FINAL SCOPING REPORT & PLAN OF STUDY OF EIA

FINAL SCOPING REPORT AND PLAN OF STUDY FOR EIA:

Proposed Gas to Power via Powership Project at Port of Richards Bay, uMhlathuze Local Municipality, KwaZulu-Natal

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

A Project of Karpowership

17 NOVEMBER 2020

KARPOWERSHIP

triplo4 sustainable solutions

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EXECUTIVE SUMMARY

The Project entails the generation of electricity from floating mobile Powerships moored in the Port of Richards Bay. The proposed design capacity for the Powerships are 540MW, which comprises of 27 gas engines and 3 steam turbines. A Floating Storage Regasification Unit (FSRU) is intended for use and will act as the storage and regasification facility and 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 days. From the Powership, power will be evacuated via a 132kV transmission line over a distance of approximately 3 km to the tie in point to the Eskom line, at a connection point (including an establishment of a switching station) in proximity to the existing Bayside Substation, which feeds into the national grid.

The proposed Project has been formulated in response to the Request for Proposals (RFP) for New Generation Capacity under the Risk Mitigation IPP Procurement Programme issued by the Department of Mineral Resources and Energy to alleviate the immediate and future capacity deficit as well as the limited, unreliable and poorly diversified provision of power generating technology with its adverse environmental and economic impacts. The RFP stipulates stringent environmental, social and economic criteria, for example, the shift from coal and LPG to NG as a cleaner and more cost effective resource, BBBEE criteria and skills development. The "Emergency/Risk Mitigation Power Purchase Procurement Programme (2000MW): National" has also been designated the status of a Strategic Integrated Project (SIP) under the Infrastructure Development Act, 2014 by the Presidential Infrastructure Coordinating Commission. SIPs are considered to be projects of significant economic or social importance to South Africa as a whole or regionally that give effect to the national infrastructure plan and for this reason, can be expeditiously implemented through the provisions of the enabling Act.

Alternatives being considered for this project include two mooring siting positions of the Powerships, two alternative routes for the gas pipeline and two 132kV transmission line route options.

The Project triggers a number of activities listed under the National Environmental Management Act 107 of 1998 (NEMA) which require environmental authorisation prior to commencement. Because these listed activities include activities described in the EIA Regulations Listing Notice 2 of 2014, the process that is required to be applied to the application for environmental authorisation is Scoping and Environmental Impact Reporting (S&EIR). The procedural requirements for S&EIR are set out in the Environmental Impact Assessment Regulations, 2014 (as amended) (the EIA Regulations, 2014).

The objectives of Scoping are, through a consultative process with Interested and Affected Parties (I&APs), including relevant organs of state, to:

- identify the relevant policies and legislation relevant to the activity;
- motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of

all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;

- identify the key issues to be addressed in the assessment phase;
- agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

A draft Scoping Report, including a Plan of Study for EIA, was subjected to a public participation process from 6 October to 9 November 2020. The draft report has been revised taking into consideration I&APs' comments, resulting in this Final Scoping Report which will be submitted to the competent authority, the Department of Environment, Forestry & Fisheries (DEFF) for consideration.

The following issues and impacts have been identified during scoping:

- Liquefied Natural Gas (LNG) Carrier, Powerships and FSRU
  - Disturbance to marine habitat;
  - Disturbance to the sediment from mooring infrastructure;
  - Reduction in ambient air quality from increased atmospheric emissions;
  - Safety risk from potential leakage of LNG;
  - Safety risk of storage of NG within the Port;
  - Increase in noise pollution;
  - Change in water temperature
  - Provision of additional electricity;
  - Contributions to climate change and Greenhouse Gases Emissions;
  - Marine traffic congestion and accidents
  - Marine impacts on fisheries
- Gas Pipeline
  - Disturbance to marine habitat;
  - Potential leakage of LNG;
  - Increase in noise pollution;
  - Disturbance to coastal dunes.
- Transmission Lines and Lattice / Monopoles Towers
  - Clearance of indigenous vegetation
  - Disturbance to the terrestrial ecosystem;
  - Loss of biodiversity;
  - Altered hydrology;
  - Increase in noise pollution;
  - Change in hydropedological processes;
  - Destruction of wetlands, watercourses, estuarine areas;

- Destruction of cultural heritage and palaeontological resources;
- Disturbance to properties and existing services;
- Provision of additional electricity.

Initial mitigation measures for these impacts have been included in the Impacts Table in Section 8.2, but will be addressed further and in more detail by the relevant specialists in various reports to be submitted with the EIA Report (indicated in Section 9.2 of the Scoping Report).

Following receipt of this final Scoping Report, DEFF must within 43 days, either accept it, with or without conditions, and advise Karpowership to proceed or continue with the tasks contemplated in the plan of study for EIA or refuse environmental authorisation.

Should the DEFF accept the Scoping Report, the S&EIR process will proceed to the EIA phase. All registered I&APs will be notified of the opportunity to comment on the draft EIA Report in this next phase, inclusive of specialist reports and the Environmental Management Programme (EMPR).

The same EIA process meets the requirements for an application for an atmospheric emission licence required for a Listed Activity under GN 893 of 22 November 2013 (as amended) in terms of Section 21 of the National Environmental Management: Air Quality Act 39 of 2004: Sub-category 1.5: Reciprocating Engines. The Powerships will have 27 gas engines having an approximate heat input of over 10MW each. The 3 steam turbines have a heat input of 15.45MW each.

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LIST OF ABBREVIATIONS

BID	Background Information Document
BOG	Boil Off Gas
CBAs	Critical Biodiversity Areas
CWDP	Coastal Waters Discharge Permit
dB	Decibel
DAFF	Department of Agriculture, Forestry and Fisheries
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEFF	Department of Environment, Forestry and Fisheries
DFP	Development Framework Plan
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
DOT	Department of Transnet
DWAF	Department of Water Affairs and Forestry
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EMS	Environmental Management Systems
G2P	Gas to Power
GG	Government Gazette
GN	Government Notice
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEP	Integrated Energy Planning
IUCN	International Union for Conservation of Nature
IRT	Issues and Response Trail
MPA	Marine Protected Area
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act
NERSA	National Energy Regulator South Africa
NGO	Non-Governmental Organisations
NFEPA	National Freshwater Ecosystems Priority Areas
NIRP	National Integrated Resource Planning
NWA	National Water Act
OCIMF	Oil Companies International Marine Forum
PLEM	Pipeline end manifold

PoS	Plan of Study
PPP	Public Participation Process
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEZ	Special Economic Zone
TOR	Terms of Reference
TPNA	Transnet National Ports Authority

THIS REPORT WAS COMPILED BY TRIPLO4 SUSTAINABLE SOLUTIONS (PTY) LTD IN TERMS OF APPENDIX 2 TO GNR 982 (AS AMENDED)

1 INTRODUCTION

1.1 Project Title

The Final scoping Report and Plan of Study for EIA for the Proposed Gas to Power via Powership at Port of Richards Bay, uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal.

1.2 Background

Triplo4 Sustainable Solutions (Pty) Ltd has been appointed by Karpowership SA (Pty) Ltd (Karpowership) to undertake the environmental impact assessment (EIA) and manage the application for Environmental Authorisation for the proposed Gas to Power Powership Project at the Port of Richards Bay located within ward 2 of the uMhlathuze Local Municipality, KwaZulu-Natal. The Competent Authority responsible for evaluating and deciding on the application for environmental authorisation is the Department of Environment, Forestry & Fisheries (DEFF). An atmospheric emission licence (AEL) is also required for the proposed project. The licensing authority for the AEL is also DEFF, although a different branch within the Department. The landowner of the Port is Transnet National Ports Authority (TNPA).

The applicant is Karpowership SA Pty Ltd, a South African company with 51% owned by Karpowership, a member of Karadeniz Energy Group, Istanbul, Turkey which owns, operates and builds Powerships (floating power plants). Since 2010, 25 Powerships have been completed with total installed capacity exceeding 4,100 MW globally with an additional 4,400 MW of Powerships either under construction or in the pipeline.

Karpowership proposes to locate Powerships at the Port of Richards Bay to generate electricity from natural gas and evacuate the electricity through a transmission line to a substation, and then to the national grid. Three ships will be berthed at any one time - a Floating Storage Regasification Unit (FSRU) and two Powerships. A Liquefied Natural Gas Carrier will supply the Liquid Natural Gas (LNG) to the FSRU over a 1 to 2 day period approximately every 20 days. The natural gas (NG) will be pumped from the FSRU to the Powership via a gas pipeline.

The proposed design capacity for the Richards Bay Powerships are 540MW, which comprises of 27 gas 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 3 km to an Eskom connection point by the Bayside Substation, which feeds into the national grid.

The proposed project is situated within the Port of Richards Bay, and in proximity to the Richards Bay Industrial Development Zone (RBIDZ), which was designated Special Economic Zone (SEZ) status in July 2017 in terms of the Special Economic Zones Act 16 of 2014. An SEZ is an economic development tool developed to promote national economic growth and export by using support measures in order to attract targeted foreign and domestic investments and technology, and includes industrial development zones as a category.

The proposed Project has been formulated in response to the Request for Proposals (RFP) for New Generation Capacity under the Risk Mitigation IPP Procurement Programme issued by the Department of Mineral Resources

and Energy to alleviate the immediate and future capacity deficit as well as the limited, unreliable and poorly diversified provision of power generating technology with its adverse environmental and economic impacts. The RFP stipulates stringent environmental, social and economic criteria, for example, the shift from coal and LPG to NG as a cleaner and more cost effective resource, BBBEE criteria and skills development. The "*Emergency/Risk Mitigation Power Purchase Procurement Programme (2000MW): National*" has also been designated the status of a Strategic Integrated Project (SIP) under the Infrastructure Development Act, 2014 by the Presidential Infrastructure Coordinating Commission. SIPs are considered to be projects of significant economic or social importance to South Africa as a whole or regionally that give effect to the national infrastructure plan and for this reason, can be expeditiously implemented through the provisions of the enabling Act.

1.3 Independent Environmental Assessment Practitioner and EIA team

2014 NEMA EIA Regulations (as amended), Appendix 2. 2. (1) (a) A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include— (a) details of—(i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;

Please see Appendix E for EAP Declaration and full Curriculum Vitae.

Table 1-1: Independent EAP Details

EAP	Triplo4 Sustainable Solutions
EAP Team Leader	Mrs Hantie Plomp
Educational qualifications	Masters in Environmental Management
Professional Registrations	EAPASA; SACNASP; AP with GBCSA
Voluntary Memberships	IAIAsa; IWMSA; IODSA, WISA
Experience at environmental assessments (yrs.)	> 20 Years
Postal Address	P.O. Box 6595 Zimbali 4418
Telephone Number	032 946 3213
Cell Number	083 308 8003
Fax Number	032 946 0826
Email Address	ppprbay.triplo4@gmail.com / hantie@triplo4.com
EAP Compiler and Reviewer	Ms. Melissa Gopaul
Educational qualifications	Honours in Environmental Management
Professional Registrations	SACNASP *(Pri.Sci.Nat)* | *EAPASA*
Voluntary Memberships	IAIAsa; IWMSA; WISA
Experience at environmental assessments (yrs.)	>7 years
EAP Reviewer	Ms. Shanice Singh

EAP	Triplo4 Sustainable Solutions
Educational qualifications	Honours in Environmental Management
Professional Registrations	*EAPASA*
Voluntary Memberships	IAIAsa
Experience at environmental assessments (yrs.)	>5 years
EAP Compiler	Mrs Chen Read
Educational qualifications	Postgraduate Diploma in Environmental Management
Voluntary Memberships	*EAPASA;* AP with GBCSA
Voluntary Memberships	IAIAsa
Experience at environmental assessments (yrs.)	>9 years
Preliminary Impact Assessment	Mr Zayd Hoosen
Educational qualifications	MSc Environmental Sciences
Professional Registrations	SACNASP (*Pri.Sci.Nat*)
Voluntary Memberships	IAIAsa
Experience at environmental assessments (yrs.)	>6 years
Transmission Aspects and Impacts	Mrs Jyotika Daya
Educational qualifications	Honours in Environmental Science
Professional Registrations	*SACNASP; Candidate EAPASA*
Voluntary Memberships	N/A
Experience at environmental assessments (yrs.)	>6 years

1.4 Purpose of this Report

2014 NEMA EIA Regulations (as amended), Appendix 2. 1 the objective of the scoping process is to, "through a consultative process:

a) identify the relevant policies and legislation relevant to the activity;
b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
c) identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
d) identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
e) identify the key issues to be addressed in the assessment phase;

f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The Scoping phase forms part of the Scoping and Environmental Impact Reporting (S&EIR) process required for the application for environmental authorisation for the proposed Project. The purpose of this Scoping Report is to provide the Competent Authority with an understanding of the Project at Port of Richards Bay, characterise the environmental and social context and describe the associated environmental attributes, identify potential environmental, social and heritage aspects and impacts associated with the Project, including the early input from potentially I&APs and stakeholders in terms of the identification of key issues and areas of concern. The aim was to fully scope the key issues and areas of concern and carry forward those that require more detailed investigation, assessment and mitigation in the next phase, the EIA process.

I&APs were given a 30 day comment period to comment on the Draft Scoping Report before it was finalised and submitted to the Competent Authority, DEFF, for consideration.

1.5 Scoping Requirements as per EIA Regulations 2014 (as amended)

Table 1-3 outlines the requirements of the Scoping Report as per the NEMA EIA Regulations (2014 and subsequent 2017 and 2018 amendments). According to Appendix 2 (1) "A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include..." the information outlined in Table 1-3 below. In addition, a Public Participation Process (PPP) will be undertaken in accordance with sections 39-44, which outline the requirements for a compliant PPP.

Table 1-2: Requirements for the Scoping Report and content (in accordance with Appendix 2 of the EIA Regulations).

Relevant section in GNR. 982	Requirement description	Relevant section in this report
(a) Details of-	(i) The EAP who prepared the report; and	Section 1.4
	(ii) The expertise of the EAP, including a curriculum vitae;	
(b) The location of the activity, including-	(i) The 21 digit Surveyor General code of each cadastral land parcel;	Section 2.3
	(ii) Where available, the physical address and farm name;	
	(iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
c) A plan which locates the	(i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Section 2.3

Relevant section in GNR. 982	Requirement description	Relevant section in this report
proposed activity or activities applied for at an appropriate scale	(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d) A description of the scope of the proposed activity, including	(i) All listed and specified activities triggered;	Section 2.2
	(ii) A description of the activities to be undertaken, including associated structures and infrastructure;	Section 2.1
(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	Section 5
(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 6.1
(g) A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including -	(i) Details of all the alternatives considered;	Section 3
	(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 7
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 7
	(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 4
	(v) The impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed or mitigated;	Section 8
	(vi) The methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	
	(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community	

Relevant section in GNR. 982	Requirement description	Relevant section in this report
	that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(viii) The possible mitigation measures that could be applied and level of residual risk;	
	(ix) The outcome of the site selection matrix;	
	(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 6.2
(h) A plan of study for undertaking the environmental impact assessment process to be undertaken including -	(i) A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	Section 9
	(ii) A description of the aspects to be assessed as part of the environmental impact assessment process;	
	(iii) Aspects to be assessed by specialists;	
	(iv) A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	
	(v) A description of the proposed method of assessing duration and significance;	
	(vi) An indication of the stages at which the competent authority will be consulted;	
	(vii) Particulars of the public participation process that will be conducted during the environmental impact assessment process; and	
	(viii) A description of the tasks that will be undertaken as part of the environmental impact assessment process;	
	(ix) Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	
(i) An undertaking under oath or affirmation by the EAP in relation to -	(i) The correctness of the information provided in the report;	Appendix D and Appendix E This was finalised for the final Scoping Report, following the conclusion of the PPP for Scoping
	(ii) The inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(iii) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	

Relevant section in GNR. 982	Requirement description	Relevant section in this report
(k)	Where applicable, any specific information required by the competent authority; and	As per guidance provided at pre-application meeting (see Appendix H1 for minutes) and correspondence form DEFF (see Appendix F)
(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	The requirements of Section 24(a) and (b) will be met in the EIA Phase.
(2)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a Scoping Report, the requirements as indicated in such notice will apply.	The Environmental Themes were considered.

1.6 Report Structure

The structure of the report is as follows –

- Chapter 1 – Introduction:
- Chapter 2 – Project Description: Provides a description of the proposed development, the properties on which the development is to be undertaken and the location of the development on the property. The technical details of the project are also provided in this Chapter.
- Chapter 3 – Legal and Policy Framework: Identifies all the legislation and guidelines that have been considered in the preparation of this Scoping Report.
- Chapter 4 – Environmental and Social Baseline: Provides a brief overview of the bio-physical and socio-economic characteristics of the site and its environs that may be affected by the proposed development, compiled largely from published information, but supplemented by information from a site visit.
- Chapter 5 – The EIA Process: Provides details of the process that will be followed when conducting the EIA as per Regulation 23, including the public participation process conducted in terms of Regulation 41. This chapter includes the objectives of the EIA process as outlined in Appendix 3 of the EIA Regulations.
- Chapter 6 – Impacts and Risks identified during Scoping: Provides a description of the key issues that have been identified by the project team and through discussions with I&APs in the Scoping Phase, and that will be assessed in the EIA phase.
- Chapter 7 - Plan of Study: Sets out the proposed approach to the environmental impact assessment including:
    - A description of the scope of work that will be undertaken as part of the EIA phase, including any specialist reports or specialised processes, and the manner in which the described scope of work will be undertaken;
    - An indication of the stages at which the competent authority will be consulted;

- A description of the proposed methodology for assessing the environmental issues and alternatives, including the option of not proceeding with the proposed development;
- Particulars of the public participation process that will be conducted during the Environmental Impact Assessment (EIA) phase, and;
- Any specific information required by the authority.

- References: Cites any texts referred to during preparation of this report.
- Appendices: Containing all supporting information.

2 DESCRIPTION OF THE PROPOSED ACTIVITY

2014 EIA Regulations (as amended), Appendix 2 - (d) (ii) a description of the activities to be undertaken, including associated structures and infrastructure.

2.1 Description of the Activities to be Undertaken Including Associated Structure and Infrastructure as per Section 2(d)

Karpowership proposes the generation of electricity from 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 terms stipulated in the RMIPPPP) - 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 days. The LNG is then converted to Natural Gas (NG) and pumped from the FSRU to the Powership via a gas pipeline. The proposed design capacity for the Powerships are 540MW, which comprises 27 gas 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 3 km to the tie in point to the Eskom line, at a connection point (including an establishment of a switching station) in proximity to the existing Bayside Substation, which feeds into the national grid.

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 generally be heavy chain lying on the seabed attached to anchors which will become buried in a very short time.

The key criteria for the mooring site are sufficient space for turning the LNG carrier 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.

Two alternative mooring sites are 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. From one of the Powerships, an electricity tower and lines will connect to a sub-station and into the national grid.

In terms of construction, the Powerships, FSRU and LNG carrier are built internationally and arrive fully equipped in the Port ready for operation. Construction is therefore limited to transmission and gas supply lines.

2.1.1 Powerships, FSRU and LNG Carrier

The Powerships are assembled off-site and will be delivered fully equipped and functional to the Port of Richards Bay. They are essentially ships which have been fitted with the necessary equipment, including reciprocating engines, steam turbines, and a high voltage substation to generate and transmit electricity using natural gas as a fuel.

The fuel is supplied by a separate, vessel, a Floating Storage Regasification Unit (FSRU) which stores the liquefied natural gas (LNG) and converts it to a gaseous state for delivery to the Powerships through a gas pipeline. A LNG carrier shall periodically supply LNG to the FSRU and will temporarily stay in the location within the Port while offloading the LNG cargo.

The proposed design capacity for the Richards Bay Powerships (classes Khan and Shark) are 540MW, which comprises of 27 gas engines having an approximate heat input of over 10MW each. The 3 steam turbines have a heat input of 15.45MW each. The Powerships are equipped with reciprocating engines for power generation, allowing reliable supply of electricity with minimal impacts from load profile and number of starts and stops. Powerships, with their modular generation capability, allow for greater technical flexibility for load cycling and shedding.

The ship to ship transfer of LNG will be managed under an international 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 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.

Refer to the images below, showing the types of Powerships, FSRU and Project Concept.

Table 2-1: Images of Various Powerships and Project

Image 1: Example of a Powership – Khan Class

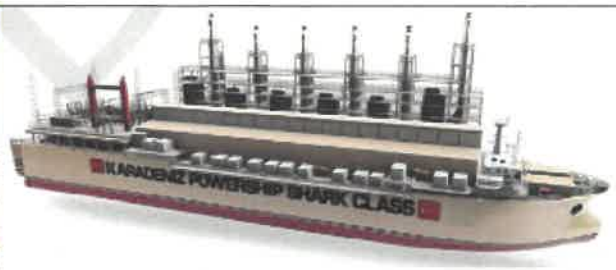

Image 2: Example of a Powership – Shark Class

Image 3: Floating Storage & Regasification Unit (FSRU)

Image 4: Project Concept

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 the locations where high levels of organic or inorganic dusts exist. Charge air filtering system day-to-day workmanship or its maintenance intervals may 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 switching station to 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.

Natural gas boil off of LNG on board the FSRU is not flared or vented. The natural boil off gas (BOG) is used as fuel for the operation of the FSRU and if in excess, is prioritised for export to the Powership for use in the generation of electrical power. In the event that BOG is in excess of the base load demand, then arrangements are provided on-board the FSRU for this excess BOG to be burnt in a specialised internal process. Under normal operations it is anticipated that the demand for gas will be significantly in excess of the natural boil off resulting in liquid LNG being re-gassified for export to the Powership.

2.1.2 Berthing & Mooring of the Powership and FSRU

Berthing and mooring will be conducted as per the Ports' approved maintenance plans, procedures and requirements, and ships will be located where adequate depths exist.

No dredging is required as the mooring locations are positioned in sufficient water depth to safely accommodate the moored vessels. In the process of identification of the potential sites, the existing cargo facilities and the Port's future short term developments were avoided. The Sand-spit area has been identified as sensitive and a 200m offset from the water line to the moored vessels maintained.

Key considerations for a feasible position are the size of the turning circle for the LNG carrier as well as that the approach channel and turning circle which will be shared with the coal terminal and bulk berths. The traffic in the basin (coal vessels, cargo vessels and tugs) cannot be impeded by the Powership project.

Marine conditions derived for all design return periods include an allowance for potential climate change impacts (increases) on wind speeds, water levels and wave heights over the design life of the infrastructure.

2.1.3 Transmission Lines

The power generated on the ship will be converted by the on-board High Voltage substation and transmitted along 132kV twin conductor transmission line. The approximate 3km transmission line route will be installed as part of the project from the Richards Bay Port to the tie in point to the Eskom line, at a connection point (including an establishment of a switching station) in proximity to the existing Bayside Substation.

Approximately 15 steel lattice / Monopoles towers are proposed, and each tower will cover a maximum footprint of 15m by 15m which will necessitate the clearing of vegetation to allow for the towers to be erected. A proposed servitude, stretching along the transmission line from the port to the connection point by the substation, will have a width of 30m as per Eskom safety specifications. No transformers will be installed.

Access will be via the existing powerline servitude, and at this stage is it deemed that no additional access roads will be required to be constructed. This will be further investigated during the EIA phase.

The transmission lines potentially traverse watercourses or will fall within 32 metres of a watercourse. This may require the infilling or depositing or excavation, removal or moving of more than 10 cubic metres of material into, or from a watercourse and removal of more than 5 cubic metres of sand, within 100 metres inland of the high-water mark.

Routes options for the transmission lines are presented in the layout alternatives, Section 3.1.3 of this report.

2.1.4 Gas Lines

A subsea gas pipeline is proposed to be installed along the toe of the existing dredged slopes between the floating storage regasification unit (FSRU) and Powership to ensure gas supply for power generation and connected to the vessels via a flexible marine hose riser.

There are two proposed alternative routes for the gas pipeline, and these are directly influenced by the selected positions of the Powership in relation to the position of the FSRU.

- Alternative 1 of the gas pipeline route (approx. 1400 meters in length) is preferred from an engineering perspective, as it is in line with the preferred position (from an engineering design perspective) of the Powerships and the FSRU within the port, positioning the Powership in closer proximity to the land and the transmission line.
- Alternative 2 of the gas pipeline route (approx. 500 meters in length) relates to the second alternative of the Powership positions (further from the shore) and the FSRU.

The preferred route subsequent to the EIA process will also need to be approved by Transnet National Port Authority (TNPA).

The Applicant is currently investigating the procurement of natural gas from global suppliers. As already mentioned, the gas will be shipped into the Port on a specialised carrier and offloaded to the FSRU.

Pipeline installation

The subsea pipeline is to be brought onto site in sections. The pipeline is likely to be delivered to the site by truck and welded together in a pipe stringing yard near the beach crossing location. The trucks used to deliver the pipeline sections will therefore require access to the stringing yard.

The proposed methodology to install the subsea gas pipeline will be to international best practices and in conjunction with the specific expertise of the Marine Contractor that will be appointed to undertake the construction works. Temporary site facility onshore will be required for the assembly and launching of the gas pipeline. The location of the facility will be selected at a location in the port which was previously used as temporary construct sites for previous projects, in order to reduce new impacts, and will be completely removed after installation of the pipeline, to reinstate the site to its original topographical and environmental condition, as has been done previously.

For the installation of the gas pipeline - sufficient space near the launch site will therefore be required to undertake the assembly of the pipeline. This area will be fully rehabilitated after the completion of the installation of the pipeline. Estimated size for the assembly area for the installation of the gas pipeline is 100m x 150m.

Pipeline Maintenance

The gas pipeline infrastructure is designed to require little to no maintenance during its design life. Relevant design features include the following:

- the subsea pipeline will be protected with a factory applied external coating as well as sacrificial anodes;

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

Monitoring requirements will be included in the Environmental Management Programme (EMPr) in the EIA Report (next phase), including the following recommended inspection intervals to identify any additional maintenance requirements during the life of the facility:

- Hoses: Annual diver inspection of hose connections, fittings and in-situ pressure test in accordance with Oil Companies International Marine Forum (OCIMF) Guidelines;
- Pipeline and Manifold (PLEM): Annual diver inspection removing sand and silt and manually operating valves;
- Pipeline: Annual visual inspection of pipeline by divers to verify the external integrity of the pipeline and its weight coating and to identify any localized changes in seabed levels; and
- Pipeline integrity pigging inspection and bathymetric survey of the pipeline every 2 – 4 years.

As reported by the applicant, leakages of gas from the FSRU, the LNG Carriers or the Powership are not anticipated, due to the design and procedures adopted by the applicant in managing the transportation, storage and regasification of LNG, undertaken with the primary purpose of 100% containment. Design features on-board the FSRU, Powership and incoming LNGC's to re-fuel the FSRU are appropriately fitted gas detection systems within annular spaces surrounding the containment for advance warning of any contained leakages, as well as in the open atmosphere, to detect and mitigate the remote chance of any leakages during the transfer stages.

2.1.5 Water Requirements

The Powerships use seawater and potable water for cooling the reciprocating engines, condensers and other auxiliaries. They operate a once through cooling system, which abstracts seawater directly for cooling and then discharges it into the sea. The Powerships will have inlets and outlets to abstract and discharge seawater accordingly, and further details of this will be provided in the EIA Phase. Part of the cooling water is processed into potable water through the vaporization process for steam generation (on-board water treatment unit) and non-process water consumption. Seawater is primarily used for steam generation, make up water and for domestic use. Water supply for domestic use is produced using the on-board water treatment unit whereby seawater is treated via fresh water generators and sea water reverse osmosis system. Water that is to be used for cleaning and bathing is produced using an onboard water treatment unit. Potable water required over the volume produced onboard, will be sourced from the local service providers. No bulk water supply will be required from the Municipality. The Powerships also have sewage treatment unit and oily bilge separator to be utilized while sailing.

The following volume of water required daily is anticipated:

- 400 litres of drinking water will be required for on-board utilisation;
- 1010 litres technical water for continuous Steam Turbine Generators (STG) operation; and
- 25-30 litres of water per engine is required and 200 litres for STG consumption.

No biocides and no other additives are necessary to control bio-fouling in seawater pumping and temperature exchange systems. Part of the cooling seawater is processed into steam through an evaporation process for non-process water consumption. No discharge of brine is proposed.

2.1.6 Water Temperature and Marine Ecology

The Powerships will use seawater for cooling the gen-sets and optionally the steam turbine generators and fresh water generators. The total intake/outlet flow rates range from 2.4 m3/s to 11.4 m3/s and the increase in temperature (ΔT) range from 4°C to 15°C. No chemicals such as chlorine are discharged with the cooling water.

The dispersion of the resulting thermal plume depends on the flow rate, ΔT, discharge geometry, bathymetry, currents, winds and water column stratification. In confined water bodies with low water exchange there can be a build-up of temperature including recirculation from the intake to the outlet.

Typical ecological thresholds include ΔT = 3°C at 100 m from the discharge point (World Bank), ΔT = 1°C at sensitive receptors or the edge of the mixing zone, which for discharges beyond the surf-zone can be assumed as 300 m from the discharge point, according to the South African Marine Water Quality Guidelines (DWAF, 1995).

The results show that a smaller footprint of ΔT is achieved when discharging at a deeper depth below the water surface. Discharging at a deeper depth allows the thermal plume to entrain colder sub-surface ambient water as it rises to the surface, reducing the temperature of the plume. In can be concluded that the thermal plume meets the World Bank guideline and the generic South African Marine Water Quality Guideline when the cooling water is discharged 4 m below the water surface.

2.1.7 Storage of Hazardous Goods

The liquefied natural gas stored on the FSRU is in a series of pressurised containers, and at any given time will not exceed 175 000m³.

The storage of NG on the Powerships is of small quantities and can be assumed as zero, as it is used for the electricity generation operations, not stored on the Powerships. Health and Safety protocols and requirements are ensured for the storage of hazardous goods, such as small quantities of lubricating oil stored for equipment maintenance purposes.

2.1.8 Refuelling

The FSRU is refuelled through vessels specially fitted for the purpose of carrying LNG and fuelling the FSRU. Refuelling would be required approximately every 20 days, depending on the power generation capacity and output of the Powership.

2.1.9 Waste Generation and Management

Due to daily operational activities and the regular repair and maintenance of the Powerships and FSRU, waste will be generated. All effluent and solid (general, and hazardous) waste will be removed by authorised service providers in terms of the legislation and TNPA and MARPOL requirements.

Sewage from on-board ablution facilities and bilge water will be produced by the Powerships. Approximate of 75m^3 of sewage (black water) will be generated per month, as well as grey water (washing and kitchen).

Pursuant to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78 or "MARPOL Convention" in short) (Annexes I, II and IV), discharge of oil, noxious liquid substances, and sewage from vessels into marine environment is prohibited. All black and grey wastewater generated during operation of Powership facilities will be removed by authorised service providers for appropriate off-site treatment and disposal.

2.1.10 Lightning Mitigation Measures

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

2.1.11 Security Measures

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

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

In addition, a Floating Storage Vessel can be moved relatively quickly in the event that South Africa becomes exposed to terrorist activities. Access to these facilities are also more easily controlled than land based facilities.

2.2 Listed Activities Triggered and Applied for as per Section 2(d) (i)

2014 EIA Regulations (as amended), Appendix 2 – 2(1)(d) (i) requires that a Scoping Report includes all listed and specified activities triggered

2.2.1 NEMA: EIA Regulations 2014 (as amended)

The table below indicates the listed activities that are deemed applicable to the project at the port of Richards Bay:

Table 2-2: Applicable Listed Activities

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
LISTING NOTICE 1		
Activity No.	Activity Description	Applicability
Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity—* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;* *excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —* *(a) temporarily required to allow for maintenance of existing infrastructure;* *(b) 2 kilometres or shorter in length;* *(c) within an existing transmission line servitude; and* (d) *will be removed within 18 months of the commencement of development.*	The power generated on the ship will be converted by the on-board High Voltage substation (110kV-170kV) and transmitted inside an industrial complex along the 132kV twin conductor overhead transmission lines.
Activity 12	*The development of—* *(ix) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs—* *i if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse*	Based on the proposed route of the transmission line it is anticipated that development may take place within 32 metres of a watercourse.
Activity 19	*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*	Based on the proposed route of the transmission line it is anticipated that development may take place within watercourses. This can only be confirmed with onsite verification.
Activity 19A	*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—* *(ix) the seashore;*	The erection of the pylons for the transmission lines may require the removal of more than 5 cubic metres of sand, within 100 metres inland of the high-water mark.

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
	(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 *(ix) the sea; —* *but excluding where such infilling, depositing , dredging, excavation, removal or moving—* *I will occur behind a development setback;* *(f) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(g) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(h) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies*	
Activity 27	*The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	The transmission line and its servitude may require clearance of more than 1 hectares of indigenous vegetation
LISTING NOTICE 2		
Activity 2	*The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more.*	The two Powerships and FSRU are assembled off-site and will be delivered fully equipped and ready to operate to the Port of Richards Bay where they will be moored. The proposed design capacity for the Richards Bay the two Powership is approximately 540MW, which comprises of 27 gas engines having heat input of over 10MW each. The 3 steam turbines have a heat input of 15.45MW each. The gas pipeline from the FSRU to the Powerships and the

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
		transmission line from the Powerships to the Substation trigger separately listed activities as does the need for an AEL which if issued, will regulate the atmospheric emissions during commissioning and operation of the project.
Activity 4	*The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.*	Storage of LNG on the FSRU will exceed 500 cubic meters, anticipated to be maximum 175000 cubic meters at any given time.
Activity 6	*The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding—* *(ix) activities which are identified and included in Listing Notice 1 of 2014;* *(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies*	The engines used for electricity generation are a Listed Activity under GN 893 of 22 November 2013 (as amended) in terms of Section 21 of the NEM: AQA Sub-category 1.5: Reciprocating Engines. In the case of the proposed project, the Powerships will have a combined sum of 27 engines that all have a heat input capacity of more than 10MW. The three steam turbines have a heat input capacity of less than 50MW, but more than 10MW. These units are therefore declared Controlled Emitters and it is expected that they will be regulated in terms of GN 831 of 1 November for Small Boilers.
Activity 7	*The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods—* *(ix) in gas form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 700 tons per day;*	A subsea gas pipeline for transportation of gas in gas form is proposed, exceeding 1000 meters, however the proposed location is within industrial complex (harbour land use).

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
	(ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 50 cubic metres per day; or *(iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons per day.*	
Activity 14	*The development and related operation of—* *(i) an anchored platform; or* *(ii) any other structure or infrastructure —* *on, below or along the sea bed;* *excluding —* *(a) development of facilities, infrastructure or structures for aquaculture purposes; or* *The development of temporary structures or infrastructure where such structures will be removed within 6 weeks of the commencement of development and where coral or indigenous vegetation will not be cleared.*	The transmission of the NG gas will flow from the moored ship along the seabed to the main ship for processing.
LISTING NOTICE 3		
Activity 10	*The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* ***KwaZulu-Natal*** ***i. In an estuarine functional zone;*** *ii. Trans-frontier protected areas managed under international conventions;* *iii. Community Conservation Areas;* *iv. Biodiversity Stewardship Programme Biodiversity Agreement areas;* *v. World Heritage Sites;* *vi. Within 500 metres of an estuarine functional zone;* *vii. A protected area identified in terms of NEMPAA, excluding conservancies;* *viii. Sites or areas identified in terms of an international convention;* ***Ix. Critical biodiversity areas as identified in systematic biodiversity plans adopted by***	The storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres. The proposed activity is within an operational port, an estuarine functional zone and critical biodiversity area.

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
	the competent authority or in bioregional plans; *x. Core areas in biosphere reserves;* *xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;* *xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *xiii. Outside urban areas:* *(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;* ***(bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or*** *(cc) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland; or* *xiv. Inside urban areas:* *(aa) Areas zoned for use as public open space; or* ***(bb) Areas seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined***	
Activity 12	*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.*	This activity may be triggered by the transmission lines as it occurs within the estuarine functional zone, within the littoral active zone and

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
	d. KwaZulu-Natal *i.Trans-frontier protected areas managed under international conventions;* *ii.Community Conservation Areas;* *iii.Biodiversity Stewardship Programme Biodiversity Agreement areas;* *iv.Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *v.Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *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;*** *vii.On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;* *viii.A protected area identified in terms of NEMPAA, excluding conservancies;* *ix. World Heritage Sites;* *x.Sites or areas identified in terms of an international convention;* *xi.Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;* *xii.Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or* *xiii. **In an estuarine functional zone.***	100 metres inland from the high water mark of the sea.
Activity 14	*The development of—* *(ix) dams or weirs, where the dam or weir, including infrastructure and*	This activity is within the littoral active zone or 100 meters inland from the high water mark of the sea and in an estuarine functional zone

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED		
	water surface area exceeds 10 square metres; or *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *I If no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* ***KwaZulu-Natal*** *i.* ***In an estuarine functional zone;*** *ii. Community Conservation Areas;* *iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;* *iv. A protected area identified in terms of NEMPAA, excluding conservancies;* *v. World Heritage Sites;* *vi. Sites or areas identified in terms of an international convention;* *vii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *viii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *ix. Core areas in biosphere reserves;* *x. Outside urban areas:* *(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of*	

LISTED NOTICES OF THE EIA REGULATIONS, 2014 AS AMENDED			
		NEMPAA or from the core area of a biosphere reserve; or	
		(bb) ***Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined;*** *or*	
	xi.	*Inside urban areas:*	
		(aa) Areas zoned for use as public open space;	
		(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose; or	
		(cc) ***Areas seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined.***	

2.2.2 NEM:AQA

In terms of Section 21 of the Air Quality Act the Minister published a 'list of activities which result in atmospheric emissions and which the Minister or MEC reasonably believes have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage'. In terms of Section 21 of the Air Quality Act the consequences of listing an activity is that:

'No person may ***without a provisional atmospheric emission licence or an atmospheric emission licence*** *conduct an activity—*

(a) listed on the national list anywhere in the Republic; or
(b) listed on the list applicable in a province anywhere in that province.'

Table 2-3: Details of the Listed Activity for the proposed Gas to Power Powership Project (GG No. 37054, GN 893 of 22 November 2013, as amended).

Category of Listed Activity	Sub-category of the Listed Activity	Application

Category 1: Combustion Installations	Sub-category 1.5: Liquid and gas fuel stationary engines used for electricity generation	All installations with design capacity equal to or greater than 10MW heat input per unit, based on the lower calorific value of the fuel use

The applicability of this listed activity has been investigated by the EAP upon advice of the air quality specialist and will be confirmed in consultation with the licensing authority.

Table 2-4: Minimum Emission Standards in mg/Nm3 for Subcategory 1.5

Substance or mixture of substances		**MES for sub-category 1.5**
Common name	**Chemical symbol**	**MES under normal conditions of 15% O_2, 273 Kelvin and 101.3 kPa**
Particulate matter	N/A	50
Oxides of nitrogen (Expressed NO_2)	NOx	400
Sulphur dioxide	SO_2	N/A

2.3 Project Locality

2014 EIA Regulations (as amended), Appendix 2 – 2(1) a scoping report must include (b) the location of the activity, including— (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; and (c) a plan which locates the proposed activity or activities applied for at an appropriate scale.

Table 2-5: Location of the proposed activity

Description	Location of the Activity
District Municipality	King Cetshwayo District Municipality
Local Municipality	uMhlathuze Local Municipality
Municipal Ward	2
Area / Town / Village	Richards Bay
Property Description & 21 Digit SG Code	See Table 2-4 below

Refer to the locality map in Figures 2-1 below, showing the alternative locations of the proposed Powerships and FSRU within the port, the alternative routes for the gas pipeline, as well as the alternative transmission line routes – from the Port to the switching station, by Bayside substation.

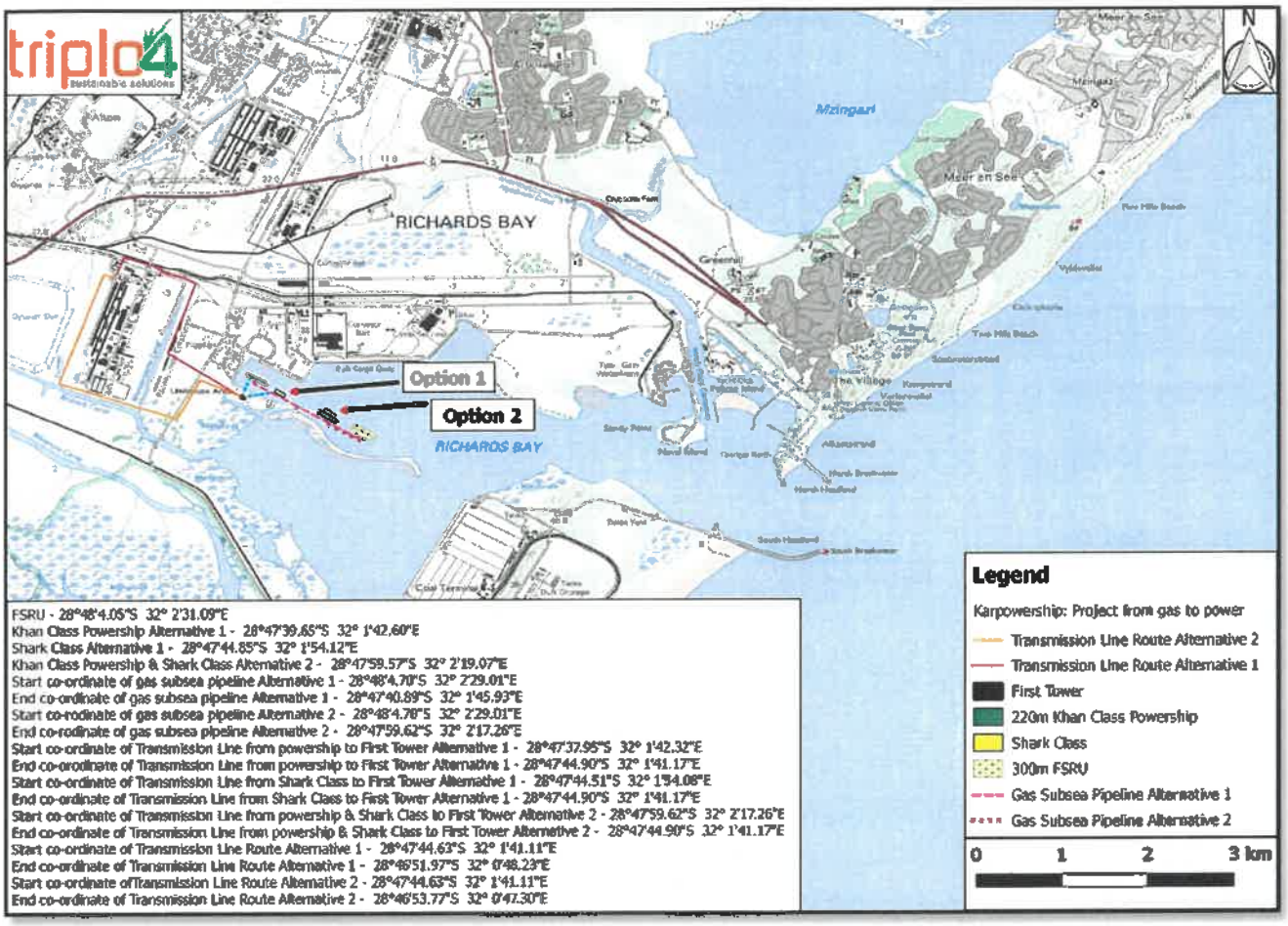

Figure 2-1: Locality map for the proposed gas to power project at Port of Richards Bay

A detailed Layout Plan, providing further additional information regarding the location of the ships, gas pipeline and the transmission line, as well as existing infrastructure within the study area, is attached as Appendix A1.

