported material must be stockpiled/stored away from areas of concentrated flow to limit the risk of sediment wash to downstream areas.</p> <p>14. Dumping of excavated material into the sensitive and no-go areas is prohibited.</p> <p>15. Water from any dewatering process, if applicable, must be stored and re-used where possible, e.g. for dust suppression</p> <p>16. Construction should be planned to the dryer winter months when high rainfall and the risk of sediment runoff is limited.</p> <p>17. 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"> <li>a) The suitable use of sand bags or soil saver;</li> <li>b) The prompt rehabilitation of exposed embankment areas (e.g. with indigenous vegetation);</li> <li>c) The removal of vegetation, only as it becomes required for work to proceed;</li> </ul>					
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## CONSTRUCTION PHASE ACTIVITIES

<p>d) Taking suitable precautions in terms of design, construction and earthworks.</p> <p>18. Soil stockpiling areas must be situated at least 50m away from any sensitive areas.</p> <p>19. No surface storm water generated as a result of the development may be directed directly into any natural drainage system.</p> <p>20. 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>21. Sandbags must be utilized as a temporary diverting barrier downslope of excavation areas. The sandbags must be 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>22. Soil stockpiles must be protected from erosion, surrounded by suitable earthen buns and covered by erosion control blanket.</p> <p>23. Site engineers must regularly inspect the erosion control measures to confirm their appropriateness and integrity.</p>					
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<b>7.6.11. Waste Management</b>					
<b>Impact Management Outcome:</b> Potential impacts to the environment caused by waste (general and hazardous) are avoided or managed.					
<b>Impact Management Actions:</b>		<b>Implementation</b>		<b>Monitoring</b>	
1. Waste must be dealt with in accordance with the National Waste Management Strategy namely reduce, re-use and	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>

## CONSTRUCTION PHASE ACTIVITIES

<p>recycling, with disposal to landfill being a last resort, in line with an integrated waste management approach.</p> <ol style="list-style-type: none"> <li>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.</li> <li>3. Different waste bins, for different waste streams, must be provided to ensure correct waste separation.</li> <li>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.</li> <li>5. Littering is prohibited and dumping of any waste is not allowed in undeveloped, open areas or neighbouring properties.</li> <li>6. No waste material is to be burned, buried or disposed of in any area that is not a licensed landfill site.</li> <li>7. A number of waste receptacles must be available for waste disposal and prevention of littering.</li> <li>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.</li> <li>9. The Contractor must ensure that all litter is collected from the work and camp areas daily.</li> <li>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.</li> <li>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</li> </ol>	Contractor	General camp house-keeping Provision of bins Awareness training on waste minimisation and re-use	ESO  ECO	Daily  Fortnightly	Provision of waste disposal facilities (bins & skips)
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## CONSTRUCTION PHASE ACTIVITIES

<p>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.</p> <p>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.</p> <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>					
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<b>7.6.12. Pollution Control Measures</b>					
<b>Impact Management Outcome:</b> Impacts to the environment soils, surface and groundwater is avoided (where possible) or managed.					
<b>Impact Management Actions:</b>					
	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
1. Material Safety Data Sheets (MSDS) for on-site chemicals, hydrocarbon materials and / or waste and hazardous substances must be readily available onsite.					
2. The Contractor must prepare an emergency procedure and a procedure for the management e.g. storage, decanting and disposal of hazardous substances.	Contractor	Provision of sanitation facilities and bunding / impervious	ESO ECO	Weekly Fortnightly	Site inspection Inspection of Environmental Incident Register

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<ol style="list-style-type: none"> <li>3. The contractor must store, handle and transport all materials that could adversely affect the environment, in accordance with material safety data sheet.</li> <li>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.</li> <li>5. In the event of a pollution incident on site the Site Environmental Officer and ECO must:             <ol style="list-style-type: none"> <li>a. Ensure the immediate implementation of reasonable measures to contain and minimise the impacts of the incident;</li> <li>b. Notify all persons as per legal requirements (NEMA, NEMWA &amp; NEM:AQA) if applicable and approved communication / incident procedure;</li> <li>c. Undertake clean up procedures immediately;</li> <li>d. Record the incident in the Environmental Incident Register; and</li> <li>e. Implement measures to prevent similar incidents from occurring in the future.</li> </ol> </li> <li>6. The Contractor will be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.</li> <li>7. The Contractor (and suppliers) must ensure that all materials are correctly secured to ensure safe passage between destinations.</li> <li>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.</li> <li>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</li> </ol>		<p style="text-align: center;">surfaces for activities that may lead to soil and groundwater pollution Construction staff to be trained in spill management</p>			<p style="text-align: center;">Compliance with Spill Contingency Plan Provision of spill kits</p>
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## CONSTRUCTION PHASE ACTIVITIES

