Offshore Bypass Pipelines and Associated Infrastructure, Voorbaai, Mossel Bay

Basic Assessment Report

Report Prepared for

The Petroleum Oil and Gas Corporation of South Africa SOC Limited

PetroSA

SRK Report Number 583957

DFFE Reference Number: To be provided

SAHRA Reference Number: To be provided

Report Prepared by

srk consulting

February 2023

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SRK Project Number 583957

February 2023

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Profile and Expertise of EAPs

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by the Petroleum Oil and Gas Corporation of South Africa SOC Limited (PetroSA) as the independent consultants to undertake the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA).

SRK Consulting was established in 1974 and comprises over 1 600 professional staff worldwide, offering wide-ranging expertise in the natural resources and environmental sectors. SRK's Cape Town Environmental, Social and Governance (ESG) department has a proven track record of managing large, complex environmental and engineering projects in the Western Cape, Africa and internationally. SRK has rigorous quality assurance standards and is ISO 9001 certified.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the BA are detailed below and Curriculum Vitae provided in Appendix A.

Project Reviewer: Christopher Dalgliesh, BBusSc (Hons), MPhil (EnvSci)
Registered EAP (no. 2019/413)
Chris Dalgliesh is an SRK Director and Principal Environmental Consultant with over 36 years' experience, primarily in Southern Africa, West Africa, South America, the Middle East and Asia. Chris has worked on a wide range of projects, notably in the natural resources, Oil & Gas, waste, infrastructure and industrial sectors. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs), in accordance with international standards (e.g. IFC). He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies and monitors project on behalf of financial institutions, and also has a depth of experience in Strategic Environmental Assessment (SEA) and Resource Economics.

Project Manager: Lauren Elston, BSc (Env); BSc (Hons) (EnvMgmt)
Registered EAP (no. 2020/981)

Lauren Elston is a Senior Environmental Consultant with almost 15 years' experience. Lauren specialises in Environmental Impact Assessment, Air Quality Management, Water Use Management and Environmental Auditing. Her core expertise includes environmental impact assessment and management of projects in the renewable energy, waste, agricultural, infrastructure, industrial, mining, and mixed development sectors in South Africa. Lauren has experience in Water Use Licences, Atmospheric Emission Licences, Waste Management Licences, Mine Closure, and the development of Environmental Management Plans. In addition, her experience includes Greenhouse Gas Reporting and Emissions Inventory Reporting on the National Atmospheric Emissions Inventory System (NAEIS).

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by PetroSA. SRK has exercised all due care in reviewing the supplied information, but conclusions

from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

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Acronyms and Abbreviations

BA	Basic Assessment
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
CBM	Central Buoy Mooring
CMOs	Coastal Management Objectives
CR	Critically Endangered
DEA	(former) (National) Department of Environmental Affairs
DEA&DP	(Western Cape) Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DFFE	(National) Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Area
ESG	Environmental and Social Governance
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRDCMP	Garden Route District Coastal Management Programme
GRDM	Garden Route District Municipality
GTL	Gas to Liquids
GN	Government Notice
HIA	Heritage Impact Assessment
HoA	Home Owners Association
HWC	Heritage Western Cape
HWM	High Water Mark
IAP	Interested and Affected Party
IWC	International Whaling Commission
IUCN	International Union for Conservation of Nature
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
KPA	Key Performance Area
LC	Least Concern
LNG	Liquified Natural Gas

LT	Lead Tug
LWM	Low Water Mark
MBLM	Mossel Bay Local Municipality
MUCH	Maritime and Underwater Cultural Heritage
MR	Medium Range
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act 24 of 2008
NEM:PAA	National Environmental Management: Protected Areas Act 57 of 2003
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act 25 of 1999
OCGT	Open Cycle Gas Turbine
PetroSA	The Petroleum Oil and Gas Corporation of South Africa SOC Limited
PIG	Pipeline Intervention Gadget
PLEM	Pipeline End Manifold
POPIA	Protection of Personal Information Act 4 of 2013
PSDF	Provincial Special Development Framework
RSV	Remote Survey Vessel
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SEZ	Special Economic Zone
SG Code	Surveyor General Code
SPM	Single-Point Mooring
SRK	SRK Consulting (South Africa) (Pty) Ltd
SSVR	Site Sensitivity Verification Report
TNPA	Transnet National Ports Authority
TOPS	Threatened or Protected Species
TT	Trail Tug
VEGMAP	Vegetation Map of South Africa, Lesotho and Swaziland
VU	Vulnerable
WCBSP	Western Cape Biodiversity Spatial Plan
WCCMP	Western Cape Coastal Management Programme

Chemical Compounds

CO_2	Carbon dioxide
CH_4	Methane
N_2O	Nitrous oxide

Glossary

Avifauna	The collective birds of a given region.
Basic Assessment Report	The report produced to relay the information gathered and assessments undertaken during the Environmental Impact Assessment.
Coastal Area	Coastal public property, littoral active zone and any area between the high water mark and up to 500 m landwards of the high water mark where dunes wetlands, mangroves, lagoons, salt marshes, salt pans, mud flats occur, but not exceeding the boundary of the coastal zone.
Coastal Zone	Means the area comprising coastal public property, the coastal protection zone, coastal access land, coastal protected areas, the seashore and coastal waters, and includes any aspect of the environment on, in, under and above such area
Coastal Public Property	Coastal waters, land submerged by coastal waters, natural islands within coastal waters and the seashore.
Coastal Protection Zone	The coastal protection zone contemplated in section 16 of NEM: ICMA
Community	Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Consultation	A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.
Critical Biodiversity Area	Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Dune	A mound or ridge of loose wind blown material, usually sand, whether covered by vegetation or not
Ecological Support Area	Areas which play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development.
Ecology	The study of the interrelationships of organisms with and within their physical surroundings
Ecosystem	The interconnected assemblage of all living organisms that occupy a given area and the physical environment with which they interact.
Endemic / Endemism	Species unique (native or restricted) to a defined geographic location, i.e. ecological state of a species being unique to a defined geographic location.
Environment	The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.

Environmental Authorisation	Permission granted by the competent authority for the applicant to undertake listed activities in terms of the NEMA EIA Regulations, 2014.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.
Environmental Management Programme	A description of the means (the environmental specification) to achieve environmental objectives and targets during all stages of a specific proposed activity.
Fauna	The collective animals of a particular region, habitat or geological period.
Flora	The collective plants of a particular region, habitat or geological period.
Heritage Resources	Refers to something tangible or intangible, e.g. a building, an area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations and has cultural significance.
Housekeeping	Maintaining the working environment in a tidy manner.
Hydrology	(The study of) surface water flow.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Independent EAP	An independent person with the appropriate qualifications and experience appointed by the Applicant to manage the Environmental Impact Assessment process on behalf of the Applicant.
Intelligently Pigged	An inspection technique whereby an inspection probe, often referred to as a "smart" pig, is propelled through a pipeline while gathering important data, such as the presence and location of corrosion or other irregularities on the inner walls of the pipe.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.
Mitigation measures	Design or management measures that are intended to minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Operational Phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Red Data List	Species of plants and animals that because of their rarity and/or level of endemism are included on a Red Data List (usually compiled by the IUCN) which provides an indication of their threat of extinction and recommendations for their protection.
Seashore	The area between the Low Water Mark and High Water Mark
Screening Tool	The National Web Based Environmental Screening Tool used to identify environmental sensitivity ratings to a specific identified site for a number of environmental themes.
Specialist study	A study into a particular aspect of the environment, undertaken by an expert in that discipline.
Stakeholders	All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development	Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.
Vessel	A waterborne craft of any kind, whether self-propelled or not, but does not include any moored floating structure that is not used as a means of transport by water.

1 Introduction

1.1 Introduction

The Petroleum Oil and Gas Corporation of South Africa SOC Limited (PetroSA) operates and owns a Gas to Liquid (GTL) refinery in Voorbaai, Mossel Bay, that imports and exports hydrocarbon fuels using a Central Buoy Mooring (CBM) facility and a Single-Point Mooring (SPM) facility. The SPM facility is connected to the GTL refinery via three marine pipelines of varying diameters (8", 12" and 14") housed in a single enclosed ~3.4 km long, 36" carrier pipe subsea bundle from the tank farm to the SPM (see Figure 1-1 and Appendix B2). Only the 14" pipe is currently utilised for condensate import and diesel export. The 8" and 12" have been inoperative since the early 1990s and 2019 respectively. In order to bypass the corroded section of the 12" and 14" pipeline, PetroSA proposes to modify the existing SPM subsea bundle by installing two new ~1.4 km steel pipelines (12" and 14") (referred to as a dual pipeline) on the seabed, parallel to and ~15 m from the existing housing structure. The dual pipeline will terminate in a new Pipeline End Manifold (PLEM) seabed structure and be tied into the existing SPM buoy (to be repositioned to align with the new PLEM) and the existing operating bundle (the project – see Figure 1-1 and Appendix B2).The new pipelines will be welded together in string lengths (strings) of approximately 200 m at the fabrication (pipeline assembly) site at PetroSA's Tank Farm and launched to sea by a tugboat across temporary elevated roller lines (via a ~12 m wide launch way) to be installed between the Tank Farm and the Low Water Mark (LWM) of the sea (see Figure 1-1).

SRK Consulting (South Africa) (Pty) Ltd (SRK) is appointed by PetroSA to undertake the Basic Assessment (BA) process, which is required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended.

1.2 Purpose of the Report

In terms of relevant legislation, the project may not commence prior to obtaining a suite of authorisations (see Section 2). This report has been compiled in support of these applications. The BA Report (BAR) documents the steps undertaken to assess the significance of impacts and determine measures to mitigate the negative impacts and enhance the benefits (or positive impacts) of the proposed project. The report presents the findings of the BA and a description of the public participation that forms part of the process.

The BAR is accompanied by an Environmental Management Programme (EMPr), which documents the management and monitoring measures that need to be implemented during the Design, Construction and Operational Phases of the project to ensure that impacts are appropriately mitigated and benefits enhanced. More specifically, the objectives of this BAR are to:

- Inform the stakeholders about the proposed project and the BA process followed;
- Obtain contributions from stakeholders (including the applicant, consultants, relevant authorities and the public) and ensure that all issues, concerns are documented and addressed;
- Assess in detail the potential environmental and socio-economic impacts of the project;
- Identify environmental and social mitigation measures to address the impacts assessed; and
- Produce a BAR that will assist the Department of Forestry, Fisheries and the Environment (DFFE) to decide whether (and under what conditions) to authorise the proposed development.