Table 2-6: Property Description & 21 Digit SG Code – The Powership location and the preferred proposed power evacuation (transmission line) route:

Properties	21 SG CODES	CENTRAL GPS-COORDINATE	
		Longitude	Latitude
Remaining Extent of Erf 223 UMhlathuze No. 16230 Held by T10589/1994 Powerships	N0GV00000001623000000	28°47'39.14"S	32°1'32.46"E

Properties	21 SG CODES	CENTRAL GPS-COORDINATE	
		Longitude	Latitude
Portion 45 of Erf 5333 Richards Bay Held by T33569/1996 Transmission line	N0GV04210000533300045	28°47'22.84"S	32°1'10.78"E
Reminder of Erf 5333 (previously Erf 397) Held by T14568/1979 Transmission line	N0GV04210000533300044	28°46'51.22"S	32°00'42.22"E
Portion 21 of Erf 5333 Richards Bay Held by T6562/1992 Transmission line	N0GV04210000533300021	28°47'36.35"S	32°1'27.60"E
Portion 8 of Erf 5333 Richards Bay Held by T29471/984 Transmission line	N0GV04210000533300008	28°47'36.35"S	32°1'27.60"E
Reminder of Erf 6363 (previously Erf 6362) Held by T3013/1980 Bayside substation	N0GV042100000636300000	28°46'45.4"S	32°00'48.3"E

With regards to property Re of Erf 6363 – this property will only be relevant if the preferred location of the tie-in points to the Eskom line (as per figure 3-9) will not be implemented and a direct connection to the Bayside substation is made.

2.3.1 Site Access

The proposed location of the Project is situated within the existing and operational Port Richards Bay, and therefore the existing access roads network from the N2 and R34 will be used to access the Powerships site. The position of the access road is indicated in the Figure 2-2 below.

Figure 2-2: Google Image showing existing access roads system to the Port of Richards Bay

3 ALTERNATIVES

3.1 Description of Feasible Alternatives

2014 EIA Regulations (as amended), Appendix 2 – 2(1) a scoping report must include (g) (i) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including—(i) details of all the alternatives considered; (h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including—(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;

***Regulation 1 of the EIA Regulations, 2014: "alternatives"**, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—*

3.1.1 The property on which or location where it is proposed to undertake the activity;

3.1.1.1 Preferred Location: Port of Richards Bay

Being a ship-based power generating operation (as opposed to land-based) with transmission of energy to land-based transmission connection points, locations that provide infrastructure associated with the proposed technology were identified.

The ports of South Africa are hubs of the economy, with the port of Richards Bay situated adjacent to the Richards Bay Industrial Development Zone (RBIDZ) – Special Economic Zones (SEZ) in terms of the SEZ Act 16 of 2014, so called as they are specifically designed to allow for related industries to be based in an Industrial Zone.

The project is situated within operational area of the port, which is also planned to be further expanded, and outside of the delineated open space areas, as per the port layout, extract from the National Port Plan, 2019, as per figures 3-1 and 3-2 below.

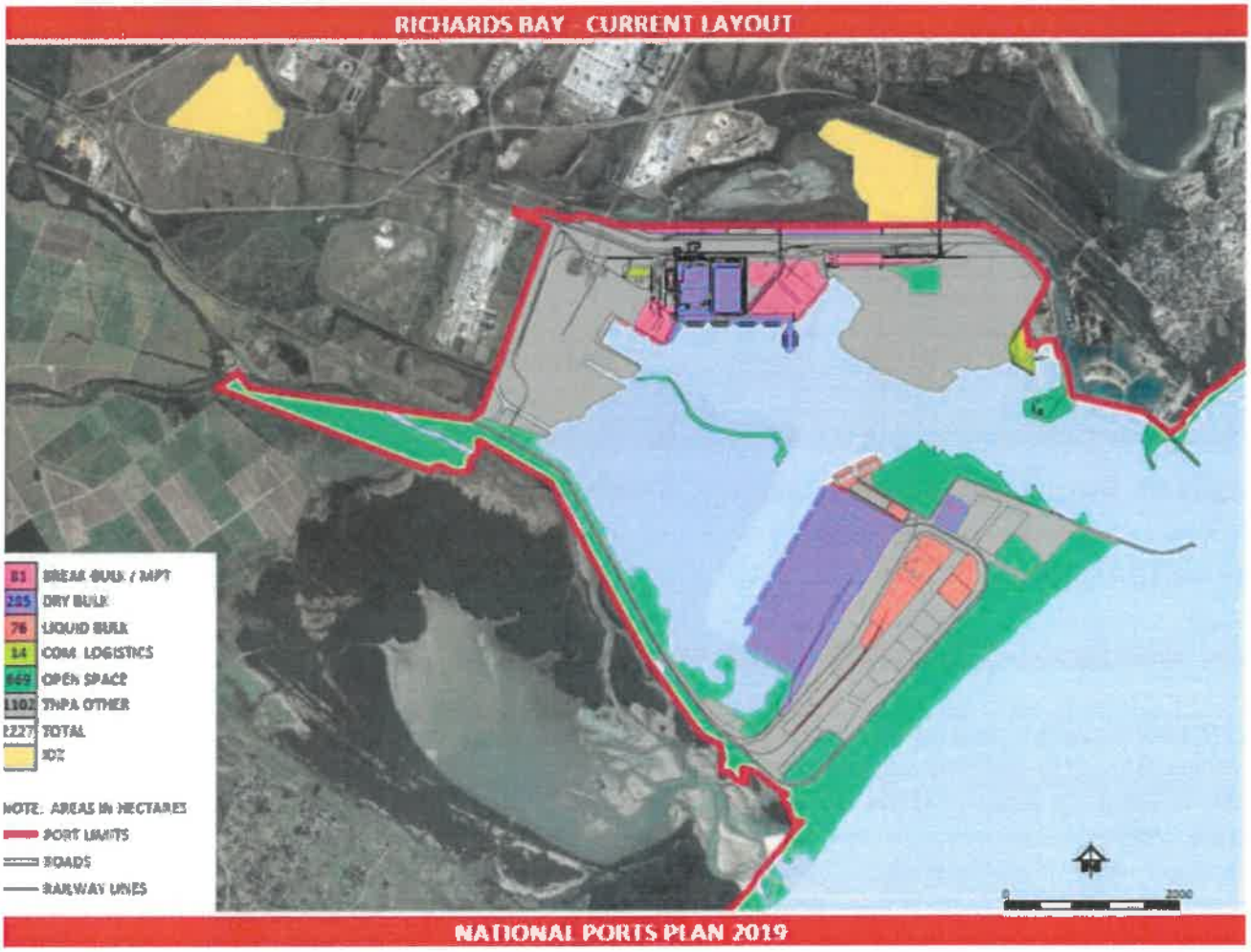

Figure 3-1: The 2019 layout for the Port of Richards Bay

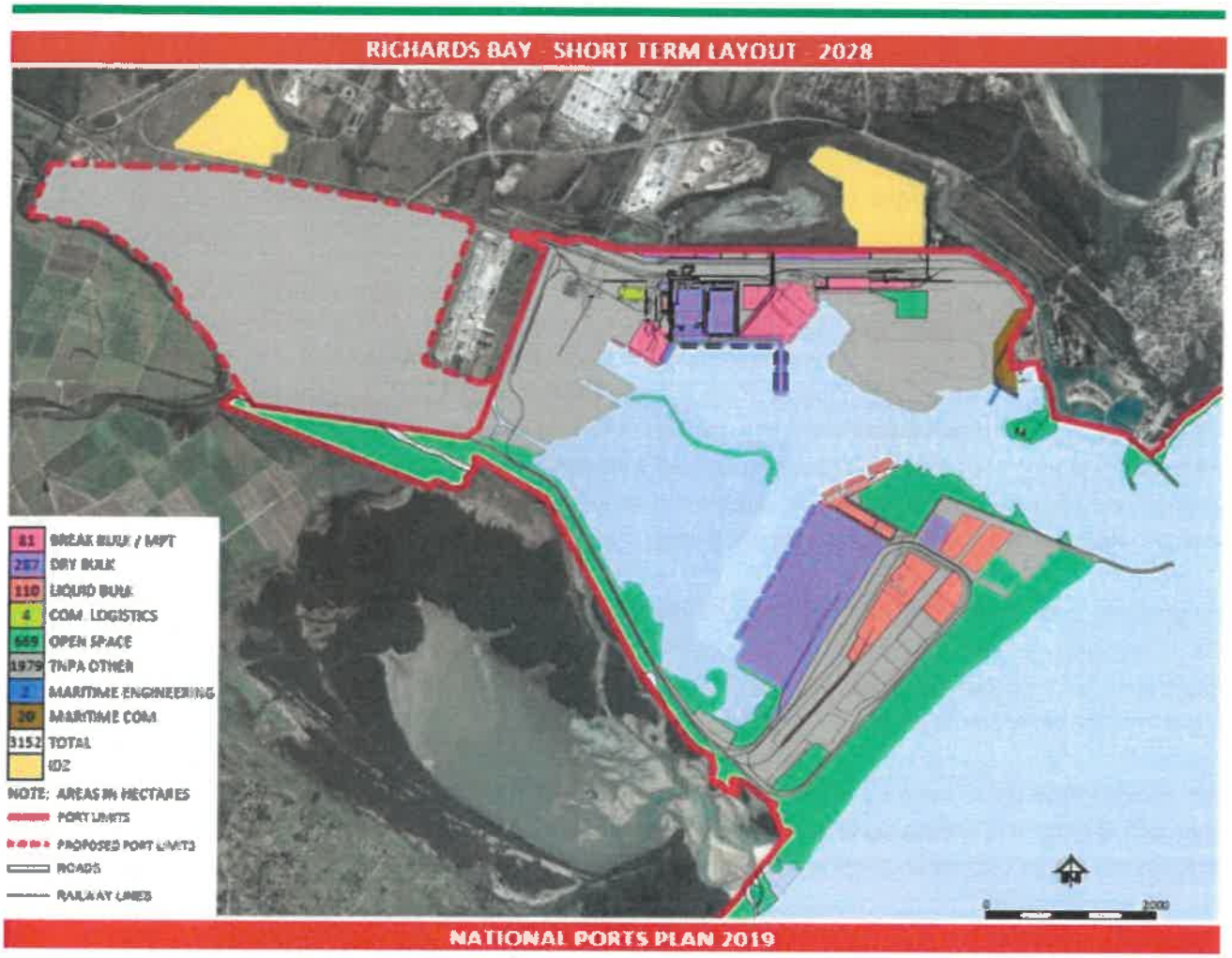

Figure 3-2: Richards Bay Port – Short term layout (2028)

The Richards Bay Port was identified as a preferred location in the region, as it meets the specifications for the proposed Powership project and occurs within a close proximity to the Richards Bay Industrial Development Zone (RBIDZ).

Other ports in the region considered was the port of Durban, however based on congested traffic, economic consideration of the evacuation line and commercial constraint, this site was not further investigated.

On a national level, there are two other projects of a similar nature being proposed by Karpowership in other locations, namely the Port of Saldanha Bay (Western Cape) and the Port of Ngqura (Eastern Cape). These are considered as separate projects for which separate applications for environmental authorisation are being submitted.

3.1.2 The type of activity to be undertaken;

The proposed activity is the generation of electricity by a Powership using natural gas as a fuel and transmission of the generated electricity. This is the Karpowership's core business and as such, no other alternatives in terms of activities are considered feasible.

3.1.3 The design or layout of the activity;

3.1.3.1 Layout Alternatives for the Development

Powership position alternatives within the port

Feasible locations for the mooring of the Powerships and the FSRU were identified and preliminarily assessed. The Powership 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 generally be heavy chain lying on the seabed attached to anchors which will become buried in a very short time.

No dredging is required as the mooring locations are positioned in sufficient water depth to safely accommodate the moored vessels. In the process of identification of the potential sites, the existing cargo facilities and the Port's future short term developments were avoided. The Sand-spit area has been identified as sensitive and a 200m offset from the water line to the moored vessels maintained.

Key consideration for a feasible position are the size of the turning circle for the LNG carrier as well as that the approach channel and turning circle will be shared with the coal terminal and bulk berths, i.e. traffic in basin from coal vessels, cargo vessels and tugs are not impeded by the Powership project.

The following alternatives, with the preferred position to be also agreed with the Port Authorities, were identified and are being assessed:

- **Alternative 1** is deemed the preferred position 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. 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 (to be confirmed with TNPA in the EIA Phase that this is still the case).
- **Alternative 2** is considered less suitable from an engineering perspective, as the Powerships and the FSRU are located too close together, and the Powerships and the mooring systems are placed closer to the sensitive sand bank. Figures 3-3 and 3-4 below show the alternatives for the positioning of the Powerships.

The two alternatives are illustrated in the two figures below:

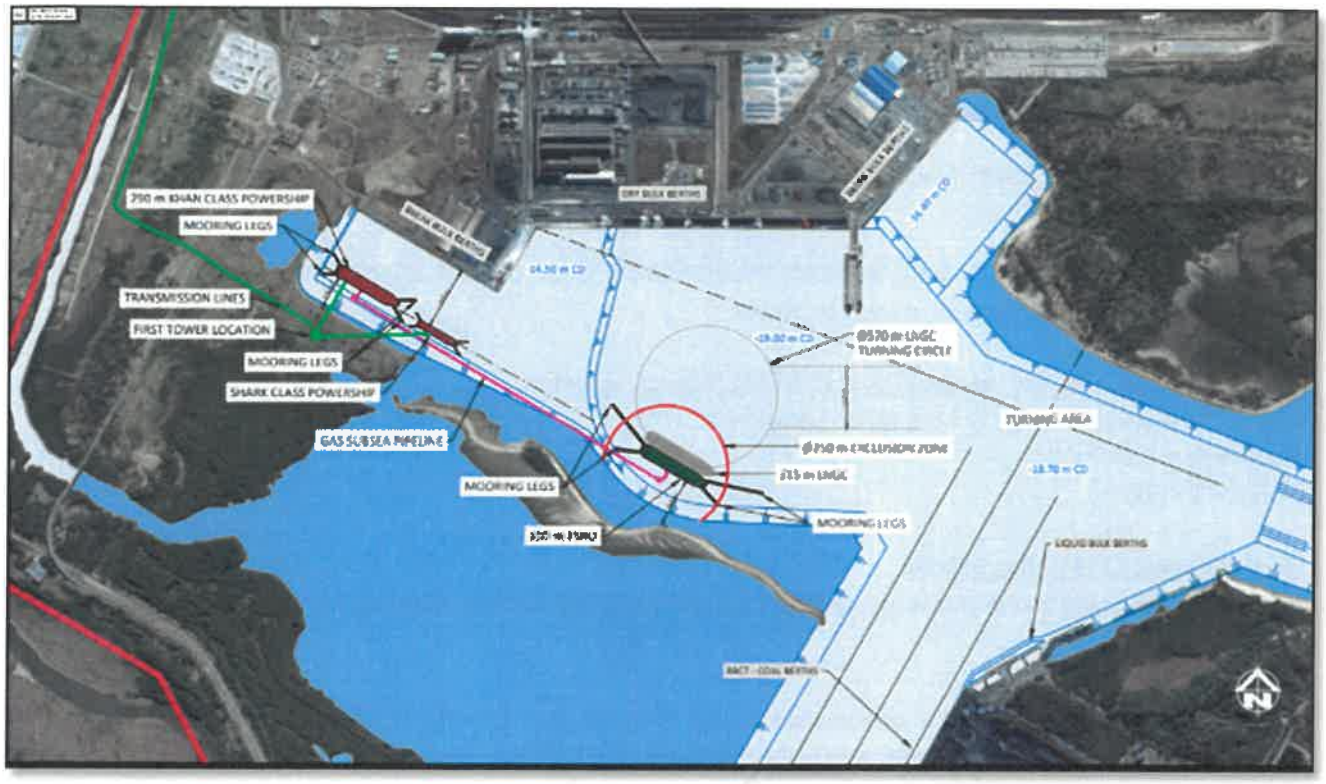

Figure 3-3: Alternative 1: Powership and FSRU position within the port – closer to transmission tower

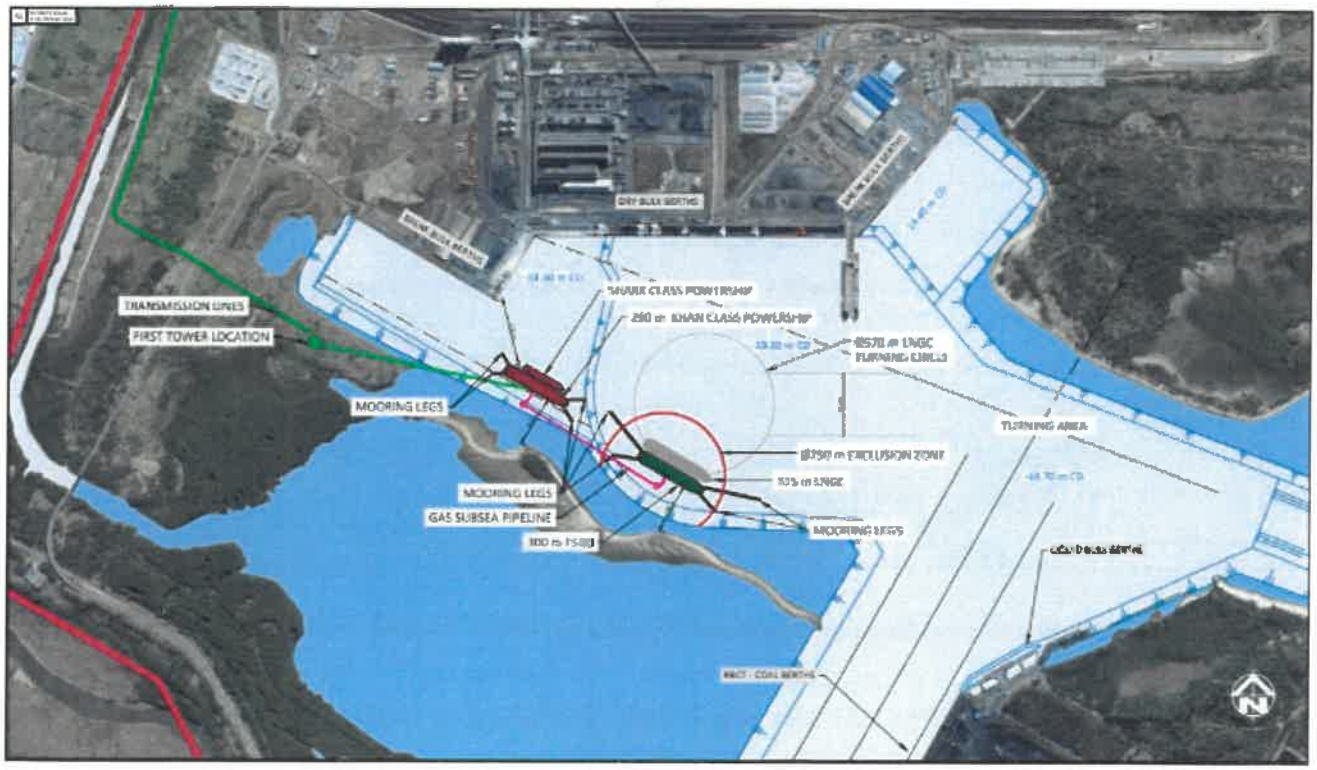

Figure 3-4: Alternative 2: Powership and FSRU position within the port – further from transmission tower

The FSRU will be mooring against the break-water at geographical co-ordinates 28°48'4.05"S 32° 2'31.09"E.

Alternative 1: the two Powerships will be mooring at geographical co-ordinates 28°47'39.65"S 32° 1'42.60"E (khan Class) and 28°47'44.85"S 32° 1'54.12"E (Shark class).

Alternative 2: the two Powerships will be mooring at geographical co-ordinates 28°47'59.57"S 32° 2'19.07"E (Khan and Shark class).

Alternative 3 – a third layout alternative might be identified to accommodate minor changes, based on specialists' final input, and will be addressed in the EIA phase.

The physical size of the Powerships and FSRU (Size of activity):
Power Generation (moored at port, within seawater):
Powerships – 19 000m²
FSRU – 29 300m²

Transmission Lines Alternatives

The power generated on the ship is converted by the on-board High Voltage substation and transmitted along 132kV transmission lines.

A transmission line is proposed to be installed as part of the project from the Powerships within the Richards Bay Port to a proposed switching station alongside the Bayside substation. The image below (figure 3-5) shows the proposed location of the Powership and the location of the Bayside substation.

Figure 3-5: 132kV connection at Bayside Substation in relation to the location of the Powership

Two alternatives were considered for the 132kV connections, i.e. overhead or underground connections.

Analysis results indicate that the 132 kV connection to Bayside is technically feasible. The overhead line connection to Bayside at 132 kV voltage level with its lower connection cost and shorter implementation timeframes offers the most practical alternative.

The underground cabling alternative was considered to be unfeasible as it requires significantly more civil work than overhead transmission line. The underground cabling is more susceptible to storm surges or flooding. Repairs and maintenance of the powerline is also more difficult as the underground cabling is not as easily accessible as overhead powerlines. Underground cabling are also more susceptible to overheating and faults due to the position underground. Underground cabling may often cause underground oil spills, which may go undetected.

Given the reasons above, the underground option is deemed not feasible and thus not being considered further.

In terms of the **transmission line route**, two alternative routes were proposed, with the same start and end point (Figure 3-6 below).

Start point – the first tower is positioned on the main land 'promontory' adjacent to the large mangrove stand, on a Freshwater Ecosystem Priority Areas (FEPA Estuary) (as per the National Freshwater Ecosystem Priority Areas (NFEPA) dataset; Nel *et al*, 2011). Transmission lines will run from the moored powerships to the starting point (numbered as 15 or 19 in figure).
End point – the switching station positioned alongside the Bayside substation, located near the north western corner of the former Bayside Aluminium Smelter site, to tie in to the existing Eskom network.

Alternative 1 (red line) - from the starting point, the route joins into the existing powerline servitude to the west through open grassland/scrubland, running along the Manzamnyama Canal, before heading north and finally in a westerly direction before reaching its end point.

The route is the preferred overhead transmission line from the Powership to the Bayside substation, as it offers a shorter route to the end point (Approx. 3km, 15 towers). The majority of the Alternative 1 route is located in areas of low to moderate ecological sensitivity with limited areas possibly traversing very high sensitive swamp forest. Overall, this route is located in low sensitivity areas, mainly due to its location in transformed areas or in highly degraded areas adjacent to transformed areas. The sensitivity in terms of wetlands is still to be verified by field investigation during the impact assessment phase. A large portion of this alternative follows the route of the existing powerline servitude (yellow line in Figure 3-6).

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

Alternative 3 – a third layout alternative might be identified to accommodate minor changes, based on specialists' final input, and will be addressed in the EIA phase.

The route is approximately 4km long, requiring 19 towers. Although the alternative route does traverse some areas of low sensitivity where it is located adjacent to existing infrastructure, this proposed transmission line traverses two Critically Endangered vegetation types: Mangrove Forest and Swamp Forest. These have extremely high sensitivity and as such, can be considered as a fatal flaw for this route. In addition, this route is located to large extent of its length within of wetlands.

Figure 3-6: Transmission line route alternatives from the Powerships to Bayside substation – Alternative 1 (red) and Alternative 2 (purple). The yellow line is the existing powerline on site.

In terms of the starting point of the transmission line (tower 15 or 19 in figure 3-6), the area is transformed due to previous disturbance in the area, as per Figures 3-7 and 3-8 below.

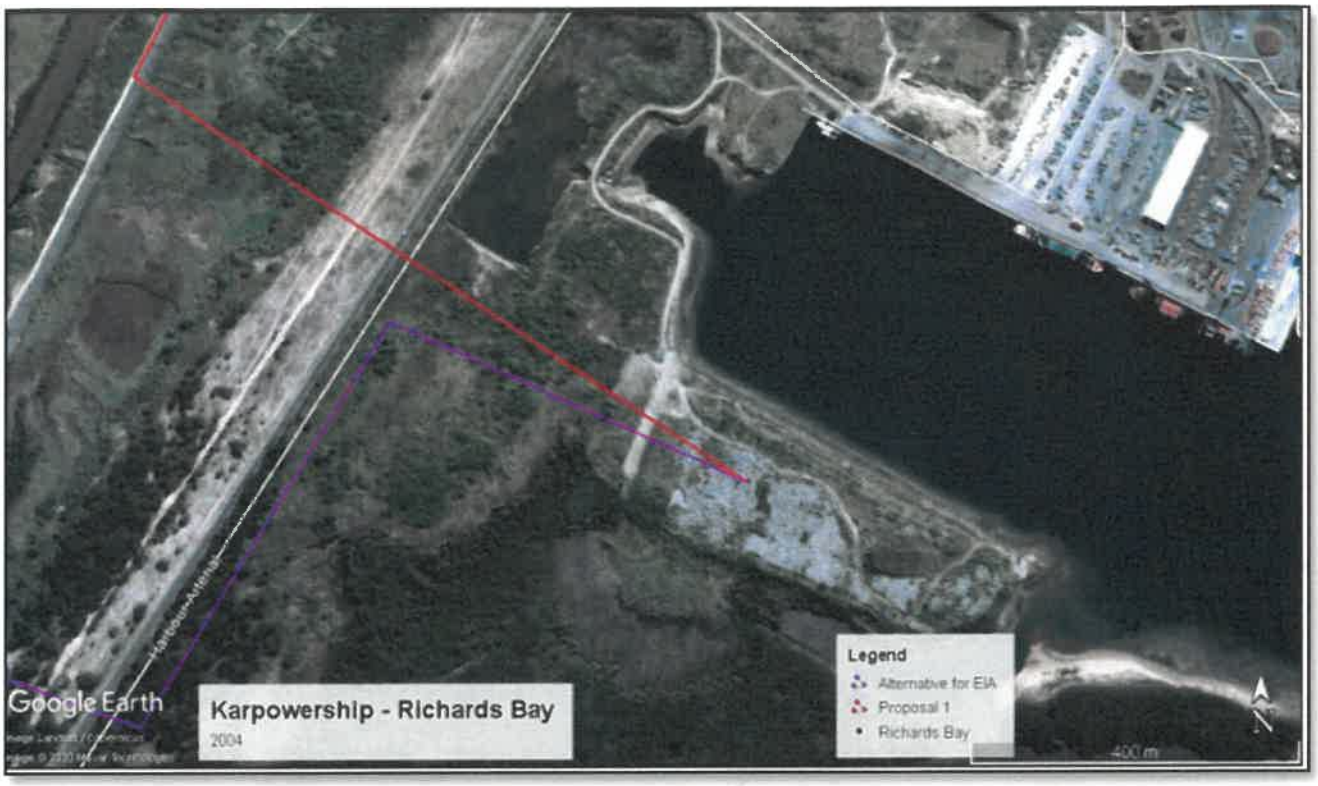

Figure 3-7: Imagery from 2004 indicated that the area of the transmission lines has been disturbed

Figure 3-8: Imagery from 2006 indicated that the area of the transmission lines has been disturbed.

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 on Erf 5333 portion 44, as illustrated in Figure 3-9 below, and currently engagement with Eskom on the connection to the line is underway. Should this not be possible, the transmission line will need to be connected to the Eskom line at the Bayside substation and engagements with the South32 (landowner) will be done accordingly.

Figure 3-9: Proposed connection to the Eskom line and placement of the switching station

The steel lattice / Monopole towers, each with a footprint of 15m x 15m (for lattice towers) or 0.6m x 0.6m to a maximum of 2.5m x 2.5m (for monopoles), are to be positioned within the servitude of 30m for the length of the route.

The preferred evacuation line is in accordance with the proposed 2015 Transnet Evacuation Route (to be confirmed with TNPA in the EIA Phase that this is still the case).

In terms of the components of the transmission line, single double circuit towers were selected, in order to minimise the environmental footprint of the installation. In addition, the proposed lattice steel / monopoles towers will include bird friendly measures as part of their designs.

Transmission Line Route Alternatives: **Size of the site/servitude:**

Alternative A1 (preferred activity alternative)	3.1km with 30m servitude = 93 000m²
Alternative A2 (if any)	4km with 30m servitude = 120 000m²

Both alternatives will include the establishment of a switching station, with an approximate footprint of 100m x 70m = 7000m²

The table below show the GPS co-ordinates for the of the start and end points of the transmission lines – from the powerships (as per 2 alternative positions) to the start point, as well as from the start point to the end point (2 alternative routes).

Transmission line	GPS-COORDINATE	
	Longitude	Latitude
From powership (Khan Class) to First Tower Alternative 1 – Start point	28°47'37.95"S	32° 1'42.32"E
From powership (Khan Class) to First Tower Alternative 1 – End point	28°47'44.90"S	32° 1'41.17"E
From powership (Shark Class) to First Tower Alternative 1 – Start point	28°47'44.51"S	32° 1'54.08"E
From powership (Shark Class) to First Tower Alternative 1 – End point	28°47'44.90"S	32° 1'41.17"E
From powerships to First Tower Alternative 2 – Start point	28°47'59.62"S	32° 2'17.26"E
From powerships to First Tower Alternative 2 – End point	28°47'44.90"S	32° 1'41.17"E
Transmission Line Route – Alternatives 1 and 2 – Start point	28°47'44.63"S	32° 1'41.11"E
Transmission Line Route – Alternatives 1 and 2 – End point	28°46'48.42"S	32° 0'42.84"E
Transmission Line Route Alternative 1 – mid-way point	28°46'57.02"S	32° 1'21.38"E
Transmission Line Route Alternative 2 – mid-way point	28°47'39.08"S	32° 0'23.51"E

Table 3-1: Coordinates for the Transmission line, including alternatives

Gas Pipelines Alternatives

A subsea gas pipeline is proposed to be installed along the toe of the existing dredged slopes between the floating storage regasification unit (FSRU) and Powership to ensure gas supply for power generation and connected to the vessels via a flexible marine hose riser. The proposed gas pipeline diameter is 24 inch, equivalent to Approx. 60cm (600mm).

There are two proposed alternative routes for the gas pipeline, and these are directly influenced by the selected positions of the Powership in relation to the position of the FSRU.

- Alternative 1 of the gas pipeline route (Approx. 1400 meters in length) is preferred from an engineering perspective, as it is in line with the preferred position (from an engineering design perspective) of the Powerships and the FSRU within the port, positioning the Powership in closer proximity to the land and the transmission line.
- Alternative 2 of the gas pipeline route (Approx. 500 meters in length) relates to the second alternative of the Powership positions (further from the shore) and the FSRU.

Alternative 3 – a third layout alternative might be identified to accommodate minor changes, based on specialists' final input, and will be addressed in the EIA phase.

The preferred route subsequent to the EIA process will also need to be approved by Transnet National Port Authority (TNPA).

Figures 3-10 and 3-11 below present the alternative gas pipelines, based on the alternative for the position of the Powerships and FSRU. An approx. 3 meters servitude will be required for the placement of the subsea gas pipeline.

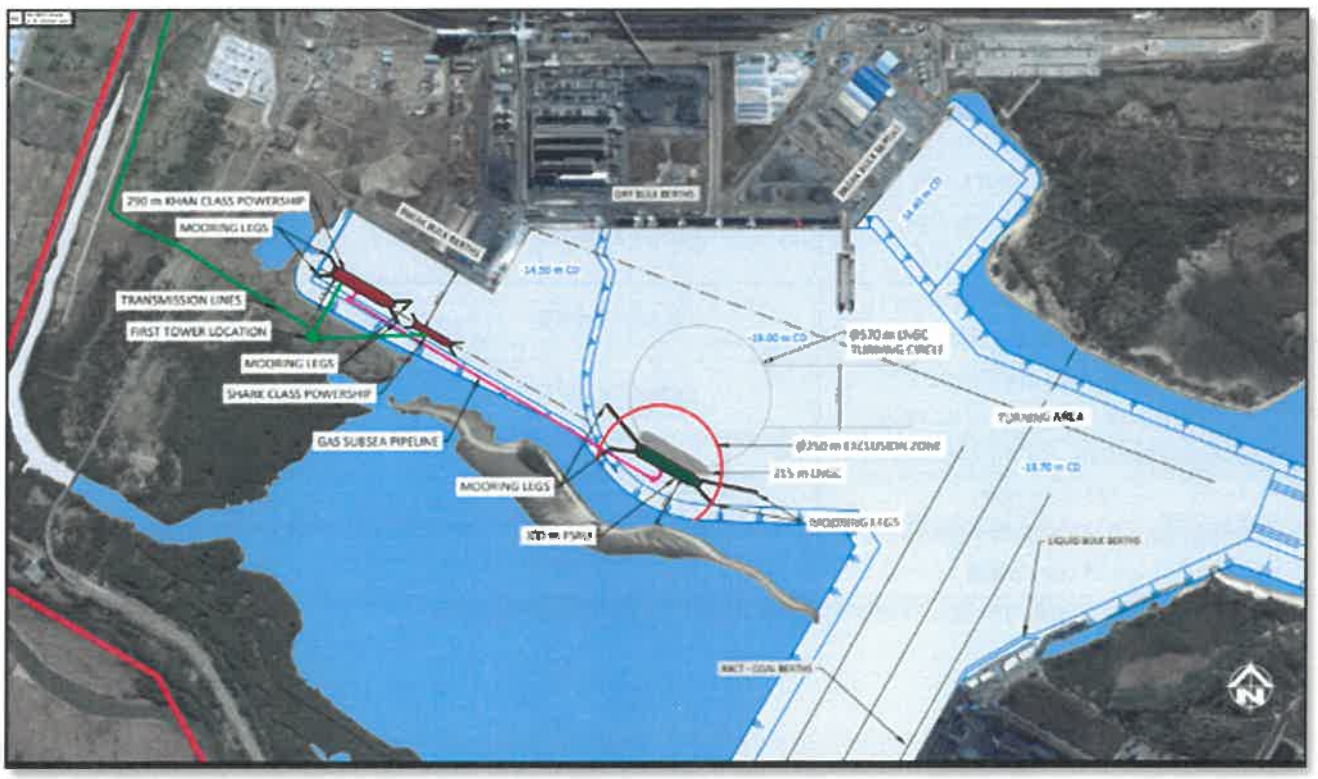

Figure 3-10: Alternative 1: Gas Pipeline route (Pink Line)

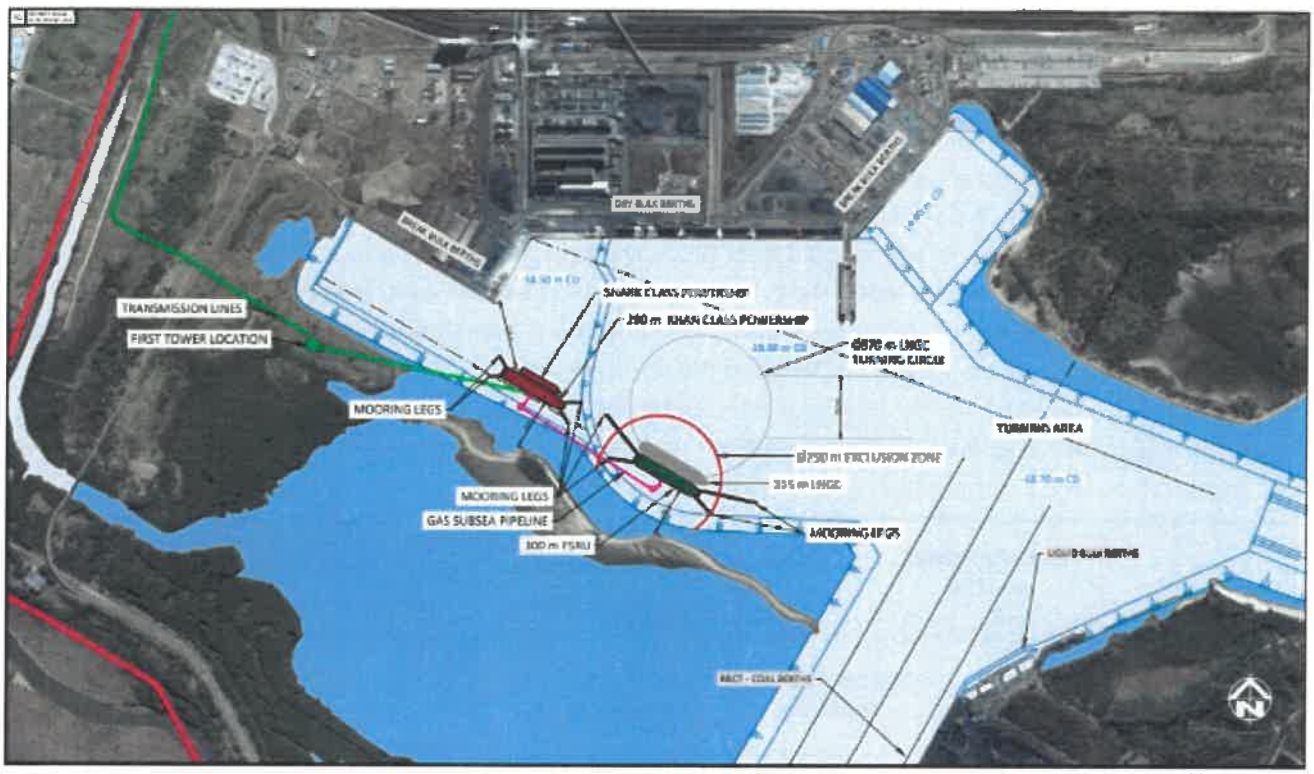

Figure 3-11: Alternative 2: Gas Pipeline route (Pink Line)

Subsea Gas Pipeline Route Alternatives:
Alternative A1 (preferred activity alternative)
Alternative A2 (if any)

Size of the site/servitude:

1.4km with Approx. 3m servitude = 4 200m²
0.5km with Approx. 3m servitude = 1 500m²

Estimated size for the assembly area for the installation of the gas pipeline = 100m x 150m (15 000m²)

Table 3-2: Coordinates for the gas pipelines' alternatives:

Subsea Gas pipeline	GPS-COORDINATE	
	Longitude	Latitude
Gas pipeline Route Alternative 1 – Start point	28°48'4.70"S	32° 2'29.01"E
Gas pipeline Route Alternative 1 – End point	28°47'40.89"S	32° 1'45.93"E
Gas pipeline Route Alternative 2 – Start point	28°48'4.70"S	32° 2'29.01"E
Gas pipeline Route Alternative 2 – End point	28°47'59.62"S	32° 2'17.26"E

3.1.4 The technology to be used in the activity;

The preferred technology entails Gas Reciprocating Engines, which are connected in series which provide heat to two steam turbines to generate electricity. Combustion engines used for electric power generation are internal combustion engines in which an air-fuel mixture is compressed by a piston and ignited within a cylinder. Dual-fuel engines are designed with the ability to burn both liquid and gaseous fuels. When operating in gas mode, the gaseous fuel is premixed with air, injected just after the compression stroke and ignited by a pilot fuel flame. In this process, the pilot fuel flame acts a "spark plug" to ignite the lean gas-air mixture. Dual-fuel DF engines retain the ability to use a backup liquid fuel when gas supply is interrupted. A flow diagram for combustion engines and a typical bank of engines at a power plant is shown in the figure below.

Electricity will be transferred from the Karpowership Project to the existing sub-station via a dedicated power line.

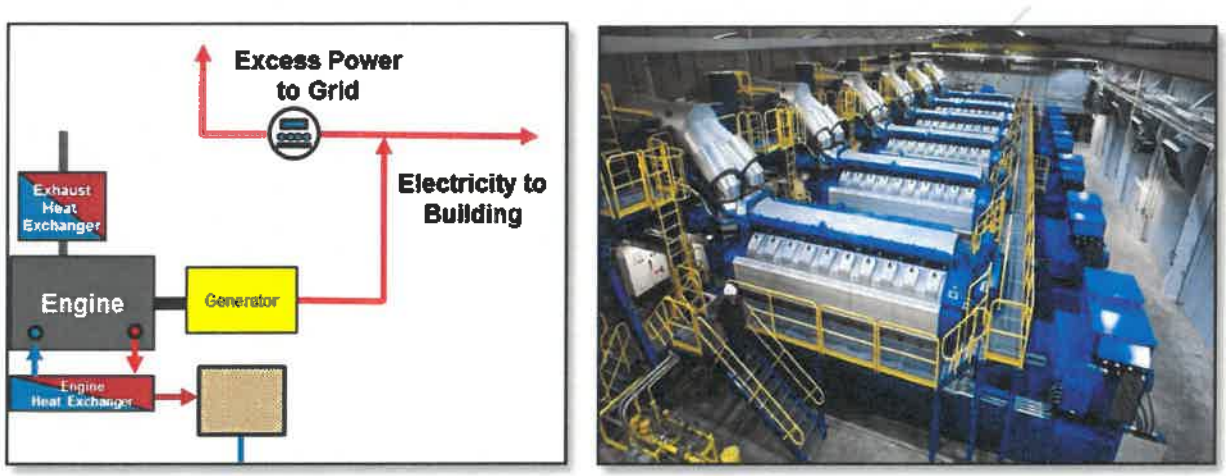

Figure 3-12: A flow diagram for power generation with engines (left), and a bank of engines connected in series

The technology alternative proposed entails the production of electricity through natural gas-fired Combined Cycle Gas Turbine (CCGT) technology.

