DRAFT

ENVIRONMENTAL ECONOMIC IMPACT ASSESSMENT

PROPOSED MARINE SERVITUDES AT THE COEGA SPECIAL ECONOMIC ZONE

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EXECUTIVE SUMMARY

The CDC is proposing to establish a number of marine servitudes for the abstraction of seawater and the discharge of various effluent streams into the marine environment from the Coega SEZ. The Scoping Phase of the EIA process determined that the preferred alternative is:

- Two seawater abstraction servitudes, one from within and the other east of the Port of Ngqura; and
- Three discharge servitudes for six (6) effluent streams, all to the east of the Port of Ngqura.

Since the main concerns relating to the marine servitudes relate to the discharge of effluent into the marine environment, and particularly the Addo Elephant Marine Protected Area (MPA), the current Environmental Economic Impact Assessment (EEIA) focusses mainly on the discharges of the following effluent streams within the three discharge servitudes located off the coast of the Coega SEZ:

- Cooling water: Once Through Cooling;
- Cooling water: Wet Mechanical Cooling;
- Aquaculture flow through system for abalone;
- Aquaculture recirculation system for finfish;
- Desalination brine; and
- Wastewater from the proposed Coega SEZ WWTW facility.

The overall objectives of the current EEIA were to:

- Describe the costs and engineering requirements of required infrastructure to transport effluent to western and eastern side of Port; and
- Quantify and compare the engineering costs with environmental costs of discharging to the east and the impact of western discharge on viability of various industries.

Direct capital and operating costs

The study determined that it will cost an additional R9.5 billion to transport and discharge all six effluent streams to the west of the Port. This represents an increase of 25% in combined total project costs over a 20 year period, and an increase cost as a percentage of total project costs from 21% to 37%.

Impact of western discharge on viability of various industries

The study determined that the significance of the capital and operating costs associated with transporting the effluent streams from the east to the west of the Port of Ngqura, varies between industries. The industries that use greater quantities of seawater are more greatly affected by the additional western discharge costs. Once Through Cooling and abalone aquaculture are the most affected due their respective high seawater requirements. They contribute about R6 billion (63%) and R2 billion (21%), respectively, to the total R9.5 additional direct cost to transport effluent to the west of the Port.

With respect to the impact on the individual industries, the additional direct cost to transport effluent to the west of the Port represents a significant increase in:

- Discharge costs: ranging from 37% for Wet Mechanical Cooling up to 58% for other streams; and
- Discharge cost as a % of total project cost: ranging from 4% for Wet Mechanical Cooling up to over three times (316%) for desalination.

Based on the above, it can be concluded that the additional cost to transport effluent streams will without doubt have a significant impact on the financial viability of the respective industries and other land-based activities such as the Coega SEZ wastewater treatment facility.

Direct, indirect and external environmental and social costs

The current EEIA has attempted to systematically identify and assess the overall economic significance of the impact of the proposed effluent discharges on the ecosystem goods and services provided by the affected terrestrial and marine ecosystems. This was achieved by identifying all the relevant ecosystem goods and services associated with the affected terrestrial and marine environments, attaching where possible an economic value, and assessing the likely economic impact based on the impact ratings provided in the Final Scoping Report and specialist Marine Impact Assessment (Anchor, 2021).

A very important assumption was that the significance of the environmental and social economic impacts (impacts to ecosystem goods and services) is directly proportional to the significance of environmental impacts as determined by the:

- Final Scoping Report; and
- Specialist Marine Impact Assessment (Anchor, 2021).

In addition, there are inherent uncertainties and gaps in knowledge with respect to the valuation of ecosystem goods and services. Attaching values to less tangible goods and services that have no material benefit to which one can attach a monetary value, can be difficult and subjective.

Based on the assessment, it is concluded that the environmental and social economic impacts associated with the discharge of the proposed effluent streams into the marine environment and the Addo MPA, will not be significant and probably not material. In addition, the impacts (limited as they are) are likely to be the same or not materially different whether discharging in the east (within the Addo MPA) compared with discharging to the west of the Port.

It must be emphasised, however, that the low projected environmental and social economic impacts are contingent on the mitigation measures proposed by the Marine Impact Assessment which reduces the impacts to LOW, VERY LOW and INSIGNIFICANT. The most critical mitigation measure is treating all effluent streams to the end of pipe concentrations specified by PRDW (2020).

Economic benefits of the project

The current EEIA has not provided a detailed assessment of the economic and social benefits that the proposed industries associated with the six effluent streams, will potentially provide. However, these are briefly described relating to:

- Energy security
- Water security
- Aquaculture

The EEIA also projected that the carbon footprint for pumping effluent around the Port would amount to 94 608 tCO_2e per annum or 1 892 160 tCO_2e over a 20 year period.

Overall conclusion

Overall, it is concluded that the additional cost to transport the six effluent streams from the proposed industries located in Zone 10 located east of the Port, to the west of the Port, will without doubt have a significant impact on the financial viability of the respective industries and other land-based activities such as the Coega SEZ wastewater treatment facility.

It is suggested that environmental and social economic impacts, whether the effluent streams are discharged to the east (including the Addo MPA) or to the west of the Port, will not be significant or material compared with the overall investment opportunity and contribution to the local and National economy.

The following mitigation measures are proposed:

- The end of pipe effluent concentration limits stipulated by the dispersion modelling report (PRDW, 2020 and Lwandle, 2020) must be adhered to;

- Appropriate technologies must be thoroughly researched and implemented to ensure end of pipe concentrations are achieved;
- The reuse of effluent water from the wastewater treatment facility must be investigated; and
- A comprehensive monitoring programme of the receiving marine environment must be developed and implemented, especially relating to the potential impacts on endangered species such as the African penguin.

Based on the results of the current EEIA, it is our opinion that Alternative 1 (preferred alternative) involving the discharge of the six effluent streams into the marine environment and Addo MPA located east of the Port of Ngqura, should be approved provided that the proposed recommended mitigation measures are included as conditions in the Environmental Authorisation.

SPECIALIST DECLARATION OF INDEPENDANCE

Coastal & Environmental Services (Pty) Ltd (CES) is an independent consultant and has no business, financial, personal or other interest in the activity, application or appeal in respect of which the company was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. No circumstances arose during the course of the project that compromised the objectivity of the CES specialist(s) that performed the work.

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1. INTRODUCTION

1.1. Background

The Coega Development Corporation (Pty) Ltd (CDC) is proposing to establish a number of marine servitudes for the abstraction of seawater and the discharge of various effluent streams into the marine environment from the Coega Special Economic Zone (SEZ). The Scoping Phase of the EIA process determined that the preferred alternative was:

- Two seawater abstraction servitudes, one from within and the other east of the Port of Ngqura; and
- Three discharge servitudes for six (6) effluent streams, all to the east of the Port of Ngqura.

Detail on the abstraction and discharge servitudes is provided at Appendix A.

Since the main concerns relating to the marine servitudes relate to the discharge of effluent into the marine environment (particularly the Addo Marine Protected Area), the current Environmental Economic Impact Assessment (EEIA) focusses mainly on the effluent discharge servitudes. Table 1.1. below provides a summary of the preferred alternative for the three proposed effluent discharge servitudes located off the coast of the Coega SEZ.

Table 1.1: Summary of preferred alternative for marine effluent discharge servitudes off the coast of the Coega SEZ.

Alternative category	Preferred alternative		
Servitude	**Discharge servitude 1**	**Discharge servitude 2**	**Discharge servitude 3**
Activity	Discharge of Once-Through and Wet Mechanical cooling water effluent totalling 15.0 m^3/sec, back into the sea.	Discharge of finfish aquaculture recirculation system effluent (0.94 m^3/sec), brine (1.22 m^3/sec), treated wastewater (1.4 m^3/sec) in three separate pipelines, and stormwater, into the sea.	Discharge of abalone aquaculture flow-through effluent (5.0 m^3/sec) and stormwater, into the sea.
Specific location	Servitude of 200 m width to -11 m CD, 650 m offshore	Servitude of 200 m width with: • Brine discharge to -13.5 m CD, 1,000 m offshore. • Finfish aquaculture discharge to -16 m CD, 1,500 m offshore. • Wastewater from phase 2 of the WWTW to -20 m CD, 3,000 m offshore.	Servitude of 200 m width along the shoreline.
Design and layout	Tunnel with diameter of up to 3,000 mm.	Pipelines including: • Brine – 700 mm diameter HDPE pipe; • Finfish – 700 mm diameter HDPE pipe; • Wastewater – up to 700 mm diameter HDPE pipe.	Beach pipeline – 1,600 mm diameter HDPE pipe.

Figure 1.1 below shows the general location of the proposed preferred seawater abstraction and effluent discharge servitudes.

Figure 1.1: Broad locations of the preferred alternative for the proposed seawater intake (BLUE) and effluent discharge (RED) marine servitudes.

Certain stakeholders, such as SANParks (see letter from SANParks at Appendix B), who manage the Addo Marine Protected Area (MPA) into which effluent will be discharged, are concerned that the decision to discharge the effluent streams into the sea within the MPA east of the Port is a decision based mostly on economic reasons. It is largely for this reason, that DEFF has requested that a specialist EEIA be conducted to achieve the following:

- Describe costs and engineering requirements of required infrastructure to take effluent to the western and eastern side of Port. This will be needed for the comparative assessment of alternatives; and
- The option to the west of the Port cannot be ruled out because it is too expensive. This will have to be quantified and compared with environmental cost of discharge to the east. Impact of western discharge on viability of various industries must be understood.

CES Environmental and Social Advisory Services (CES) has been appointed by the CDC as the independent Environmental Assessment Practitioner (EAP) to undertake an Environmental Impact Assessment (EIA) of the proposed marine servitudes. CES was also appointed to conduct a specialist Environmental Economic Impact Assessment (EEIA) relating to the effluent discharge servitudes.

Stormwater is excluded from the current EEIA since stormwater will be dissipated on land, but with a provision for attenuation and overspill into the marine environment, only in the event of large flood events.

1.2. Specialist Reporting Requirements

Table 1.2 below provides the requirements for compiling specialist studies as specified in the NEMA 2014 Regulations - Appendix 6.

Table 1.2: Requirements for specialist studies according to the NEMA 2014 Regulations - Appendix 6.

Section	*NEMA 2014 Regs - Appendix 6(1) Requirement*	Position in report
1	A specialist report prepared in terms of these Regulations must contain—	
(a)	details of-	
	(i) the specialist who prepared the report; and	Section 1.6
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.6
(b)	a declaration that the person is independent in a form as may be specified by the competent authority;	Appendix B
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
(d)	the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	NA
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 3
(f)	the specific identified sensitivities of the site related to the activity and its associated structures and infrastructure;	Section 5
(g)	an identification of any areas to be avoided, including buffers;	NA
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitive of the site including areas to be avoided, including buffers;	Section 5.3
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.7
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 2 – alternatives Section 6 – impacts
(k)	any mitigation measures for inclusion in the EMPr;	Section 7.5
(l)	any conditions for inclusion in the environmental authorization;	Section 7.5
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7.5
(n)	a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorized and (ii) if the opinion is that the proposed activity of portion thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 7.5
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	None
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Appendix B
(q)	any other information requested by the competent authority.	NA

1.3. EEIA Guidelines

There are no mandatory standards or requirements relating to the scope and content of an EEIA. The current approach is based substantially on the Author's experience over the past 20 years as an environmental accountant. However, for the purposes of the current EEIA, guidance has been taken from the following sources:

- EPA (1998) An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms.
- DEFRA (UK) (2006) Marine Biodiversity - An economic valuation.
- Turpie and Wilson (2011) Cost/benefit analysis of marine and coastal resources in the Western Indian Ocean: Mozambique and South Africa.

1.4. Terms of Reference

The following EEIA terms of reference were recommended in the Plan of Study for the Environmental Impact Assessment Report (EIAr), in the Final Scoping Report.

Defining EEIA boundaries
When compiling the EEIA, clear boundaries need to be established relating to the geographical and operational extent or scope extent of the assessment.

Materiality
Materiality is an important aspect of the EEIA, as one does not want to focus effort on unimportant and minor issues and impacts. A level of financial materiality will therefore need to be decided by the project team and CDC prior to conducting detailed costing exercises.

The determination of materiality may be influenced by the following two main dimensions:
- The significance of the environmental and social impacts of the marine pipeline; and
- Their substantive influence on the assessments and decisions of stakeholders.

There will need to be a very clear explanation of how the Materiality principle were applied to identify material environmental issues, including any assumptions made.

Distinguishing and weighting of different types of costs
The following types of sustainability costs may need to be distinguished and weighted differently in the EEIA:
- Positive and negative;
- Direct and indirect;
- External costs;
- Actual or potential;
- Short term or long term; and
- Intended or unintended.

CES will identify all habitats and activities that impose environmental impacts, that will be affected by the proposed pipelines, including:
- Marine;
- Terrestrial; and
- Fresh water.

Important biodiversity and species information will be available from SANBI and the Eastern Cape Biodiversity Conservation Plan. DEFF Oceans and Coasts also has information of sensitive coastal environments. Other EIA information will also provide useful information on the extent of expected impacts.

CES will attach economic values to the potential impacts on biodiversity. Although environmental impacts are difficult to quantify, CES will determine appropriate valuation methods for various environmental and social aspects, such as:
- Cost to remediate or replace;
- Cost of setting up a biodiversity offset project;
- Costs of natural resource goods and services (e.g. value of harvested fish or shellfish); and
- Willingness to pay.

In some instances, it may be impossible or very challenging to attach a financial value to an environmental or social cost or benefit. In such instances, qualitative information may be necessary, or even a range of financial estimates provided. Valuation in many instances will be based on an estimated RANGE of valuations usually reflecting orders of magnitude (i.e. the range could be R1 million to R10 million).

Where it is not reasonably possible to attach an economic value to impacts, qualitative information can be provided.

