

COEGA GAS TO POWER INFRASTRUCTURE, EASTERN CAPE PROVINCE

DFFE Reference Number: 14/12/16/3/3/2/2265

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PREPARED FOR:

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ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

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COEGA GAS TO POWER INFRASTRUCTURE: ENVIRONMENTAL MANAGEMENT PROGRAMME

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DRAFT

PROJECT NUMBER:

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DEFINITIONS

For the purposes of this Environmental Management Programme (EMPr), the following terms, abbreviations and descriptions apply:

TERMS	DESCRIPTION
Alien Vegetation	Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable. This includes plant species identified as Alien and invasive species in the National Environmental Management Biodiversity Act of 2004, Alien and Invasive Species Regulations, 2014.
Cement-laden water	Cement laden water refers to water containing cement or concrete arising from the Contractor's activities.
Contaminated water	Contaminate water refers to water that has been contaminated by the Contractor's activities such as with hazardous substances, hydrocarbons, paints, solvents and runoff from plant, workshop or personnel wash areas but excludes water containing cement/ concrete or silt.
Construction Camp	Construction camp (site camps) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities and other areas required to undertake construction activities.
Environment	Environment refers to the surroundings within which humans exist and that could be made up of: <ul style="list-style-type: none"> (i) The land, water and atmosphere of the earth; (ii) Micro-organisms, plant and animal life; (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental Aspect	An environmental aspect is any component of a Contractor's construction activity that is likely to interact with the environment.
Environmental Authorisation (EA)	An Environmental Authorisation (EA) refers to a written statement from the relevant environmental authority, with or without conditions, that records the approval (partial approval or refusal) of a proposed project and the mitigating measures required to prevent or reduce the effects of environmental impacts during the lifespan of a contract.
Environmental Control Officer (ECO)	An Environmental Control Officer (ECO) refers to a suitably qualified and experienced person or entity appointed for the construction and/or operation of works, to perform the obligations specified in the EA.
Environmental Impact	An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.
Environmental Management Programme (EMPr)	An Environmental Management Programme (EMPr) is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning specific to a project are prevented; and that the positive benefits of the project are enhanced.
Environmental Management System (EMS)	The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001 an EMS is defined as, <i>"that part of the overall management system that includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy."</i>

Environmental Policy	Environmental Policy is a statement (or statements) by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.
Environmental Site Officer (ESO)	An Environmental Site Officer (ESO) refers to the site-based designated person responsible for implementing the environmental provisions of the construction contract and is appointed by the service provider that carries-out construction activities.
External Auditor	An External Auditor is a suitably qualified and experienced independent expert as per the required auditor qualifications (ISO 14012).
Independent Environmental Consultant (IEC)	An Independent Environmental Consultant (IEC) is a suitably qualified and IEC appointed by the Engineer to perform the obligations specified in the Contract. The IEC must provide reports to the regulatory authority, the Engineer and any other parties as specified by the regulatory authority.
Interested and/or Affected Party (I&AP)	An Interested and/or Affected Party (I&AP) is contemplated in Section 24(4)(d) of the NEMA (1998, Act No. 107) and which, in terms of that section, includes – <i>(i) Any person, groups of persons, organisation interested in or affected by an activity, and;</i> <i>(ii) Any organ of state that may have jurisdiction over any aspect of the activity.</i>
ISO 14001 Environmental Management System (ISO 14001)	The internationally accepted and recognised Environmental Management System as reflected in the document SABS ISO 14001: 1996; the most recent being the ISO 14001:2015.
Method Statement (MS)	A Method Statement (MS) is a written submission by the Contractor to the ECO in response to the EMPr or to a request by the ECO, setting out the plant (construction equipment), materials, labour and method the Contractor proposes to carry out an activity, identified by the relevant specification or the ECO when requesting the Method Statement. The MS should be in such detail that the ECO is able to assess whether the Contractor's proposal is in accordance with the EMPr and/or will produce results in accordance with the EMPr.
Mitigate/Mitigation	Mitigate (or mitigation) refers to the implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.
No-Go Area	A no-go area refers to an area in which construction activities are prohibited.
Pollution	According to the NEMA (Act No. 107 of 1998), pollution can be defined as, “ <i>Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future</i> ”.
Potentially hazardous substance	A potentially hazardous substance refers to a substance, which, in the reasonable opinion of the ECO, can have a harmful effect on the environment. Hazardous Chemical Substances are defined in the Regulations for Hazardous Chemical Substances published in terms of the Occupational Health and Safety Act.
Reasonable	Reasonable means reasonable in the opinion of the ECO, after consultation with the ESO - unless the context indicates otherwise.
Rehabilitation	Rehabilitation refers to re-establishing or restoring something to its original state or to a healthy, sustainable capacity or state.
Site	A site, in this context, refers to the area in which construction is taking place.
Solid waste	Solid waste refers to all solid waste materials, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
Species of Conservation Concern (SCC)	Species of Conservation Concern (SCC) refers to species listed in the rare, indeterminate, or monitoring categories of the South African Red Data Books, and/or species listed in globally near threatened, nationally threatened or

	nationally near threatened categories (Barnes, 1998).
Threatened species	Threatened species are defined as: a) species listed in the endangered or vulnerable categories in the revised South African Red Data Books or listed in the globally threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).
Topsoil	Topsoil refers to the top 100 mm of soil and may include top material e.g. vegetation and leaf litter.

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1 INTRODUCTION

The Coega Development Corporation (CDC) proposes to develop a Gas to Power project, including three power plants and associated infrastructure, within the Coega Special Economic Zone (SEZ) (see **Error! Reference source not found.** to **Error! Reference source not found.** for site locality of gas infrastructure components).

An EIA process was undertaken in 2020/2021 (DFFE Ref: 14/12/16/3/3/2/1131) for the Coega Gas to Power Infrastructure project, and the Final Scoping Report was accepted by DFFE on 6 January 2021. Ultimately though, environmental authorisation was refused due to incorrect proof of landowner consent and insufficient information within the EIR for the Department to make a decision.

The overall project would broadly involve the following components:

- ❖ A Liquefied Natural Gas (LNG) terminal, consisting of a berth with off-loading arms within the Port of Ngqura, cryogenic pipelines, storage and handling facilities and re-gasification modules (both on and off-shore);
- ❖ Gas and LNG pipelines and distribution hub, for the transmission, distribution and reticulation of natural gas within the Coega SEZ and Port of Ngqura - the subject of this EIA;
- ❖ Three Gas to Power plants, each with a 1000 W generation capacity (specific generation technologies may vary); and
- ❖ Electricity transmission lines to evacuate electricity to the previously approved 400 kV lines in the SEZ.

The overall/ultimate proposed project will comprise of three power plants with power generation capacities of up to 1000 MW each. A total power generation capacity of up to 3000 MW will therefore be available once the full extent of the project has been developed (which may be spread over a number of phases in a modular fashion, each with a generation capacity of approximately 500 MW, which may also be broken down into smaller sub-phases), the timing of which is unknown at this stage and is dependent on the CDC securing successful clients for the development of each component.

This Draft Environmental Impact Report (Draft EIR) deals only with the construction and operation of the gas infrastructure components of the project, facilitating the supply of gas to the power plants, and the transmission of gas and LNG to third party off-takers.

As developers and their chosen technologies for the gas to power plants have not yet been identified, various technologically feasible options are applied for, and the assessment presented is based on the worst case scenario for each impact. The aim of this approach is to identify the envelope limits within which the project impacts will fall, and which will be acceptable to the receiving environment with implementation of mitigation measures where relevant.

The NEMA and the Environmental Impact Assessment (EIA) Regulations, 2014 (promulgated in terms of NEMA) warrant that listed activities require Environmental Authorisation (EA). The Department of Environment, Forestry and Fisheries (DEFF) is the competent authority for projects supplying energy to the national grid. A Scoping and Environmental Impact Reporting (S&EIR, also referred to as an EIA) process is required to support an application for EA.

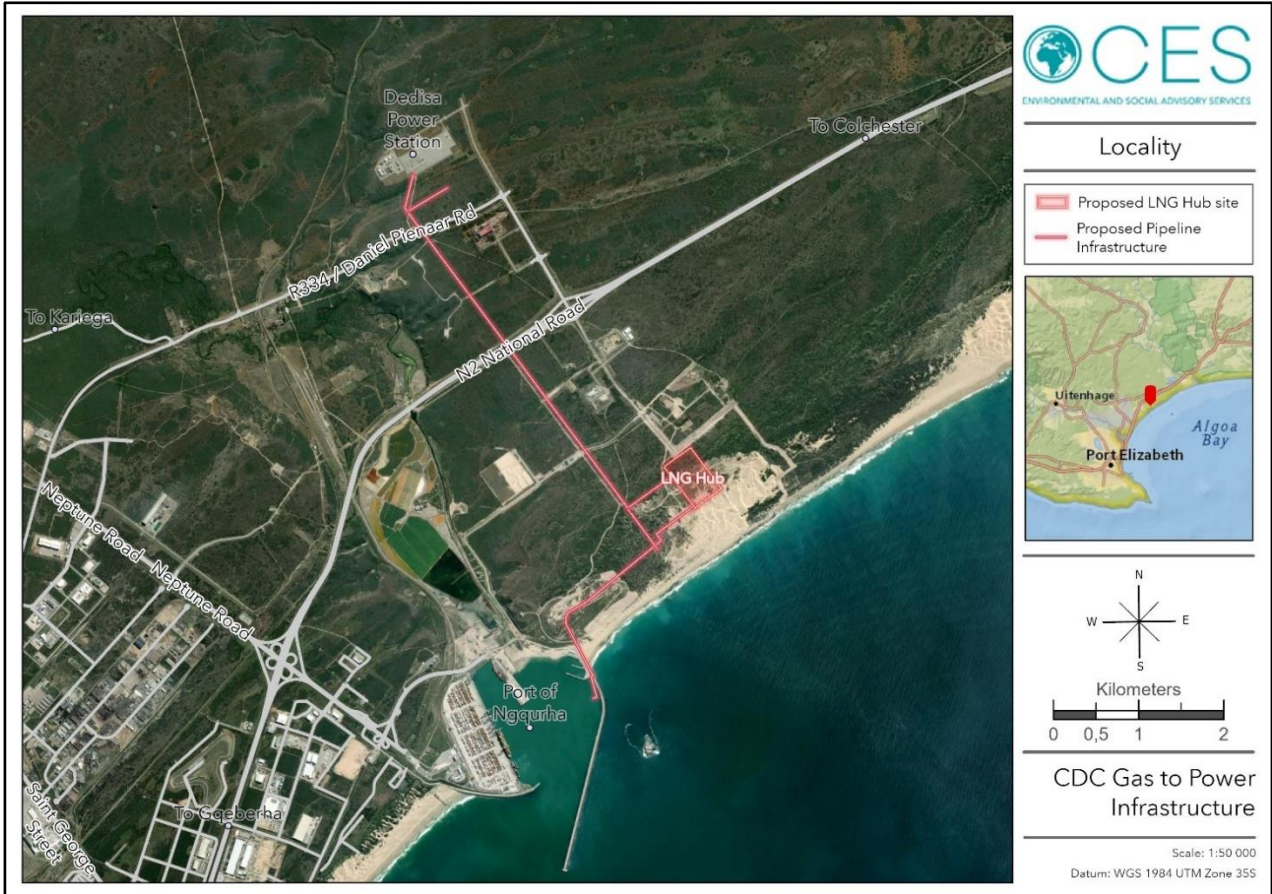


Figure 1-1: Locality and layout map of the proposed Coega Gas to Power Infrastructure.

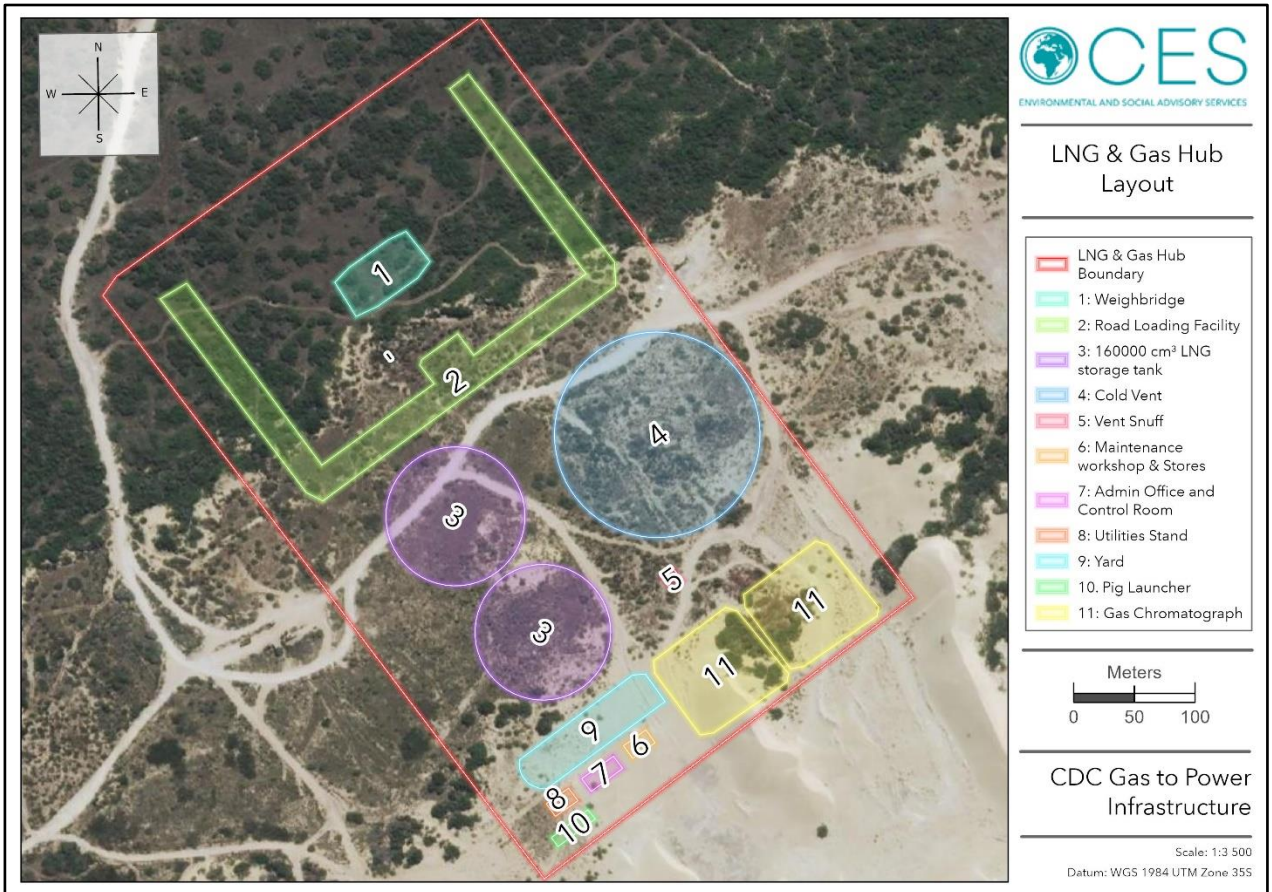


Figure 1-2: Layout map of the proposed LNG and Gas Hub proposed in Zone 10.

1.1 OBJECTIVES OF THE EMPR

This Environmental Management Programme (EMPr) has been compiled to provide mitigation, monitoring and institutional measures to be taken during the construction and operation of the Coega Gas to Power Infrastructure in the Eastern Cape Province. These measures aim to eliminate, offset and/or reduce adverse environmental and social impacts.

This EMPr informs all relevant parties, in this case, the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by Coega Development Corporation (Pty) Ltd at the site, of their duties in the fulfilment of the legal requirements for the construction and operation of the Coega Gas to Power Infrastructure, with particular reference to the prevention and mitigation of anticipated potential environmental and social impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the Environmental Authorisation (EA) granted by the relevant environmental permitting authority, the national Department of Forestry, Fisheries and the Environment (DFFE).

The general objectives of the EMPr are to:

- Ensure compliance with the regulatory authority stipulations and guidelines which could be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures which could optimize beneficial impacts;
- Create management structures which address the concerns and complaints of I&APs relating to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Ensure that safety recommendations are complied with; and
- Specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

1.2 STRUCTURE AND FUNCTION OF THE EMPR

An EMPr is focused on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies measures which should be in place or will be actioned to manage any incidents and emergencies that could occur during the operation of the project.

As such, the EMPr provides specifications which must be adhered to in order to minimise adverse environmental and social impacts associated with the construction and operation of the Coega Gas to Power Infrastructure. The contents of the EMPr are consistent with the requirements as set out in Appendix 4 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments), as stipulated below.

**REQUIREMENTS OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME
IN TERMS OF APPENDIX 4 OF GN R. 982 (GN R. 326, 2017)**

- (1) An EMPr must comply with Section 24(N) of the Act and include -
 - (a) Details of –
 - (i) The EAP who prepared the EMPr; and
 - (ii) The expertise of the EAP to prepare an EMPr, including a curriculum vitae;
 - (b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
 - (c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
 - (d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –
 - (i) Planning and design;
 - (ii) Pre-construction activities;
 - (iii) Construction activities;
 - (iv) Rehabilitation of the environment after construction and where applicable post closure; and
 - (v) Where relevant, operation activities;
 - (f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable include actions to –
 - (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
 - (ii) Comply with any prescribed environmental management standards or practices;
 - (iii) Comply with any applicable provisions of the Act regarding closure, where applicable;
 - (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;
 - (g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
 - (h) The frequency of monitoring the implementation of the impact management actions contemplated in (f);
 - (i) An indication of the persons who will be responsible for the implementation of the impact management actions;
 - (j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
 - (k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
 - (l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;
 - (m) An environmental awareness plan describing the manner in which –
 - (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and
 - (n) Any specific information that may be required by the competent authority.
- (2) Where a government notice *gazetted* by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

1.3 LEGAL REQUIREMENTS

Construction must be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Contractor of their duties in the fulfilment of the project objectives, with reference to the prevention and mitigation of environmental and social impacts caused by the construction and operational activities associated with the Coega Gas to Power Infrastructure. The Contractor should note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract which pertain to this project. If any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter must prevail.

The Contractor must identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the phases of the project must be complied with. The list of applicable legislation provided in Table 1.1 below is intended to serve as a guideline only and is not exhaustive.

Table 1.1: Relevant Legislation, Policies and Guidelines.

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
National Environmental Management Act (NEMA) (Act No. 107 of 1998) and its subsequent amendments	1998 and 2014 amendments
National Environmental Management Act (NEMA) (Act No. 107 of 1998) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments)	2014 and 2017 amendments
The Constitution Act (Act No. 108 of 1996)	1996
National Heritage Resources Act (NHRA) (Act No. 25 of 1999)	1999
National Water Act (NWA) (Act No. 36 of 1998) and its subsequent amendments	1998
National Environmental Management: Waste Act (NEMWA) (Act No. 59 of 2008) and its subsequent amendments	2008
National Environmental Management: Protected Areas Amendment Act (NEMPAA) (Act No. 31 of 2004)	2004
National Environmental Management: Air Quality Act (NEMAQA) (Act No. 39 of 2004) and its subsequent amendments	2004
Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)	1983
National Environmental Management: Biodiversity Act (NEMBA) (Act No. 10 of 2004)	2004
National Forest Act (NFA) (Act No. 84 of 1998) and its subsequent amendments	1998
National Environmental Management: Biodiversity Act, Alien and Invasive Species Regulations (2014)	2014
Occupational Health and Safety Act (OHSA) (Act No. 85 of 1993)	1993
Hazardous Substances Act (HSA) (Act No. 15 of 1973)	1973
Spatial Planning and Land Use Management Act (SPLUMA) (Act No. 16 of 2013)	2013
Electricity Regulation Act (Act No. 4 of 2006) and its subsequent amendments	2006
Minerals and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002) and subsequent 2013 amendments	2002 and 2013 amendments
Subdivision of Agricultural Land Act (Act No. 70 of 1970)	1970
National Road Traffic Act (NRTA) (Act No. 39 of 1996)	1996
National Veld and Forest Fire Act (Act No. 101 of 1998)	1998
Environment Conservation Act (ECA) (Act No. 73 of 1989) Noise Control Regulations	1989
Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974)	1974
Local Municipality: Land Rezoning Permit. LUPO Ordinance (No. 15 of 1985)	1985
National Energy Regulator of South Africa (NERSA): Generation License	
Eskom: Connection agreement and Power Purchase Agreement (PPA)	

Makhana Local Municipality Spatial Development Framework (SDF), Integrated Development Plan (IDP) and municipal by-laws	
Sarah Baartman District Municipality SDF and IDP	

1.4 ENVIRONMENTAL AUTHORISATION

In accordance with the requirements of the NEMA EIA Regulations (2014 and subsequent 2017 amendments), the proposed Coega Gas to Power Infrastructure has been subjected to a Scoping and EIA Process.

In terms of the EIA Process, all reports generated from the environmental studies form part of a series of documents for the project. The Environmental Impact Report (EIR) identified potentially significant environmental and social impacts and was the main report in the series. Additional specialist assessments serve to supplement the assessment contained in the EIR.

This EMPr interprets the findings of the EIR and prescribes project-specific specifications to be achieved. The EMPr is a progressive working document which will be updated based on the relevant conditions stipulated in the Environmental Authorisation (EA). The EMPr will then be submitted to DFFE (along with the final approved layout) for approval prior to the commencement of construction.

2 DETAILS OF THE EAP AND ENVIRONMENTAL ASSESSMENT TEAM

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DR ALAN CARTER

Dr Alan Carter is an Executive and the East London Branch Manager at CES. He has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. He is also certified ISO14001 EMS Auditor with the American National Standards Institute. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years. He is a registered professional with the South African Council for Natural Scientific Professionals (SACNASP) and through Environmental Assessment Practitioners Association of South Africa (EAPASA).

MR LUC STRYDOM

Luc has over 13 years of experience developing his skills and expertise and has been involved in a wide spectrum of projects and activities ranging from general environmental assessment work (EIAs, ESIA's and EMP's), environmental permitting (WULAs, trans-relocation permits, waste permits), geo-hydrological sampling, auditing (ECO & Performance Assessments) as well as specialist studies including freshwater impact assessments (wetlands and riparian assessments), terrestrial biodiversity assessments, vegetation impact assessments, botanical surveys, and related management plans (invasive alien species management plans, biodiversity management plans and rehabilitation plans). Luc has a particular interest in wetland ecology and botany.