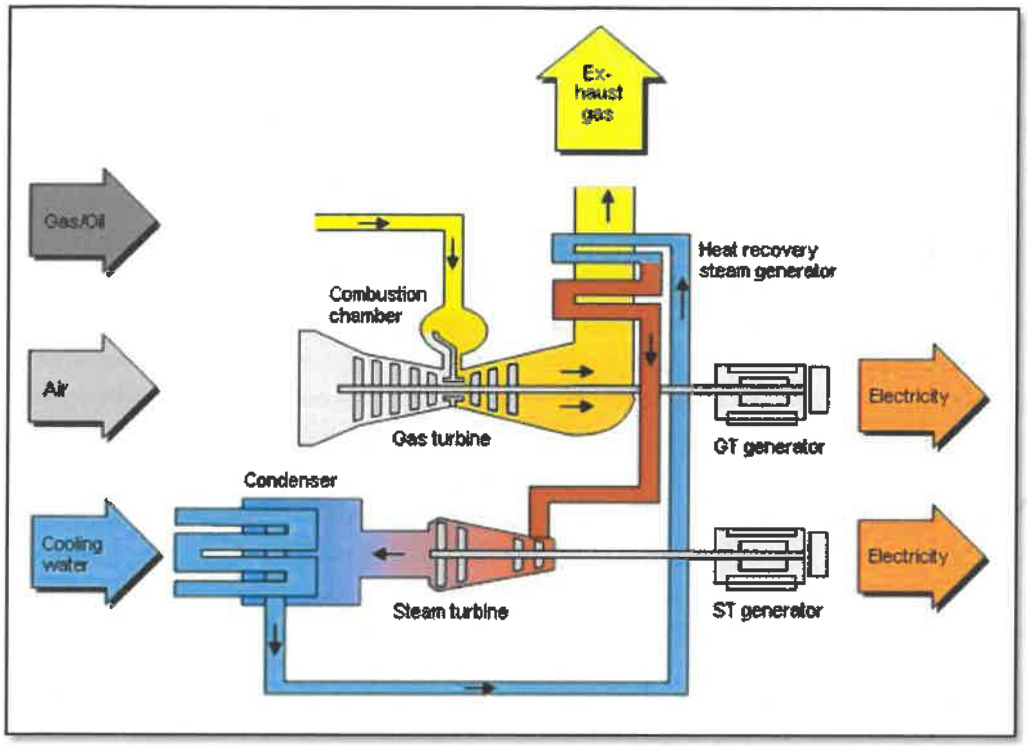

Figure 3-13: Schematic Presentation of a Typical CCGT Process

The preferred Gas Reciprocating Engines technology option will ensure higher efficiency and reliability in electricity generation with overall improved environmental performance compared to traditional coal fired technology.

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 the locations where high levels of organic or inorganic dusts exist. Charge air filtering system day to day workmanship or its maintenance intervals may affected by the pollutant intensity, but operations can continue. The Charge Air Filtering system has proved itself at Guinea Conakry, where the Applicant is operating next to an iron ore exporting harbour.

In terms of construction and footprint, the Powerships are considered to be a complete pre-constructed, purpose-built, offshore power solution, offering several advantages over land based solutions of similar energy generating capacity, e.g. in terms of development footprint and terrestrial impacts.

3.1.5 Fuel Alternatives

The Powership is designed to use Natural Gas, a cleaner burning fuel for the cost effective generation of power, as opposed to coal-fired power stations. In addition, coal-fired power technology is associated with significant air pollution as a result of the coal-fired combustion. Natural gas emits between 45 and 55% fewer greenhouse gas emissions and less than one-tenth of the air pollutants than coal when used to generate electricity (Shell SA, Media Release, 2020).

The Powership engine technology provides for dual fuel usage and is capable of utilizing both Liquid Natural Gas and Heavy Fuel Oils as primary fuel sources. However, for this project, the powership generation process will use

of internationally sourced LNG gas supply (which will be lawfully sourced). No gas supply is required from local South Africa resources to ensure efficient operations and all other infrastructure will be supplied. 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.

3.1.5.1 Liquid Natural Gas (LNG)

According to Shell SA, "*Natural gas is the cleanest-burning hydrocarbon, producing around half the carbon dioxide (CO2) and just one tenth of the air pollutants of coal when burnt to generate electricity. If consumption remained at today's levels, there would be enough recoverable gas resources to last around 230 years. It is versatile. A gas-fired power station takes much less time to start and stop than a coal-fired plant. This flexibility makes natural gas a good partner to renewable energy sources like solar and wind power, which are only available when the sun shines and the wind blows.*" (https://www.shell.co.za/energy-and-innovation/natural-gas.html).

The benefits of running the engine on NG include emission reductions of Nox, Sox, CO_2, particulates, no smoke, reduced waste streams to meet the requirements of local or international legislations. No emission abatement will be installed for the control of these emissions. Nox emissions are controlled to the required concentration at source using selective catalytic reduction (SCR). LNG has only trace amounts of sulphur, if any. LNG is the cleanest fuel possible, and the combustion of LNG does not result in SO_2 emissions of any significance. Similarly, particulate emissions are very low. The maximum predicted SO_2 concentrations resulting for the proposed project is well below 1 $\mu g/m^3$.

As reported by the applicant, Ship to Ship (STS) transfers will be undertaken by qualified and experienced operators with experience across numerous operations in the transfer of LNG by STS using internationally agreed and monitored procedures. FSRU senior officers will be similarly experienced as the staff of service providers such as those employed by Fendercare or other non-routine STS providers as the POAC (Person in Over All Charge), working to accredited international standards set by non-governmental organizations such as OCIMF (Oil Company's Marine Forum) SIGTTO (Society of Gas Tanker & Terminal Operators) and ICS (International Chamber of Shipping) with each operation being subject to a due diligence auditing by the shipper of the LNG before an STS takes place. Karpowership and its suppliers all operate to internationally accredited procedures to ensure in country compliance with quality, health and safety at the forefront of any task / action across their entire operations. Operators of FSRU's and LNGC's must comply with comprehensive safety regulations and procedures to protect people from injury and ensure operational safety. Should any LNG be released and spill on water, it is not anticipated to cause harm to the aquatic life or damage the waterways, as LNG vaporizes rapidly in air, becoming buoyant at -110degC and disperses quickly. Similarly, the re-gassified NG, used as fuel in the Powerships, is supplied at ambient temperature. As such, should a release occur, the NG would be much lighter than air and disperses immediately, removing the potential risk of fire.

The use of natural gas to generate electricity, which is what the Powerships technology is designed to do, is the preferred alternative for power generation, and no other technology alternatives are proposed.

3.1.5.2 Heavy Fuel Oil

The purpose of this subsection is to provide a brief description of Heavy Fuel Oil (HFO) which is not being considered further as an alternative fuel because of its chemical makeup and physical properties which give rise to higher levels of greenhouse gas and other emissions and environmental risk.

Heavy Fuel Oil (HFO) is a general term used to describe a range of fuel oils made from the heavier parts of crude oil after the lighter parts are removed to produce petrol, diesel and other light products. The most common technologies used to generate power from HFO are reciprocating engines and gas turbines (CDC, not date).

It is not just the carbon emissions from HFO that are poisonous (Degnarain, 2020). Characteristics of HFO, other than viscosity are also controlled, in particular the inherent levels of sulphur and vanadium. Sulphur levels lead directly to the emission of sulphur oxides (Sox) from the fuel combustion process, which can have negative health and environmental impacts. HFO is highly concentrated in sulphur (35,000 parts per million) (Degnarain, 2020).Vanadium in combination with sodium can be problematic in engines, causing corrosion to internal components (CDC, not dated). Another by-product is Nitrogen Oxide, which contributes toward air pollution and respiratory disease.

HFO is viscous and sticky consistency, making it more difficult than crude oil to pump or collect during a spill, often fouling habitats for years. HFOs can be particularly difficult to clean up if spilled in the ocean as HFO doesn't readily disperse or breakdown in the marine environment, as it has a tendency to stick to surfaces like sea ice or sink and emulsify in sea water (rather than floating on the surface or evaporating off) (Degnarain, 2020). HFO also remains longer in cooler waters before they have had the chance to evaporate off, making their presence felt for longer. HFO becomes more toxic when exposed to Ultra-Violet (UV) light and can be absorbed by organisms, increasing their mortality (Degnarain, 2020).

3.1.6 The operational aspects of the activity; and

The operational aspects are in relation to:

- activity to be undertaken is the development of facilities or infrastructure (assembled off-site and will be delivered fully equipped) for an activity which requires a licence in terms of Section 21 of the NEM: AQA for the generation or release of emissions;
- operation of the Powership is associated with a ship-based power generating and transmission of energy to land-based transmission connection points;
- operation of the Powership and FSRU for the storage, or storage and handling of a dangerous good (LNG & NG).

The generation of electricity is the purpose of the Powerships' operations and the technology is fixed. As such, no operational alternatives have been identified for the proposed project.

3.1.7 The option of not implementing the activity.

The option of not implementing the activity is also referred to as the "No-go" alternative. In respect of the Project, it would mean that the existing status quo would prevail and that no additional power using this particular technology will be generated and transmitted for inclusion into the energy grid in the KwaZulu-Natal and uMhlathuze Local Municipality in particular.

The implications of the no-go option will be assessed in the respective specialist studies and their findings will be incorporated into the EIA Report in the next phase of the application process.

4 SITE DESCRIPTION OF SURROUNDING LAND USE

2014 EIA Regulations (as amended), Appendix 2 – (h) (iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;

4.1 TOPOGRAPHY AND BIOPHYSICAL ENVIRONMENT

4.1.1 Eco-region

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

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

Table 4-1: Main attributes of the Natal Coastal Plain Eco-region (Kleynhans et al., 2005)

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

Median annual simulated runoff (mm) for quaternary catchment	40 to 80; 100 to >250

4.1.2 Climate

The description of the climate in Richards Bay is derived from the South African Weather Bureau (now Service) long-term climate statistics (SAWB, 1992 and 1998). The Richards Bay region has a warm temperate climate and the temperature range is not extreme, although high temperatures can occur during summer. Averages of daily minimum, maximum and mean temperatures, and average monthly rainfall are presented in Figure 6. The average summer maximums exceed 27 °C from December to March, when it is also very humid. Winters are mild with the average minimum temperatures of 14 °C in June and July (SAWS, 1998). The average annual rainfall at Richards Bay is 1 212 mm (SAWB, 1992). The majority of rainfall occurs from late September to March and this period is usually associated with convective 19 summer storms. The winter rainfall is not uncommon and is associated with the passage of cold fronts.

The predominant winds are associated with the Indian Ocean high pressure system and its seasonal movement relative to Richards Bay, with coastal lows and the passage of frontal systems having some influence. The winds are generally aligned with the coastline and at Richards Bay winds occur predominantly in the sector north to north-northeast and in the sector south to southwest.

4.1.3 Geology

The proposed development is located over alluvium, sand and calcrete. These are loose unconsolidated deposits which were formed during the Quaternary period. Further explanation is provided in Table 4-2.

Figure 4-1: Dominant deposits within the proposed development site

Table 4-2: Description of the dominant deposits within the proposed development site

Deposits	Description
Alluvium:	Known as loose, unconsolidated (not cemented together into a solid rock) soil or sediment that has been eroded, reshaped by water in some form, and redeposited in a non-marine setting (Geosciences, 2011). Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. When this loose alluvial material is deposited or cemented into a lithological unit, or lithified, it is called an alluvial deposit (Geosciences, 2011). The term "alluvium" is not typically used in situations where the formation of the sediment can clearly be attributed to another geologic process that is well described. This includes (but is not limited to): lake sediments (lacustrine), river sediments (fluvial), or glacially-derived sediments (glacial till). Sediments that are formed or deposited in a perennial stream or river are typically not referred to as alluvial (Geosciences, 2011).

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

4.1.4 Soils

According to the Land types of South Africa databases (ARC, 2006), the soils in the project area fall within Ia74 (deep alluvial soils comprise >60% of land type) land types. In general, the moisture regime of the Ia74 land types is dominated by surface flows of water with infiltration and subsequent lime and gypsum translocation. As these land types occur more readily in dry to arid environments the dominance of lime in the soil will mask most redox morphology features due to alkaline condition. These conditions lead to the potential development of redox depletions in the form of grey colours but will not readily yield high chroma redox accumulations (in the form of Fe oxides and hydroxides) due to the dominance of white FeCO3 minerals (as the dominant Fe minerals in alkaline soil solution conditions). Additionally, the youthful nature of the soils lead to limited expression of mottling (Der Waals, 2019); (Job, et al., 2019). Different soil types are encountered within shoulder, mid-slope and valley positions of the project area, and is mainly due to sub-surface geology, products of weathering, degree of saturation, soil texture and slope position. Fine to medium-grained sand is expected for the study area.

4.2 FAUNA AND FLORA

4.2.1 Vegetation types

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

The proposed development extends over two vegetation units identified at a desktop level, namely the Maputaland Coastal Belt and Subtropical Freshwater Wetlands (Figures 4-2 and 4-3). Threatened vegetation are shown in Figure 4-4. The conservation status these vegetation types are vulnerable and least threatened, respectively (SANBI, 2011). The Maputaland Coastal Belt vegetation was intact to a probably 50%, which was noted to be disturbed by industrial development, tar roads and other linear activity. The Subtropical Freshwater Wetlands vegetation was predominantly disturbed along the routes of the preferred and alternative Transmission Line routes. The disturbance that was noted is from built platforms, industrial development, dirt and tar roads and other linear activities.

Vegetation of the site comprises a mix of all four of these vegetation types, with the routes traversing areas of completely transformed and degraded vegetation, as well as areas of Critically Endangered Swamp Forest and Mangrove Forest. Several protected species were found on site, as well as several alien invasive plant species.
Some Species of Conservation Concern (SCC) recorded from the site include the Swamp Forest dominant tree *Ficus trichopoda*, as well as the mangrove trees, all of which are on the National List of Protected Trees. *Sideroxylon inerme*, also a protected tree, was also recorded on the site. In addition, some geophytic species from the *Iridaceae* family were recorded but could not be identified due to lack of flowers at the time of the site visit.
The swamp forest is also a fauna habitat. Fauna within the estuarine environment is captured in the estuarine assessment section of this report (Section 4.4.1). A detailed fauna assessment will be included in the EIA phase of the application process.

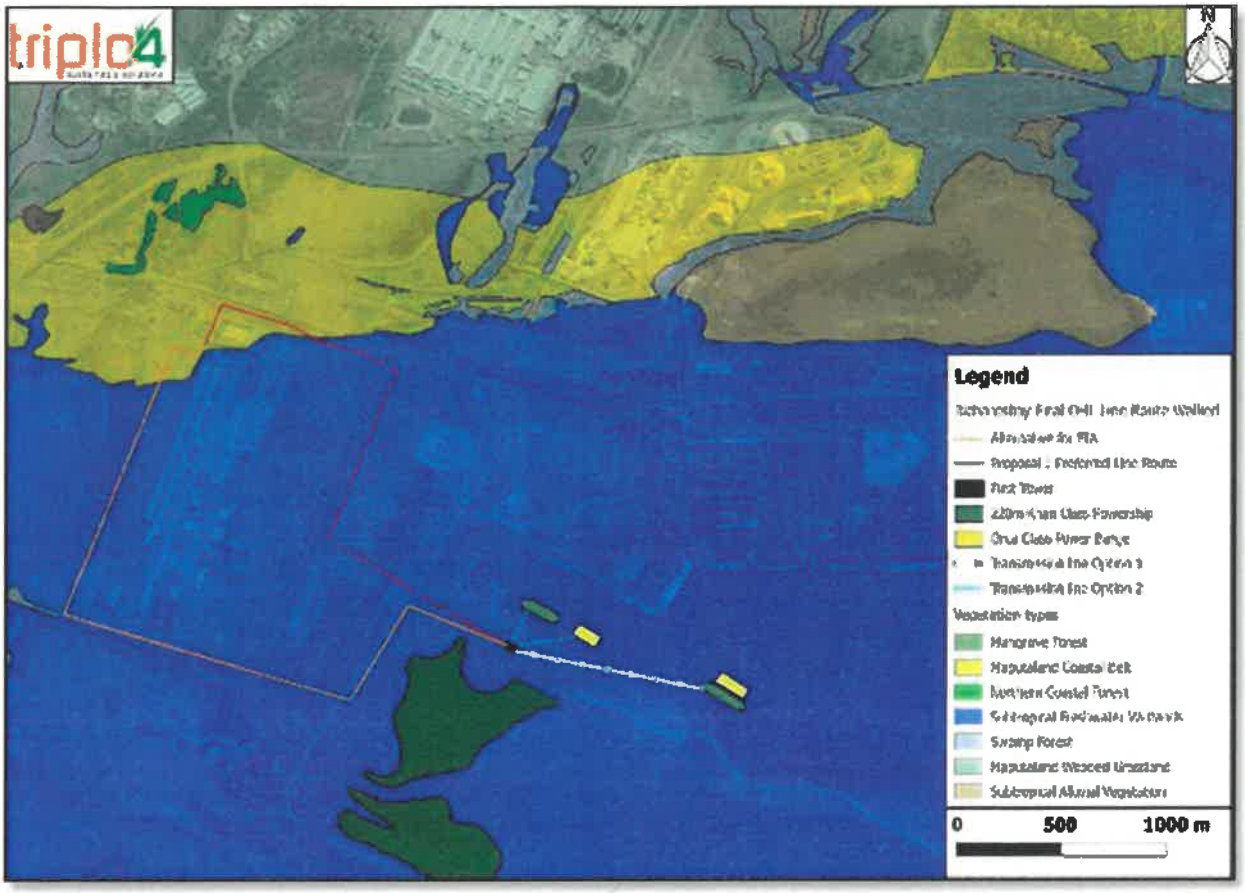

Figure 4-2: Map of the vegetation types within the proposed development

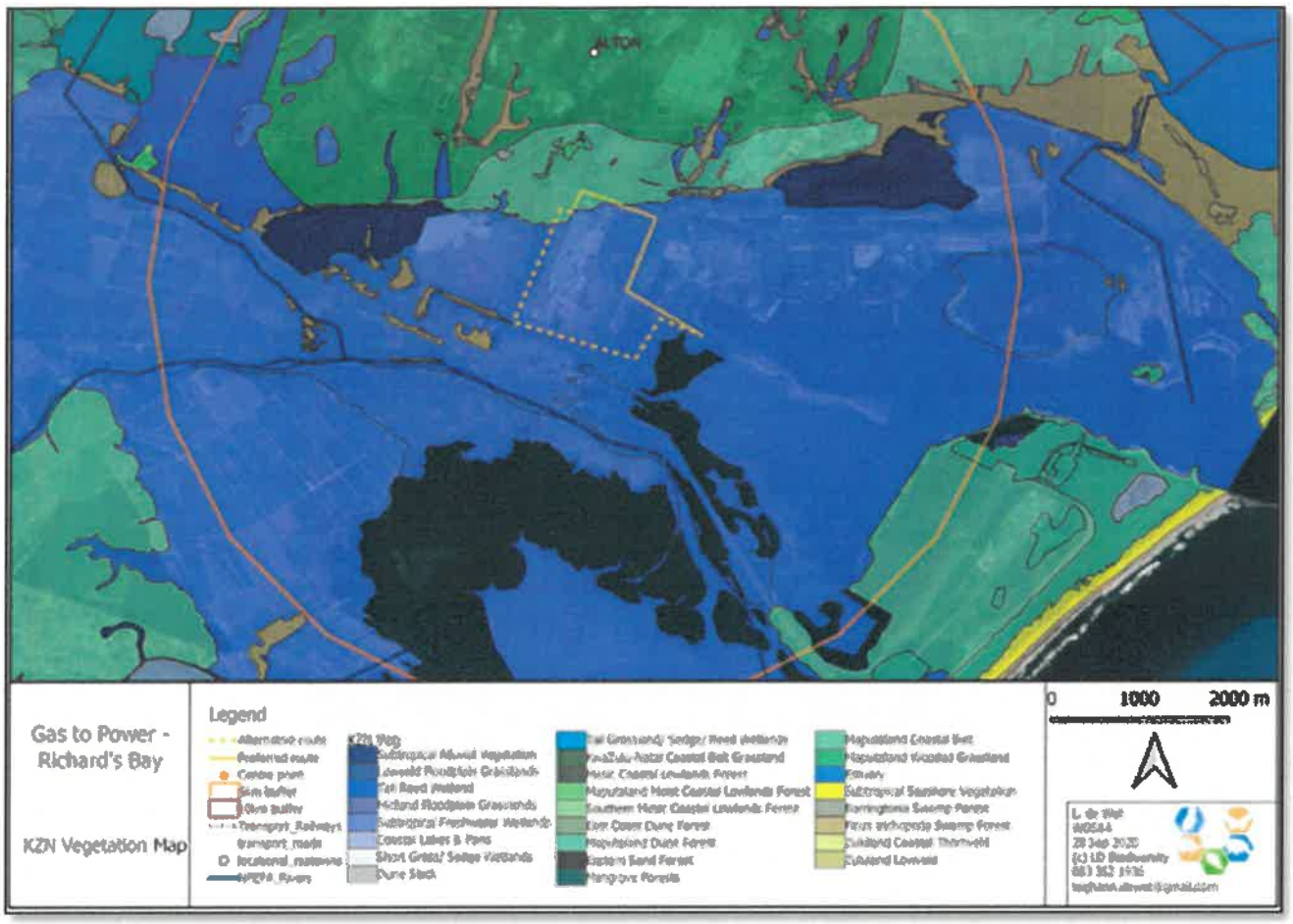

Figure 4-3: Additional map for Vegetation types within the study area

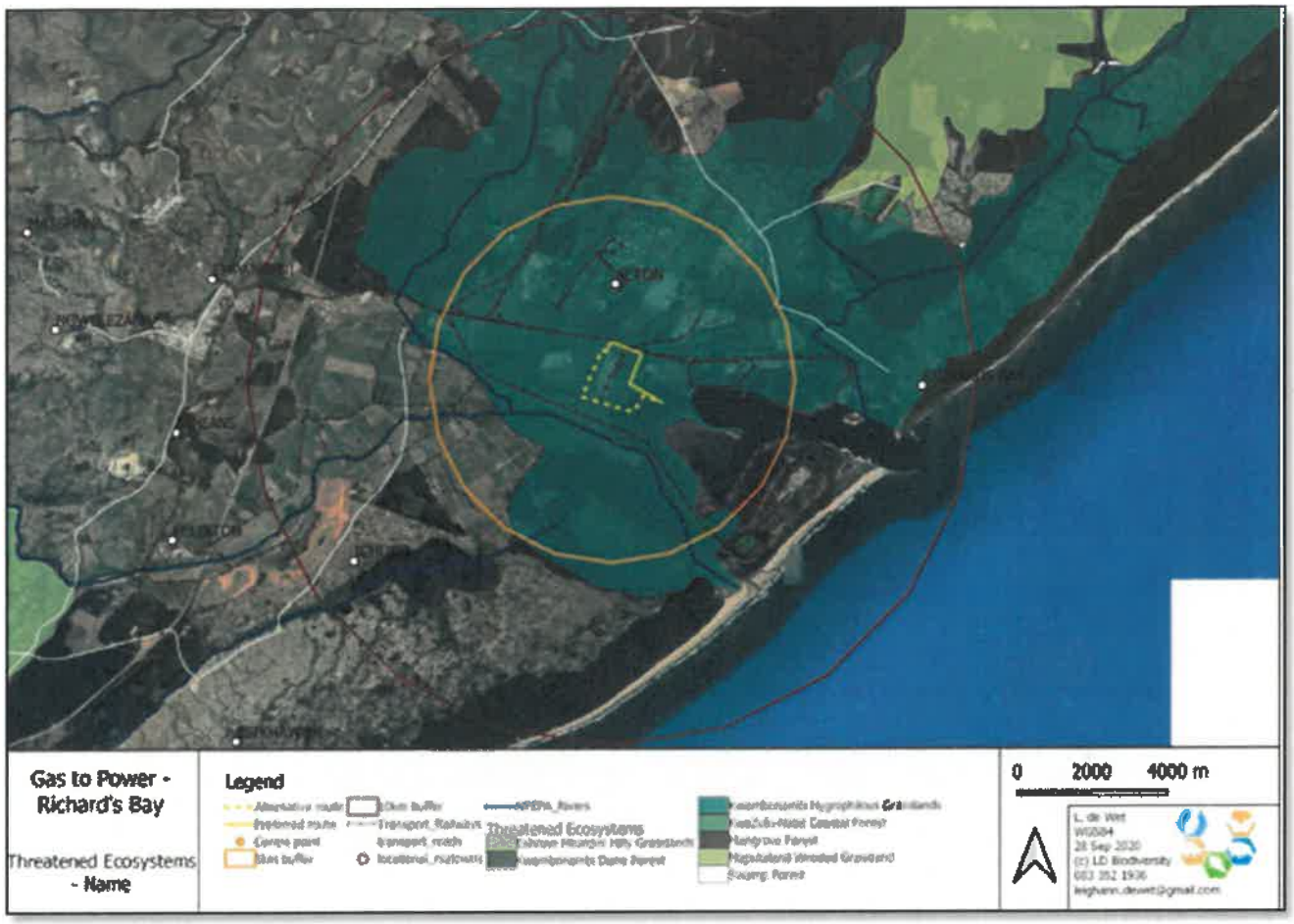

Figure 4-4: Threatened Ecosystems within the study area

4.2.2 Critical Biodiversity Area

A preliminary desktop study was undertaken to identify the Critical Biodiversity Areas (CBAs) within the study area. Ezemvelo KwaZulu-Natal Wildlife has developed and implemented the KwaZulu-Natal Biodiversity Plan to assist with development, protected areas expansion and conservation with the province (Ezemvelo Wildlife, 2016). The plan identifies areas as Critical Biodiversity Areas (CBAs) which cannot be lost if conservation goals are to be met. Figures 4-3 and 4-4 below present the identified CBA within the study area.

Furthermore, Ecological Support Areas (ESAs) were also established as these areas are required to support the functioning of CBAs and ecosystems. The guidelines of the KwaZulu-Natal Biodiversity Plan for each CBA and ESA category are outlined in table 4-5.

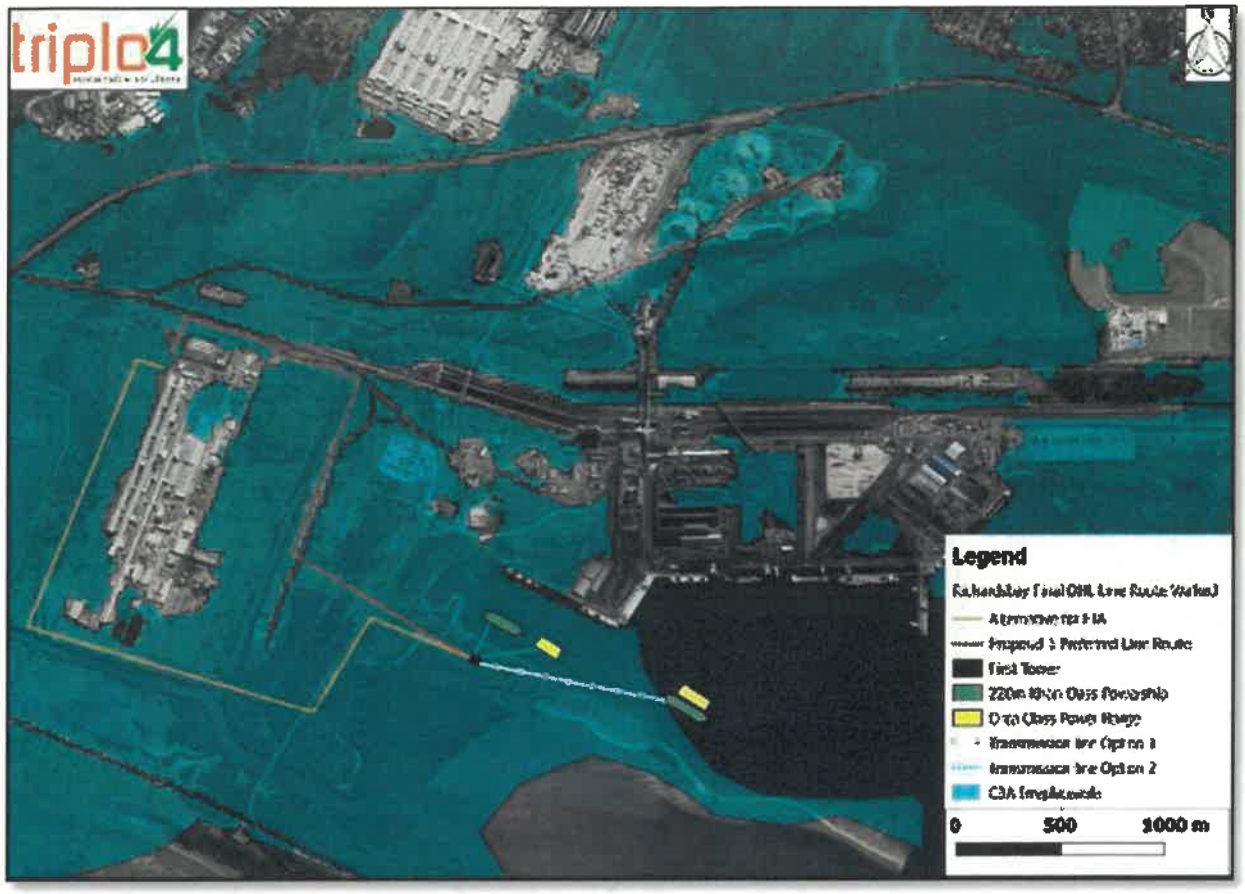

Figure 4-5: Critical Biodiversity Area within the proposed development

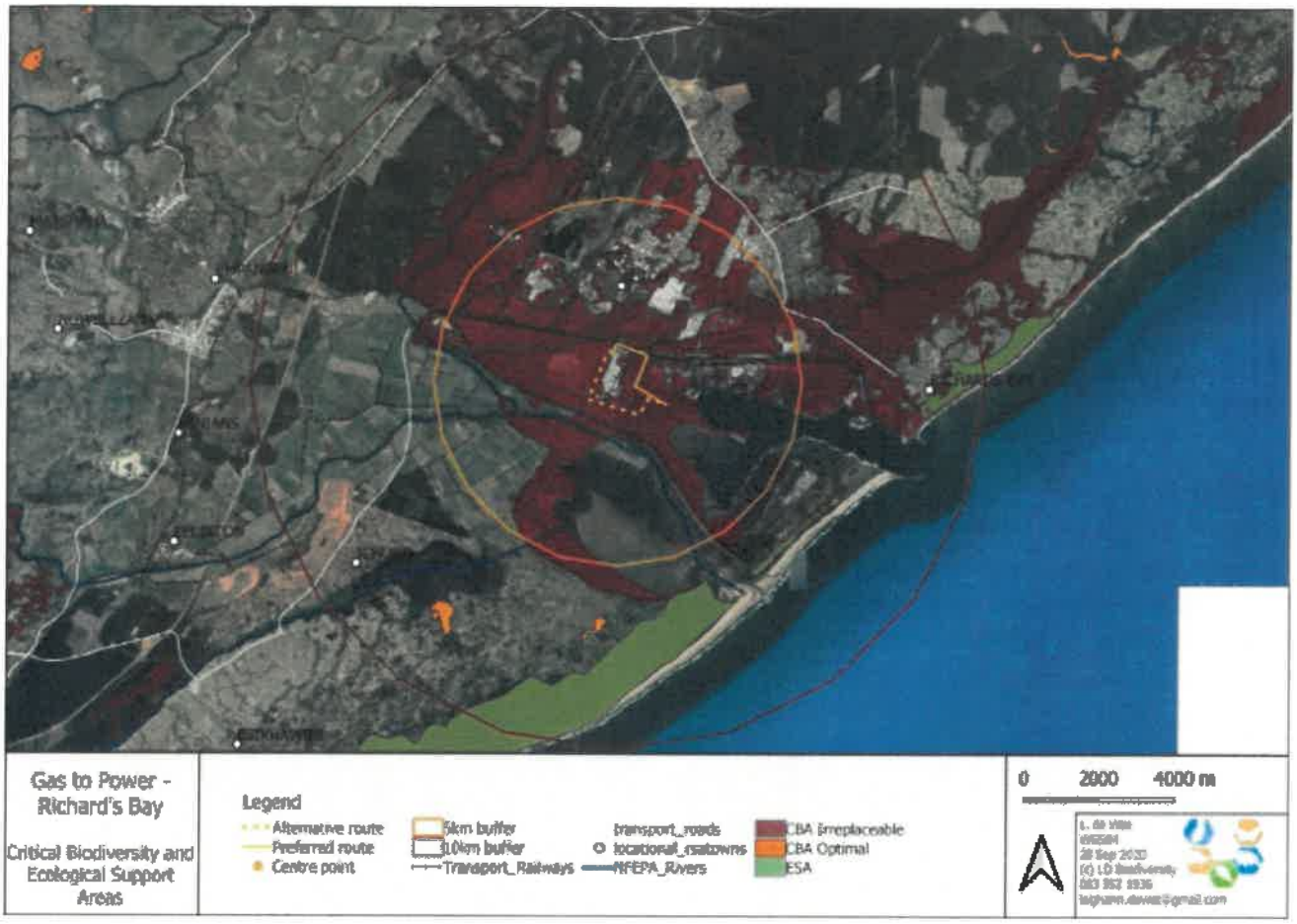

Figure 4-6: Critical Biodiversity Area within the proposed development

The CBA associated with the proposed development is CBA irreplaceable at a desktop level. This means that the proposed development occurs in areas considered critical for meeting biodiversity targets and thresholds, which are required to ensure the persistence of viable populations of species and the functionality of ecosystems. During the site visit, it was noted that several sensitive areas along the preferred and alternative route had the potential to have habitat for red data species. However, due to the anthropogenic changes in the area, proliferation of alien invasive plants were evident (species: *Ageratum conyzoides, Lantana camara, Ricinius communis* to name a few).

Table 4-3: CBA Descriptions for KwaZulu-Natal Province

CBA	Description
Critical Biodiversity Area: Irreplaceable	Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.
Critical Biodiversity Area: Optimal	Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process but is informed by expert input).

CBA	Description
Ecological Support Areas	Functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to the maintenance of Ecosystem Services.
Modified Areas	Areas with no significant natural vegetation remaining and therefore regarded as having a low biodiversity value (e.g. sugarcane plantation areas or highly developed areas with no connectivity to natural environment).
Protected Area	A specifically delineated area that is both designated and managed to achieve the conservation of the indigenous state and the maintenance of associated ecosystem services and cultural values, through legal or other effective means.

Proximity to protected areas is also important to consider, as sites close to these areas may be ecologically sensitive, and buffers around protected areas should be maintained to preserve biodiversity and connectivity. Richards Bay Nature Reserve lies less than 1km to the southwest of the site, and the Enseleni Nature Reserve is located approximately 10km to the north of the site, as per figure 4-7 below. Richards Bay Nature Reserve is also considered an Important Bird Area (IBA), internationally recognized for their importance for birds, and thus internationally important for conservation.

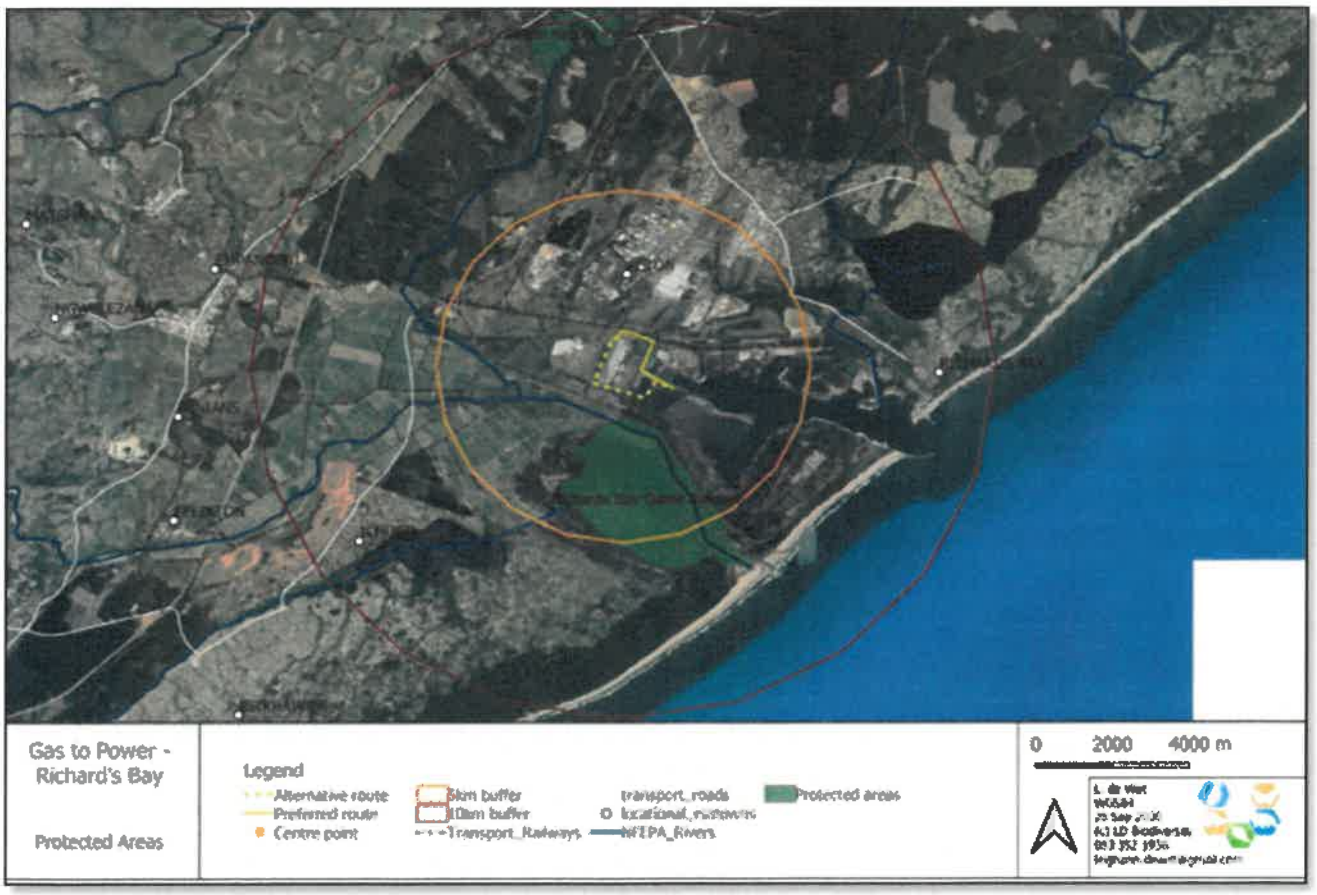

Figure 4-7: Protected areas in proximity to the study area

4.3 WATER RESOUCES

4.3.1 Water Management Areas

The proposed development falls within the Water Management Area (WMA): Usuthu to Mhlathuze, and the sub-WMAs: Mhlathuze and the quaternary catchment W12F. The WMA is drained by several parallel rivers which flow in a south-easterly direction and eventually discharge into the Indian Ocean. The rivers which contribute to the highest flow within this WMA are the Usuthu, Pongola, Mhlathuze, Mfolozi and Mkuze rivers with several smaller coastal rivers that feed the aforementioned larger rivers ((Nel *et al.*, 2011), as shown in Figure 4-8 below.