The timing of economic risks and impacts could also be relevant in attaching value to environmental economic valuations:

- Short term – 1 to 10 years (i.e. immediate loss of biodiversity due to construction footprint);
- Medium term – 10 to 50 years (i.e. accumulation of heavy metals in marine sediments); and
- Long term – 50 to 100 years (e.g. climate change induced sea level rise).

1.5. Legislative context

The National Environmental Management Act (NEMA) and the Regulations do not provide any detail on the scope and approach for EEIA's. However, the NEMA principles do make reference to economic considerations with respect to achieving sustainable development and provides a useful context with respect to the current EEIA.

- Section 2 (2) of NEMA indicates that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably;
- Section 2 (3) Development must be socially, environmentally and economically sustainable;
- Section 4 (i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment; and
- Section 4 (p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment (polluter pays principle).

1.6. Authors details

Alan Carter, Author
Alan is an Executive Director at CES overseeing the East London and Port Elizabeth offices, and has over 30 years of experience in both environmental science and financial accounting disciplines including with international accounting firms in South Africa and the USA. He holds a PhD in Plant Sciences (Marine Phycology) and a BCom Honours degree in financial accounting.

Alan is a member of a number of professional bodies including the American Institute of Certified Public Accountants (AICPA), the Texas State Board of Public Accountancy (USA), the South African Council for Natural Scientific Professions (SACNASP) and the Institute of Waste Management South Africa (IWMSA). He is also certified as an Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and as an ISO14001 EMS auditor with Exemplar Global (formerly the American National Standards Institute).

Alan's areas of specialization include: environmental impact assessment, coastal management, waste management, climate change and emissions inventories, aquaculture, environmental accounting and auditing and visual impact assessment. Alan has been involved in numerous financial and environmental accounting projects, where his responsibility has included author, reviewer and project leader.

Relevant qualifications and experience:

Employment Experience - Financial

- Executive & Director (Coastal & Environmental Services, East London, South Africa) - 2002 – Present.
- Manager (Arthur Andersen LLP, Public Accounting Firm, Chicago, Illinois USA) - 1999 –2001.
- Senior Accountant/Auditor (Ernst & Young LLP, Public Accounting Firm, Austin, Texas, USA) - 1996 –1998.
- Senior Accountant/Auditor (Ernst & Young, Charteris & Barnes, Chartered Accountants, East London, South Africa) 1994 –1996.

Academic Qualifications - Financial

- Ph.D. Plant Science (Marine Phycology) - Rhodes University 1987
- B. Compt. Hons. Accounting Science - University of South Africa 1997
- B. Com. Financial Accounting - Rhodes University 1995
- B.Sc. Hons. Plant Science - Rhodes University 1983
- B.Sc. Plant Science & Zoology - Rhodes University 1982

Financial Consulting Experience

Financial Feasibility and Pre-feasibility Assessments

- Managed projects to develop financial pre-feasibility and feasibility assessments for various projects, including various tourism developments, aquaculture, infrastructure projects, etc.
- Managed project for the East London Industrial Development Zone (ELIDZ) to develop a Conceptual Framework for a Mariculture Zone within the ELIDZ (2009).
- Managed the following aquaculture financial feasibility studies:
    - Mariculture Zone at Qoloha on the South African Wild Coast (2013).
    - Mariculture Zone within the Coega Industrial Development Zone (2014).
    - Aquaponics Zone within the Coega Industrial Development Zone (2017).
    - Finfish cage farming within the Port of Richards Bay (2019).
    - Multispecies aquaculture hatchery and demonstration facility in the Eastern Cape Province (2019).
- Managed project to determine the financial feasibility of various proposed tourism developments for the Kouga Development Agency in the Eastern Cape Province (2006)
- Contributed significantly to a study to determine the financial and environmental feasibility of three proposed tourism development projects at Coffee Bay on the Wild Coast (2004).

Environmental Economic Due Diligence and Business Risk

- Managed project for the Transnet National Ports Authority to identify the environmental financial risks and liabilities associated with the operations of the Port of Durban as part of a broader National initiative to assess business and financial risks relating to environmental management (2006).
- Conducted sustainability and cost/benefit analysis of various wastewater treatment options (including a marine pipeline at Hood Point) for the West Bank of East London (2004).
- Conducted analysis of permit fees and application processing costs for off-road vehicle use on the South African coastline for the Department of Environmental Affairs and Tourism, Marine & Coastal Management (2003).
- Involved in the determination of the historical cost element of environmental remediation insurance claims for a number of multinational companies, including Dow Chemicals, Inc. and International Paper, Inc.
- Evaluated the environmental budgeting process of the US Army and provided best practice guidance for improving the process.

Public Financial Accounting

- For three consecutive years, managed elements of the evaluation of the environmental financial reserves of the three largest solid waste companies (Waste Management, Inc., Republic Services, Inc., Allied Waste, Inc.) and number of smaller waste companies in the USA as part of the annual financial audit process for SEC reporting purposes. Ensured compliance with RCRA and CERCLA environmental regulations.
- Managed elements of the evaluation of the environmental financial reserves of the largest hazardous waste company in the USA (Safety-Kleen, Inc.), as part of the audit process for SEC reporting purposes. Ensured compliance with RCRA and CERCLA environmental regulations.
- While with Ernst & Young LLP, (USA), functioned as lead financial auditor for various public and private companies, mostly in the technology business segment of up to $200 million in annual sales. Client experience included assistance in a $100 million debt offering, a $100 million IPO and SEC annual and quarterly reporting requirements.
- Completed three years of articles (training contract) in fulfilment of the certification requirements of the South African Institute of Chartered Accountants which included auditing, accounting and preparation of tax returns for many small to medium sized commercial entities.

Financial Policy

- Managed project to develop the Administration / Application Fee Structure for the Reclamation of Land, Coastal Use Permits, Coastal Waters Discharge Permits, Dumping Of Waste at Sea, Off-Road Vehicle Regulations Promulgated in Terms of the National Environmental Management Act: Integrated Coastal Management Act (Act No. 24 Of 2008) (2017).
- Managed project for the Department of Environmental Affairs and Tourism, Marine & Coastal Management to determine the cost implications associated with the implementation of the Integrated Coastal Management Act (2007).
- Conducted analysis of permit fees and application processing costs for off-road vehicle use on the South African coastline for the Department of Environmental Affairs and Tourism, Marine & Coastal Management (2003).

Published Reports - Financial

- Water Research Commission. 2006. Profiling Estuary Management in Integrated Development Planning in South Africa with Particular Reference to the Eastern Cape. Project No. K5/1485.
- Turpie J., N. Sihlophe, A. Carter, T, Maswime and S. Hosking. 2006. Maximising the socio-economic benefits of estuaries through integrated planning and management: A rationale and protocol for incorporating and enhancing estuary values in planning and management. Un-published Water Research Commission Report No. K5/1485.

Conference Proceedings - Financial

- Carter, A.R. 2003. Accounting for environmental closure costs and remediation liabilities in the South African mining industry. Proceedings of the Mining and Sustainable Development Conference. Chamber of Mines of South Africa, Vol. 2: 6B1-5.
- Carter, A.R. and S. Fergus. 2004. Sustainability analysis of wastewater treatment options on the West Bank of East London, Buffalo City. Proceedings of the Annual National Conference of the International Association for Impact Assessment, South African Affiliate: Pages 295-301.
- Carter, A., L. Greyling, M. Parramon and K. Whittington-Jones. 2007. A methodology for assessing the risk of incurring environmental costs associated with port activities. Proceedings of the 1st Global Conference of the Environmental Management Accounting Network.

2. ALTERNATIVES

The current EEIA assesses two different alternatives:

- Alternative 1 (preferred): Discharge of effluent east of the Port of Ngqura; and
- Alternative 2: Discharge of effluent west of the Port of Ngqura.

2.1. Alternative 1 (preferred): Discharge of effluent east of the Port

The preferred alternative includes the discharge of the following six (6) proposed effluent streams within three (3) servitudes to the east of the Port of Ngqura and within the Addo MPA:

Table 2.1: Description of the Preferred Alternative for effluent discharges.

Alternative category	Preferred alternative		
Servitude	**Discharge servitude 1**	**Discharge servitude 2**	**Discharge servitude 3**
Activity	Discharge in a single pipeline: Once-Through and Wet Mechanical cooling water effluent totalling 15.0 m^3/sec, back into the sea.	Discharge in three separate pipelines: • Finfish aquaculture recirculation system effluent (0.94 m^3/sec), • Brine (1.22 m^3/sec), • Treated wastewater (1.4 m^3/sec)	Discharge in a single pipeline: Abalone aquaculture flow-through effluent (5.0 m^3/sec) into the sea.
Specific location	Servitude of 200 m width to -11 m CD, 650 m offshore	Servitude of 200 m width with: • Brine discharge to -13.5 m CD, 1,000 m offshore. • Finfish aquaculture discharge to -16 m CD, 1,500 m offshore. • Wastewater from phase 2 of the WWTW to -20 m CD, 3,000 m offshore.	Servitude of 200 m width along the shoreline.
Design and layout	Tunnel with diameter of up to 3,000 mm.	Pipelines including: • Brine – 700 mm diameter HDPE pipe; • Finfish – 700 mm diameter HDPE pipe; • Wastewater – up to 700 mm diameter HDPE pipe.	Beach pipeline (surf zone discharge) – 1,600 mm diameter HDPE pipe.

Alternative 1 (preferred) was arrived at through an iterative process during the scoping phase of the EIA process and was informed by:

- CES 2015, Feasibility Study for the Development of an Aquaculture Development Zone in the Coega IDZ.
- PRDW 2016, Coega Aquaculture Development Seawater Intake & Outfall Study, Concept Design Report.
- Mott Mc Donald 2016, Coega IDZ, Probable Power Plant Configurations.
- PRDW, 2017, Marine Pipeline Servitude for the Coega IDZ: Specialist Marine Modelling Study and Effluent Dispersion.
- Ethical Exchange 2017, Coega Land-Based Aquaculture Development Zone (ADZ) Final Environmental Impact Report.
- PRDW 2020, Marine Pipeline Project for the Coega SEZ, Marine Effluent Dispersion Modelling.
- Lwandle 2020, Marine Pipeline Project for the Coega SEZ, Marine Ecological Assessment.
- WSP 2020, Techno-economic Assessment: Cooling Options for the Coega SEZ Gas-to-Power Project Report.

- SRK 2020, Proposed Coega 1,000 MW Gas-to-Power Plant – Zone 10 South, Zone 10 North and Zone 13. Draft Scoping Reports.

2.2. Alternative 2: Discharge of effluent west of the Port

Alternative 2 would involve the separate discharge of the same six waste streams as described for Alternative 1 (preferred) above and would more than likely also require the same multiple servitudes to host the discharge infrastructure, as for the east. However, this alternative would require the pumping and reticulation of the effluent streams within five (5) separate pipelines around the Port to the west. The pipelines would probably need to be routed up and close to the N2 (an elevation of 70 m ASL) and adjacent to the N2 route to a position about 2 km west of the Port entrance, a total distance of about 12 km.

While the western discharge would avoid discharging into the Addo MPA, it would be located about 3 km west of the Port.

Figure 2.1 below shows the possible routing of the effluent pipelines to the west of the Port.

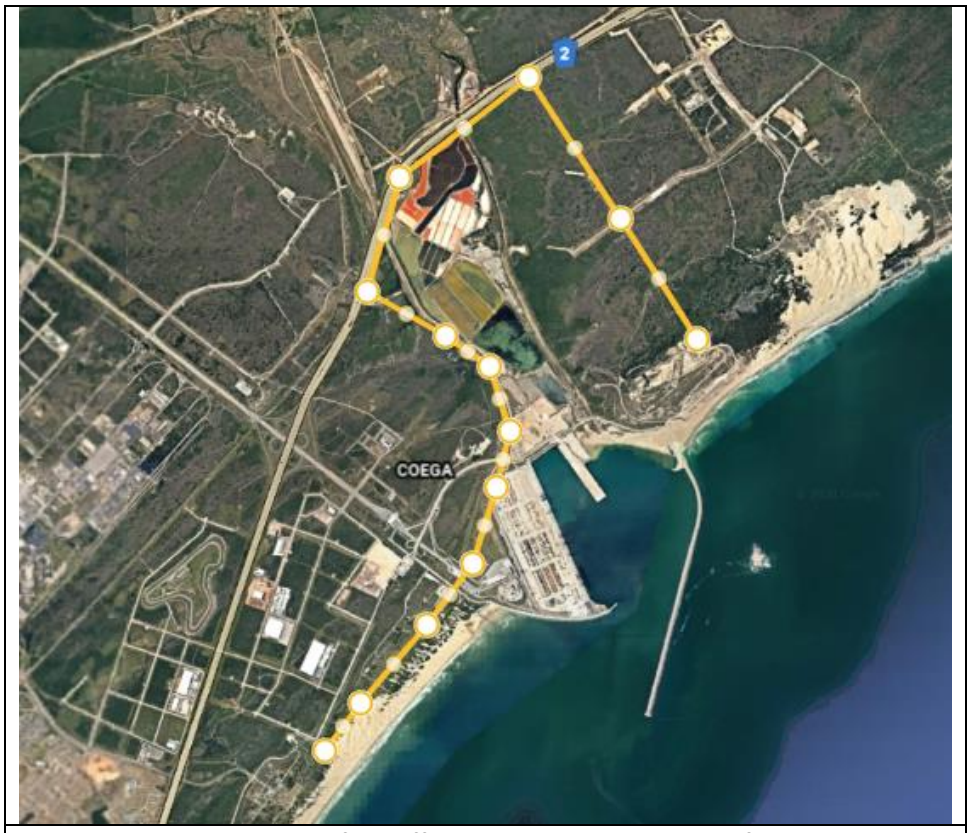

Figure 2.1: Possible routing of the effluent pipelines to the west of the Port.

2.3. Main differences between the two alternatives

The main differences between the two alternatives include:

Alternative	Alternative 1 (preferred)	Alternative 2
Location	Discharges east of Port within MPA.	Discharges west of Port outside but 3 km to the west of the MPA.
Effluent streams	Six effluent streams the same for both alternatives.	Six effluent streams the same for both alternatives.
Additional infrastructure	None	Reticulation of ALL six effluent streams to the west of the Port

Alternative	Alternative 1 (preferred)	Alternative 2
		via the N2, a distance of about 12 km pumping to an elevation of about 70 metres ASL.