MS SAGE WANSELL

Sage Wansell holds a Master of Science degree in Botany and has gained experience in field and laboratory work by researching invasive aquatic species in South Africa during that time. Her research focused on the ecology, spread and management strategies of an invasive wetland species called Pickerelweed. Apart from invasion biology research, Sage has a BSc Honours degree in Biotechnology. Her Biotechnology, botany and microbiology background provide an understanding of wastewater management, indigenous biodiversity and water quality. Sage joined CES in 2022 and is currently involved in several projects, these include Public Participation Plans (PPP), Basic Assessments and EIA's.

3 PROPOSED ACTIVITY

3.1 DESCRIPTION OF THE PROPOSED ACTIVITY

At the outset, it is important to note that this description is deliberately non-specific in terms of the proprietary technologies that would be required for the overall site development. As the specific technology providers have not yet been selected, the approach in this report is to describe each of the components of the development using typical/standard Gas to Power plant design information.

Where the different technologies that reasonably might be procured for this project have differing potential impacts, the worst case scenario was assessed. The basis of the design for the power plants, and the associated infrastructure, is that the power plants would operate at 100% capacity 80% of the time and the assessment of environmental impacts is based on the quantities associated with this design basis.

The proposed Gas Infrastructure will consist of all key supporting infrastructure required for the operation of the CDC's proposed Gas to Power plants in the Coega SEZ. This will be made up specifically of infrastructure for the import, storage and transmission of LNG via the Port of Ngqura, to the various power plants, and seawater for cooling to and from the Zone 10 power plants (should they be seawater cooled), and heating water to the onshore storage and regasification unit. Additional capacity of supply of LNG and natural gas (NG) to third party offtakers, potentially including the Dedisa peaking power plant, should this be converted to gas, will also be included. The key infrastructure includes the following:

- ✦ Up to two floating storage and regasification units (FSRUs), moored in the Port, which will receive, store and regasify the LNG from the LNG carrier. It is proposed that onshore storage and regasification facilities will replace the FSRUs once the demand for NG reaches a point where onshore storage and regasification is the more feasible option, at which point the FSRUs will be removed
- ✦ A new jetty with offloading platform and berthing facilities in the port of Ngqura
- ✦ A trestle structure to support the gas and cryogenic pipelines running within the port from the offloading platform parallel to the eastern breakwater, to the point where the pipelines will cross under the breakwater near the admin craft basin, thereafter running underground
- ✦ A LNG and gas hub, consisting of storage and regasification facilities (for development once the FSRU is no longer the most feasible option), and a truck delivery centre for third party offtakers. Gas metering, admin, control rooms, workshops, and vents will be included in the LNG and gas hub
- ✦ Gas pipelines (for transmission of NG) from the FSRU and jetty to the three proposed power plants, the LNG and gas hub (for third party offtakers) as well as the boundary of the Dedisa power plant in Zone 13
- ✦ Cryogenic pipelines (for transmission of LNG) from the berthing facilities in the port to the storage and regasification unit at the LNG and gas hub (once this has replaced offshore storage and regasification at the FSRU)
- ✦ Pipelines for the transmission of seawater for cooling from the abstraction point in the port, to the Zone 10 power plants (if seawater cooled), and for heating to the regasification plant at the LNG and gas hub in Zone 10

In addition, the affected properties are indicated in the Cadastral Map in Figure 3-2. Please refer to Appendix F for the Sensitivity Map, which consists of the proposed layout superimposed on the identified site sensitivity.

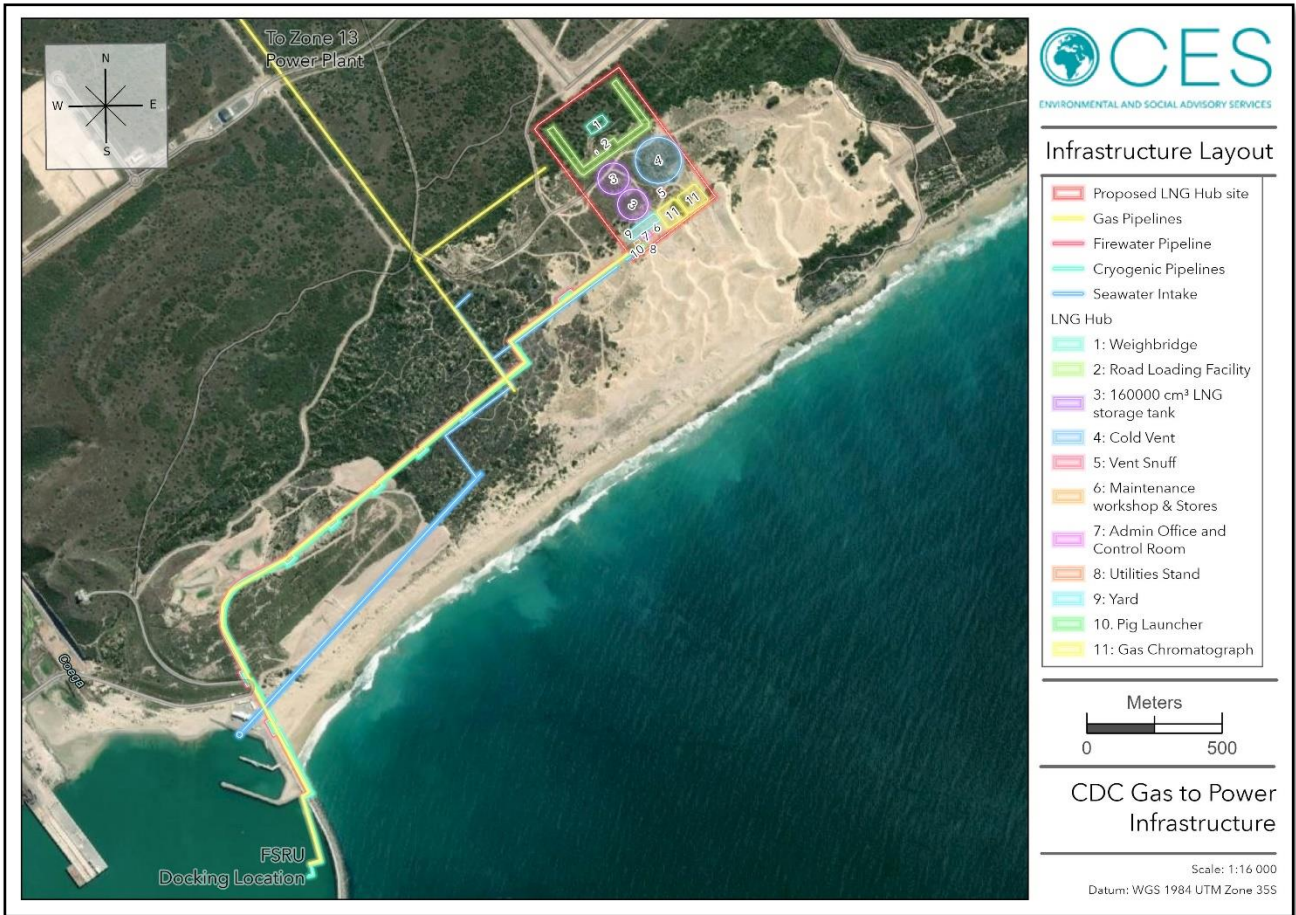


Figure 3-1: Layout Map of the Coega Gas to Power Infrastructure.

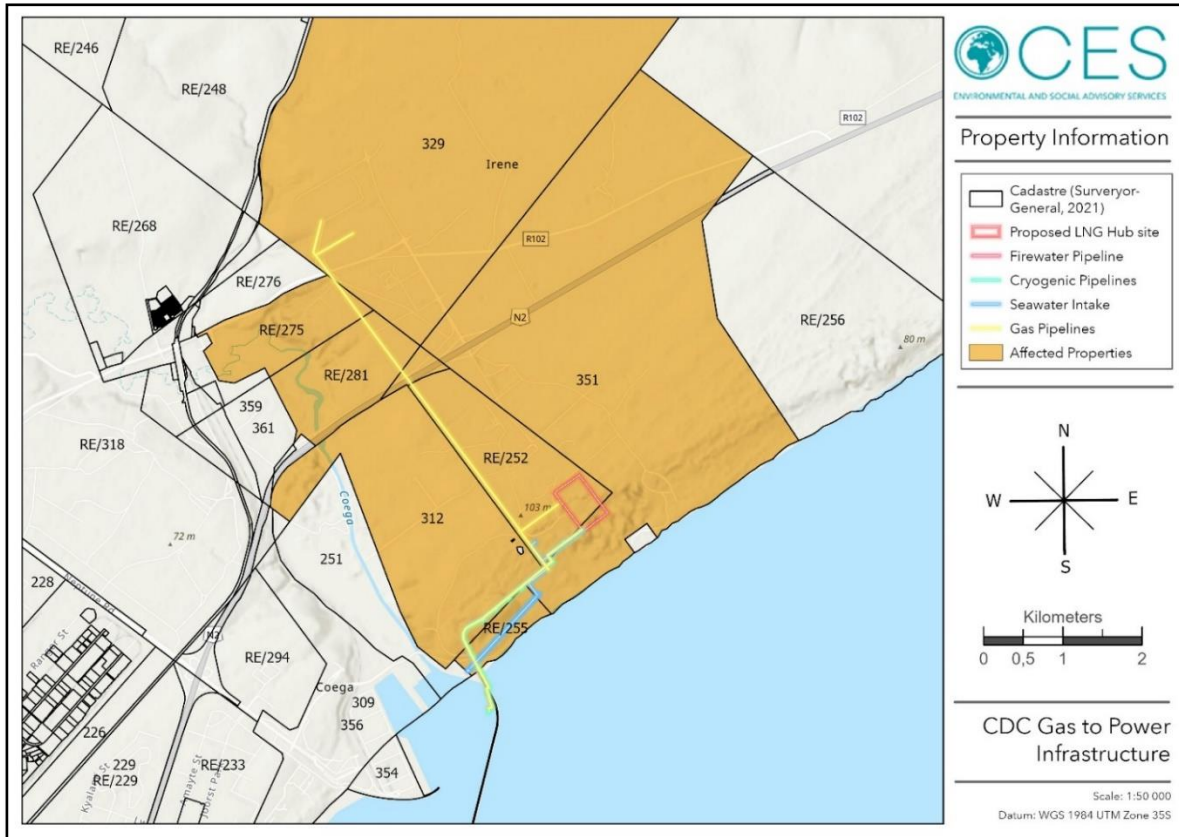


Figure 3-2: Cadastral Map of the affected properties within the Proposed Site.

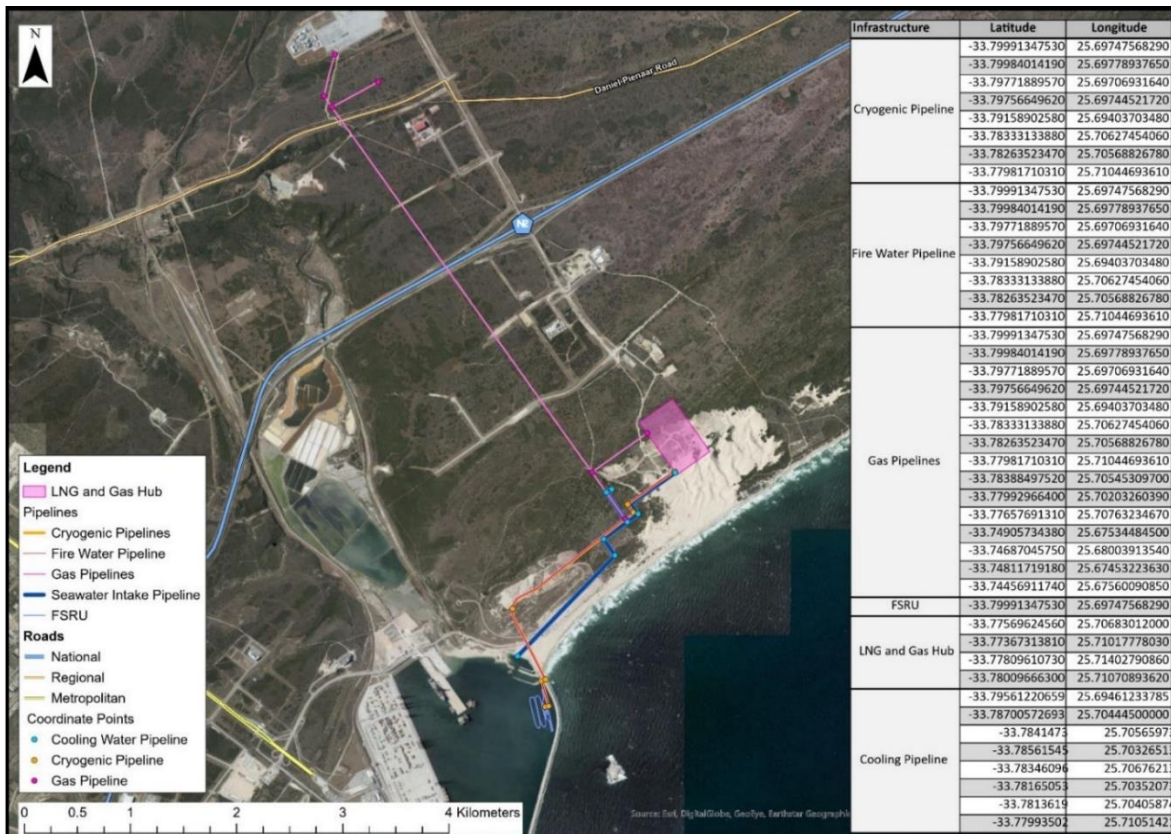


Figure 3.3: Co-ordinate points of the proposed gas infrastructure.

4 LAYOUT OF THE EMPR

In order to ensure a holistic approach to the management of environmental and social impacts during the planning and design, construction, operational and decommissioning phases of the proposed Coega Gas to Power Infrastructure, this EMPR sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved. The phases of development have been discussed in more detail below and have specific potential issues unique to each phase.

4.1 PLANNING AND DESIGN PHASE

The Planning and Design Phase is an integral component of the project life cycle and requires interaction between the design engineers and environmental consultants to ensure that the engineers are aware of the environmental constraints which must be considered and incorporated into the final design of the project.

The format of the Planning and Design Phase section is to ensure that all specifications are included in the design phase. It requires ongoing and in-depth discussions between the final design team and the appointed Environmental Control Officer (ECO). The engineer will have to cost for, and be available for, ongoing discussions with the ECO at all stages of final design.

4.2 CONSTRUCTION PHASE

The Construction Phase section details the environmental management system/framework within which construction activities will be governed, and it consists of various actions, initiatives and systems which the Contractor will have to ensure are in place and are undertaken. It consists of both a management system and environmental specifications which contain detailed specifications that will need to be undertaken or adhered to by the Contractor.

The Construction Phase section will need to be developed parallel to the Final Design Stages, and constructive input should be invited from the selected Contractor. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the Contractor, while being bound by the EMPR, fully understands it and has had input into its final development. For this reason, the final construction EMPR will need to be signed-off after input from the selected Contractor prior to the initiation of construction activities. It should, however, be noted that the Contractor must tender on the existing document and that in areas of uncertainty, a precautionary approach to the environmental guidelines and specifications must be adopted.

4.3 OPERATIONAL PHASE

The Operational Phase section provides specific guidance related to operational activities associated with the development. By taking proactive measures during the Construction Phase, potential environmental and social impacts emanating during the Operational Phase will be minimised. Monitoring of certain issues, such as the success of vegetation re-establishment and erosion control, will be required to continue during operation. The final Operational Phase section should be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.

4.4 CLOSURE & DECOMMISSIONING PHASE

This section includes principles for the decommissioning and closure phase of the Coega Gas to Power Infrastructure. This section will be required to be re-visited and updated at the time of decommissioning.

5 Mitigation and/or management measures

5.1 GENERAL CONSTRUCTION PHASE MITIGATION AND MANAGEMENT MEASURES

In addition to the mitigation and management measures which are stipulated in the Coega Gas to Power Infrastructure EIR (Section 5.2) and associated specialist reports (Section 5.3), the following general Construction Phase mitigation and management measures apply. Should the mitigation and management measures specified in the Table below contradict any of the measures in Sections 5.2 and 5.3, the latter will take precedence.

GENERAL CONSTRUCTION PHASE		
Activity		Mitigation and/or Management Measure
1.	Demarcation	<p>The location, layout and method of establishment of the construction camp, including the following, must be clearly indicated and demarcated prior to the commencement of construction:</p> <ul style="list-style-type: none"> • All Contractors’ offices; • Laydown areas; • Vehicle wash areas (if any); • Workshops and drip trays; • Fuel storage areas (including filling and dispensing from storage tanks); • Cement/concrete mixing areas (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete); and • Other infrastructure required for the project. <ul style="list-style-type: none"> • The Contractor must erect and maintain permanent and/or temporary fences in the locations directed by the ECO. Such fences should, if so specified, be erected before undertaking designated activities; and • Should “no-go” areas exist on the site, the Contractor must ensure that, insofar as he/she has the authority, no person, machinery, equipment or materials enter the “no-go” areas at any time.
2.	Site Access	<p>Details, including a drawing, showing where and how the access points and routes will be located and managed must be submitted to the ECO and the Developer. These should be supported by the following management requirements:</p> <ul style="list-style-type: none"> • On the site and within such distance of the site as may be stated, the Contractor should control the movement of all vehicles, including vehicles of suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles should be routed and operated in a manner that minimises the disruption to regular users of the routes; • On gravel or earth roads on site and within 500 m of the site, the Contractor’s vehicles as well as the suppliers’ vehicles must not exceed a speed of 40 km/h or as per the conditions of the EA; and • The Contractor must supply the ECO with a Method Statement detailing the location and management of all access points and roads.
3.	Materials Handling, Use & Storage	<ul style="list-style-type: none"> • The Contractor must ensure that any delivery drivers are informed of all procedures and restrictions (including identified "no-go" areas) required to comply with this EMPR; • The Contractor must ensure that these delivery drivers are supervised during offloading, by someone with an adequate understanding of the requirements of the EMPR; • Materials must be appropriately secured to ensure safe passage between destinations. Loads including, <i>but not limited to</i>, sand, stone chip, fine vegetation, refuse, paper and cement, should have appropriate cover to prevent them spilling

		<p>from the vehicle during transit.;</p> <ul style="list-style-type: none"> The Contractor will be responsible for any clean up resulting from the failure by his/her employees or suppliers to properly secure transported materials; All manufactured and/or imported material should be stored within the Contractor's camp and out of the rain; All laydown areas outside of the construction camp should be subject to the ECO's approval; and Imported gravel, fill, soil and sand materials should be free of weeds, alien invasive seed matter, plant material, litter and contaminants and must be obtained from sources approved by the ECO.
4.	Stockpiling	<ul style="list-style-type: none"> Any stockpiling of gravel, cut, fill or any other material including spoil must only be in areas that have been approved by the ECO within the defined working area; The Contractor should ensure that the material does not blow or wash away. If the stockpiled material is in danger of being washed or blown away, the Contractor should spray it with Dustex or cover it with a suitable material, such as hessian or plastic. Stockpiles of topsoil must not be covered with plastic; and No stockpiling of any material will be allowed within 20 m of any "no-go" areas (if applicable).
5.	Solid Waste Management	<ul style="list-style-type: none"> Onsite burning, burying or dumping of any waste materials, litter or refuse must not occur; The Contractor should provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must always be kept firmly on the bins; Bins must not be allowed to become overfull and should be emptied daily; The waste from bins may be temporarily stored onsite in a central waste area that is weatherproof and scavenger proof, and which the ECO has approved; Recyclable waste should be disposed of into separate skips/bins and removed offsite for recycling; All solid waste must be disposed of offsite at an approved registered landfill site; The Contractor must supply the ECO with the appropriate disposal certificates; and The Contractor must submit a solid waste management plan, as part of the Pollution Control Method Statement, to the ECO.
6.	Water Use	<ul style="list-style-type: none"> All sources of water for construction purposes must be approved by the ECO in writing before any such sources can be used to obtain water; and All wash water should be recycled for use as wash water again or for dust suppression, <i>where applicable</i>.
7.	Hazardous Substances	<ul style="list-style-type: none"> The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229; The Contractor must also comply with all other applicable regional and local legislation and regulations regarding the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) should be available onsite; Procedures detailed in the MSDSs must be followed in the event of an emergency; The Contractor should be responsible for the training and education of all personnel onsite that will be handling hazardous materials about their proper use, handling and disposal; and If potentially hazardous substances are to be stored or used onsite, the Contractor must submit a Method Statement to the ECO detailing the substances/materials to be used, together with the transport, storage, handling and disposal procedures for the substances.
8.	Cement & Mixing of Concrete	<ul style="list-style-type: none"> The proposed location of cement mixing areas (including the location of cement stores as well as sand and aggregate stockpiles) must be indicated on the site

		<p>layout plan and approved by the ECO;</p> <ul style="list-style-type: none"> • All wastewater generated from the operation and cleaning of concrete mixing equipment and other sources of concrete should be passed through a concrete wastewater settlement system; • The Contractor must ensure that minimal water is used for washing of concrete and cement mixing equipment; • Used cement bags must be disposed of in weatherproof bins onsite to prevent the generation of wind-blown cement dust and to prevent the bags from blowing away; • The Contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all surplus aggregate is removed; and • As part of the Pollution Control and Concrete Mixing Method Statement, a plan detailing all actions to be taken to comply with the requirements must be submitted to the ECO.
9.	Fuel & Oil	<p><u>Fuel Storage</u></p> <ul style="list-style-type: none"> • All construction materials including fuels and oil should be stored in demarcated areas which are contained within berms/bunds. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion; • All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking” and “Danger”, conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate fire-fighting equipment at the fuel storage area; • The Contractor must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank should be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 Part 1. The capacity of fuel storage tanks should not exceed 9 000 litres and must be kept on site only for as long as fuel is needed for construction activities, on completion of which they must be removed; • Tanks onsite should not be linked or joined via any pipe work but should remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund should be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining should extend to the crest of the bund. The floor of the bund should be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs/breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water, should be installed in the sump; • The tanks and banded areas should be covered by a roofed structure, taken offsite to a disposal site approved by the ECO and the material, which absorbs/breaks-down or encapsulates minor hydrocarbon spillages, should be replenished; • Adequate precautions should be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks should be stored in a waterproof container when not in use; and • As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing/breaking-down or encapsulating material to be used. <p><u>Refuelling</u></p> <ul style="list-style-type: none"> • Where reasonable and practical, the plant should be refuelled at a designated re-