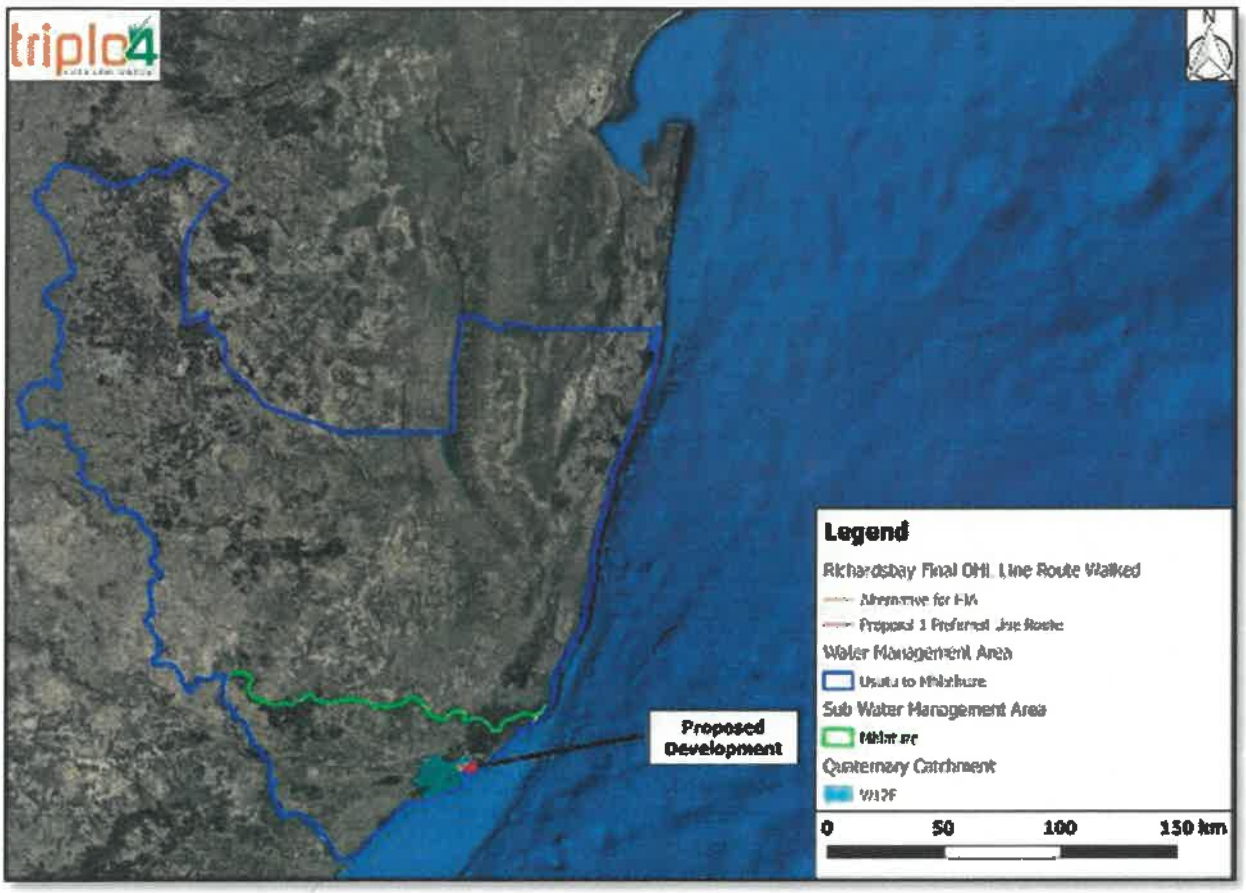

Figure 4-8: Map of the WMA, sub-WMA and Quaternary Catchment that fall within the proposed development

4.3.2 Wetlands and Watercourses

The National Freshwater Ecosystem Priority Areas

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

According to the NFEPA dataset, a FEPA Estuary will be at risk as a result of the preferred and alternative routes. Only a small portion of both of the aforementioned routes do not occur within the FEPA Estuary, as per figure 4-9 below.

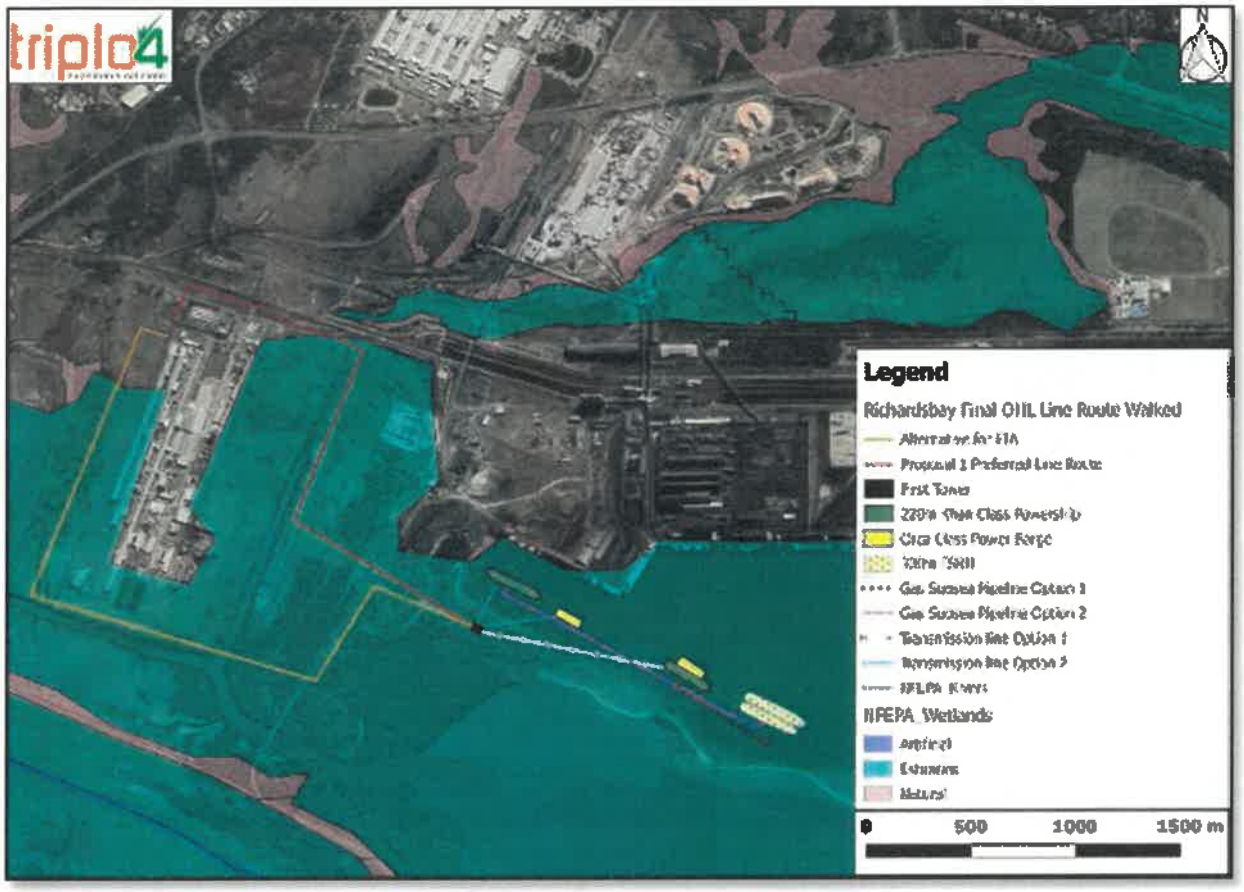

Figure 4-9: Map of the FEPA Rivers and Wetland in relation to the proposed development, from the NFEPA dataset

Historical Wetlands Delineation

The Richards Bay Port and the surrounding areas have undergone significant changes as a result of developments such as linear infrastructure (dirt and tar roads, overhead powerlines), coal storage areas, ship docking areas, industrial hubs, and yacht clubs which have largely altered and destroyed the natural landscape which featured forest, swamps, grasslands and watercourses.

In order to understand these changes and the current landscape, historical topographical maps dating back to 1943, 1964 and 1983 were interrogated.

From this information, the following watercourse delineation (Figure 4-10) was assumed to be historically present before the Richard Bay Port was established, or fully established.

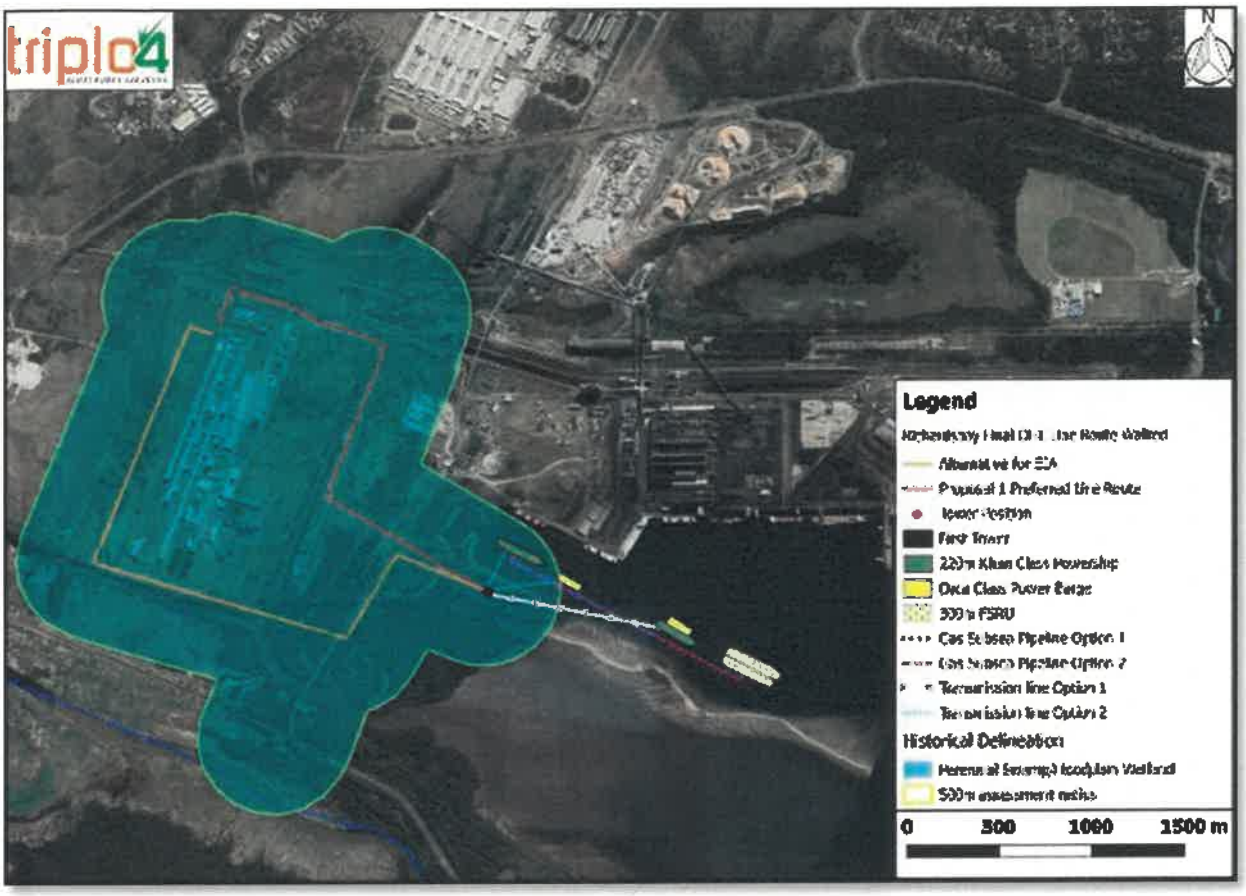

Figure 4-10: Map representing the historical watercourse delineation within the proposed development site and 500m assessment radius

Wetland Delineation

A technical assessment of the wetlands was done in September 2020, and the watercourses within the study area were identified on a desktop level, classified and delineated in-field and subsequently mapped utilising GIS (QGIS 2.14 and Google™ Earth Pro) and available spatial data. Figure 4-11 below demonstrate the delineated watercourses identified within the study area during the field assessment. However due to access restrictions, no wetland delineation was conducted for the eastern portion of the site, and this will need to be completed during the EIA phase.

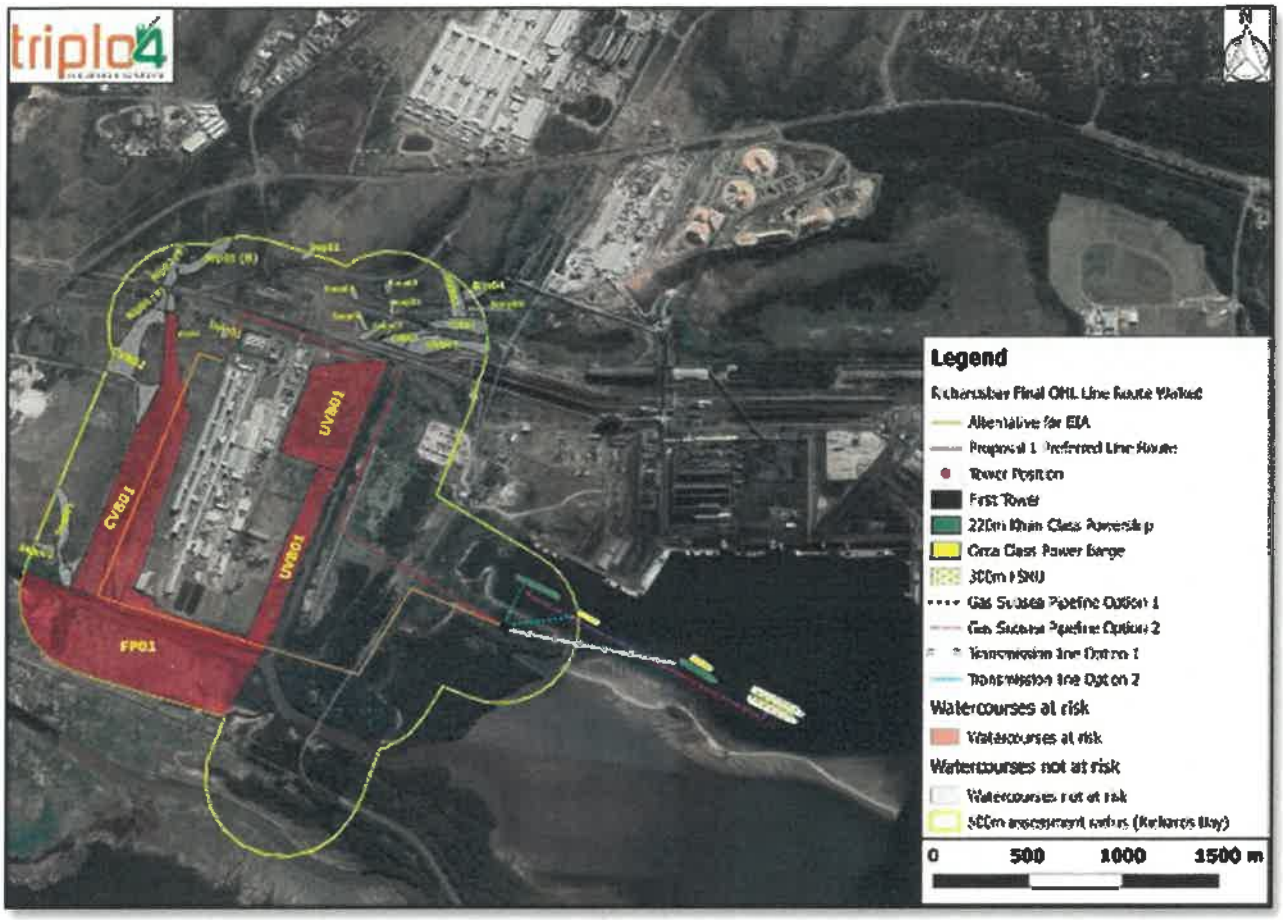

Figure 4-11: Map of the in-field delineations of the watercourses identified at the proposed development site and 500m assessment radius

The proposed development consist of a total of nineteen (19) watercourses, in which one was determined to be an artificial dam, fourteen were determined to be wetland and four were determined to be riverine systems. Furthermore, of the fourteen wetlands; three were classified as channelled valley bottom wetlands, one as a floodplain wetland, three as unchannelled valley bottom wetlands, two as depression wetlands and five hillslope seepage wetlands. The riverine systems were classified as B channel streams. It was determined that CVB01, FP01 and UVB01 will be impacted upon by the proposed development.

Aquatic Assessment

An Aquatic Assessment was conducted in September 2020, six assessment sites were investigated, to assess the possible impacts associated with the proposed project and findings are captured in section 8.2.1 of this report.

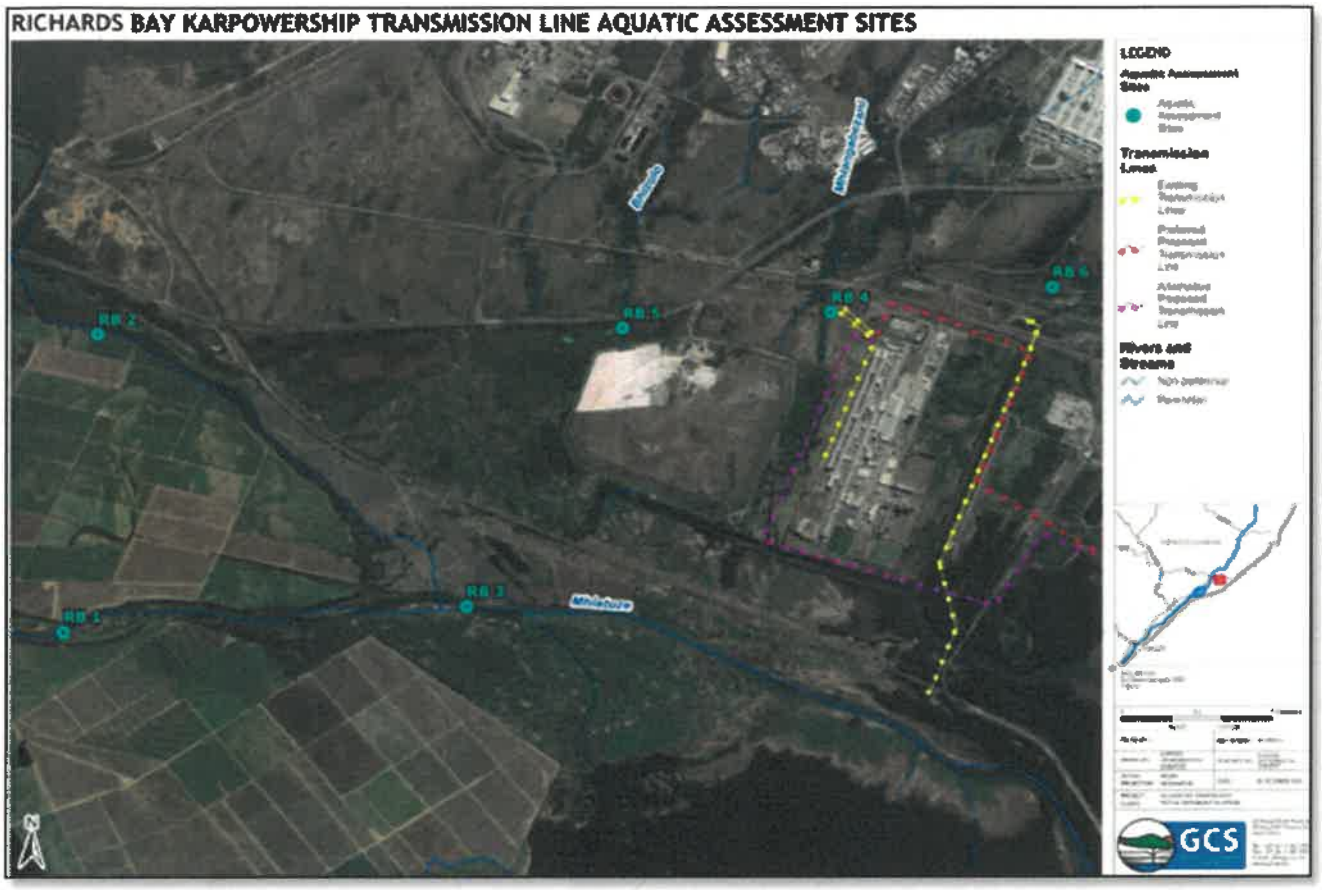

Figure 4-12: Aquatic Assessment Sites for the proposed development

4.3.3 Groundwater

A geohydrological assessment was undertaken in September 2020 for the proposed development of a transmission line, associated with this proposed project.

A hydrogeological and geological site conceptual model was developed with data obtained for the study area, and a preliminary risk assessment was conducted, based on the Source-Pathway-Receptor (SPR) model.
No groundwater boreholes were discovered during the field hydrocensus, and thus no groundwater samples could be obtained. Literature suggests that the electrical conductivity (EC) for the underlying aquifer generally ranges between 0 – 70 mS/m (milli Siemens/metre) and the pH ranges from 6 to 8. This means that groundwater abstracted from the aquifer can generally be used for domestic and recreational use (DWAF, 1998).
Two (2) aquifer systems have been identified – an unconfined aquifer associated with the unconsolidated sands; and a confined and fractured aquifer network associated with deeper and older granite/gneiss rock. Based on available groundwater level data, the water table for the area range from 3 to 15 metres below ground level (mbgl).

The project is situated in Quaternary Catchment W21F of the Pongola –Mtamvuna (DWS, 2016) Water Management Area (WMA 4). The delineated sub-catchment is indicated in Figure 4-13 below. The total extent of

the sub-catchment area is Approx. 22.6 km².

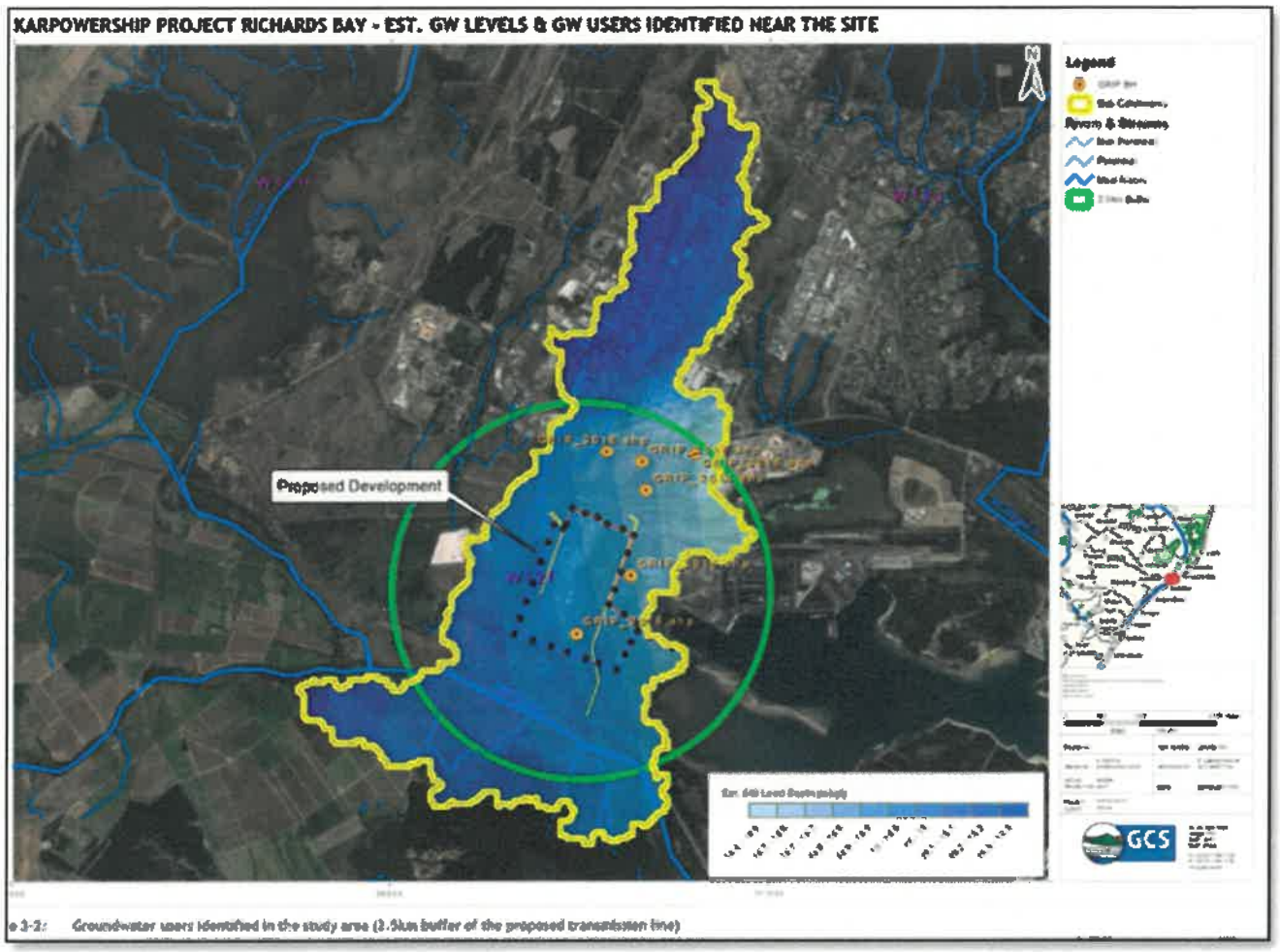

Figure 4-13: Estimated Groundwater Levels & Groundwater Users

Six (6) Groundwater Resource Information Project (GRIP) boreholes are situated within the boundary of the sub-catchment. Assuming a median aquifer yield of 0.5 l/sec, an existing use in the order of 259.2 m³/day is assumed. The site conceptual geohydrological model for the site is shown in Figure 4-14 below.

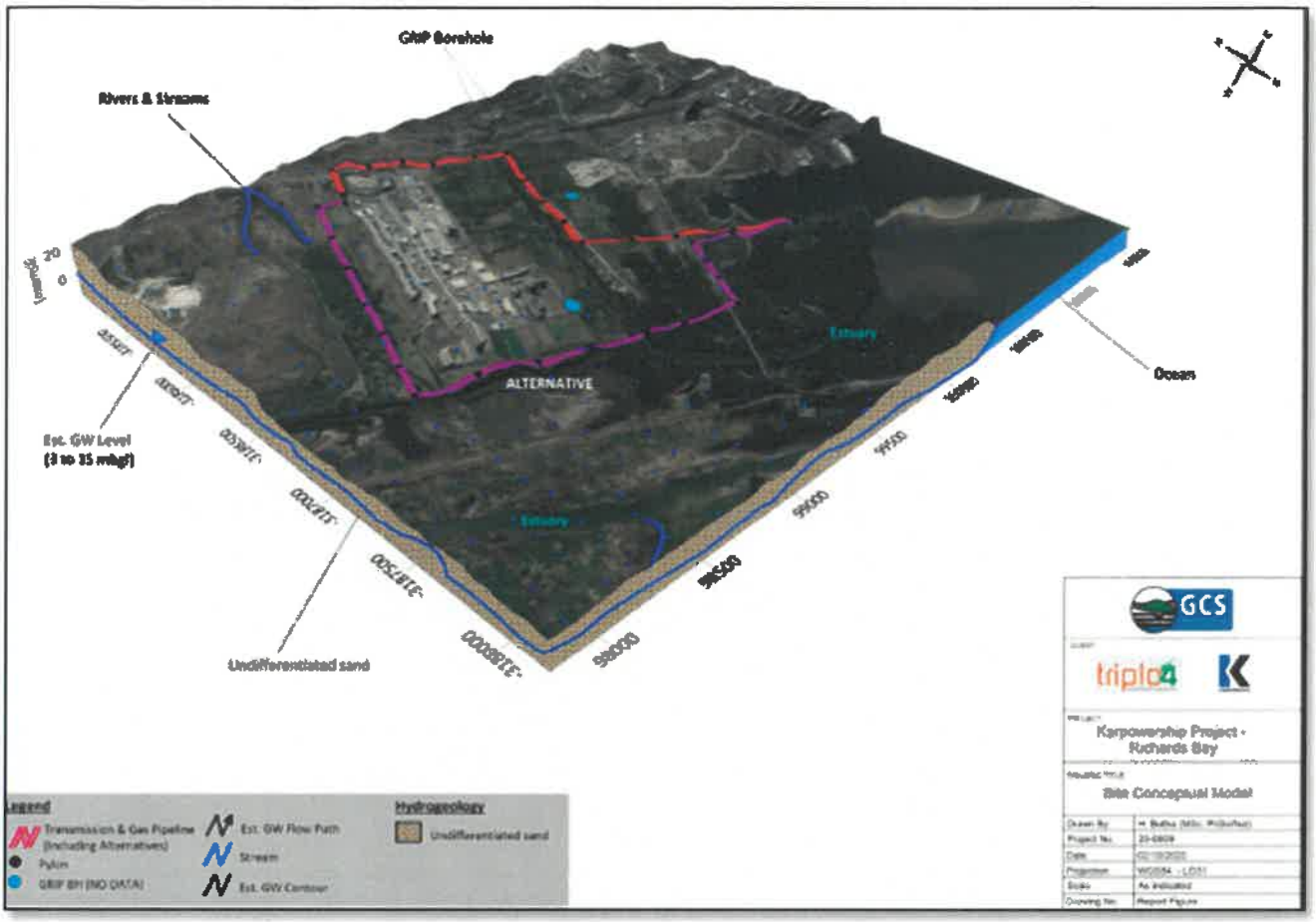

Figure 4-14: The site conceptual geohydrological model for the proposed transmission lines

4.4 ESTUARINE AND MARINE ENVIRONMENT

4.4.1 Estuarine Environment

Richards Bay is one of only three estuarine bays in the country, along with the Knysna Estuary and Durban Bay, and is thus considered an extremely rare estuarine type among South Africa's 300 or so estuaries, and therefore the system is locally, regionally and nationally significant. Estuarine bays are characterised by their large size and a permanent connection to the sea, which imparts strong marine influences in terms of tidal activity, salinity, and water temperature (Whitfield, 1992; Van Niekerk et al., 2020). The ecology of these systems is thus marine and estuarine dominated, and extensive wetlands and mangrove swamps are typical noteworthy features (Whitfield, 1992).

Drastic transformation of the Richards Bay Estuary and its habitats continued through port development activities, including the widening and stabilisation of the mouth for the entry channel, the protection of the mouth with constructed breakwaters, dredging, wharf construction, infilling and the construction of supporting infrastructure and industry (Zwamborn and Cawood, 1974; Campbell, 1976; Begg, 1978; MER, 2013). At the western extent of the harbour, the Bhizolo and Manzamnyama Canals where excavated (by ca. 1976) as a means to drain the local

wetlands and swamps to facilitate industrial development around the Port, e.g. the then Alusaf (Bayside) Aluminium smelter (Begg, 1978). The Bhizolo /Manzamnyama confluence discharges into the western corner of the Bay into an ecologically sensitive area known as the Kabeljous Flats (MER, 2013).

In terms of adjacent protected areas, or areas of conservation importance, the uMhlathuze Estuary is a formal protected area (Richards Bay Game Reserve) and an important bird area (SA no: SA079) managed by Ezemvelo KZN Wildlife (Birdlife, 2016; DEA, 2017; CoastKZN, 2019). Further, the eChwebeni Natural Heritage Site, which is a Transnet designated site of conservation significance within the Port of Richards Bay, preserves part of an original mangrove site that existed prior to the development of the Port (Tholet, 2012; DEA, 2017). It is located approximately 4.4 km south-east of the site. Figure 4-15 below showing the delineation of Richards Bay Estuarine, as well as the neighbouring uMhlathuze Estuary to the south.

Figure 4-15: Estuarine functional zone of the uMhlathuze/Richards Bay estuarine systems

The size of the estuarine functional zone (EFZ) is approximately 5509ha, comprising 3543ha developed/transformed area and 1966 natural habitat, of which approximately 869ha is open water habitat (Van Niekerk et al., 2019). Mixing processes within the system are dominated by tidal action, with tidal amplitude and water levels close to those of the sea due to the unrestricted permanently open inlet (Van Niekerk et al., 2019). Under high wind conditions, strong wind-driven flows occur, especially in the shallow peripheral areas (DEA, 2017). The influence of freshwater on circulation is low, due to low freshwater inflow volumes compared with tidal volume exchanges (DEA, 2017). Freshwater inputs into the system are via the Mzingazi River/Canal (draining from Lake Mzingazi), Manzamnyama and Bhizolo canals (DEA, 2017), thus freshwater mixing processes are mostly confined

to these restricted upper areas. Inorganic nutrients (dissolved inorganic nitrogen and dissolved inorganic phosphate) enter the Richards Bay Estuary via the Bhizolo/Manzamnyama Canal complex as a result of activities in the catchments, groundwater seepage, as well as the spillage of industrial products (DEA, 2017). There is significant sediment contamination by metals and hydrocarbons in some parts of the Bay, with cadmium, copper, chromium and zinc being the most important metal contaminants. This is attributed to port associated activities (DEA, 2017).

Very little natural habitat remains in the Port of Richard Bay today, whilst that which is present in the uMhlathuze Estuary, is largely transformed through changes in tidal variation, river inflow and sediment deposition directly as a result of port development. The importance of the transformed Richards Bay in supporting critical ecosystem services, such as habitat provision and feeding grounds for fish and crustaceans, has long been recognised. It still supports habitats of conservation significance, including intertidal salt marsh, reeds and sedges, mangroves, swamp forest, and sand and mud banks and flats. Of particular note is the Kabeljous Flats, which is a 440 ha shallow embayment area in the western corner of the Port at the outlet of the lower Bhizolo Canal, that comprises a variety of habitats including intertidal and subtidal sand- and mud- flats, and mangrove habitat, which in turn support different biotic communities and serve different biological functions (MER, 2013). This area, together with the lower reaches of the Bhizolo and Manzamnyama Canals, performs an important nursery function for a range of marine and estuarine fauna utilising the estuary. The total area covered by mudflats in the western portion of the harbour is approximately 125 ha (AECOM, 2014).An overview of the sensitive habitats of Richards Bay is provided in Figure 4-16 below (CSIR, 1996 in AECOM, 2014).

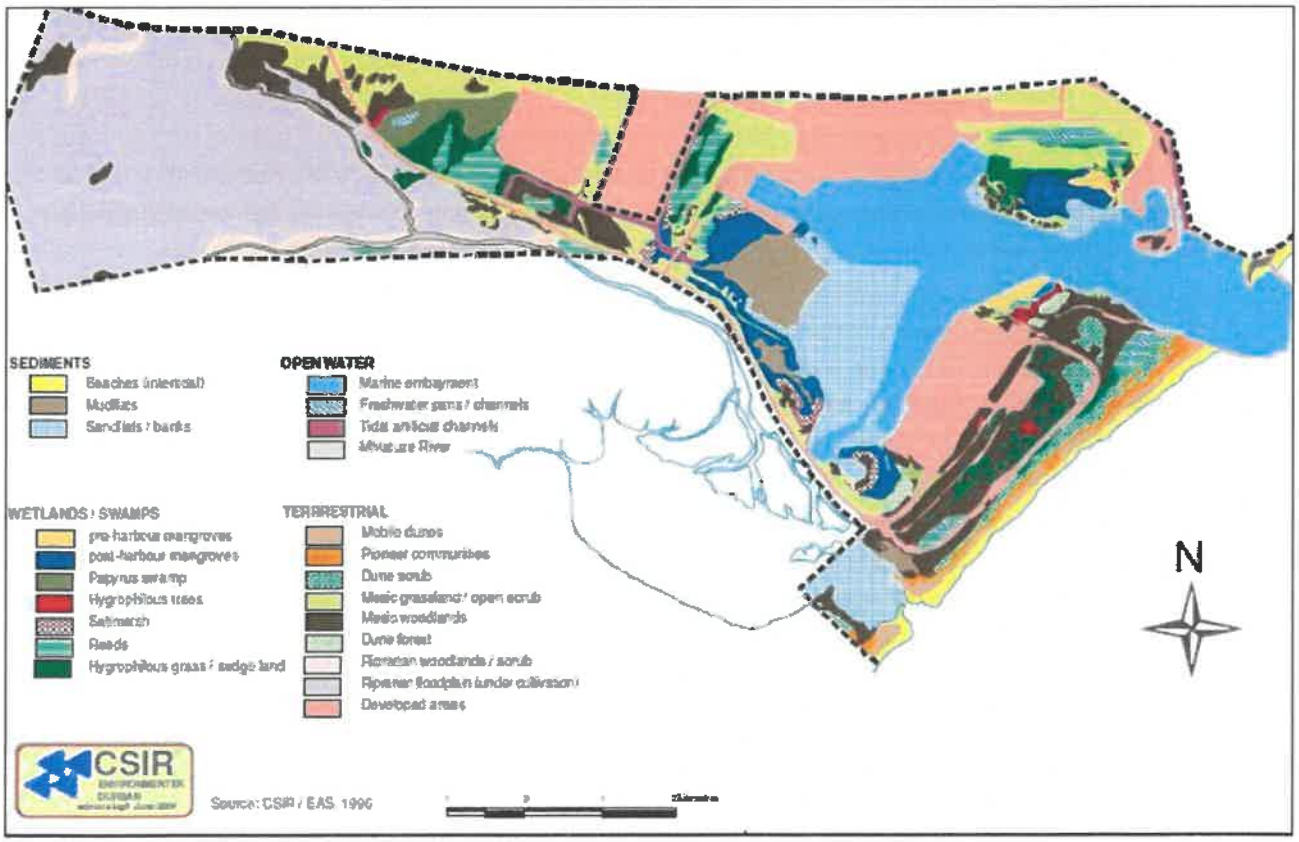

Figure 4-16: Sensitive habitats of Richards Bay Estuarine

The Port of Richards Bay is known to have the oldest area of mangroves in the country, which are preserved in the eChwebeni Natural Heritage Site, covering an area of about 54 ha. Together, the Richards Bay and uMhlathuze estuaries support almost half (47%, 652.1 ha) of South Africa's mangrove habitat. Richards Bay also possesses the highest density of white mangrove, *Avicennia marina* and red mangrove, *Rhizophora mucronata*. Reeds and sedges cover approximately 309 ha and occur mainly to the west of the port, with some habitat noted on the seaward margin of the *Manzamnyama* Canal (Van Niekerk and Turpie, 2012). Swamp forests dominated by *Barringtonia racemosa, Hibiscus tiliaceus* and *Ficus trichopoda* occur in small dense stands along rivers, drainage channels, and the upper portions of the bay (SiVEST, 2018). Remaining swamp forest covers approximately 18 ha (Turpie, Wilson and Van Niekerk, 2012). A fairly large and well developed swamp forest occurs seaward of the *Manzamnyama* Canal and railway line, comprising *Ficus trichopoda–Syzygium cordatum* swamp forest, and *Phragmites australis–Cyperus* papyrus freshwater wetland (CRUZ, 2014a, 2014c).

Studies on the *macrocrustaceans* in the canals and Kabeljous Flats yielded 34 species, comprising 14 prawns, one sand prawn and 20 crab species (MER, 2013). The most abundant species on the Kabeljous Flats were the small pelagic shrimp species, *Acetes erythraeus*, followed by *Metapenaeus monoceros* and *Marsupenaeus japonicas* (CRUZ, 2009). These areas are expected to support significant food resources for the predacious fish populations of the port.

The Richards Bay Estuary, and specific habitats within, serve as critically important fish habitat.
The macrobenthic invertebrate community of the Kabeljous Flats is highly diverse, supporting a total 113 species (MER, 2013), which is typical of marine-dominated systems. The fauna comprise a mixture of marine and estuarine taxa, including cnidarians, nemerteans, nematodes, sipunculids, predominantly marine polychaete groups, molluscs including gastropods and bivalves, and a wide variety of crustaceans including typical estuarine species (MER, 2013). These fauna are critical food organisms for marine and estuarine fish and coastal bird species, and thus contribute to a complex food web with strong species interdependence (MER, 2013). Richards Bay is also one of the major providers of prawn nursery grounds in the KwaZulu-Natal region. Studies on the macrocrustaceans in the canals and Kabeljous Flats yielded 34 species, comprising 14 prawns, one sand prawn and 20 crab species. These areas are expected to support significant food resources for the predacious fish populations of the port (MER, 2013). Richards Bay is ranked as the third most important estuary out of 247 South African systems in terms of its importance for fish populations. Numerous fish surveys have repeatedly shown that different habitats support different numbers and types of species. Fifty-three species alone were recorded from the sheltered mangrove areas on the south-western edge of the Kabeljous Flats (Cyrus and Forbes, 1996 cited in MER, 2013).

The diversity of water-associated bird species present in the Richards Bay Estuary is reportedly unmatched in South Africa. It also supports the highest numbers of birds in South Africa for 18 species of water birds (MER, 2013). Richards Bay estuary is critically important for national and global water bird populations. Many of the recorded species feature in species lists associated with the Ramsar and Bonn Conventions, IBA Programme and Red Data book (MER, 2013; AECOM, 2014). As of 1995, out of 42 South African estuaries, the Richards Bay estuary was ranked as the most important system in terms of the species population sizes it supports, the second most important in terms of species endemism and third for total bird abundance (Turpie, 1995).

The National Biodiversity Assessment (NBA) (Van Niekerk, J. B. Adams, et al., 2019), provides inter alia an updated assessment of the health status of estuaries in South Africa. The health condition of each estuary (also known as

the Present Ecological State (PES)) was provisionally determined (or confirmed if updated studies were available, e.g. for the uMhlathuze Estuary) at the desktop level using the Estuarine Health Index, in which the current conditions of various abiotic and biotic components are rated as a percentage of the probable pristine condition. The table below present the result for Richards Bay Estuarine (the study area), as well as for the neighbouring uMhlathuze Estuary, which is a formal protected area.

COMPONENT	CATEGORY	
	MHLATHUZE	RICHARDS BAY
Hydrology	B	D
Hydrodynamics and mouth condition	D	D
Water quality	E	D
Physical habitat alteration	E	E
Habitat health score	D	D
Microalgae	C	D
Macrophytes	E	F
Invertebrates	D	E
Fish	F	E
Birds	E	D
Biotic health score	D	E
PRESENT ECOLOGICAL STATE (PES)	D	D
2018 CONDITION STATUS	HEAVILY MODIFIED	HEAVILY MODIFIED

Table 4-4: Desktop Present Ecological Status and preliminary Recommended Ecological Categories allocated to uMhlathuze and Richards Bay estuaries in the 2018 NBA

As one of only three estuarine bays in the country, the Richards Bay estuarine system is an extremely rare estuarine type and is included in the priority estuaries requiring formal protection in order to conserve South Africa's estuarine biodiversity. The biodiversity plan requires that the uMhlathuze/Richards Bay estuaries be partially protected (e.g. possess a designated no-take fishing zone), have 50% of its estuarine margin left untransformed, and achieves a Recommended Ecological Category (REC) of A (natural) or best attainable state (Turpie, Wilson and Van Niekerk, 2012). However, given the highly transformed state of the estuarine complex, and the operation of the Richards Bay Estuary as an Industrial port, the restoration of the uMhlathuze/Richards Bay estuaries to their natural/pristine state is reported to be both impractical and unattainable (as per preliminary report made by Coastwise – Estuarine Specialists, September 2020).

4.4.2 Marine Ecology

The port hosts several ecologically important and sensitive habitats, as detailed below:

- The estuarine vegetation and mangroves that occur within the port, fringing most of the southern shoreline, adjacent to the sand spit and the proposed floating power plant development. These habitats

enhance the general biodiversity of the region and serve as important nursery grounds for various fish and invertebrate species. They also play a role in nutrient cycling and protection of the coastline from storm surges and floods.

- The mud and sand-flats that co-occur with mangroves mainly within the southern section of the port, adjacent to the proposed floating power plant development. These habitats are generally rich in detritus and provide foraging and roosting areas for coastal birds and waders.
- The water body in the port that supports ecological processes that sustain the biological communities of the system.