3. METHODOLOGY

The following describes the CES approach to conducting the Environmental Economic Impact Assessment (EEIA) of the proposed marine pipeline servitudes in the Coega SEZ.

3.1. Types of costs

The current EEIA distinguishes between two main costs categories, namely:

- Direct capital and operational costs; and
- Direct, indirect and external environmental and social costs.

3.2. Direct capital and operational costs

Information for the capital and operating costs was obtained from the following sources:

- CES 2015, Feasibility Study for the Development of an Aquaculture Development Zone in the Coega IDZ.
- PRDW 2016, Coega Aquaculture Development Seawater Intake & Outfall Study, Concept Design Report.
- Ethical Exchange 2017, Coega Land-Based Aquaculture Development Zone (ADZ) Final Environmental Impact Report.
- WSP 2020, Techno-economic Assessment: Cooling Options for the Coega SEZ Gas-to-Power Project Report.
- SRK 2020, Proposed Coega 1000 MW Gas-to-Power Plant – Zone 10 South, Zone 10 North and Zone 13. Draft Scoping Reports.
- Other literature and costing information sources including the Coega SEZ technical department.

3.3. Direct, indirect and external environmental and social costs

The main sources for the identification of potential environmental and social economic impacts, included:

- Final Scoping Report;
- Marine Ecological Impact Assessment; and
- Addo Elephant National Park – Park Management Plan For the period 2015-2025
- Written submissions made by SANParks (see Appendix B).

Ecosystem services

The nature of the potential environmental costs associated with the effluent discharge is based on the costs associated with the potential loss of ecosystem services.

Marine and coastal ecosystems produce broadly four types of ecosystem services including:

- Provisioning services: fisheries, building materials;
- Supporting services: life-cycle maintenance for both fauna and local, element and nutrient cycling;
- Regulating services: carbon sequestration and storage, erosion prevention, waste-water treatment, moderation of extreme events; and
- Cultural services: tourism, recreational, aesthetic, and spiritual benefits.

Turpie and Wilson (2011) also provide a useful framework for the valuation of environmental goods and services, where such services offer a range of goods, services and attributes that generate value as well as contribute to human welfare.

The concept of ecosystem goods and services stems from the observation of ecosystems as natural capital which contributes to economic production. Goods, services and attributes can be defined as follows:

- Goods are harvested resources, such as fish or mangroves.
- Services are processes that contribute to economic production or save costs, such as water purification.
- Attributes relate to the composition and organisation of biodiversity, such as beauty, rarity or diversity, and generate less tangible values such as spiritual, educational, cultural and recreational value.

Total Economic Value

The Total Economic Value of an ecosystem comprises Direct Use, Indirect, Option and Non-Use values.

- **Direct use values** are generated through the consumptive use of resources (e.g. fishing) or non-consumptive use (e.g. photographic tourism, recreational diving).
- **Indirect use values** are values generated by outputs from ecosystems that form inputs into production by other sectors of the economy, or that contribute to net economic outputs elsewhere in the economy by saving on costs. These outputs are derived from ecosystem functioning such as carbon sequestration, flow regulation and provision of wildlife refugia.
- **Non-use values** include the value of having the option to use the resources (e.g. genetic) of ecosystems in the future, and the value of knowing that their biodiversity is protected. Even though they are far less tangible than the above values, non-use values are reflected in society's willingness to pay to conserve these resources.

DEFRA (2006) "Marine Biodiversity - An economic valuation" provides a useful framework for the valuation of less tangible environmental costs. The types of costs and valuation approach is provided in Table 3.1 below.

Table 3.1: Approach to valuation of ecosystem goods and services (DEFRA, 2006).

Good/Service	Definition	Valuation Method
Food provision	Plants and animals taken from the marine environment for human consumption	Market
Raw materials	The extraction of marine organisms for all purposes, except human consumption	Market
Leisure and recreation	The refreshment and stimulation of the human body and mind through the perusal and engagement with, living marine organisms in their natural environment	Market
Resilience and resistance	The extent to which ecosystems can absorb recurrent natural and human perturbations and continue to regenerate without slowly degrading or unexpectedly flipping to alternate states	Valuation data not readily available
Nutrient cycling	The storage, cycling and maintenance of availability of nutrients mediated by living marine organism	Replacement cost
Gas and climate regulation	The balance and maintenance of the chemical composition of the atmosphere and oceans by marine living organisms	Cost to avoid
Bioremediation of waste	Removal of pollutants through storage, dilution, transformation and burial	Valuation data not readily available
Biologically mediated habitat	Habitat which is provided by living marine organisms	Valuation data not readily available
Disturbance prevention and alleviation	The dampening of environmental disturbances by biogenic structures	Cost to avoid
Cultural heritage and identity	The cultural value associated with the marine environment e.g. for religion, folk lore, painting, cultural and spiritual traditions	Valuation data not readily available
Cognitive values	Cognitive development, including education and research, resulting from marine organisms	Market
Option use value	Currently unknown potential future uses of the marine environment	Valuation data not readily available

Good/Service	Definition	Valuation Method
Non-Use values – bequest and existence	Value which we derive from marine organisms without using them	Contingent valuation

Where it was not possible to attach an accurate financial value to an environmental or social cost or benefit, qualitative/descriptive information was used, or even a range of financial estimates provided. Valuation in many instances will be based on an estimated RANGE of valuations usually reflecting orders of magnitude (i.e. the range could be R1 million to R10 million).

Where it is not reasonably possible to attach an economic value to ecosystem goods and services, qualitative information has been provided.

The timing of economic risks and impacts were also considered to be potentially relevant in attaching values to ecosystem goods and services:

- Short term – 1 to 10 years (i.e. immediate loss of biodiversity due to construction footprint);
- Medium term – 10 to 50 years (i.e. accumulation of heavy metals in marine sediments); and
- Long term – 50 to 100 years (e.g. climate change induced sea level rise).

3.4. EEIA boundary

The boundary of the EEIA is limited to the following:

- The activities associated with abstracting seawater and discharging effluent to the marine environment;
- The immediate geographical area affected by the abstraction and discharge infrastructure; and
- Within a geographical distance in which the potential effluent streams may have an impact or influence including the Addo MPA. It would not include the entire wider Algoa Bay area.

3.5. Materiality

Materiality is an important consideration with respect to the current EEIA. The Materiality Principle or materiality concept is the accounting principle that concerns the relevance of information, and the size and nature of transactions that report in the financial statements. The most important consideration is to make sure that information using by shareholders and investors is sufficient for them in making the correct decision.

The information, size, and nature of transactions are considered material if the omission or error of it could potentially lead to the decision of users of financial information.

The materiality concept is not only used by the accountant as the basis to prepare the entity's financial statements but also used by auditors to assess the correctness of financial statements' disclosure or financial analyses and use in their audit testing, and other financial practitioners to determine the significance of a financial cost or valuation in making, for example, an investment decision.

With respect to the current EEIA, the determination of materiality may be influenced by the following two main considerations:

- The overall total costs of the proposed project (e.g. capital and operating costs over the life of the project);
- The significance that decision makers should reasonably attach to the environmental and social costs of the proposed project compared with the wider economic benefits that could accrue should the project proceed. In other words, are the environmental and social costs so significant that the project should not go ahead.

There is no simple formula to establish a level of materiality. In financial accounting, materiality is typically

defined as a percentage of a financial base value such as turnover or asset value. The most commonly used base in auditing is net income (earnings / profits). Most commonly percentages are in the range of 5 – 10 percent (for example an amount <5% = immaterial, > 10% material and 5-10% requires judgment).

A simple percentage of a base value approach may not be appropriate for assessing the materiality of environmental and social costs that may be incurred by a project since the baseline valuation of many environmental and social costs is difficult to achieve. However, if one was to set materiality at say 1% of the total project cost (capital cost projected to be in the order of R30 billion), this would suggest a materiality value of R300 million. Consideration of the likely significance of impacts on the environment caused by the activity, would also be relevant when applying this materiality value.

3.6. Information sources

The following information sources provide important information with respect to the current EEIA.

- Final Scoping Report.
- CES 2015, Feasibility Study for the Development of an Aquaculture Development Zone in the Coega IDZ (Now SEZ).
- PRDW 2020, Marine Pipeline Project for the Coega SEZ, Marine Effluent Dispersion Modelling.
- Lwandle 2020, Marine Pipeline Project for the Coega SEZ, Marine Ecological Assessment.
- WSP 2020, Techno-economic Assessment: Cooling Options for the Coega SEZ Gas-to-Power Project Report.
- Anchor Environmental 2021, Updated Marine Impact Assessment for the Proposed Marine Pipeline Servitude at the Coega Special Economic Zone, Port of Ngqura, South Africa.
- Eastern Cape Biodiversity Conservation Plan;
- Nelson Mandela Bay Metro Environmental Management Plan and Coastal Management Plan;
- Reference to relevant CDC reports such as the for the Aquaculture Development Zone and Scoping Reports for the Gas to Power Plants; and
- Input from the CDC Technical Department; and
- Inputs from stakeholder (e.g. SANParks).

3.7. Assumptions, uncertainties and gaps in knowledge

Assumptions

The following assumptions were made with respect to the current EEIA:

- It is assumed that the significance of environmental economic impacts (impacts to ecosystem goods and services) is directly linked to the significance of environmental impacts as determined by the:
    - Final Scoping Report; and
    - Specialist Marine Impact Assessment (Anchor, 2021).
- The time value of money and discounted future cashflows, was not considered.
- VAT is excluded.
- Pumping capacity of 15,000 Kw for the western routing of effluent, is based on WSP assessment of the capacity required to pump water to Zone 13 in the SEZ at a height of 70 Metres ASL.

Uncertainties and gaps in knowledge

There are inherent uncertainties and gaps in knowledge with respect to the valuation of ecosystem goods and services. It is still a developing discipline and attaching values to less tangible goods and services that have no material benefit to which one can attach a monetary value. Subjective estimates or ranges, and qualitative descriptions may be necessary.

4. DISCHARGE CHARACTERIZATION

The nature of the discharge effluents is relevant to the environmental economic impacts associated with the discharge of the six respective effluent streams to the marine environment.

Table 4.1 below summarises the nature of the six point-source effluent streams (excluding stormwater).

Table 4.1: Nature of six effluent streams.

Purpose	Type of effluent	Worse case discharge flow rates
Cooling water: once-through cooling	Seawater at 28°C and 35 ppt	14.70 m^3/sec
Cooling water: wet mechanical cooling	Seawater at 23°C and 53 ppt	0.30 m^3/sec
Aquaculture flow through system for abalone	Seawater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD.	5.00 m^3/sec
Aquaculture recirculation system for finfish	Seawater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD.	0.94 m^3/sec
Desalination brine	Brine at 60 ppt	1.22 m^3/sec
Wastewater	Treated domestic and industrial wastewater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD, salinity heavy metals and E.coli	0.93 + 0.46 m^3/sec
TOTAL		**23.55 m^3/sec**

Effluent modelling and characteristics

The following effluent information was sourced directly from the PRDW Dispersion Modelling Report (2020) since this provides the most comprehensive information available on the quality of the various effluent streams.

The revised dispersion modelling assessment (PRDW 2020) considered water quality and volume requirements for abstraction of seawater as well as effluent characteristics and volumes from four broad industrial types that may be established in the Coega SEZ – i.e. aquaculture, desalination, industrial wastewater, including the planned Coega Waste Water Treatment Works (WWTW), and thermal cooling (e.g. the planned gas to power plants). As such, six effluent discharge pipeline options were modelled. Two scenarios were modelled, based on differing effluent source mixes.

Given that there is limited difference in the assessment of ecological impacts between Scenario 1 and Scenario 2, the PRDW report recommended that Scenario 1 be followed with the recommended adjustments as stipulated by PRDW (2020). In addition, it is critical that end of pipe limits stipulated by the dispersion modelling report be adhered to so as to safeguard the marine environment of Algoa Bay and mitigate impacts on other water users.

PRDW (2020) and Lwandle (2020) have further recommended a 300 m mixing zone for all outfalls.

Table 4.2 below shows characteristics of each individual effluent and the required dilution for each constituent in Scenario 1 to meet the applicable water quality guideline target concentration, which is calculated according to the table below (PRDW, 2020). The Lwandle (2020) provided details of the water quality guidelines and background concentrations applied.

Table 4.2: Effluent characterization and required dilutions for individual waste streams for Scenario 1 (PRDW, 2020).

Effluent	Abstraction flow [m³/s]	Discharge flow rate [m³/s]	Effluent temperature [°C]	Effluent salinity [PSU]	Effluent density [kg/m³]	Constituent	Unit	Effluent Conc.	Target Conc.	Background Conc.	Required Dilution
Abalone	5.00	5.00	18.0	35.00	1025.30	TSS	mg/l	15	15	10	1
						Viruses?	?	?	?	?	?
Wastewater 1	0.00	0.93	18.00	0.00	998.58	E. coli	cfu/100ml	1.00E+05	500	0	200
						TKN + NH4	mg/l	81	0.6	0.045	146
						TSS	mg/l	610	15	10	120
						Salinity	PSU	0	33	35	17.5
Wastewater 2	0.00	0.46	18.00	0.00	998.58	Mercury	mg/l	5	0.0003	0	16667
						Sulphides	mg/l	5	0.001	0	5000
						Cobalt	mg/l	5	0.001	0	5000
						Copper	mg/l	20	0.005	0	4000
						Cadmium	mg/l	5	0.004	0	1250
						COD	mg/l	6000	20	5	400
						E. coli	cfu/100ml	1.00E+05	500	0	200
						TSS	mg/l	1000	15	10	198
						TKN + NH4	mg/l	30	0.6	0.045	54.0
						Salinity	PSU	0	33	35	17.5
Finfish	0.94	0.94	18.00	35.00	1025.30	Ammonia, Nitrates, Nitrites	mg/l	50	0.6	0.045	90.0
						TSS	mg/l	200	15	10	38
						COD	mg/l	100	20	5	6.3
						Viruses?	?	?	?	?	?
Brine	2.03	1.22	18.00	60.00	1044.73	Salinity	PSU	60	36	35	25
Cooling water 1	14.74	14.60	25.91	35.33	1023.51	Temperature	°C	25.91	19.00	18.00	7.9
Cooling water 2	14.33	14.33	26.00	35.00	1023.23	Temperature	°C	26.00	19.00	18.00	8.0
Cooling water 3	0.82	0.54	21.00	53.00	1038.46	Salinity	PSU	53.00	36.00	35.00	18.0
Heating water 1	1.53	1.53	13.00	35.00	1026.34	Temperature	°C	13.00	17.00	18.00	5.0
Heating water 2	4.00	4.00	13.00	35.00	1026.34	Temperature	°C	13.00	17.00	18.00	5.0

PRDW (2020) also determined the required end-of-pipe concentrations for contaminants of concern within the various effluent streams, such as in wastewater from the land-based waste-water treatment works (WWTW). This is in order to meet acceptable limits within the 300 metres radius initial mixing zone recommended by PRDW and Lwandle (2020).