<p>capacity to hold 130% of the quantity of liquid stored (110% statutory requirement plus an allowance for rainfall).</p> <p>10. Installation of piezometric seepage boreholes if pollution is evident.</p> <p>11. The quality of the surface <del>w</del>ater downstream must be monitored, in frequencies as stipulated in the Water Use Licence.</p>					
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<b>7.6.13. Hazardous Substances Management</b>					
<b>Impact Management Outcome:</b> The management of hazardous substances is undertaken in accordance with the Hazardous Substances Act (Act No. 15 of 1973).					
<b>Impact Management Actions:</b>					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<ol style="list-style-type: none"> <li>1. All hazardous substances must be stored within a secured storage area, with impervious lining and bunding. Drip trays must be used where suitable.</li> <li>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.</li> <li>3. Plant and equipment must be maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.</li> <li>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.</li> <li>5. No smoking is allowed in the vicinity of storage or dispensing areas.</li> </ol>	Contractor	Bunding of hazardous storage sites	ESO  ECO	Daily  Fortnightly	Site inspection of hazardous storage areas and inspection of drip trays and impervious surfaces

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>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.</li> <li>7. Spill kit must be kept on site and all spills must be immediately cleaned up, treated accordingly and reported to the PM, ESO and ECO.</li> <li>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.</li> <li>9. Waste storage facilities must be regularly inspected and replaced when full</li> <li>10. All concrete mixing must take place at designated areas with an impermeable surface e.g. concrete, tarpaulin.</li> <li>11. Hazardous storage areas must be 110% bunded with an impermeable liner to protect groundwater quality.</li> <li>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.</li> <li>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.</li> <li>14. Lime and other powders must not be mixed during excessively windy conditions.</li> <li>15. All hazardous substances required for vehicle maintenance and repair must be stored in sealed containers for disposal to a registered waste disposal site.</li> <li>16. Drums / tanks must be safely and securely stored in the construction camp in a location as far as possible from any watercourse.</li> </ol>					
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## CONSTRUCTION PHASE ACTIVITIES

<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>					
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### 7.6.14. Sanitation / Ablution Management

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

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>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.</p> <p>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.</p> <p>3. Under no circumstances may open areas or the surrounding bush be used as a toilet facility.</p>	Contractor	Provision of ablution facilities during construction Management of facilities	ESO  ECO	Daily  Fortnightly	Proof of servicing and safe disposal

## CONSTRUCTION PHASE ACTIVITIES

<p>4. Temporary toilet facilities and sanitation facilities must be serviced weekly and locked from casual access by local communities and general public.</p> <p>5. Ablution facilities must not cause any pollution to any water resource and it must not be a health hazard to the general public.</p> <p>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.</p>					
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<b>7.6.15. Water Management</b>					
<b>Impact Management Outcome:</b> Water for construction is compliant with the requirements of the National Water Act (Act No. 36 of 1998).					
<b>Impact Management Actions:</b>					
	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>1. Only municipal or other approved / licenced sources of water must be used for construction on the construction site and in the construction camps.</p> <p>2. Water for human consumption must be available at the site offices and at other convenient locations on site where work occurs.</p> <p>3. Washing of clothes, equipment or machinery within any watercourse is prohibited.</p> <p>4. Site staff are not permitted to use any 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.</p> <p>5. If any abstraction points or boreholes are to be used, these must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis.</p>	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).

## CONSTRUCTION PHASE ACTIVITIES

<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> <ol style="list-style-type: none"> <li>a. Minimising water use during cleaning of equipment;</li> <li>b. Undertaking regular audits of water systems; and</li> <li>c. Including a discussion on water usage and conservation during environmental awareness training.</li> <li>d. The use of grey water is encouraged.</li> </ol>					
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<b>7.6.16. Stormwater Management</b>					
<b>Impact Management Outcome:</b> Avoid, prevent and manage impacts related to stormwater					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. Temporary cut off drains and berms must be implemented where required to capture storm water and promote infiltration.</li> <li>2. Proper drainage must be in place to channel storm water to prevent soil erosion and the deposition of water into sensitive areas.</li> <li>3. Earth, stone and rubble is to be disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in stormwater channels, drainage lines or rivers.</li> <li>4. A storm water management plan (SWMP) for the construction camp/laydown area must be developed and adhered to, so that the stormwater generated on site does not adversely affect the natural watercourses nearby.</li> <li>5. Storm water runoff must be minimised so that the soil within the area is not subjected to erosion.</li> </ol>	Project Manager	Detailed SWMP	ECO	Fortnightly	Approval of SWMP