Data Source:	Esri Basemap
Scale	1:35 000
Projection:	Datum: WGS84
Central Meridian/Zone:	
Date:	Compiled by:
18/08/2022	LEKT
Project No.	Fig No.
583957	

srk consulting

PETRO SA SPM PIPELINE

LOCALITY MAP

Path: \\Ctn-svr0.ctn.za.srk.ad\vol1\Root\Proj\New Proj\583957_PetroSA SPM Pipeline BA\8GIS\GISPROJ\MXD\583957_PetroSA_SPM_Pipeline_Locality_Map1_20220818.mxd

Revision: C Date: 20 02 2023

1.3 Structure of this Report

This report discusses relevant environmental legislation and its application to this project, outlines the BA process, presents a detailed project description and environmental baseline, details the stakeholder engagement process followed and assesses the potential impacts of the project before concluding the report with a set of pertinent findings and key recommendations.

The report consists of the following sections:

Section 1: Introduction

Provides an introduction and background to the proposed project and outlines the purpose of this document and the assumptions and limitation applicable to the study.

Section 2: Governance Framework and Environmental Process

Provides a brief summary and interpretation of the relevant legislation as well as pertinent strategic planning documents, and outlines the approach to the environmental process.

Section 3: Project Description

Describes the location and current status of the site and provides a brief summary of the surrounding land and marine uses as well as background to, motivation, and description of, the proposed project.

Section 4: Description of the Affected Environment

Describes the biophysical and socio-economic characteristics of the affected environment against which potential project impacts are assessed.

Section 5: Stakeholder Engagement

Details the stakeholder engagement approach and summarises stakeholder comments that informed the impact assessment.

Section 6: Environmental Impact Assessment

Describes the specialist studies undertaken and assesses the potential impacts of the project utilising SRK's proven impact assessment methodology.

Section 7: Conclusions and Recommendations

Provides an Environmental Impact Statement (EIS), describes the need and desirability of the project, and summarises the recommendations of the BAR.

The BAR has been prepared in accordance with Section 19 of the EIA Regulations, 2014 (as amended).

1.4 Content of Report

Section 3 of Appendix 1 of the EIA Regulations, 2014 prescribe the required content in a BAR. These requirements and the sections of this BAR in which they are addressed, are summarised in Table 1-1.

Table 1-1: Content of BAR as per EIA Regulations, 2014

GN 982, Appendix 1 S 3(1) Ref.:	Item	Section Ref.:
(3) (a)	Details of:	
(a) (i)	The Environmental Assessment Practitioner (EAP) who prepared the report	p. ii
(a) (ii)	The expertise of the EAP, including a Curriculum Vitae	p. ii, App A
	Location of the activity, including	

GN 982, Appendix 1 S 3(1) Ref.:	Item	Section Ref.:
(b) (i)	The 21 digit Surveyor General code of the properties	3.1.1 and 3.1.2
(b) (ii)	The physical address and farm name (where available)	
(b) (iii)	The coordinates of the boundary of the property / properties (where (3) (b) (i) and (3) (b) (ii) are not available)	
(c)	A plan indicating the location of the proposed activity / activities and associated infrastructure, or:	Figure 1-1
(c) (i)	For linear activities: a description and coordinates of the corridor in which the proposed activity is to be undertaken	3.1.1 and 3.1.2
(c) (ii)	On land where the property has not been defined, the coordinates within which the activity is to be undertaken	
(d)	A description of the scope of the proposed activity, including:	3
(d) (i)	All listed and specified activities trigger and being applied for	2.1.1.1
(d) (ii)	A description of the associated structures and infrastructure related to the development	3.5.1 and 3.5.2
(e)	A description of the policy and legislative context within which the development is proposed including	2
(e) (i)	an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and	
(e) (ii)	how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	
(f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location	3.2 and 7.2
(g)	A motivation for the preferred site, activity and technology alternative	7.4
(h)	A full description of the process followed to reach the proposed development footprint within the approved site, including:	
(h) (i)	Details of all the alternatives considered;	3.3
(h) (ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	5
(h) (iii)	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them	N/A will be included in the Final BAR
(h) (iv)	the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	4
(h) (v)	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed or mitigated	6
(h) (vi)	the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	6.1.3
(h) (vii)	positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	6
(h) (viii)	The possible mitigation measures that could be applied and level of residual risk	
(h) (ix)	The outcome of the site selection matrix	3.3.1.2
(h) (x)	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	3.3

GN 982, Appendix 1 S 3(1) Ref.:	Item	Section Ref.:
(h) (xi)	A concluding statement indicating the preferred alternatives, including preferred location of the activity	7.4
(i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including:	6
(i) (i)	A description of all environmental issues and risks that were identified during the environmental impact assessment process	
(i) (ii)	An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	
(j)	An assessment of each identified potentially significant impact and risk, including:	
(j) (i)	Cumulative impacts	
(j) (ii)	The nature, significance and consequences of the impact and risk	
(j) (iii)	The extent and duration of the impact and risk	
(j) (iv)	The probability of the impact and risk occurring	
(j) (v)	The degree to which the impact and risk can be reversed	
(j) (vi)	The degree to which the impact and risk may cause irreplaceable loss of resources	
(j) (vii)	The degree to which the impact and risk can be avoided, managed or mitigated;	
(k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	
(l)	An EIS which contains	7.1
(l) (i)	A summary of the key findings of the environmental impact assessment	
(l) (ii)	A map at an appropriate scale which superimposes the proposed activity and its associated structures and the infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers	
(l) (iii)	A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	6 and 7.3
(n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	7.3
(o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	1.5
(p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	7.4
(q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	N/A
(r)	An undertaking under oath or affirmation by the EAP in relation to	Appendix A
(r) (i)	The correctness of the information provided in the reports	
(r) (ii)	The inclusion of comments and inputs from stakeholders and I&APs	
(r) (iii)	The inclusion of inputs and recommendations from the specialist reports where relevant; and	
(r) (iv)	Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	To be provided in Final BAR

GN 982, Appendix 1 S 3(1) Ref.:	Item	Section Ref.:
(s)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	Where applicable, any specific information required by the competent authority; and	N/A
(u)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

1.5 Assumptions and Limitations

As is standard practice, the report is based on a number of assumptions and is subject to certain limitations. These are as follows:

- Information provided by PetroSA, other consultants and specialists is assumed to be accurate and correct;
- SRK's assessment of the significance of impacts of the proposed development on the affected environment has been based on the assumption that the activities will be confined to those described in Section 3. If there are any substantial changes to the project description, impacts may need to be re-assessed;
- Where detailed design information is not available, the precautionary principle, i.e. a conservative approach that overstates negative impacts and understates benefits, has been adopted;
- The marine ecology, and underwater heritage specialist impact assessments are desktop based assessments based on existing available information;
- Current design information provided by PetroSA is conceptual. Final detailed designs for the launch way and bypass pipeline and associated infrastructure will be compiled following Environmental Authorisation (EA) and following hydrographic surveys; and
- PetroSA will in good faith implement the agreed mitigation measures identified in this report. To this end it is assumed that PetroSA will commit sufficient resources and employ suitably qualified personnel.

Limitations and assumptions applicable to specific specialist studies are listed in the respective specialist reports. Notwithstanding the above, SRK is confident that these assumptions and limitations do not compromise the overall findings of the report.

2 Governance Framework and Environmental Process

2.1 Legal Requirements

There are a number of regulatory requirements at local, provincial and national level with which the proposed development will have to conform. Some of the key legal requirements include the following:

- National Environmental Management Act 107 of 1998 (NEMA);
  - EIA Regulations 2014, promulgated in terms of NEMA (as amended);
  - National Web Based Environmental Screening Tool; and
  - Procedures for the Assessment and Minimum Criteria for Reporting;
- National Environmental Management: Biodiversity Act 10 of 2004 (NEM:BA);
  - Threatened or Protected Species Regulations (23 February 2007);
  - Alien and Invasive Species Regulations (30 September 2014), as amended;
- National Environmental Management: Integrated Coastal Management Act 24 of 2008 (NEM:ICMA);
  - Regulations for the Control of Use of Vehicles in the Coastal Zone (June 2014) promulgated in terms of NEM:ICMA;
- National Heritage Resources Act 25 of 1999 (NHRA); and
- Prevention and Combating of Pollution of the Sea by Oil Act 6 of 1981.

A brief summary of SRK's understanding of the relevant Acts and Regulations that are applicable to this study is provided below. Note that other legislative requirements may also pertain to the proposed project. As such, the summary provided below is not intended to be definitive or exhaustive, and serves only to highlight key environmental legislation and obligations.

2.1.1 National Environmental Management Act 107 of 1998

NEMA establishes a set of principles which all authorities have to consider when exercising their powers. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental consequences of a policy, project, product or service applies throughout its life cycle.

Section 28(1) states that "*every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring*". If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;

- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

Legal requirements for this project

PetroSA has a responsibility to ensure that the proposed activities and the BA process conform to the principles of NEMA. In terms of Section 28 of NEMA, the proponent is obliged to take actions to prevent pollution or degradation of the environment, and to ensure that the environmental impacts associated with the project are considered, and mitigated where possible.

2.1.1.1 EIA Regulations, 2014

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA issued by the competent authority (in this case the DFFE). In this context, the EIA Regulations, 2014, promulgated in terms of NEMA, govern the process, methodologies and requirements for the undertaking of BAs in support of EA applications. Listing Notices 1-3 in terms of NEMA list activities that require EA ("NEMA listed activities").

The EIA Regulations 2014 lay out two alternative authorisation processes. Depending on the type of activity that is proposed, either a BA process or a Scoping and Environmental Impact Reporting (S&EIR) process is required to obtain EA. Listing Notice 1[1] lists activities that require a BA process, while Listing Notice 2[2] lists activities that require S&EIR. Listing Notice 3[3] lists activities in certain sensitive geographic areas that also require a BA process.