Table 4.3: Required end-of-pipe concentrations for contaminants of concern within the various effluent streams (PRDW, 2020).

Effluent stream	Constituent	Unit	Maximum end of pipe concentration
Wastewater 1	Salinity	PSU	17
	TKN + NH4	mg/l	5
	TSS		50
	E. coli	Cfu/100ml	4500
Wastewater 2	Sulphide	mg/l	0.21
	Hg		0.062
	Co		0.21
	Cu		1.04
	Cd		0.83
Brine + Finfish	Ammonia, nitrates, nitrites	mg/l	13.37

5. BASELINE ECONOMIC VALUATIONS

This section focuses on the determination of the possible economic values of ecosystem goods and services that are currently provided by the environment in the vicinity of the proposed effluent discharge servitudes. The valuations are assessed in three main sectors:

- Terrestrial environment;
- Marine environment; and
- Addo MPA (since this is a particular area of concern).

5.1. Baseline of the terrestrial environment

The Final Scoping Report provides a detailed baseline description of the terrestrial environment that could potentially be affected by the proposed effluent servitudes. Table 5.1 below summarises this information including whether there are likely to be any impacts, the nature of the associated ecosystem goods and services and whether there is any potential economic value associated with the ecosystem goods and services.

Table 5.1: Summary of terrestrial environment.

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
Physical environment				
Topography	**YES**	Describes topography	Biological habitat	Unable to attach value.
Surface Hydrology	**YES**	Describes hydrology including waster courses and wetlands	Biological habitat and water resources	Cost to remediate surface water resource R1 to R10 million.
Groundwater	**YES**	Describes groundwater resources	Water resources	Cost to remediate ground water R1 to R10 million.
Climate	**NO**			
Geology and soils	**NO**			
Biological environment				
Flora	**YES**	Describes floral biota including: Cape Seashore Vegetation and St Francis Dune Thicket. Both classified as 'least threatened'.	Biological habitat, cognitive and non-use value	Unable to attach value.
Fauna	**YES**	Describes faunal biota including amphibians, reptiles, mammals and birds including the critically endangered Damara Tern.	Biological habitat, cognitive and non-use value	Unable to attach value.
Conservation planning	**YES**	Provincial – Eastern Cape Biodiversity Conservation Plan entire Coega SEZ area located in an Ecosystem Support Area (ESA) 1.	Biological habitat, cognitive and non-use value	Unable to attach value.
Socio-Economic				

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
Education	**YES**	Describes educational levels in the area.	Cognitive values	Possible value of research projects within MPA R1 to R10 million PA.
Health	**NO**			
Economic Profile	**NO**			
Land Use	**NO**			
Cultural Heritage	**YES**	Describes heritage assets including shipwrecks	Cultural and heritage	Damage to shipwrecks R1- R10 million.
Noise	**YES**	Noise during construction	Recreation and leisure	Unable to attach value
Visual	**YES**		Recreation and leisure	Unable to attach value

5.2. Baseline of the receiving marine environment

The specialist Marine Impact Assessment (Anchor, 2021) provides a detailed baseline description of the marine environment into which the proposed effluent streams will discharge into the MPA. Table 5.2 below summarises this information including whether there are likely to be any impacts, the nature of the associated ecosystem services and whether there is any potential economic value associated with the ecosystem goods and services.

Table 5.2: Summary of marine environment.

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
Physical oceanography				
Currents	NO			
Waves and tides	NO			
Water quality	YES	Algoa Bay does not generally have elevated concentrations of nutrients and trace metals.	Bioremediation of waste	Same as cost to treat on land to ambient standards. Could amount to R billions.
Offshore pelagic region	NO			
Marine ecology				
Regional biogeography	NO			
Rocky intertidal shores	YES	Describes associated floral and faunal biota.	Biological habitat, cognitive and non-use value	Unable to attach value.
Sandy shores and surf zones	YES	Describes associated floral and faunal biota.	Biological habitat, cognitive and non-use value	Unable to attach value.

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
Estuaries	YES	Coega estuary listed as critically modified with almost complete loss of floral and faunal biota.	No value	No value
Subtidal habitats	YES	Describes associated floral and faunal biota.	Biological habitat, cognitive and non-use value	Unable to attach value.
Birds	YES	Describes birds in the region with particular emphasis on the African penguin colony on St Croix Island listed as "Endangered".	Biological habitat, cognitive and non-use value	No value attached to possible extinction risk to African penguin.
Cetaceans	YES	Describes distribution and migration of various whale and dolphin species in Algoa Bay.	Biological habitat, cognitive and non-use value	Unable to attach value.
Seals and sharks	YES	Describes distribution and migration of Cape fur seal and various shark species in Algoa Bay including Great White which attracts tourists.	Biological habitat, cognitive and non-use value	Unable to attach value.
Alien and invasive species	NO			
Human uses and influences				
Recreational users	YES	Describes various recreational activities that may be affected by the Coega pipeline servitudes, including: shore-based fishing, scuba diving, beach use, motorised and non-motorised water sports.	Leisure and recreation	Value estimated at R1 to R10 million PA.
Commercial users				

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
Tourism	YES	Marine eco-tourism such as whale and shark watching.	Leisure and recreation	Shark viewing industry – possible value up R1 to R10 million PA, based on study done on Aliwal Shoal MPA (Dicken and Hosking, 2009).
Wild caught commercial fisheries				
• Small pelagic	YES	Pilchard only targeted species in Algoa Bay. Annual effort within Ngqura area a very small proportion of National catch but 12% of Eastern Cape average catch.	Food provision	Value estimated at R10 to R100 million PA.
• Squid jig fishery	YES	Catch effort from Plettenberg Bay to the Wild Coast.	Food provision	Value estimated at R350 to R600 million PA.
• Traditional line fishery	YES	Total catch in Algoa Bay of about 500 tons PA.	Food provision	Value in the order of R12 million PA.
• Shark longline	YES	Describes targeted species and near-shore concession blocks in Algoa Bay including Ngqura area which overlaps with the pipeline servitude. About 5% of annual catch in Ngqura area blocks.	Food provision	Value estimated at R10 to R100 million PA.
Aquaculture				
• Sea-based	YES	Describes the proposed sea-based aquaculture precincts. Algoa 7 close to Coega and adjacent to MPA projected to produce 8,500 tons PA.	Food provision	Potential value: R400 million PA.
• Land-based	YES	Describes the proposed land-based Coega aquaculture development zone.	Food provision	Valuation: Finfish – R2.5 billion PA. Abalone – R1.7 billion PA.

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
		Potential production of finfish, 30,000 tons PA, abalone, 3,200 tons PA.		

5.3. Addo Elephant National Park Marine Protected Area (MPA)

According to the specialist Marine Impact Assessment (Anchor, 2021) Algoa Bay is known to support a high biodiversity of marine life, particularly reef-associated invertebrates and fish, as well as several breeding colonies of endangered or vulnerable seabirds and a suite of cetaceans. For these reasons, 1,200 km^2 of Algoa Bay has been protected within the Addo Elephant National Park Marine Protected Area (MPA) as of 2019. This MPA extends the protection of the land based Addo Elephant National Park to include marine species such as the great white shark and several whale species that frequent the Algoa Bay coastline (Bryde's, Minke, Humpback and Southern Right whales). In addition, the MPA protects the breeding and important feeding grounds of two endangered bird species, namely African penguin and Cape gannet, which breed on the St Croix and Bird Islands located within the MPA.

Addo has created a major source for tourism development in the region, creating employment and impacting positively on the livelihood of the community. With respect to the MPA, existing boat charters currently offer boat cruises around the St Croix and Bird islands if permits allow. However, the park currently generates no income from any such activities.

5.3.1. SANParks comments

South African National Parks (SANParks) provided the following comments on the impact of the proposed development on the environment, and specifically the Addo Elephant National Park (the islands) and the MPA (see letter at Appendix B).

Algoa Bay is a highly biodiverse area and important for recreational and commercial fisheries as well as marine tourism. SANParks is the national conservation authority responsible for management of the Addo Elephant National Park and Marine Protected Area.

African penguin

SANParks manages the largest remaining colonies of African penguins, with ±7,616 breeding pairs (57%) on St Croix and Bird Islands within the Addo Elephant National Park MPA. The African penguin population has declined dramatically on a national scale. They were classified as Endangered by the IUCN in 2010, following a 61% decrease in their population over 28 years (BirdLife International 2010). The South African population was estimated at 13,312 breeding pairs in 2019, which represents a 42% decline since 2010. If current population trajectories continue, the African penguin will become functionally extinct in the wild (Sherley et al. 2018). St Croix island, with the largest remaining breeding colony of the African Penguins are situated within 5km and Jahleel within 500m of the Port of Ngqura.

General Risks and concerns SANParks are concerned over the several possible risks and long term impacts from this project on water quality, marine biodiversity, the pelagic food chain, pelagic fish species serving as prey for the penguins, the island ecosystems, and disease risks amongst others.

Figures 5.1 and 5.2 below show the location of the discharge servitudes within the Addo MPA.

Alternative site

SANParks are concerned that the alternative outfall site west of the Port was discarded due to economic reasons. The outfall to the west of the Port still remains SANParks preferred option as it will allow for substantial dilution, dissipation and mixing of effluent before reaching the Addo MPA. It will lessen the impact on the highly sensitive and biodiverse area significantly, as the distance from the MPA and islands are increased.

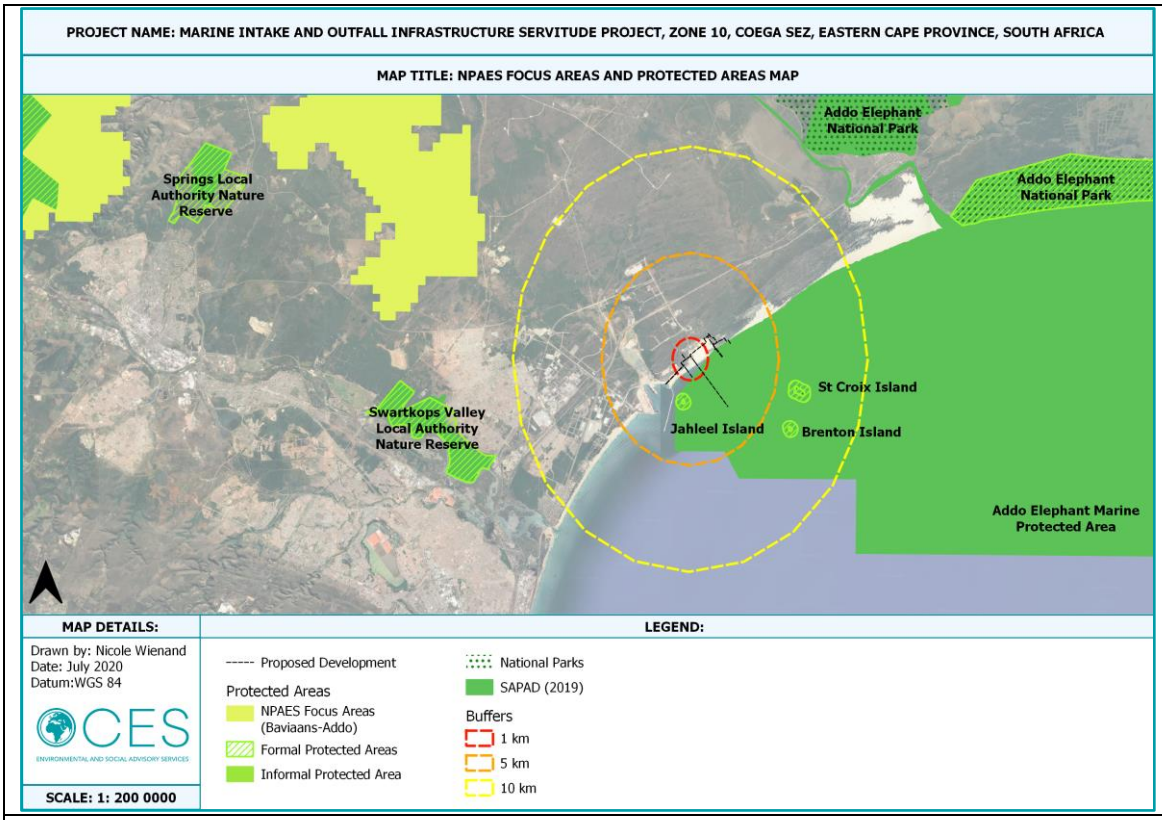

Figure 5.1: Map showing the project site in relation to the nearby protected areas and national protection Expansion Strategy (NPAES) areas.