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>6. Ensure no waste disposal to marine environment.</li> <li>7. 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;</li> <li>8. Batching plants areas must be fitted with a containment facility for the collection of cement laden water.</li> <li>9. Dirty water from the batching plant must be contained to prevent soil and groundwater contamination</li> <li>10. A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;</li> <li>11. Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;</li> <li>12. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site.</li> <li>13. 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.</li> </ol>				
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<b>7.6.17. Air Quality</b>					
<b>Impact Management Outcome:</b> Minimal dust, emissions and odour due to adherence of management actions					
<b>Impact Management Actions:</b>		<b>Implementation</b>		<b>Monitoring</b>	
1. No burning of waste, such as plastic bags, cement bags and litter, is permitted.	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>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.</li> <li>3. Should excessive vehicle emissions be observed, the required maintenance must be done or the equipment removed from site.</li> <li>4. A speed limit of 40km/hr must be set for all vehicles travelling over exposed areas or near stockpiles.</li> <li>5. A complaints register must be provided to report any excessive dust incidents.</li> <li>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.</li> <li>7. Prevent the excavation, handling and transport of erodible materials under high wind conditions.</li> </ol>	Contractor	<p>Regular dust suppression Maintaining a dust suppression register Plant and equipment must be in good working order Ablutions / toilets cleaned weekly</p>	<p>ESO</p> <p>ECO</p>	<p>Daily</p> <p>Fortnightly</p>	<p>Site inspection Dust suppression register Inspection of Complaints Register relating to dust complaints</p>
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### **7.6.18. 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)

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. Construction activities must be undertaken according to working hours approved by local municipality</li> <li>2. Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance.</li> <li>3. Construction vehicles and equipment generating excessive noise must be fitted with suitable noise abatement measures maintenance undertaken or replaced.</li> </ol>	Contractor	<p>Compliance with SANS 10103 and OHS Act Use of appropriate PPE</p>	<p>ESO</p> <p>ECO</p>	<p>Daily</p> <p>Fortnightly</p>	<p>Inspection of Complaints Register Site inspection</p>

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>4. Construction workers must be provided with proper PPE i.e. ear plugs at activity areas where excessive noise is generated.</li> <li>5. 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.</li> <li>6. 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.</li> <li>7. 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.</li> <li>8. A complaints register must be provided to record any complaints regarding excessive noise.</li> <li>9. Construction staff should receive “noise sensitivity” training including the switching off vehicles when not in use and the location of noise sensitive areas.</li> <li>10. An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase.</li> <li>11. A separate study should be considered to determine the impact on the marine environment. This should include the impact of anthropogenic noise on the protected species within the Richard’s Bay Nature Reserve, as well as the underwater noise impacts.</li> <li>12. Periodic noise measurements are taken during the construction and operational phases.</li> </ol>					
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## CONSTRUCTION PHASE ACTIVITIES

<p>13. A long-term hydrophone system is installed in the vicinity of the FSRU, LNGC berth, harbour entrance and other sensitive areas in Richards Bay to determine the current underwater noise environment.</p> <p>14. As a precautionary measure piling should not occur at night. Piling should only occur during the day to take advantage of unstable atmospheric conditions.</p> <p>15. All construction operations should only occur during daylight hours if possible.</p> <p>16. All staff on the construction project should receive training to mitigate the noise impacts, such as switching off vehicles when not in use, location of Noise sensitive areas etc.</p> <p>17. The ambient noise around the project and at the closest receptors be monitored during the construction phase.</p>					
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### **7.6.19. Protection of watercourses, estuaries and the Coastal Environment**

**Impact Management Outcome:** Impacts 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
<p>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.</p> <p>2. In the event of a spill, prompt action must be taken to clear the polluted or affected areas.</p> <p>3. Where possible, no development equipment must traverse any seasonal or permanent wetland.</p> <p>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.</p>	Contractor	Demarcation of watercourses and sensitive areas maintaining the specified buffers	ESO  ECO	Daily  Fortnightly	watercourses and sensitive areas are marked as No-Go areas

## CONSTRUCTION PHASE ACTIVITIES

<ol style="list-style-type: none"> <li>5. Watercourse or estuary crossings can only be undertaken as per approved site layout plan.</li> <li>6. There must not be any impact on the long term morphological dynamics of watercourses or estuaries.</li> <li>7. Existing crossing points must be favoured over the creation of new crossings (including temporary access).</li> <li>8. When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken:             <ol style="list-style-type: none"> <li>a. Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse</li> <li>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;</li> <li>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</li> <li>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.</li> </ol> </li> <li>9. No Construction activities with the potential to affect the general public's enjoyment of the coast should be scheduled during peak season.</li> <li>10. Construction periods to be scheduled avoiding heavy rain and storm seasons. Historical data must be used for best time period allocation.</li> </ol>				
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## CONSTRUCTION PHASE ACTIVITIES