The regulations for both processes – BA and S&EIR – stipulate that:

- Public participation must be undertaken as part of the assessment process;
- The assessment must be conducted by an independent EAP;
- The relevant authorities must respond to applications and submissions within stipulated timeframes;
- Decisions taken by the authorities can be appealed by the proponent or any other Interested and Affected Party (IAP); and
- A draft EMPr must be compiled and released for public comment.

The EIA Regulations 2014 set out the procedures to be followed and content of reports compiled during the BA and S&EIR processes.

The NEMA National Appeal Regulations[4] make provision for appeal against any decision issued by the relevant authorities. In terms of the Regulations, an appeal must be lodged with the relevant authority in writing within 20 days of the date on which notification of the decision (EA) was sent to the applicant or IAP (as applicable). The applicant, the decision-maker, IAPs and organs of state must submit their responding statement, if any, to the appeal authority and the appellant within 20 days from the date of receipt of the appeal submission.

The Construction Phase of the project includes activities that are listed in terms of the EIA Regulations, 2014 (see Table 2-1).

[1] GN R983, as amended by GN R517 of 2021
[2] GN R984, as amended by GN R517 of 2021
[3] GN R985, as amended by GN R517 of 2021
[4] GN R993, as amended by GN R205 of 2015

Table 2-1: NEMA listed activities (2014) applicable to the proposed project

No.	Listed activity
Listing Notice 1	
19A	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- (i) the seashore; (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or (iii) the sea; but excluding where such infilling, depositing , dredging, excavation, removal or moving- (f) will occur behind a development setback; (g) is for maintenance purposes undertaken in accordance with a maintenance management plan; (h) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (i) occurs within existing ports or harbours that will not increase the development of the port or harbour; or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
54	The expansion of facilities- (i) in the sea; (ii) in an estuary; (iii) within the littoral active zone; (iv) in front of a development setback; or (v) if no development setback exists, within a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater; in respect of- (a) fixed or floating jetties and slipways; (b) tidal pools; (c) embankments; (d) rock revetments or stabilising structures including stabilising walls; or (e) infrastructure or structures where the development footprint is expanded by 50 square metres or more but excluding- (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; or (bb) where such expansion occurs within an urban area.
65	The expansion and related operation of (i) an anchored platform; (ii) or any other structure or infrastructure on or along the sea bed, where the expansion will constitute an increased development footprint, excluding expansion of facilities, infrastructure or structures for aquaculture purposes.
Listing Notice 2	
N/A	
Listing Notice 3	
N/A	

The Maintenance Phase of the bypass pipeline and associated infrastructure may trigger LN1 Activity 19A (see Table 2-1). PetroSA do not seek approval from DFFE for future maintenance activities on the bypass pipeline. Maintenance activities are therefore excluded from the scope of this project.

PetroSA plan to request the adoption of a Maintenance Management Plan (MMP), for maintenance activities triggering LN1 Activity 19A for the entire SPM system, including the existing pipelines.

Legal requirements for this project

PetroSA is obliged to apply for EA for the activities listed in Table 2-1 and to undertake a BA process in support of the application, in accordance with the procedure stipulated in the EIA Regulations 2014. Prior to the undertaking of maintenance activities that trigger LN1 Activity 19A on the SPM system a MMP must be approved by DFFE.

2.1.1.2 National Web Based Environmental Screening Tool

In terms of Regulation 16(1)(b)(v) of the NEMA EIA Regulations, 2014, an application for EA must include "the report generated by the national web based environmental screening tool" (Screening Tool). On 20 March 2020, notice was given that that the submission of such a report is compulsory for all applications submitted after 4 October 2019 (GN R960 of 2020).

The Screening Tool is based on broad scale national environmental sensitivity data and identifies specialist studies that may be required for the EIA. It is the responsibility of the EAP to confirm whether these specialist studies will be conducted or provide a motivation as to why the specialist studies will not be conducted as part of the EIA process.

The Screening Tool Report has informed the identification of specialist studies required for the BA and, where applicable, motivation as to why certain specialist studies have not been scoped has been submitted to DFFE.

Legal requirements for this project

The Screening Tool Report and Site Sensitivity Verification Report (SSVR) confirming the specialist studies proposed to inform the BA process was submitted to DFFE on 19 August 2022 following the Pre-Application Meeting.

2.1.1.3 Procedures for the Assessment and Minimum Criteria for Reporting

In terms of the *Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes when Applying for EA* (GN R320 of 2020):

- The EAP and / or specialist(s) must verify (update) the findings of the Screening Tool based on desktop sources and a site inspection and compile a SSVR;
- Where the Screening Tool indicates that a site is sensitive for an "Identified Environmental Theme", a specialist assessment (for more sensitive sites) or Compliance Statement (for less sensitive sites) must be undertaken, depending on the verified sensitivity of the site;
- Specialists must ensure compliance with the Protocols for the assessment and minimum report content requirements of environmental impacts published in GN320 of 2020 and GN 1150 of 2020 for the various identified environmental themes; and
- Should the Screening Tool (or EAP) identify site sensitivities for disciplines which are not "Identified Environmental Themes" and specialist assessment is required, specialist reporting must comply with the requirements of Appendix 6 of the EIA Regulations, 2014.

Legal requirements for this project

Specialists report content must comply with the relevant Protocols for the assessment and minimum report content requirements of environmental impacts or Appendix 6 of the EIA Regulations, 2014. Evidence of compliance is provided in each specialist report.

2.1.2 National Environmental Management: Biodiversity Act 10 of 2004

The purpose of the NEM:BA is to provide for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection. The NEM:BA makes provision for the publication of bioregional plans and the listing of ecosystems and species that are threatened or in need of protection. Threatened or Protected Species Regulations (2007), guidelines for the determination of bioregions and the preparation and publication of bioregional plans (2009) and a Revised National List of Ecosystems that are Threatened and in Need of Protection (2022) have been promulgated in terms of NEM:BA.

A published bioregional plan is a spatial plan indicating terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. These areas are referred to as Critical Biodiversity Areas (CBAs) in terms of NEM:BA. Bioregional plans provide guidelines for avoiding the loss or degradation of natural habitat in CBAs with the aim of informing, EIAs and land-use planning (including Environmental Management Frameworks [EMFs], Spatial Development Frameworks [SDFs], and Integrated Development Plans [IDPs]).

Permits to carry out a restricted activity involving listed threatened or protected species or alien species may only be issued after an assessment of risks and potential impacts on biodiversity has been undertaken.

Legal requirements for this project

The onshore portion of the proposed project area (the launch way) is located in a terrestrial Ecological Support Area (ESA) and comprises Hartenbos Dune Thicket classified as a Threatened Ecosystem. The impacts of the project on the biodiversity of the area and, in particular, the loss of Hartenbos Dune Strandveld, are assessed.

2.1.2.1 Threatened or Protected Species (TOPS) Regulations (23 February 2007)

The TOPS Regulations provides, *inter alia*, the permitting process involving listed threatened or protected species. Species regulated by the TOPS Regulations include Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and protected species. Specialists are not required to survey for, or specifically assess the impact of the development on the species listed as 'protected' under the NEMBA (and regulated by the TOPS Regulations), unless a species has been evaluated as threatened (CR, EN or VU) during the most recent national assessment following the International Union for Conservation of Nature (IUCN) Red List Criteria or a species has a defined biodiversity management plan. Protected species are only regarded as Species of Conservation Concern (SCC) if they are classified as CR, EN or VU.

Legal requirements for this project:

Approximately 15 Milkwood trees, a protected tree species under the National Forest Act 84 of 1998 were found on the onshore portion (the launch way) of the proposed project area. PetroSA require a permit in terms of the TOPS Regulations for the destruction and / or removal of the Milkwood trees. The species is listed as Least Concern (LC) in the IUCN Red List, therefore an Ecology Assessment that meets the content requirements of a Compliance Statement, as defined in GN 320 of 2020 and GN 1150 of 2020 has been undertaken.

2.1.2.2 Alien and Invasive Species Regulations (30 September 2014)

The Alien Invasive Species Regulations provides for different categories of invasive species and regulates the management thereof. In terms of Regulation 6, the spreading or allowing the spread of, any specimen of a listed invasive species is prohibited. In terms of Regulation 2 and 3, invasive species listed as Category 1a or 1b must be controlled and eradicated.

Legal requirements for this project:

The launch way site is invaded with Acacia cyclops, a Category 1b invader (NEMBA, 2016), Measures to eradicate and control alien invasive species, are included as required mitigation.

2.1.3 National Environmental Management: Integrated Coastal Management Act 24 of 2008

The National Environmental Management: Integrated Coastal Management Act 24 of 2008 (NEM:ICMA) provides for the integrated management of the coastal zone, including the promotion of social equity and best economic use, while protecting the coastal environment.

Chapter 7 of the Act establishes integrated permitting procedures and other measures to ensure the protection and sustainable use of the coastal zone and its resources. This includes the requirement that adequate consideration be given to the objectives of this Act when considering applications for EA (and planning authorisation) for any development within the coastal zone, and the consideration of impacts on coastal public property, the coastal protection zone and coastal access land.

Chapter 11 of the Act states that the ownership of coastal public property[5] vests in the citizens of the Republic and coastal public property must be held in trust by the State on behalf of the citizens of the Republic. Coastal public property is inalienable and cannot be sold, attached or acquired by prescription and rights over it cannot be acquired by prescription.

NEM: ICMA provides for the establishment of Provincial Coastal Committees and Municipal Coastal Committees to co-ordinate the effective implementation of this Act and the Provincial Coastal Management Programme (Section 2.2.7).

Legal requirements for this project:

The project entails development of infrastructure in the coastal zone and the coastal protection zone. Impacts on the coastal environment are thus assessed. Landowner consent is not required for activities undertaken exclusively in coastal public property.

2.1.3.1 Regulations for Control and Use of Vehicles in the Coastal Area (June 2014)

In terms of Section 4 of the Regulations, a permit is required for the use of a vehicle in a coastal area for the purposes of the construction or maintenance of infrastructure authorised by any law. The competent authority is the DFFE: O&C and the vehicle access permit for the construction or maintenance of infrastructure must be granted by the Minister.