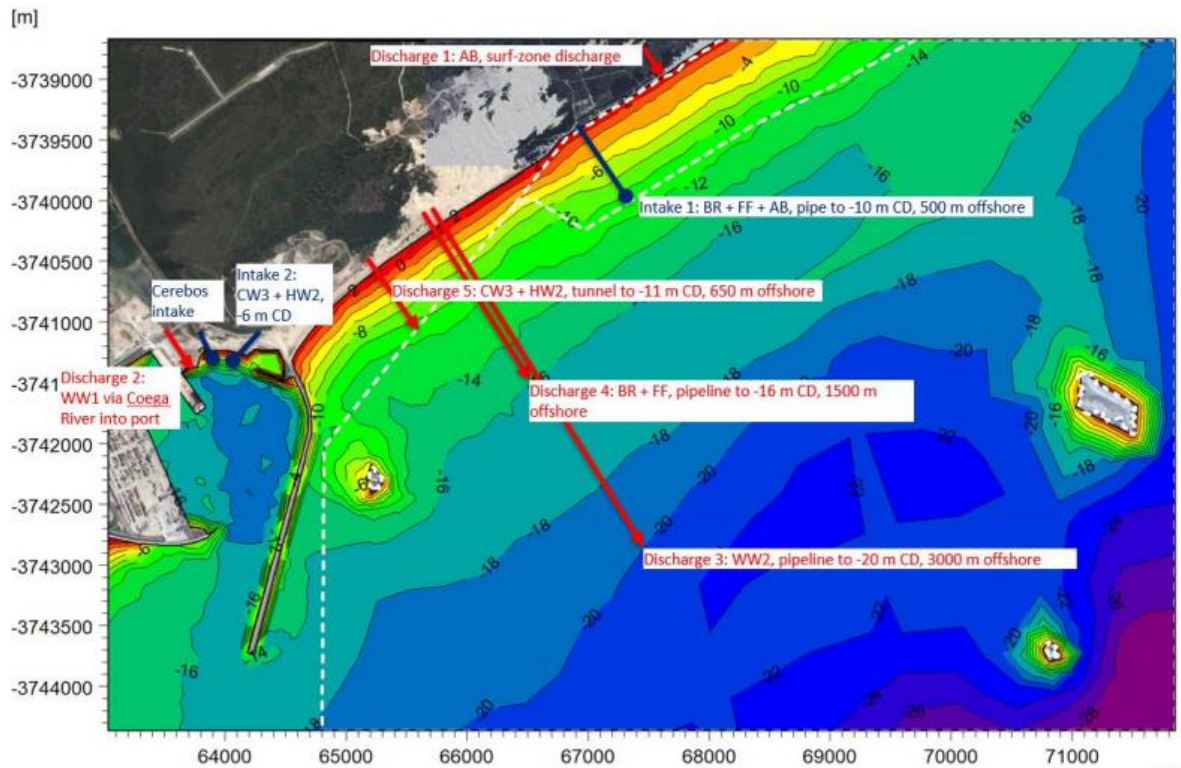

Figure 5.2: Recommended effluent discharge (RED) and intake (BLUE) marine servitude locations (PRDW, 2020).

5.3.2. Addo Elephant National Park – Park Management Plan 2015-2025

In addition to the written submission from SANParks, the Addo Management Plan provides some insights into the future vision for the Park including the MPA.

Some of the identified park features, strengths and threats relevant to the MPA are provided in Table 5.3 below.

Table 5.3: Addo Park features, strengths and threats relevant to the MPA (Park Management Plan 2015-2025).

Park attribute	Strengths	Threats
2. AENP's important ecosystem services including marine (i.e. direct and indirect benefits to society and creating awareness).	Unique combination of marine, terrestrial and islands with proximity to the metropole thus ease of displaying benefits e.g. clean water due to park up the road.	• MPA implementation will take 10 - 15 years to provide realised benefits to fisheries.
3. AENP's sense of place (diversity of natural vistas scenery, land- and seascapes).	Presence of natural environmental regime.	• Inappropriate placement of new infrastructure / developments and land use change (within and around park). • Pollution (including oil spills, noise, light pollution; alien plants, power lines, railway lines, wind farms; infrastructure on horizons, etc.). • Viewshed modification.
5. Biodiversity of AENP (hotspots, including marine), unique species (provides stronghold for several threatened / unique species).	Islands provide suitable habitats for breeding of sea birds; aquifers as driver of nutrient cycling / inputs into sea (ecosystem service); presence of species of special concern.	• Overexploitation of marine resources. • Pollution. • Inappropriate / uninformed quotas for resource use (fishing). • Climate change (including increase in extreme weather and catastrophic events). • Development and proximity of non-compatible landuse / industry. • Alien / invasive / extralimital species (including fish, boat-borne). • Warm-water outlets from industry. • Delayed implementation of MPA.
8. Stimulation of regional tourism opportunities (inside and outside the park, of which some are unexplored) through interactions and representations on all tourism fora.	Driver of development of other conservation products in the region.	• Not enough exposure to the marine environment.
9. AENP is a popular tourism destination, the Big 7, specifically elephants, are draw cards for tourism.	Terrestrial and marine opportunities.	• Poaching. • Big 7 experiences limited by inaccessibility to marine component (great white sharks and whales).
12. AENP is an economic catalyst, locally and regionally, which drives the wildlife-based economy.	Big 7, diverse birding opportunities, year round mild climate.	• Lack of adequate awareness about the park. • Poaching.

Table 5.4 below summarises the likely impacts, the nature of the associated ecosystem services and whether there is any potential economic value associated with the ecosystem goods and services provided by the Addo MPA.

Table 5.4: XXX

Environment	Potential impact	Description of environment	Ecosystem Services	Potential economic value
Protected Areas				
Addo Marine Protected Area	**YES**	Marine Impact Assessment provides a detailed description of the Addo MPA and impacts, and the Park Management Plan 2015-2025 provides insights into the vision for the MPA.	Biological habitat, cognitive and non-use value Leisure and recreation	Unable to attach value with respect to biological attributes and risk to biota such as the African penguin. Tourism income could amount to between R1 to R10 million PA.

6. ASSESSMENT OF ECONOMIC IMPACTS

The current section provides the economic impact analysis for each of the two main alternatives under consideration:

- Alternative 1: Discharge of effluent east of the Port (Preferred alternative); and
- Alternative 2: Discharge of effluent west of the Port

The analysis for each alternative is divided into two main cost categories:

- Direct capital and operational costs; and
- Direct, indirect and external environmental and social costs.

6.1. Alternative 1: Discharge of effluent east of the Port (Preferred alternative)

6.1.1. Direct capital and operational costs

The identification of direct capital and operational costs for Alternative 1 (preferred) is based substantially on the costing information provided in the WSP (2020) economic technical report and access to other information as mentioned in the methodology section of this report, such as the Coega SEZ Aquaculture Development Zone Feasibility Study (2015).

Table 6.1 below provides the direct capital and operational costs associated with the six (6) effluent streams.

Table 6.1: Direct capital and operational costs associated with the six effluent streams.

Direct capital and operational costs							
Effluent streams	**Once through**	**Wet mechanical**	**Abalone**	**Finfish**	**Desal-ination**	**Wastewater**	**TOTAL**
Volume (m^3/sec)	14,7	0,4	5,0	0,9	2,0	1,4	
	R million	**R million**	**R million**	**R million**	**R million**	**R million**	**R million**
Total project capital cost	14 100	12 735	3 000	7 000	450	768	**38 053**
Abstraction and discharge							
Capital	1 041	164	354	64	142	675	2 439
Operational							
- M&E	12	1	4	1	2	2	
- Pipelines	5	1	2	0	1	2	
- Civils and marine	10	1	3	1	1	2	
- Pumping	140	3	48	9	19	6	
Total annual ops costs	167	6	57	10	23	12	275
Total annual ops costs over 20 years	3 340	120	1 136	204	454	240	5 495
TOTAL CAP AND OPS COST OVER 20 YEARS	**4 381**	**284**	**1 490**	**268**	**596**	**915**	**7 934**
Discharge cost as % of total project cost	31%	2%	50%	4%	132%	119%	21%

It is projected that the overall capital investment costs for the proposed industries that will generate effluent, will be in the order of R38 billion with the two gas-power plants contributing R27 billion to this total, excluding seawater abstraction and effluent discharge costs.

The capital cost to construct the seawater abstraction and effluent discharge infrastructure is projected to be in the order of R2.4 billion for all six projects with the Once Through Cooling gas-power plant contributing R1 billion to this total.

The total cost associated with seawater abstraction and effluent discharge (capital and operations) over a 20 year period is projected to be R7.9 billion and 21% of total project cost, with Once Through Cooling and abalone aquaculture contributing R4.4 billion and R1.5 billion to this total, respectively.

6.1.2. Direct, indirect and external environmental and social costs

The current section provides an analysis of the environmental and social costs associated with the six effluent streams. It needs to be emphasised again (as indicated in the assumptions section), that the significance of environmental economic impacts (impacts to ecosystem goods and services) is based on the significance and proportional effect of the environmental and social impacts as predicted by the:

- Final Scoping Report; and
- Specialist Marine Impact Assessment (Anchor, 2021).

Terrestrial impacts

The Final Scoping Report provides an assessment of the terrestrial environmental and social impacts associated with the proposed marine servitudes. Table 6.2 below provides a summary of the significance of impacts post mitigation.

Table 6.2: Summary of impact ratings post mitigation for the terrestrial environment per the final Scoping Report.

IMPACT	RISK RATING WITH MITIGATION
IMPACTS ON THE PHYSICAL ENVIRONMENT	
TERRESTRIAL IMPACTS	
Topography	MODERATE
Soil contamination and erosion	LOW
Surface and groundwater resources	LOW
Coastal zone and loss of Coastal Public Property	LOW
IMPACTS ON THE BIOLOGICAL ENVIRONMENT	
TERRESTRIAL IMPACTS	
Disruption to terrestrial ecosystems	LOW
GENERAL IMPACTS AND IMPACTS ON THE SOCIO-ECONOMIC ENVIRONMENT	
Waste management	LOW
Health and Safety	LOW
Archaeological, palaeontological and/or cultural sites	LOW
CROSS CUTTING IMPACTS	
Noise Impacts	LOW
Traffic	LOW
Air Quality	LOW
Visual Impact	LOW
Climate change adaptation	LOW
Climate change mitigation	LOW

Marine Impacts

The specialist Marine Impact Assessment (Anchor, 2021) assessed the impacts of the construction and operation of the marine intake and discharge infrastructure along the shore and in the marine environment adjacent to the Coega SEZ. Specifically, this report uses the effluent dispersion modelling results produced by PRDW (2020) and comments provided by Lwandle (2020) to assess and rate the significance of the impacts of the proposed discharges on sensitive environments, marine users and aquaculture water quality requirements.

A total of 17 potential marine environmental impacts were identified and assessed for this report.

Scenario 1 and Scenario 2 were assessed separately for operational impacts. There were nine (9) identified operational impacts (including the impacts on fisheries), of which three (3) were assessed as being of 'high' significance. However, all operational impacts were assessed as 'low', 'very low' or 'insignificant' after mitigation. All impacts on fisheries are considered 'low' or 'very low' with mitigation. Impacts are summarised in Table 6.3 below.

Table 6.3: Summary of marine impacts pre and post mitigation.

Phase	Impact identified	Without mitigation								With mitigation
		Scenario 1				Scenario 2				
Operation	Impact 8: Disturbance and/or mortality of marine life due to the intake of seawater.	LOW								VERY LOW
	Impact 9: Elevated temperature.	LOW				VERY LOW				VERY LOW
	Impact 10: Changes in salinity.	VERY LOW								INSIGNIFICANT
	Impact 11: Elevated nutrients from aquaculture effluent and wastewater effluent.	HIGH								LOW
	Impact 12: Increased suspended solid concentrations.	MEDIUM								LOW
	Impact 13: Increased trace metal and inorganic constituent concentrations	HIGH								LOW
	Impact 14: Reduced dissolved oxygen concentrations.	MEDIUM								VERY LOW
	Impact 15: Sediment scouring and shifts in sediment movement patterns.	LOW								LOW
	Impact 16: Pathogens present in effluent.	HIGH								LOW
	Impact 17: Impacts on fisheries *	SP	LF	SQ	S	SP	LF	SQ	S	
		L	H	L	VL	VL	L	VL	VL	
Cumulative impacts		HIGH								LOW

* SP = Small pelagics, LF = Linefish, SQ = Squid jig, S = Shark longline

Cumulative marine environmental impacts resulting from the proposed effluent discharges are primarily related to the overlap in use with various other water users in the vicinity of the proposed servitude. As sea-based finfish farms tend to be significant sources of nitrogenous waste (i.e. nutrients), there is particular concern about the cumulative impacts of increased nutrient concentrations arising from both the sea based finfish aquaculture in the Algoa 7 finfish ADZ, and the nutrients discharges by the wastewater and finfish pipelines of the Coega SEZ. However, dispersion modelling by PRDW (2020) shows that required dilutions of nitrogenous waste (TKN + NH4) from Wastewater 1 achieve dilutions of ~1 870 at Algoa 7 (required dilution to meet WQG is 120), and that the finfish + brine effluent combination under Scenario 2 achieves dilutions of ~580 at Algoa 7

(required dilution to meet WQG is 39.1). As such, it is considered unlikely that there will be significant interaction between these nutrient sources, especially if the recommended scenario is implemented (PRDW 2020), and end of pipeline requirements are met.

However, there is a low level of confidence in the assessment of cumulative impacts of the simultaneous operation of multiple discharge pipelines. While the effluents are relatively different to each other (i.e. dense brine vs buoyant finfish aquaculture effluent), there are potential interactions between effluent constituents that can only be identified by a far field dispersion model. To improve the confidence in the assessment of cumulative impacts (currently low / not possible), the specialist marine report recommends that the simultaneous discharge scenario should be modelled.

The marine impact report provides various mitigation measures to reduce the severity of effluent impacts on the marine environment, the most critical being that the end of pipe concentration limits stipulated by the dispersion modelling report (PRDW, 2020 and Lwandle, 2020) must be adhered to so as to safeguard the marine environment of Algoa Bay and mitigate impacts on other water users.