A dusky kob pilot aquaculture project was being run on the northern edge of the sand spit, near the proposed development, however this has since been abandoned.

A detailed Marine Ecology assessment will be conducted for the next phase of the application process.

4.5 COASTAL AND CLIMATE CHANGE

4.5.1 Coastal

The Richards Bay port lies within a complex, largely natural estuarine feature fed by the Mhlatuze River, the outflow of the Mzingazi dam (and its wetland catchment) and a range of smaller wetland features. The port section of the estuarine area has been separated from the Mhlatuze by a causeway constructed by linking several islands which now includes a railway line for transport of goods within the port area.

The proposed development area lies over 4.5 km inland of the estuary mouth, so coastal sedimentary process driven by wave action are not likely to be present to a significant degree.

The sedimentary system is likely to be driven rather by estuarine processes. The potential coastal impact of the proposed infrastructure, in terms of the scope of this assessment, will be restricted to the infrastructure footprint, the operational construction area in the immediate surrounds and access routes to and from the infrastructure.

No dune systems are present in the project area, the transmission line pylons do not lie on the beaches and the gas pipeline lies only on the seafloor so coastal impacts are limited to the seafloor and to the vegetated terrestrial areas within the coastal zone where pylons are to be placed. The proposed mooring sites, transmission lines and gas pipelines that fall within the coastal zone also fall entirely within the estuarine functional zone.

4.5.2 Climate Change

The climate change risks associated with the Richards Bay site are considered to be low. The Sea Level Rise and a projected increase in severe storms pose the most significant climate change threat to the project. This is the most pertinent concern for the Richards Bay site, as tropical storms in the Indian Ocean are projected to increase in intensity. This risk is somewhat mitigated by the location of the floating platforms within the existing port. The implementation of the project at the Richards Bay site may also exacerbate the decreasing availability of water as a result of climate change. However, the province of KwaZulu-Natal is not considered as water-stressed area in comparison to other locations in the South Africa, making this a negligible risk factor for the near future. As such, the climate change adaptation risks associated with the Richards Bay site are considered to be negligible. Assessment of impacts and mitigation measures will be included in the next EIA phase.

4.6 AIR QUALITY AND NOISE

4.6.1 Air Quality

Poor ambient air quality in the Richards Bay area has been a longstanding issue with local residents and thus, any proposed development that has the potential to further reduce air quality is likely to cause concern.

In relation to the Karpowership project, there are obviously no residential areas at the Port of Richards Bay however, the closest residential area is Arboretum, which is located approximately 3.9 km to the north-east of the site. Arboretum is a moderately populated township. It is identified as a sensitive receptor due to the presence of schools, hospitals, crèches, and other similar facilities. Another residential area, Meerensee, is located to the west, more than 5 km from the proposed Karpowership Project site. Other residential areas are located further away from the proposed project site

The maximum predicted annual SO_2, NO_2 and PM_{10} concentrations and the 99th percentile concentration of the 24-hour and 1-hour predicted concentrations are very low relative to the NAAQS.

Table 4-5: Maximum predicted ambient annual SO2, NO2 and PM10 concentrations in µg/m3 and the predicted 99th percentile concentrations for 24-hour and 1-hour averaging periods, with the South African NAAQS

		SO_2	
Description	Annual	24-hour	1-hour
Predicted maximum SO_2	0.07	0.34	0.94
NAAQS	50	125	350
		NO_2	
Predicted maximum NO_2	1.34		18.9
NAAQS	40		200
		PM_{10}	
Predicted maximum PM_{10}	0.33	1.72	
NAAQS	40	75	

Monitoring has shown ambient SO_2 concentrations to be relatively low in the Richards Bay and below the NAAQS. The additive effect of the contribution of SO_2 from the Karpowership Project is predicted to be very small and the potential increase in ambient SO_2 concentrations is highly unlikely to result in exceedances of the NAAQS.

Natural Gas (NG) will be the primary fuel used for the generation of electricity in the proposed project. The pollutants that are usually emitted include oxides of nitrogen (NO_x), sulphur dioxide (SO_2) and particulate matter (PM_{10}). Preliminary findings of the air emission impact are captured in Section 8 of this report – Preliminary Impact Assessment.

4.6.2 Noise

The proposed project site is within the Port of Richards Bay. The site borders a sensitive marine environment to the south and residential areas to the north and east. These areas could be impacted by the surface noise as well as the underwater noise from the vessel operations (transmission through the hull, propellers, sonar ranging devices etc.)

The current ambient sound level could vary from approximately 35 dBA to 65dBA. This is dependent upon the weather, time of day and any human activity such as shipping etc in the area. A more detailed study to determine the ambient noise level will be conducted in the EIA phase.

The most applicable standard for planning purposes used in this study is SANS 10103:2008 which provides typical rating levels for noise in various types of districts. Ideally, in such areas one does not want to experience any anthropogenic noise pollution.

SANS 10103:2008 provides typical rating levels for noise in various types of districts, as described in Table 4-6 below.

Type of District	Equivalent Continuous Rating Level, Lreq.T for Noise					
	Outdoors (dB(A))			Indoors, with open windows (dB(A))		
	Day-night	Daytime	Night-time	Day-night	Daytime	Night-time
Rural Districts	45	45	35	35	35	25
Suburban districts with little road traffic	50	50	40	40	40	30
Urban districts	55	55	45	45	45	35
Urban districts with one or more of the following: Workshops; business premises and main roads	60	60	50	50	50	40
Central business districts	65	65	55	55	55	45
Industrial districts	70	70	60	60	60	50

Table 4-6: Typical rating level for noise in various district types

The highlighted red font are the rating limits applicable to this project in the Port of Richards Bay (Industrial Districts) and the residential areas to the north and east.

4.7 HERITAGE AND ARCHAEOLOGY

A map from 1937 indicates that the study area was mostly used as agricultural fields surrounding wetlands where Alusaf facility currently occurs. Settlements and one cattle byre were also visible on this map, but to the north of the study area. A topographical map from 1964 indicates that there is one settlement near the study area, and human graves would have been associated with this settlement. This has been now destroyed by the railway line. A map from 1984 shows the area as an industrial zone. These maps concur that there was a swamp and wetland formed by the Hlangabenzani River, however, by 1964 furrows/canals had drained much of the water. The maps also

indicate that much of the landscape has changed with the building of the harbour and extra docking areas. For example, the small peninsula where the Powership will be anchored only occurs post-1983. The historical maps thus indicate that human settlements did exist in the general area and thus there is a possibility for human graves. This area has also been one of the many areas regarding forced removals of the Mandlazini people (Griffiths 1996; Ntuli 2019). There is still a land claim for the general area.

The area is in an area of low to medium paleontological sensitivity (figure 4-17). The green area refers to the Cretaceous deposits that occur 3m – 5m below the surface. These deposits were noted during the harbor expansion project. The proposed project will not reach those depths and it consists of small impact areas for each pole. No heritage sites were noted along the route during the field survey.

Figure 4-17: Paleontological Sensitivity Map

4.8 SOCIAL AND ECONOMIC

The table below (table 4-6) provides a summary of the key demographic indicators for the uMhlathuze Local Municipality and uThungulu District Municipality in comparison with the Province (KwaZulu-Natal) and South Africa as a whole. Data was sourced from Wazimaps portal online.

Demographic Indicators		uMhlathuze	uThungulu	KwaZulu-Natal	South Africa
Population	Population 2011	362,778	907,518	10,267,300	51,770,560
	Population 2016	410,465	971,135	11,065,240	55,653,654
	Average Annual Growth	2.5%	1.4%	1.5%	1.5%
	Estimated Population 2020	453,090	1,025,225	11,748,015	58,968,807
Households	Households 2011	97,038	213,916	2,635,643	15,065,018
	Households 2016	110,502	225,798	2,875,844	16,923,309

Demographic Indicators		uMhlathuze	uThungulu	KwaZulu-Natal	South Africa
	Average Annual Growth	2.6%	1.1%	1.8%	2.4%
	Estimated Households 2020	122,606	235,777	3,083,673	18,573,673
Age (2016)	00 – 14 years	35%	40%	35%	30%
	15 – 19 years	10%	10%	10%	9%
	20 – 34 years	30%	26%	27%	27%
	35 – 64 years	22%	20%	24%	28%
	65 – 84 years	3%	4%	4%	5%
	85+ years	0%	0%	0%	0%
Gender (2016)	Female	52%	53%	52%	51%
	Male	48%	47%	48%	49%
Race (2016)	Black African	89%	95%	87%	81%
	Coloured	1%	0%	1%	9%
	Indian or Asian	4%	2%	8%	2%
	White	6%	3%	4%	8%
Dwelling Type (2016)	House	72%	59%	58%	66%
	Apartment	6%	5%	5%	3%
	Traditional	7%	26%	18%	7%
	Hose/Flat in backyard	5%	4%	6%	7%
	Informal dwelling	4%	3%	9%	13%
	Semi-detached & townhouses	2%	1%	2%	2%
	Other	4%	3%	3%	2%
Access to Electricity (2016)	In-house conventional meter	5%	4%	18%	16%
	In-house prepaid meter	93%	86%	68%	74%
	No access to electricity	1%	7%	11%	7%
	Other source (paid for)	0%	0%	1%	1%
	Other source (not paid for)	1%	1%	1%	1%
	Other	0%	0%	1%	1%
Average Annual Household Income (2011)	No income	15%	14%	16%	15%
	Under R5,000	4%	5%	5%	4%
	R5,000 – R10,000	8%	9%	9%	7%
	R10,000 – R20,000	15%	21%	20%	17%
	R20,000 – R40,000	16%	21%	20%	19%
	R40,000 – R75,000	12%	11%	12%	13%
	R75,000 – R150,000	11%	8%	8%	9%
	R150,000 – R300,000	9%	6%	6%	7%
	R300,000 – R600,000	7%	4%	4%	5%
	R600,000 – R1,2 million	2%	1%	1%	2%
	R1,2 million – R2,5 million	0%	0%	0%	1%
	More than R2,5 million	0%	0%	0%	0%

Table 4-7: summary of the key demographic indicators for the uMhlathuze Local Municipality and uThungulu District Municipality in comparison with the Province (KwaZulu-Natal) and South Africa as a whole.

The population of uMhlathuze grew at 2.5% per annum between 2011 – 2016, which was significantly more than the Provincial and National averages of 1.5% per annum. It is estimated that there are approximately 453,000 people living within the area in 2020, which is just less than 4% of the population of the Province. Households grew at 2.6% per annum, which is more than double that of the District, indicating that the desirability of the uMhlathuze area, probably due to the concentration of economic activity within Richards Bay.

The population of uMhlathuze is relatively youthful, with 35% being under the age of 14 years, and another 40% being between the ages of 15-34 years. Therefore, 74% of the population is considered 'youth', which is 9% greater than the National average of 66%. The working age population (15 – 64) is 62% in uMhlathuze and 56% in uThungulu, compared to 60% in the Province and 65% in South Africa.

In relation to gender breakdown, the split between male and female is consistent across all areas with the population comprising 52% female and 48% male in uMhlathuze. In terms of the racial profile, almost 90% of the uMhlathuze are African, which is greater than the Province (87%) and significantly greater than the National average (81%).

Households in uMhlathuze comprise 72% formal houses (much greater than the rest of the areas) while informal dwellings were 4%, which is much less than the National figure of 13%. Almost all households have access to electricity in their household (98%), which is significantly greater than the Provincial and National averages of 86% and 89% respectively.

Household income is only available for 2011 but provides an indication of the breakdown across the household population. Across all areas, around 15% of households have no income, while around 5% earn less than R5,000 per annum (R400 per month). Only 29% of the uMhlathuze population earn upward of R75,000 per annum (R6,000 per month), indicating a small middle and higher-income population. This is however slightly higher than the provincial and national population of 20% and 24% respectively.

The City of uMhlathuze Municipality is a licensed electricity provider, however in rural areas, electricity is still supplied by Eskom. The City of uMhlathuze Municipality does not have electricity backlogs in its area of supply, while a few backlogs exist in the areas within the municipality that are directly serviced by Eskom. The municipality solely operates on infills for new customers. Most of the households use electricity for lighting, cooking and heating. The minority use wood and gas amongst other alternative energy sources for lighting, cooking and heating (uMhlathuze LM. (2018).

The table 4-8 below provides a breakdown of the economy of the uMhlathuze Local Municipality in 2017:

uMhlathuze Local Municipality Gross Value Added (GVA) Contribution (2017)	
Agriculture, forestry & fishing	3.21%
Mining & quarrying	5.93%
Manufacturing	28.59%
Electricity, gas & water	2.25%
Construction	3.69%
Wholesale & retail trade, catering & accommodation	10.56%
Transport, storage & communication	14.60%

Finance, insurance, real estate & business services	13.63%
General government	3.23%
Community, social & personal services	14.32%

Table 4-8: uMhlathuze Local Municipality Gross Value Added (GVA) Contribution (2017)

The total GVA (at current prices) of the uMhlathuze local economy was R16,7 billion in 2017, which grew by 1.1% per annum on average between 2012 – 2017. The main sectors in 2017 were the Manufacturing sector (29%), Transport (15%), Community, social and personal services (14%), Finance (14%), and Trade (11%).

4.9 MARINE TRAFFIC

A marine traffic analysis is being undertaken to ascertain the effect of LNG vessels calling at the proposed FSRU mooring in the port, on current and future vessel traffic of the Port of Richards Bay. The marine traffic analysis is based on LNG delivery considering LNGC vessels, with a capacity of 218 000 m3 resulting in an LNG demand estimate of 24 vessel calls per annum.

The average number of traffic vessels calling at the Port of Richards Bay for a typical calendar year is approximately 2 100 vessels, with the majority being vessels for bulk operations. Bulk operations in the port currently focus on four major activities: export coal from Richards Bay Coal Terminal (RBCT), dry bulk, break-bulk and liquid bulk. The existing traffic in the port considers general cargo vessels of 50 000 DWT manoeuvring to and from the 700 series minor bulk berths and bulk carriers of 150 000 DWT manoeuvring to and from the 6 berths at the 300 series for the export of coal from RBCT. Other traffic in the port considers liquid bulk vessels from berth 208 and berth 209 and MPT vessels from the 600 series berths. The latter traffic may impact the FPP site, but the assumed frequency of this traffic will be low. The primary challenge for the port will be to accommodate the growing demand for the handling of break bulk cargoes. Medium term development projects see the 600 series break bulk basin expanding to include a new break bulk berth. This may impact the vessel traffic at the FPP site. At the FPP site, a gas engine Powership or barge will be moored on a spread-mooring in the protection of the harbour to export power via overhead transmission cables to an Eskom transmission substation on the shore. The Powership and FSRU will be moored on independent spread-moorings but in close proximity in order to reduce the gas distribution pipeline length and overall footprint of the facility infrastructure.

The impact on existing port vessel traffic as a result of the LNG demand estimate of 24 vessel calls per annum is an increase in vessel traffic by less than 1%. The vessel call estimate for the short term is being carried out to determine the trends in the increase in vessel traffic over the next seven years and to assess the associated implications for navigational safety. The annual percentage growth in demand is being used to estimate the future vessel traffic for the various cargo handled within the port for the years 2021 to 2028. The effect on future port operations of the LNGC traffic combined with the forecasted future port traffic will then be assessed in the next phase, as well as the effect on current and future port operations with respect to navigation of traffic vessels past the FPP and FSRU mooring.

4.10 CONSERVATION AND PLANNING TOOLS

4.10.1 DEFF Screening Tools

The table below provides a summary of the DEFF Screening Report of the proposed site.

Table 4-9: Powerships & Transmission Lines- Environmental sensitivities identified by the DEFF Screening Report & Proposed Way Forward

Variable	Sensitivity	Way Forward
Agriculture	Very High Sensitivity	The proposed Powerships, FSRU and gas pipeline is within the Port of Richards Bay. The transmission lines is proposed between the port and the adjacent South32 Aluminium SA site. No agricultural assessment is proposed to be conducted for the proposed sites.
Animal Species	High Sensitivity	An ecological assessment will be conducted for the proposed development site.
Aquatic Biodiversity	Very High Sensitivity	Relevant studies are being conducted, namely wetland assessment, aquatic assessment and marine ecology assessment.
Archaeological & Cultural Heritage	High Sensitivity	A Heritage Impact Assessment was conducted for the proposed development site
Civil Aviation	High to Medium Sensitivity	None required
Defence	Medium	None required
Plant Species	Medium	Findings of species will be included in the ecological assessment
Terrestrial Biodiversity	Very High Sensitivity	An ecological assessment is being conducted for the proposed development site.

5 POLICY AND LEGISLATIVE FRAMEWORK

2014 NEMA EIA Regulations (as amended), appendix 2- I a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.

5.1 NATIONAL REGULATORY FRAMEWORK

The Constitution, 1996 is the supreme law of the Republic. Any law or conduct inconsistent with it is invalid and the obligations imposed by it must be fulfilled.

- Chapter 2 of the Constitution contains the Bill of Rights, one of which is Section 24 in terms of which everyone has the right to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for benefit of present and future generations, through reasonable legislative and other measures that:
  - prevent pollution and ecological degradation;
  - promote conservation; and
  - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

One of the key legislative measures that has been established is the promulgation of the National Environmental Management Act 107 of 1998 (NEMA). NEMA aims to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith.

NEMA prohibits a person from commencing a listed activity without environmental authorisation. The Project triggers several activities listed in the EIA Regulations Listing Notices 1, 2 and 3 of 2014 (as amended). The procedural requirements for such an application and associated EIA that needs to be undertaken, are prescribed by the EIA Regulations, 2014 (as amended) (the EIA Regulations, 2014) and informed by guidelines published in terms of Section 24J of NEMA as well as applicable protocols and minimum information requirements.

In addition, the Project triggers an activity listed under the National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) which requires an atmospheric emission licence (AEL). The same EIA process prescribed by the EIA Regulations, 2014 need to be applied to the AEL application, with a number of additional requirements set out in NEMAQA and its Regulations.

As part of the EIA process, the EIA Regulations require that a description of the policy and legislative context within which the development is proposed is reported on in the Scoping Report. This includes an identification of all applicable legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments. This section has been prepared to satisfy this requirement.

Table 5-1: Additional Environmental Guidelines

Regulations and Guidelines
Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.
DEA (2017), Guideline on Need and Desirability, Department of Environmental Affair (DEA), Pretoria, South Africa
The General Policy on Environmental Conservation (January 1994)

5.1.1 National Environmental Management Act (No 107 of 1998 [as amended])

Legislation	Section	Relates to
National Environmental Management Act (No 107 of 1998 [as amended])	Section 2	Contains sustainable development and other principles that apply throughout South Africa to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
	Section 30	Deals with the control of emergency incidents, including the different types of incidents, persons responsible for the incidents and reporting procedures to the relevant authority.

Relevance to the Proposed Project:

Three sets of listed activities, published 4th of December 2014 (w.e.f 8 December 2014) under Government Notices R.983, R.984, and R.985, and subsequently amended, describe the activities that require either a Basic Assessment (applies to activities in Listing Notices 1 and 3)), or Scoping and Environmental Impact Reporting (S&EIR) (applies to activities in Listing Notice 2)). All listed activities that are triggered in the above listing notices need to be assessed in the assessment report – refer to Section 2.2.

Because the Project triggers activities in Listing Notice 2, the application for environmental authorisation is subject to the S&EIR process for all activities, including those listed under Listing Notice 1 and 3. As set out by Section 24C of the NEMA, the relevant competent authority for this activity is DEFF.

The applicable 24J Guidelines include:

- Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.
- DEA (2017), Guideline on Need and Desirability, Department of Environmental Affair (DEA), Pretoria, South Africa

5.1.2 National Environmental Management: Waste Act (No 59 of 2008)

Legislation	Section	Relates to
National Environmental Management: Waste Act (No 59 of 2008)	Sections 16 – 18, 21 – 27, 35 -= 41, 60	Provides for general and specific waste management measures; the remediation of contaminated land and reporting.
	Sections 19, 20, 43 – 59	Requirements for waste management licensing
Relevance to the Proposed Project:		
• All reasonable measures must be taken to avoid the generation of waste and where such generation cannot be avoided, minimise the toxicity and amounts of waste that are generated; reduce, re-use, recycle and recover waste; where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner; • Manage the waste in such a manner that it does not endanger human health or the environment or cause a nuisance through noise, odour or visual impacts; • Prevent any employee or any person from contravening this Act; and prevent the waste from being used for an unauthorised purpose; • The proposed development does not trigger any listed activities (under Categories A and B) of this Act and as such does not require a Waste Licence.		

5.1.3 National Environmental Management: Air Quality Act (No 39 of 2004)

Legislation	Section	Relates to
National Environmental Management: Air Quality Act (No 39 of 2004)		Provides for the protection of the environment by regulating air quality in order to prevent air Pollution.
	Sections 22, 21 22A	Atmospheric Emission Licensing.
	Sections 23-25	Controlled emitters
	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
Relevance to the Proposed Project:		
• The proposed project requires an Atmospheric Emission Licence. • It is likely that the steam turbines will be regulated as controlled emitters.		

5.1.4 Marine Living Resources Act (Act 18 of 1998 amended 2000)

Legislation	Section	Relates to
Marine Living Resources Act (Act 18 of 1998) amended 2000		Regulates the utilization, conservation and management of marine living resources and the need to protect whole ecosystems preserve marine biodiversity and minimize marine pollution.
Relevance to the Proposed Project:		

The main implication of this act is the sustainable utilisation of marine resources. Due to the project being located in the Port of Richards Bay, all reasonable measures must be taken to avoid marine pollution to the marine living resources.

5.1.5 National Environmental Management: Integrated Coastal Management Act (24 of 2008)

Legislation	Section	Relates to
National Environmental Management: Integrated Coastal Management Act (24 of 2008)	Section 2	Provides for the protection and to enhance the status of coastal public property, and secure equitable access to the opportunities and benefits of coastal public property.
	Section 13	Persons right of reasonable access to coastal public property as well as the entitlement to use and enjoy coastal public property.
	Section 69	Stipulate requirements for permits to discharge effluent that originates from a source on land into coastal waters.
Relevance to the Proposed Project:		
Discharge of cooled water from the powership operations from the moored Powerships into the sea, i.e. there is no discharge from land based activities. DEFF has confirmed that a coastal waters discharge permit is not required. Discharge temperatures will conform to the current guideline, the South African Water Quality Guidelines For Coastal Marine Waters, Volume 1, Natural Environment (1995), i.e. the maximum acceptable variation in ambient temperature will not exceed + or – 1°C, in terms of the targeted value for the South African coastal zone.		

5.1.6 National Water Act (No 36 of 1998) and Regulations

Legislation	Section	Relates to
National Water Act (No 36 of 1998) and regulations		Regulates the protection, use, development, conservation, management and control of water resources.
	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
	Section 21	Permissible water use, including discharge & abstraction and development within 500m of a watercourse (including wetlands).
Relevance to the Proposed Project:		
Should the proposed transmission line be constructed within or within close proximity to a watercourse or wetland a water use license may be required for the proposed development. This will be confirmed with the Department of Water and Sanitation and reported on in the EIA Report.		

5.1.7 National Forest Act (84 of 1998)

Legislation	Section	Relates to
National Forest Act (84 of 1998)	Section 12	Provides for protection, control and licencing for cutting, disturbing, damaging or destroying protected trees
Relevance to the Proposed Project:		
If any protected trees in terms of this Act occur on site, the developer will require a licence from the DEFF to perform any of the above-listed activities.		

5.1.8 National Environmental Management: Biodiversity Act (No 10 of 2004) and the Threatened or Protected Species Regulations (2007)

Legislation	Section	Relates to
National Environmental Management: Biodiversity Act (No 10 of 2004) and the Threatened or Protected Species Regulations (2007)		Provides for the management and conservation of biodiversity, protection of species and ecosystems, and sustainable use of indigenous biological resources.
Relevance to the Proposed Project:		
• Critical Biodiversity Area was identified within the proposed development study area; • The proposed development must conserve endangered ecosystems and protect and promote biodiversity; • Must assess the impacts of the proposed development on endangered ecosystems; • No protected species may be removed or damaged without a permit; • The proposed site and transmission routes must be cleared of alien and invasive vegetation using appropriate means.		

5.1.9 National Environmental Management: Protected Areas Act (31 of 2004)

Legislation	Section	Relates to
National Environmental Management: Protected Areas Act (31 of 2004)		Provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. Promotes sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas.
Relevance to the Proposed Project:		
No protect areas are identified within the proposed development site.		

5.1.10 National Environmental Management: Protected Areas Act (31 of 2004) – Strategy on Buffer Zones for National Parks (106 of 2012)

Legislation	Section	Relates to
National Environmental Management: Protected Areas Act (31 of 2004) – Strategy on Buffer Zones for National Parks (106 of 2012)		Defines buffer zones to protect important areas of high value for biodiversity and/or to society where these extend beyond the boundary of the Protected Area; and stipulate legal requirements for developments within formally established buffer zone.
Relevance to the Proposed Project:		
The strategy states that all development in a formally established buffer zone that requires an environmental authorisation in terms of the NEMA, will be subject to an environmental impact assessment.		

5.1.11 National Heritage Resources Act (No 25 of 1999) and Regulations

Legislation	Section	Relates to
National Heritage Resources Act (No 25 of 1999) and regulations	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities'

		comments into account prior to making a decision on the HIA.
Relevance to the Proposed Project:		
▪ No person may alter or demolish any structure or part of a structure, which is older than 60 years or disturb any archaeological or paleontological site or grave older than 60 years without a permit issued by the relevant provincial heritage resources authority. ▪ No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter or deface archaeological or historically significant sites. ▪ Cultural and palaeontological impact assessments have been included as specialist studies in the EIA.		

5.1.1 Conservation of Agricultural Resources Act (Act No 43 of 1983)

Legislation	Section	Relates to
Conservation of Agricultural Resources Act (Act No 43 of 1983)		Prohibition of the spreading of weeds
		Control measures for alien and invasive plant species
Relevance to the Proposed Project:		
There are no applicable permit or licence requirements, however cognisance of these requirements are to be taken during vegetation clearance and the maintenance of the existing servitudes, for the entire duration of the project lifecycle.		

5.1.2 National Ports Act (12 of 2005)

Legislation	Section	Relates to
National Ports Act (12 of 2005)		Provide for the establishment of the National Ports Authority and the Ports Regulator; to provide the administration of certain ports by the National Ports Authority; and to provide for matters connect therewith.
		Prescribes that the National Ports Authority is to prepare and periodically update a Port Development Framework Plan (PDFP) for each port. The creation of new capacity in the ports' system results from the implementation of the Port Development Framework Plans.
Relevance to the Proposed Project:		
TNPA is required by the Act to promote economic development of the Port. Further, a balance between environmental protection and economic development must be achieved.		

5.1.3 Occupational Health and Safety Act (No 85 of 1993)

Legislation	Section	Relates to
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees
	Section 9	General duties of employers and self-employed persons to persons other than their employees

Relevance to the Proposed Project:
The developer must be mindful of the principles and broad liability and implications contained in the OHSA and mitigate any potential impacts. Major Hazardous Installations are regulated under the Act.

5.1.4 Hazardous Substances Act (No 15 of 1973) and regulations

Legislation	Section	Relates to
Hazardous Substances Act (No 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances
Relevance to the Proposed Project:		
▪ Manage the hazardous substances in such a manner that it does not endanger human health or the environment. • Prevent hazardous substances from being used for an unauthorised purpose.		

5.1.5 SANS 10103 (Noise Standard)

Legislation	Section	Relates to
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication, as well as the categories for community responses to excess environmental noise.
Relevance to the Proposed Project:		
The ambient noise level guidelines in SANS 10103:2008 is 70dBA during the day and 60dBA at night in industrial districts. These levels can be seen as the target levels for any noise emissions within the port and adjacent area (South32 Aluminium site). Furthermore, the South African noise control regulations describe a disturbing noise as any noise that exceeds the ambient noise by more than 7dB. This difference is usually measured at the complainant's location should a noise complaint arise. Therefore, if a new noise source is introduced into the environment, irrespective of the current noise levels, and the new source is louder than the existing ambient environmental noise by more than 7dB, the complainant will have a legitimate complaint. Guidelines for expected community responses to excess environmental noise is reflected in Table 5-2 below. Table 5-2: Categories of environmental community / group response (SANS 10103:2008).		

Excess Lr dB (A)	Estimated Community/Group Response	
	Category	Description
0 -10	Little	Sporadic complaints
5 – 15	Medium	Widespread complaints
10 – 20	Strong	Threats of community / group action
15	Very Strong	Vigorous community / group action

5.1.6 National Road Traffic Act (No 93 of 1996)

Legislation	Section	Relates to
National Road Traffic Act (No 93 of 1996)		Provides for controlling transport of dangerous goods, hazardous substances and general road safety
Relevance to the Proposed Project:		
All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed project;		

5.1.7 Gas Act 48 of 2001

Legislation	Section	Relates to
Gas Act 48 of 2001		This Act regulates the development and operation of gas transmission, storage, distribution, liquefaction and re-gasification facilities. No person may construct or operate gas storage facilities without a licence issued by the Gas Regulator (NERSA) except if listed in Schedule 1, in which case, registration may be required. Schedule 1 includes any person engaged in the transmission of gas for that person's exclusive use. Registration with NERSA is also required for the importation of gas.
Relevance to the Proposed Project:		
As Karpowership will be importing, storing and regasifying natural gas and transporting it between its ships via a pipeline, it will need to comply with the provisions of this Act by applying for the necessary licence and/or registration. These application processes do not form part of the application process for environmental authorisation and an AEL.		

5.1.8 Electricity Regulation Act 4 of 2006

Legislation	Section	Relates to
Electricity Regulation Act 4 of 2006		The Act's main objective is to establish a national regulatory framework for the electricity supply industry and to make the National Energy Regulator of South Africa (NERSA) the custodian and enforcer of the national electricity regulatory framework. The Act empowers the Minister of Mineral Resources and Energy, in consultation with NERSA, to: ▪ determine that new generation capacity is needed to ensure the continued uninterrupted supply of electricity;

Legislation	Section	Relates to
		• determine the types of energy sources from which electricity must be generated, and the percentages of electricity that must be generated from such sources; • determine that electricity thus produced may only be sold to the persons or in the manner set out in such notice; • determine that electricity thus produced must be purchased by the persons set out in such notice; • require that new generation capacity must – o be established through a tendering procedure which is fair, equitable, transparent, competitive and cost-effective; o provide for private sector participation. The Act also gives NERSA various powers to carry out its functions, including the power to consider applications for the licences required and issued under this Act. No person may operate any generation, transmission or distribution facility without a licence issued by NERSA.
Relevance to the Proposed Project:		
The primary enabling legislation for the Risk Mitigation IPP Procurement Programme is the Electricity Regulation Act, together with the Electricity Regulations on New Generation Capacity and the IRP 2019. Karpowership's proposal for New Generation Capacity through its Powership projects falls under the Risk Mitigation IPP Procurement Programme. In order to generate and transmit electricity, Karpowership will require a generation licence from NERSA. This application is separate to the application process for environmental authorisation and an AEL.		

5.1.9 Electricity Regulations on New Generation Capacity, 2006

Legislation	Section	Relates to
Electricity Regulations on New Generation Capacity, 2006		The objectives of the Regulations published under the Act are to: • to facilitate planning for the establishment of new generation capacity; • the regulation of entry by a buyer and a seller into a power purchase agreement; • to set minimum standards or requirements for power purchase agreements; • the facilitation of the full recovery by the buyer of all costs efficiently incurred by it under or in connection with a power purchase agreement including a

Legislation	Section	Relates to
		reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and • the provision of a framework for implementation of an IPP procurement programme and the relevant agreements to be concluded.
Relevance to the Proposed Project:		
The primary enabling legislation for the Risk Mitigation IPP Procurement Programme is the Electricity Regulation Act, together with the Electricity Regulations on New Generation Capacity and the IRP 2019. Karpowership's proposal for New Generation Capacity through its Powership projects falls under the Risk Mitigation IPP Procurement Programme. In order to generate and transmit electricity, Karpowership will require a generation licence from NERSA. This application is separate to the application process for environmental authorisation and an AEL.		

5.1.10 Integrated Resource Plan (IRP) 2019

Legislation	Section	Relates to
Integrated Resource Plan (IRP) 2019		The IRP 2019 was issued by the Minister of Mineral Resources and Energy under Notice No 1360 dated 18 October 2019 in Government Gazette 42784. The IRP is South Africa's national electricity infrastructure plan in which the country's energy mix is determined.
Relevance to the Proposed Project:		
The primary enabling legislation for the Risk Mitigation IPP Procurement Programme is the Electricity Regulation Act, together with the Electricity Regulations on New Generation Capacity and the IRP 2019. Karpowership's proposal for New Generation Capacity through its Powership projects falls under the Risk Mitigation IPP Procurement Programme. In order to generate and transmit electricity, Karpowership will require a generation licence from NERSA. This application is separate to the application process for environmental authorisation and an AEL.		

5.1.11 National Energy Regulator Act 40 of 2004

Legislation	Section	Relates to
National Energy Regulator Act 40 of 2004		This Act establishes a single regulator to regulate the electricity, piped-gas and petroleum pipeline industries. The statutory body is the National Energy Regulator of South Africa (NERSA). This Act requires NERSA inter alia to undertake the functions of the Gas Regulator as set out in section 4 of the Gas Act and the functions set out in section 4 of the Electricity Regulation Act, 2006, which includes the

Legislation	Section	Relates to
		planning for new generation capacity and integrated resource plan.
Relevance to the Proposed Project:		
NERSA has been identified an organ of state having jurisdiction in respect of an aspect of the activities for which the EIA process is being conducted and thus has been registered as an I&AP as required by the EIA Regulations, 2014.		

5.1.12 Infrastructure Development Act (23 of 2014)

Legislation	Section	Relates to
Infrastructure Development Act 23 of 2014		• To provide for the facilitation and co-ordination of public infrastructure development which is of significant economic or social importance to the Republic; • to ensure that infrastructure development in the Republic is given priority in planning, approval and implementation; • to ensure that the development goals of the state are promoted through infrastructure development; • to improve the management of such infrastructure during all life-cycle phases, including planning, approval, implementation and operations; and • to provide for matters incidental thereto.
Relevance to the Proposed Project:		
The designation of the Risk Mitigation IPP Procurement Programme as a Strategic Integrated Project.		

Table 5-3: Applicable Provincial Plans, Strategies and Programmes

Legislation	Relates to
KwaZulu-Natal Planning and Development Act,(No. 6 of 2008)	Strategic spatial development intentions for the municipality based on the IDP and SDF, influenced by and in alignment with adjacent municipalities.
KwaZulu-Natal Provincial Spatial Economic Development Strategy (2016)	The prioritisation of spatial economic development initiatives in the province, including strategy to ensure that investment occurs in the sectors that provide the greatest socio-economic return to investment.
The KZN Conservation Management Act, 1997 (No 9 of 1997)	Provides for the establishment of the KZN Conservation body (Ezemvelo KZN Wildlife – EKZNW) and prescribes its powers, duties and functions, including direct management of nature conservation and protected areas.
KwaZulu-Natal Biodiversity Plan	The plan has been developed to guide development, protected areas expansion and conservation within the province. The plan identified areas as

Legislation	Relates to
	Critical Biodiversity Areas (CBAs) which cannot be lost if conservation goals are to be met, and Ecological Support Areas (ESAs), which are required to support the functioning of ecosystems and CBAs. Development guidelines for each category of CBA and ESA are included in the plan.
The Provincial Norms and Standards on Biodiversity Offset for KwaZulu-Natal (2009, 2013)	Provides details on how EKZNW, as the Provincial biodiversity authority, requires offsets to be investigated and reported upon.
KZN Cogta – Adopted Provincial Norms and Standards For Climate Change And Energy Efficiency In Land Use Management (January 2020)	Providing set of norms and standards that focus on climate change and energy efficiency, which are interrelated, which must be used in the assessment of land development applications in order to proactively respond to climate change.
KwaZulu-Natal Coastal Management Programme	Developed to bring provincial coastal management in KwaZulu-Natal in line with the Integrated Coastal Management Act. The Provincial Coastal Management Programme (PCMP) sets out the objectives and requirements to fully realise integrated coastal management in KwaZulu-Natal.
KwaZulu-Natal Draft Climate Change Action Plan	This provincial level strategy is modelled on the NNCRP. It defines an approach to achieving climate resilience and emissions reductions within the context of both provincial development priorities and projected climate change impacts.
KwaZulu-Natal Provincial Growth and Development Plan (PGDP) (2019)	Aims to curb poverty, inequality and achieve shared growth. Alternative sources of energy are indicated as a priority, including generation of energy through gas and diesel turbines.
KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs Revised Strategic Plan 2015 – 2020	Relevant objectives of the strategy include the facilitation and creation of new markets; to drive growth of the KZN provincial economy; to enhance sector and industrial development and to investigate and develop viable alternative energy generation options.

Table 5-4: Applicable Regional and Local Planning Frameworks

Legislation	Relates to
Richards Bay Environmental Management Framework (EMF)	Secures environmental protection and promote sustainability and cooperative environmental governance. Guides the decision-making in the area.
uMhlathuze Land Use Scheme Regulations – 25 September 2019	Determines the use and development of land within the municipal area to which it relates in order to promote— (a) economic growth; (b) social inclusion; (c) efficient land development; and (d) minimal impact on public health, the environment and natural resources.

uMhlathuze Municipality Integrated Development Plan (IDP), 2019/2020	Aiming to reduce the demand for energy and investigate alternative energy sources, to meet the sustainable development goal of ensuring access to affordable, reliable and modern energy for all.
King Cetshwayo District Coastal Management Programme (updated 2015)	The simplified CMP includes only a summary of the situation assessment, coastal management precincts, a municipal vision and concluding with priorities and strategies.
Richards Bay/ uMhlathuze Estuarine Management Plan	In accordance with a National Estuarine Management Protocol, the plan is in line with the minimum requirements and general content for estuarine management plans (EMPs) and the responsible institutions for developing EMPs.
King Cetshwayo District Municipality Draft Integrated Development Plan (2020/21 – 2021/22)	The objective is to promote economic growth in the District and improve the socio-economic conditions of residents, including infrastructure development and service delivery.

5.2 INTERNATIONAL AGREEMENT

South Africa is a party to a number of international agreements which regulate shipping as well as the protection of marine resources:

- International Convention for the Prevention of Pollution from Ships – MARPOL 73/78
    - The MARPOL Convention regulates pollution from ships – accidental pollution and pollution from the general operations associated with shipping; Preserves the marine environment by eliminating pollution from harmful substances. Ships sailing under the flag of a country that has entered into the MARPOL convention are expected to comply with the regulations. The MARPOL Convention was ratified by South Africa in 1985,

- Convention on Biological Diversity – 1992-1995
- International Convention on Civil Liability for Oil Pollution
- Damage – 1969-1997
- International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties – 1969-1986
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) – 1972-1978
- Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter – 1996-1998
- United Nations Convention on the Law of the Sea (UNCLOS) – 1982-1997
- Protocol relating to intervention on the high seas in cases of pollution by substances other than oil – 1973-1997
- International Convention for the Safety of Life at Sea – 1974-1980
- Convention on the Conservation of Migratory Species of Wild Animals

- Agreement on the Conservation of African-Eurasian Migratory Waterbirds, or African-Eurasian Waterbird Agreement (AEWA)

Also of relevance to the Project is the Framework Convention on Climate Change, 1992 and the Paris Agreement. This is discussed in more detail under Section 6.

6 MOTIVATION, NEED AND DESIRABILITY

Appendix 2 of the 2014 EIA Regulations (as amended): 2 (1)(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location

6.1 NEED AND DESIRABILITY AS PER SECTION 2 (F)

This section contextualises the strategic planning context within which the Project is being proposed.

South African legislation, including the Constitution and NEMA, entrenches the principle of sustainable development as do the various National strategies, policies, programmes and plans, including the National Development Plan 2030 (NDP). The motivation for the need and desirability motivation for the proposed Project thus needs to be assessed within the context of these strategies, policies, programmes and plans by specifically looking at whether the proposed project is ecologically sustainable and socially and economically justifiable.

STRATEGIC OVERVIEW

The United Nations Sustainable Development Goals (SDGs) or Global Goals were adopted by all member states of the United Nations in 2015 in the commitment to end poverty, protect the planet and ensure peace and prosperity for all people by 2030. South Africa was one of these nations.

The provision of electricity falls under the SDG 7: Affordable and Clean Energy. Notably, the goals are integrated and an improvement in one area affects the outcome of the other SDG areas. For example, an improvement in SDG 7: Affordable and Clean Energy is likely to lead to an improvement in the other SDGs such as: 1 (No Poverty); 3 (Good Health and Well-Being); (8 (Decent Work and Economic Growth); 9 (Industry, Innovation and Infrastructure); 11 (Sustainable Cities and Communities) and 13 (Climate Action).

Figure 6-1: United Nations Sustainable Development Goals (Source: UN General Assembly, 21 October 2015)

Environmental

The principles outlined in the National Environmental Management Act 107 of 1998 (NEMA) must be applied to all decision-making that may affect the environment and its biodiversity. The first two principles in Section 2 of NEMA are that, "environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably" and "development must be socially, environmentally and economically sustainable".

Given the integrative nature of sustainability, the requirement for and provision of reliable energy will cross cut various environmental, social and economic goals. Various specialist environmental studies are being commissioned to identify the potential environmental impacts of the proposed project on life below water, life on land and climate change in order to establish required mitigation in terms of alternatives and other mitigation measures during the EIA phase. Preliminary findings indicate that:

- GHG emissions, due to the use of natural gas rather than LPG as energy source, are likely to be very low;
- Marine environment impacts such as physical disturbance of the littoral zone, increased seawater temperatures and modifications to the hosted biological communities may occur. However, gas pipeline design and construction as well as mitigations for e.g. temperature increases as per maritime engineering may be effected within coastal temperature discharge standards thereby reducing impacts;
- Risk management can be applied to limit air quality or maritime related incidents;
- Life on land impacts e.g. vegetation clearance, aquatic and wetlands are within the limits of acceptable change as the relatively short distance (less than 10km) 132KV transmission line is the only aspect of the project to have a terrestrial impact. The Karpowership with its relatively small footprint will be moored in the port and have no significant footprint typically associated with power stations or solar power plants;
- Abstraction for cooling purposes will be from the coastal waters with an abundant supply being available in the Port. Fresh water resource allocation, protection of the reserve as well as concerns related to water scarcity, usually associated with land-based power stations, will therefore not be a concern;
- Waste management impacts to the marine environment from black and grey water can be avoided in accordance with the MARPOL requirements.