Legal requirements for this project:

The construction of infrastructure in the coastal zone which requires the use of vehicles will require a permit for the use of vehicles in this zone, prior to construction commencing.

2.1.4 National Heritage Resources Act 25 of 1999

The protection and management of South Africa's heritage resources are controlled by the NHRA. In terms of the Act, historically important features such as graves, trees, archaeological artefacts/sites and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection.

Section 38 of the NHRA requires that any person who intends to undertake certain categories of development must notify the applicable heritage authority at the very earliest stage of initiating such a development and must furnish details of the location, nature and extent of the proposed development.

[5] Coastal waters, land submerged by coastal waters, natural islands within coastal waters and the seashore (area between the High Water Mark and Low Water Mark).

The heritage authority must decide whether a Heritage Impact Assessment (HIA) will be required and provide final comment on the development application.

In terms of Sections 2, 35 and 38 of the NHRA, SAHRA, through its Maritime and Underwater Cultural Heritage (MUCH) unit, is the heritage authority for activities that are located below the high-water mark (HWM) of the sea. In the Western Cape, for activities that trigger Section 38 located above the HWM SAHRA has delegated this authority to Heritage Western Cape (HWC).

Section 38 also makes provision for the assessment of heritage impacts as part of a BA process. There is a requirement in terms of Section 38 (8) for the consenting authority (in this case DFFE) to ensure that the evaluation of impacts on the heritage resources fulfils the requirements of the relevant heritage resources authority and that the comments and recommendations of the heritage resources authority are taken into account prior to the granting of the EA.

Section 38(1) of the NHRA specifies activities that trigger the need for the proponent to notify SAHRA of the proposed development, in order for SAHRA to determine the need for further Heritage Assessment. The proposed project triggers the following activity:

(a) Construction of a road, wall, powerline, canal or other similar form of linear development or barrier over 300 m in length.

Legal requirements for this project:

The proponent notified SAHRAs MUCH unit of the proposed activities through the submission of an application via the South African Heritage Resources Information System (SAHRIS) on 27 October 2022. SAHRA indicated by means of an interim comment (see Appendix C5), they support the mitigation measures listed in the Marine HIA. Furthermore, SAHRA provided additional management measures (see Appendix C5) that have been included in the BAR and EMPr.

2.1.5 Prevention and Combating of Pollution of the Sea by Oil Act 6 of 1981

The Prevention and Combating of Pollution of the Sea by Oil Act 6 of 1981, as amended, contains provisions designed to prevent marine pollution and to determine liability for loss, damage or costs caused by the discharge of oil from vessels or offshore installations. In terms of the aforementioned Act, an offshore installation[6] may not be operated without a Pollution Safety Certificate, to be issued upon application to the DFFE following the submission of an Emergency Contingency Plan.

Section 13 requires that a vessel carrying more than 2 000 tonnes of oil must carry a certificate, to be issued by the DFFE, stating that there is a contract of insurance or other financial security to cover the liability for any loss, damage or cost as a result of an oil discharge incident occurring.

Legal requirements for this project:

PetroSA must ensure the appointed vessel operators have the requisite Safety Certificate and Emergency Contingency Plan to cover potential risks associated with oil discharge incidents.

2.2 Planning Policy Framework

This section discusses a number of key formal planning policies relevant to the project. The policies and plans discussed below include regional and local development and spatial plans, including the:

- Western Cape Provincial Spatial Development Framework (PSDF) (2014);
- Garden Route District Draft IDP (2022 – 2027);

[6] A facility used for the transfer of any kind of mineral oil, including spirit produced from oil or oil mixed with any substance, from a vessel to land.

- Garden Route District Coastal Management Programme (2021/2022);
- Mossel Bay Municipality 5th Generation Integrated Development Plan (IDP) (2022 – 2027);
- Mossel Bay Municipality Spatial Development Framework (SDF) (2018); and
- Mossel Bay Municipality By-law Relating to the Control of the Seashore and Sea (3 June 2011).

This section implicitly examines the extent to which the proposed project is consistent with relevant plans, supported by an explicit analysis of need and desirability in Section 7.2.

2.2.1 Western Cape Provincial Spatial Development Framework (2014)

The Western Cape Provincial Spatial Development Framework (PSDF) (2014) is a spatial planning document which guides district and local spatial initiatives including IDPs and SDFs. The Western Cape PSDF sets out to put in place a coherent framework for the Province's urban and rural areas that:

- Gives spatial expression to the national and provincial development agendas;
- Serves as basis for coordinating, integrating and aligning 'on the ground' delivery of national and provincial departmental programmes;
- Supports municipalities in fulfilling their municipal planning mandate in line with the national and provincial agendas; and
- Communicates government's spatial development intentions to the private sector and civil society.

Three interrelated themes are covered in the PSDF: resources, space economy and settlement. Each theme contributes to achieving the province's strategic objectives (see Figure 2-1).

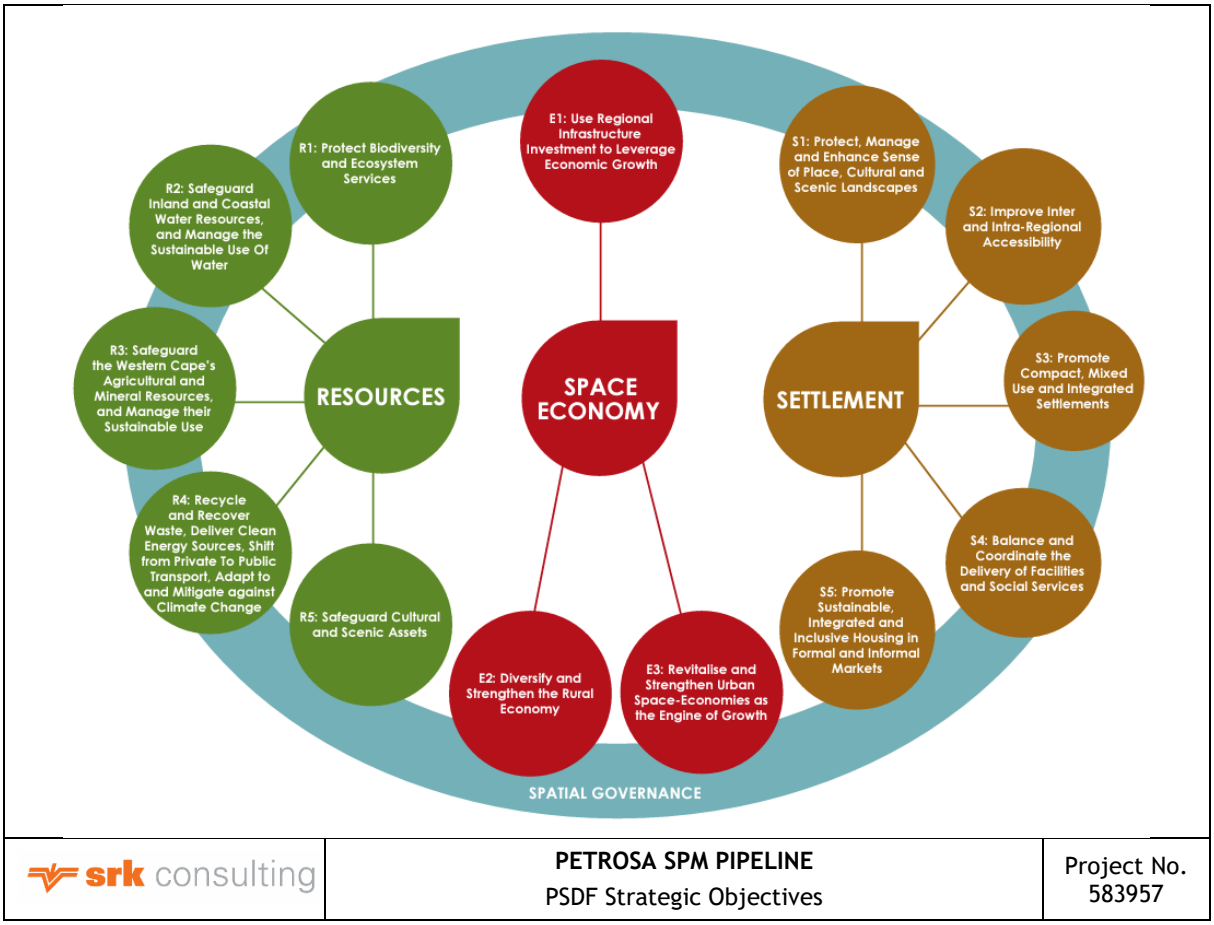


Figure 2-1: PSDF strategic objectives

Policy R4 includes the following strategic objectives:

- Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use; and
- Investigate and develop the West Coast Gas opportunity, with a focus on imported Liquified Natural Gas (LNG).

Policy R5 includes the following strategic objective:

- Protect heritage and scenic assets from inappropriate development and land use change.

Although the hydrocarbon fuels produced by PetroSA are not regarded as low carbon fuels, the project will contribute to energy diversification in South Africa, by providing diesel as alternative energy supply option to coal. Although the project is located on the south coast (not the west coast), it plays a key role in the supply of diesel to South Africa.

2.2.2 Garden Route District Draft IDP (2022 – 2027)

The Garden Route District Municipality (GRDM) Integrated Development Plan (IDP) seeks to fulfil the municipality's mandate by making provision for resource and infrastructural development, strategic social leadership to address social issues, and initiating funding mechanisms to ensure financial sustainability. Strategic objectives identified to realise this vision are:

- A skilled labour force;
- Bulk infrastructure co-ordination;
- Financial viability;
- Good governance;
- Growing and inclusive district economy;
- Healthy and socially stable communities; and
- Sustainable environmental management.

The GRDM takes a holistic approach to economic development by looking at the interlinkages between economic sectors to achieve socio-economic growth. Two of the goals that the GRDM seeks to achieve include the attraction of inward and outward investment and investment in hard and soft infrastructure. This project makes a small contribution to these goals through the development / repair of hard infrastructure.

2.2.3 Garden Route District Coastal Management Programme (2021/2022)

The Garden Route District Coastal Management Programme (GRDCMP) (2021/2022) was developed in accordance with the requirements of Chapter 6 (Sections 48, 49 and 50) of the NEM: ICMA. The GRDCMP seeks to ensure that development and use of natural resources in the coastal zone are simultaneously socially and economically justifiable and ecologically sustainable (Garden Route District Municipality, 2021).