Terrestrial and marine economic impacts

Table 6.4 below provides an assessment of the overall environmental and social economic impacts significance associated with the proposed effluent discharge servitudes.

Table 6.4: Overall environmental and social economic impacts significance associated with the proposed effluent discharge servitudes.

Environment	Ecosystem Services	Potential economic value	Risk rating with mitigation	Economic impact
TERRESTRIAL ENVIRONMENT				
Physical environment				
Topography	Biological habitat	Unable to attach value	MODERATE	Not material
Surface Hydrology	Biological habitat and water resources	Unable to attach value	LOW	Not material
Groundwater	Water resources	Unable to attach value	LOW	Not material
Biological environment				
Flora	Biological habitat, cognitive and non-use value	Unable to attach value	LOW	Not material
Fauna	Biological habitat, cognitive and non-use value	Unable to attach value	LOW	Not material
Conservation planning	Biological habitat, cognitive and non-use value	Unable to attach value	LOW	Not material
Socio-Economic				

Environment	Ecosystem Services	Potential economic value	Risk rating with mitigation	Economic impact
Education	Cognitive values	Possible value of research projects within MPA	LOW	Not material
Cultural Heritage	Cultural and heritage	R10 – R50 million for possible damage to shipwrecks	LOW	Not material
Noise	Recreation and leisure	Unable to attach value	LOW	Not material
Visual	Recreation and leisure	Unable to attach value	LOW	Not material
RECEIVING MARINE ENVIRONMENT				
Physical oceanography				
Water quality	Bioremediation of waste	Same as cost to treat on land to ambient standards. Could amount to R billions.	LOW	Not material
Marine ecology				
Rocky intertidal shores	Biological habitat, cognitive and non-use value	Unable to attached value.	LOW	Not material
Sandy shores and surf zones	Biological habitat, cognitive and non-use value	Unable to attached value.	LOW	Not material
Estuaries	No value	No value attached.	NONE	Not material
Subtidal habitats	Biological habitat, cognitive and non-use value	Unable to attached value.	LOW	Not material
Birds	Biological habitat, cognitive and non-use value	No value attached to possible extinction risk to African penguin.	LOW	Not material
Cetaceans	Biological habitat, cognitive and non-use value	Unable to attach value.	LOW	Not material
Seals and sharks	Biological habitat, cognitive and non-use value	Unable to attach value.	LOW	Not material
Human uses and influences				
Recreational users	Leisure and recreation	Value estimated at R10 to R100 million PA.	LOW	Not material
Commercial users				
Tourism	Leisure and recreation	Shark viewing industry – possible value up R10 million PA, based on study done on Aliwal Shoal MPA (Dicken and Hosking, 2009).	LOW	Not material
Wild caught commercial fisheries				
• Small pelagic	Food provision	Value estimated at R10 to R100 million PA.	LOW	Not material

Environment	Ecosystem Services	Potential economic value	Risk rating with mitigation	Economic impact
• Squid jig fishery	Food provision	Value estimated at R350 to R600 million PA.	LOW	Not material
• Traditional line fishery	Food provision	Value in the order of R12 million PA.	LOW	Not material
• Shark longline	Food provision	Value estimated at R10 to R100 million PA.	LOW	Not material
Aquaculture				
• Sea-based	Food provision	Potential value: R400 million PA.	LOW	Not material
• Land-based	Food provision	Valuation: Finfish – R2.5 billion PA. Abalone – R1.7 billion PA.	LOW	Not material
PROTECTED AREAS				
Addo Marine Protected Area	Biological habitat, cognitive and non-use value Leisure and recreation	Biodiversity conservation • Unable to attach value conservation of endangered species such as the African penguin but would suggest HIGH. Tourism • R1 to R10 million PA.	LOW	Not material

The potential economic value of the various terrestrial and marine environments can be high such as the value of sea-based aquaculture. Other valuations are difficult to determine in monetary terms, but could be high such as the risk of extinction of biota such as the African penguin. However, since the likely risks associated with the marine servitudes have been determined to be LOW, VERY LOW or INSIGNIFICANT, it is our conclusion that the overall environmental and social economic impacts associated with the marine servitudes are not significant or material.

6.2. Alternative 2: Discharge of effluent west of the Port

6.2.1. Direct capital and operational costs

Alternative 2 for the discharge of effluent west of the Port, consists of the following:

- The **same** abstraction and discharge infrastructure as Alternative 1 with the same capital and operation costs, but located west instead of east of the Port.
- **Additional** infrastructure and operational costs to pump and transport the six effluent streams to the west of the Port adjacent to the N2 route (see Figure 6.1 below).

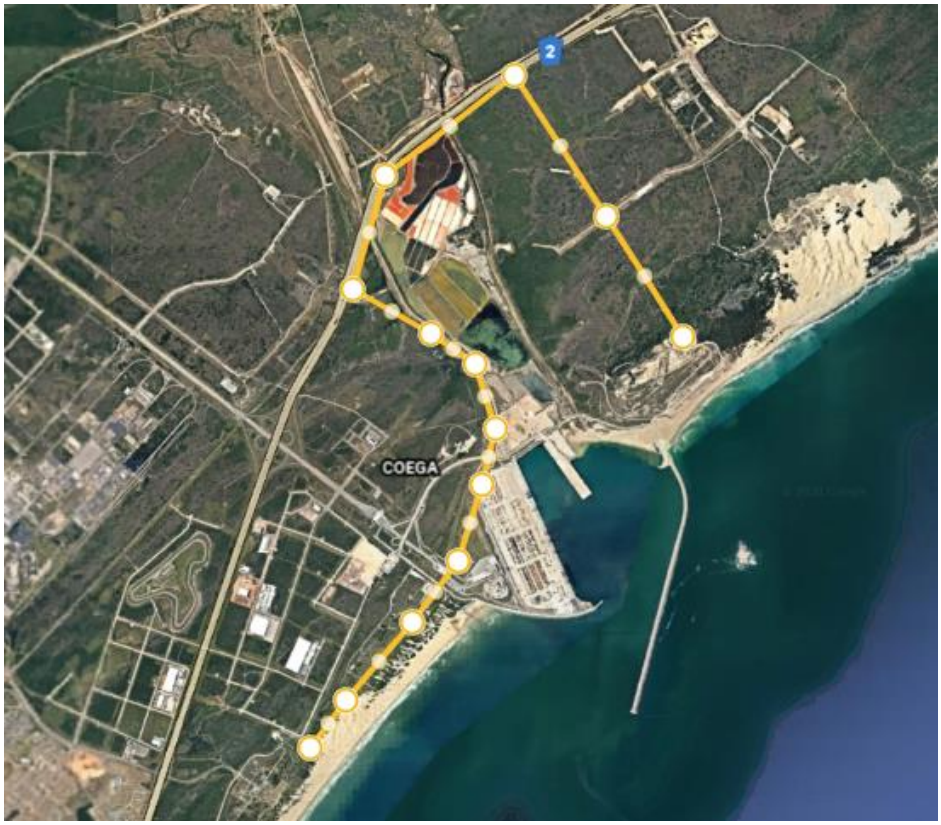

Figure 6.1: Effluent reticulation route adjacent to the N2 from east of the Port to the west of the Port.

The pumping and transportation of the six effluent streams to the west of the Port will be a significant engineering exercise. Figure 6.2 below shows the anticipated scale of the project with the following main cost drivers:

- Multiple Glass Reinforced Plastic (GRP) or HDPE pipelines with diameters ranging from 3.0 metres for cooling water to 0.7 metres for brine, finfish and wastewater effluent streams;
- Engineering and installation of multiple piping along a 12 km route from the east to west of port; and
- Pump capacity of 15,000 kW to pump effluent streams to a hight of 70 metres ASL adjacent to the N2 on a continuous basis.

The possible need to install additional booster pumps along the route has not been included in the costings.

Figure 6.2: Indication of the anticipated scale of a project to pump and reticulate effluent streams to the west of the Port.

Costing

The identification of direct capital and operational costs for Alternative 2 (western discharge) is based substantially on an extrapolation of the indicative costing information provided in the WSP (2020) economic technical report and access to other information including:

Information sources

- Supplier technical information and pricing;
- Other similar projects (e.g. East London Hood Point marine outfall EIA); and
- Input from Coega SEZ technical department.

Table 6.5 below provides **ONLY the additional** direct capital and operational costs associated with transporting the various effluent streams from the east to the west of the Port.

Table 6.5: Additional direct capital and operational costs associated with transporting six effluent streams from the east to the west of the Port.

Effluent streams	Once through	Wet mechanical	Abalone	Finfish	Desal ination	Waste water	TOTAL
	R million	R million	R million	R million	R million	R million	R million
Capital cost pipelines	1 250	34	425	77	170	119	1 956
Operational							
- M&E	130	4	44	8	18	12	
- Pipelines	13	0	4	1	2	1	
- Pumping	99	3	34	6	13	9	
Total annual ops costs	241	7	82	15	33	23	377
Total annual ops costs over 20 years	4 821	131	1 640	295	656	459	7 543
TOTAL CAP AND OPS COST OVER 20 YEARS	**6 071**	**165**	**2 065**	**372**	**826**	**578**	**9 499**
TOTAL CAP AND OPS COST OVER 20 YEARS EAST	4 381	284	1 490	268	596	915	7 934
TOTAL COST TO DISCHARGE WEST	**10 452**	**449**	**3 555**	**640**	**1 422**	**1 493**	**17 433**
% increase in discharge cost	58%	37%	58%	58%	58%	39%	54%
Discharge cost as % of total project cost	74%	4%	119%	9%	316%	194%	46%

Based on the above costings, it is projected that the cost to pump and transport the six effluent streams to the west of the Port will amount to about:

- Capital cost – R2 billion; and
- Operational cost over 20 years – R7.5 billion.

This represents an overall increase of R9.5 billion or 54% increase in effluent disposal costs over a 20 year period with the most significant contributions being the mechanical and electrical (M&E) maintenance costs and electricity consumption for driving the pumps.

6.2.1. Direct, indirect and external environmental and social costs

The environmental and social costs associated with, Alternative 2, the transport and discharge of effluent streams to the west, would be substantially the same as for Alternative 1, the preferred eastern discharge i.e. not significant or material. However, there could be additional environmental and social costs associated with Alternative 2 such as:

- Impacts due to disturbance of terrestrial habitats along the reticulation route to the west; and
- Impacts resulting from effluent spills due to pipeline leakages or pump failures along the route to the west.

7. CONCLUSIONS

The CDC is proposing to establish a number of marine servitudes for the abstraction of seawater and the discharge of various effluent streams into the marine environment from the Coega SEZ. The Scoping Phase of the EIA process determined that the preferred alternative is:

- Two seawater abstraction servitudes, one from within and the other east of the Port of Ngqura; and
- Three discharge servitudes for six (6) effluent streams, all to the east of the Port of Ngqura.

Since the main concerns relating to the marine servitudes relate to the discharge of effluent into the marine environment, and particularly the Addo MPA, the current EEIA focusses mainly on the discharges of the following effluent streams within the three discharge servitudes located off the coast of the Coega SEZ:

- Cooling water: Once Through Cooling;
- Cooling water: Wet Mechanical Cooling;
- Aquaculture flow through system for abalone;
- Aquaculture recirculation system for finfish;
- Desalination brine; and
- Wastewater from the Coega SEZ WWTW facility.

The overall objectives of the current EEIA were to:

- Describe the costs and engineering requirements of required infrastructure to transport effluent to western and eastern side of Port; and
- Quantify and compare the engineering costs with environmental costs of discharging to the east and the impact of western discharge on viability of various industries.

7.1. Summary of direct capital and operating costs

Table 7.1 below provides a summary of the **combined** direct capital and operating costs associated with discharging the six proposed effluent streams to the east of the Port, compared with discharging to the west of the Port.

Table 7.1: Comparison of the direct capital and operational costs between discharging effluent streams to the east versus the west of the Port of Ngqura.

Cost Category	R' million	R' million
	EAST	WEST
Total project capital cost	38 053	38 053
Reticulation to west	-	9 499
Sub Total	38 053	47 552
% increase in total cost		25%
Abstraction and discharge to east or west		
Capital cost	2 439	2 439
Total annual ops costs over 20 years	5 495	5 495
Sub Total	7 934	7 934
Additional reticulation to west		
Capital cost	-	1 956

Cost Category	R' million	R' million
Total annual ops costs over 20 years	-	7 543
Sub Total	-	9 499
Combined Total	7 934	17 433
Discharge cost as % of total project cost	21%	37%

It is evident from the above that it will cost an additional R9.5 billion to transport and discharge all six effluent streams to the west of the Port. This represents an increase of 25% in combined total project costs over a 20 year period, and an increase cost as a percentage of total project costs from 21% to 37%.

7.2. Impact of western discharge on viability of various industries

Table 7.2 below provides a summary of the direct individual industry capital and operating costs associated with transporting the six proposed effluent streams from the east to the west of the Port of Ngqura.

It is evident from Table 7.2 that the significance of the capital and operating costs associated with transporting the effluent streams from the east to the west of the Port of Ngqura, varies between industries. The industries that use greater quantities of seawater are more greatly affected by the additional western discharge costs. Once Through Cooling and abalone aquaculture are the most affected due their respective high seawater requirements. They contribute about R6 billion (63%) and R2 billion (21%), respectively, to the total R9.5 additional direct cost to transport effluent to the west of the Port.

With respect to the impact on the individual industries, the additional direct cost to transport effluent to the west of the Port represents a significant increase in:

- Discharge costs: ranging from 37% for Wet Mechanical Cooling up to 58% for other streams; and
- Discharge cost as a % of total project cost: ranging from 4% for Wet Mechanical Cooling up to over three times (316%) for desalination.

Based on the above, it can be concluded that the additional cost to transport effluent streams will without doubt have a significant impact on the financial viability of the respective industries and other land-based activities such as the Coega SEZ wastewater treatment facility.

Table 7.2: Summary of the direct individual industry capital and operating costs associated with transporting effluent streams from the east to the west of the Port of Ngqura.