		<p>fuelling area/depot or at a workshop as applicable. If this is not reasonable or practical then the surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities;</p> <ul style="list-style-type: none"> • If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used, and the drum should not be tipped in order to dispense fuel. The Contractor should ensure that the appropriate fire-fighting equipment is present during refuelling operations; and • The Contractor must ensure that there is always a supply of absorbent material readily available to absorb/breakdown or, where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the ECO must approve this material. <p><u>Used oil and hydrocarbon contaminated materials</u></p> <ul style="list-style-type: none"> • Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal site; and • Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material which breaks-down or encapsulates such spillages, as approved by the ECO.
10.	Workshop, Equipment Maintenance & Storage	<ul style="list-style-type: none"> • The Contractor should ensure that in the workshop and other plant maintenance facilities, including those areas where, after obtaining the ECO's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop must have a smooth impermeable (concrete or thick plastic covered with sand) floor; • The floor should be bunded and sloped towards an oil trap or sump to contain any spillages. When servicing equipment, drip trays should be used to collect the waste oil and other lubricants. Drip trays should also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders and vehicles); • All vehicles and equipment must be kept in good working order and serviced regularly. Leaking equipment should be repaired immediately or removed from the site; • All vehicle and equipment washing must be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing should be restricted to low phosphate and nitrate products and low sudsing-type detergents; and • As part of the site layouts, a plan must be submitted to the ECO detailing the design of the bunding of the workshop and how runoff from the workshop will be managed as well as how drip trays, which are used under plant, will be managed.
11.	Ablution Facilities	<ul style="list-style-type: none"> • Washing, whether of a person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The Contractor must provide the necessary ablution facilities for all the personnel prior to the commencement of work; • Ablution facilities must be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. Toilets should be situated within 200 m of any area where work is taking place and in numbers which are enough to meet the ratio depicted above for the workers in the area; • The facilities should be maintained in a hygienic state and serviced regularly. Toilet paper must be provided. Temporary/portable toilets should be secured to the ground to prevent them toppling due to wind or any other cause. This should be to the satisfaction of the ECO; and • Discharge into the environment and burial of waste is strictly prohibited. The Contractor must ensure that no spillage occurs when the toilets are cleaned or

		emptied and that the contents are removed from the site. Toilets must be emptied before any temporary site closure.
12.	Eating Areas	<ul style="list-style-type: none"> The Contractor should designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the Contractor’s camp area onsite; At mealtimes, all workers should eat in designated eating areas. These areas should have shade for the workers; Enough bins must be present in these areas. All disposable food packaging must be disposed of in the bins after every meal; and The feeding- or leaving of food for animals is strictly prohibited.
13.	Site Structures	<ul style="list-style-type: none"> All site establishment components (as well as equipment) should be positioned to limit visual intrusion on neighbouring areas and the size of the land area disturbed. The type and colour of roofing and cladding materials of the Contractor’s temporary structures should be selected to reduce reflection; and The Contractor should supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials which could deteriorate or corrode if exposed to the weather should be weatherproof, adequately ventilated and provided with raised floors.
14.	Lighting	<ul style="list-style-type: none"> The Contractor should ensure that any lighting installed on the site for their activities does not cause a reasonably avoidable disturbance to neighbouring residents or the naturally occurring fauna.
15.	Noise	<ul style="list-style-type: none"> The Contractor should take precautions to minimise noise generated on site (e.g. install and maintain silencers on machinery); The Contractor must comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act; Appropriate directional and intensity settings are to be maintained on all hooters and sirens; Where reasonable and practical, work should be limited to daylight hours – between 06:00 and 18:00; and No amplified music must be allowed on site. The Contractor must not use sound amplification equipment on site unless in emergency situations.
16.	Dust Control	<ul style="list-style-type: none"> The Contractor will be responsible for the continued control of dust arising from their activities. The Contractor should take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. Appropriate dust suppression measures include spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the Contractor cannot dampen the dust to the satisfaction of the ECO, then the ECO may halt operations until such time as the conditions are more suitable for lower dust generating construction activities; Areas which are to have the topsoil stripped for construction purposes must be limited and only stripped prior to the work taking place; Other activities and situations which could result in nuisance dust include site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing; and The appropriate health and safety equipment (e.g. dust masks) should be worn by workers during the phases of dust-producing construction activity.
17.	Environmental Awareness Training	<ul style="list-style-type: none"> Environmental awareness training courses should be run for all personnel onsite (See Annexure A for a proposed Basic Environmental Education Course). Two (2) courses should be run, one (1) for the Contractor’s and Subcontractor’s management and one (1) for all site staff and labourers. Courses should be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees should remain for the duration of the course and sign an attendance register on completion, that clearly indicates participant’s names, a copy of which must be handed to the ECO; The Contractor should allow for enough sessions to train all personnel. Subsequent

		<p>sessions should be run for any new personnel entering the site. A Method Statement with respect to the organisation of these courses should be submitted; and</p> <ul style="list-style-type: none"> • Notwithstanding the specific provisions of this clause, the Contractor is obligated to convey the sentiments of the EMPR to all personnel and Subcontractors involved with the works.
18.	Fire Control	<ul style="list-style-type: none"> • The Contractor must take all the necessary precautions to ensure that fires are not started as a result of site activities; • No open fires must be permitted on the site; • Smoking must not be permitted in areas where there is a fire hazard. Such areas include the workshop and fuel storage areas and any areas where vegetation or other material is such as to support the rapid spreading of an initial flame; • The Contractor should appoint a Fire Officer who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed. The Contractor must forward the name of the Fire Officer to the ECO for approval within seven (7) days of being on site; • The Contractor must ensure that basic firefighting equipment is always available onsite. This should include at least rubber beaters, when working in urban open spaces and natural areas, and at least one (1) fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken; and • The Contractor will be liable for any expenses incurred by any organisations called to assist with fighting fires which resulted due to their activities or the activities of their personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.
19.	Emergency Procedures	<ul style="list-style-type: none"> • Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and should be clearly displayed at relevant locations at the site. The Contractor should advise the ECO of any emergencies onsite, together with a record of action taken, within 24 hours of the emergency occurring; and • The Contractor must submit a Method Statement which covers the procedures for emergencies, such as fire and accidental leaks and spillages. <p><u>Fire</u></p> <ul style="list-style-type: none"> ○ The Contractor should advise the relevant authority of a fire as soon as one (1) starts. It is crucial that this is done before the fire is out of control; and ○ The Contractor must ensure that all employees are aware of the procedures to be followed in the event of a fire. <p><u>Accidental leaks and spillages</u></p> <ul style="list-style-type: none"> ○ The Contractor must ensure that all employees are aware of the procedures to be followed for dealing with spills and leaks, which must include notifying the ECO and the relevant authorities. The Contractor must ensure that all the necessary materials and equipment for treating and remedying spills and leaks are available onsite at all times. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the ECO; ○ In the event of a hydrocarbon spill, the source of the spillage must be isolated, and the spillage contained. The area should be cordoned off and secured. The Contractor should ensure that there is always a supply of absorbent material readily available to absorb/breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill; and ○ Any spills must be cleared, and the contaminated soil or sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.
20.	Protection of	<ul style="list-style-type: none"> • The Contractor must not deface, paint, damage or mark any natural features (e.g.

	Natural Features	<p>rock formations or trees) situated in or around the site for survey or other purposes unless agreed upon beforehand with the ECO. Any features affected by the Contractor in contravention of this clause must be restored/rehabilitated to the satisfaction of the ECO; and</p> <ul style="list-style-type: none"> • The Contractor and staff may not enter dense, intact vegetation without written approval from the ECO.
21.	Protection of Flora & Fauna	<ul style="list-style-type: none"> • A suitably qualified Botanist or Horticulturist should identify the need for plant search and rescue (prior to construction) to identify any plant Species of Conservation Concern (SCC) which require relocation; • Protected plant species should then be removed from the designated construction footprint and relocated to adjacent areas of similar habitat which will not be affected by construction activities. Or the plants should be stored in a suitable nursery and used in landscaping once construction is complete (if applicable); • Except to the extent necessary for the carrying out of the works, flora should not be removed, damaged or disturbed; • The removal and stockpiling of topsoil must be carried out in accordance with this EMPr; • Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted onsite during construction; • The use of chemicals of all forms should be carefully controlled and monitored to avoid contamination of surrounding areas; and • The construction phase should allow for the education of staff as to the significance of floral and faunal SCC.
22.	Protection of Heritage Features	<ul style="list-style-type: none"> • Construction managers and/or foremen must be informed, prior to the commencement of the construction phase, of the possible types of heritage sites and cultural material which could be encountered during construction activities and the procedures to follow if/when they find such sites; • If concentrations of palaeontological and/or archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Eastern Cape Provincial Heritage Resources Authority (ECPHRA), the South African Heritage Resources Agency (SAHRA) (021 642 4502) and/or the South African Police Service (SAPS) in the case of human remains so that systematic and professional investigation/excavation can be undertaken; and • Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act (Act No. 25 of 1999).
23.	Vegetation Clearance	<ul style="list-style-type: none"> • Vegetation clearing and trampling should be avoided in areas demarcated as “no-go” areas (<i>if any</i>); • Temporary infrastructure such as the site camp, laydown areas and storage areas must be placed in the location which has been approved by the ECO; • The Contractor must work according to a plan, which demarcates areas to be cleared. The plan should be part of the Project Layout Plan developed during the Site Design Phase; • The minimum amount of vegetation clearance must take place; and • Collection of, or wilful damage to, any plants outside of the areas demarcated for clearing is not allowed.
24.	Topsoil	<ul style="list-style-type: none"> • Topsoil should only be stripped from the areas as indicated below: <ul style="list-style-type: none"> ○ The approved development footprint; ○ Any area which is to be used for temporary storage of materials; ○ Areas which could be polluted by any aspect of the construction activity; and ○ Areas designated for the dumping of soil. • Stripping of topsoil should be undertaken in such a manner as to minimise erosion by wind or runoff; • Outside of the development footprint, topsoil should not be stripped to a depth below 150 mm from the original ground level;

		<ul style="list-style-type: none"> • Areas from which the topsoil is to be removed must be cleared of any foreign material which could form part of the topsoil during removal, these materials include bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil; • The Contractor must ensure that subsoil and topsoil are not mixed during stripping, excavation, storage, reinstatement or rehabilitation. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost; • Soils should be exposed for the minimum time possible once cleared; • Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky materials; • Topsoil should only be stockpiled in areas designated by the ECO; • Stockpiles should either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds; and • Stockpiled topsoil must not be compacted.
25.	Stormwater Management	<ul style="list-style-type: none"> • Stormwater should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any runoff from the development site is attenuated prior to discharge. Silt and sedimentation should be kept to a minimum, using the above-mentioned structures. Ensure that the structures do not create any form of erosion; and • Natural runoff must be diverted to stormwater drains, where these are available.
26.	Erosion & Sedimentation Control	<ul style="list-style-type: none"> • The Contractor must take all reasonable measures to limit erosion and sedimentation due to construction activities and must comply with such detailed measures as required by the EMPR; • Revegetate areas, which have been disturbed, as soon as possible; • Where erosion and/or sedimentation occur, whether on site or in proximity to the site, despite the Contractor complying with the aforementioned, rectification should be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification must be carried out to the reasonable requirements of the ECO and at the expense of the Contractor; and • Actions must also be taken in the event of heavy rains and potential flooding, whereby diversion barriers must not cause excessive erosion.
27.	Aesthetics	<ul style="list-style-type: none"> • The Contractor must take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.
28.	Community Relations	<ul style="list-style-type: none"> • The Contractor must keep a "Complaints Register" onsite. The Register should contain all contact details of the person who made the complaint, and information regarding the complaint itself as well as the date and time that the complaint was resolved; • The ECO and/or the Community Liaison Officer (CLO) will be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff; and • Construction materials and other purchases relating to the project should be done, where possible, within the nearby community and at local stores.
29.	Temporary Site Closure	<ul style="list-style-type: none"> • If the site is closed for a period exceeding five (5) days, the Contractor's Safety, Health and Environment (SHE), in consultation with the ECO, should carry out the following checklist procedure and ensure that the following conditions are adhered to and report on compliance with this clause: <p><u>Fuels/flammables/hazardous materials stores</u></p> <ul style="list-style-type: none"> • Fuel stores are as low in volume as practicable; • There are no leaks; • The outlet is secure and locked; • The bund is empty; • Fire extinguishers are serviced and accessible; • The area is secure from accidental damage through vehicle collision and the like; • Emergency and contact numbers are available and displayed; and

	<ul style="list-style-type: none"> • There is adequate ventilation in enclosed spaces. <p><u>Safety</u></p> <ul style="list-style-type: none"> • Ensure that the site safety checks have been carried out in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) prior to site closure; • An inspection schedule and log for use by security or contracts staff is developed; • All trenches and manholes are secured; • Applicable notice boards are in place and secured; • Emergency and Management contact details are prominently displayed; • The contact details of the CLO are prominently displayed; • Security personnel have been briefed and have the facilities available to contact or be contacted by relevant management and emergency personnel; • Night hazards such as reflectors, lighting, traffic signage, etc. have been checked; • Fire hazards identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.; • Pipe stockpiles are wedged/secured; • Scaffolds are secure; and • Structures vulnerable to high winds are secure. <p><u>Erosion</u></p> <ul style="list-style-type: none"> • Wind and dust mitigation measures such as straw, brush packs, irrigation, etc. are in place; • Excavated and filled slopes and stockpiles are at a stable angle; • Re-vegetated areas have a watering schedule and the supply to such areas is secured; and • There are enough detention ponds or channels in place. <p><u>Water contamination and pollution</u></p> <ul style="list-style-type: none"> • Hazardous fuel stores are secure; • Cement and material stores are secure; • Toilets are empty and secured; • Refuse bins are empty and secured; • Bunding is clean and treated with appropriate material which will absorb/breakdown and, where possible, be designed to encapsulate minor hydrocarbon spillages; and • Drip trays are empty and secure.
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5.2 EIR MITIGATION AND MANAGEMENT MEASURES

The following table sets out the potential general environmental and social issues which could occur during the lifespan of the Coega Gas to Power Infrastructure development, as per the *Draft Environmental Impact Report (EIR): Coega Gas to Power Infrastructure, Eastern Cape Province. CES. February 2023*. The Draft EIR provides mitigation measures and recommendations in an effort to reduce the significance of potential negative impacts and enhance potential benefits for the Planning and Design, Construction, Operational and Decommissioning Phases of the proposed Coega Gas to Power Infrastructure.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
PLANNING & DESIGN PHASE		
<i>GENERAL IMPACTS</i>		
Traffic & Transport	Inadequate planning for the transportation of Gas Infrastructure and construction equipment to the site by long and/or slow-moving vehicles could cause traffic congestion, especially if temporary road closures are required.	<ul style="list-style-type: none"> ▲ <i>Project planning must include a plan for traffic control that will be implemented, especially during the construction phase of the development. Consultation with the local Road Traffic Unit in this regard must be done early in the planning phase. The necessary road traffic permits must be obtained for transporting parts, containers, materials and</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	<p>The integrity of existing highway infrastructure such as bridges and barriers may be compromised by the heavy vehicle traffic delivering components to the site.</p>	<p>construction equipment to the site.</p> <ul style="list-style-type: none"> ✦ Careful planning of the routes taken by heavy vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified, these areas must be upgraded if necessary.
<p>Storage of Hazardous Substances</p>	<p>Inappropriate planning for the storage of hazardous substances such as diesel, paint, pesticides, etc, tools and equipment used on site could lead to surface and ground water pollution e.g. due to oil leaks, spillage of diesel etc. In addition, these hazardous substances could be washed off into nearby drainage lines. The mixing of cement on site could result in ground water contamination from compounds in the cement. In addition, a large number of cement mixing stations on site could increase the presence of impermeable areas which in turn could increase rates of runoff and thereby increase the risk of localized flooding, soil erosion, silting, gully formation, etc.</p>	<ul style="list-style-type: none"> ✦ All hazardous substances such as paints, diesel and cement must be stored in a bunded area with an impermeable surface beneath them. ✦ Cement mixing must be conducted at a single location which must be centrally located, where practical. This mixing must take place on an impermeable surface, and dried waste cement must be disposed of with building rubble.
<p>Environmental Legal and Policy Compliance</p>	<p>Failure to adhere to existing policies and legal obligations could lead to the project conflicting with local, provincial and national policies, guidelines and legislation. This could result in lack of institutional support for the project, overall project failure and undue disturbance to the natural environment.</p>	<ul style="list-style-type: none"> ✦ Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy. ✦ These must include (but not restricted to): <ul style="list-style-type: none"> ▪ Local and District Spatial Development Frameworks ▪ Local Municipal bylaws ✦ In addition, planning for the construction and operation of the proposed energy facility must consider available best practice guidelines.
<p>Stormwater Management and Erosion</p>	<p>The introduction of roads and impermeable areas could increase rates of runoff and therefore the risk of localised flooding.</p>	<ul style="list-style-type: none"> ✦ Structures must be located at least 32m away from identified drainage lines. ✦ A Stormwater Management Plan must be designed and implemented to ensure maximum water seepage at the source of water flow. ✦ The plan must also include management mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.
<p>Management of General Waste</p>	<p>Inappropriate planning for management and disposal of waste e.g. storage disposal could result in surface and ground water contamination.</p>	<ul style="list-style-type: none"> ✦ Develop and implement a waste management plan for handling on site waste. ✦ Designate an appropriate area where waste can be stored before disposal. ✦ General Waste must be disposed of at a registered landfill site.
<p>Scheduling of Construction</p>	<p>Construction scheduling that does not take into account the seasonal requirements of</p>	<ul style="list-style-type: none"> ✦ Wherever possible, construction activities must be undertaken during the driest part of