The concept of generating power on the ocean has several benefits over land-based power plants, including a smaller footprint (e.g. the same amount of output can be achieved in a much smaller area compared to land based power plants), significantly shorter timeframes for project delivery and adding capacity, as the Powerships arrive already assembled and ready-to-operate, and land-based impacts are limited and of short term, associated with the establishment of the transmission line and the temporary assembly area for the gas pipeline.

More detail of each of these environmental factors is provided elsewhere in the final Scoping Report, namely the project scope alternatives (Section 3), baseline environment section (Section 4) as well as preliminary risk assessment (Section 8).

These impacts also need to be considered together with the socio-economic-context i.e. the need to improve the economy and job creation, sustaining businesses and industry within a constrained energy sector and ensuring energy provision for a growing population where many is still disadvantaged and have to making a living without energy. The proposed project is likely to have a significant socio-economically benefit locally, provincially and nationally based on the proposed capacity to be generated and supplied to the grid network, as expanded in the following sections.

The environmental as well as socio-economic impacts will be assessed in more detail in the EIA phase.

Socio-economic

The importance of energy for socio-economic benefit is well documented as early as 2012- The Draft 2012 Integrated Energy Planning Report: Executive Summary (IEPR) stated that "energy access is now widely recognised as a prerequisite for human development". The access to electricity is outlined within the Municipal Services Act 32 of 2000, giving priority to the provision of basic needs to the local community that is "conducive to the prudent, economic, efficient and effective use of available resources". NEMA supports this through the principle of "equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination", as would be the case for facilities and citizens unable to afford the more expensive countermeasures to stable electricity supply throughout load shedding.

According to the National Development Plan (NDP) (2030), Government is committed to ensure economic growth and development through adequate provision of sustained energy services that are competitively priced, reliable and efficient. This must be ensured to promote sustainable development and to ensure that the living standard of South African citizens is maintained and improved.

South Africa has experienced a progressively worsening energy crisis from 2007 that has resulted in numerous load shedding events including Level 6 load shedding. Eskom, which provides over 90% of power generating capacity in South Africa (Donnelly, 2018; Mthethwa, 2019; Gosling, 2019; Cohen & Vecchiatto, 2019), has been unable to meet the demands of both the private and public sector. The load shedding measures which were implemented to prevent a total blackout has had dire effects on the South African Economy according to Goldberg, 2015 and Makinana, 2019. Load shedding reduced the South African GDP by roughly 0.30% in 2019, which translates to 8.5 billion of real, inflation-adjusted Rand (Writer, 2019).

Government interventions of introducing additional power stations, generators and even tariff increases have proved to be inefficient in terms of addressing the country's electricity shortages. The Integrated Resource Plan (IRP) 2019 stressed a short-term gap in supply to be anticipated between 2019 and 2022 due to the time expected for the new power stations (Medupi and Kusile) and the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to come online. This may further be delayed by the poor design and planning of the Medupi and Kusile plants and the delayed correction thereof (Hosken, 2020). The IRP specified the need for new energy efficient technology and the diversification of both the supply and nature of energy production to reduce pollution and minimise impacts related to climate change.

The CSIR (*Setting up for the 2020s: Addressing South Africa's electricity crisis and getting ready for the next decade, 2020*) further predicts that load shedding can be expected for the next 2 – 3 years and that an urgent response is required to ensure reliable short-term energy supply.

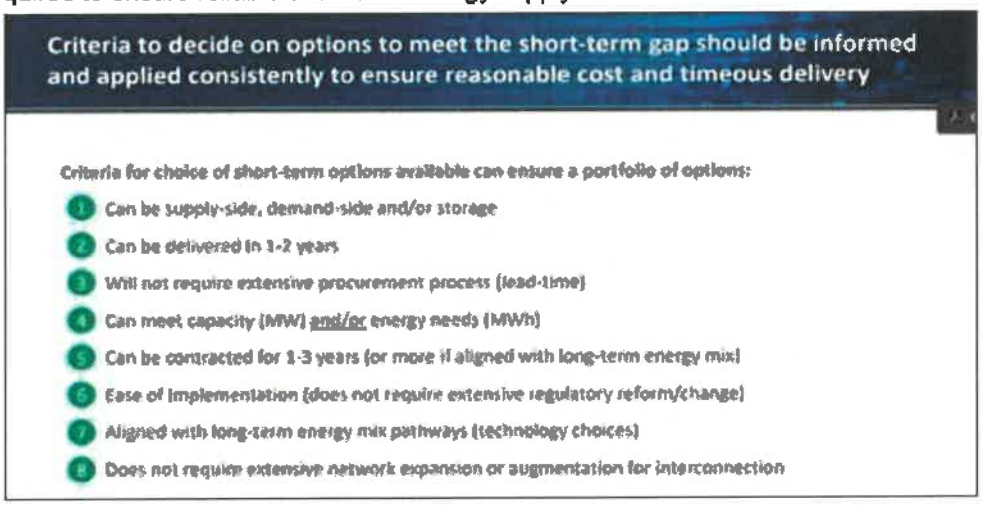

Figure 6-2: Extract from the CSIR Report (Setting up for the 2020s: Addressing South Africa's electricity crisis and getting ready for the next decade, 2020)

The Minister of Mineral Resources and Energy published regulations to help address South Africa's ongoing power issues (Staff Writer, 2020 (b)). In addition, the National Development Plan (2030) outlined the need to move the electricity system from Eskom to an independent system and for accelerated procurement of independent power producers on a wide range of alternatives, moving away from the unsustainable use of coal as fuel resource.
The proposed Project, is aligned with National Government initiatives e.g. the "RFI Response Risk Mitigation Power Procurement Programme" and Request for Proposal (RFP) which aims to alleviate the immediate and future capacity deficit as well as the limited, unreliable and poorly diversified provision of power generating technology with its adverse environmental and economic impacts. The RFP stipulated stringent environmental, social and economic criteria inclusive of e.g.:

- the shift from coal and LPG to NG as a cleaner and more cost effective resource;
- BBBEE criteria;
- Skills development.

Karpowership, in submitting applications in terms of the IPP initiatives will comply with sustainable development criteria as these applications are compiled with input from various Government Departments that need to ensure compliance with the Constitution and NEMA principles and meet the country's international obligations.

According to the applicant, projects will meet and exceed Economic Development qualification criteria stipulated within the RMIPPPP RFP. Karpowership will engage with local businesses and award contracts to local service providers for maintenance aspects as well as waste management, food and other daily consumables. They take pride in their positive impact on local communities through both social responsibility programs, tailored to the specific needs of the community, and the career opportunities that are provided.

Karpowership projects create significant direct and indirect employment, driving knowledge and skills transfer across a broad spectrum of disciplines including some that are unique to floating power plants. Karpowership also emphasizes youth development as the future of our business, industry, and the local economy. As a globally recognized leader with 1,800+ direct employees, they provide an opportunity for South Africans, which will make up the majority of their personnel, to develop specific skills and knowhow which will ultimately benefit the South African economy. They will also be provided with the opportunity to become part of an internationally diverse team, gaining and sharing experience and knowledge either locally or worldwide alongside industry leading colleagues.

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. They also believe that the job creation, including within the power generation function, will be comparatively more than a renewable energy project should the project be selected to proceed. Detailed job creation and other local economic development activities will be provided at preferred bidder stage during EIA preparation.

NEW GENERATION CAPACITIY AND RISK MITIGATION IPP PROCUREMENT PROGRAMME

The Department of Mineral Resources and Energy (DMRE) issued the Request for Proposals (RFP) to procure new energy generation capacity as per Government Notice 753 (7 July 2020): Determination Under Section 34(1) of the Electricity Regulation Act, 2006 (Act No. 4 of 2006) wherein the Minister, in consultation with the National Energy Regulator of South Africa (NERSA) has determined "that new generation capacity is needed to be procured to contribute towards energy security" and "the electricity must be purchased from independent power producers".

The Risk Mitigation Independent Power Producer (IPP) Procurement Programme has been identified by the DMRE as the appropriate programme to procure the new generation capacity designated in the above Determination. As such, a call for proposals to IPPs was published by DMRE "to ensure the establishment of this new generation capacity through the Risk Mitigation IPP Procurement Programme:

- The Risk Mitigation IPP Procurement Programme has been designed to procure the target of 2000 MWs of new generation capacity to be derived from different types of dispatchable power generation projects that will enter into public-private agreements with Eskom to provide new generation capacity in compliance with the Performance Requirements, among other things.
- The dispatchable power generation projects may utilise fuel to produce the energy output and may be comprised of more than one facility and project Site.
- Furthermore, the selected projects will contribute towards socio-economic development and sustainable economic growth, while enabling and stimulating the participation of independent power producers in the electricity supply industry in South Africa."

The updated Integrated Resource Plan (IRP) 2019 was developed as a "co-ordinated schedule for generation expansion and demand-side intervention programmes, taking into consideration multiple criteria to meet electricity demand". The IRP is a plan for infrastructure development based on a least supply and demand balance approach,

taking into account security of supply and minimising negative emissions and water usage impacts on the environment. It has been developed within a context characterised by changes in energy technologies and their associated uncertainty of the impact on the future energy provision system. With this uncertainty expected to continue, a cautionary approach must be adopted when making assumptions and committing for the future in this rapidly changing environment. As such, long-term commitments are to be avoided as much as possible, to eliminate the risk that they might prove costly and ill-advised (IRP, 2019).

The decommissioning of the existing coal fleet (due to end of design life) can provide space for a relatively different energy mix. It must be noted that, in the period preceding 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity (IRP, 2019). This is essentially what a system like the Karpowership fleet can provide, ship-based power generating and transmission of energy to land-based transmission connection points. This capacity can be modularly up-scaled on site with a very short lead time to meet additional requirements, should these be required at a later stage.

Also of particular importance is securing energy security by developing adequate electricity generation capacity to meet our demand under both the low-growth economic environment as well once the economy improves to the level of 4% growth per annum. Electricity generation capacity must therefore be paced to restore the necessary reserve margin and to be ahead of the economic growth curve at least possible cost (IRP, 2019).

One concern and risk raised during the August 2018 public participation process undertaken for the IRP 2019 update, was related to the capacity provided for and practicality of gas to power and the risks it poses since South Africa does not currently have adequate gas infrastructure. The Karpowership generation process proposes the use of internationally sourced LNG gas supply that will be transported via a LNG carrier to the proposed FSRU location. A gas line will be established between the FSRU and powerships to provide a secured supply of natural gas. No gas supply is required from local South Africa resources to ensure efficient operations and all other infrastructure will be supplied.

ESKOM POWER RELIABILITY AND GOVERNMENT'S RESPONSE TO THE ENERGY DEMAND

Past experiences show that Eskom has not always been able to meet the electrical demands of the country.

Eskom's existing generation plant Energy Availability Factor (EAF) was assumed to be averaging 86% in the promulgated IRP 2010–2030. The actual EAF at the time (2010) was averaging 85%. Since then, Eskom's EAF declined steadily to a low average of 71% in the 2015/16 financial year before recovering to average around 77% in the 2016/17 financial year. Information as at January 2018 indicated that EAF had regressed further to levels below 70%. This low EAF was the reason for constrained capacity early in December 2018 and January 2019 that resulted in load shedding (IRP, 2019).

Additionally, the IRP (2019) states that there are a number of Eskom coal plants that will reach end of design life from year 2019 and that most of the Eskom plants were designed and constructed for operation for 50 years. Eskom had also submitted a revised plant end of design life (decommissioning) plan. This submission brings forward the shutdown of some units at Grootvlei, Komati and Hendrina. The IRP (2019) showed that approximately 5 400 MW of electricity from coal generation by Eskom will be decommissioned by year 2022, increasing to 10 500 MW by

2030 and 35 000 MW by 2050. The socio economic impact of the decommissioning of these Eskom plants were not quantified or included in the IRP.

A number of Eskom power plants (Majuba, Tutuka, Duvha, Matla, Kriel and Grootvlei) have been retrofitted with emission abatement technology to ensure compliance with the law (IRP, 2019). In 2014 Eskom applied for postponement of the date for compliance and permission in this regard was granted for a period not exceeding 5 years. According to the IRP (2019), Grootvlei was the only station that has been brought to compliance and failure to undertake abatement retrofits is likely to result in non-compliant plants. Eskom has been known to apply to postpone compliance with the minimum emissions standards for air pollution. With multiple additional postponement application for the majority of their powerstations during 2020. Eskom has stated that it will apply for rolling postponement rather than trying to meet the sulphur dioxide standards. Should these not be issued, Eskom maybe required to expedite plans to decommission old polluting stations that cannot meet the MES with potential dire consequences for secured energy supply.

Simulations used to update the IRP (2019) show that there is an immediate risk of energy shortage in the immediate term. Eskom's early shutdown of non-performing units (Grootvlei, Komati and Hendrina), coupled with the non-compliance status of some plants and the de-rating of Medupi and Kusile to below name-plate rating result in an immediate risk of huge power shortages. The recently experienced load shedding as well frequent alerts of possible shortages corroborate the observations from the power system simulations.

Industrialisation of South Africa has led to increased demand for electricity by an ever-growing population from a strained power service operated by, Eskom. This has led to a number of power shortfalls throughout the country, as supply cannot meet demand. The power shortfalls and the unreliable electricity generation has had major impact on the South African economy (Goldberg, 2015; Makinana, 2019). Furthermore, certain temporary and permanent shut downs of power plants across the country have come with serious impacts to energy supply. These shutdowns directly impact the energy supply to the host community thus directly impact the local economy. This has generated the need for a diversified/ innovative power supply. This is based on national policy and informed by ongoing planning undertaken by the Department of Energy (DoE) and the National Energy Regulator of South Africa.

The National Development Plan 2030 has outlined access to electricity as one of the "Elements of a Decent Standard of Living". South Africa has faced significant electricity shortages over a number of years and the escalating electricity crises experienced since 2007 has significantly impacted the standard of living of its citizens and resulted in ruinous economic losses.

In order to achieve sustainable and inclusive growth by 2030, South Africa needs to invest in a strong network of economic infrastructure to support the country's medium and long term objectives according to the National Development Plan (NDP) 2030.

The vision of the NDP includes the promotion of economic growth and development though adequate provision of quality energy services that are competitively priced, reliable and efficient. Addressing access to energy will promote sustainable development, encourage economic competition and ensure that living standards are maintained and improved. According to the Integrated Resource Plan 2019, the Minister of Energy determined that 39,730 MW of

new generation capacity must be developed. Currently 18,000 MW of the required 39,730 MW has been committed to as follows:

- 6,422 MW new capacity under the REIPPP with a total of 3,876 MW operational on the grid;
- 4,514 MW Eskom build with remaining planned build of 6,418 MW;
- 100 MW of Sere Wind Farm; and
- 1,005 MW from OCGT for peaking.

A key component of the 20 year master-plan is the requirement for new energy generating capacity from a range of technologies like renewables and natural gas. Alternative sources of power generation allow countries to move away from open cycle gas turbines (OCGTs) (South Africa's- Eskom situation), and use of expensive diesel to generate electricity during peak demand (Siyobi, 2015).

The use of natural gas from LNG in power generation provides a cleaner alternative to coal and other fossil fuels, reducing carbon and other emissions such as SO_2 and PM_{10}, resulting in both immediate and long-term benefits for public health and the environment. LNG shipments allow the environmental benefits of natural gas to be spread around the world and can help reduce global greenhouse gas emissions according to a report by PACE Global LNG and Coal Life Cycle Assessment of Greenhouse Gas Emissions. The ability to burn natural gas for power generation is an ideal complement to renewable energy generation, like wind and solar power, which can be intermittent and inconsistent in their output. Natural gas power plants can be quickly turned on and off or ramped up and down to help provide consistent electricity production when solar or wind resources fluctuate.

As part of his 2020 State of the Nation Address on 13 February 2020, the President announced that government would implement measures to "rapidly and significantly increase generation capacity outside of Eskom". Established measures include the Section 34 Ministerial Determination that supports the Integrated Resource Plan 2019, which facilitates additional energy generation to the national grid through renewable energy, natural gas, hydro power, battery storage and coal.

The Emergency/Risk Mitigation Power Purchase Procurement Program (2000 MW) (ERMPPPP) has been declared a Strategic Integrated Project (SIP) under the Infrastructure Development Act, 2014 under SIP 20. One of the objects of this Act is "the identification and implementation of strategic integrated projects which are of significant economic or social importance to the Republic or a region in the Republic or which facilitate regional economic integration on the African continent, thereby giving effect to the national infrastructure plan".

South Africa's electricity generation capacity shortfall can only be solved by additional generating capacity. Although additional power stations are under construction, there is a lengthy gap of time between the present shortage and the commissioning of all units of these new power stations. In the meantime, the economy suffers from the reduction of productivity and increased costs resulting from power interruptions caused by equipment failure (so-called unplanned maintenance) and load shedding.

Access to cost-effective temporary base-load generation of a significant magnitude will help to solve the problem by supplying the power to meet the load which is often being shed or reduced at present. Reliable power generation facilities are required to address both the immediate power shortfalls, as well as the longer term increasing demand for electricity. Powerships can deliver electricity in a very short timeframes as the normal delays associated with

land-based power plants construction are negated as these powerships have been purpose built prior to deployment.

ECONOMIC RECOVERY AND ENERGY REQUIREMENTS

Sustainable energy provision is also key to ensuring economic recovery. The CSIR reported that in 2019 load shedding reduced the South African economy by between R 60 billion to R 120 billion (Wright and Callitz, 2020). There are estimations that the overall economic loss to the South African economy over the last 10 years is as high as R 338 billion. Energy analysts have determined that every hour of every stage of load shedding costs the economy R 50 million to R 100 million (Hosken, 2020). Energy analysts predict that load-shedding will have a greater detrimental impact to South Africa's failing economy and may drive many businesses into bankruptcy and reduce investment into the country (Hosken, 2020).

IMPORTANCE OF NATIONAL & PROVINCIAL COLLABORATION AND PRIVATE PARTNERSHIPS

As per the MEC of Economic, Development, Tourism and Environmental Affairs (EDTEA) (25 May 2020), the department supports the Port of Ngqura Bay to stimulate sectors and ultimately grow the provincial economy. RBIDZ is working with the private sector and forming partnerships with neighbouring provinces and other countries. According to the MEC such partnerships are crucial because the growth of KZN is also dependent on the growth of other provinces and various other states and trading friends of South Africa. The planned economic recovery for the Country will be impossible in the absence of a reliable and adequate power supply to the economic sectors. Therefore, the success of one province impacts on the success of other provinces. The establishment of reliable power has in one province therefore has a domino effect on the economic sectors of other provinces.
The proposed project is being planned at a port and within close proximity to the Strategic Economic Zones of the RBIDZ.

PORT PLANNING

Transnet have been actively involved over an extended period of time with the identification of gas to energy options to be established within the Ports e.g. "Transnet preparations for gas infrastructure in South Africa" as part of the South Africa Gas Options Conference held on September 2015 in Cape Town.

Based on the National Ports Plan, 2019, in terms of the strategic development plan, the Port of Richards Bay aspires 'to be a premier dry bulk and liquid bulk port with diversification in other segments'. It desires to be a growing, effective, economic, efficient and integrated port. It intends to grow the business by investing in infrastructure and improving terminal and supply chain efficiencies.

Furthermore, the signing of the MOU between uMhlathuze Municipality, Richards Bay Industrial Development Zone (RBIDZ) and Transnet National Ports Authority (TNPA) has ensured that the port is positioned to be a natural location for bulk handling capabilities. With the two phases of RBIDZ that are juxtaposed with first class industry while the deep-water Port of Richards Bay provides substantial volume for beneficiation opportunities for investments. In line with this vision, strategic projects in the port include the expansion of the port and upgrading of roads and services. Berth upgrades are also planned to ensure that sufficient berth capacity exists at all times.

The current layout of the port (published in 2019) is shown in figure 6.3 below. It is noted that the proposed position of the first towers for the transmission line, (positioned on the main land, adjacent to the moored Powerships and the large mangrove stand) are situated within area marked as "other", and out of the delineated open space.

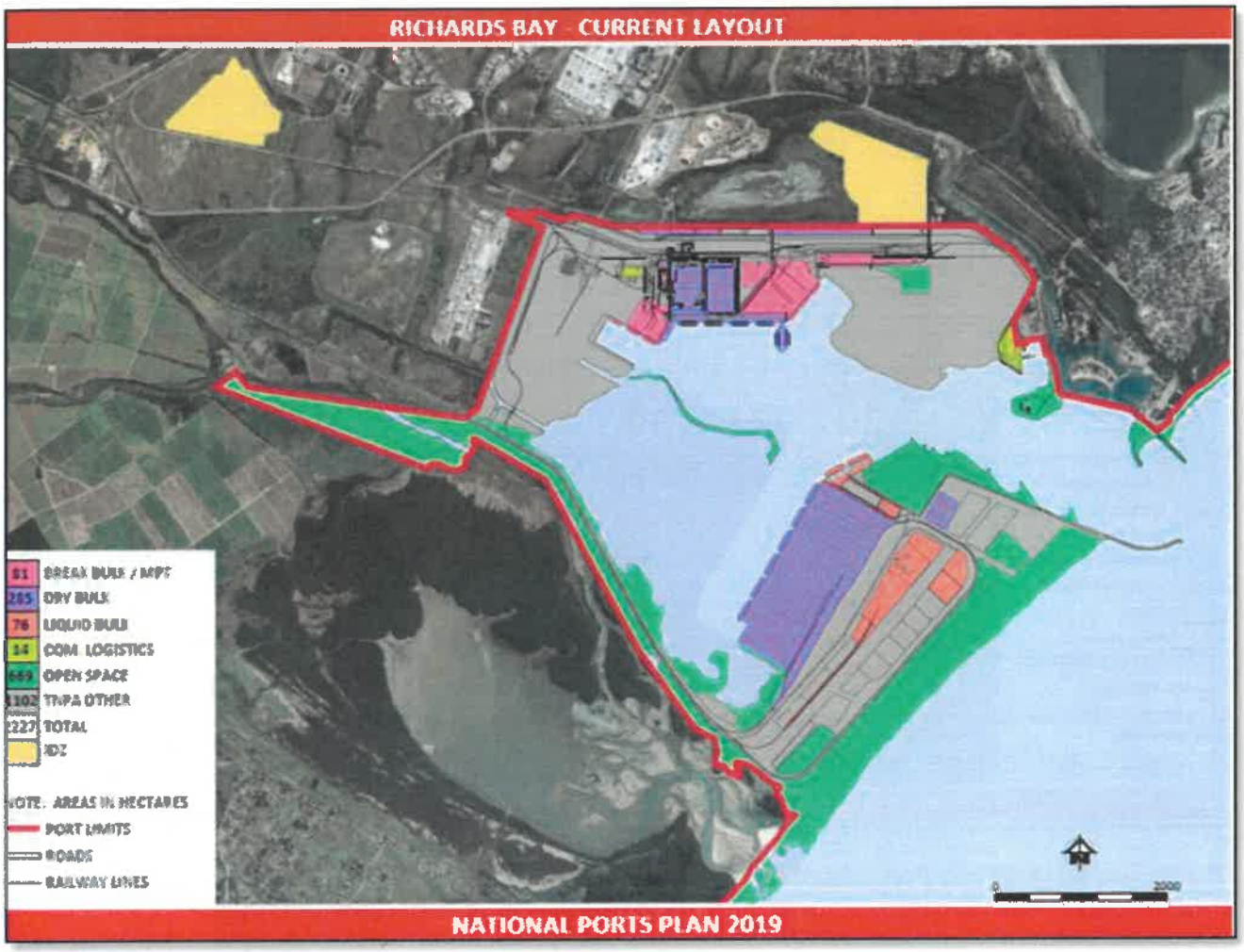

Figure 6-3: The 2019 layout for the Port of Richards Bay

Further layout plans for short, medium and long terms (for the years 2028 and 2048) indicate further planned expansions and disturbance to the West of the port, as shown in figures 6-4, 6-5 and 6-6 below.

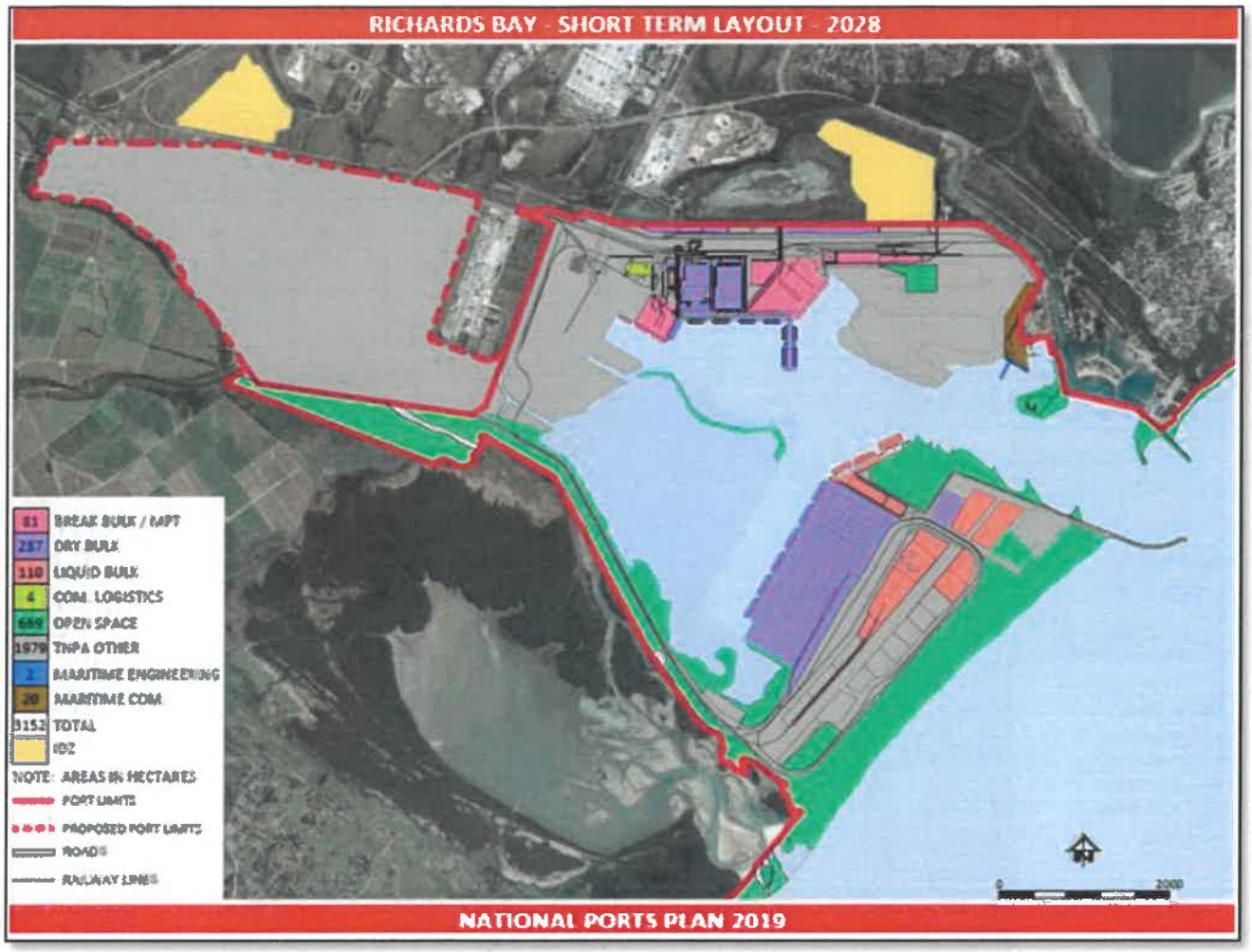

Figure 6-4: Richards Bay Port – Short term layout (2028)

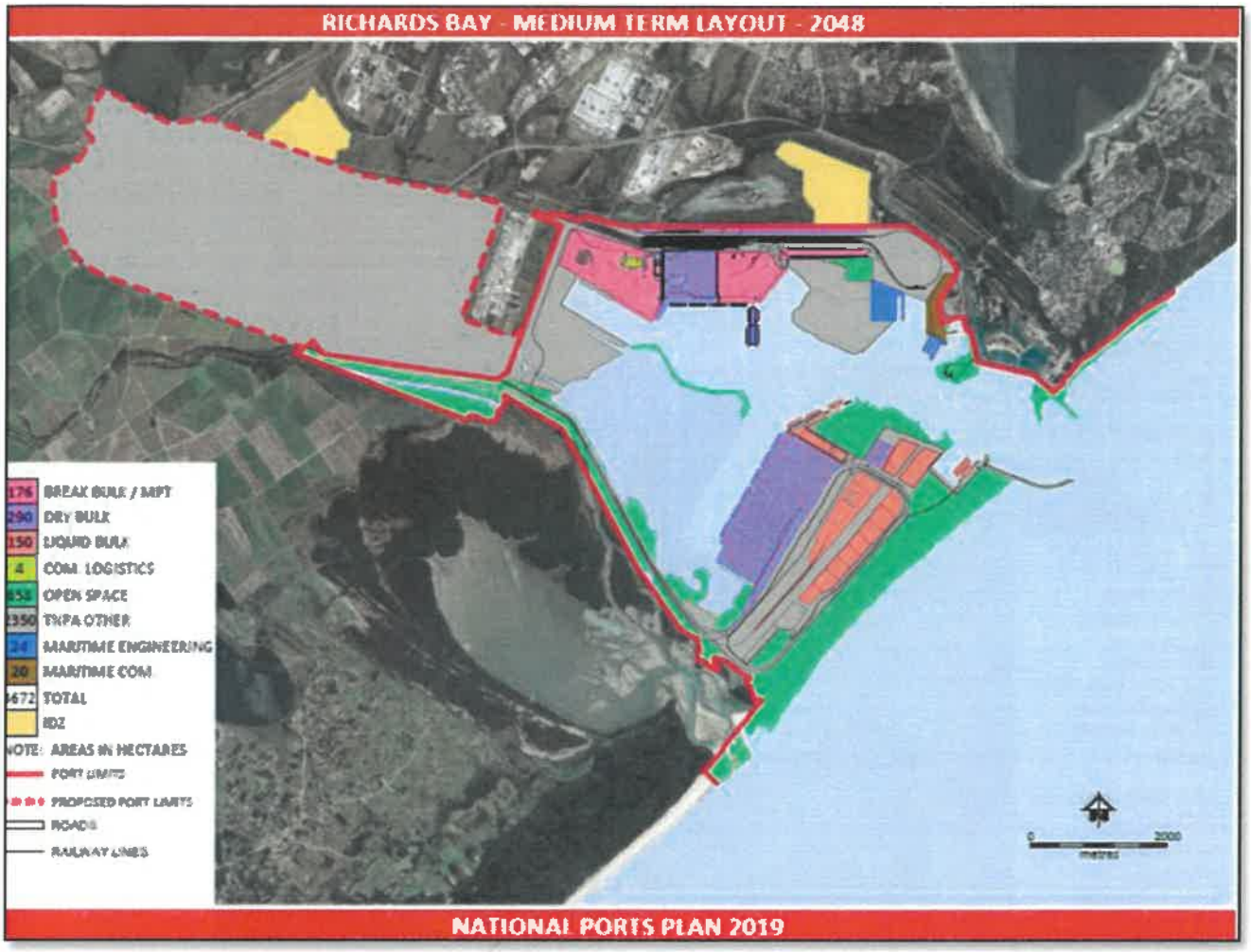

Figure 6-5: Richards Bay Port – Medium term layout (2048)

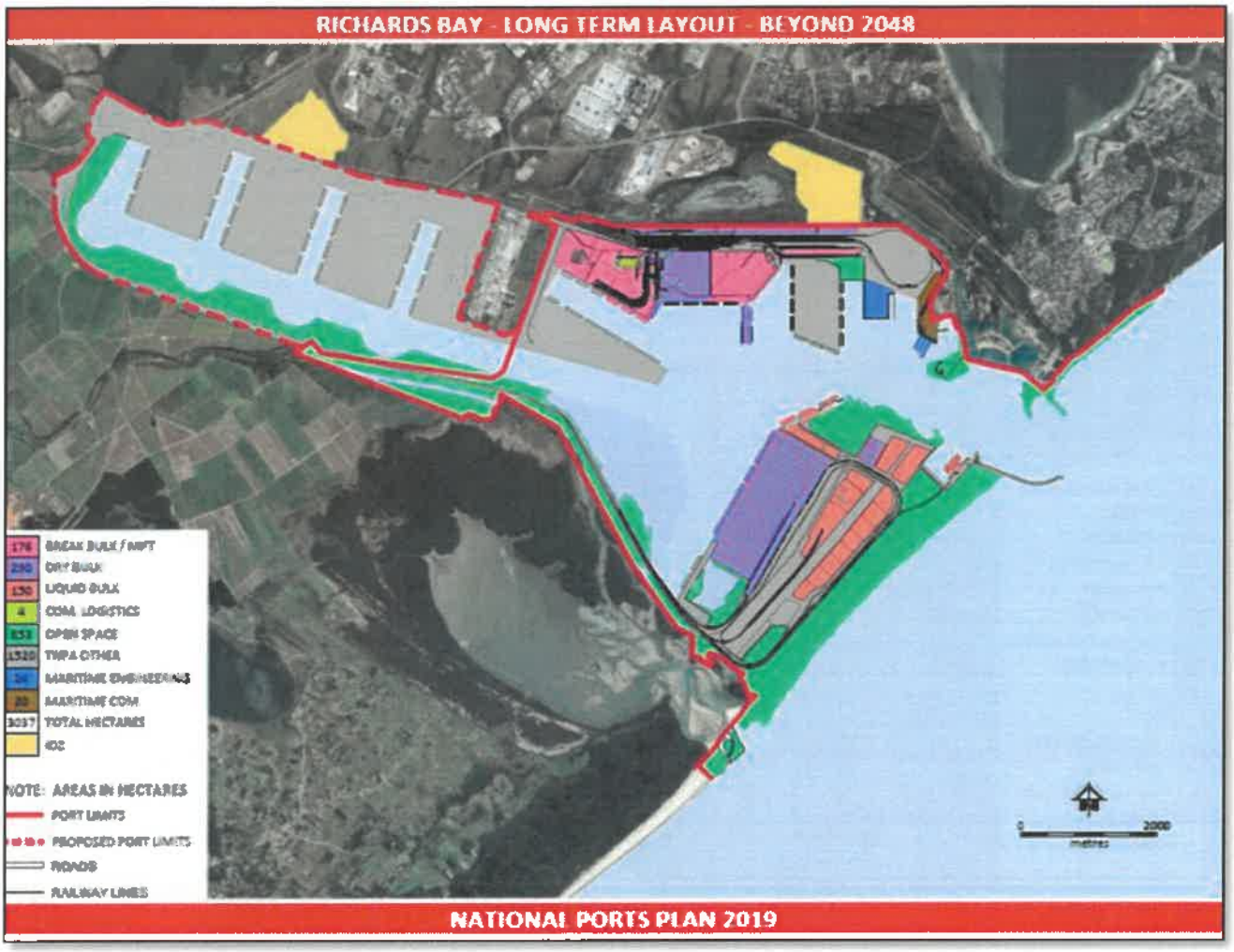

Figure 6-6: Richards Bay Port – Long term layout (Beyond 2048)

Based on the strategic plans for the Port of Richards Bay, the proposed development is situated within an area that is planned for development, and out of the demarcated open space area. In addition, the proposed purpose of the gas to power project can positively contribute in providing reliable electricity to the current and planned expansion activities within the port.

The project proposal, having been assessed by PRDW in relation to the proposed Port Plans, is reported to be aligned with the Transnet studies and plans.

MUNICIPAL PLANNING

The study area falls within a critical biodiversity area (CBA), listed as irreplaceable, which encompasses all areas that are currently in a natural or near natural state. Further, the site is located within an Estuarine Functional Zone (refer to section 4 of this report). Whilst the sensitivity and significance of estuarine areas are recognised, given the highly transformed state of the estuarine complex, and the operation of the Richards Bay Estuary as an industrial port, the restoration of the estuary to its natural/pristine state is deemed impractical and unattainable (as per

preliminary report made by Coastwise – Estuarine Specialists, September 2020). Furthermore, the neighbouring uMhlathuze estuary was declared protected area and excluded from future development. The Richards Bay estuary, on the contrary, is embarked for further development in the port expansion plans, and the proposed development site is situated within the planned expansion area, and not within the open space area (Refer to Port planning section above).

Furthermore, in line with the planned expansions on the Port (as per the National Ports Plan, 2019), the port expansion is also captured in the uMhlathuze Local Municipality: Spatial Development Framework (SDF) (Draft Review, dated March 2020), as per extracted map below, figure 6-7:

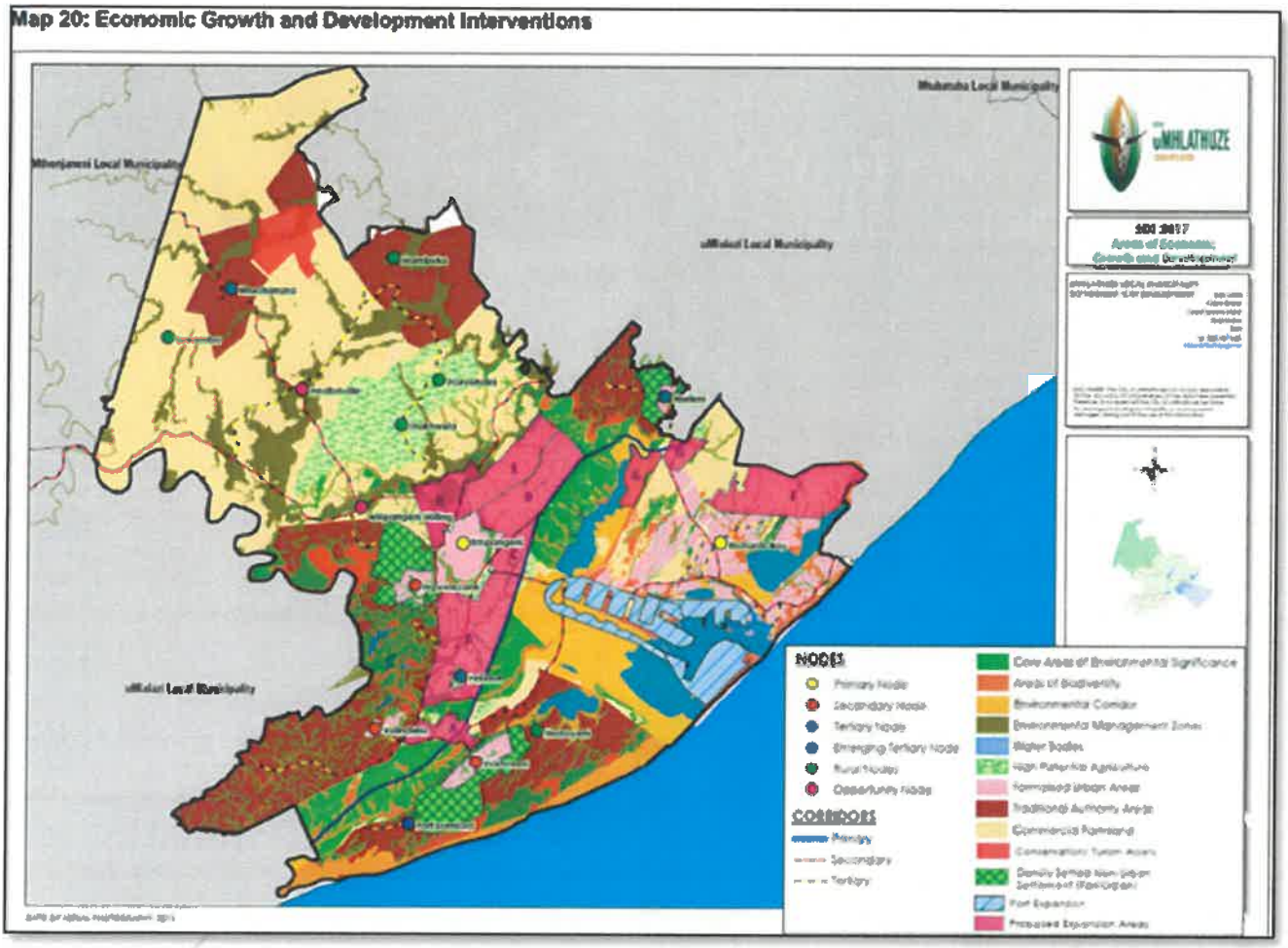

Figure 6-7: Economic Growth and Development Interventions (uMhlathuze Local Municipality SDF – Draft Review, March 2020).

According to the uMhlathuze 2019 Land Use Scheme Viewer (uMhlathuze website, online GIS tools), the study area is situated within an area zoned as Harbour (refer to figure 6-8 below). The uMhlathuze 2019 Land Use Regulations stipulates the permitted uses within Harbour land use; these permitted uses include the following:

- Industry – General
- Industry – Light

- Industry – Service
- Utilities Facility

The above uses are in line with the Intent of the Harbour land use, including – land for administrative purposes, customs, *industrial uses*, and areas for bulk storage, terminals, custom posts, limited commercial activity, social, health and recreational activities.

The proposed development of infrastructure for the provision of electricity is in line with the permitted uses within the Harbour land use.

Figure 6-8: uMhlathuze 2019 Land Use Scheme Viewer – Development site zoned as Harbour

The development of an Estuarine Management Plan for the uMhlathuze/ Richards Bay estuaries was initiated in early 2017 and, following the gazetting of the final draft EMP (DEA, 2018a) in November 2019 (GN 1395), was approved in July 2020.