Effluent streams	Once through	Wet mechanical	Abalone	Finfish	Desalination	Wastewater	TOTAL
	R million	R million	R million	R million	R million	R million	R million
Total project capital cost	14 100	12 735	3 000	7 000	450	768	38 053
Abstraction and discharge							
Capital cost	1 041	164	354	64	142	675	2 439
Total annual ops costs over 20 years	3 340	120	1 136	204	454	240	5 495
TOTAL CAP AND OPS COST OVER 20 YEARS	4 381	284	1 490	268	596	915	7 934
Discharge cost as % of total project cost	31%	2%	50%	4%	132%	119%	21%
Additional cost for reticulation from East to West							
Capital cost pipelines	1 250	34	425	77	170	119	1 956
Total annual ops costs over 20 years	4 821	131	1 640	295	656	459	7 543
TOTAL CAP AND OPS COST OVER 20 YEARS	6 071	165	2 065	372	826	578	9 499
	63%	2%	21%	3%	6%	5%	
TOTAL COST TO DISCHARGE WEST	10 452	449	3 555	640	1 422	1 493	17 433
Discharge cost as % of total project cost	74%	4%	119%	9%	316%	194%	46%
% increase in discharge cost	58%	37%	58%	58%	58%	39%	54%

7.3. Direct, indirect and external environmental and social costs

The current EEIA has attempted to systematically identify and assess the overall economic significance of the impact of the proposed effluent discharges on the ecosystem goods and services provided by the affected terrestrial and marine ecosystems. This was achieved by identifying all the relevant ecosystem goods and services associated with the affected terrestrial and marine environments, attaching where possible an economic value, and assessing the likely economic impact based on the impact ratings provided in the Final Scoping Report and specialist Marine Impact Assessment (Anchor, 2021).

A very important assumption was that the significance of the environmental and social economic impacts (impacts to ecosystem goods and services) is directly proportional to the significance of environmental impacts as determined by the:

- Final Scoping Report; and
- Specialist Marine Impact Assessment (Anchor, 2021).

In addition, there are inherent uncertainties and gaps in knowledge with respect to the valuation of ecosystem goods and services. Attaching values to less tangible goods and services that have no material benefit to which one can attach a monetary value, can be difficult and subjective.

With respect to materiality, a simple percentage of a base value approach may not be appropriate for assessing the materiality of environmental and social costs that may be incurred by the proposed Coega SEZ marine effluent discharge servitudes since the baseline valuation of many environmental and social costs is difficult to achieve. However, if one was to set materiality at say 1% of the total project cost (capital cost projected to be in the order of R38 billion), this would suggest a materiality value of R380 million.

Based on the assessment, it is concluded that the environmental and social economic impacts associated with the discharge of the proposed effluent streams into the marine environment and the Addo MPA, will not be significant and probably not material. In addition, the impacts (limited as they are) are likely to be the same or not materially different whether discharging in the east (within the Addo MPA) compared with discharging to the west of the Port.

It must be emphasised, however, that the low projected environmental and social economic impacts are contingent on the mitigation measures proposed by the Marine Impact Assessment which reduces the impacts to LOW, VERY LOW and INSIGNIFICANT. The most critical mitigation measure is treating all effluent streams to the end of pipe concentrations specified by PRDW (2020).

7.4. Economic benefits of the project

The current EEIA has not provided a detailed assessment of the economic and social benefits that the proposed industries associated with the six effluent streams, will potentially provide. These are briefly highlighted below.

Energy security

The contribution of the proposed Gas-Power plants to local and National energy security in terms of increased generation capacity of 3,000 MW, is highlighted in the Needs and Desirability chapter in the Final Scoping Report. In addition to the direct capital investment of over R38 billion that will accrue to the local and National economy, it is projected that the power plants will produce over R260 billion in electricity sales over a period of 20 years which is a significant contribution to the local and National GDP.

	MW Capacity*	MWhr/day	MWhr/Year	MWhr/20 years
Electricity generation	1 500	36 000	13 140 000	262 800 000
		R million**	R million**	R million**
Electricity sales		36	13 140	262 800
* Assumed 75% generation from 2,000 MW capacity. ** Assumed R1.00 per kWhr.				

Water security

Similar to energy, the need to secure water resources in a water stressed area, in order to attract industries to invest in the Coega SEZ, is also highlighted in the Needs and Desirability chapter in the Final Scoping Report. The proposed desalination plant will contribute close to 70 Ml/day of water for industry at a projected value of over R15 billion in sales over a 20 year period.

	Ml/day	Ml/year	Ml/20 years
Water volumes	69	25 229	504 576
Sales value	2,1	757	15 137

Aquaculture

With respect to aquaculture, the Coega Aquaculture Development Zone (ADZ) Feasibility Study provides projections on potential aquaculture production and market value for finfish and abalone where the combined potential market value is projected to be in the order of R4 billion per year with the potential to create over 5,000 employment opportunities.

Species	Total production (tonnes PA)	Market value (R million PA)	Jobs created
Finfish	30 000	2 475	3 000
Abalone	3 200	1 680	2 080

Carbon footprint

It is also worth noting that the electricity required to pump the six effluent streams to the west of the Port will result in an increased carbon footprint estimated to be:

Annual Carbon footprint	94 608 tCO_2e
Carbon footprint over a 20 year period	1 892 160 tCO_2e
Annual cost of carbon @ R100 per ton	R9 460 800
Cost of carbon @ R100 per ton over 20 year life	R189 216 000

7.5. Overall conclusion

Overall, it is concluded that the additional cost to transport the six effluent streams from the proposed industries located in Zone 10 located east of the Port, to the west of the Port, will without doubt have a significant impact on the financial viability of the respective industries and other land-based activities such as the Coega SEZ wastewater treatment facility.

It is suggested that environmental and social economic impacts, whether the effluent streams are discharged to the east (including the Addo MPA) or to the west of the Port, will be not be significant or material compared with the overall investment opportunity and contribution to the local and National economy.

The following mitigation measures are proposed:

- The end of pipe effluent concentration limits stipulated by the dispersion modelling report (PRDW, 2020 and Lwandle, 2020) must be adhered to;
- Appropriate technologies must be thoroughly researched and implemented to ensure end of pipe concentrations are achieved;
- The reuse of effluent water from the wastewater treatment facility must be investigated; and
- A comprehensive monitoring programme of the receiving marine environment must be developed and implemented, especially relating to the potential impacts on endangered species such as the African penguin.

Based on the results of the current EEIA, it is our opinion that Alternative 1 (preferred alternative) involving the discharge of the six effluent streams into the marine environment and Addo MPA located east of the Port of Ngqura, should be approved provided that the proposed recommended mitigation measures are included as conditions in the Environmental Authorisation.

8. REFERENCES

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- EPA (1998) An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms.
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- Lwandle 2020, Marine Pipeline Project for the Coega SEZ, Marine Ecological Assessment.
- Mott Mc Donald 2016, Coega IDZ, Probable Power Plant Configurations.
- PRDW 2016, Coega Aquaculture Development Seawater Intake & Outfall Study, Concept Design Report.
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- SRK 2020, Proposed Coega 1,000 MW Gas-to-Power Plant – Zone 10 South, Zone 10 North and Zone 13. Draft Scoping Reports.
- Turpie and Wilson (2011) Cost/benefit analysis of marine and coastal resources in the Western Indian Ocean: Mozambique and South Africa.
- WSP 2020, Techno-economic Assessment: Cooling Options for the Coega SEZ Gas-to-Power Project Report.

APPENDIX A

Summary of preferred seawater intake servitude alternative

The need for the two different locations for the marine seawater intake servitudes is driven by the water requirements for the following proposed Coega SEZ industries:

1. Cooling water for two 1000 MW LNG power stations for which the EIA is currently in progress. They require large volumes of water.
2. Land-based aquaculture (including abalone, finfish and algae farming of more than 40,000 tonnes / year). Environmental Authorisation was received on 07 February 2018. Moderate volumes of good quality seawater are required.
3. The Coega ADZ includes the development of a Seawater Desalination Plant with a maximum capacity of 60 Ml / day. Environmental Authorisation was received as part of the authorisation for the ADZ on 07 February 2018. Moderate volumes of good quality seawater are required.

Since the water quality for the power station cooling is not critical, the required large volumes can be abstracted from inside the Port area. However, the aquaculture operations require seawater of good quality, and hence abstraction outside the Port is necessary.

The following **maximum (worst-case)** seawater intake volume requirements are projected:

Purpose	Worse case intake flow rates
Cooling Water: Once-Through Cooling	14.70 m^3/sec
Cooling Water: Wet Mechanical Draft Cooling	0.42 m^3/sec
Aquaculture flow through system for abalone	5.00 m^3/sec
Aquaculture recirculation system for finfish	0.94 m^3/sec
Desalination	2.03 m^3/sec
Total	**23.09 m^3/sec**

The following table provides a summary of the **preferred seawater intake servitude alternative**, which includes two separate servitudes that are assessed in the EIA. No other alternatives will be assessed (except for the no-go alternative), since there are no other reasonable and feasible alternatives as determined in the Scoping Report.

Alternative category	**Preferred alternative**	
Servitude	**Intake servitude 1**	**Intake servitude 2**
Activity	• Abstraction of seawater from the sea for Once-Through and Wet Mechanical Cooling of power stations.	• Abstraction of seawater from the sea for land-based aquaculture and desalination.
Broad geographical location	• Cooling water intake servitude inside the Port located at the root of the eastern breakwater as indicated in PRDW map (Figure 2.18 in the scoping report or Figure 5.2 in current EEIA report).	• Combined aquaculture and desalination water intake servitude located east of the Port as indicated in PRDW map (Figure 2.18 in the scoping report or Figure 5.2 in current EEIA report).

Alternative category	Preferred alternative	
Specific location	• Servitude radius of 100 m and a depth of -6 m CD.	• Servitude width of 200 m to a distance of 600 m offshore and a depth of -10 m CD.
Design and Technology	• Once-Through Cooling water intake basin with four concrete channels each 3.5 m wide. • Wet Mechanical Cooling water intake jetty with a 710 mm HDPE pipe.	• Desalination – up to three 1,000 mm diameter HDPE intake pipes; • Aquaculture – up to three 1,600 mm diameter pipeline tunnels; • Vertical beach wells; and • WEROP wave pumps.

Summary of preferred effluent discharge servitude alternative

The need for the marine effluent discharge servitudes is mostly driven by a corresponding need of the respective Coega SEZ industries to return mostly seawater effluent used for cooling water and aquaculture, back into the offshore marine environment. Other additional effluent streams include wastewater from the Coega WWTW, brine from the desalination plant and stormwater.

The following **maximum (worst-case)** effluent discharge requirements are projected:

Purpose	Type of effluent	Worse case discharge flow rates
Cooling water: once-through cooling	Seawater at 28°C and 35 ppt	14.70 m^3/sec
Cooling water: wet mechanical cooling	Seawater at 23°C and 53 ppt	0.30 m^3/sec
Aquaculture flow through system for abalone	Seawater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD.	5.00 m^3/sec
Aquaculture recirculation system for finfish	Seawater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD.	0.94 m^3/sec
Desalination brine	Brine at 60 ppt	1.22 m^3/sec
Wastewater	Treated domestic and industrial wastewater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD, salinity heavy metals and E.coli	0.93 + 0.46 m^3/sec
Stormwater	Rainwater	Uncertain
TOTAL		**23.55 m^3/sec**

The following table provides a summary of the **preferred alternative effluent discharge servitudes** (made up of three servitudes) that are assessed in the EIA. No other alternatives will be assessed except for the no-go alternative, since there are no other reasonable and feasible alternatives as determined in the Scoping Report.

Alternative category	Preferred alternative		
Servitude	**Discharge servitude 1**	**Discharge servitude 2**	**Discharge servitude 3**

Alternative category	Preferred alternative		
Activity	Discharge of Once-Through and Wet Mechanical cooling water effluent totalling 15.0 m^3/sec, back into the sea.	Discharge of finfish aquaculture recirculation system effluent (0.94 m^3/sec), brine (1.22 m^3/sec), treated wastewater (1.4 m^3/sec) in three separate pipelines, and stormwater, into the sea.	Discharge of abalone aquaculture flow-through effluent (5.0 m^3/sec) and stormwater, into the sea.
Geographical location	East of the Port of Ngqura, as indicated in PRDW map (Figure 2.18 in the scoping report).	East of the Port of Ngqura, as indicated in PRDW map (Figure 2.18 in the scoping report or Figure 5.2 in current EEIA report).	East of the Port of Ngqura, as indicated in PRDW map (Figure 2.18 in the scoping report or Figure 5.2 in current EEIA report).
Specific location	Servitude of 200 m width to -11 m CD, 650 m offshore	Servitude of 200 m width with: • Brine discharge to -13.5 m CD, 1,000 m offshore. • Finfish aquaculture discharge to -16 m CD, 1,500 m offshore. • Wastewater from phase 2 of the WWTW to -20 m CD, 3,000 m offshore.	Servitude of 200 m width along the shoreline.
Design and layout	Tunnel with diameter of up to 3,000 mm.	Pipelines including: • Brine – 700 mm diameter HDPE pipe; • Finfish – 700 mm diameter HDPE pipe; • Wastewater – up to 700 mm diameter HDPE pipe. Stormwater gabion system.	Beach pipeline – 1,600 mm diameter HDPE pipe. Stormwater gabion system.

APPENDIX B – Letter from SANParks

10 December 2020

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Dear Nicole

SANParks comment on the COEGA MARINE INTAKE AND OUTFALL INFRASTRUCTURE PROJECT - DRAFT SCOPING REPORT.

SANParks takes note of this re-application, the first application which was submitted in 2016, and authorisation refused for several reasons in 2020. SANParks comment on this project follows a meeting with the consultant CES, and the developer CDC and a team from SANParks.

This project proposes both intake and outfall infrastructure to service a range of industries, including land based aquaculture, a Municipal wastewater treatment plant, two proposed LNG Power stations, a Desalination plant, associated stormwater outfalls and other possible future developments in the Special Economic Zone (SEZ). Some of the proposed infrastructure will fall within the boundary of the Addo Elephant National Park MPA, which will also be the receiving environment for all the proposed outfall effluent, associated impacts and some seawater abstraction (Fig 1).