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	the aquatic environment, e.g. allowing for unimpeded flood events, could lead to short-term (and potentially long-term) impacts such as excessive sediment mobilization, etc.	<p><i>the year to minimize downstream sedimentation due to excavation, etc.</i></p> <ul style="list-style-type: none"> ✦ <i>When not possible, suitable stream diversions structures must be used to ensure that rivers/streams are not negatively impacted by construction activity.</i>
CONSTRUCTION PHASE		
<i>GENERAL IMPACTS</i>		
Traffic and Transport	Increased traffic volumes, affecting traffic flow during construction.	<ul style="list-style-type: none"> ✦ <i>Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic;</i> ✦ <i>Traffic accommodation measures to be provided in terms of Chapter 13 of the South African Road Traffic Signs Manual;</i> ✦ <i>Measures to be provided subject to approval by the Engineer; and</i> ✦ <i>Ensure construction traffic is confined to site area where possible.</i>
Traffic and Transport	Additional Axle Loading resulting in deterioration of road condition during construction.	<ul style="list-style-type: none"> ✦ <i>Minimise need for continuous construction traffic on Ring Road by confining construction traffic to the site;</i> ✦ <i>Ensure that vehicle loads are within legislated limits, i.e. Gross vehicle mass of 56 000kg; and</i> ✦ <i>Source relevant permits from the EC Department of Transport should abnormal loads be required for transport of components.</i>
Traffic and Transport	Traffic Safety Impact due to additional / high-speed traffic during construction.	<ul style="list-style-type: none"> ✦ <i>Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic, including speed restriction signage</i> ✦ <i>Increased law enforcement protocols.</i>
Dust Impacts	Dust impacts caused by general construction related activities.	<ul style="list-style-type: none"> ✦ <i>Clear vegetation in a phased manne</i> ✦ <i>Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be rehabilitated immediately on completion of the construction activity in that area</i> ✦ <i>Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated</i> ✦ <i>When transporting fine materials, dust tarps should be installed on vehicle</i> ✦ <i>Limit speeds on access and internal roads to</i> ✦ <i>When necessary, appropriate dust control measures (such as wetting of soil¹⁴ and covering of stockpiles) shall be implemented; and</i> ✦ <i>Maintain a complaints register to monitor levels of nuisance experienced by</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p><i>neighbours and respond to complaints by increasing the frequency and/or intensity of the dust suppression.</i></p>
<p>Nuisance Dust</p>	<p>Dust is likely to be a potential nuisance due to the construction activities.</p>	<ul style="list-style-type: none"> ✦ <i>Fugitive/nuisance dust must be reduced by implementing one of or a combination of the following:</i> <ul style="list-style-type: none"> ▪ <i>Damping down of un-surfaced and un-vegetated areas</i> ▪ <i>Retention of vegetation where possible</i> ▪ <i>Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring area</i> ▪ <i>A speed limit of 40km/h must not be exceeded on dirt roads</i> ✦ <i>Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Contractor.</i>
<p>Fire</p>	<p>Veld fires and fire management</p>	<ul style="list-style-type: none"> ✦ <i>No fires on or around the site allowed;</i> ✦ <i>Sufficient fire-fighting equipment to be maintained and be accessible on sites at all times; and</i> ✦ <i>Any incidents or accidents must be recorded, and a record thereof must be kept on site.</i>
<p>Fire</p>	<p>Risk of runaway fires from construction activities related to having people on site, such as cooking, smoking or burning of vegetation might lead to the burning of surrounding vegetation.</p>	<ul style="list-style-type: none"> ✦ <i>There must be no burning of construction waste or debris onsite.</i> ✦ <i>Cooking and burning of vegetation is not permitted on site.</i> ✦ <i>Smoking on site must be confined to a designated area in the vicinity of the site office which must be equipped with the necessary fire extinguishers.</i>
<p>Soil, Stormwater and Erosion Impacts</p>	<p>Pollution of Soil and Stormwater, and increase in Erosion.</p>	<ul style="list-style-type: none"> ✦ <i>Disturbance of soil and the natural vegetation to be kept to the minimum;</i> ✦ <i>Use existing access tracks where possible;</i> ✦ <i>Handling of hazardous liquids over impermeable surfaces only to prevent leaks or spills; and</i> ✦ <i>An erosion control plan must be compiled by a suitably experienced specialist, outlining specific recommendations for stabilisation of dunes that are cleared or disturbed during construction. This must be compiled in conjunction with a revegetation plan by a suitably experienced specialist in coastal vegetation</i>
<p>Stormwater Management</p>	<p>Sediment is likely to be created during construction. This could be washed off into the nearby drainage line e.g. during the excavation of foundations, the laying of access roads within the site, digging of cable runs and soil stripping and stockpiling to create foundations and temporary areas of</p>	<ul style="list-style-type: none"> ✦ <i>The recommendations of the stormwater management plan must be implemented to avoid soil erosion and siltation of drainage line.</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	hard-standing, such as the construction camp.	
Degradation of Drainage Lines from Earthworks	Unplanned construction activities or earthworks that occur close to onsite drainage lines could cause adverse impacts such as soil erosion, siltation, and blockage of the drainage line.	<ul style="list-style-type: none"> ✦ <i>There must be no earthworks within 32m of the drainage lines to avoid contamination of water sources.</i>
Management of General Waste	Littering by construction workers could cause surface and ground water pollution.	<ul style="list-style-type: none"> ✦ <i>A waste management plan incorporating recycling and waste minimisation must be implemented. The Waste Management Plan must be explained to all employees as part of the environmental induction training.</i>
Waste Management	Poor Waste Management resulting in pollution of the surrounding area	<ul style="list-style-type: none"> ✦ <i>A waste management plan should be in place and should address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping;</i> ✦ <i>The Contractor must identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling;</i> ✦ <i>No disposal of wastes, other than at registered landfill sites;</i> ✦ <i>No waste may be burned;</i> ✦ <i>Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licenced landfill site, and proof of disposal retained for auditing purposes);</i> ✦ <i>Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage; and</i> ✦ <i>Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO</i>
Hazardous Substances	Onsite maintenance of construction vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals contaminating surface and ground water. Surface and ground water pollution could arise from the spillage or leaking of diesel, lubricants and cement during construction activities.	<ul style="list-style-type: none"> ✦ <i>The storage of fuels and hazardous materials must be located away from sensitive water resources.</i> ✦ <i>All hazardous substances (e.g. diesel, oil drums, etc.) must be stored in a bunded area.</i> ✦ <i>The recommendations of the stormwater management plan must be implemented during construction.</i>
Management of Construction	Waste from construction activities e.g. excess concrete and cement mixture, empty	<ul style="list-style-type: none"> ✦ <i>A waste management plan for the project must be developed and implemented in the</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
Waste	paint containers, oil containers, etc., could cause pollution of ground and surface water when they come into contact with runoff water.	<p><i>construction phase.</i></p> <ul style="list-style-type: none"> ✦ <i>All waste must be disposed of at an appropriately licensed landfill site.</i> ✦ <i>All construction materials must be stored in a central and secure location with controlled access with an appropriate impermeable surface.</i> ✦ <i>The recommendations of the Stormwater Management Plan must be implemented to mitigate the impacts of runoff water on pollution.</i>
Water Quality	Wet concrete is highly alkaline. This could result in flash kills of macroinvertebrates and fish species in the vicinity. Soil erosion will decrease the quality of the aquatic habitat downstream of the construction activities by silting over exposed rocks and decreasing the clarity and oxygen saturation of the water. Soil erosion will decrease the quality of the aquatic habitat downstream of the construction activities by silting over exposed rocks and decreasing the clarity and oxygen saturation of the water.	<ul style="list-style-type: none"> ✦ <i>No concrete mixing will take place within 32m of any watercourse.</i> ✦ <i>The concrete batching plant must be clearly demarcated, and no sprawl must be tolerated.</i>
Disposal of Spoil Material	Incorrect disposal of subsoil/spoil material could result in significant loss of a useful resource.	<ul style="list-style-type: none"> ✦ <i>Subsoil cannot be disposed of onsite without the appropriate Waste License in terms of the NEMA: Waste Act.</i> ✦ <i>Spoil could be used to rehabilitate open borrow pits or erosion features.</i> ✦ <i>Disposal of spoil material to a registered landfill must be the last option.</i> ✦ <i>No spoil stockpiles will be allowed to remain onsite once construction activities have ceased.</i>
Visual Impact/Sense of place	Change in visual character and sense of place due to earth moving and other construction activities.	<ul style="list-style-type: none"> ✦ <i>Disturbance to the natural vegetation to be kept to the minimum;</i> ✦ <i>Dust control measures such as wetting and covering of stockpiles to be implemented when necessary; and</i> ✦ <i>Effective waste management.</i>
Heritage Resource Impacts	Damage or destruction of concentrations of palaeontological/ archaeological material.	<ul style="list-style-type: none"> ✦ <i>An archaeologist must be present on-site during vegetation clearing of selected strips of vegetation (to be identified by the archaeologist). Clearing must be by small machinery, or the least invasive method of clearing.</i> ✦ <i>Monitoring by an archaeologist must take place during all earthmoving activities, including, but not limited, to trenching and piling.</i> ✦ <i>If any concentrations of heritage material / fossils are exposed during construction, all work in that area must cease and it must be reported immediately to the Albany Museum so that the required investigations can be undertaken. This could entail Phase 2 mitigation (to be</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p>determined by the Albany Museum).</p> <ul style="list-style-type: none"> ✦ After vegetation clearing a report must be sent to SAHRA for review and guidance on the way forward. ✦ Any excavations in the Salnova formation must be examined and sampled by a professional palaeontologist WHILE fresh bedrock is still exposed. The presence of a palaeontologist is required on site soon after exposure. ✦ Should historic remains be uncovered during construction of the port infrastructure , all works must cease until SAHRA has been contacted to advise the way forward
<p>General construction related impact</p>	<p>Damage to other infrastructure.</p>	<ul style="list-style-type: none"> ✦ Existing infrastructure and services within or close to the construction footprint are to be located (via GPR if necessary) and demarcated prior to construction activities commencing; ✦ Relevant authority agencies and/or Department of the service supplied are to be notified should existing infrastructure be damaged by construction related activities; and ✦ Other users are to be notified of any planned disruptions to services ahead of time.
OPERATIONAL PHASE		
<i>GENERAL IMPACTS</i>		
<p>Traffic and Transport</p>	<p>Increased traffic volumes, affecting traffic flow during construction.</p>	<ul style="list-style-type: none"> ✦ No measures required to accommodate additional traffic.
<p>Traffic and Transport</p>	<p>Traffic Safety Impact due to additional / high-speed traffic during construction.</p>	<ul style="list-style-type: none"> ✦ Suitable warning traffic signage must be provided to ensure safe operation along access roads; and ✦ Ongoing enforcement along access roads.
<p>Architecture of Ancillary Infrastructure</p>	<p>Control buildings, toilet facilities and other ancillary infrastructure could cause negative visual intrusion if allowed to fall into disrepair and not maintained properly.</p>	<ul style="list-style-type: none"> ✦ All project structures and buildings must be maintained.
<p>Hazardous Chemical Storage</p>	<p>Inappropriate storage of chemical, herbicides, diesel and other hazardous substances on site could result in soil and water contamination and pose a high accident danger risk.</p>	<ul style="list-style-type: none"> ✦ All hazardous substances must be stored in appropriately bunded locations.
<p>Increased Stormwater Runoff</p>	<p>Failure to maintain the storm water system could increase the risk of surface water damage to the landscape and vegetation from increased rates of runoff and therefore the risk of localised flooding and increased sheet erosion downstream due to the presence of roads and impermeable areas of hard standing.</p>	<ul style="list-style-type: none"> ✦ Recommendations of the Stormwater Management Plan must be implemented.
<p>Waste Management</p>	<p>There could be littering by maintenance workers and security personnel on site</p>	<ul style="list-style-type: none"> ✦ A waste management plan incorporating recycling and waste minimisation must be implemented. The Waste Management Plan

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
<p>Waste Management</p>	<p>Poor Waste Management resulting in pollution of the surrounding area.</p>	<p><i>must be explained to all employees as part of the environmental induction training.</i></p> <ul style="list-style-type: none"> ✦ <i>The developer must identify and separate materials that can be reused or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins/skips for these items. These wastes must then be sent for recycling and records kept of recycling;</i> ✦ <i>No dumping within the surrounding area shall be permitted, and no waste may be buried or burned on site;</i> ✦ <i>Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licenced landfill site, and proof of disposal retained for auditing purposes);</i> ✦ <i>Cleared alien vegetation should be disposed of so that it does not re-establish on site;</i> ✦ <i>Regular (weekly) waste collection service to be provided; and</i> ✦ <i>All staff shall be trained on correct waste management.</i>
<p>Soil, Stormwater and Erosion impacts</p>	<p>Pollution of Soil and Stormwater, and increase in Erosion.</p>	<ul style="list-style-type: none"> ✦ <i>Implementation of a site specific stormwater management plan, in accordance with the CDC's overarching stormwater management strategy for the SEZ, to ensure stormwater exiting the site meets the requirements in terms of quality and volume;</i> ✦ <i>Harvesting of rainwater and stormwater where possible for use on site;</i> ✦ <i>Separation of clean and dirty stormwater on site and treatment of dirty stormwater prior to discharge; Ensure all storage and handling of hazardous liquids takes place over an impermeable surface to capture any leaks or spills for disposal or further treatment; and</i> ✦ <i>Include bunding to at least 110% of storage capacity around all fuel and chemical storage vessels where appropriate to do so, to capture any spills / leaks</i>
DECOMMISSIONING PHASE		
<i>GENERAL IMPACTS</i>		
<p>Pollution</p>	<p>Littering by construction workers could cause surface and ground water pollution.</p> <p>Onsite maintenance of construction vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals contaminating surface and ground water. Surface and ground water</p>	<ul style="list-style-type: none"> ✦ <i>Littering must be avoided, and litter bins must be made available at various strategic points on site.</i> ✦ <i>Refuse from the construction site must be collected on a regular basis and deposited at an appropriate landfill.</i> ✦ <i>No storage of fuels and hazardous materials must be permitted near sensitive water resources. All hazardous substances (e.g. diesel, oil drums, etc.) to be stored in a bunded area.</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	pollution could arise from the spillage or leaking of diesel, lubricants, and cement during construction activities.	
Dust	Dust is likely to be a potential nuisance due to the decommissioning activities.	<ul style="list-style-type: none"> ✦ <i>Fugitive/nuisance dust could be implemented through the following:</i> <ul style="list-style-type: none"> ▪ <i>Damping down of un-surfaced and un-vegetated areas;</i> ▪ <i>Retention of vegetation where possible; Demolitions and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas;</i> ▪ <i>A speed limit of 40km/h must not be exceeded on dirt roads.</i> ✦ <i>Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Contractor.</i>
Traffic & Transport	A high number of heavy vehicle movements will occur during the decommissioning phase. This may have a detrimental effect on sensitive receptors.	✦ <i>Construction vehicles and machinery must make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment.</i>
Soil Erosion	After the removal of all wind turbine related structures, the disturbed soils could become exposed, unstable and prone to erosion.	✦ <i>After the removal of all wind turbine-related structures, the disturbed soils must be re-vegetated to avoid unnecessary soil erosion.</i>
Land-Use	Land previously unavailable for certain types of land use will now be available for those uses.	✦ <i>No mitigation necessary</i>

5.3 SPECIALIST MITIGATION AND MANAGEMENT MEASURES

In addition to Section 5.2, which contains the General Coega Gas to Power Infrastructure EIR issues with suitable recommendations and mitigation measures. The following table sets out the specialist issues which could occur during the lifespan of the Coega Gas to Power Infrastructure development, as included in the *Draft Environmental Impact Report (EIR): Coega Gas to Power Infrastructure, Eastern Cape Province. CES. February 2023*. The specialists have each provided mitigation measures and recommendations in an effort to reduce the significance of potential negative impacts and enhance potential benefits for the Planning and Design, Construction, Operational and Decommissioning Phases of the proposed Coega Gas Infrastructure.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
PLANNING & DESIGN PHASE		
<i>AIR QUALITY IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>CLIMATE CHANGE IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>MARINE ECOLOGICAL IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
Intake Of Large Volumes Of Seawater From The Port	The impingement and entrainment of marine organisms through the intake of large volumes of seawater by the LNGC and FSRU for ballasting and heating and cooling of onboard processes is deemed to potentially be of medium intensity. The effect will be highly localised but would continue over the medium- (FSRU and LNGC) to long-term (LNGC only) and is assessed to be of medium significance	<ul style="list-style-type: none"> ✦ <i>Design intakes to minimise entrainment or impingement by reducing the average intake velocity to about 0.1 to 0.15 m/s. This is comparable to background currents in the oceans, and will allow mobile organisms to swim away from the intake under these flow conditions (UNEP 2008)</i> ✦ <i>Undertake an entrainment study to more accurately determine the potential impacts of impingement and entrainment on communities within the Port of Ngqura</i>
<i>TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>NOISE IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>SAFETY RISK ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>SOCIO-ECONOMIC IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>TRAFFIC IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
CONSTRUCTION PHASE		
<i>MARINE IMPACT ASSESSMENT</i>		
Loss Of Benthic Communities	Removal and disturbance of seabed sediments may occur due to the following project-related activities during construction and operation: <ul style="list-style-type: none"> ✦ dredging within the port for the new LNG berth and release of dredge spoil; ✦ construction of underwater revetments and rock armour, ✦ construction of piles into the seabed for the LNG terminal, and ✦ discharge of heating and cooling water from 	<ul style="list-style-type: none"> ✦ <i>Fit deflector plates to discharges directed vertically downwards to modify the discharge to 45°.</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	the LNGC and FSRU (depending on discharge depth and velocity) during operation.	
Reduced Physiological Functioning Of Marine Organisms (Due To Turbidity)	Sediment resuspension and increased turbidity may occur due to the construction activities within the Port. Impacts on marine organisms are related to the concentration of suspended material and duration of exposure to it, and range from reduced visibility for feeding, clogging of gills, diminished light penetration affecting photosynthetic capability of aquatic plants	<ul style="list-style-type: none"> ✦ <i>All dredging activities and associated environmental monitoring must be conducted in accordance with the conditions stipulated under the port expansion authorisation.</i> ✦ <i>All contractors must have an approved Environmental Management Plan in place that ensures that environmental impacts are minimised as far as practicable possible</i> ✦ <i>Manage suspended sediment plumes generated during dredging and construction of the LNG Terminal by the installation of silt curtains.</i>
Marine Contamination (Rebolisation)	Resuspension of sediments during dredging and dumping of dredge spoil, as well as construction of piles for the access trestle along the breakwater, may result in the release of contaminants, increased nutrient concentrations and potential alteration of dissolved oxygen levels in the water column.	<ul style="list-style-type: none"> ✦ <i>All dredging activities and associated environmental monitoring must be conducted in accordance with the conditions stipulated under the port expansion authorisation.</i>
Disturbance Of Marine Fauna	Dredging, dumping of dredge spoil, deposition of rocks onto the sea bed and pile driving, drilling, etc. during construction of the port infrastructure, as well as pumping of heating and cooling water by the LNGC and FSRU, and regasification of LNG will generate noise and vibrations that may be transmitted underwater and impact on marine organisms	<ul style="list-style-type: none"> ✦ <i>Restrict construction noise and vibration-generating activities to the absolute minimum required</i>
Waste Discharges To Sea	Dredging and construction activities, as well as operation of the LNGC and FSRU at the LNG terminal will result in a reduction of water quality from routine discharges to the sea from vessels	<ul style="list-style-type: none"> ✦ <i>Implement a waste management system that addresses all wastes generated at the various sites, shorebased and marine. This should include:</i> <ul style="list-style-type: none"> ○ <i>Separation of wastes at source;</i> ○ <i>Recycling and re-use of wastes where possible;</i> ○ <i>Treatment of wastes at source (maceration of food wastes, compaction, incineration, treatment of sewage and oily water separation).</i> ✦ <i>Implement leak detection and repair programmes for valves, flanges, fittings, seals, etc.</i> ✦ <i>Use a low-toxicity biodegradable detergent for the cleaning of all deck spillages.</i>
TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT		
Loss Of Indigenous Vegetation	Vegetation clearance for the construction of the proposed pipeline will result in the approximate loss of 4.42 ha of Grassridge Bontveld and 0.14 ha of Sundays Valley Thicket.	<ul style="list-style-type: none"> ✦ <i>The clearance of approximately 32.06 ha of vegetation must be limited to that which is strictly necessary for the installation of the pipeline and</i>

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	<p>Secondly, the clearance of vegetation for the construction of both the proposed pipeline and LNG hub site will result in the approximate loss of 19.85 ha of St Francis Dune Thicket and 11.25 ha of Cape Seashore Vegetation.</p> <p>Based on the current remaining extent of these vegetation types (NBA 2018), the proposed development is expected to alter less than 1% of these vegetation types.</p> <p>Consequently, due to the relatively small size of expected alteration (36,06 ha in total) and the small percentage loss (< 1%) of vegetation relative to remaining extent and combined with the ecological sensitivity of each vegetation type, this impact is rated moderate negative</p>	<p>construction of the hub site.</p> <ul style="list-style-type: none"> ✦ Laydown areas should be located within previously disturbed areas. ✦ The Search & Rescue (S&R) of rare, endemic, or threatened plant species, prior to vegetation clearance, must be carried out in accordance with the Project Vegetation Specification (PVS), by a competent and qualified service provider. ✦ The removal and stockpiling of topsoil must also be carried out in accordance with the PVS. ✦ Employees must be prohibited from making fires and harvesting plants. ✦ Existing access roads should be used as far as practically possible. ✦ The Alien Vegetation Management Plan developed for the Coega SEZ must be implemented and managed to prevent the further spread of alien invasive species within Zone 10 of the Coega SEZ.
<p>Loss Of Sensitive Species Habitat</p>	<p>Certain sensitive habitat (i.e., Damara Tern Colony and Rare Butterfly Habitat) and Species of Special Concern (i.e., A. clarki, M. schelpeana) occurring within the project area have been delineated and declared no-go areas. Should construction activities encroach on these areas, the impact associated with the loss of sensitive habitat and/or SCC would be high. However, if the recommended mitigation measures and buffers are implemented, the impact on these areas would be negligible.</p>	<ul style="list-style-type: none"> ✦ Areas delineated in the OSMP (2014) and habitat for SCC must be declared no-go areas. ✦ Construction vehicles and machinery used for the proposed development must not encroach into identified 'no-go' areas or areas outside the development footprint
<p>Loss Of Plant SCC</p>	<p>It is possible that four (4) Endangered species (B. litoralis, C. adscendens, R. gilliana, E. ericifolius), six (6) Vulnerable species (E. chloroloma, G. elliptica, A. stenopetala, E. glumiflora, O. rufibarbis and S. obtusata), and one (1) Near Threatened species (P. repens) that may occur within the project area.</p> <p>Due to the high number of rare, endemic, or threatened species in the project area, the loss of SCC is rated high negative</p>	<ul style="list-style-type: none"> ✦ The development footprint (i.e., pipeline and hub site) must be micro-sited prior to construction. During micro siting attempts must be made to avoid as many SCC's as possible, and if this not possible, geophytes and succulent species need to be translocated and the seeds of other species collected for propagation in a nursery for use in rehabilitation activities. ✦ No plants are to be removed, damaged, or disturbed outside of the extent of the development footprint nor vegetation planted. ✦ The S&R of rare, endemic, or endangered species prior to vegetation clearance must be carried out in accordance with PVS, by a competent and qualified service provider. ✦ Permits for the removal of plant