<p>11. Construction should be scheduled to avoid local species breeding seasons.</p> <p>12. 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>13. No vehicles and machinery shall be refuelled within sensitive coastal areas.</p>					
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### 7.6.20. Protection of Marine Environment

**Impact Management Outcome:** Impacts to marine environment are managed in adherence to legislation and specialist recommendations

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>1. No mixing of concrete in the intertidal zone.</p> <p>2. 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.</p> <p>3. In response to possible pollution as a result of Shipping activities:</p> <ul style="list-style-type: none"> <li>• Provide an inventory of waste produced and the nature of waste being produced and cooperate with the TNPA in every way;</li> <li>• A requirement to report environmental accidents and emergencies immediately they occur, to the port captain;</li> <li>• A Formal Failure Analysis (FFA) must be conducted to conclude each incident investigation in order to inform preventative measures to be taken in future;</li> <li>• Training of emergency response teams to deal with environmental implications of an emergency in addition to the safety implications; and</li> </ul>					

## CONSTRUCTION PHASE ACTIVITIES

<ul style="list-style-type: none"> <li>• In the event of a spill, a penalty should be issued and the 'polluter pays' principle should be applied for clean-up operations and rehabilitation, if necessary.</li> <li>4. The intake(s) must be located in deep water, away from shallow intertidal and subtidal habitat.</li> <li>5. The intake(s) must be of appropriate design to reduce the uptake of macrofauna and larger organisms as much as possible (e.g., screens).</li> <li>6. The intake(s) should preferably be positioned within or adjacent to the disturbed shipping channel where fewer larger organisms are likely to be encountered.</li> <li>7. No discharging to the dead-end basin where water circulation is poor, but rather where water circulation by tidal flushing would be maximised and/or facilitated by vessel movement.</li> <li>8. Heated cooling water to be discharged as deep as possible, and away from shallow intertidal and subtidal habitat.</li> <li>9. Discharge pipeline must be well secured and regularly checked for damages or leaks</li> <li>10. Discharges must be compliant with the South African Water Quality Guidelines for Coastal and Marine Waters (DWAF, 1995; DEA, 2018b) and/or other applicable international standards.</li> <li>11. Lighting during night-time must be limited to essential lighting only.</li> <li>12. The contractors laying the pipes and anchors should minimise the area of seabed disturbed.</li> <li>13. 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.</li> </ul>				
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## CONSTRUCTION PHASE ACTIVITIES

14. All records of discharge volumes and quality are to be kept for auditing purposes.					
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<b>7.6.21. Areas of Heritage Importance</b>					
<b>Impact Management Outcome:</b> Impact to heritage and palaeontological resources are managed in terms of the National Heritage Act					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately.</li> <li>2. 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.</li> <li>3. 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 been obtained.</li> <li>4. Work may only resume once clearance is given in writing by an archaeologist.</li> <li>5. 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.</li> <li>6. The provincial heritage authority must be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial.</li> </ol>	Contractor	Demarcation of heritage sites maintaining the specified buffers	ECO	Fortnightly	Heritage sites including graves are marked as No-Go areas

<b>7.6.22. Monitoring, Reporting and Record Keeping</b>
<b>Impact Management Outcome:</b> Impact to the construction site and surrounding areas are minimal as result of adherence to the authorisations and EMPr.

## CONSTRUCTION PHASE ACTIVITIES

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"> <li>1. Environmental monitoring must be undertaken by the ESO on a daily basis and by the ECO on a fortnightly basis.</li> <li>2. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and other environmental authorisations.</li> <li>3. Contractors must provide proof of disposal of building rubble, domestic waste, industrial waste and hazardous waste to licensed waste disposal or recycling facilities.</li> <li>4. Complaints received from the community or other I&amp;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"> <li>a. Time, date and nature of complaint;</li> <li>b. Response and investigation undertaken; and</li> <li>c. Corrective and preventative actions taken and by whom.</li> </ol> </li> <li>5. All complaints received must be investigated and a response given to the complainant within 7 days.</li> <li>6. Monitoring of turbidity levels must be undertaken daily during the pipe laying and anchorage operations. TSS levels may not exceed 20 mg/l.</li> </ol>	<p>ESO</p> <p>Contractor</p>	<p>Establish registers, record of receipts,, environmental file</p>	<p>ESO</p> <p>ECO</p>	<p>Daily</p> <p>Monthly</p>	<p>Proof of registers, receipts and environmental file</p>

## POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

### 7.7. Post Construction Phase and Rehabilitation Activities – Construction Camp / Gas pipes Laydown Area

<b>7.7.1. Construction Camp, Construction Areas and Rehabilitation</b>					
<b>Impact Management Outcome:</b> Post-construction and rehabilitation activities are undertaken in accordance with EMPR requirements as well as Rehabilitation Plans.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. All remaining construction infrastructure and material / consumables must be removed.</li> <li>2. The working servitude must be rehabilitated / reinstated once all planting of vegetation has been completed to rectify any damage that may have been caused by heavy machinery.</li> <li>3. All spillage areas must be cleaned and/or remediated.</li> <li>4. All remaining waste and litter must be collected and recycled and/or disposed to reputable contractors / licensed facilities.</li> <li>5. The Contractor must arrange for the cancellation of all temporary services, including but not limited to chemical toilets and waste removal and disposal services.</li> <li>6. Temporary fences, barriers and demarcations associated with the construction phase are to be removed from the site, unless stipulated otherwise by the Project Developer.</li> <li>7. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.</li> <li>8. The Contractor must repair any damage that the construction works has caused to neighbouring properties.</li> <li>9. The Contractor is to check that all watercourses are free from building rubble, spoil materials, debris and waste materials.</li> </ol>	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. No temporary works, stockpiles or other circumstances that could impede natural water movements or act to concentrate run-off must be removed.</p> <p>11. Post construction rehabilitation of the laydown area/stringing yard and all unnecessary access routes must be undertaken.</p>					
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### **7.7.2. Rehabilitation of Watercourses, Estuary and Coastal Environment**

**Impact Management Outcome:** Post-construction and rehabilitation activities are undertaken in accordance with EMPR requirements as well as Rehabilitation Plans.

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>1. The Wetland Rehabilitation Plan (Appendix F) must be adhere to and implemented.</p> <p>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.</p> <p>3. The undeveloped areas must be rehabilitated to its pre-establishment condition or agreed alternative i.e. hardened areas ripped and vegetated.</p> <p>4. 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>5. On completion of all operations, the construction site must be cleared of any contaminated soil accordance with the soil management procedure.</p>	Contractor	Clean rehabilitated site	ECO	Fortnightly	Site Inspection, Record Keeping and ECO Reports

## POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES

<p>6. 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>7. 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> <p>8. 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>9. 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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### **7.7.3. 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.

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
1. Environmental monitoring must be undertaken by the Environmental Site Officer 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 Environmental Authorisation.	ESO	Establish registers, record of receipts, environmental file	ESO	Daily	Proof of registers, receipts and environmental file
3. A close-out inspection must be conducted by the ECO following the post-construction and rehabilitation activities.	Contractor		ECO	Fortnightly	
4. Karpowership must not sign-off on the project and make payment of the final invoice to the Contractor until the close-					

**POST CONSTRUCTION PHASE AND REHABILITATION ACTIVITIES**

out inspection is conducted by the ECO and 100% compliance to the EMPr has been achieved.					
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## OPERATION PHASE AND RELATED ACTIVITIES

### 7.8. Operational Phase and Related Activities – Powerships, FSRU and Gas Pipeline

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.

<b>7.8.1. Legislative Requirements</b>					
<b>Impact Management Outcome:</b> Compliance with all environmental legislative requirements during the operational phase of the project.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
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. An ECO must be appointed, and will be mandated with ensuring compliance with any and all Environmental	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

Authorisations granted as well as the supplementary requirements, such as the Wetland Rehabilitation Plan (Appendix F), a Management and Maintenance Plan (Part C of the Report) and any other documentation that will be required to ensure that the proposed works are carried out and maintained into perpetuity.					
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<b>7.8.2. Marine Environment</b>					
<b>Impact Management Outcome: Minimised</b> impact to the benthic and marine environment from the establishment of the Karpowership.					
<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>1. Monitoring of infrastructure and general maintenance as required.</li> <li>2. Access of infrastructure and maintenance of infrastructure and services servitude as per port's approvals and procedures.</li> <li>3. Contractual agreements must include the EMP conditions for e.g. alien invasive management, firebreak, and security.</li> <li>4. Noise level monitoring must performed to measure the ambient noise from the ship. The 50 dBA at 100m levels are to be maintained.</li> <li>5. Point source emissions are to be monitored and submitted annually to SAAELIP.</li> <li>6. Plume modelling and managing of the mixing zone to remain within the 1 degree Celsius within 300m radius.</li> <li>7. 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.</li> <li>8. Discharges would need to be compliant with the South African Water Quality Guidelines for Coastal and Marine Waters (DWAF, 1995; DEA, 2018b)</li> </ol>	Operations Manager and Project Manager and Engineer	Operation of the Karpowership, FSRU and Gas Pipeline	ECO	Fortnightly	Site inspections