The vision of the GRDCMP is "*adaptive coastal management for a future of sustainability, prosperity, awareness, responsibility, equality, natural beauty and abundance*". It aims to achieve this vision through 13 Coastal Management Objectives (CMOs) encompassing themes of reasonable and equitable public access (CMO 1); maintenance of infrastructure in the coastal zone, (CMO 2); biodiversity protection, conservation and enhancement (CMO 3); heritage resources (CMO 4); disaster management (CMO 5); water quality and quantity (CMO 6); institutional arrangements (CMO 7); compliance and enforcement (CMO 8); education and awareness (CMO 9); economic development

(CMO 10); tourism and recreation (CMO 11); sustainable livelihoods (CMO 12); and research (CMO 13).

The project aligns with CMO 1, CMO 2, CMO 3 and CMO 4 for the following reasons:

- Public access to the section of Dias Beach seawards of PetroSA will only be restricted temporarily to ensure public safety during the installation of the bypass pipeline;
- The project is an upgrade / modification of existing infrastructure which will prevent degradation to the environment by replacing the corroded pipeline section;
- Biodiversity impacts on the onshore component of the project will be managed through alien eradication and the rehabilitation of the site by re-introducing indigenous flora, post construction; and
- The impacts of the project on the marine heritage of the area, are assessed and mitigated.

2.2.4 Mossel Bay Municipality 5th Generation IDP (2022 – 2027)

The Mossel Bay Municipality 5th Generation IDP (2022 – 2027) outlines the GROW Strategy of the municipality as a vehicle to accelerate service delivery. The outcomes of the GROW strategy outlined in the IDP are:

- Continued service delivery excellence;
- Cross section inclusive partnerships;
- Creating jobs through credible economic growth;
- Creating confidence in a safer environment; and
- Investment in future generation through the local environment.

The Key Performance Areas (KPAs) of the Municipality of particular relevance to this project, include:

- Economic development and tourism – to turn around the dwindling local economy by positioning Mossel Bay as a Special Economic Zone (SEZ).

The IDP recognises that a challenge to economic development of the region is that the PetroSA gas field does not deliver processable volumes of gas anymore and that the PetroSA facility is not producing any gas products, likely to result in huge job losses. However, the discovery of huge gas deposits by TotalEnergies off the coast of Mossel Bay has great potential to reignite the Oil and Gas industry in the area (Mossel Bay Municipality, 2022).

It would be beneficial to the Mossel Bay local economy to attract new investment to the Southern Cape to ensure the optimal use of the investment in PetroSA and the Mossel Bay National Harbour (Mossel Bay Municipality, 2022).

PetroSA and the existing SPM facility is already contributing to the local economy. This contribution will be retained and improved as a result of the project. The project therefore aligns with the IDP's economic growth strategy and KPA by retaining and growing an existing economic driver.

2.2.5 Mossel Bay Municipality Spatial Development Framework (2018)

The Mossel Bay Municipality SDF (2018) recognises the need for economic development. A key objective in the SDF is to facilitate jobs in the area through economic development and an investor friendly environment.

The implementation of this project will contribute to meeting this objective, as it will allow PetroSA to continue to provide jobs in the hydrocarbon fuel processing sector and may result in local economic

growth as the project increases the capacity of infrastructure from a single pipeline to two operational pipelines for hydrocarbon fuel import / export.

2.2.6 By-law Relating to the Control of the Seashore and Sea (3 June 2011)

The By-law relating to the Control of the Seashore and Sea (2011) makes provision for procedures, methods and practices to regulate the use and management of bathing and beach areas. It also seeks to control activities on beaches and public land adjoining beaches. Section 8(5) states that plants growing on a dune or beach area may not be picked, felled or damaged in any way by unauthorised persons. Furthermore, section 8(7) states that vegetation, sand, shingle, rock or stone may not be removed or deposited from or on the beach area.

The project includes the launch of the pre-assembled pipeline to the sea via a temporary launch way comprising rollers located on a vegetated dune, and on the beach. Vegetation will be removed on municipal-owned land comprising of vegetation to install the launch way. The area will be rehabilitated once construction is completed.

2.2.7 Western Cape Coastal Management Programme (2016)

The Western Cape Coastal Management Programme (WCCMP) was adopted by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) , in May 2016 (Provincial Notice 2012/2016) in accordance with the NEM:ICMA. The WCCMP focuses on growing the blue and green economy by unlocking the province's economic potential of coastal assets. It directly contributes to enabling a resilient, sustainable, quality and inclusive living environment on the coast through improved spatial and development planning, access, protection and Local Government support in the coastal environment.

The WCCMP is structured against a framework of several goals, including:

- Promote coastal access and accessibility that is both equitable and sustainable;
- Minimise the impacts of pollution on the coastal environment;
- Promote resilience to the effects of dynamic coastal processes, environmental hazards and natural disaster; and
- Ecosystem goods and services and cultural assets are sustained as the basis for coastal economic development and livelihood.

The impacts of the project on the coastal environment, are assessed and mitigated in this BA. Furthermore, the economic contribution of this coastal based project will contribute to economic development in the area due to job retention and increased hydrocarbon import/export capacity.

2.3 Environmental Process

The general approach to this study is guided by the principles contained in Section 2 of NEMA and those of Integrated Environmental Management (IEM).

NEMA lists a number of principles that apply to the actions of organs of state and that also serve as reference for the interpretation of environmental legislation and administration of environmental processes. The principles most relevant to environmental assessment processes and projects for which authorisation is required are summarised below.

Principles relevant to the EIA process:

- Adopt a risk-averse and cautious approach;
- Anticipate and prevent or minimise negative impacts;
- Pursue integrated environmental management;
- Involve stakeholders in the process; and
- Consider the social, economic and environmental impacts of activities.

Principles relevant to the project:

- Place people and their needs at the forefront of concern and serve their needs equitably;
- Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;
- Assume responsibility for project impacts throughout its life cycle; and
- Polluter bears remediation costs.

This BA process complies with these principles through its adherence to the EIA Regulations, 2014 and associated guidelines, which set out clear requirements for, *inter alia,* impact assessment and stakeholder involvement (see below), and through the assessment of impacts and identification of mitigation measures. An initial analysis of the project's compliance with the aims of sustainable development is provided in the impact assessment.

In accordance with the IEM Information Series (DEAT, 2004), an open, transparent approach, which encourages accountable decision-making, has been adopted.

The underpinning principles of IEM require:

- Informed decision making;
- Accountability for information on which decisions are made;
- A broad interpretation of the term "environment";
- An open participatory approach in the planning of proposals;
- Consultation with interested and affected parties;
- Due consideration of alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts of proposals;
- An attempt to ensure that the social costs of development proposals are outweighed by the social benefits;
- Democratic regard for individual rights and obligations;
- Compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and
- The opportunity for public and specialist input in the decision-making process.

Although various environmental authorisations, permits or licences are required before the proposed project may proceed (see Section 2.3.1), the regulatory authorities are committed to the principle of cooperative governance and in order to give effect to this principle, a single BA process is required to inform all applications. To this end, a single BAR (this report) has been compiled. The BAR will be submitted to the DFFE in support of the application for EA of NEMA listed activities.

Supplementary applications will be made as required for the remaining authorisations.

The study will also be guided by the requirements of the EIA Regulations, 2014 (see Section 2.1.1.1), which are more specific in their focus and define the detailed approach to the BA process, as well as relevant guidelines published by the former Department of Environmental Affairs (DEA) and the DEA&DP, including:

- DEA's Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017), which contains *"information on best practice and how to meet the peremptory requirements prescribed by the legislation and sets out both the strategic and statutory context for the consideration of the need and desirability of a development involving any one of the NEMA listed activities*" (DEA, 2017);
- DEA&DP's EIA Guideline and Information Document Series (DEA&DP, 2013), which includes guidelines on Generic Terms of Reference (ToR) for EAPs and Project Schedules, Public Participation, Alternatives, Need and Desirability and Exemption Applications and Appeals; and
- DEA's Public Participation Guideline (DEA, 2012), which provides information and guidance for applicants, stakeholders and EAP's on the public participation requirements as prescribed in the EIA Regulations of 2014.

The competent authority for this project is DFFE.

2.3.1 Submission of Applications

Various environmental authorisations, permits and licences are required before the proposed project may proceed. The required authorisations and their status are listed in Table 2-2.

Table 2-2: Environmental Authorisations, permits and certificates required for the project

Application	Authority	Status
EA	DFFE	Application submitted to the DFFE on XXX in compliance with Section 16 of the EIA Regulations.
Heritage Application	HWC	Notification submitted via the SAHRIS on 27 October 2022. Acknowledgement of receipt and Interim comment was received from SAHRA on 7 November 2022 and **Case ID. 19936** was allocated to the project. SAHRA will provide final comment once the BAR is submitted via the SAHRIS.
Pollution Safety Certificate	DFFE	PetroSA have a valid Pollution Safety Certificate. PetroSA will ensure vessel operators that carry more than 2000 tons of oil have the requisite Pollution Safety Certificate, once appointed.
Permit to Use a Vehicle in the Coastal Zone	DFFE	To be applied for once the EA is issued and EMPr approved.

2.3.2 BA Process and Phasing

The BA process consists of two phases, namely the Pre-Application (which has been completed) and Basic Assessment Phases (the current phase) (see Figure 2-2 below).