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		<p><i>species protected in terms of the Natal Nature Conservation Ordinance (No. 15 of 1974) must be obtained prior to vegetation clearance.</i></p> <ul style="list-style-type: none"> ✦ <i>The removal and stockpiling of topsoil must also be carried out in accordance with the PVS.</i> ✦ <i>Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the development footprint.</i>
<p>LOSS OF HERPETOFAUNA AND HABITAT</p>	<p>During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil, and the movement of construction vehicles) could result in wildlife mortalities through road kills or accidental killing, and/or cause the displacement of herpetofauna via increased noise or air pollution. Additionally, the loss of vegetation/soil due to clearance will result in the direct loss of faunal habitat, which will directly, and indirectly, impact on amphibians and reptiles adapted to their ground dwelling habitats. Reptiles also face a high risk of being poached in the wild, and the increase in individuals associated with the construction of the proposed development could create poaching opportunities. Moreover, Sensitive Species 18 is restricted to Bonteveld vegetation and has a high risk of being affected by construction (and operation) activities. As such, this impact is rated severe negative.</p>	<ul style="list-style-type: none"> ✦ <i>It is illegal to remove or kill amphibians and reptiles within the project area listed as either Schedule I or II on the PNCO unless the relevant permit is acquired.</i> ✦ <i>All construction staff must be educated with regards to wildlife conservation, and all staff employed by the development must ensure that any amphibians or reptiles encountered during construction of the proposed development are not harmed or killed.</i> ✦ <i>Amphibians and reptiles encountered must be allowed to move away from the construction area. In the event they need to be translocated, amphibians must be released in the same catchment areas while reptiles must be relocated to directly adjacent areas of the proposed development. No amphibian or reptile species may be removed off site without proper authorisation from the relevant authority.</i> ✦ <i>A rescue plan must be developed to protect reptiles which could fall into construction pits.</i> ✦ <i>The appointed ECO should be trained in snake handling and removal techniques.</i> ✦ <i>Herpetofauna SCC that may die due to construction activities associated with the proposed development must be recorded (e.g., photographed and GPS coordinates taken) and reported to the appointed ECO and relevant authorities (i.e., EWT). Where needed, the carcass should be donated to SANBI.</i> ✦ <i>All individuals, including construction workers must sign a register prior to accessing the construction site.</i> ✦ <i>Construction workers must not be housed on site.</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<ul style="list-style-type: none"> ✦ <i>Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads.</i> ✦ <i>Unless in case of emergencies, driving of construction vehicles within the project area must be restricted to day-light hours.</i> ✦ <i>Existing roads must be used as far as practically possible.</i> ✦ <i>An S&R must be undertaken by a qualified herpetologist for SCC, particularly Sensitive Species 18. This must be in line with the CDC’s Environmental Specifications relating to the translocation of wild animals.</i> ✦ <i>The construction of infrastructure near permanent waterbodies must be avoided. Moreover, some amphibian species breed in temporary waterbodies, therefore it is recommended that construction activities take place outside of the wet and rainy season.</i> ✦ <i>All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas.</i> ✦ <i>Construction vehicles and machinery must not encroach into identified ‘no-go’ areas or areas outside the development footprint.</i>
<p>LOSS OF MAMMALS AND HABITAT</p>	<p>Construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in wildlife mortalities through road kills or accidental killing, and/or cause the displacement of mammals via increased noise or air pollution. Additionally, the loss of vegetation/soil due to clearance will result in the direct loss of faunal habitat, which will directly, and indirectly, impact on small sedentary species adapted to their ground dwelling habitats. Larger more agile species such as antelope are likely to disperse to more suitable habitats away from construction areas. As such, this impact is rated moderate negative.</p>	<ul style="list-style-type: none"> ✦ <i>It is illegal to remove or kill mammals within the study area listed as either Schedule I or II on the PNCO unless the relevant permit is acquired.</i> ✦ <i>All construction staff must be educated with regards to wildlife conservation, and all staff employed by the developer must ensure that any mammals encountered during construction of the proposed development are not harmed or killed.</i> ✦ <i>Any mammals encountered must be allowed to move away from the construction area. The CDC’s Environmental Specifications relating to the translocation of wild animals must be adhered to in the event mammal SCC need to be translocated.</i> ✦ <i>Mammal SCC that may die due to construction activities associated with the proposed development must be recorded (e.g., photographed and GPS coordinates taken) and reported to</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p><i>the appointed ECO and relevant authorities (i.e., EWT). Where needed, the carcass should be donated to SANBI.</i></p> <ul style="list-style-type: none"> ✦ <i>Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads.</i> ✦ <i>Unless in case of emergencies, driving of construction vehicles within the project area must be restricted to day-light hours.</i> ✦ <i>Existing roads must be used as far as practically possible.</i> ✦ <i>The construction of linear infrastructure near permanent waterbodies must be avoided.</i> ✦ <i>All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas.</i> ✦ <i>The CDC's Environmental Specifications relating to the translocation of wild animals must be adhered to.</i> ✦ <i>Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the development footprint.</i>
<p>LOSS OF CBA (OSMP)</p>	<p>The construction of the proposed pipeline will result in the loss of approximately 0.14 ha of intact Sundays Valley Thicket, which in the OSMP spatial dataset (2014) directly translates to CBA - IDZ. The category of CBA – IDZ is driven by the vegetation type (i.e., Mesic Succulent Thicket), Species of Special Concern, and long-term conservation commitments. According to the OSMP, development in these areas should be avoided, however certain linear infrastructure (i.e., pipeline) could be allowed, but this should preferably either be put underground or above vegetation. Disturbed land should be rehabilitated after construction to ensure a continuous system is maintained.</p> <p>Due to the relatively small size of the pipeline within the CBA (~0.14 ha) and the type of activity (i.e., linear), this impact is rated moderate negative.</p>	<ul style="list-style-type: none"> ✦ <i>The clearance of approximately 0.14 ha of Sundays Valley Thicket vegetation must be limited to that which is strictly necessary for the installation of the pipeline.</i> ✦ <i>The S&R of rare, endemic, or threatened plant species, prior to vegetation clearance, must be carried out in accordance with the Project Vegetation Specification (PVS), by a competent and qualified service provider.</i> ✦ <i>The removal and stockpiling of topsoil must also be carried out in accordance with the PVS.</i> ✦ <i>Employees must be prohibited from making fires and harvesting plants.</i> ✦ <i>Existing access roads should be used as far as practically possible.</i>
<p>LOSS OF AQUATIC ESA</p>	<p>The construction of the proposed development will result in the loss of approximately 32.06 ha of Aquatic ESA (ECBCP, 2019). ESAs extend into catchments that are essential for the maintenance of CBA rivers and wetlands.</p>	<ul style="list-style-type: none"> ✦ <i>The clearance of approximately 32.06 ha of vegetation must be limited to that which is strictly necessary for the installation of the pipeline and construction of the hub site.</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	<p>However, with the recommended 32m buffer around rivers and wetlands in the project area, combined with the relatively small footprint of the development (32.06 ha), it is unlikely that the proposed development will have a significant impact on nearby rivers and/or wetlands. As such, the significance of this impact is rated low negative.</p>	<ul style="list-style-type: none"> ✦ Existing roads must be used as far as possible. ✦ All exposed areas must be stabilised against erosion and rehabilitated, using appropriate indigenous vegetation. ✦ The affected areas should be monitored regularly for signs of erosion and remedial action must be taken at the first signs of erosion.
<p>Disruption Of Ecosystem Function And Process</p>	<p><u>Coastal Dune System:</u> Development within the coastal dune system will alter the natural dynamic processes characteristic of the coastal zone, including sediment dynamics and longshore sediment transport, ultimately resulting in the modification of the dune system and changes to the coastal sediment budget in the region.</p> <p><u>Albany Thicket System:</u> Development within Bontveld and to a lesser extent Sundays Valley Thicket, may cause changes to fire dynamics (e.g., due to increased vehicular use and traffic in the Construction (and Operation) Phase and/or the proliferation of grasses in disturbed areas, amongst other factors.</p> <p>Due to this impact being restricted to the affected areas, this impact is rated moderate negative before mitigation.</p>	<ul style="list-style-type: none"> ✦ The clearance of approximately 32.06 ha of vegetation must be limited to that which is strictly necessary for the installation of the pipeline and construction of the hub site. ✦ Existing roads must be used as far as possible. ✦ All exposed areas must be stabilised against erosion and rehabilitated, using appropriate indigenous vegetation. ✦ Laydown areas should be located within previously disturbed areas. ✦ Employees must be prohibited from making fires. ✦ No livestock grazing must be allowed.
<p>Habitat Fragmentation And/Or Degradation</p>	<p>During the Construction Phase, the loss of vegetation associated with the proposed development will coincide with the loss of faunal habitat, thereby reducing breeding and rearing locales. Faunal populations could become locally extinct or diminish in size. However, as the development is linear in nature and there is sufficient suitable habitat surrounding the proposed servitude, this impact is rated moderate negative.</p>	<ul style="list-style-type: none"> ✦ Please refer to the mitigation measures relating to the Loss of Herpetofauna SCC as well as the Loss of Mammal SCC listed in this table.
<p>Establishment And/Or Spread Of Alien Plant Species</p>	<p>The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems. Alien invasive species already present on site include <i>Acacia cyclops</i>.</p>	<ul style="list-style-type: none"> ✦ In line with the recommendations and management requirements outlined within the Coega OSMP, the following mitigation measures apply: ✦ The Alien Vegetation Management Plan developed for the Coega SEZ must be implemented and managed to prevent the further spread of alien invasive species within Zone 10 of the Coega SEZ. ✦ Any alien vegetation which establishes during the construction phase should be removed from site and disposed of at a registered waste disposal site.

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		<ul style="list-style-type: none"> ✦ Continuous monitoring for seedlings should take place throughout the construction phase.
NOISE IMPACT ASSESSMENT		
Noise Affecting Nearby Receptors	<p>The field study results showed that the ambient noise levels in the area of the proposed development were 49.2dB(A). The Cerebos Office (NSA 3) is approximately 440m away from the nearest pipeline location. Taking this distance into consideration, it can be inferred that NSA 3 will experience noise levels of 58.3 dB(A). While this is above the ambient noise levels, the receptors are expected to be inside the building and thus experience lower noise levels due to the barrier of the building walls blocking the sound from propagating towards these receptors.</p>	<ul style="list-style-type: none"> ✦ All construction operations should only occur during daylight hours if possible. ✦ No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions. ✦ Construction staff should receive “noise sensitivity” training such as switching off vehicles when not in use, location of NSA’s etc. ✦ An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase.
TRAFFIC IMPACT ASSESSMENT		
Increased Traffic Volumes	<p>Additional vehicle trips generated by the proposed development (up to 323 and 34 additional trips during the AM and PM peak hours for the construction and operational scenarios respectively) will have minimal impact in terms of road capacity given the current low hourly volumes along the road links and at the affected intersections, and low trips generated by the proposed power plant.</p>	<ul style="list-style-type: none"> ✦ Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic ✦ Traffic accommodation measures to be provided in terms of Chapter 13 of the South African Road Traffic Signs Manual
Additional Axle Loading Resulting In Deterioration Of Road Condition	<p>The Coega IDZ Demand Modelling Report indicates that all Class 2 roads would likely need to accommodate 7.5 million E80s per lane over a 20-year period. Given that the Ring Road is a class 2 road it has likely been designed for these volumes. As such the number of E80s generated by the power plant traffic relative to the maximum expected loading over the 20-year period is minimal</p>	<ul style="list-style-type: none"> ✦ Measures to be provided subject to approval by the Engineer ✦ Ensure construction traffic is confined to site area where possible ✦ Minimise need for continuous construction traffic on Ring Road by confining construction traffic to the site ✦ Ensure that vehicle loads are within legislated limits, i.e. maximum Gross vehicle mass of 56 000kg
Traffic Safety Impact Due To Additional / High-Speed Traffic	<p>Safety issues may initially be a concern given low traffic volumes as traffic is likely to operate at high speeds in low traffic environments.</p>	<ul style="list-style-type: none"> ✦ Source relevant permits from the Eastern Cape Department of Transport should abnormal loads be required for transport of components ✦ Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic, including speed restriction signage; and ✦ Increased law enforcement protocols
DAMARA TERN IMPACT ASSESSMENT		
Construction Disturbance To	<p>For Phase 1 (road loading facility, weighbridge and presumably some administrative offices), no</p>	<ul style="list-style-type: none"> ✦ The Phase 1 development within the Gas Hub (road loading facility,

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
<p>Damara Tern Colony (Phase 1)</p>	<p>large structures are planned and the pipelines will be buried underground. Consequently visual impacts of construction of permanent structures are expected to be low. Noise, lighting and movement of personnel and construction machinery is very likely to have an impact on the colony if not controlled and mitigated.</p>	<p><i>weighbridge, entrance gate, administrative offices, construction site offices and facilities) must be located in the north-west portion of the Gas Hub, as far from the Damara Tern colony as possible.</i></p> <ul style="list-style-type: none"> ✦ <i>Ideally, to avoid some of the mitigation measures below, all Phase 1 construction activities east of the south-north pipeline corridor, located approximately 500m west of the Damara Tern colony, should take place outside of the Damara Tern breeding season, 1 October to end February.</i> ✦ <i>During the Damara Tern breeding season, 1 October to end February, construction must take place only during daylight hours to take advantage of the unstable atmospheric conditions during the day to ameliorate noise and to prevent lights from vehicles, machinery and the construction site from disturbing the colony.</i> ✦ <i>A noise reduction plan, approved by a Professional Engineer and a practitioner qualified in acoustics must be developed with the objective of ensuring that daytime noise levels attributable to construction activities do not exceed 50 dBA at the western boundary of the Damara Tern colony during the Damara Tern breeding season. The plan must detail how this will be measured, monitored and reported on.</i> ✦ <i>Loud construction activities, especially those causing sudden loud noises (e.g. piling) must be scheduled for periods outside of the Damara Tern breeding season, 1 October to end February.</i> ✦ <i>All construction vehicles and equipment must be well maintained and in good condition.</i> ✦ <i>Construction staff should receive “noise sensitivity” training such as switching off vehicles and equipment when not in use.</i> ✦ <i>During the Damara Tern breeding season 1 October to end February, the boundaries of the construction footprints closest to the Damara Tern colony (generally the southern and south-eastern boundaries) must be fenced off to prevent human access</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p>and disturbance and must be screened off to prevent visual disturbance (fence should be a minimum of 2m high with e.g. shade cloth able to withstand the strong winds). There must be no activity between the fence and the Damara Tern colony.</p> <ul style="list-style-type: none"> ✦ CDC's Standard Environmental Specifications for Construction must be strictly adhered to. These control most of the negative impacts associated with construction activities (e.g. minimise construction footprint, management of construction material, chemicals and equipment, dust control, waste management, provision and control of ablutions and dining areas, worker induction and toolbox talks)
<p>Construction Disturbance To Damara Tern Colony (Phase 2)</p>	<p>The Gas Infrastructure required for Phase 2 of the project is mostly located in the south-east portion of the Gas Hub, 200m-550m from the Damara Tern colony. The infrastructure includes large structures including a regasification facility, two 160,000 m3 LNG Storage Tanks and a tall stack vent (Figure 5-1; Figure 2-2). The impact rating due to disturbance during construction of Phase 2 infrastructure is consequently based on the Phase 2 construction activities planned within the Gas Hub as these impacts will outweigh other developments further from the colony. Likely disturbance impacts include visual impacts, noise, lighting and movement of personnel and construction machinery.</p>	<ul style="list-style-type: none"> ✦ Ideally, to avoid some of the mitigation measures below, all Phase 2 construction activities east of the south-north pipeline corridor, located approximately 500m west of the Damara Tern colony, should take place outside of the Damara Tern breeding season, 1 October to end February. However, it is very unlikely that this will be possible with a project of this magnitude. ✦ During the Damara Tern breeding season, 1 October to end February, construction must take place only during daylight hours to take advantage of the unstable atmospheric conditions during the day to ameliorate noise and to prevent lights from vehicles, machinery and the construction site from disturbing the colony. ✦ A noise reduction plan, approved by a Professional Engineer and a practitioner qualified in acoustics must be developed with the objective of ensuring that daytime noise levels attributable to construction activities do not exceed 50 dBA at the boundaries of the Damara Tern colony during the Damara Tern breeding season. The plan must detail how this will be measured, monitored and reported on. ✦ Loud construction activities, especially those causing sudden loud noises (e.g. piling) must be scheduled for periods

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p><i>outside of the Damara Tern breeding season, 1 October to end February</i></p> <ul style="list-style-type: none"> ✦ <i>All construction vehicles and equipment must be well maintained and in good condition Construction staff should receive “noise sensitivity” training such as switching off vehicles and equipment when not in use</i> ✦ <i>Fencing around the Gas Hub will contain human access and disturbance within the Gas Hub precinct. In addition, during the Damara Tern breeding season 1 October to end February, the south-eastern boundary of the Gas Hub and the west and east boundaries for a distance of at least 200m northwest of their junction with the south-eastern boundary, must be screened off to prevent visual disturbance to the Damara Tern colony (e.g. with shade cloth able to withstand the strong winds). Unfortunately, even a 3m high fence will not adequately screen construction of the larger components of the project</i> ✦ <i>CDC’s Standard Environmental Specifications for Construction must be strictly adhered to. These control most of the negative impacts associated with construction activities (e.g. minimise construction footprint, management of construction material, chemicals and equipment, dust control, waste management, provision and control of ablutions and dining areas, worker induction and toolbox talks).</i>
SOCIO-ECONOMIC IMPACT ASSESSMENT		
Job Creation	<p>The proposed Gas Infrastructure development may result in the direct creation of approximately 2000 temporary job opportunities (over a construction period of 3 years), of which 30% would be unskilled labour. Indirect job opportunities (industries that provide construction materials and services for the project) may also benefit as a result of the construction of the proposed development.</p>	<ul style="list-style-type: none"> ✦ <i>Maximise local employment (unskilled, semi- and skilled workers) as well as the number of local SMMEs and vendors. Set standards for local employment in the Contractor Services Management Plans.</i> ✦ <i>Implement a fair and transparent employment process and employ a Community Employer Relations</i>

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Local Economic Growth	<p>During construction, income to the government is expected to be marginally increased by taxes (VAT) paid by CDC/ the developer on locally procured goods and services. Investment in locally procured goods and services will also have a very limited indirect and induced effect on economic performance.</p> <p>CDC Estimates the Gas Infrastructure development to have a CapEx of approximately R2 billion, disbursed over a 36 month construction period, representing 0.6% of the GVA of R 111.3 billion for the NMBM in 2018, annually for 3 years – a significant short-term investment for a single project. Furthermore, taxes generated by local procurement will contribute a small but significant portion of national income</p>	<p><i>Officer for the duration of the construction period.</i></p> <ul style="list-style-type: none"> ✦ <i>Implement a SMME skills development programme (training on how to tender, understanding contracts, etc.) at least 4 months prior to inviting SMMEs to tender. The programme must not only assist local small businesses but also aim to do skills development for the local Municipality.</i>
OPERATIONAL PHASE		
<i>AIR QUALITY IMPACT ASSESSMENT</i>		
<i>None identified by specialist</i>		
<i>CLIMATE CHANGE IMPACT ASSESSMENT</i>		
Impact On Climate Change (GHG Emission)	<p>The total annual emissions (Scope 1, 2 and 3) are 28.5 million tCO₂e per annum and the total GHG Inventory across the lifetime of the Gas Distribution Infrastructure is 855 million tCO₂e. These emissions equate to 19.4% of South Africa’s carbon budget.</p>	<ul style="list-style-type: none"> ✦ <i>The LNG to be sourced from nearby suppliers, to reduce upstream transport emissions.</i> ✦ <i>The LNG to be sourced from responsible suppliers, reducing emissions associated with extraction and upstream processing of the LNG.</i> ✦ <i>Use of good quality equipment to reduce the amount of LNG that vaporizes and escapes as fugitive emissions</i>
Risk And Vulnerability Of The Project To Climate Change	<p>Several climate change impacts could affect the core operations of the Gas Distribution Infrastructure. These impacts mostly affect the structural integrity of the equipment and installations. The health and safety of employees as well as their performance could also be significantly impacted, mostly due to increasing average temperatures and reducing water security. The climate change impacts that are likely to have severe impacts are associated with the increased frequency and severity of severe weather events, such as severe storms and severe rainfall events</p>	<ul style="list-style-type: none"> ✦ <i>The designs of infrastructure and processes must consider the potential impact of extreme weather events such as severe storms/storm surge, severe winds, extreme heat, heavy rains, and flooding impacts. The corrosive nature of maritime climate on infrastructure and equipment must be taken into account in design and maintenance;</i> ✦ <i>The designs for the piping must account for increasing ambient temperatures as well as an increased frequency of very hot days and the associated material fatigue;</i> ✦ <i>Safety protocols must take into consideration the impacts of climate change on construction and operations. This includes the introduction of disaster management policies, as well as onsite employee training, specifically for risk management of extreme weather</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p>events.</p> <ul style="list-style-type: none"> ✦ Design of an on-site stormwater drainage system, and implementation of a stormwater management plan. ✦ Improve storm water drainage capacity to minimise flood occurrences onsite and the associated contamination occurrences. ✦ Use a closed-loop water system for the Gas Infrastructure to minimise water losses to evaporation, and reduce water consumptio
DAMARA TERN IMPACT ASSESSMENT		
<p>DISTURBANCE TO DAMARA TERN COLONY (PHASE 1)</p>	<p>For Phase 1 (road loading facility, weighbridge and presumably some administrative offices), no large structures are planned and the pipelines will be buried underground. Consequently visual impacts of permanent structures from the Damara Tern colony are expected to be low. Lighting (for operations and security), movement of personnel and especially gas transport trucks (including the impact of headlights at night) is very likely to have an impact on the colony if not controlled and mitigated.</p>	<ul style="list-style-type: none"> ☒ Phase 1 of the Gas Hub (the road loading facility) must be fenced off to contain human access and disturbance within the facility. The south east boundary (closest to the Damara Tern colony) must be sufficiently high (e.g. 3m) and screened off (ideally with a wall) to prevent visual disturbance to the colony, especially from vehicle headlights. Ideally the road loading facility should operate during daylight hours only (during the Damara Tern breeding season, 1 October to end February) to minimise disturbance to the colony from vehicle headlights ☒ Planned maintenance of the gas pipelines east of the south-north corridor must not take place during the Damara Tern breeding season, 1 October to end February. If emergency repairs or inspections are required during the Damara Tern breeding season they should be undertaken during daylight hours and the work site should be screened off (e.g. high fence, shade cloth), in a similar manner to that required by the construction phase mitigation ☒ CDC’s Operational Safety, Health and Environmental Management Plan for the Coega SEZ must be complied with. This management plan is applicable to all tenants and governs the management, monitoring and reporting requirements for most operational activities (e.g. environmental awareness, waste, storm-water, waste- water, air quality management, noise control, pollution control, management of hazardous substances, emergency preparedness, visual impacts, alien vegetation