## OPERATION PHASE AND RELATED ACTIVITIES

<p>9. 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>10. Implementation of awareness, inspections, contingency plans, compliance with port protocols and reporting of environmental incidents.</p> <p>11. Ensure continued supply of natural gas to the Powership.</p> <p>12. Specific EMP conditions for gas pressure monitoring must be developed.</p> <p>13. An Operations Manual for each operation, including the gas transfer process must be developed and implemented.</p> <p>14. Operational and Emergency procedures must be implemented and adhered to.</p> <p>15. The Emergency Plan must comply with the MHI Regulations.</p> <p>16. The Emergency Plan must be approved by the Port Authorities.</p> <p>17. The visiting Ship Captains must provide Port Management with their detailed Ship to Ship Cargo Transfer Operations Manual before offloading.</p> <p>18. Only suitably qualified people must be used for all operations. All applicable certificates of conformance must be on site.</p> <p>19. Security measures must be implemented to prevent any unauthorised access.</p> <p>20. Environmental incident reporting to the Port &amp; Authorities must be undertaken as per required timeframes.</p> <p>21. The Port Fire Department will handle all fire-fighting and emergencies.</p> <p>22. Risk reduction programmes must be continually investigated to reduce the impact from accidental fires and explosions on surrounding communities.</p>					
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## OPERATION PHASE AND RELATED ACTIVITIES

<p>23. The employees and sub-contractors of Karpowership must receive basic training in environmental awareness, including the minimisation of disturbance to sensitive areas, management of waste, identification of protected biodiversity, water conservation and prevention of erosion and water pollution.</p> <p>24. 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>25. Install acoustic enclosures around all major noise emitting components to suppress the noise emissions from equipment such as engines.</p> <p>26. Install Silencers on equipment such as exhaust stacks and turbo chargers.</p> <p>27. Beyond the headland of the 600 Berth Basin, movement of supporting vessels to be restricted to the main channel only.</p>					
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<b>7.8.3. Waste Management</b>					
<b>Impact Management Outcome:</b> Environmental impacts during the Operation and Maintenance Phase are managed in terms of Operational Maintenance Management Plan requirements.					
<b>Impact Management Actions:</b>					
	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<p>1. A procedure and system for the separation, recycling and management of general waste must be adhere to by all operational staff.</p> <p>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.</p> <p>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.</p>	Operations Manager and Project Manager	Procedures, Plans and records	ECO	Fortnightly	Site inspections

## OPERATION PHASE AND RELATED ACTIVITIES

<ol style="list-style-type: none"> <li>4. A hazardous waste collection point must be established to collect all hazardous waste.</li> <li>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).</li> <li>6. Contingency measures must be in place to ensure quick detection and repair of leakage or breakage to the sanitation systems, etc.</li> <li>7. Keep sewage infrastructure plans available for management and maintenance purposes.</li> <li>8. Leaking systems must be monitored for any pollution of the surrounding environment and repaired as soon as possible.</li> <li>9. Records and certificates of waste collection must be documented and maintained at all times.</li> </ol>					
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### **7.8.4. Socio-Economic Management**

**Impact Management Outcome:** Socio-economic development is enhanced

<b>Impact Management Actions:</b>	<b>Implementation</b>		<b>Monitoring</b>		
	<b>Responsible Person/s</b>	<b>Method of Implementation</b>	<b>Responsible Person</b>	<b>Frequency of Monitoring</b>	<b>Mechanism for Monitoring Compliance</b>
<ol style="list-style-type: none"> <li>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.</li> <li>2. Where possible, local labour should be considered for employment to increase the positive impact on the local economy.</li> <li>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.</li> </ol>	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

<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> <p>5. Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy.</p> <p>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.</p> <p>7. A social development and economic development programmes should be devised by the developer throughout the project's lifespan.</p> <p>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.</p> <p>9. These plans should be reviewed on an annual basis and, where necessary, updated.</p> <p>10. When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises.</p> <p>11. In devising the programmes to be implemented, the developer should take into account the priorities set out in the local IDP.</p>				
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<b>7.8.5. Maintenance, Refurbishment &amp; Management of the Infrastructure</b>		
<b>Impact Management Outcome:</b> Environmental impacts during the Operation and Maintenance Phase are managed in terms of an Operational Maintenance Management Plan requirements.		
<b>Impact Management Actions:</b>	<b>Implementation</b>	<b>Monitoring</b>