Indicated in the spatial zonation in the abovementioned EMP are the marine aquaculture activities, the initial proposed LNG terminal and the proposed port expansion relative to the existing port limits. In respect to nearby

mariculture activities, an area of 7 ha in the Port of Richards Bay on the northern edge of the sand spit has been leased out for a commercial marine sea finfish farm, using Dusky Kob. This is a collaborative undertaking between the various institutions as part of Operation Phakisa (DEA, 2018a). The initial proposed LNG terminal was to be located adjacent to the eChwebeni Natural Heritage Site. In terms of the port expansion, the indicated Gas to Power project location, as well as critical estuarine habitat (mangroves, mudflats/sandflats, Bhizolo/Manzamnyama Canal Complex, etc.) are included in, and will be directly affected by, the expansion plan (DEA, 2018a).

The potential conflict of use, i.e. the overlap between the project area and the mariculture activities needs to be investigated by the port and an agreement reached in terms of location of the Gas to Project and/or mariculture activities. While critical estuarine habitat will undoubtedly be dramatically modified by the expansion, it is important however, that the ecological integrity of these habitats should be protected until the proposed large-scale changes of the expansion come into effect.

6.2 MOTIVATION FOR THE NEED AND DESIRABILITY OF THE ACTIVITY IN THE CONTEXT OF THE PREFERRED LOCATION

Being a ship-based power generating operation (as opposed to land-based) with transmission of energy to land-based transmission connection points, locations that provide infrastructure associated with the proposed technology were identified.
The ports of South Africa are hubs of the economy, with the port of Richards Bay situated adjacent to the Richards Bay Industrial Development Zone (RBIDZ) – Special Economic Zones (SEZ) in terms of the SEZ Act 16 of 2014, so called as they are specifically designed to allow for related industries to be based in an Industrial Zone.

The project is situated within operational area of the port, which is also planned to be further expanded, and outside of the delineated open space areas, as per the port layout, extract from the National Port Plan, 2019, as per figures 3-1 and 3-2.

The Richards Bay Port was identified as a preferred location in the region, as it meets the specifications for the proposed Powership project and occurs within a close proximity to the Richards Bay Industrial Development Zone (RBIDZ).

Other ports in the region considered was the port of Durban, however based on congested traffic, economic consideration of the evacuation line and commercial constraint, this site was not further investigated.

The proposed activity is the generation of electricity by a Powership using natural gas as a fuel and transmission of the generated electricity. This is the Karpowership's core business and as such, no other alternatives in terms of activities are considered feasible.

7 PUBLIC PARTICIPATION PROCESS

2014 EIA Regulations (as amended), Appendix 2 – 2(1) a scoping report must include (g)(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting

documents and inputs; and (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

7.1 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

In terms of Regulation 41(2) of the EIA Regulations, 2014, notice must be given to all potential interested and affected parties of the application by-

(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—
- *(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and*
- *(ii) any alternative site;*

Site notices

Site notices, in two languages (English and IsiZulu), were erected at three (3) locations within the site:
Location 1: At the Richards Bay port's permit office (near the entrance to the port)
Location 2: By the access road, leading to the entrance to the South32 Aluminium SA site.
Location 3: Near the fenced boundary of South32 Aluminium SA site

Refer to Appendix D4 for photographic evidence of the site notices erected.

(b) giving written notice, in any of the manners provided for in section 47D of the Act, to—
- *(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;*
- *(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;*
- *(ix) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;*
- *(iv) the municipality which has jurisdiction in the area;*
- *(v) any organ of state having jurisdiction in respect of any aspect of the activity; and*
- *(vi) any other party as required by the competent authority;*

A Background Information Document (BID) and Notice of Application (NOA) was emailed in two languages (English and IsiZulu) to identified Stakeholders and I&APs on 21st September 2020, including landowners, the municipal ward councillor, Ratepayers Association, and including the following organs of state: Department of Energy, Eskom, Department of Water and Sanitation, Department of Forest, Fisheries and the Environment, Ezemvelo KZN Wildlife, Amafa KZN, South Africa Maritime Safety Authority, KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA): King Cetshwayo, KZN Department of Economic Development, Tourism and Environmental Affairs: Coastal Management, Department of Transport, South African Heritage Resource Agency (SAHRA), South Africa Gas Development Corporation (SOC) Ltd, National Energy Regulator of South Africa (NERSA), and the South African National Roads Agency (SANRAL);

Refer to Appendices D3, D4 & D6 – Proof of Notification and copies of BID and NOA.

I placing an advertisement in—

(i) one local newspaper; or

(ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;

(ix) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph I(ii); and

Advertisements were placed in 2 languages ((English and isiZulu), in 2 local newspapers, namely the Zululand Observer and the Bay Watch, published on the 21st September 2020 and the 22 September 2020 respectively. .
Refer to Appendix D6 – Proof of Placement of Advert.

Ongoing and other communication methods

Information flyers, containing the notification of the EIA process and the PPP, were placed on the 21th September 2020 at Seafarers Mission, located near the entrance to the port. Additional information flyers were also placed at Bayside Alusaf Aluminium entrance – on their front desk and at the turnstiles (designated place for flyers), however no pictures were allowed to be taken at the Bayside Alusaf facility.

Refer to Appendices D3 and D4 for copies of the information flyers and photographic evidence of the placement information flyers.

During Scoping, the BID (including registration and comments forms) were made available to I&APs on request. While I&APs were encouraged to submit comments and queries in writing, they were also invited to contact the EAP consultants telephonically if they so wished. These contact details appeared in the advertisements, onsite notices, BID, NOA and flyers.

Additional Media Sources:

Since commencement of the public participation process on the 21st September 2020, the following media publications had assisted in expanding the reach through to the public:

- **"Harbour gas-to-power project goes public (by Dave Savides), Zululand Observer, 21 Sept 2020;**
- **https://www.dailymaverick.co.za/article/2020-10-18-turkish-floating-gas-power-ships-sail-into-public-consultation-process-after-back-door-passage-to-sa-freezes-up (by Tony Carnie), Daily Maverick, 18 October 2020;**
- **https://www.reddit.com/r/southafrica/comments/jk6kjq/turkish_floating_gas_power_ships_applied_for/ (29 October 2020).**

Refer to Appendix D11 – Other media Sources for proofs.

Public Meetings:

Phelamanga, an independent public participation facilitation company, was appointed to facilitate the public participation process.

Recognising that not all stakeholders and I&APs are available at certain times of the day, the online meeting platform has enabled Phelamanga to provide a morning and evening meeting options for the relevant Stakeholders and registered I&APs to interact. The same information was to be provided at both sessions and registered I&APs were to receive the minutes of both sessions and the comments and issues trail. The meeting was held via Microsoft Teams and the link was shared to relevant stakeholders and Registered I&APs.

Date: 14 October 2020
Time: 10am and/or 6pm
Online Platform: Microsoft Teams

The draft Scoping Report was made available before the Webinar dates, and Stakeholders and registered I&APs were encouraged to submit questions or comments in advance of the online meeting so that feedback can be provided.

It must be noted that the evening meeting was not held as no attendees were present – the Secretariat (PPP facilitator), as well as the professional team and presenters, waited 45 minutes before closing off the meeting due to no attendees.

Minutes of the morning public meeting are attached as Appendix D12.

Public Review of the Draft Scoping Report:

The Draft Scoping Report was made available to all I&APs, including State Departments and DEFF for public comment for period of 30 days. The report was available on the Triplo4 website (www.triplo4.com). In addition, the draft Scoping Report was also electronically available via an online platform (GoogleDrive), the link to which has been emailed to registered I&APs. Electronic copies have also been sent to DEFF and organs of state.

Various attempts (telephonically and emails) were made with the local municipality (various departments) and the ward councillor in order to be advised on suitable venues that are opened under the COVID, in order to place the public document at, but no responses were received.

However, it was confirmed telephonically with a librarian on the 5th October 2020, that the Richards Bay's public library re-opened as of the 6th October 2020, and a hard copy of the draft Scoping Report was placed

there for public viewing on the 7th October 2020. No comments on the Draft Scoping Report were left at the public library, and no requests were made to view the copy of the report at Triplo4 office.

Refer to Appendix D4 for proof of placement of the Draft Scoping Report at the Richards Bay Library.

7.2 PRE-APPLICATION MEETING WITH COMPETENT AND APPROVAL OF PUBLIC PARTICIPATION PLAN

A virtual pre-application meeting was held with DEFF on the 17th September 2020 via Microsoft Teams, and the minutes are attached as Appendix H1. A public participation plan was subsequently approved by DEFF according to which the public participation process is being conducted. Other points discussed in the meeting and addressed in the report include assessing the compatibility of the proposed project with Port's planning, assessing cumulative impacts (to be further assessed during the next phase of the application process), and the involvement of the DEFF air quality branch. The assessment of the decommissioning phase will be included in the next EIA phase.

7.3 REGISTER OF INTERESTED AND AFFECTED PARTIES

A proponent or applicant is required to open and maintain of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of—

(a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;

(b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and

(c) all organs of state which have jurisdiction in respect of the activity to which the application relates.

An I&AP register has been opened and a copy of it is included in Appendix D7, although contact details of private persons have been omitted in interests of privacy. The register will be updated on an ongoing basis during the EIA process. A full copy of the IAP register has been submitted with the final Scoping Report to DEFF.

7.4 COMMENTS AND RESPONSES REPORT

44. (1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in sub regulation (1) due to—

(a) a lack of skills to read or write;

(b) disability; or

I any other disadvantage;

(d) reasonable alternative methods of recording comments must be provided for.

All concerns, comments, viewpoints and questions (collectively referred to as 'issues') submitted or raised by I&APs were documented and responded to in the Comment and Response Report, including an indication of how these issues have been incorporated into the Scoping Report, alternatively the reasons for not including them.

Refer to Appendix D9– Comments and Responses Trail Report, which includes the comments received during Scoping and the corresponding responses.

8 PRELIMINARY IMPACT ASSESSMENT

2014 NEMA EIA Regulations (as amended), Appendix 2 – 2(1) a scoping report must include((g)(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed or mitigated (vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix

8.1 METHODOLOGY TO DETERMINE AND RANK POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

The following method was used by the EAP, with the input from specialists to identify and rank the potential environmental impacts and risks associated with the project.

Rating of Impacts	
Consequence	
Nature	1 – Insignificant / Non-harmful 2 – Small / Potentially harmful 3 – Significant / Slightly harmful 4 – Great / Harmful 5 – Disastrous / Extremely harmful
Duration	1 – Up to 1 month 2 – 1 month to 3 months 3 – 3 months to 1 year 4 – 1 to 10 years 5 – Beyond 10 years / Permanent
Spatial Scale	1 – Immediate, fully contained area 2 – Surrounding area 3 – Within business unit area or responsibility 4 – Within mining boundary area / Beyond BU boundary 5 – Regional, National, International
Overall Consequence = (Severity + Duration + Extent) / 3	
Likelihood	
Frequency of the Activity	1 – Once a year or once / more during operation / LOM 2 – Once / more in 6 months 3 – Once / more a month 4 – Once / more a week 5 – Daily / hourly
Probability of the Incident / Impact	1 – Almost never / almost impossible 2 – Very seldom / highly unlikely 3 – Infrequent / unlikely / seldom 4 – Often / regularly / likely / possible 5 – Daily / highly likely / definitely
Overall Likelihood = (Frequency + Probability) / 2	
Overall Environmental Significance = Overall Consequence X Overall Likelihood	
Overall Environmental Significance:	
0 – 2.9	Very Low

3 – 4.9	Low
5 – 6.9	Medium – Low
7 – 8.9	Medium
9 – 10.9	Medium – High
11 and above	High

Some of the impacts in the table below will be expanded on in the EIA Report once more information is available from the various specialist studies. Impacts scoring a higher significance in the Scoping Report, will receive more attention in the EIA Report. The impacts identified below are preliminary, as there may be more impacts identified in the specialist reports and through the public participation process. Please note that scoring and assessment of impacts as well as discussion of mitigations below are also **preliminary** and that a more detailed assessment will be provided in the EIA Report.

Refer to Section 8.2 for the impacts and mitigation measures associated with the proposed activity.

8.2 PRELIMINARY IMPACT ASSESSMENT

The following potential impacts were considered in the Preliminary Impact Assessment Phase for the proposed project. The specialist reports will be made available in the next phase with the draft EIA report for public comment, and will take into account the comments submitted by I&APs during Scoping.

8.2.1 Preliminary Specialists Findings

8.2.1.1 Air Quality

As a result of the low predicted ambient concentrations for SO_2 and PM10 the consequence of impacts is very low. The predicted ambient NO_2 are somewhat higher, but the consequence of the impact is low. The likelihood of occurrence of impacts associated with SO_2, NO_2 and PM10 is very low. Therefore, the significance of impacts resulting from the Karpowership Project is predicted to be very low. The specialist report will be made available for review as part of the EIA phase.

Figure 8-1: Air Quality Impact Scores

Description	Pollutants	Consequence	Likelihood	Significance	
				Score	Rating
Karpowership Project	SO_2	2	1	**2**	**Very low**
	NO_2	2.7	1	**2.7**	**Very low**
	PM_{10}	2	1	**2**	**Very low**
Additive assessment	SO_2	2	1	2	**Very low**
	NO_2	2.7	1	**2.7**	**Very low**
	PM_{10}	2	1	**2**	**Very low**

It was concluded that with low predicted ambient concentrations for SO_2 and PM10 the consequence of impacts is very low. The predicted ambient NO_2 are somewhat higher, but the consequence of the impact is low. The likelihood of occurrence of impacts associated with SO_2, NO_2 and PM10 is very low. Therefore, the significance of impacts resulting from the Karpowership Project is predicted to be very low.

8.2.1.2 Vegetation Assessment

The majority of the alternative 1 for the transmission line route is located in areas of low to moderate sensitivity with limited areas possibly traversing very high sensitive swamp forest. Overall, the alternative 1 route is located in low sensitivity areas, mainly due to its location in transformed areas or in highly degraded areas adjacent to transformed areas. Although the alternative 2 transmission line route does traverse some areas of low sensitivity (where it is located adjacent to existing infrastructure), this proposed alternative 2 transmission line traverses two Critically Endangered vegetation types with extremely high sensitivity, namely: Mangrove Forest and Swamp Forest.

8.2.1.3 Wetland Assessment

These wetlands that will be impacted upon by the proposed development were determined to be of a high risk as a result of their position in the landscape in relation to the proposed development. It must be noted that the risk rating was provided on the basis that the proposed development will occur within the wetland extent.

The overall Present Ecological State (PES) scores for CVB01 and FP01 were calculated to be C (moderately modified), whereas UVB01 calculated to be a D (largely modified) PES. The aforementioned scores for the at risk watercourses were primarily as a result of anthropogenic pressures in the catchment and wetland extent namely: construction of linear infrastructure (dirt and tar roads, overhead powerlines) within the catchment, increase in hardened surfaces in the catchment predominantly by industry development, construction of industry and industry platforms within the wetland, creation of dirt roads within the wetland and proliferation of alien invasive plants due to the aforementioned changes. This indicated that modifications have moderately and largely impacted the wetlands within the study area which has subsequently impacted on the habitat quality, diversity, and size.

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

The alternative 2 for the transmission line route is not supported, as this route will destroy a major extent of an important wetland in the landscape. Alternative 1 route of the transmission line will need to be assessed to determine the sensitivity of the route in terms of impacts to watercourses on site. This assessment will be undertaken in the next phase of this application process.

8.2.1.4 Aquatic Assessment

An Aquatic Assessment was conducted in September 2020, six assessment sites were investigated, to assess the possible impacts associated with the proposed project and findings are captured in section 8.2.1 of this report. Only one site on an unnamed non-perennial drainage line (RB4 – as indicated in Figure 4-12 below) presented flowing

water in which DWS-endorsed SASS5 (South African Scoring System Version 5) sampling methodology (Dickens & Graham, 2002) could be undertaken. A downstream assessment site could not be assessed due to the presence of the estuary functional zone. One exceedance of the Department of Water and Sanitation (DWS) Target Water Quality Guidelines was observed at the time of the assessment. Slightly lower levels of Dissolved Oxygen Saturation (%) were observed at the upstream assessment site in the unnamed drainage line (RB4), although this is no concern at present as the deviation is minimal, where seasonal variations are known to occur due to flow.

The RB4 site is located on an unnamed drainage line located northwest of the proposed development. The site consisted of a well-defined stream channel with moderate flow. The water depth was between 10 to 30cm and the river channel was 1 to 2m wide. Upstream was characterised by trees (Milkwood) and downstream by grasses. GSM and marginal vegetation were abundant. However, the stones biotope was absent. A slight sewage odour was present and black, anoxic sediment was observed. The surrounding land use associated with the reach is electrical powerlines and port infrastructure.

The aquatic macroinvertebrate community assessment of the unnamed drainage line could not be classed using the Dallas (2007) biological bands due to insufficient information for the Natal Coastal Plan Ecoregion. However, a variance calculation based on the expected number of taxa for the Sub-Quaternary Catchment (SQR) was revealed to be high. The absence of taxa is considered to be impacted primarily by inadequate habitat availability. In addition, the macro-invertebrate assemblage was in a largely modified state with an ecological category of D (largely modified).

The impact of the proposed project ranges from medium to low pre mitigation and impacts can be further reduced with appropriate mitigation. The proposed project is located within a Sub-Quaternary Catchment that is already within a modified state.

8.2.1.5 Groundwater

The assessment included review of available reports, including all geohydrology, hydrology, hydrochemistry, and geology literature data, and conducting a desktop-level hydrocensus, to identify existing groundwater users in the area. In addition, site walkover and field borehole census was undertaken to identify groundwater users and sensitive groundwater areas. No exploratory drilling or fieldwork was conducted, and thus although data in this assessment was extracted from reliable data sources, the risk assessment is considered preliminary until groundwater data is verified with intrusive site work (i.e. drilling of onsite boreholes, on-site water quality and quantity testing).

Based on the scope of activities proposed on the land (i.e. transmission lines (i.e. limited impermeable surface generation), and as no groundwater abstraction is proposed, no impact of the proposed development on the groundwater reserve is predicted, and the impacts on the groundwater environment was assessed to be low to marginal.

8.2.1.6 Estuarine

The project is situated within the Port of Richards, adjacent to the most productive and ecologically sensitive habitats within Richards Bay Estuary, namely the Kabeljous Flats. Although the majority of the potential impacts associated with the project are likely to be highly localised, that is, in situ of the project components within the Bay, the close

proximity of the project to these sensitive areas renders them vulnerable to disturbance in many ways. Direct impacts on the ecological integrity and functioning of the system, as an important breeding, feeding and resting area for estuarine/marine/coastal associated fauna, and for protection of threatened species, are therefore likely, and must be mitigated.

8.2.1.7 Marine Ecology

Based on previous thermal plume modelling studies undertaken by PRDW coastal engineers, and considering the proposed Powership locations in the port and the proposed flow rates and ΔT's, the altered temperatures may affect biological communities and linked ecology processes that sustain the existing natural conditions within port water bodies.

Potential marine ecological issues include:

- physical disturbance of the littoral zone as a result of gas pipeline assembly, installation and burial;
- physical disturbance and modification of the seabed as a result of vessel mooring and gas pipeline installation;
- the sublethal and lethal effects of increased seawater temperatures in the receiving water body as a result of the discharge of cooling water during the power generation process;
- modifications of the hosted biological communities and ecology as a result of modification of seawater temperatures in the receiving water body as a whole;
- impingement, entrainment and mortality of holoplankton, meroplankton and ichthyoplankton during the uptake of cooling water from the surrounding water body; and
- increased noise and vibration levels in the surrounding marine environment from the power generation machinery.

Potential mitigation measures include running at a reduced load and without the steam generators, discharging deeper below the surface to improve initial dilutions, moving the Powership to a location with improved mixing capacity or further from sensitive receptors, or piping the cooling water to a location with improved mixing capacity. This possible issues and associated mitigation measures, will be addressed in the impact assessment phase.

8.2.1.8 Climate Change

The climate change risks associated with the Richards Bay site are considered to be low. The Sea Level Rise and a projected increase in severe storms pose the most significant climate change threat to the project. This is the most pertinent concern for the Richards Bay site, as tropical storms in the Indian Ocean are projected to increase in intensity. This risk is somewhat mitigated by the location of the floating platforms within the existing port. The implementation of the project at the Richards Bay site may also exacerbate the decreasing availability of water as a result of climate change. However, the province of KwaZulu-Natal is not considered as water-stressed area in comparison to other locations in the South Africa, making this a negligible risk factor for the near future. As such, the climate change adaptation risks associated with the Richards Bay site are considered to be negligible.

With regards to storm events, while uncertainty exists concerning the specific frequency of future extreme events such as coastal storm surges, general global trends indicate that an increase in both the frequency and intensity of such events, particularly under a high-emissions scenario, should be expected. Proposed activities in exposed or risk-prone areas should therefore adopt a precautionary and risk-averse approach to both the design and location

of infrastructure, to ensure that damage is avoided when extreme events occur. Good practice in this regard is to adopt a medium- to long-term approach (between 20 and 50 years) by adequately incorporating anticipated future conditions in the detailed design phase of infrastructure, such as subsea pipelines and transmission lines, that are proposed for installation in exposed areas. For coastal storm surges, this would likely entail designing proposed project infrastructure to withstand events with 1:50 year return periods, or possibly 1:100 year events to account for extreme scenarios.

Assessment of impacts and mitigation measures will be included in the next EIA phase.

8.2.1.9 Noise

The potential noise impacts may arise from the following sources:

- Noise from the establishment of the berthing, gas reticulation and electrical reticulation infrastructure.
- Construction areas and temporary workshops / storage areas.
- Construction equipment and vehicle noise.
- Noise from the Power Ship, FSRU and LNGC. This will impact on the local residents, the avifauna as well as terrestrial fauna in the vicinity of the project. The noise will include audible, low frequency and infra sound.
- Noise from the tug and towing operations resulting in surface and underwater noise.

A more detailed noise assessment will be conducted in the EIR phase.

8.2.1.10 Heritage

The project site falls within in an area of low to medium paleontological sensitivity and no heritage sites were noted along the route during the field survey.

8.2.2 Cumulative Impacts

The project site is located within the existing and operational port of Richards Bay, adjacent to the Richards Bay Industrial Development Zone (RBIDZ). This area is characterised by light and heavy industrial operations, with further planning to expand the port and the operations at the RBIDZ.

Other proposed gas to power projects identified within the area include –

- 450MW Emergency Risk Mitigation Power Plant (RMPP) at Alton Industrial area in Richards Bay. The project includes the construction of a gas-fired power station, to be operated on Liquid Petroleum Gas (LPG) or naphtha, and later converted from utilising LPG to natural gas. The natural gas or naphtha is to be supplied via a pipeline to the power plant from a supply take-off point at the Richards Bay Harbour, with LPG being supplied via truck from the import terminal at the Richards Bay harbour.
- 400MW gas to power project at the RBIDZ (proposed amendments to the existing Environmental Authorisation and EMPr). The scope includes 6 gas turbines for mid-merit/peaking plant power provision, with 2 steam turbines utilizing the heat from the engineers in a separate steam cycle, as well as 3 fuel tanks of 2000m³ each for on-site fuel storage.
- Liquid Natural Gas (LNG) project, as proposed by the Transnet National Port Authority (TNPA) within the Port of Richards Bay. Based on limited information available, the scope of the proposed project seemingly includes a gas pipeline infrastructure within the harbour, running from the eastern portion of the port (Coal terminal) to the proposed power plant and gas distribution facility, located near the Bayside substation, within South32 property adjacent to the port.

Existing and operational facilities in proximity to the study area include Richards Bay Coal Terminal, Fermentech Fertilizer Supplier facility, South32 / Bayside Aluminium facility and Mondi Richards Bay facility. In addition, developments that have received authorisation which potentially pertain to cumulative impacts in terms of emissions include Eskom CCPP, Elegant Afro Chemicals Chlor-Alkali Plant, Hulamin (previously Isizinda) expansions, and the Mondi Upgrade.

Giving the similar proposed projects and current operations within close proximity to the study area, cumulative impacts can potentially occur. Anticipated cumulative impacts, based on information available at the time of the assessment, and as relevant to this powership project, will be assessed and included in the next phase of the EIA process, as per the Plan of Study included in this report.

Regarding other proposed projects in the area, it must be noted that limited information was available. At this stage, the approach of the Independent Power Producer (IPP) Procurement Programme is not clear, and it will have to be further confirmed whether only one bidder or more will be selected for the programme, and as such affecting the potential cumulative impacts. Furthermore, at this stage, only the proposed scope can be assessed (based on information available), and any changes to the scope as a result of the permitting process and the final project outcome (e.g. authorised alternatives) are unknown and thus cannot be assessed. Should the competent authority hold relevant information to assist with the identification and assessment of cumulative impacts, a request will be made to share this information with the EAP.

8.2.3 Preliminary Impact Assessment

The following table present the site specific impacts with mitigation measures. Unless indicated to the contrary, all impacts presented are negative impacts.

8.2.3.1 Liquefied Natural Gas (LNG) Carrier

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Anchors destroy marine habitat	12	High	No marine structures are planned and the mooring system for the vessels will generally be heavy chain lying on the seabed attached to anchors. Marine aquatic assessment to determine most suitable area for mooring.	7.5	Medium
Leak of LNG due to improper connection for re-stocking leading to	4.0	Low	Quality check undertaken immediately after	1.3	Very Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
contamination of surface water			connection to ensure that connection point is secure.		
Discharge of LNG into marine environment due to pipeline bursting leading to marine pollution	10.8	Medium-High	Regular inspections on the quality and integrity of the pipeline.	2.0	Very Low
Disturbance to the marine ecosystems and mammals from operation of the LNG carrier in the Port	5.0	Medium-Low	Social compact (as part of KPS Social Corporate Responsibility) with Port Authority, Municipality and Environmental Authority(ies) regarding the monitoring, reporting and rehabilitation of Impacted mammals. Proposed location to be established adjacent to or in close proximity to the FSRU.	2.0	Very Low
Disturbance to the sediment from mooring infrastructure leading to increased suspended solids and reduction in sunlight infiltration.	8.0	Medium	Complete activities within a short timeframe as per standard operating procedures. No mooring infrastructure required.	4.0	Low
No energy generation or gas delivery activities associated with the terrestrial environment.	5.8	Medium-Low (Positive)	As per general Port agreements.	5.8	Medium-Low (Positive)
Water and waste produced during the re-stocking leading to marine pollution	4.7	Low	LNG Carrier re-stocks FSRU once every Approx. 20 days.	2.5	Very Low
Air emissions from the operation of engines and turbines to produce energy. SO_2, NO_2 and	1.0	Very Low	Point source emissions monitoring and annual submissions to SAAELIP shall be	1.0	Very Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
PM^{10} emissions, adversely affecting ambient air quality and human health.			provided throughout the contract term. No mitigation measures required as per the Atmospheric Impact Report.		
Cumulative Impacts					
Contributions to climate change from operations and emissions of the LNG carrier (cumulatively)	17.3	High	LNG Carrier re-stocks FSRU once every Approx. 20 days.	4.0	Low
Destruction of marine ecosystem from the operations of the LNG carrier in the Port.	14.0	High	Quality check undertaken immediately after connection to ensure that connection point is secure. Inspection on the quality and integrity of the pipeline.	2.0	Very Low
Increased traffic congestion and accidents	3.0	Low	Placement of LNG Carrier in accordance with Port approval.	1.3	Very Low

8.2.3.2 Floating Storage Regasification Unit (FSRU)

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Anchors destroy marine habitat	12	High	No marine structures are planned and the mooring system for the vessels will generally be heavy chain lying on the seabed attached to anchors. Marine aquatic assessment to determine most suitable area for mooring.	7.5	Medium

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Leak of LNG due to improper connection for re-stocking leading to contamination of surface water	4.0	Low	Quality check undertaken immediately after connection to ensure that connection point is secure.	1.3	Very Low
Discharge of LNG into marine environment due to pipeline bursting leading to marine pollution	10.8	Medium-High	Inspection on the quality and integrity of the pipeline.	2.0	Very Low
Disturbance to the marine ecosystems and mammals	5.0	Medium-Low	Proposed locations established adjacent to or in close proximity to the Powership. Social compact (as part of KPS Social Corporate Responsibility) with Port Authority, Municipality and Environmental Authority(ies) regarding the monitoring, reporting and rehabilitation of impacted mammals.	2.0	Very Low
Disturbance to the sediment from mooring infrastructure leading to increased suspended solids and reduction in sunlight infiltration.	8.0	Medium	Complete activities within a short timeframe as per standard operating procedures. No mooring infrastructure required.	4.0	Low
No energy generation or gas delivery activities associated with the terrestrial environment.	5.8	Medium-Low (Positive)	As per general Port agreements.	5.8	Medium-Low (Positive)
Water and waste produced during the re-stocking leading to marine pollution	4.7	Low	All effluent and solid (general, hazardous and domestic) waste will be disposed though registered and certified	2.5	Very Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
			service provides as per the NPA and MARPOL requirements. Waste must be stored in a designated area. Service provider must be contracted to remove waste and dispose to a licensed waste disposal facility.		
Aesthetic value of the area changes.	4.0	Low	No mitigation.	4.0	Low
Air emissions from the operation of engines and turbines to produce energy. SO_2, NO_2 and PM^{10} emissions, adversely affecting ambient air quality and human health.	1.0	Very Low	Point source emissions monitoring and annual submissions to SAAELIP shall be provided throughout the contract term. No mitigation measures required as per the Atmospheric Impact Report.	1.0	Very Low
Cumulative Impacts					
Destruction of marine ecosystem	14.0	High	Quality check undertaken immediately after connection to ensure that connection point is secure. Inspection on the quality and integrity of the pipeline.	2.0	Very Low
Traffic congestion and accidents	3.0	Low	Placement of FSRU in accordance with Port approval.	1.3	Very Low

8.2.3.3 Gas pipeline from the FSRU to Powerships (Sub-Sea)

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Marine disturbance and leakage of the gas pipeline to the as line between the FSRU and Powership resulting in contamination.	9.0	Medium-High	Adhere to the recommendations of the estuarine specialist.	6.7	Medium-Low
Generation of small quantities of construction waste and accidental discharge or pollution of marine environment.	5.8	Medium-Low	Implement re-use, recycle and disposal to registered waste disposal site. Operational procedures and environmental incident management.	2,0	Very Low
Installation and commissioning noise.	7.5	Medium	General EMPr conditions.	2,0	Very Low
Work and supplier opportunities will be created.	12.0	High (Positive)	Local labour and local supply companies to be utilised for project operations throughout the contract. General EMPr conditions.	0,0	High (Positive)
Natural Gas leaks from pipeline due to vandalism, and equipment or infrastructure failure, resulting in contamination	9.2	Medium-High	Specific EMPr conditions for gas pressure monitoring. Operational and Emergency procedures. Security Environmental incident reporting to Authorities Regular monitoring and maintenance.	2,5	Very Low
Disturbance of coastal sediments and beach area from subsea pipeline	6.7	Medium-Low	The subsea pipeline shore-crossings (beach crossings) will all be buried, so no interruption of longshore sediment transport will occur. Conduct Coastal Impact Assessment.	3.3	Low
Cumulative Impacts					

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Destruction of marine ecosystem	12.0	High	Implement quality, maintenance and environmental controls.	3.0	Low

8.2.3.4 Powerships

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Anchors destroy marine habitat	12	High	No marine structures are planned and the mooring system for the vessels will generally be heavy chain lying on the seabed attached to anchors. Marine aquatic assessment to determine most suitable area for mooring.	7.5	Medium
Leak of LNG due to improper connection, leading to water contamination	9.0	Medium-High	Quality check undertaken immediately after connection to ensure that connection point is secure.	4,0	Low
Discharge of LNG into marine environment due to pipeline bursting, leading to water contamination	10.8	Medium-High	Inspection on the quality and integrity of the pipeline.	4,0	Low
Disturbance to the marine ecosystems	11.7	High	Limited and localised footprint. Located out of the open space system within existing port.	5.8	Medium-Low
Disturbance to the sediment from mooring infrastructure leading to increased suspended solids and reduction in sunlight infiltration.	8.0	Medium	Complete activities within a short timeframe as per standard operating procedures.	4,0	Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
			No mooring infrastructure required.		
Waste generation from - General maintenance and repairs; - Domestic from cooking, etc.; - Sewage and greywater. Storage of waste on the ship, being improperly disposed and therefore impacting on the marine ecosystem	13.3	High	All effluent and solid (general, hazardous and domestic) waste will be disposed though registered and certified service provides as per the NPA and MARPOL requirements. Waste must be stored in a designated area. Service provider must be contracted to remove waste and dispose to a licensed waste disposal facility.	2,0	Very Low
Generation of noise from engines and steam turbines affecting the ambient noise quality	15.0	High	The port allows a maximum of 70 dBA. Noise level monitoring performed at existing Powership site established the ambient noise to be 50 dBA at 100m from the ship. Situated within operational port and away from residential areas.	4,7	Low
Air emissions from the operation of engines and turbines to produce energy. SO_2, NO_2 and PM^{10} emissions affecting the ambient air quality. Project to commence with the generation of 540 MW.	2.0	Very Low	Point source emissions monitoring and annual submissions to SAAELIP shall be provided throughout the contract term. No mitigation measures required as per the Atmospheric Impact Report.	2,0	Very Low
Potential change in water quality from internal processes and cooling.	12.8	High	Water that is discharged does not undergo any treatment or addition of any	2,0	Very Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
			chemicals. All black and grey wastewater generated during operation of Powership facilities shall be transferred to a subcontracted licensed Environmental Service Company for appropriate off-site treatment and disposal.		
Indiscriminate disposal and spillage of waste; Oil or gas leaks or accidental spillage; Fire and explosions, leading to water contamination.	15.2	High	Incident dependent (Localised). Implement approved emergency and contingency plans. Conduct drills and training for emergencies.	3,5	Low
Generation of electricity and provision of 540MW into the national grid, improving electricity provision	17.3	High (positive)	Positive impact on economy and community from reliable and continuous electricity flow from the Powership.	0,0	High (Positive)
Skilled service providers required for maintenance, creating employment	14.7	High (positive)	Positive impact on economy and community, skill and knowledge from internationally recognised training.	0,0	High (Positive)
Aesthetic value of the area changes.	9.3	Medium-High	No mitigation. Situated within operational port and away from residential areas.	9,3	Medium-High
Potential change in temperature from heating from energy processes and cooling from FSRU. Increase in seawater temperature in the 100m and 300m mixing zones radii, affecting the	9.0	Medium-High	Plume modelling and managing of the mixing zone to remain within the 3 degree Celsius MARPOL requirements. The Powerships operate a once through cooling system, which	3,0	Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
tolerance of marine organisms.			abstracts water directly for cooling and discharges into the sea. Discharge at a depth of 8m as specified in the Cooling Water Dispersion Modelling report.		
Cumulative Impacts					
Contributions to climate change from operations and emissions of the powerships (cumulatively)	17.3	High	Use of LNG – cleaner burning fuel, positively cleaner and greener preference over other fossil fuels.	4.0	Low
Destruction of port area and marine ecosystem	18.7	High	Adhere to quality, maintenance and environmental controls.	3.0	Low
Traffic congestion and accidents	3.0	Low	Placement of Powership in accordance with Port approval.	1,3	Very Low

8.2.3.5 132kV Transmission lines to Switching Station

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Overhead powerlines from the ship to the services servitude leading to visual and avifauna impacts	2,3	Very Low	No establishment of transmission infrastructure within the marine environment or along the seabed.	2,0	Very Low
Vegetation clearance for overhead or underground lines. Clearance of indigenous vegetation leading to loss of biodiversity	7.5	Medium	Existing servitudes to be used in as far as possible. Servitude negotiations are currently underway. All alien vegetation occurring within the servitude must be	5.3	Medium Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
			cleared on an ongoing basis.		
Disturbance to the terrestrial ecosystem	8,3	Medium	Existing servitude is to be used. Biodiversity Assessment (Faunal and Floral), as well as Avian faunal Assessment should be conducted. Single double circuit lattice steel / monopoles towers, Eskom approved Bird-Friendly design are to be used.	5.3	Medium Low
Generation of small quantities of construction waste and localised contamination of water resources	6,7	Medium-Low	Implement re-use, recycle and disposal to registered waste disposal site. General EMPr conditions e.g. pollution prevention measures.	4,7	Low
Small amount of water ponding and localised erosion may occur from water run-off	5,8	Medium-Low	Storm water management is to be implemented in conjunction with sound erosion control measures.	4,7	Low
Release of dust from the construction activities and vehicles	3,0	Low	Existing access routes are to be used to minimise erosion.	1,3	Very Low
Construction noise affecting the ambient noise quality	5,8	Medium-Low	Activity takes place along existing servitude and in an industrialised area that has been transformed.	2,5	Very Low
Work and supplier opportunities will be created. Skilled service providers required for maintenance	9,3	Medium-High (positive)	Positive Impact – Contractors will be required for the construction and maintenance of the powerlines.	0,0	Medium – High (Positive)

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Occupational health and safety risks (e.g. falls and injuries)	10,0	Medium-High	All labourers are to subscribe to the Health and Safety Act as will be outlined during Site Induction.	3,5	Low
Risk of veld fires leading to destruction of the surrounding environment	9,2	Medium-High	Electrical infrastructure holds internal fail safes to ensure lines short circuiting do not cause fires or explosions. Servitudes will be maintained as free of vegetation.	3,0	Low
Cumulative Impacts					
Contributions to climate change from large environmental footprint and improper sourcing of material	5.0	Medium-Low	Use of existing servitudes to minimise environmental footprint. Use of sustainably sourced materials and construction methodologies.	3.3	Low

8.2.3.6 132kV Steel Lattice / Monopoles Towers

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Civil works to establish the foundation of the steel lattice / monopoles towers resulting in destruction of natural environment (e.g. vegetation and wetlands)	6,7	Medium-Low	Steel lattice / monopoles towers for powerline are to be established along the existing services servitude. Exposed soils to be protected using a suitable covering or revegetating.	2,0	Very Low
Vegetation clearance for construction and operation of the steel	10,0	Medium-High	Existing servitudes to be used in as far as possible. Area is	6,0	Medium Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
pylons for the transmission lines could lead to loss of biodiversity			previously disturbed. Retain as much indigenous vegetation as possible.		
Disturbance to the terrestrial ecosystem could lead to loss of biodiversity	8,3	Medium	Existing servitudes are to be used, which are previously disturbed industrial area.	5,3	Medium Low
Disturbance to terrestrial aquatic ecosystems downstream of the transmission line and infrastructure leading to decrease in soil productivity	6.0	Medium-Low	Temporary stormwater channels and preferential flow paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion. Monitoring should be done to ensure that sediment pollution is timeously addressed.	2.7	Very Low
Change in hydropedological processes such as soil interflow, soil structure and soil quality	8,0	Medium	Only excavate areas applicable to the project area. Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. Soil quality monitoring & visual assessments.	2,5	Very Low
Generation of small quantities of construction waste and localised contamination of water resources.	6,7	Medium-Low	Implement re-use, recycle and disposal to registered waste disposal site. General EMPr conditions e.g. pollution prevention measures.	4,7	Low
Minimal amount of water ponding and localised erosion may occur from water run-off	5,8	Medium-Low	Storm water management is to be implemented in conjunction with sound erosion control measures. Water	4,7	Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
			quality monitoring of the downstream surface water. Dewater all groundwater to the nearest surface drain/watercourse.		
Dust from construction vehicles leading to change in air quality	3,0	Low	Servitude to be used as access routes to limit disturbance.	1,3	Very Low
Construction noise affecting noise quality	5,8	Medium-Low	Activity takes place along existing servitude and in an industrialised area.	2,5	Very Low
Work and supplier opportunities	9,3	Medium-High (positive)	Contractors will be required for the construction and maintenance of the powerlines.	0,0	Medium – High (Positive)
Occupational health and safety risks such as falls and injuries	10,0	Medium-High (positive)	All are to subscribe to the Health and Safety Act as will be outlined during site induction.	3,5	Low
Cumulative Impacts					
Contributions to climate change from large environmental footprint and improper sourcing of material	5.0	Medium-Low	Use of existing servitudes to minimise environmental footprint. Use of sustainably sourced materials and construction methodologies.	3.3	Low

8.2.3.7 132kV Switching Station

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Civil works to establish the switching station disturbing the soil and removing nutrient rich topsoil	8,0	Medium	The switching station is to be established within existing servitude. Exposed soils to be protected	3,0	Very Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
			using a suitable covering or revegetated. Topsoil is to be kept aside for reuse in the revegetation process		
Vegetation clearance for construction of the switching station could lead to loss of floral biodiversity.	10,0	Medium-High	Existing servitudes to be used in as far as possible. Area is previously disturbed as it falls within existing powerline servitude. Retain as much indigenous vegetation as possible.	6,0	Medium
Disturbance to the terrestrial ecosystem could lead to loss of floral and faunal biodiversity	8,3	Medium	Existing servitudes are to be used, which are previously disturbed industrial area along existing powerline servitude.	6,7	Medium Low
Disturbance to terrestrial aquatic ecosystems downstream of the transmission line and switching station infrastructure and could lead to loss of terrestrial aquatic biodiversity and degradation	5,0	Medium-Low	Temporary stormwater channels and preferential flow paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion.	2.7	Very Low
Change in hydropedological processes such as soil interflow, soil structure and soil quality due to the establishment of the switching station altering the flow of water on site	8,0	Medium	Only excavate areas applicable to the project area. Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. Soil quality monitoring & visual assessments.	2,5	Very Low
Generation of small quantities of construction waste and localised contamination	7,5	Medium	Implement re-use, recycle and disposal to registered waste disposal site.	5.3	Medium-Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
of water resources through the construction and operation of the switching station			General EMPr conditions e.g. pollution prevention measures.		
Reduced amount of water ponding and localised erosion may occur from water run-off during construction and operation of the switching station	5,8	Medium-Low	Storm water management plan is to be implemented in conjunction with sound erosion control measures. Water quality monitoring of the downstream surface water. Dewater all groundwater to the nearest surface drain/watercourse. Adequate stormwater measures to be in place as part of building design	4,7	Low
Dust from construction vehicles due to construction of the switching station which may contribute to air pollution	3,0	Low	Existing roads used as access routes to limit disturbance.	2,5	Very Low
Construction noise during the construction of the switching station affecting the neighbouring properties and contributing to noise pollution	5,8	Medium-Low	Activity takes place along existing servitude and in an industrialised area.	3,0	Very Low
Work and supplier opportunities through the construction and operation of the switching station	9,3	Medium-High	Contractors will be required for the construction and maintenance of the powerlines.	0,0	Medium – High (Positive)
Occupational health and safety risks through the construction and operation of the switching station	10,0	Medium-High	All are to subscribe to the Health and Safety Act as will be outlined during site induction.	3,5	Low

NATURE AND CONSEQUENCES OF IMPACT	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MANAGEMENT/ MITIGATION	IMPACT SCORE	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Cumulative Impacts					
Contributions to climate change through the establishment of the switching station	5.0	Medium-Low	Use of existing servitudes to minimise environmental footprint. Use of sustainably sourced materials and construction methodologies.	3.3	Low

9 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Appendix 2 of the EIA Regulations requires that the Scoping Report contain a plan of scoping for undertaking the next phase, which is the EIA process. The specific reporting requirements are as follows:

Appendix 2 of the EIA Regulations, 2014 (as amended): 2(1) "A scoping report ..... must include –

(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including—

- *(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;*
- *(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;*
- *(ix) aspects to be assessed by specialists;*
- *(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;*
- *(v) a description of the proposed method of assessing duration and significance;*
- *(vi) an indication of the stages at which the competent authority will be consulted;*
- *(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and*
- *(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;*
- *(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored*

The plan of study for undertaking the EIA process is part of the draft Scoping Report that was made available to I&APs for comment during Scoping. In response to I&AP comments, including those from the respective authorities and input from specialists, the plan of study has been revised in the final Scoping Report.