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
<p>CONSTRUCTION DISTURBANCE TO DAMARA TERN COLONY (PHASE 2)</p>	<p>The Gas Infrastructure required for Phase 2 of the project is mostly located in the south-east portion of the Gas Hub, 200m-550m from the Damara Tern colony. The infrastructure includes large structures including a regasification facility, two 160,000 m³ LNG Storage Tanks and a tall stack vent. The impact rating due to disturbance during construction of Phase 2 infrastructure is consequently based on the Phase 2 construction activities planned within the Gas Hub as these impacts will outweigh other developments further from the colony. Likely disturbance impacts include visual impacts, noise, lighting and movement of personnel and construction machinery.</p>	<p><i>management, species of conservation concern, problem animal control, resource management)</i></p> <ul style="list-style-type: none"> ✦ <i>The Gas Hub must be fenced off to contain human activities within the Gas Hub precinct. The south east boundary (closest to the Damara Tern colony) and the west and east boundaries for a distance of at least 200m northwest of their junction with the south-eastern boundary, must be screened off to prevent visual disturbance to the Damara Tern colony (ideally with a wall). Unfortunately, even a 5m high wall will not adequately screen the larger components of the project.</i> ✦ <i>Planned maintenance of the gas pipelines east of the south-north corridor must not take place during the Damara Tern breeding season, 1 October to end February. If emergency repairs or inspections are required during the Damara Tern breeding season they should be undertaken during daylight hours and the work site should be screened off (e.g. high fence, shade cloth), in a similar manner to that required by the construction phase mitigation.</i> ✦ <i>CDC's Operational Safety, Health and Environmental Management Plan for the Coega SEZ must be complied with. This management plan is applicable to all tenants and governs the management, monitoring and reporting requirements for most operational activities (e.g. environmental awareness, waste, storm-water, waste-water, air quality management, noise control, pollution control, management of hazardous substances, emergency preparedness, visual impacts, alien vegetation management, species of conservation concern, problem animal control, resource management)</i>
<p>MARINE ECOLOGICAL IMPACT ASSESSMENT</p>		
<p>Loss Of Benthic Communities</p>	<p>In the case of the heating and cooling water discharges from the LNGC and FSRU, structural adaptations can be implemented to the vessels outlets thereby avoiding impacts to the sediments below the vessels. Furthermore, the negative impacts persist over the short-term only recolonization of unconsolidated sediments will be rapid and the new structures and rock</p>	<ul style="list-style-type: none"> ✦ <i>Fit deflector plates to discharges directed vertically downwards to modify the discharge to 45°</i> ✦ <i>Design intakes to minimise entrainment or impingement by reducing the average intake velocity to about 0.1 to 0.15 m/s. This is comparable to background currents in</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	armouring will offer a new settling ground for hard bottom species and will be rapidly colonised	<i>the oceans, and will allow mobile organisms to swim away from the intake under these flow conditions (UNEP 2008)</i>
Reduced Physiological Functioning Of Marine Organisms	Sediment resuspension and increased turbidity may occur during operation as a result of discharge of heating and cooling water from the LNGC and FSRU (depending on discharge depth and velocity) during operation. Impacts on marine organisms are related to the concentration of suspended material and duration of exposure to it, and range from reduced visibility for feeding, clogging of gills, diminished light penetration affecting photosynthetic capability of aquatic plants.	<ul style="list-style-type: none"> ✦ <i>Optimise operating modes in the open-loop system as far as possible to reduce impacts, or use closed-loop systems in recruitment areas or during periods when abundances of eggs and larvae are seasonally high</i> ✦ <i>Undertake an entrainment study to more accurately determine the potential impacts of impingement and entrainment on communities within the Port of Ngqura</i>
Intake Of Large Volumes Of Seawater From The Port	The operation of the FSRU is estimated to require a seawater flow rate of 45,000 – 600,000 m ³ /day for the vaporisers, cooling water and onboard desalination, which will be taken in directly from the port. The LNGCs will also require water for engine cooling and to protect the vessel from damage during LNG transfer and regasification, and both vessels would have a ballast control system to maintain vessel stability during cargo transfer.	<ul style="list-style-type: none"> ✦ <i>Consider water conservation opportunities for LNG facility cooling systems (e.g. air cooled heat exchangers in place of water cooled heat exchangers and opportunities for the integration of cold water discharges with other proximate industrial or power plant facilities). The selection of the preferred system should balance environmental benefits and safety implications of the proposed choice</i>
Introduction And Spread Of Marine Alien Invasive Species	The operation of the ballast control system in the FSRU and LNGC, as well as bio-fouling organisms on the hulls of LNGCs from outside South African waters may result in introduction of species not naturally found in the area. These may be in the form of larvae, eggs, cysts, or adult organisms, using the vessel hull as substrate.	<ul style="list-style-type: none"> ✦ <i>Discharge cooling or cold water to surface waters in a location that will allow maximum mixing and dilution of the thermal plume to ensure that the temperature is within 3 °C of ambient temperature at the edge of the mixing zone or within 100 meters of the discharge point</i>
Discharge Of High Volumes Of Water With Depressed Or Elevated Temperatures	Changes in water temperature resulting from thermal water discharges from the LNGC and FSRU during operation can have a substantial impact on aquatic organisms and ecosystems, in terms of physiology of biota, localised changes in behaviour, or influences on ecosystem functioning	<ul style="list-style-type: none"> ✦ <i>The LNGCs must have a Ballast Water Management Plan in place</i> ✦ <i>Ballast water exchange must be done at least 200 nautical miles from the nearest land in waters of at least 200 m deep; the absolute minimum being 50 nautical miles from the nearest land</i>
Discharge Of Co-Pollutants (Biocide, Metals And Salinity)	Disinfection of the pipe and plant system with hypochlorite to prevent fouling of the heat-exchange system of the FSRU, as well as operation of the on-board desalination plant on the LNGC and FSRU, may result in release of heated seawater to the port/	<ul style="list-style-type: none"> ✦ <i>Ensure that routine cleaning of ballast tanks to remove sediments is carried out, where practicable, in mid-ocean or under controlled arrangements in port or dry dock, in accordance with the provisions of the ship's Ballast Water Management Plan</i>
Increase In Ambient Lighting	The project will result in an increase in ambient night time lighting through operation of the LNGC and FSRU may disturb and disorientate pelagic seabirds feeding in the area	
Waste Discharges To Sea	Operation of the LNGC and FSRU at the LNG terminal will result in a reduction of water quality from routine discharges to the sea from vessels.	<ul style="list-style-type: none"> ✦ <i>Use filtration procedures during loading of ballast in order to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms</i>
Accidental Spills Of Lng And/Or Hypochlorite	During operation, accidental spills of LNG may occur during connection and disconnection between the LNGC and FSRU, between the FSRU	<ul style="list-style-type: none"> ✦ <i>Optimise operating modes in the</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	<p>and onshore unloading arms, leakage from joints, emergency disconnection or rupture of the ship's containment system, or casualty / collision of the LNGC.</p> <p>During operation, spills of sodium hypochlorite (used or disinfection against biofouling) on the offloading platform may occur. As marine organisms are extremely sensitive to residual chlorine, a spill of concentrated hypochlorite solution into the marine environment at the generation unit would likely have lethal or sublethal effects on the biota in the area affected by the spill</p>	<p><i>open-loop system as far as possible to reduce impacts, or use closed-loop systems whenever practicable.</i></p> <ul style="list-style-type: none"> ✦ <i>Use multi-port discharges and adjust discharge rate to facilitate enhanced mixing with the receiving water body</i> ✦ <i>Ports should discharge horizontally or within -45° of horizontal to maximise dilution and avoid erosion of the sediments where the jet hits the seabed</i> ✦ <i>Neutralise NaOCl with SMBS prior to discharge to ensure that the most conservative international guideline value (<2 µg/ℓ) for residual chlorine at the point of discharge is met</i>
<p>Faunal Strikes With Lngcs And Dredgers</p>	<p>The movement of LNGCs to and from the LNG terminal area may result in collisions, propellor injuries, behavioural disturbance, physiological injury or mortality to marine mammals, turtles, and fish species</p>	<ul style="list-style-type: none"> ✦ <i>Blend the brine with the cooling/heating water prior to release</i> ✦ <i>Implement closed-loop systems whenever practicable</i>
<p>Diesel Spillage</p>	<p>Refueling of vessels (offshore and in port), collisions or other accidents, or operation of the dredger or construction equipment may result in accidental diesel / oil spills, negatively affecting water quality and causing toxic effects potentially resulting in mortality (e.g. suffocation and poisoning) of marine fauna or affecting faunal health.</p>	<ul style="list-style-type: none"> ✦ <i>Implement the principle of mechanical cleaning of the entire system as part of regular annual maintenance of the FSRU in preference to the use of a biocide.</i> ✦ <i>Reduce lighting in non-essential areas.</i> ✦ <i>Use of guards to direct lights to areas requiring lighting</i> ✦ <i>Avoid direct light in water, except during safety inspections</i> ✦ <i>Low light mounting where possible</i> ✦ <i>Use of long wavelength lights that are less intense for nocturnal animals</i> ✦ <i>Compile a lighting plan that identifies specific measures that could be implemented to minimize or avoid impacts associated with operational night-time lighting on avian species, fish species, and marine mammals</i> ✦ <i>Implement a waste management system that addresses all wastes generated at the various sites, shorebased and marine. This should include:</i> <ul style="list-style-type: none"> ✦ <i>Separation of wastes at source;</i> ✦ <i>Recycling and re-use of wastes where possible;</i> ✦ <i>Treatment of wastes at source (maceration of food wastes, compaction, incineration, treatment of sewage and oily water separation).</i> ✦ <i>Implement leak detection and repair programmes for valves, flanges, fittings, seals, etc.</i> ✦ <i>Use a low-toxicity biodegradable</i>

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		<p><i>detergent for the cleaning of all deck spillages</i></p> <ul style="list-style-type: none"> ✦ <i>All construction activities in the coastal zone must be managed according to a strictly enforced Environmental Management Plan</i> ✦ <i>Prepare an emergency response plan covering recommended measures to prevent and respond to LNG spills</i> ✦ <i>The hypochlorite generation unit must be suitably banded to prevent and spills from the plant entering the marine environment</i> ✦ <i>Ensure that vessel speed is kept below 10 knots when underway in Algoa Bay.</i> ✦ <i>The vessel operators should keep a constant watch for slow-swimming large pelagic fish, marine mammals and turtles in the path of the vessel</i> ✦ <i>Ensure that all project-associated vessels have an oil spill contingency plan in place.</i> ✦ <i>As far as possible, and whenever the sea state permits, attempt to control and contain the spill at sea with suitable recovery techniques to reduce the spatial and temporal impact of the spill.</i> ✦ <i>Ensure adequate resources are provided to collect and transport oiled birds to a cleaning station.</i> ✦ <i>Refueling is to take place only under controlled conditions within the port</i>
NOISE IMPACT ASSESSMENT		
<p>Noise Affecting Nearby Receptors</p>	<p>The modelling results show that no NSAs will be impacted from the noise levels emitted during the operational phase. This is because the noise levels will be below the ambient noise levels and thus be masked. The predicted operational noise levels of the proposed project are below the SANS 10103 recommended levels for the human receptors within the SEZ and at the SEZ boundary</p>	<ul style="list-style-type: none"> ✦ <i>The noise impact from the Gas Infrastructure should be measured during the operational phase, to ensure that the impact is within the required legal limit</i>
SAFETY IMPACT ASSESSMENT		
<p>LOSS OF CONTAINMENT OF LNG DURING OPERATION OF FSRUs</p>	<p>The risks from the FSRU will remain within the Port of Ngqura and the Coega SEZ and would not impact the general public outside of this area. For this reason, the project would not be considered a Major Hazard Installation.</p>	<ul style="list-style-type: none"> ✦ <i>Installation and maintenance of monitoring instrumentation including detection and emergency shut-down facilities</i>
<p>LOSS OF CONTAINMENT OF LNG DURING OPERATION OF LNG & GAS HUB</p>	<p>The extent from fires and explosions could extend considerable distances, particularly at low windspeeds. However, the risks would remain within the Port of Ngqura and the Coega SEZ and would not impact the general public outside of this area. For this reason, the project</p>	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	would not be considered a Major Hazard Installation.	
<i>TRAFFIC FEASIBILITY STUDY AND MANAGEMENT PLAN</i>		
Increased Traffic Volumes	Additional vehicle trips generated by the proposed development (up to 323 and 34 additional trips during the AM and PM peak hours for the construction and operational scenarios respectively) will have minimal impact in terms of road capacity given the current low hourly volumes along the road links and at the affected intersections, and low trips generated by the proposed power plant.	<ul style="list-style-type: none"> ✦ <i>Suitable warning traffic signage be provided to ensure safe operation along access roads;</i> ✦ <i>Ongoing enforcement along access roads</i>
Additional Axle Loading Resulting In Deterioration Of Road Condition	The Coega IDZ Demand Modelling Report indicates that all Class 2 roads would likely need to accommodate 7.5 million E80s per lane over a 20-year period. Given that the Ring Road is a class 2 road it has likely been designed for these volumes. As such the number of E80s generated by the power plant traffic relative to the maximum expected loading over the 20-year period is minimal	
Traffic Safety Impact Due To Additional / High-Speed Traffic	Safety issues may initially be a concern given low traffic volumes as traffic is likely to operate at high speeds in low traffic environments.	
<i>TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT</i>		
ESTABLISHMENT AND/OR SPREAD OF ALIEN PLANT SPECIES	Failure to rehabilitate and monitor the establishment of Alien Plant Species during the Construction (and Operation) Phase) could lead to the establishment and spread of Alien Plant Species.	<ul style="list-style-type: none"> ✦ <i>The priority biodiversity areas delineated by the Coega OSMP, including the Ecological Support Area and the Secondary Dune have been classified as HIGH sensitivity and the strict management/mitigation measures as specified in the approved OSMP (2014) and Section 8.1 of this report must be applied to development in or near these areas</i>
DISTURBANCE AND/OR DEATH OF FAUNAL SCC	Operational activities associated with the proposed development such as vehicular movement are likely to disturb faunal species (e.g., sensitive species 18) using the affected areas. This could result in the movement of faunal species away from the affected areas and/or the loss of faunal species. Slow-moving species such as tortoises and snakes are particularly susceptible to road kills. As such, this impact is rated moderate negative	<ul style="list-style-type: none"> ✦ <i>The Alien Vegetation Management Plan developed for the Coega SEZ must be implemented and managed to prevent the further spread of alien invasive species within Zone 10 of the Coega SEZ. This requires active management and maintenance</i> ✦ <i>A comprehensive Rehabilitation Plan must be compiled and implemented. Only indigenous plant species typical of the local vegetation should be used for rehabilitation purposes. This requires active management and maintenance</i> ✦ <i>An Erosion Management Plan must be developed prior to the commencement of construction activities to mitigate the unnecessary loss of topsoil and runoff. This requires active management and</i>

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		<i>maintenance</i>

6 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

6.1 MANAGEMENT STRUCTURE

In line with this EMPr, the Contractor must prepare a document clearly outlining and demonstrating the environmental responsibilities, accountability and liability of the Contractor's employees. The Contractor must assign responsibilities for the following:

- Reporting structures;
- Actions to be taken to ensure compliance;
- Overall design, development and implementation of the EMPr;
- Documenting the environmental policy and strategy;
- Implementing the EMPr in all stages/phases of the project; and
- All the aspects which require action under the other core elements and sub-elements of the EMPr.

All official communication and reporting lines, including instructions, directives and information, should be channelled according to the organisation structure.

6.2 ROLES AND RESPONSIBILITIES

6.2.1 The Applicant/Developer

Coega Development Corporation (CDC) (hereafter referred to as the Developer). The Developer is the responsible entity for monitoring the implementation of the EMPr and compliance with the EA. However, if the Developer appoints a Contractor to implement the project and hence implement the recommended mitigation measures documented in this EMPr on their behalf, then the successful Contractor's responsibilities are outlined as per the section that follows.

The Developer will also be responsible for stipulating and enforcing fines and penalties to the Contractor for contravention or any non-compliances against the EMPr, the EA and other approved plans.

6.2.2 The Contractor

The successful Contractor will:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the Developer and the EA;
- Ensure that all third parties, who carry out all or part of the Contractor's obligations under the contract, comply with the requirements of this EMPr;
- Be responsible for obtaining any outstanding permits and licenses which are required for the construction of the Coega Gas Infrastructure; and
- Ensure that the appointment(s) of the ECO and the Environmental Site Officer (ESO) are subject to the approval of Albany Wind Power (Pty) Ltd.

6.2.3 The Resident Engineer

The Resident Engineer (RE) should be appointed by the Developer and will be required to oversee the construction programme and construction activities performed by the Contractor. The RE is expected to liaise with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. The RE will oversee the general compliance of the

Contractor with the EMPr and other pertinent site specifications. The RE should also be familiar with the EMPr specifications and further monitor the Contractor’s compliance with the environmental specifications daily, through a Site Diary, and enforce compliance.

6.2.4 The Environmental Site Officer (ESO)

The Contractor should appoint a nominated representative of the Contractor as the ESO for the contract. The ESO must be site-based and should be the responsible person for implementing the environmental provisions of the construction contract.

The approved ESO must be onsite at all times.

The ESO’s duties will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations, licenses and permits, required in terms of the applicable legislation, have been obtained prior to construction commencing;
- Reviewing and approving construction method statements with input from the ECO and RE, where necessary, in order to ensure that the environmental specifications contained within the construction contract are adhered to;
- Assisting the Contractor in finding environmentally responsible solutions to problems;
- Keeping accurate and detailed records of all activities on site;
- Keeping a register of complaints onsite and recording community comments and issues, and the actions taken in response to these complaints or working alongside the CLO to undertake these tasks;
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to the ECO and Contractor; and
- The ESO must submit regular written reports to the ECO, not less frequently than once a month, during the construction phase of the Coega Gas Infrastructure.

The ESO must have:

- The ability to manage public communication and complaints unless a suitably qualified CLO is appointed to undertake public liaison;
- The ability to think holistically about the structure, functioning and performance of environmental systems;
- The ESO must be fully conversant with the EIR, EMPr, EA, relevant environmental legislation and any other relevant documents relating to the Coega Gas Infrastructure; and
- The ESO and/or CLO must have received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in the first bullet point above.

The ECO should be in the position to determine whether or not the ESO has adequately demonstrated their capabilities to carry out the tasks at hand and in a professional manner. The ECO will therefore have the authority to instruct the Contractor to replace the ESO if, in the ECO’s opinion, the appointed officer is not fulfilling their duties in terms of the requirements of the construction contract. Such instruction must be in writing and must clearly set out the reasons why a replacement is required and within what timeframe. The ECO must visit the development site and, in addition to the responsibilities listed in section 6.2.5 below, review the performance of the ESO and submit performance reviews to the Developer, as and when required.

6.2.5 Environmental Control Officer (ECO)

For the purpose of implementing the conditions contained herein, CDC (The Developer) must appoint an ECO for the contract. The ECO must be the responsible person for ensuring that the provisions of the EMPr as well as the EA are complied with during the construction phase. The ECO will be responsible for issuing instructions to the Contractor, where environmental considerations call for action to be taken. The ECO must submit regular written reports, at least once a month, to the Developer and, when required and/or requested, to the environmental authority (national DFFE). The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr and conditions of the EA by the Contractor.

The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the EAs, licenses and permits required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr, EA and Contract are adhered to at all times and taking action if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction Method Statements with input from the ESO and RE, where necessary, to ensure that the environmental specifications contained within this EMPr and the EA are adhered to;
- Inspecting the site and surrounding areas on a regular basis to monitor compliance with the EMPr, EA and Contract;
- Monitoring the undertaking by the Contractor of environmental awareness training for all personnel onsite;
- Ensuring that activities onsite comply with all relevant environmental legislation;
- Undertaking a continual internal review of the EMPr and submitting any changes to the Developer and the Competent Authority (national DFFE) for review and approval, as applicable;
- Checking the register of complaints, which should be kept onsite and maintained by the ESO and/or the CLO, and ensuring that the correct actions are/were taken in response to these complaints;
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to the Developer;
- If required by the EA, the ECO should submit compliance audit reports to the national DFFE, in accordance with the specifications of the EA. Such reports should be reviewed by Albany Wind Power (Pty) Ltd prior to their submission;
- Keeping a photographic record of progress onsite from an environmental perspective. This can be conducted in conjunction with the ESO, because the ESO will be the person that will be onsite at all times and can therefore take photographic records weekly. The ECO should ensure that the ESO understands the task at hand;
- Recommending additional environmental protection measures, where necessary; and
- Providing feedback on any environmental issues during the site meetings.

The ECO must have:

- A good working knowledge of all relevant environmental policies, legislation, guidelines and standards;
- The ability to conduct inspections and audits and to produce thorough, readable and informative reports;
- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems; and
- Proven competence in the application of the following integrated environmental management tools:
 - Environmental Impact Assessment;

- Environmental Management Plans/Programmes;
- Environmental auditing;
- Mitigation and optimisation of impacts;
- Monitoring and evaluation of impacts; and
- Environmental management systems.

The ECO must be fully conversant with the EIA Process, the Coega Gas Infrastructure Final EIR, EA (if/when issued), this EMPr and all relevant environmental legislation for the project. The Developer will have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling their duties in terms of the requirements of the EMPr or this specification. Such instruction must be in writing and must be clearly set out with reasons why a replacement is required and within what timeframe.

6.3 COMPLIANCE MONITORING AND CORRECTIVE ACTION

Non-compliance with the conditions of the EMPr must be viewed as a breach of appointment Contract for which the construction Contractors will be held liable. The Contractor is deemed NOT to have complied with the EMPr if:

- There is evidence of contravention of the EMPr, its environmental specifications or the method statements developed by the Contractor within the boundaries of the construction site or areas of contractor responsibility;
- Construction related activities take place outside the defined boundaries of the site;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the ECO within a specific time; or
- The Contractor fails to respond adequately to complaints from the public or authorities.

The Developer and the construction contractors are liable for any construction rehabilitation costs associated with their non-compliance with this EMPr. This rehabilitation must be undertaken to the satisfaction of the ECO. The construction contractors will have the right to appeal any punitive action undertaken by the ECO or the Developer.

6.4 REPORTING AND REVIEW

The EMPr reporting and documentation requirements must be based on best practice principles, e.g. ISO 14001, which must take the following requirements into account:

- Documents associated with the EMPr must be reviewed regularly and updated by all environmental management parties;
- Audits of the environmental performance of the construction phase of the project will be undertaken on a monthly basis by accredited auditors in fulfilment of likely conditions of EA in this regard;
- The findings of external, internal and informal environmental reviews will be recorded and items requiring action will be identified from the recommendations made; and
- The construction contractors will be contractually obliged to fulfil any reasonable recommendations, and implementation of these actions will be assessed in the above audit.

Meetings, where required, should take place onsite. Internal auditing and reporting should be subject to external review by the ECO during the monthly compliance audits.

6.5 MONITORING

Construction activities have the potential to impact on a range of biophysical habitats as well as neighbouring communities. The monitoring programme which requires development by the Developer, ECO and Contractor should, *inter alia*, allow for analysis of:

1. Air quality (such as dust)
2. Hydrocarbon pollution
3. Alien invasive plant species
4. Rehabilitation activities
5. Success of local labour employment
6. Success of local procurement policies
7. Ambient and workplace noise
8. Health and safety incidents
9. Success of traffic management measures
10. Contamination and soil erosion.

6.6 EMERGENCY PREPAREDNESS

The Contractor must develop environmental emergency response procedures to ensure that there are appropriate responses to unexpected or accidental actions or incidents which are likely to cause environmental impacts during the construction phase. Such activities include, *inter alia*:

- Accidental discharges to water and land
- Accidental exposure of employees to hazardous substances
- Accidental fires
- Accidental spillage of hazardous substances
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Contractor and Subcontractors must comply with the emergency preparedness incident reporting requirements, which must be developed and in place prior to the commencement of the construction phase.

6.7 ENVIRONMENTAL INCIDENT MANAGEMENT

The construction contractors must adhere to the hazard and incident reporting protocols to be developed by the Contractor. A report must be completed for all incidents, and appropriate action taken, where necessary, to minimise any potential impacts. The national DFFE must be informed of any environmental incidents, in accordance with legislative requirements, should this be necessitated by a major environmental incident.

6.8 MANAGEMENT REVIEW

A formal management review should be conducted in which the internal audit reports, written by the ESO and based on frequent inspections and interactions with the ECO and review of the periodic reports, including audit reports by the independent external auditor - will be reviewed. The purpose of the review is to critically examine the effectiveness of the EMPr and its implementation and to decide on potential modifications to the EMPr as and when necessary. The process of management review will be to keep to the principle of continual improvement.

Management review should take place when the liaison committee, consisting of representatives from the Contractor, construction Subcontractors (as appropriate), ECO and other parties or I&APs deem them

necessary or on a quarterly basis. The purpose of these quarterly meetings will be to review the progress of the Contractor in implementing and complying with their obligations in terms of this EMPr for the duration of the project. Where necessary, management review will take place more frequently than the required quarterly meetings.