## 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"> <li>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.</li> <li>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.</li> <li>3. All maintenance, refurbishment or related activities during operation must comply with the construction measures detailed in the construction phase of the EMPr.</li> <li>4. All operation components, including radios used within the operations, must be regularly inspected and any structural failures must immediately be reported and the necessary steps must be taken to ensure continued safety.</li> <li>5. Service Logbooks must be kept for all hoses and pipelines and checked regularly.</li> <li>6. Operating, monitoring / auditing, reporting, emergency and preventative and corrective action procedures must be available and all staff trained in accordance thereto.</li> <li>7. Mitigating the potential direct impact of damage to equipment and infrastructure from extreme climatic/weather events and/or long-term climate trends during LNG transportation – 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.</li> </ol>	Operations Manager and Project Manager and Engineer	Standard Operating Procedures	ECO	Fortnightly	Site inspections

## OPERATION PHASE AND RELATED ACTIVITIES

### 7.8.6. 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.

Impact Management Actions:	Implementation		Monitoring		
	Responsible Person/s	Method of Implementation	Responsible Person	Frequency of Monitoring	Mechanism for Monitoring Compliance
<p>9. 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. rehabilitation plan, monitoring programmes).</p> <p>10. Monitoring plan of alien invasive plants must be implemented to prevent streamflow reduction on the Mhlatuze River.</p> <p>11. 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>12. Environmental monitoring must be undertaken by the ECO on a fortnightly basis.</p> <p>13. This monitoring must be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and Environmental Authorisations.</p> <p>14. Water quality monitoring of the downstream watercourses if spills from transformer occur.</p> <p>15. Installation of piezometric seepage boreholes only if major pollution is evident and after liaison and permission from the Department of Water Affairs. The boreholes can be positioned downstream of the transmission lines.</p>	<p>Operations Manager and Project Manager</p>	<p>Establish registers, record of receipts, environmental file</p>	<p>ECO</p>	<p>Fortnightly</p>	<p>Site inspections</p>



## OPERATION PHASE AND RELATED ACTIVITIES

<p>16. A method statement in respect to the use, handling, storage and disposal of all chemicals as well as anticipated generated waste, must be compiled.</p> <p>17. Mitigating the potential cumulative impact of emission of greenhouse gases with global warming potential - Implement technical measures to reduce fugitive emissions at source and during transfer to FSRU and consider contributions to appropriate carbon offset/drawdown initiatives.</p> <p>18. Mitigating the potential direct impact of damage to equipment and infrastructure from extreme climatic/weather events and/or long-term climate trends during FSRU mooring/operation - Adherence to port safety regulations and emergency procedures during mooring/operation.</p> <p>19. Mitigating the potential cumulative impact of fugitive emission of greenhouse gases with global warming potential - 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>20. Mitigating the potential direct impact of damage to the submerged gas pipeline from extreme weather - Adherence to port safety regulations and emergency procedures, particularly during construction/installation.</p> <p>21. Mitigating the potential cumulative impact fugitive emissions - The ship-to-ship transfer of LNG will be managed under an internationally-accredited process via trained personnel to ensure compliance and within clear quality, health and safety regulations. The fuel lines between the FSRU and the Powership will be via double walled with annular space being inerted and continuously purged with Nitrogen "N2" gas. A gas</p>					
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## OPERATION PHASE AND RELATED ACTIVITIES

detector in-circuit will identify a leak, so that the fuel gas can be immediately isolated and shut off, the leak identified, and the necessary repairs or replacements made.					
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## OPERATION PHASE AND RELATED ACTIVITIES

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

Part C of the EMPr 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 EMPr;
- 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 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> <i>(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>d. KwaZulu-Natal</i></p> <p><i>vi. 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).

### 7.9.1. 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		
Telephone:	(032) 946 3213	Postal Code:	4418
Fax:	(032) 946 0826	Cell:	083 308 8003
Email:	hantie@triplo4.com		
Name of landowner(s)	Transnet National Ports Authority		
Contact person (if other):	Mr. Sithole		
Postal address:	P.O.Box 619 Pretoria, Gauteng		

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Telephone:	+971 4 368 8601		
Fax:	+971 4 368 8602		
Email:			
Municipality for project:	uMhlathuze 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 Municipality		
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		
<b>*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.</b>			