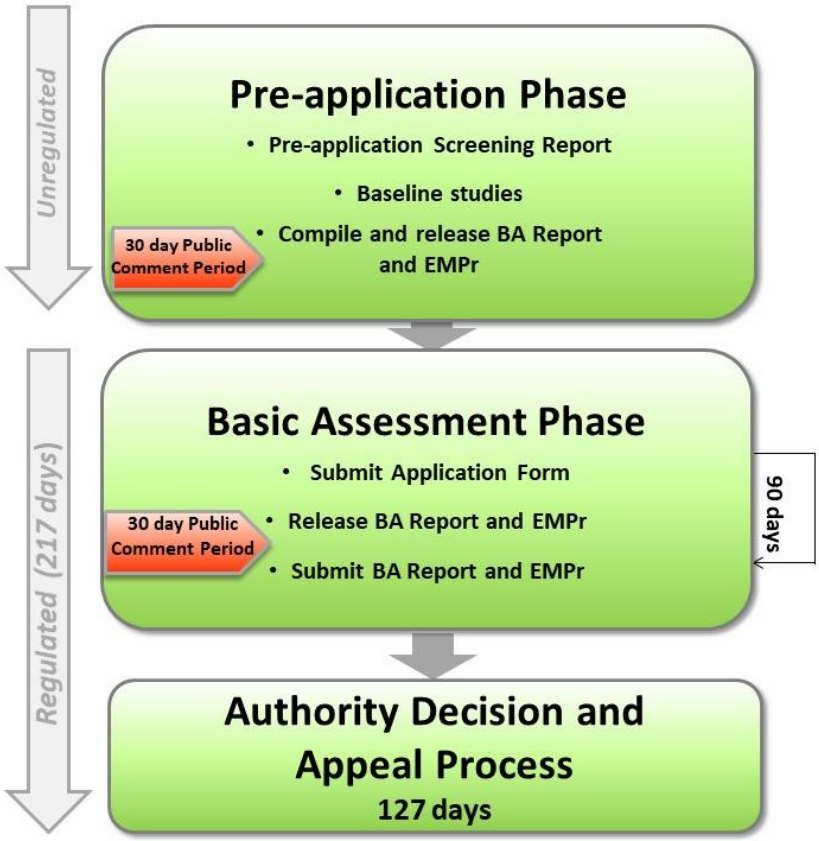


Figure 2-2: BA process

The objectives of the Pre-Application Phase were to:

- Identify stakeholders, including neighbouring landowners/ residents and authorities;
- Undertake specialist studies;
- Compile the draft BA Report which should:
  - Describe the affected environment;
  - Document and contextualise the biophysical baseline conditions of the study area and the socio-economic conditions of affected communities;
  - Assess in detail the potential environmental and socio-economic impacts of the project;
  - Identify environmental and social mitigation measures to avoid and/or address the impacts assessed; and
  - Develop and/or amend environmental and social management plans based on the mitigation measures developed in the BA Report and EMPr.

The objectives of the BA Phase are to:

- Inform stakeholders of the proposed activity, feasible alternatives and the BA process;
- Provide stakeholders with the opportunity to participate effectively in the process and identify any issues and concerns associated with the proposed activity, review specialist study ToR;
- Build capacity amongst stakeholders during the BA process so that they may actively and meaningfully participate;
- Inform and obtain contributions from stakeholders, including relevant authorities, the public and local communities and address their relevant issues and concerns;
- Submit a final BA Report to the relevant authorities (in this case, DFFE).

Further detail about activities undertaken or planned during the BA process is presented in Section 5.

3 Project Description

3.1 Description of the Project Area

3.1.1 Offshore Bypass Pipelines and Associated Infrastructure

The project area / corridor for the bypass pipelines and associated infrastructure extends from ~1.5 km to ~3 km offshore of Voorbaai in Mossel Bay. The corridor is ~720 m north east off the Mossel Bay Seal Island Nature Reserve, a protected area comprising Seal Island (Figure 1-1). The offshore component of the project area, therefore, has no Surveyor General (SG) code.

The bypass dual pipelines will be installed on the seabed, parallel to and ~15 m from the existing SPM pipeline housing structure, predominantly in an area that is already disturbed/transformed.

PetroSA import condensate, reformate, diesel and petrol and export diesel, kerosene and petrol via an existing SPM buoy (see Figure 3-1) which is aligned with a PLEM structure on the seabed, where the existing pipeline housing structure terminates. Medium Range (MR) vessels berth on the SPM, which PetroSA leases from the Transnet National Ports Authority (TNPA).

srk consulting	PETROSA SPM PIPELINE Existing SPM Bouy	Project No. 583957

Figure 3-1: Existing SPM buoy

The co-ordinates for the offshore bypass pipelines and associated infrastructure are provided in Table 3-1.

Table 3-1: Approximate co-ordinates of offshore bypass pipelines and associated infrastructure

Aspects of the project	Coordinates[7]
Bypass pipelines	Start: 34° 8'51.56"S; 22° 7'36.56"E End: 34° 8'39.83"S; 22° 8'29.74"E
Repositioned SPM and PLEM	34° 8'39.83"S; 22° 8'29.74"E (end of pipelines)

[7] Note that these are approximate coordinates. The exact coordinates of the new bypass pipeline and associated infrastructure can only be determined after detailed design / installation.

3.1.2 Fabrication Yard and Launch way Corridor

The dual pipelines will be welded together at a fabrication site (pipeline assembly site) at PetroSA's existing Tank Farm (Erf 1349 and Remainder of Erf 13) and placed on a pipe string roller line within the yard (see Figure 3-2). The pipe string roller line (temporary launch way) will extend in a straight line towards the sea (see Figure 3-2) within the launch way corridor (see Figure 3-3). Part of the launch way corridor (above the HWM) is located on a vegetated dune, ~15 m above mean sea level (amsl), on Erf 1358 owned by the Mossel Bay Municipality. The temporary launch way will extend from the vegetated dune above the HWM of the sea to the sealine, also referred to as the LWM (see Figure 3-2).

The launch way corridor, within which the ~12 m wide launch way will be constructed (including space for vehicles), is ~20 m wide and 100 m long. It is located in between the Gericke Estuary (~230 m north of the launch way site and the Twee Kuilen Estuary (~550 m south of the launch way site) (see Figure 1-1).The launch way corridor is located within a coastal area, in the coastal protection zone and on coastal public property.

The launch way corridor is located within an Ecological Support Area (ESA) (see Section 4.1.5). Although several milkwood trees (a protected tree species under the under the National Forests Act 84 of 1998) are located within the launch way corridor (and on the entire dune system) the launch way site is very degraded as evident from the alien vegetation that has colonised the site as a result of prior disturbance to construct underground stormwater infrastructure.

A stormwater manhole, underground stormwater pipe and drainage outfall (on the beach) are located within the launch way corridor. Despite the existing infrastructure within the launch way corridor, the ~12 m wide and ~100 m long launch way (including space for vehicles) will be accommodated within the corridor. Wood poles on the beach (see Figure 3-4) next to the stormwater outfall will be removed and later re-instated.