7 Reporting

7.1 METHOD STATEMENTS

Method Statements must be completed by the Contractor, an individual that is competent with the tasks to be undertaken, for each activity which requires a Method Statement as specified in the EMPr or as requested by the ECO. Each Method Statement must be submitted to the ECO and the Developer for approval. For the purposes of the environmental specification, a Method Statement is defined as:

“A written submission by the Contractor to the ECO setting out the plant, materials, labour and method the Contractor proposes to carry out an activity, in such detail that the ECO is enabled to assess whether the Contractor’s proposal is in accordance with the EMPr and/or will produce results in accordance with EMPr.”

The Method Statement must include details of the:

- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to- and from site;
- How the equipment and/or material will be moved while on site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of activities;
- Compliance and non-compliance with the specifications; and
- Any other information deemed necessary by the Engineer.

Method Statements can be for once-off tasks or a series of tasks which are often repeated. The risks are identified during the various work stages when a Method Statement is prepared. Steps taken to reduce the potential risk associated with these stages can then be determined. The sequential steps and actions to be followed by the persons carrying out the works are written down. This sequence of steps should include all environmental and safety aspects relevant to the task being executed.

As a minimum, the Contractor should produce the following method statements:

- Site Dust Management
- Phased Vegetation Clearing
- Solid Waste Management
- Hazardous Material Management
- Hydrocarbon Management
- Site Clearing and Topsoil Management
- Fire Management
- Noise Management
- Concrete Mixing
- Pollution Control
- Site Access and Traffic Management
- Incident and Emergency Response Management.

The Method Statements should be submitted to the ECO and the Developer not less than twenty (20) days prior to the intended date of commencement of the activity, or as directed by the ECO. The Contractor must not commence an activity until all required Method Statements have been approved by the ECO and the Developer. The ECO should provide comment on the methodology and procedures proposed by the Contractor, but the ECO will not be responsible for the Contractor’s chosen measures of impact mitigation

and emergency/disaster management systems. Approval of the Method Statements should not be withheld unreasonably.

All control measures detailed in the Method Statement must be the subject of "toolbox" talks prior to the initiation of works. By introducing or reaffirming these measures during the "toolbox" talk, everyone involved should have a clear understanding of the work to be carried out, as well as the safe work method sequences and equipment required.

An example of a Method Statement layout is provided in [Appendix C](#).

7.2 GOOD HOUSEKEEPING

The Contractor must undertake "good housekeeping" practices during the construction phase. This will help avoid disputes on responsibility and allow for the smooth running of the contract. Good housekeeping extends beyond the wise practice of construction methods to include the care for and preservation of the environment within which the construction is situated.

7.3 RECORD KEEPING

The ECO must continuously monitor the Contractor's adherence to the approved impact prevention procedures and the ECO should issue the Contractor with a notice of non-compliance whenever transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the actions taken to discontinue the non-compliance, the actions taken to mitigate its effects and the results of the actions. The non-compliance should be documented and reported to the Developer in the monthly reports. These reports must be made available to the national DFFE when requested.

7.4 DOCUMENT CONTROL

The Contractor is responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person;
- Every document should identify the personnel and their position(s), who drafted and compiled the document(s), who reviewed and recommended approval, and who finally approved the document for distribution; and
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five (5) year period.

The Contractor must ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations, essential to the functioning of the EMPr, are performed. All documents must be made available to the ECO and other independent external auditors.

8 Environmental Awareness

8.1 ENVIRONMENTAL TRAINING

The Contractors must ensure that their employees and any third party, who carries out all or part of the Contractors' obligations, is adequately trained regarding the implementation of the EMPr and the general environmental legal requirements and obligations.

Environment and health awareness training programmes should be targeted at three (3) distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes should contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

The ECO must ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records must verify each of the targeted personnel's training experience.

The Developer must ensure that adequate environmental training takes place. All employees must be given an induction presentation on environmental awareness and the content of the EMPr. The presentation should be conducted in the language of the employees to ensure it is understood. The environmental training must, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral and faunal SCC and protected species, and the procedures to be followed should these be encountered during the construction of construction camps;
- The importance of not littering;
- The importance of using supplied ablution facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and the
- Details regarding archaeological and/or historical sites which could be unearthed during construction and the procedures to be followed should these be encountered.

Recommended Environmental Education Material is provided in Appendix A.

8.2 MONITORING OF ENVIRONMENTAL TRAINING

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and/or

a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.

9 MANAGEMENT PLANS AND MONITORING RECOMMENDATIONS

The following management plans have been proposed by the specialists in the Draft EIR:

- Alien Invasive Management Plan
- Plant Rescue and Protection Plan
- Damara Tern Monitoring and Management Plan
- Re-vegetation and Habitat Rehabilitation Plan
- Open Space Management Plan
- Traffic Management Plan
- Stormwater Management Plan
- Erosion Management Plan

Please refer to Sections 9.1 to 9.7 and Appendix G for the preliminary management plans which should be updated once an EA has been received to include the relevant conditions of the EA and refined prior to the commencement of the construction of the Coega Gas Infrastructure.

9.1 SEARCH AND RESCUE, REHABILITATION AND ALIEN INVASION MANAGEMENT PLAN

The Search and Rescue, Rehabilitation and Alien Invasion Management Plan includes specialist input from Dr Greer Hawley and Dr Cherie-Lynn Mack (Management Plans, 2015).

9.1.1 Relevant Definitions

- **Composition** refers to the identity, and in some cases the abundance, of the species which occur in an assemblage.
- **Environmental Control Officer (ECO)** refers to independent Environmental Specialist(s) tasked with monitoring the environmental performance and compliance of Contractors involved in the construction of the Coega Gas Infrastructure.
- **Framework Species** typically refers to a tree, herb or liana species occurring in established natural vegetation, and which is structural in the vegetation complex.
- **Pioneer species** are typically r-selection species which colonise a disturbed habitat in the initial stages of restoration and they are typically a highly abundant, widespread species with high growth rates.
- **Re-vegetation** refers to the process of establishing vegetative cover, which is typically required in areas which need to be restored without the objective of reinstating a native ecosystem. In re-vegetation, any plant species would do (for instance, sowing a mixture of commercially available grasses on mine tailings for soil rehabilitation) although a commercial crop or timber producing trees are often used.
- **Replacement** refers to the establishment of a different type of vegetation on the degraded environment following the vegetation clearance associated with construction activities.
- **Restoration** is the process of reconstituting a degraded system to its original state.
- **Rehabilitation** is a general term which includes the replacement, restoration and re-vegetation, and is the process or programme implemented to achieve restoration or replacement.
- **Succession** is the directional development in the species composition of a community after disturbance, from the so-called pioneer stages to an end-state or climax that tends to persist.
- **Topsoil** refers to the top 100 mm of the soil which often includes organic material such as stem and leaf litter.
- **Weed** refers to an undesirable plant, typically an alien or non-native species, which exhibits robust growth and may provide competition for resources with the desired vegetation.

9.1.2 Vegetation Clearing Procedure

Vegetation clearance may only occur once the relevant permits have been secured.

A) Vegetation Clearing

The following activities must be undertaken prior to the commencement of the construction activities:

- All trees and identified plant Species of Conservation Concern (SCC) which need to be transplanted should be demarcated, using a suitable demarcation material which will not damage the trees and/or plant SCC.
- Herbaceous and geophytic plant species which need to be transplanted (bulbs and seedlings), slipped, or have their seed collected must be identified and marked.
- Obtain permits from the Eastern Cape provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) and the Department of Agriculture, Forestry and Fisheries (DAFF) for the transplantation, removal, damage or destruction of protected plant species.

- Establish a nursery within the site or make use of a suitable nursery in proximity to the site to ensure that the plants are stored in suitable potting bags or pots, watered as often as required, sheltered from the weather, etc.
- All geophytic (bulbous) plants and tree samplings, which are visible, should be removed from the construction footprint and stored in nursery conditions.
- Grass sods from a variety of naturally occurring grasses should be collected from the site and kept in nursery conditions. At least ten (10) sods or runners per species should be collected. Where possible, the grass should be mowed during seeding season and the seed should be collected and stored for reseeding.

The following activities must be undertaken during the construction activities:

- Ensure that the plants which are housed in the nursery are cared for by a suitably qualified/experienced individual.
- Any geophytic (bulbous) plants which are observed in the topsoil during vegetation clearance must be removed and stored in nursery conditions.

Please note: If any unusual plant species are encountered, the Contractor and/or the ECO should contact a suitably qualified specialist and provide photographic depictions of the unknown plant species for rapid species identification by the specialist.

B) Disposal of Vegetation Material

In sections where the site is covered by grasses, the grasses and topsoil should be removed, no disposal mechanism is required. However, where woody vegetation has been cleared, all material should be chipped, shredded and utilised on the site for mulching and composting during rehabilitation.

9.1.3 Search and Rescue Plan (Plant Stockpiling)

The plant Search and Rescue Plan aims to establish which plants should be harvested from the pipeline and gas infrastructure footprint, in order to:

- Collect important pioneer plants which can be transplanted, kept under nursery conditions and utilised for re-vegetation after construction as part of rehabilitation activities; and to
- Collect and transplant plant SCC which have a high conservation value or apply for destruction permits, where transplanting will not be possible.

A nursery should be established within the site, in an area where minimal construction disturbance will occur, or a suitable existing nursery in proximity to the site should be used. Please note that if the latter is chosen, all necessary permits and conditions must be in place to ensure that the plant species are suitably transported to the nursery. If the former is chosen, the following minimum requirements must be implemented during the operation of the nursery within the site:

- Establish a nursery within the site, in an area where minimal construction disturbance will occur.
- Bush clumps within the site could be utilised in the nursery because of the shelter and micro-climate which is provided by the bush clumps/vegetative cover.
- Make use of fencing of at least 1.2 m in height to fence-off the nursery for protection from livestock, which are likely to continue grazing within the site and surrounds. A gate should be constructed to ensure access to the nursery for the maintenance of the plants, as well as for vehicle access and deliveries.
- Where necessary, equip the nursery with a water tank for irrigation purposes.
- Install hose-lines in the nursery, if required.

- Procured plants should be transported with care to ensure that they arrive at the nursery in a condition which is suitable for successful growth.
- All harvested seeds and seedlings, as well as plants removed for transplanting, are the responsibility of the Contractor and must be kept under approved nursery conditions. Additional measures and/or remedial action should be taken if the nursery is not functioning successfully under the approved nursery conditions.
- Plants which are to be stored in containers in the nursery should be planted in two (2) parts of topsoil which has been excavated from the site (to emulate site conditions) and one (1) part of compost (produced from mulching the cleared vegetation).
- Ensure that the nursery is properly equipped with the necessary implements, containers, fertilisers and other equipment required to function efficiently.
- All plants must be fully maintained by staff from the date of receipt until rehabilitation has concluded. This includes watering, weeding, fertilising, etc. as required.
- All plants must be protected against wind, frost and direct sunlight, until such time as they are fully acclimatised. If necessary, shade net or a shade house should be installed for this purpose.
- Plants which are held in the nursery for more than one (1) year, must be replanted into larger containers. Any plants which outgrow their current containers must be replanted in larger containers when required.
- The Contractor will be held liable for the replacement of plants lost due to negligence or mismanagement.

9.1.4 Rehabilitation Plan

Rehabilitation of disturbed and heavily impacted environments is closely linked to ecological successional theory (van Ardel & Aronson, 2005). Succession can be described as a change of species, or patterns of species abundance, over time. Directional, continuous and sequential patterns of colonisation by various species are indicators of successional stages of an environment.

The first sequence of succession (after a disturbance) is the initial colonisation of an area of fast-growing, aggressive *pioneering* species, which are often short-lived, perennial species and grasses. These plant species are responsible for changing soil properties and creating micro-niches for further colonisation.

The initial sequence of pioneer species is followed by early and late successional species migrating into the area, resulting in a *climax community*.

The “4 R” Approach should be employed for the rehabilitation of the disturbed environment. This includes:

- Restoration;
- Rehabilitation;
- Replacement/re-vegetation; and
- Reservation/conservation.

Ensure that these activities start with soil stabilisation and soil preparation or remediation. Soil remediation includes activities to improve soil stabilisation, soil structure and soil fertility.

The success of rehabilitating the community/population within a designated area is dependent on the satisfactory establishment of the chosen plant species. To ensure that the process is optimised, the correct plant species in the correct densities and combinations should be utilised. Monitoring of the rehabilitation process is imperative to ensure that aggressive plant species and herbivores are controlled, and slopes/banks remain stable.

The general aim of a rehabilitation programme is to recreate a natural ecosystem. The rehabilitation will therefore be outlined in three (3) phases, which are required, namely:

- I. Take measures to stabilise the soil and remedy the soil, when required, through the monitoring and management of the soil composition, pH levels, nutrients, etc.;
- II. Re-vegetate disturbed areas using appropriate natural successional species;
- III. Monitor and manage the success of the rehabilitation by controlling aggressive indigenous plants, removing alien invasive plant species as soon as they are observed, and maintaining the re-vegetated areas to ensure the successful establishment of these re-vegetated areas.

A) Soil Stabilisation and Remediation

Topsoil, which is removed during construction, must be utilised in the nursery and stored on site for rehabilitation and re-vegetation. Once construction is complete, the topsoil must be spread over the disturbed site and covered with mulch. Where necessary, the soil must be stabilised using suitable materials, such as netting or geotextiles. The plant material (grasses and herbs), which has been removed from the site, should be mixed into the topsoil to supplement the organic nutrient content of the soil. No further soil conditioning in terms of fertilising is deemed necessary at this stage.

B) Re-vegetation Procedure

The species which are to be used for re-vegetation should be based on the ability of the species to:

- Successfully grow from the indigenous seeds, sods and/or slips which have been collected from the site; and
- All Red Listed species, SCC and protected species which have been removed from the site.

The Table below consists of the steps which should be followed during out-planting for the re-vegetation procedure.

<u>Plot preparation</u>	<p>The plots should be prepared as follows:</p> <ul style="list-style-type: none"> • Prior to rehabilitation of the site, all remnants of foreign debris should be removed from the site. • Compacted soil should be ripped to a depth of more than 250 mm. • The final prepared surface should not be smooth but furrowed to follow the natural contours of the land. • All plots must be covered with topsoil. Topsoil should be manually spread evenly over the surface. Topsoil must be spread to the original depth and deeper where sufficient topsoil is available. • All the plots should be mulched. The vegetation stripped, chipped and stockpiled during site preparation must be spread in a single layer across the plots as mulch. • All plots should be treated with nitrogen-fixing bacteria which is important for legumes, <i>Trichoderma sp.</i> and mycorrhizal products as a natural form of soil remediation.
<u>Plant Preparation</u>	<p>Plants should undergo a period of 'hardening-off' during which they have been exposed to full, direct sunlight and been under a reduced watering regime. The individual plants destined for each plot should be grouped into plot-specific, marked baskets or containers, before they leave the nursery. Each plant should be labelled with an aluminium label, giving species code, and a specific numeral identifying the plot. Before out-planting commences, the equipment necessary for the proper handling and placing of all required materials must be on hand, in good condition and to acceptable approved standards.</p> <p><u>Shrubs and trees</u></p> <ul style="list-style-type: none"> • Planting should preferably be done during the rainy season (summer). • Unless otherwise specified by the ECO, excavate square holes of approximately 800 mm x 800 mm for trees and approximately 500 mm x 500 mm x 500 mm for shrubs. • Backfill planting holes with excavated material/approved topsoil, thoroughly mixed with weed-free manure or compost (per volume, approximately one quarter of the plant hole),

	<p>one cup of 2:3:2 fertiliser and an approved ant and termite poison (if required).</p> <ul style="list-style-type: none"> As much of the soil from container plants as possible must be retained around the roots of the plant during planting. The soil must cover all the roots and be gently pressed down to a level equal to that of the surrounding <i>in situ</i> material. After planting, each plant must be well watered and additional soils should be added once the soil has settled, if necessary. Add mulch to the surface area of the bermed basin in order to sustain soil moisture Stake all trees using at least three (3) weather resistant wooden or steel stakes anchored firmly into the ground. Two (2) of the three (3) stakes should be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20 mm diameter plastic hosepipe must be tied tightly to the stakes, half- to two thirds the height of the tree above the ground and looped around the trunk of the tree. Place stakes at least 500 mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots. Thoroughly water plants as required until the plants are able to survive independently, i.e. until they are able to survive when receiving water from rainfall only. A raised circular 200 mm high subsoil berm placed 500 mm (shrubs) to 750 mm (trees) from the plant stem must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose, the berm must be raised above the natural soil level. Water aloes and bulbs once directly after transplanting to settle the soil. Remove stakes and wire binds over time as required, as plants become established.
<p>Grassing using sods</p>	<ul style="list-style-type: none"> “Sodding” is defined as the laying of grass sods. Sodding may be done at any time of the year. The soil should be uniformly wet to a depth of at least 150 mm before grass sods are planted. Protect sods against drying out by keeping them moist from the time of harvesting until final placement. Rake or spike the plot area to create a loose surface to a depth of approximately 100 mm. Lay two (2) rows of sods in a straight line or following a contour, starting at the bottom of a slope, where possible. Place the next two (2) rows of sods in the same direction, 5 m away, until the full area is covered with rows of sods. Tightly push sods together, taking care not to stretch or overlap sods. Where a good fit cannot be obtained, the intervening spaces should be filled with parts of sods or topsoil. After planting, water sods to prevent drying out. Irrigate as required until the grass is able to survive independently, i.e. until it is able to survive when receiving water from rainfall only.
<p>Grassing using runners</p>	<ul style="list-style-type: none"> Plant grass runners evenly by hand or by mechanical means at a rate of at least 400 runners per hectare (i.e. at 250 mm centres). Only use fresh runners, avoiding grass runners which have dried out. Rake or spike the area to create a loose surface to a depth of approximately 100 mm. The soil should be uniformly wet to a depth of at least 150 mm before planting of grass runners. After planting, the runners must be given copious amounts of water and, when sufficiently dry, must be rolled with a light agricultural roller and re-watered. Irrigate as required until the grass is able to survive independently, i.e. until it is able to survive when receiving water from rainfall only.
<p>Grassing using seeds</p>	<ul style="list-style-type: none"> All seed should be collected from the site during vegetation clearing or from the neighbouring veld. Seeding must be done during the summer months, when the germination rate is better. The soil should be loose and uniformly wet to a depth specified by the ECO, before any seeding commences. Halve the seed and fertiliser mixture as specified and apply evenly in two (2) successive applications perpendicular to each other. The seeded area must be raked over after seed application and well-watered.

	<ul style="list-style-type: none"> • Irrigate as required until the grass is able to survive independently, i.e. until it is able to survive when receiving water from rainfall only.
<p>Maintenance</p>	<ul style="list-style-type: none"> • Cordon-off areas which are under rehabilitation as temporary no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced-off to prevent vehicular, pedestrian and livestock access. • Delay the re-introduction of livestock to all rehabilitated areas until an acceptable level of re-vegetation has been reached. Fencing may be used, or the area may be covered by suitable branches. • Re-vegetation should be the same as the vegetation type which previously existed, unless otherwise indicated in the Contract or specified by the ECO. • Water all transplanted, planted and grassed areas as specified. • Watering must commence and continue immediately after the seeds have germinated and growth begins. • Mow lawns regularly to a height of 50 mm above ground level. This promotes adequate coverage. • Mowing of veld grass is to take place once a year after the grass has shed its seed and not before the grass has fully grown - fire breaks are important. • Check all plants for pests and diseases on a regular basis and treat the plants, when required, using approved methods and products as per the manufacturers' specifications. • Control weeds by means of extraction, cutting or other approved methods. • In planted areas which have failed to establish, replace plants with the same species as originally specified. The same species must be used unless otherwise specified by the ECO. • A minimum grass cover of approximately 80% is required. Individual plants must be strong and healthy growers by the end of the maintenance period. • Acceptable cover, in the case of sodding, is attaining 100% cover by the specified vegetation.

C) Rehabilitation Monitoring

It is recommended that the success of the rehabilitation is monitored from the commencement date of rehabilitation activities, which should be recorded in the Environmental File, and for a period of twelve (12) months after the rehabilitation procedure has been completed. Should any issues arise, which are not resolved through the implementation of the recommended measures, a suitably qualified horticulturist or botanist should be contacted to provide further rehabilitation/remedial measures.

The ECO should monitor the rehabilitation process and record the progress in the monthly audit reports using photographic evidence. This should include monitoring:

- Establishment success (presence, percentage cover or absence) of plant cover per plot; and
- Water used for irrigation.

Monitoring must be undertaken once a month for the first three (3) months and then quarterly thereafter for twelve (12) months or until rehabilitation has been deemed successful. Rehabilitation will be deemed successful once primary grass cover has been established, and there is no further requirement for frequent monitoring and management of the growth of alien species.




9.1.5 Alien Plant Species Management




Based on the current condition of the vegetation within the proposed Coega Gas Infrastructure site, it is important to manage alien plant species during the phases of the Gas Infrastructure development.


A) Potential Alien Invasive Plant Species on the Coega Gas Infrastructure site

The Ecological Specialist identified numerous alien plants within the proposed site, especially *Acacia cyclops*, where they have formed closed canopies and dense stands. In addition to the alien invasive plant

species identified within the Coega Gas Infrastructure site, other alien plant species were found to occur in various vegetation types. The Table below consists of alien invasive species which have been identified within the proposed Coega Gas Infrastructure site as well as the management requirements in terms of the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004) Alien and Invasive Species Regulations (2014).