The competent authority will consider the final Scoping Report in relation to the comments submitted by I&APs, including State Departments during Scoping, and should it accept the Scoping Report, it will do so with or without conditions, and advise the applicant to proceed or continue with the tasks contemplated in the plan of study for EIA.

The issues and impacts that are identified through Scoping will be taken through a more detailed assessment and subjected to a second round of public participation. The plan of study for EIA thus proposes how this will be done. An Environmental Management Programme (EMPr) will also be compiled during the EIA phase and *inter alia* contain the mitigation measures to either avoid, or minimise and remedy the identified impacts. It too will be subjected to public participation during the EIA Phase, as will the specialist reports.

9.1 Alternatives

The following alternatives will be considered and assessed within the preferred site (Refer to Section 3 of this report) in the EIA process:

- Layout Alternatives:

Powerships and FSRU positioning:

Alternative 1 – Powerships are positioned within the dead-end basin adjacent to the break bulk quay /multi-purpose terminal, and thus located closer to the transmission line and further away from the sensitive sand bank. 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 (figure 3-3).

Alternative 2 – less suitable from an engineering perspective, as the Powerships and the FSRU are located too close together, and the Powerships and the mooring systems are placed closer to the sensitive sand bank (figure 3-4).

Transmission line route:

Both route alternative have the same starting and ending points.

Alternative 1 – shorter route to the substation (Approx. 3km). The majority of the Alternative 1 route is located in areas of low to moderate ecological sensitivity with limited areas possibly traversing very high sensitive swamp forest. Overall, this route is located in low sensitivity areas, mainly due to its location in transformed areas or in highly degraded areas adjacent to transformed areas. The sensitivities in terms of wetlands is still to be verified by field investigation during the impact assessment phase (Figure 3-6 red line).

Alternative 2 – Approx. 4km long and thus will have more impacts on the receiving environment. Although the alternative route does traverse some areas of low sensitivity where it is located adjacent to existing infrastructure, this proposed transmission line traverses two Critically Endangered vegetation types: Mangrove Forest and Swamp Forest. These have extremely high sensitivity and constitutes a fatal flaw for this route. In addition, this route is located within large extent of wetlands (Figure 3-6 yellow line).

Transmission line Connection point:

Engagements with Eskom on the connection to the line, by tying in to the Eskom line and placing the switching station out of the Bayside substation (figure 3-9).

Subsea gas pipeline:

There are two proposed alternative routes for the gas pipeline, and these are directly influenced by the selected positions of the Powerships in relation to the position of the FSRU.
Alternative 1 – in line with the preferred position (from an engineering design perspective) of the Powerships and the FSRU within the port, positioning the Powerships in closer proximity to the land and the transmission line (figure 3-10).
Alternative 2 – in line with the second alternative of the Powerships positions (further from the shore) and the FSRU. Although this alternative presents a shorter gas pipeline, the position of the Powerships in relation to the shore is not supported from an engineering perspective, and therefore the associated gas pipeline is not supported from the engineering design perspective (figure 3-11).

- Technology Alternatives;

The preferred technology entails Gas Reciprocating Engines, which are connected in series which provide heat to two steam turbines to generate electricity. Combustion engines used for electric power generation are internal combustion engines in which an air-fuel mixture is compressed by a piston and ignited within a cylinder. Dual-fuel engines are designed with the ability to burn both liquid and gaseous fuels. When operating in gas mode, the gaseous fuel is premixed with air, injected just after the compression stroke and ignited by a pilot fuel flame. In this process, the pilot fuel flame acts a "spark plug" to ignite the lean gas-air mixture. Dual-fuel DF engines retain the ability to use a backup liquid fuel when gas supply is interrupted.
The preferred Gas Reciprocating Engines technology option will ensure higher efficiency and reliability in electricity generation with overall improved environmental performance compared to traditional coal fired technology.

The powerships engine technology provides for dual fuel usage and is capable of utilizing both Liquid Natural Gas and Heavy Fuel Oils as primary fuel sources. The powership generation process proposes the use of internationally sourced LNG gas supply. No gas supply is required from local South Africa resources to ensure efficient operations and all other infrastructure will be supplied.

- No-Go Option (current status-quo prevails)

In respect of the project, it would mean that the existing status quo would prevail and that no additional power using this particular technology will be generated and transmitted for inclusion into the energy grid in the KwaZulu Natal and uMhlathuze Local Municipality in particular.

9.2 Aspects to be assessed as part of the EIA process

One of the objectives of Scoping is to identify the aspects to be addressed in the assessment phase. The following aspects have been identified and supplemented based on the comments submitted by I&APs, including organs of state and State Departments during Scoping and additional specialist input as was required.

Aspects to be addressed	Company & Specialist
Wetland Delineation and Functionality	*Triplo4 – Mr. Suheil M Hoosen*
Terrestrial Ecological (Transmission Lines)	*Ms Leigh Anne de Wet*
Heritage & Palaeontology Impact	*UMLANDO – Mr. Gavin Anderson*

Estuarine Impacts	*GroundTruth – Ms Catherine Meyer & Coastwise Consulting -Ms Tandi Breetzke*
Coastal and Climate Change Impact	*Themis – Mr. Luke Moore & Coastwise- Ms Tandi Breetzke*
Geohydrological, Hydrology & Hydropedology	*GCS Water and Environmental Consultants – Mr. Henri Botha & Mr. Gareth Preen*
Hydrological & 1:100 Year Floodline	*GCS Water and Environmental Consultants – Mr. Henri Botha & Mr. Gareth Preen*
Aquatic Aspects	*GCS Water and Environmental Consultants – Ms Karin Lukes & Mr. Gareth Preen*
Major Hazardous Installation	*Occutech cc – Mr. Harold Gaze*
Marine Ecology	*Lwandle – Dr Robin Carter & Ms Laura Weston*
Air Quality Impact	*uMoya-Nilu – Dr Mark Zunckel*
Socio-Economic Impact	*Lumec – Mr. Paul Jones*
Noise	*Safetech – Dr Brett Williams*
Avifauna	*Mr Paul Martin*
Greenhouses Gas Emissions Assessment	*Southern Cross Capacitating Corporation (PTY) LTD – Mr. Kubus Van Der Merwe*

9.3 Impact Assessment Methodology

Another of the prescribed objectives of Scoping is to agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site.

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed development. The process of assessing the impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts;
- Prediction of the nature, magnitude, extent and duration of potentially significant impacts;
- Recommendation of mitigation measures to be implemented to avoid or reduce the severity or significance of the impacts of the activity;
- Evaluation of the significance of the impact after the mitigation measures have been implemented and determining the extent of any residual impacts that need to be managed and monitored.

The possible impacts associated with the project are identified in the Scoping phase through available information, desktop research, preliminary specialist input and I&AP comments. In the EIA phase, these aspects will be assessed through more in-depth specialist investigations which will also be subjected to public participation.

The proposed method of assessing the environmental impacts is set out below as well as the proposed specialist studies. The reporting of the EIA findings in the EIA Report will follow the requirements prescribed in Appendix 3 of the EIA Regulations, 2014.

Rating of Impacts	
Consequence	
Nature	1 – Insignificant / Non-harmful 2 – Small / Potentially harmful 3 – Significant / Slightly harmful 4 – Great / Harmful 5 – Disastrous / Extremely harmful
Duration	1 – Up to 1 month 2 – 1 month to 3 months 3 – 3 months to 1 year 4 – 1 to 10 years 5 – Beyond 10 years / Permanent
Spatial Scale (extent)	1 – Immediate, fully contained area 2 – Surrounding area 3 – Within business unit area or responsibility 4 – Within mining boundary area / Beyond BU boundary 5 – Regional, National, International
Overall Consequence = (Severity + Duration + Extent) / 3	
Likelihood	
Frequency of the Activity	1 – Once a year or once / more during operation / LOM 2 – Once / more in 6 months 3 – Once / more a month 4 – Once / more a week 5 – Daily / hourly
Probability of the Incident / Impact	1 – Almost never / almost impossible 2 – Very seldom / highly unlikely 3 – Infrequent / unlikely / seldom 4 – Often / regularly / likely / possible 5 – Daily / highly likely / definitely
Overall Likelihood = (Frequency + Probability) / 2	
Overall Environmental Significance = Overall Consequence X Overall Likelihood	
Overall Environmental Significance:	
0 - 2.9	Very Low
3 - 4.9	Low
5 - 6.9	Medium - Low
7 - 8.9	Medium
9 - 10.9	Medium - High
11 and above	High

9.3.1 Specialist Studies

All specialists' assessments (including cumulative impacts) and findings will be incorporated into the EIA Report. Specialists will also be required to address any additional relevant issues raised by I&APs during Scoping.

The following Specialist Studies will inform the EIA Phase of the assessment:

9.3.1.1 Atmospheric Impact Assessment

An Atmospheric Impact Report has been undertaken by uMoya-NILU Consulting (Pty) Ltd, in order to assess the potential air quality impacts from the proposed project. The assessment includes a:

- Description of current state of the receiving atmospheric environment using available monitoring data;
- Description of the legal environment including regulations and the requirements of the Licensing Authority;
- Development of an emission inventory for the Project including emissions from LNG supply vessels;
- Predictive modelling using the DEFF recommended CALPUFF dispersion model according to the DEFF modelling guideline (Government Gazette No. 36804, Notice No. 589, 11 Jul 2014), to predict ambient concentrations of all relevant substances or mixture of substances resulting from emissions for the proposed project;
- Assessment of impacts on ambient air quality of the proposed project and the implications for human health considering the predicted ambient concentrations relative to the National Ambient Air Quality Standards (NAAQS), and using EIA criteria for impact significance.

These initial findings show that with low predicted ambient concentrations for SO_2 and PM_{10} the consequence of impacts is very low. The predicted ambient NO_2 is somewhat higher, but the consequence of the impact is low. The likelihood of occurrence of impacts associated with SO_2, NO_2 and PM_{10} is very low. Therefore, the significance of impacts resulting from the Project is predicted to be very low.

Following the public webinar, and as a response to a comment raised regarding air quality study done in the area, the following was added by the specialist:

The baseline ambient air quality in Richards Bay for the proposed project was based on published data from 2004 to 2017. For PM_{10} this data showed no exceedences and indicated a relatively high background concentration. The data from a subsequent study showed an increase in PM_{10} concentration in Richards Bay over the period 2017 to 2019. It is agreed that this more recent information adds to the understanding of background PM_{10} concentrations.

It must be noted that emissions of particulates from the proposed project are very low and the maximum predicted increase in PM_{10} concentrations is less than 1 $\mu g/m^3$. Regardless of the increase in ambient PM_{10} concentrations shown by the 2017-2019 study, the proposed project will not result in a measurable increase in PM_{10} concentrations in Richards Bay and will not introduce exceedences of the NAAQS.

Cumulative impacts will be addressed in the EIA Report, based on the following input from the air quality specialist:

- The inclusion of emission from future and other sources in an assessment to assess their cumulative effect in an area is not deemed a practical exercise. The assessment that is being conducted for the proposed project and cumulative impacts are assessed using current ambient air quality data and the potential additive effect of the project. In the case on this proposed project, the predicted ambient concentrations resulting from LNG combustion are very low. It is unlikely that that they will make a measurable difference (within the accuracy of the monitoring equipment) to current ambient concentrations. In the specialist's opinion, a cumulative assessment including existing and future other sources will not provide an answer that is any different to that currently included in the scope of the Atmospheric Impact Assessment.

- It very difficult to characterise fugitive emissions, transport (vehicles and shipping), wind dependant emissions like storage piles and open land, fires, agricultural emissions, and others that vary temporally and spatially. The complexity of the problem to develop an inclusive emission inventory to simulate ambient concentrations on an hourly basis and to assess these under worse-case meteorology can be appreciated. Always excluded is the contribution of emission sources outside the region of interest that also contribute to the areas air quality. In Richards Bay, this is particularly important as the background (not attributed to local sources) PM_{10} concentration is relatively high. The approach to include emissions for other sources in a cumulative assessment is flawed if all emissions are not included and characterised spatially and temporally.
- By comparison, ambient air quality monitoring is influenced by all possible contributing sources including those outside the area of interest, and measures continuously, i.e. during good dispersion conditions and in worse-case conditions. Assessing the modelled contribution of the project's emissions to the monitored (existing) ambient concentrations is far more meaningful and provides a sound science-based indication of what future ambient concentrations might if the project was operational in the area.

9.3.1.2 Wetland Delineation and Functionality Assessment

A Wetland Screening has been conducted at desktop level, to identify the water management areas and any watercourses within the study area. Due to the presence of watercourses, further specialist study is required for the EIA phase, which will:

- Identify all potential wetland and riparian areas within 500m of the proposed development based on aerial photography and available wetland/river coverage;
- Site visit and field delineation of wetlands and/or riparian areas within 500m of the proposed development that are primarily affected by the development using the Department of Water Affairs & Forestry guideline manual "A practical field procedure for the identification and delineation of wetlands and riparian areas" (DWAF, 2005);
- Delineation of all wetland and riparian areas within 500m of the proposed development that are not directly affected by the development using aerial photography and satellite imagery;
- Classification of delineated wetlands/riparian areas using the latest National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa;
- Conduct a wetland screening of the wetlands and watercourses on site and within the 500m to identify wetlands and watercourses that are potentially at risk from the proposed development based on specialist expertise;
- Wetland buffer zone recommendations for construction and operational phases of the proposed development based on best-practice and available buffer zone guidelines;
- Develop a wetland map showing the extent of wetland areas occurring within 500m of the proposed development site with applicable buffer zones/development setback recommendations shown;
- The findings of the wetland delineation and risk assessment will determine the wetland functional assessment requirements. A wetland functional assessment will be conducted as per the methods outlined below;
- WET-Health Level 1 rapid assessment to establish the Present Ecological State (PES) of wetland areas (Macfarlane et al., 2008);
- An assessment of the importance of wetland areas in providing ecosystem goods and services according to the WET-EcoServices assessment tool (Kotze et al., 2009);

- Rating of the Ecological Importance and Sensitivity (EIS) of the wetland areas using the WET-EIS tool (Rountree, 2013);
- Recommendation of management and mitigation measures to deal with potential impacts to wetlands/rivers;
- Undertake a risk assessment of the wetlands considered to be potentially at risk from the proposed development using the risk assessment tool developed by the DWS (2015) "Aspects and impact register/risk assessment for water courses including rivers, pans, wetlands, springs, drainage lines"; and
- Outcomes of the risk assessment, together with the assessment of the proposed activities on site (including bulk service provisions) will determine whether a Water Use Authorisation is required for the site.

9.3.1.3 Ecological Assessment (Transmission Lines)

As vegetation will need to be cleared to erect the transmission lines, there will be an impact on biodiversity in the area. Thus, a specialist study is needed to determine the ecological impacts (flora and fauna) of the proposed development on the site. The study will determine the vegetation of the study area, any areas of specific ecological sensitivity, and the general ecological sensitivity of the area. The report will also identify the likely impacts associated with the proposed development and recommend mitigation measures to reduce negative impacts of the proposed development.

Scope of work includes the following:

- Identify and map the vegetation communities
- Determine the type of vegetation within the study site and place it in context for the wider area
- Identify and record the main plant species that occur within the project area
- Where possible identify any flora species of specific concern (SSC)
- Take a GPS point for each of the protected species occurring on site
- Record any animal species encountered through opportunistic sightings and active searching
- Where possible identify any animal species of conservation concern
- Assess the extent of alien plant species over the site, and associated risks of alien invasion as a result of any proposed development
- Identify any significant landscape features or rare or important vegetation/faunal associations such as wetlands or rocky areas that might support rare or important vegetation/faunal associations
- Place the project area within the biodiversity context of the wider area in terms of vegetation, conservation areas and Critical Biodiversity Areas as mapped by existing guidelines both nationally and provincially
- Determine and map the sensitivity of the site
- Determine and rate the likely impacts associated with the proposed development; and
- Recommend mitigation measures that can be used to reduce negative impacts of the proposed development.

This assessment will be undertaken as per the NEMA, Environmental Themes, and Protocols for Biodiversity (published on 20 March 2020)

9.3.1.4 Marine Ecological Assessment

A specialist study is required to determine the baseline / status-quo description describing aspects of the marine environment that may be affected by the proposed development and assess the impacts of the project on the marine environment, which include entrainment losses and impact on fisheries.

Lwandle, the appointed specialist will conduct a site visit, where after collate the available information comprising but not limited to scientific literature, previous studies carried out in the area, any relevant local reports as well as findings gathered during the site investigation. This report will describe the ecological significance and sensitivity of the area.

Following this, the impact assessment methodology (provided by Triplo4) will be applied to produce a Specialist Marine Ecology EIA and EMP. The report will succinctly identify and evaluate predicted impacts and will assess a realistic scenario for the proposed development influenced by the level of project design information.

The results of hydrodynamic modelling by PRDW, the project engineers will be utilised to assess the potential impacts of mainly temperature dispersion plumes and other discharges that may occur. This report will also outline measures to manage residual impacts and identify monitoring requirements.

9.3.1.5 Heritage & Palaeontology Impact Assessment

It is possible that heritage resources (cultural and natural) are present on the study area and if so, may be impacted on by the proposed development.

The desktop study will use various historical maps (1st edition topographical and aerial photographs) that can pinpoint human settlements that occurred in study area before increased urbanisation and commercial industry. In this case we have the 1937 aerial photographs and 1942 topographical maps to indicate older buildings and human settlements. This is important as the maps will indicate the potential for human graves, regardless of the current land use. These older maps are also useful for showing previous water table levels.

The initial archaeological survey (i.e. fieldwork) consists of a foot survey where the selected area is covered. The survey results will define the significance of each recorded site, as well as a management plan. If the archaeological visibility is poor then I survey in transects and concentrate on exposed areas, molehills and aardvark (or similar) holes where artefacts, middens etc. may have been exposed. Previous experience allows one to determine where sites are more likely to occur.

All sites are grouped according to low, medium and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts, especially pottery. Sites of medium significance have diagnostic artefacts and these are sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips and decorated sherds are sampled, while bone, stone and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features. We attempt to recover as many artefacts from these sites by means of systematic sampling, as opposed to sampling diagnostic artefacts only.

A management plan for each site will be given as well as a general management plan for the area. This will include a heritage audit.

A palaeontological study will also be conducted following the "SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports" which require the palaeontological impact assessment to:

- identify exposed and subsurface rock formations that are considered to be palaeontologically significant;
- assess the level of palaeontological significance of these formations;
- comment on the impact of the development on these exposed and/or potential fossil resources and
- make recommendations as to how the developer should conserve or mitigate damage to these resources.

In preparing a palaeontological study the potential fossiliferous rock units (groups, formations etc.) represented within the study area are determined from geological maps and Google Earth imagery. The known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region and the author's field experience.

The likely impact of the proposed development on local fossil heritage will be determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of bedrock excavation envisaged.

9.3.1.6 Socio-economic Impact Assessment

A socio-economic impact assessment will be conducted focussing on the following aspects and adopting the following methodology:

- Review of all relevant project and government planning documents, including Port and municipal plans.
- Identify all the anticipated impacts of the proposed project and categorise according to duration of the impact, extend of the impact, significance, and probability of impact. These will include impacts identified by I&APs during Scoping.
- Development of a National and Provincial baseline for the electricity sector including GVA, employment and current electricity production, distribution and consumption.
- Development of a baseline for each geographic area of influence with regard to employment and GVA in total and for the electricity sector.
- Gain a detailed understanding of the technical operation processes (inputs, production processes, capacity, and distribution), employment (short vs. long-term, local vs. regional), and operational and capital expenditure (breakdown of construction/capital investment, human resource costs, operational expenditure, etc.).
- Undertake an analysis of information gathered and apply national multipliers to determine the direct and indirect impacts on GVA, business activity and employment.
- Assess the impact on the national power grid (capacity and pricing) and any impact on port operations
- Determine the socio-economic impacts of the proposed project on the national economy including impact on GVA, turnover and employment and the impact on the national power grid (capacity and pricing).
- Determine the compatibility of the project with Port and municipal planning.
- Determine the impacts of the proposed projects on the regional economies including impact on GVA, turnover and employment, impact on port capacity, and any other impacts on local communities.
- Draft specialist report in line with the requirements set out in Appendix 6 of the EIA Regulations, 2014.

9.3.1.7 Geohydrological Assessment

The geohydrological study will identify the in-situ geohydrological conditions of the site and focus on the proposed transmission line development and gas coupling areas. Subsequently, the potential impact on the groundwater aquifer, existing water users and surrounding water bodies will be determined. In addition to meeting the requirements set out in Appendix 6 of the EIA Regulations, the scope of work will also adhere to the requirements for groundwater studies in respect of water use licence applications.

The main objectives of the study will be as follows:

- Understand baseline groundwater quantity and quality that can be used as a benchmark for future comparison purposes. This will be achieved via a hydrocensus within a 2.5 km radius of the site and a site visit.
- Assess the status of groundwater resources in general and any fatal flaws and /or sensitive areas.
- Review public domain geophysical data for the site, to supplement the hydrogeology report.
- Understand all groundwater risks associated with the proposed activities on the groundwater environment.
- A hydrogeological and geological site conceptual model will be developed with data obtained for the study area
- A preliminary risk assessment will be conducted based on the Source-PathwayReceptor (SPR) model.
- A groundwater and surface water monitoring plan, with mitigation measures, will be developed for the site based on the baseline assessment of the site conditions.
- A geohydrological report encompassing all the work completed and a preliminary groundwater risk assessment and monitoring plan will be compiled.
- Present findings in an understandable and presentable format so that it can be used for decision-making purposes.

9.3.1.8 Hydrological & 1:100 Year Floodline Assessment

The hydrology study will identify the hydrological and climate conditions of the site, and to evaluate flooding risk for watercourses which fall in the vicinity of the proposed transmission lines. Subsequently, the potential risks of the hydrological environment, ecological water requirements, and risk towards existing water users and surrounding water bodies will be determined. The scope of work will also adhere to the requirements for groundwater and surface water studies required for water use licence applications in terms of the National Water Act, 1998. The study will include:

- Assess the study area hydrological functions.
- Undertake a site visit to confirm drainage lines and rivers.
- Investigate 1:10, 1:50 and 1:100-year peak flow return periods, to undertake conceptual flood line modelling. The aim is to identify possible exclusion zones.
    - The post-development impacts on runoff and peak flows will be determined, as well as impacts on baseflow to nearby watercourses.
    - The conceptual flood lines will present 1:50 and 1:100-year flood events.
- Assess surface water quality and compile a water monitoring plan; and
- Compile a detailed hydrological report with hydrological risks identified.

9.3.1.9 Aquatic Assessment

The aquatic assessment aims to ascertain, by means of rapid biomonitoring methods, the Present Ecological State (PES) of the various streams or drainage lines potentially impacted by the proposed 132kV transmission lines.

The scope of work for the aquatic assessment entails the following:

- Measuring in situ water quality variables at the time of sampling
  - Water quality will be measured at each aquatic biomonitoring site using a Hanna HI 98130 EC and pH meter and a HI 9146 Dissolved Oxygen and Temperature Meter for Aquaculture. The following parameters will be recorded: temperature (°C), pH, electro conductivity (EC) (mS/m), dissolved oxygen (% saturation) and oxygen content (mg/l).
  - The recorded values will be compared against the Target Water Quality Ranges (TWQRs) in terms of the South African Water Quality Guidelines for aquatic ecosystems (SAWQGs) (DWAF, 1996b) to ascertain whether any of the measured parameters were beyond the prescribed limits for healthy river ecosystems and therefore detrimental to aquatic organisms.

- Establishing the integrity of the aquatic habitat using the Invertebrate Habitat Assessment System (IHAS), Index of Habitat Integrity Assessment (IHIA), and visual assessment
  - The Index of Habitat Integrity (IHI) assessment will consider the impacts on the riparian and the instream habitats and describes their PES. The estimated impacts of all criteria will be calculated, expressed as a percentage to arrive at an assessment of habitat integrity for the instream and riparian components respectively.
    The Integrated Habitat Assessment System (IHAS v2) will be used to assess the specific habitat suitability for the survival of aquatic macro-invertebrates and aid in the interpretation of the SASS5 results. The diversity and quality of the three habitat biotypes (Stone, Vegetation, and (GSM) will be recorded, assessed and calculated for each site.
- Assessing the health of the watercourse(s) according to the aquatic macro invertebrates present by using the SASS5 Protocol:
  - Aquatic biomonitoring of river benthic (bottom dwelling) macro-invertebrates will be undertaken according to the DWA-endorsed SASS v.5 sampling protocol (Dickens & Graham, 2002), where suitable habitat conditions and safe accessibility prevails. The method utilises a semi-quantitative sampling approach, were the relative abundances of stipulated aquatic invertebrate taxa are recorded within a specific time limit. All sampling will be undertaken by an accredited SASS5 practitioner.
- Identify impacts (whether positive and/or negative), associated with the construction and operation of instream dams, as well as provide recommendations and mitigation measures.

9.3.1.10 Hydropedology Assessment

Following a similar approach to that required by the Water Use Licence Application & Appeal Regulations and associated DWS guidelines received, the hydropedology study will:

- A field soil survey using the South African soil classification system:
  - Soils are classified by hand augering to a depth of 3m or the restricting layer
  - Survey positions are recorded with a GPS and logged; and
- A hydropedological response based on the HOSASH (Le Roux et al., 2015) for Hillslopes of South African Soils and Hydrology is then undertaken.

To achieve the study objective, the following scope of work is proposed:

- Evaluate the soils in the study area:

- Specialist reports and public data will be assessed.
- Soils will be classified per the taxonomic system for South Africa (Department of Agricultural Development, 1991).
- Soil permeability will be estimated based on available data and according to best practice guidelines (FAO, 1980); and (DWS, 2011).
- Evaluate all available data to derive a soil distribution map.

- Derive hydropedological flow regimes and interaction areas:
  - In the determination of Hydrological Soil Types (HST), soils will be divided into classes based on their expected hydrological responses (Van Tol, Le Roux, & Lorentz, 2013)
- Conceptualise the water flow dynamics and derive hydropedological flow buffer areas (if required) for wetlands identified in the area.
  - Hydrological processes will be perceived from traceable signatures in the soil matrix resulting from the soil's ability to transmit, store and react with water (Le Roux, et al., 2011).
- Identify potential hydropedological impacts per the standard Department of Water and Sanitation (DWS) risk assessment methodology and Appendix 6 of the EIA Regulations.
- Mapping and reporting:
  - A project report will be produced by entailing the components above.
  - Recommendations and study limitations will be discussed in the report.

9.3.1.11 Noise Impact Assessment

To assess the potential noise impacts from the Powership's engines, steam turbines and other sound generating components, on the receiving environment, a number of ambient measurements will be taken by placing a noise meter on a tripod and ensuring that it was at least 1.2 m from floor level and 1.4m from any large flat reflecting surface. One measurement will be taken at each point. All measurement periods will be at least over 10 minutes. The noise meter will calibrated before and after the survey. The weighting used will be on the A scale and the meter placed on impulse correction, which is the preferred method as per Section 5 of SANS 10103:2008. As the noise may have a tonal correction 5 dB will be added to the measured noise level if applicable.

The scope of the Noise Impact Assessment will be as follows:

- Identify the major noise sources in both the Port of Ngqura, Port of Richards Bay and Port of Saldanha
- On-site measurement of current ambient noise as per the requirements of the "National Environmental Management Act, 107 OF 1998 - Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the Act when applying for Environmental Authorisation" – GN 320 of 20th March 2020. Page 53 – 56 Section on Noise.
- Model the noise impacts to include the:
  - LNG off-loading,
  - Regasification,
  - Power generation
- Provide a brief review of noise legislation and standards applicable in South Africa as well as international standards.
- Identify relevant protocols, legal and permit requirements.
- Identify potential noise impact mitigation measures.

Relevant noise related legislation will be identified. Where applicable, the following standards will be consulted.

- GNR 320 of 20 March 2020: National Environmental Management Act, 107 OF 1998 - Procedures for the Assessment and Minimum Criteria for Reporting on identified
- Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the Act when applying for Environmental Authorisation". Page 53 – 56 Section on Noise.
- GNR.154 of January 1992: Noise control regulations in terms of section 25 of the Environment Conservation Act (ECA), 1989 (Act No. 73 of 1989)
- GNR.155 of 10 January 1992: Application of noise control regulations made under section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989)
- SANS 10103:2008 Version 6 - The measurement and rating of environmental noise with respect to annoyance and to speech communication.
- SANS 10328: Methods for environmental noise impact assessments.
- SANS 10357: The calculation of sound propagation by the Concawe method.
- World Bank Guidelines on Pollution Prevention
- International Finance Corporation – 2007 General EHS Guidelines: Environmental Noise.

9.3.1.12 Risk Assessment

The handling, transporting and storage of natural gas pose a potential hazardous risk to people, property and the environment which DEFF has requested be assessed as part of the EIA process.

The specialist risk assessment will include the following:

- To use the methodologies prescribed in the Occupational Health and Safety Act No 85 of 1993 and Major Hazard Installation Regulations (GNR 692 of 30 July 2001) to determine if the facility is a Major Hazard Installation.
- To determine the worst case scenario. Should this identify an off-site consequence, then the other scenario would be determined and calculated.
- Both of the above would identify the need for the performance of a risk assessment. Its purpose would be to determine what circumstances, conditions could cause or have potential to cause a major incident, accident or disaster and how these circumstances/ conditions can reduce this potential.
- Obtain information on the site, its activities, processes, chemicals, operations, mitigation measures and use this information to determine the potential risk(s) to employees and general public.
- Perform site walk through assessment
- To determine the potential risk by identifying the likely hazards, the potential consequences of a hazardous event and its severity.
- It is accepted that the process and storage installations were designed using the correct design specifications and other relevant standards and that the installation was built by qualified professionals.
- The public in this report refers to all persons outside of the boundary of the facility.
- The consequences will be calculated using specifically-designed computer software.
- The risk calculations were performed using the SANS Code of Practice.
- The Quantitative Risk Assessment (QRA) process is summarized with the following steps:
- Identification of components that are flammable, toxic, reactive or corrosive and that have potential to result in a major incident from fires, explosions or toxic releases;

- Development of accidental loss of containment (LOC) scenarios for equipment containing hazardous components (including release rate, location and orientation of release);
- For each incident developed in the LOC, determination of consequences (such as thermal radiation, domino effects, toxic-cloud formation and so forth);
- For scenarios with off-site consequences (greater than1% fatality off-site), calculation of maximum individual risk (MIR), taking into account all generic failure rates, initiating events (such as ignition), meteorological conditions and lethality;
- Using the population density near the facility, determination of societal risk posed by the facility;
- The results of the QRA are then used to make a determination of environmental significance of the impact of hazardous chemicals on the public.
- Assessment of the City's Disaster Management capacity, as well as the Port's capacity to respond to an incident at the facility.

9.3.1.13 Estuarine Impact Assessment

In light of the anticipated impacts on the estuarine functional zone, it is evident that a specialist estuarine assessment is required during the Impact Assessment phase. The following steps will be taken for the specialist estuarine assessment:

- Undertake a desktop study of reputable sources to provide baseline information for the estuarine environment;
- Collect and collate (not primary) data for the harbour/estuary and immediate coastline from available datasets and reports to supplement the baseline information;
  Undertake a site visit and compile an Impact Assessment Report that considers the following aspects:
  - A baseline description of the ecology of the affected estuary;
  - Delineation of the estuarine functional zone;
  - A map of sensitive estuarine habitats;
  - Assessment of the ecological state, importance and sensitivity of the estuary of concern, including species of concern which may be present in the study area;
  - Comment on whether ecosystem processes/functions/ecosystem services would be affected (including comment on how these would be affected);
  - Identify and rate potential estuarine impacts, according to the methodology supplied by Triplo4;
  - Provide recommendations to prevent or mitigate negative impacts; and
  - Identify any monitoring requirements.
- Obtain comments from I&APs on the Impact Assessment Report and amend it accordingly, responding to the comments and issues raised, if necessary.

9.3.1.14 Coastal and Climate Change Assessment

The climate change adaptation assignment will assess the identified potential impacts — including cumulative impacts — of the proposed activities, based on:

- All other specialist reports produced as part of the EIA Phase;
- The public participation engagements; and
- The outputs of a climate change analysis for each site.

The climate change analysis will provide downscaled climate projections at the highest possible resolution for the site and will provide information on the anticipated trends for relevant climatic parameters. These parameters may include but are not necessarily limited to precipitation, temperature and extreme events. The Climate Change Impact Assessment will conclude with a suite of recommendations for each site to offset or mitigate potential negative impacts identified and optimise potential positive impacts.

9.3.1.15 Avifaunal Assessment

As the construction of an overhead transmission line impacts birds of the area, an avifaunal impact assessment is required. As part of the study, the following Terms of Reference apply:

- Determine the desktop baseline for likely bird species occurring in the region;
- Place the study site in context with regards to surrounding bird habitats including the presence of nearby Important Bird Areas ;
- Identify and record the native bird species on site;
- Identify and record the potential nesting, roosting or migratory birds occurring on site;
- Identify any micro habitats for bird species occurring on site;
- Determine and rate the likely impacts associated with the proposed development; and
- Recommend mitigation measures that can be used to reduce negative impacts of the proposed development.

9.3.1.16 Greenhouse Gas Emission Assessment

Karpowership assigned a third-party technical consultant to calculate annual greenhouse gas emissions for Powership operations.

The study has been conducted using the Global Warming Potential impact category developed by the Intergovernmental Panel on Climate Change (IPCC, 2013) on their fifth assessment report. The analysis covers only Scope I emissions direct emissions from natural gas burning. It contains heat recovery from generation engines through steam forming for the purpose of additional electricity generation via steam turbines.

9.4 STAGES AT WHICH THE COMPETENT AUTHORITY WILL BE CONSULTED

Prior to the submission of the final EIA report, inclusive of specialist reports and the EMPr, the competent authority will be consulted during the EIA process as follows:

- Should it at any time become necessary to deviate from the approved scoping report, including the plan of study, the competent authority will be immediately notified and approached for guidance.
- A copy of the draft EIA Report, inclusive of specialist reports and the EMPr will be submitted to the competent for comment, at the same time these reports are made available to I&APs, including State Departments, for comment.

9.5 PUBLIC PARTICIPATION PROCESS TO BE CONDUCTED DURING THE EIA PROCESS

The following public participation activities are planned for the EIA Phase:

9.5.1 I&AP Review of the Draft EIA Report, inclusive of specialist reports and EMPr

- Registered I&APs will be notified via email of the availability of the Draft EIA Report, inclusive of specialist reports and EMPr for comment. I&APs who don't have email will be notified telephonically or by SMS.
- Flyers announcing the availability of these reports will also be distributed locally and put up on public notice boards with assistance requested from the municipality and ward councilor.
- The Draft EIA Report will be made available to I&APs, including State Departments and DEFF for comment for period of 30 days.
- The report will be available:
    - on the Triplo4 website (www.triplo4.com).
    - electronically available via an online platform such as Dropbox or GoogleDrive, the link to which will be emailed to all registered I&APs.
    - Electronic copies will also be sent to DEFF and organs of state, including State Departments.
    - The public copy venue will be confirmed with the municipality and ward councilor and will depend on what public venues are open under the Covid-19 pandemic. The Richards Bay library will be selected if opened.
    - Other arrangements will be made to ensure people have access to the report should they be unable to access the public venue copy or an electronic copy.

9.5.2 I&AP engagement and recording of comments

A key component of the EIA Process is recording and responding to the comments received from I&APs and the authorities. Such comment is anticipated by way of:

- Written and emailed comments (e.g. emails, letters and completed comment and registration forms);
- Comments made at public meetings and/or focus group meetings (if required);
- Telephonic communication with Triplo4 project team; and
- One-on-one meetings with key authorities and/or I&APs (if required).

The comments received during the EIA phase will be recorded in a Comments and Responses Report for inclusion the final EIA Report that will be submitted to the DEFF for decision-making. All comments will be considered by the EIA team and appropriate responses provided by the applicant, EAP and/or relevant specialist.

9.6 TASKS TO BE UNDERTAKEN AS PART OF THE EIA PROCESS

Upon notification by the competent authority (DEFF), that the Scoping Report has been accepted, and subject to any conditions set by DEFF, the applicant will proceed or continue with the following tasks as contemplated in the plan of study for EIA:

- Undertake / finalise the specialist studies and specialist reports
- Draft the EIA Report and EMPr, incorporating the findings of the specialist studies
- Make the draft EIA Report, inclusive of specialist reports and EMPr available for a 30-day comment period, to I&APs, organs of state, including State Departments and the competent authority
- Consider and process all comments received and revise the EIA Report, specialist reports and EMPr accordingly;
- Submit the final EIA Report, inclusive of specialist reports, EMPr and I&AP Comments and Response report to the competent authority (DEFF) for consideration and decision-making.

9.7 IMPACT MITIGATION AND ENVIRONMENTAL MANAGEMENT PROGRAMME

Impacts that are identified and assessed as part of the EIA process, will be assessed before and after mitigation measures are applied, such mitigation measures having been recommended by the respective specialists, the EAP, the competent authority and I&APs, including organs of state. As part of this process, the extent of the residual risks (i.e. the impacts that will likely remain even after mitigation is implemented) will be determined and measures proposed as to how these risks should be managed and monitored.

All mitigation measures, as well as the management and monitoring of residual risks, will be contained in an Environmental Management Programme (EMPr) as per the requirements of Appendix 4 of the EIA Regulations, 2014.

10 CONCLUDING STATEMENT

The Richards Bay Port was identified as a preferred location in the region, as it meets the specifications for the proposed Powership project and occurs within a close proximity to the Richards Bay Industrial Development Zone (RBIDZ). The Port and RBIDZ areas are considered a hub of economy.

The port is planned to be expanded (short terms planning – by 2028). The project is situated within operational area of the port, and outside of the delineated open space areas (figures 3-1 and 3-2).

The proposed activity is the generation of electricity by a Powership using natural gas as a fuel and transmission of the generated electricity. This is the Karpowership's core business and as such, no other alternatives in terms of activities are considered feasible.

The Powerships and FSRU will be moored in the protected waters within the Port of Richards Bay. Feasible locations for the mooring sites were identified and preliminarily assessed. The preferred positioning of the Powerships and FSRU (figure 3-3), from an engineering design perspective, had considered the size of the turning circle for the LNG carrier as well as that the approach channel and turning circle will be shared with the coal terminal and bulk berths, i.e. traffic in basin from coal vessels, cargo vessels and tugs are not impeded by the Powership project. 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 (to be confirmed with TNPA during the EIA Phase).
From an environmental perspective, the position of the powerships is 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.

The subsea gas pipeline connecting the FSRU to the Powership is proposed to be routed along the toe of the existing dredged slopes and to connect to the vessels via a flexible marine hose riser.
The preferred gas pipeline route will be in line with the preferred positioning of the Powerships and the FSRU within the port.

The alternative routes for the transmission line will be further assessed based on the specialists' findings.

The generation of electricity is the purpose of the Powerships' operations and the technology is fixed.
As such, no operational alternatives have been identified for the proposed project.

The following must be noted:

- ***This is the Final Scoping Report that has been prepared by the EAP with input from the applicant and specialists in accordance with the prescribed requirements in the EIA Regulations, 2014 and guidance from the competent authority.***
- ***Before this Final Scoping Report was submitted to the competent authority for consideration, it was subjected to a public participation process, the comments from which were incorporated into this Final Scoping Report.***
- ***Should the component authority accept the Final Scoping Report, the EIA process will commence and need to be conducted in accordance with the approved plan of study for undertaking the EIA***

process (Section 9 of this Scoping Report) and any additional conditions that the competent authority may impose.

- ***The EIA process requires a second round of public participation and the draft EIA Report, inclusive of specialist reports and the Environmental Management Programme (EMPr) will be made available for public comment.***
- ***Only then can the final EIA report be submitted to the competent authority and a decision made as to whether the application for environmental authorisation can be granted or refused.***
- ***If granted, the application for an atmospheric emission licence under the National Environmental Management: Air Quality Act of 2004 will be considered by the licensing authority.***

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