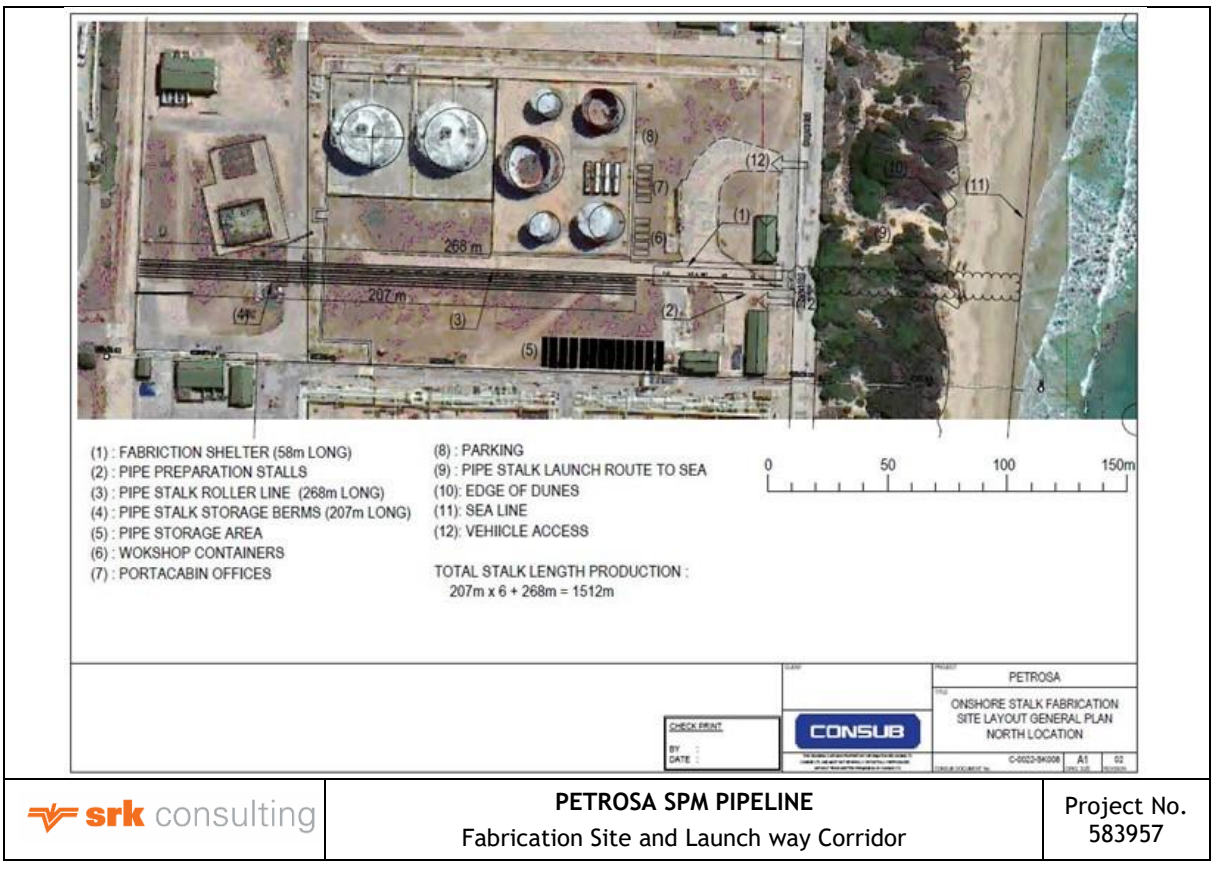
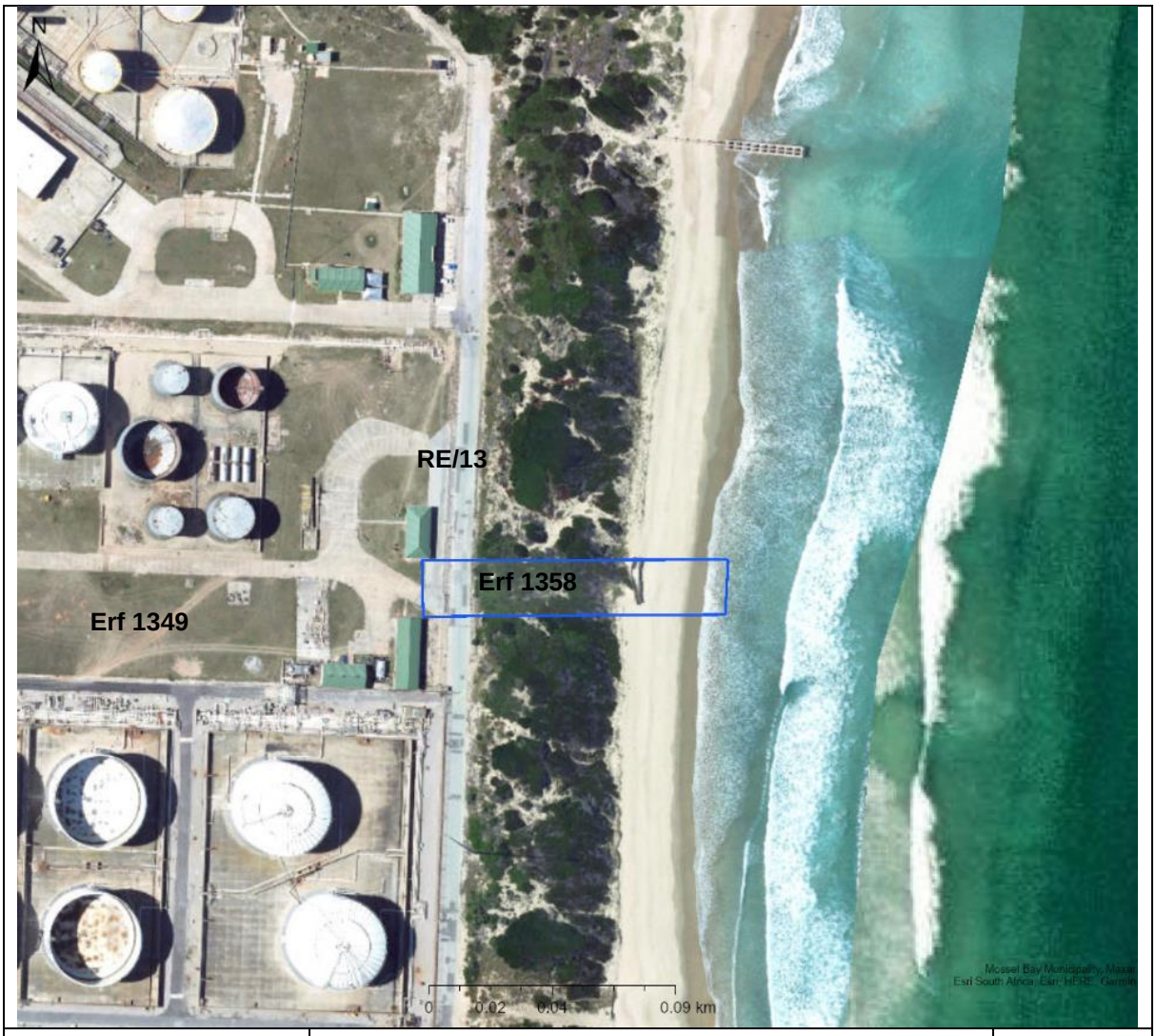
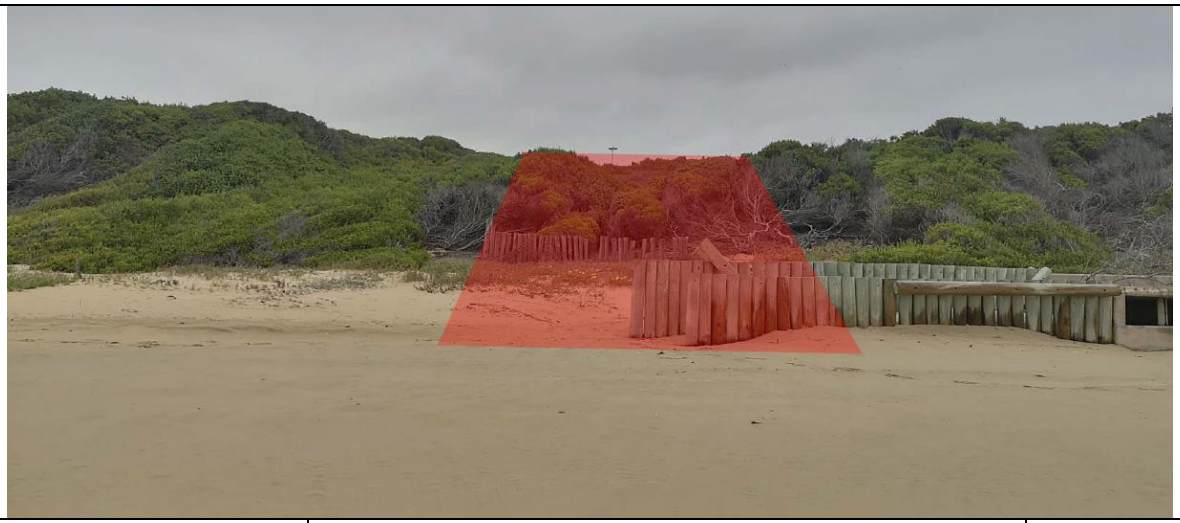


Figure 3-2: Fabrication site and launch way corridor



srk consulting	PETROSA SPM PIPELINE Launch way Corridor	Project No. 583957

Figure 3-3: Launch way corridor



srk consulting	PETROSA SPM PIPELINE View of the Approximate Project Area for the Launch way	Project No. 583957

Figure 3-4: Schematic beach view of the launch way corridor

Property details for the fabrication site and launch way corridor are provided in Table 3-2.

Table 3-2: Property details: Fabrication site and launch way corridor

Physical Address of PetroSA Tank Farm (fabrication site)	Voorbaai Tank Farm Depot Road Mossel Bay 6500		
Aspect	**Farm Name/ Erf Number**	**SG 21 Digit Code**	**Co-ordinates**
PetroSA Tank Farm	Erf 1349	C05100040000134900000	See Figure 1-1: Approximate Centre Co-ordinate: 34° 8'45.67"S; 22° 6'30.93"E
Launch way corridor	RE/13	C05100040000001300000	See Figure 3-3: Corner 1: 34° 8'46.24"S; 22° 6'36.10"E Corner 2: 34° 8'46.92"S; 22° 6'36.12"E Corner 3: 34° 8'46.89"S; 22° 6'40.42"E Corner 4: 34° 8'46.25"S; 22° 6'40.44"E
	Erf 1358	C05100040000135800000	

3.1.3 Surrounding Land Use

The bypass dual pipeline and launch way are located in front of PetroSA's existing Tank Farm. There are no other directly adjacent landowners. The dual pipeline and associated infrastructure will be installed between ~1.5 and 3 km offshore, on the seabed.

The site for the temporary launch way is visible from Dias Beach, although the nearest public access points are approximately 750 m south (Sea Cottages residential complex) and ~400 m north (Bay Dunes residential complex) of the site. Given the temporary nature of the launch way infrastructure and the distance to the nearest surrounding residents, residents of Sea Cottages and Bay Dunes are not deemed to be sensitive receptors.

3.2 Proponent's Project Motivation

PetroSA is a state-owned oil company of the South African Government. The core business activities of PetroSA are (PetroSA, 2022):

- The exploration and production of oil and natural gas;
- The participation in, and acquisition of, local as well as international upstream petroleum ventures;
- The production of synthetic fuels from offshore gas at one of the world's largest GTL refineries in Mossel Bay, South Africa;
- The development of domestic refining and liquid fuels logistical infrastructure; and
- The marketing and trading of oil and petrochemicals.

PetroSAs main activities are the extraction of natural gas from offshore fields about 89 km from Mossel Bay to provide feedstock to the Mossel Bay GTL refinery. The GTL refinery produces ultra-clean, low-sulphur, low-aromatic synthetic fuels and high-value products converted from natural methane-rich gas and condensate. Key commodities produced include unleaded petrol, kerosene (paraffin), diesel, propane, liquid oxygen and nitrogen, distillates, eco-fuels and alcohols. Its synthetic fuels and petrochemicals are supplied to the Southern Cape region and to other areas in South Africa (PetroSA, 2022).

The SPM handles multiple products and is connected to the onshore tank farm via the following three pipelines:

- 8” pipeline which was utilised for ballast water but was taken out of service in 1999 due to corrosion;
- 12” pipeline which was used for petrol export and reformate / condensate import but was taken out of service in 2019 when it failed a service test due to corrosion on a section of the pipeline; and
- 14” pipeline currently used for diesel export and condensate import.

Conveyance of various grades of fuels and hydrocarbons in a single pipeline results in demurrage costs and product quality downgrade losses, hence the need to have both the 12” and 14” pipelines operational.

The 14” pipeline was intelligently pigged[8] in December 2019 and in March 2021. Results showed corrosion of a section of the pipeline, with up to 65% metal loss recorded on a section of the 14” pipeline. PetroSA is therefore currently in a vulnerable situation as only a single pipeline is being used for product import and export. If this pipeline fails it will jeopardise import and export of hydrocarbons, with detrimental socio-economic impacts.

PetroSA supplies Eskom’s Open Cycle Gas Turbine (OCGT) power plant with diesel usingthe existing 14” pipeline for imports. The OCGT is a peaking power plant, operated when Eskom’s coal power stations are strained and unable to meet peak demand.

The project is therefore necessary for the following reasons:

- To ensure the structural integrity of infrastructure conveying hydrocarbons in the marine environment, to minimise risk of ruptures releasing hydrocarbons into the marine environment;
- For short term and long-term import and export of finished products to meet local (Southern Cape and South Africa) fuel demands.
- To reduce the vulnerability / economic risk to PetroSA of using a single pipeline; and
- To supply diesel to Eskom’s OCGT peaking power plant, reducing the intensity of loadshedding in the country.