SPECIES & COMMON NAME	PHOTOGRAPH	NEM:BA CATEGORY	LEGISLATIVE REQUIREMENTS
<p><i>Acacia cyclops</i> (Rooikrans)</p>		<p>1b</p>	<p><u>Category 1b Listed Invasive Species (Regulation 3):</u> 1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled. 2) A person in control of a Category 1b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.</p>
<p><i>Carduus nutans</i> Musk Thistle</p>		<p>1b</p>	<p>3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme. 4) A person contemplated in sub-regulation (2) (point 2 above) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme</p>
<p><i>Cestrum laevigatum</i></p>		<p>1b</p>	<p>4) A person contemplated in sub-regulation (2) (point 2 above) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme</p>

SPECIES & COMMON NAME	PHOTOGRAPH	NEM:BA CATEGORY	LEGISLATIVE REQUIREMENTS
<i>Opuntia ficus-indica</i>		1b	contemplated in section 75(4) of the Act.
<i>Opuntia stricta</i>		1b	
<i>Ricinus communis</i>		2	

SPECIES & COMMON NAME	PHOTOGRAPH	NEM:BA CATEGORY	LEGISLATIVE REQUIREMENTS
<p><i>Salsola kali</i> (Russian Thistle)</p>		<p>1b</p>	<p><u>Category 2 Listed Invasive Species (Regulation 4):</u></p> <p>1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.</p> <p>2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.</p> <p>3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.</p> <p>4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to</p>

SPECIES & COMMON NAME	PHOTOGRAPH	NEM:BA CATEGORY	LEGISLATIVE REQUIREMENTS
			Regulation 3. 6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

B) Working for Water (WfW) Methods to Control Invasive Alien Plants

The following methods for the control of invasive alien plants are deemed acceptable, in accordance with the Working for Water (WfW) programme which was launched in 1995 and initially administered by the Department of Water Affairs and Forestry (DWAF) and now it is administered by the national Department of Environment, Forestry and Fisheries (DFFE). These include:

- **Mechanical methods** of invasive alien plant removal, such as tree felling, removing or burning.
- **Chemical methods** of invasive alien plant removal through the careful use of environmentally safe herbicides in accordance with the manufacturers’ instructions.
- **Biological control** using species-specific insects and/or diseases from the alien plant’s country of origin, this method should only be used with extreme caution.
- **Integrated control** which consists of a combination of at least two (2) of these methods.

The WfW programme aims to improve the integrity of natural resources by:

- Preventing new and emerging invasive alien plant problems;
- Reducing the impact of existing priority invasive alien plants; and
- Enhancing capacity and commitment to solve invasive alien plant problems.

C) Recommended Guidelines for the Removal and Control of Invasive Alien Plants within the Coega Gas Infrastructure Development Site

Please note: The Developer and/or Contractor will not be responsible for the removal of all the current alien invasive plants which occur within the affected properties but the Contractor will be responsible for using suitable methods to remove the alien invasive plants from the proposed Coega Gas Infrastructure development footprint and controlling alien invasive plant growth within the areas which have been disturbed by the construction activities.

The following general requirements are recommended for the removal of invasive alien plants within the site:

- All staff involved in the removal and management of invasive alien plants must receive suitable training prior to the removal of plants and tree cutting.
- Large trees should be cut with chainsaws or axes and the open stems should be poisoned to ensure that the plant dies and does not re-sprout.
- All cuttings and vegetative material should be removed from the site and disposed of at a suitably registered waste disposal site.
- Cleared sites should receive follow up inspections, as frequently as required, to remove upcoming seedlings.
- In areas in which large-scale alien plant removal has been conducted, measures to stabilise the soil from wind and water erosion must be taken. Soils can be mulched and planted with indigenous pioneer species.
- Continued monitoring throughout the life of the project will be required as the risk of alien plant species invasion is never eliminated.

The following mechanical methods for alien plant removal are recommended:

- Hand-pulling seedlings and/or young plants by gripping them low down with a gloved hand and pull the plant out. Ensure that the roots are removed from the soil and that the plant does not break-off above the root.
- Ringbark trees by removing bark from the bottom of the stem up to a height of between 0.75 and 1 m. Hatchets or bush-knives may be used for debarking.
- Cut stump treatment can be used by cutting stems as low as practical as stipulated on the herbicide label. Chemical herbicides are applied in diesel or water as recommended. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.

The appointed ECO should monitor the mechanical methods used for the removal of invasive alien plants and provide additional recommendations if and/or when required.

Chemical methods for alien plant removal are also a feasible method which can be used within the Coega Gas Infrastructure site to control alien invasive plants. The Contractor should submit a Method Statement, containing the details of the chosen environmentally safe herbicide(s) and the method(s) of application, to the ECO for approval prior to the use of chemical methods for alien plant removal. Once the Method Statement has been approved, the ECO should monitor the removal of the alien plants and ensure that it is being undertaken in accordance with the approved Method Statement.

9.2 TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

9.2.1 General Traffic Standards

The following general traffic standards must be adhered to during the phases of the Coega Gas Infrastructure development:

- All drivers of vehicles which enter the site must comply with the site rules and regulations.
- Rotational lights must be operational and mounted on the most visible point of the vehicle.
- All traffic signage and/or flagmen instructions must be adhered to.
- All road traffic should keep to designated, approved, access routes and should not cause unnecessary damage to vegetation or features within the site.
- Only authorised vehicles should be permitted on the haulage roads.
- Construction vehicles and/or plant must not drive through any watercourses or wetlands.

9.3 STORMWATER MANAGEMENT, EROSION AND SEDIMENT CONTROL PLAN

This plan aims to:

- Provide appropriate guidelines for the conservation of soil to reduce the risk of erosion and sedimentation.
- Provide appropriate plans for the management of stormwater runoff.
- Minimise the potential for sediment loss.
- Minimise the risk of contamination of stormwater.
- Provide corrective measures to be implemented if erosion increases as a result of construction activities.

9.3.1 General Performance Criteria

The following general performance criteria will be applicable to the Coega Gas Infrastructure site:

- Minimal soil erosion as a result of construction activities.
- Implementing reasonable and practical measures to manage and mitigate the impacts which could result in increased soil erosion during the construction phase.
- Minimal to no contaminants present within the site, including sediments and litter, which could result in adverse environmental impacts to surface water resources due to construction activities, including vehicle movements and spoil placement.
- Where applicable, the capture, containment and treatment of groundwater which has been collected in excavations as a result of construction activities.

9.3.2 Stormwater Management, Erosion and Sediment Control

In addition to the sections below, the Department of Water and Forestry Stormwater Management G1 Best Practice Guideline (2006) must be adhered to.

A) Planning

- The clearing of the development footprint must be planned prior to clearing and construction activities to ensure that clearing is undertaken in a controlled manner.
- The Contractor and all personnel must be made aware of site-specific stormwater management measures, erosion and sediment control measures, and the implementation and maintenance which is required.
- The risks associated with the management of stormwater, sedimentation and erosion must be identified and the mitigation measures stipulated in the approved EMPr must be implemented.
- The following factors must be considered when determining erosion and sediment control, as well as the effectiveness of the recommended measures:
 - Local climatic condition and seasonal variations;
 - The soil types present on site and the condition of the soils;
 - The surface water resources which are present within the site; and
 - Local drainage, including temporary and overland flow paths.

B) Recommended Actions

- All mitigation measures stipulated in the approved EMPr and the conditions of the EA relating to stormwater management, sedimentation and erosion must be implemented (see Section 9.5.3).

- Sediment controls, such as basins or catch drains, should be designed to provide adequate bunding of spoil placement areas to prevent surface runoff entering nearby stormwater drains and watercourses without treatment, where required. These should be implemented according to ECO's recommendations.
- Disturbances to the Coega Gas Infrastructure site due to clearing must be limited to the approved development footprint(s). This should be achieved through the demarcation of the development footprint(s) prior to the commencement of vegetation clearance and construction activities.
- All restricted and/or "no-go" areas should be demarcated prior to the commencement of construction activities.
- Erosion and sediment control measures should be both reasonable and practical. These measures must consider the receiving environment, water quality objectives, quality and quantity of water, location and accessibility, and other necessary factors.
- The Contractor must submit a detailed Method Statement/(s) to the ECO for approval prior to the commencement of construction activities. This Method Statement should include, but not be limited to, the planned stormwater management measures, sediment control measures, and erosion management and corrective measures (should erosion occur as a result of construction activities). This Method Statement/(s) must align with the mitigation measures stipulated in the approved EMPr and the conditions of the EA.
- The ECO should monitor the site for erosion or increased erosion due to construction activities and recommend suitable corrective measures to the Contractor. Corrective action must be taken at the first signs of erosion or increased erosion (in areas which were eroded prior to the commencement of the construction activities).
- Construction activities within a watercourse or wetland, such as roads or cabling, must only take place once the necessary approvals and/or authorisations have been received. All relevant conditions, such as those in the EA, EMPr and Water Use Approval(s), must be adhered to during construction within a watercourse or wetland. A Method Statement should be submitted to the ECO for approval prior to the commencement of such activities. The ECO should monitor the construction within these sensitive areas and report on the Contractor's compliance with the relevant conditions and Method Statement(s) in the monthly ECO audit reports.
- All watercourse protection controls must be implemented and functional prior to the commencement of construction activities within watercourses and/or wetlands.
- Vehicles must remain within the approved roads and adhere to all traffic rules.
- Where applicable, uncontaminated sediment removed from erosion and sediment control devices should be stockpiled in a suitable and approved location for reuse in areas which require landscaping, or the sediment should be removed from the site and disposed of at a suitably registered facility.
- Access roads should be graded to a crossfall which allows water to naturally drain into the surrounding environment without slowing or cut-off berming across the roads. The effectiveness of the road drainage systems should be monitored and, should the current drainage systems not be sufficient or effective, additional drainage measures should be recommended by the ECO.
- In areas where the water table is high, the excavation areas should be dewatered. Should this be required, a Method Statement detailing the proposed dewatering process should be submitted to the ECO for approval prior to dewatering taking place.

C) Monitoring

The stormwater management as well as erosion and sediment control measures within the Coega Gas Infrastructure site should be monitored, and additional measures should be put in place if/when necessary.

- The monitoring of the management of stormwater and erosion control should be undertaken using an environmental inspection checklist, which contains all the required conditions, recommendations and mitigation measures.
- All drainage facilities and systems should be inspected regularly and maintained whenever required.
- Should circumstances arise which result in the current drainage facilities and/or systems being inadequate, further measures should be implemented to ensure the adequate functioning of drainage facilities and/or systems.

D) Reporting

- The monitoring of the management of stormwater and erosion control should be undertaken using an environmental inspection checklist, which contains all the required conditions, recommendations and mitigation measures, on a weekly basis.
- Any complaints and/or incidents relating to stormwater management, erosion and sediment control must be reported to the ESO and the ECO.
- The ECO will be responsible for notifying the Contractor and the Developer of any complaints and/or incidents relating to stormwater management, erosion and sediment control.
- The ECO should investigate all incidents and report the findings to the Contractor and the Developer in an Environmental Incident Report.

9.3.3 Recommended Mitigation Measures

- Stormwater should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any runoff from the development site is attenuated prior to discharge. Silt and sedimentation should be kept to a minimum, using the above-mentioned structures. Ensure that the structures do not create any form of erosion.
- Natural runoff must be diverted to stormwater drains, where these are available.
- Stormwater structures must be located at least 32m away from identified drainage lines.
- This Stormwater Management Plan must be updated prior to commencement of construction to include measures for maximum water seepage at the source of water flow, mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.
- Stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise the risk of erosion and scouring.
- No stormwater runoff should be discharged directly into the watercourses, where it could cause increased erosion.

Please note that this Stormwater Management Plan must be updated prior to the commencement of construction. In addition to the recommendations listed above, it should include detailed design drawings of the proposed structures for watercourse crossings for approved roads and cables.

9.4 STORAGE AND HANDLING OF HAZARDOUS SUBSTANCES

All necessary equipment to handle hazardous substances must be available on the Coega Gas Infrastructure site. Personnel responsible for the handling of hazardous substances must be suitably trained. The Developer's Site Supervisor or the Contractor should submit a Method Statement, detailing the storage and handling of hazardous substances, to the ECO for approval. In addition, the Method Statement should include a list of all potentially hazardous substances within the Coega Gas Infrastructure site.

9.4.1 Legislation, Policy and Guidelines

The storage and handling of hazardous substance must be in accordance with the relevant legislation, policy and guidelines. This should include, but not be limited to, the following:

- Occupational Health and Safety Act (Act No. 85 of 1993),
- National Environmental Management: Waste Management Act (Act No. 59 of 2008),
- Hazardous Substances Act (Act No. 15 of 1973, as amended), and
- South African National Standards (SANS).

9.4.2 Responsibility

The Developer's Site Supervisor and/or the Contractor must be responsible for overseeing the storage and handling of hazardous substances in accordance with this plan and all relevant legislation. Should the Developer's Site Supervisor and/or the Contractor appoint a designated individual to undertake the tasks on their behalf, the designated individual (the Developer's Site Supervisor or the Contractor) will be responsible for the following:

- Assessing the hazardous properties and disposal requirements of the materials used on the Coega Gas Infrastructure site.
- Monitoring the use and management of the inventory.
- Advising and assisting the personnel with the correct handling and storage of hazardous substances.
- Updating the chemical register when new chemicals are brought to the site.
- Preparing and maintaining the Material Safety Data Sheets (MSDSs).
- Maintaining a register of the consumption of oil, diesel, etc. and maintaining a spill register.

9.4.3 Registers

The Developer's Site Supervisor or the designated individual will be responsible for compiling and maintaining the chemical register, MSDSs and spill register.

The following should be included in the chemical register:

- Name and description of the substance,
- Supplier name and details,
- Quantity,
- MSDS,
- Validity of the MSDS,
- Storage location and storage requirements,
- Method of disposal,
- Emergency equipment (firefighting equipment, first aid kits, emergency contact details, etc.)

9.4.4 Management of Hazardous Substances

The mitigation measures stipulated in the Coega Gas Infrastructure EMPr must be implemented to manage hazardous substances, reduce the risk of accidental spillages and treat accidental spills.

- The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229.
- The Contractor must also comply with all other applicable regional and local legislation as well as regulations regarding the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant MSDS should be available onsite.
- Procedures detailed in the MSDSs must be followed in the event of an emergency.
- The Contractor and/or the Developer's Site Supervisor should be responsible for the training and education of all personnel onsite that will be handling hazardous materials about their proper use, handling and disposal.
- If potentially hazardous substances are to be stored or used onsite, the Contractor and/or the Developer's Site Supervisor must submit a Method Statement to the ECO detailing the substances/materials to be used, together with the transport, storage, handling and disposal procedures for the substances.
- Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal site.
- Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material which breaks-down or encapsulates such spillages, as approved by the ECO.
- The storage of fuels and hazardous materials must be located away from sensitive water resources.
- All hazardous substances (e.g. diesel, oil drums, etc.) must be stored in a bunded area.
- The recommendations of the Stormwater Management Plan must be implemented during construction.
- All construction materials including fuels and oil should be stored in demarcated areas which are contained within berms/bunds. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion.
- All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting "No Smoking" and "Danger", conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate firefighting equipment at the fuel storage area.
- The Contractor and/or the Developer's Site Supervisor must ensure that all liquid fuels and oils are stored in tanks with lids, which are always kept firmly shut and under lock and key. The capacity of the tank should be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 Part 1. The capacity of fuel storage tanks should not exceed 9 000 litres and must be kept on site only for as long as fuel is needed for construction activities, on completion of which they must be removed.
- Fuel storage tanks onsite should not be linked or joined via any pipe work but should remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund should be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining should extend to the crest of the bund. The floor of the bund should be sloped to enable any spilled fuel and/or fuel-contaminated water to be

removed. Appropriate material, approved by the ECO that absorbs/breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water, should be installed in the sump.

- The tanks and bunded areas should be covered by a roofed structure, taken offsite to a disposal site approved by the ECO and the material, which absorbs/breaks-down or encapsulates minor hydrocarbon spillages, should be replenished.
- Adequate precautions should be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks should be stored in a waterproof container when not in use.
- As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing/breaking-down or encapsulating material to be used.
- Where reasonable and practical, the plant should be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonable or practical, then the surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities.
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used, and the drum should not be tipped in order to dispense fuel. The Contractor should ensure that the appropriate firefighting equipment is present during refuelling operations.
- The Contractor must ensure that there is always a supply of absorbent material readily available to absorb/breakdown or, where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the ECO must approve this material.
- Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal site.
- Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material which breaks-down or encapsulates such spillages, as approved by the ECO.

9.5 FIRE MANAGEMENT PLAN

9.5.1 Background

The Coega Gas Infrastructure development must comply with the relevant sections of the following legislation, guidelines and policies with regards to fire management:

- National Veld and Forest Fire Act (Act No. 101 of 1998),
- Disaster Management Act (Act No. 57 of 2002, as amended),
- Fire Brigade Services Act (Act No. 99 of 1987, as amended),
- Local Government: Municipal Structures Act (Act No. 117 of 1998),
- Occupational Health and Safety Act (Act No. 85 of 1993),
- Municipal By-Laws, and the relevant
- South African National Standards (SANS).

9.5.2 Recommended Mitigation Measures

The following mitigation measures, as stipulated in the EMPr, should be implemented to reduce the risk of accidental fires and in response to accidental fires on the Coega Gas Infrastructure site:

- Appropriate firefighting equipment and protective clothing must always be available on the Coega Gas Infrastructure site. Personnel should receive basic firefighting training, which includes guidelines for extinguishing fires and the correct method to use firefighting equipment.
- The Contractor must take all the necessary precautions to ensure that fires are not started as a result of site activities.
- No open fires must be permitted on the site.
- Smoking must not be permitted in areas where there is a fire hazard. Such areas include the workshop and fuel storage areas and any areas where vegetation or other material is such as to support the rapid spreading of an initial flame.
- The Contractor should appoint a Fire Officer who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed. The Contractor must forward the name and contact details of the Fire Officer to the ECO for approval within seven (7) days of being on site.
- The Contractor must ensure that basic firefighting equipment is always available onsite. This should include at least rubber beaters, when working in urban open spaces and natural areas, and at least one (1) fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.
- The Contractor will be liable for any expenses incurred by any organisations called to assist with fighting fires which resulted due to their activities or the activities of their personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.
- Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and should be clearly displayed at relevant locations at the site. The Contractor should advise the ECO of any emergencies onsite, together with a record of action taken, within 24 hours of the emergency occurring.
- The Contractor must submit a Method Statement which covers the procedures for emergencies, such as fire and accidental leaks and spillages.
- The Contractor should advise the relevant authority of a fire as soon as one (1) starts. It is crucial that this is done before the fire is out of control.
- The Contractor must ensure that all employees are aware of the procedures to be followed in the event of a fire.

In preparation for temporary site closure, the following should apply:

- The Contractor must ensure that fire extinguishers are serviced and accessible.

- Emergency and contact numbers are available and displayed.
- There is adequate ventilation in enclosed spaces.
- Ensure that the site safety checks have been carried out in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) prior to site closure.
- Fire hazards have been identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.

9.5.3 Emergency Contact Signage

Emergency contact details should be displayed at visible locations at the Coega Gas Infrastructure site, these should include:

EMERGENCY SERVICE	CONTACT DETAILS
Nelson Mandela Bay Municipality	Tel.: +27 (0)41-585-1555
Sarah Baartman District Municipal Disaster Management Centre	Tel.: +27 (0)41 508 7048
	Toll free: +27 (0)80 022 2238
Sarah Baartman East Fire Protection Association – Willem Breytenbach (FPA Manager)	Mobile: +27 (0)83 945 1545
Sarah Baartman East Fire Protection Association – Mervyn Sauls (Fire Protection Officer)	Mobile: +27 (0)79 440 4112
Ambulance Services	10177
South African Police Services	10111
Public Emergency Centre	112

10 CLOSURE PLANNING

The Contractor must clear and clean the site and ensure that all equipment and residual materials, not forming part of the permanent works, are removed from site before issuing the completion certificate or as otherwise agreed.

10.1 POST-CONSTRUCTION AUDIT

A post-construction audit must be carried out and submitted to the national DFFE at the expense of the Developer. Objectives should be to audit compliances with the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The post-construction audit must be submitted to the national DFFE within three (3) months of completion of the development and prior to the operational phase.

Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on site and have not been dealt with in the current document.

10.2 GENERAL REVIEW OF EMPR

The EMPr will be reviewed by the ECO on an on-going basis. Based on observations during site inspections and issues raised at site meetings, the ECO will determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on site.

Any such changes or updates will be registered in the ECO's record, as well as being included as an annexure to this document. Annexures of this nature must be distributed to all relevant parties.

11 CONCLUSIONS

All foreseeable actions and potential mitigations and/or management actions have been (to date) and should be contained in this document. The EMPr should be seen as a day-to-day management document. The EMPr sets out the environmental and social standards, which are required to minimise the negative impacts and maximise the positive benefits of the Coega Gas Infrastructure development. The EMPr could therefore change daily, and, if managed correctly, lead to successful phases of development.

All attempts should be made to have this EMPr available, as part of any tender documentation, so that the Contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of this EMPr, thus adequately costing for these.






APPENDIX A

PROPOSED ENVIRONMENTAL EDUCATION COURSE OUTLINE







www.webweaver.nu/clipart/environmental.shtml
















Reasons why should we look after the environment

-  We have a right to a clean environment
-  A clean environment is essential to healthy living
-  All our basic needs come from the environment
-  A contract has been signed – development vs the environment
-  Penalties / fines could be issued

How to look after the environment

-  Report issues
-  Teamwork
-  Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
-  Conserve, reuse and recycle

Tips and Guidelines

-  Workers and equipment should not be allowed outside demarcated areas
-  No swimming or polluting of water bodies allowed
-  No damage / disturbance to vegetation or water bodies without consent / permits
-  No disturbance allowed in no-go areas
-  No hunting of animals
-  Report all fires
-  No burning or burying of waste
-  No smoking near hazardous materials
-  Training on fire fighting equipment
-  Hazardous materials to be stored in designated and bunded areas
-  Spill kits and drip trays a must
-  Report all spills
-  Control dust and Noise
-  Maintain construction vehicles
-  Availability and maintenance of sanitation facilities



Tips and Guidelines

- Only eat in designated areas
- Do not litter
- Vehicles to remain on approved tracks and adhere to speed limit
- Ensure emergency phone numbers are available
- Ensure PPE is worn
- Report fires, leaks and injuries
- Ask if unsure



APPENDIX B

COPY OF THE ENVIRONMENTAL AUTHORISATION (ONCE RECEIVED)

APPENDIX C

EXAMPLE OF A METHOD STATEMENT

METHOD STATEMENT

CONTRACT:..... DATE:.....

PROPOSED ACTIVITY (give title of Method Statement and reference number from the EMPr):**WHAT WORK IS TO BE UNDERTAKEN** (give a brief description of the works):**WHERE ARE THE WORKS TO BE UNDERTAKEN** (where possible, provide an annotated plan and a full description of the extent of the works):**START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:**

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches

and plans where possible):

*** Note: Please attach additional pages should you require more space.**

DECLARATIONS**1) ENVIRONMENTAL CONTROL OFFICER (ECO)**

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(Signed)

(Print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____

APPENDIX E

Curriculum Vitae (CVs) of the environmental team, including the EAP:

- Dr Alan Carter (Project Lead)
- Mr Luc Strydom (EAP, Project Manager, Author)
- Ms Sage Wansell (PPP, Co-Author)

APPENDIX F