### 7.9.2. Authority Engagement

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

Authority	Required involvement
Department of Water and Sanitation	Comment on EIAR and EMPPr, Issuing Water Use Authorisation
Department of Environment, Forestry and Fisheries (DEFF)	Comment on EIAR and EMPPr, Issuing Environmental Authorisation
Department of Environment, Forestry and Fisheries (DEFF) – Climate Change; Oceans and Coast; Biodiversity and Protected Areas Directorates	Comment on EIAR and EMPPr
Department of Mineral Resources (DMR)	Comment on EIAR and EMPPr
Department of Energy (DoE)	Comment on EIAR and EMPPr
KZN Department of Economic Development, Environmental Affairs, and Tourism (EDTEA)	Comment on EIAR and EMPPr
KZN Provincial Department of Transport	Comment on EIAR and EMPPr
KZN Provincial Department of Agriculture	Comment on EIAR and EMPPr

## OPERATION PHASE AND RELATED ACTIVITIES

uMhlathuze Local Municipality	Comment on EIAR and EMPPr
King Cetshwayo District Municipality	Comment on EIAR and EMPPr
South African Heritage Resource Agency (SAHRA)	Comment on EIAR and EMPPr
Amafa Heritage KZN	Comment on EIAR and EMPPr
South African National Roads Agency (SANRAL)	Comment on EIAR and EMPPr
Department of Rural Development and Land Reform (DRDLR)	Comment on EIAR and EMPPr
Transnet National Port Authority (TNPA)	Comment on EIAR and EMPPr
Richards Bay Industrial Development Zone (RBIDZ)	Comment on EIAR and EMPPr
Ezemvelo KZN Wildlife	Comment on EIAR and EMPPr
South African Maritime Safety Authority (SAMSA)	Comment on EIAR and EMPPr
National Energy Regulator of South Africa (NERSA)	Comment on EIAR and EMPPr
South Africa Gas Development Corporation (SOC) Limited	Comment on EIAR and EMPPr
Department of Human Settlements	Comment on EIAR and EMPPr

### **7.9.3. Public Participation**

This MMP is an outcome of the Environmental Impact Assessment Process undertaken for the 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 30 days from 26<sup>th</sup> February 2021 to 31<sup>st</sup> March 2021 in which to provide comment. A summary of the public participation will be included in the submission of the final EIR.

### **7.9.4. Management Specifications**

#### *7.9.4.1. Infrastructure Maintenance*

The infrastructure servitudes 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 EMPPr shall be applicable to any construction work required as part of maintenance work. An ECO shall be appointed for maintenance construction work only if the work scope is longer than 2 weeks.

#### *7.9.4.2. Alien Invasive Plant Management*

The area within 2 meter width of the infrastructure servitudes must be kept free of alien invasive plants as listed in the Alien Invasive Species Regulations (2016 and any subsequent amendments) of the National

## OPERATION PHASE AND RELATED ACTIVITIES

Environmental Management: Biodiversity Act (of 2004). These shall be pulled out by hand as seedlings and the plants removed from the area for disposal.

### 7.9.4.3. *Clearance of Vegetation*

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

### 7.9.4.4. *Working within proximity to the watercourse or watercourse crossing*

Construction method statements must be developed and detailed for all excavation and trenching activities in order to mitigate potential environmental impacts. Of significance are the activities relating to the crossing of the watercourse and working in proximity to the watercourse.

### 7.9.4.5. *No-go areas*

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 servitudes and trampling of vegetation.

### 7.9.4.6. *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

### 7.9.4.7. *Safety*

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

### 7.9.4.8. *Local Labour*

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

### 7.9.4.9. *Interpretative Signage*

Interpretative signage, encouraging environmental/conservation awareness is encouraged.

### 7.9.4.10. *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.

## **7.9.5. Method Statement**

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

## OPERATION PHASE AND RELATED ACTIVITIES

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.

### ***7.9.6. 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.

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 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. Penalties to be imposed for the transgression of environmental specifications are also noted along with the roles and responsibilities of all stakeholders. 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

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## 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
<b>PLANNING</b>				
<b>ESTABLISHMENT</b>				
<b>CLEARANCE</b>				

**ROUTINE SITE INSPECTION SHEET**

**ROUTINE SITE INSPECTION SHEET**

PROJECT: \_\_\_\_\_  
 CONTRACT NO.: \_\_\_\_\_  
 CONTRACTOR: \_\_\_\_\_

DATE: \_\_\_\_\_  
 COMPLETED BY: \_\_\_\_\_

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

**SITE DECOMMISSIONING INSPECTION SHEET**





# 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

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### **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

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WETLAND REHABILITATION PLAN – FEBRUARY 2021

# APPENDIX G

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## GENERIC CONSTRUCTION METHOD STATEMENTS

# APPENDIX H

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## APPENDIX H: ENVIRONMENTAL AUTHORISATION AND AMENDMENTS