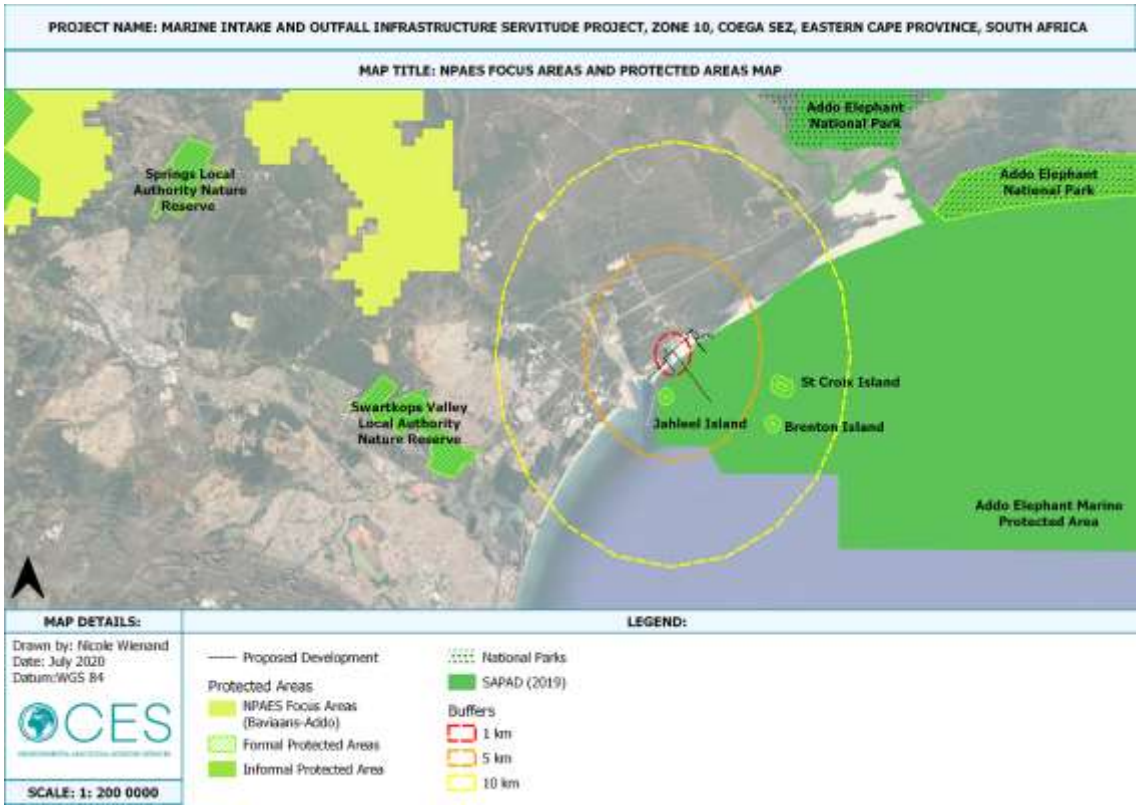

Figure 1. Map indicating the location of the proposed infrastructure in relation to the Addo Elephant National Park MPA.

The purpose and type of effluent is indicated in the table below:

Purpose	Type of effluent	Worse case discharge flow rates
Cooling water: once-through cooling	Seawater at 28°C and salinity of 35 ppt	14.70 m^3/sec
Cooling water: wet mechanical draft cooling	Seawater at 23°C and salinity of 53 ppt	0.30 m^3/sec
Aquaculture flow through system for abalone	Seawater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD.	5.00 m^3/sec
Aquaculture recirculation system for finfish	Seawater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD.	0.94 m^3/sec
Desalination brine	Brine at 60 ppt	1.22 m^3/sec
Wastewater	Treated domestic and industrial wastewater with projected concentrations of ammonia, nitrate, nitrite, TSS, COD, salinity heavy metals and E.coli	0.93 + 0.46 m^3/sec
Stormwater	Rainwater	Uncertain
TOTAL		**23.55 m^3/sec**

SANParks comments on the impact of the proposed development on the environment, and specifically the Addo Elephant National Park (the islands) and the MPA.

Algoa Bay is a highly biodiverse area and important for recreational and commercial fisheries as well as marine tourism. South African National Parks (SANParks) is the national conservation

authority responsible for management of the Addo Elephant National Park and Marine Protected Area. The Management plan of Addo Elephant National Park can be found at: https://www.sanparks.org/conservation/park_man/approved_plans.php and the MPA notice and regulations at http://www.gpwonline.co.za/Gazettes/Pages/Published-Gazettes.aspx

SANParks manages the largest remaining colonies of African penguins, with ±7,616 breeding pairs (57%) on St Croix and Bird Islands within the Addo Elephant National Park MPA. The African penguin population has declined dramatically on a national scale. They were classified as Endangered by the IUCN in 2010, following a 61% decrease in their population over 28 years (BirdLife International 2010). The South African population was estimated at 13,312 breeding pairs in 2019, which represents a 42% decline since 2010. If current population trajectories continue, the African penguin will become functionally extinct in the wild (Sherley *et al*. 2018). St Croix island, with the largest remaining breeding colony of the African Penguins are situated within 5km and Jahleel within 500m of the Port. See map below for context.

Figure 1. Map indicating the proximity of the Addo Elephant National Park MPA (AENP MPA), and in particular Jahleel island, to the Port and Zone 10 adjacent to the MPA boundary. The distance from the closest point of the boundary to the breakwater is approximately 166m.

General Risks and concerns

SANParks are concerned over the several possible risks and longterm impacts from this project on water quality, marine biodiversity, the pelagic food chain, pelagic fish species serving as prey for the penguins, the island ecosystems, and disease risks amongst others.

General comment on the DSR:

- The report lacks a more strategic view in tying together all of the proposed activities which are to make use of the infrastructure. SANParks requests a map with the proposed facilities (aquaculture, WWTW, desalination and power plants, storm water system) along with the infrastructure for which authorisation is sought is provided in

the report (similar to figure 2.3 in report). Ideally this map should show the proposed location of infrastructure between the intake / discharge points and the facilities (including the drainage areas for the storm water discharge points).

- Background detail regarding the structures that the pipelines will service should be included in the report. This should include the status of each of the facilities (power plants, aquaculture, desalination plant, WWTW and the storm water system on site) – have they been constructed, have designs been finalised, have authorisations been obtained, if not how far along in the process are the applications (these should be cross referenced e.g. EIA application numbers provided or EA provided as an appendix), etc.
- The reuse options of grey water to be explored as part of the WWTW application (given that it is a water stressed area) would be critical before a decision can be made on what type of outfall infrastructure is approved. In this case, the WWTW application needs to first be finalised before approval for the discharge infrastructure is sought. The location of the proposed WWTW structure, land-based water filtration / purification systems and distance to the discharge point need to be indicated on a map. Given that this will be discharged into an MPA, worst case scenarios need to be avoided and therefore approval of structures to accommodate such flows before treatment scenarios are investigated and approved is inappropriate.

Alternative site

- SANParks are concerned that the alternative outfall site west of the Port were discarded due to economic reasons. The outfall to the west of the Port still remains SANParks preferred option as it will allow for substantial dilution, dissipation and mixing of effluent before reaching the Addo ENP MPA. It will lessen the impact on the highly sensitive and biodiverse area significantly, as the distance from the MPA and islands are increased. The statement below indicates that the concern for water quality within an industrial port, and economic cost is of greater concern to the developers than that of a national protected area. Excerpt from the Draft Scoping report, page 50:

> ***Discharge west of the Port***
>
> The location of the discharge servitude west of the Port was identified as **'not viable'** for the construction of the proposed servitude for the following reasons:
>
> - Effluent will need to be pumped around the perimeter of the Port which would result in significantly higher capital and operational costs compared with an eastern discharge.
> - Although the required dilutions can be achieved, discharges west of the Port at -10 m will enter the Port, which increases the risk of accumulation of particulate matter with associated nutrients and heavy metals. If the pipeline is extended to -16 m, the achieved dilutions reduce the risk of effluent entering the Port is lowered. However, there is still a risk of accumulation of particulate matter with associated nutrients and heavy metals.

- The EIA process should emphasise the Environmental Impacts of various options, which does not appear to have been adequately addressed in the documentation provided. One concern raised about a more westerly discharge is potential elevation of metals in the harbour, yet no such concern is being raised about heavy metal accumulation in the MPA.
- Further, the report states that the effluent should not impact on the water quality needed for the abalone farm, the intake infrastructure situated east and down current from the effluent outfall. Using the site west of the port will reduce this risk substantially.

- During the meeting on the 8 December, the Consultant indicated that assessment of Biodiversity vs Economic value will be conducted. SANParks requests that the balance between economic development and the environment will be considered, and the longterm impact of degraded water quality on marine tourism income, impacted ecosystems and the possible loss of species, and species feeding areas, impacts on local fisheries taken into account.

Monitoring of the final outfall composition and Coastal discharge permits.

- In the previous application it was indicated that CDC will be responsible for monitoring the adherence to water quality standards at the outfalls, however it is now indicated that each individual developer will be responsible for monitoring tis own water quality. With several industries contributing to the effluent it leaves room for different interpretations in the case of contravention. The applicant in this project will not be held accountable for the effluent emanating from the applicants infrastructure.
- SANParks requests DEFF to establish a single monitoring body, and that SANParks are consulted in the issuing of any coastal waters discharge permit for effluent into the Addo ENP MPA. SANParks also requests that any future coastal discharge permits for effluent discharge through the applicant's infrastructure be linked to the applicant's Environmental authorisation. The future coastal discharge permits and this application cannot be seen as separate and are intrinsically linked.
- In both the report and the Consultant presentation emphasis was placed on sensitivities in the terrestrial environment, yet comparatively little mention is made of the marine environment, and the potential impact of the proposed developments on marine biota and processes. It almost appears as if because the regulations permit discharge of effluents into the marine environment no significant consideration is given of the impact of the effluent discharge on the marine environment, and options presented highlighting how these effects could be minimised or mitigated through system design, placement etc.
- There needs to be a clear indication of all potential pollutants from the various industries including all chemicals used in reverse osmosis plants, as well pharmaceutical products (hormones, antibiotics etc) used in aquaculture, and explanations given on if and how these were incorporated into the dispersion models. What standards were used to define acceptable concentrations in the marine environment, and what approach was used in determining possible impact for compounds for which no national standards exist.
- There is obvious concern about discharges in close proximity to St Croix Island, and how this may impact seabirds, notably penguins, dependant on this area of the ocean, and their prey species. Options for more removed positions of discharge outlets away from the island need to be considered.

Construction, maintenance, failure and contingency plans

- Scoping report deals mostly with effluent discharges with no significant consideration given to the likely impact of the actual construction or placement of infrastructure, in terms of both actual disruptions to the sea floor as well as well as disturbance, pollution etc during construction. Mitigation of these impacts also needs to be considered in the discussion of more than one option and locality.
- SANParks requests that the applicant provide models for infrastructure failure scenarios supported by contingency plans for the different structures in the case of their failure. By nature of the position of this infrastructure, any failure could impact the marine environment of Algoa Bay and the Addo ENP MPA severely.

- SANParks requests that the applicant provide a monitoring and maintenance plan, and schedule for the proposed infrastructure.

Marine dispersion modelling and marine ecological assessment

- Modelling should include both effluent outfall sites west and east of port
- Address the impact of increased water temperature and nutrients and the likelihood of regular Harmful algal blooms (HABs) occurring in the Bay and MPA.
- Impact of effluent on the water turbidity, and turbidity dispersion
- Temperature and turbidity impacts on plankton, the pelagic food web and small pelagic fish species
- Accumulation of discharge elements in the sediments and benthic habitats and associated impacts
- We note that scenarios of noncompliance from Coastal discharge permit holders will be modelled

Comments on storm water.

- Additional information on the storm water structures should be provided. How much of the storm water will be from the industrial stands and how much will come from runoff from roads, etc. Storm water should ideally be discharged onto land (e.g. onto an artificial wetland) as opposed to on a beach. Can the proposed open space areas at the site not be used for this purpose? Is it not possible to have small grassy areas where water can flow onto from the storm water outlets (even if it is landward of the roads mentioned – the water from higher up can then flow onto these areas, thus reducing the amount of water potentially discharged onto the beach)? The possibility of pollutants (oil and fuel from vehicles, domestic, etc.) entering the marine environment from storm water runoff is extremely high without proper mitigation, especially after first rains, therefore beach discharge should be considered a last resort. Also, if discharge onto land is not possible, is it possible to discharge the storm water with the one of the other pipelines / tunnels into the ocean if treated to acceptable standards (e.g. the South African Water Quality Guidelines for Coastal Waters – Volumes I and II, whichever is more stringent) before being discharged (there are various options, the CoCT are exploring some of these).
- The municipality should be made aware that discharges onto beaches could affect applications for blue flag status for beaches and could impact use of beaches (localised erosion, hard structures on sandy coastlines, functioning of dune systems, etc.).
- If the gabions are to be built on sandy beaches I would also not support their use as they limit coastal access (if it extends to the HWM) and they could potentially change the nature of the beach (erosion / accretion of sediment) if placed incorrectly.

SANParks are concerned about the proposed impacts of these projects, as well as those environmental impacts not taken into consideration. Addo Elephant National Park MPA is the last stronghold of the African Penguin in the world and any further cumulative impacts can add to the pressures on this species.

SANParks requests the Department of Environment, Forestry and Fisheries to carefully consider the number of power stations as well as the location of these plants, the likely impacts on and the adjacency of the Addo Elephant National Park and MPA.

Yours sincerely

Mr R Ngwenya
Managing Executive (Acting): Parks
South African National parks
CC: *Dr L Dziba – ME: Conservation Services, N de Goede – Acting Regional Manager, Dr A Oosthuizen – SANParks Marine coordinator.*