3.3 Project Alternatives

Appendix 1 Section 3 (h)(i) of the EIA Regulations, 2014 requires that all BA processes must identify and describe alternatives to the proposed activity that are feasible and reasonable. Different types or categories of alternatives can be identified, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and / or operational alternatives. The “No-Go” or “no development” alternative must also be considered.

Not all categories of alternatives are applicable to this project, as discussed below.

3.3.1 Location Alternatives

3.3.1.1 Bypass Dual Pipelines and Associated Infrastructure

The purpose of the project is to bypass the corroded sections of the existing 12” and 14” pipelines. Location alternatives for the proposed bypass pipelines have thus not been considered for assessment as no other location would meet the purpose of the project. Location alternatives for the new PLEM structure and SPM buoy have similarly not been considered since the PLEM structure needs to be

[8] Intelligent pigging is an inspection technique whereby an inspection probe, often referred to as a "smart" Pipeline Intervention Gadget (PIG), is propelled through a pipeline while gathering important data, such as the presence and location of corrosion or other irregularities on the inner walls of the pipe.

installed where the new bypass pipeline terminates and the existing SPM buoy must be repositioned to align with the PLEM.

3.3.1.2 Fabrication Yard and Launch way Corridor

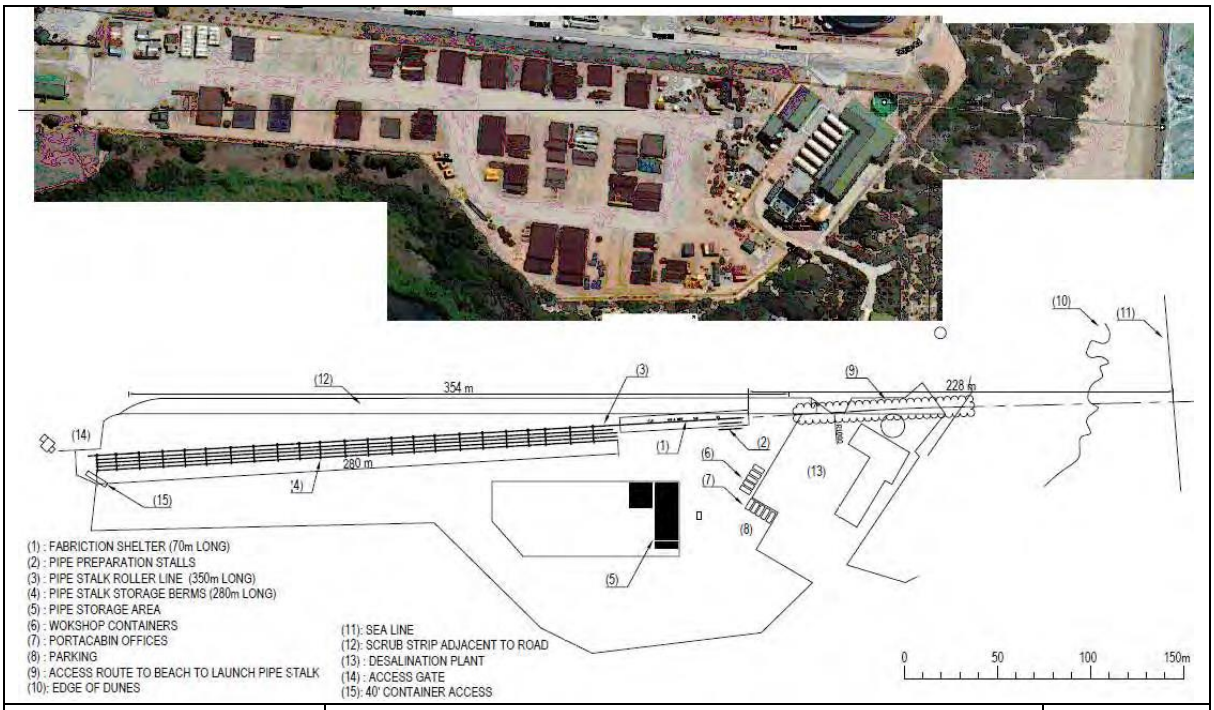
Two locations (see Figure 3-5) were considered for the pipe string fabrication site and associated launch way on the beach, as indicated in Table 3-3 and Figure 3-6. However, location alternatives for the launch way are limited since the launch way is linked in a straight line to the fabrication yard. The location of the launch way is therefore determined by feasible locations for the ~270m pipe string roller line (Figure 3-6). The southern location has been eliminated, therefore no location alternatives for the fabrication yard and associated launch way corridor are assessed.

Table 3-3: Location alternatives considered during the conceptual phase

Location	Feasibility of alternative
Southern location: Equipment storage area	This location alternative is considered unfeasible and was therefore **excluded** due to inappropriate topography, as there is a significant slope from the yard to the beach over the sand dune. In addition, the pipe string would block access into the desalination plant, while infrastructure within the desalination plant blocks the pathway to the beach to some extent.
Northern location: Liquids storage depot	This location alternative was selected as a **feasible alternative** as the physical characteristics of the site, e.g. in terms of topography (less elevated and uniform gradient from the yard to the beach) are particularly well-suited to the proposed development.

srk consulting | PETROSA SPM PIPELINE Alternative Locations Fabrication Site And Associated Launch way Corridor | Project No. 583957

Figure 3-5: Alternative locations for fabrication site and associated launch way corridor



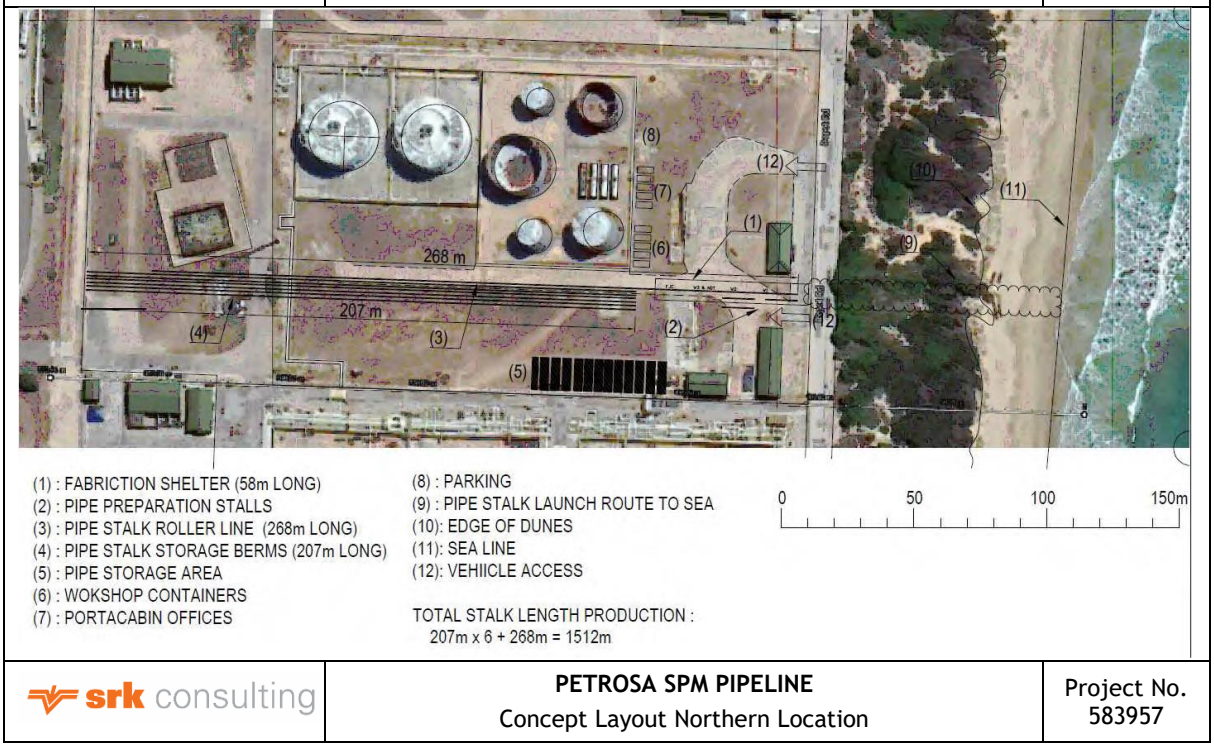


Figure 3-6: Conceptual layout for southern and northern location alternatives

3.3.2 Technology Alternatives

Various technology alternatives, for infrastructure components, were identified and screened out by PetroSA during the feasibility phase of the project:

Mechanical (bolted) connections were selected over welded pipe end connections based on the following benefits:

- Proven technology in general subsea market;

- Simple repair solution (slide on and bolt up) that provides a consistent quality of repair;
- No need to mobilise specialist divers;
- Outer body casing may be profiled to avoid clash with adjacent 8” and 14” pipelines; and
- Any post installation leaks may be addressed by retorquing the bolted array.

3.3.3 Activity Alternatives

The purpose of the project is to bypass the corroded section of the existing 12” and 14” pipelines.

No other activity alternatives (other than the No Go alternative) are considered acceptable or viable by the proponent and activity alternatives (other than the No Go alternative) are not considered further in the EIA process.

3.3.4 Pipeline Installation Alternatives

- Two alternative methods to install the dual pipeline were considered as indicated in In the S-lay method, the pipelines are welded on board a vessel and laid onto the seabed from the vessel; and
- In the towed bundle method, the pipelines are built in short lengths on shore and towed to sea by a vessel.

Table 3-4 and Figure 3-7:

- In the S-lay method, the pipelines are welded on board a vessel and laid onto the seabed from the vessel; and
- In the towed bundle method, the pipelines are built in short lengths on shore and towed to sea by a vessel.

Table 3-4: Pipeline installation method alternatives considered during the conceptual phase

Pipeline Installation Method	Feasibility of alternative
S-Lay	This pipeline installation method was **excluded** due to comparatively greater cost. In addition, it would require the use of return sheave which has associated risks and there is limited interest from established contractors to implement this method.
Towed Bundle	This location alternative was selected as a **feasible alternative** as this pipeline installation method is an established common method of installing pipelines on the seabed. In addition, PetroSA has experience with this method having utilised this method to install pipelines in the past at the same location and the cost is comparatively lower.

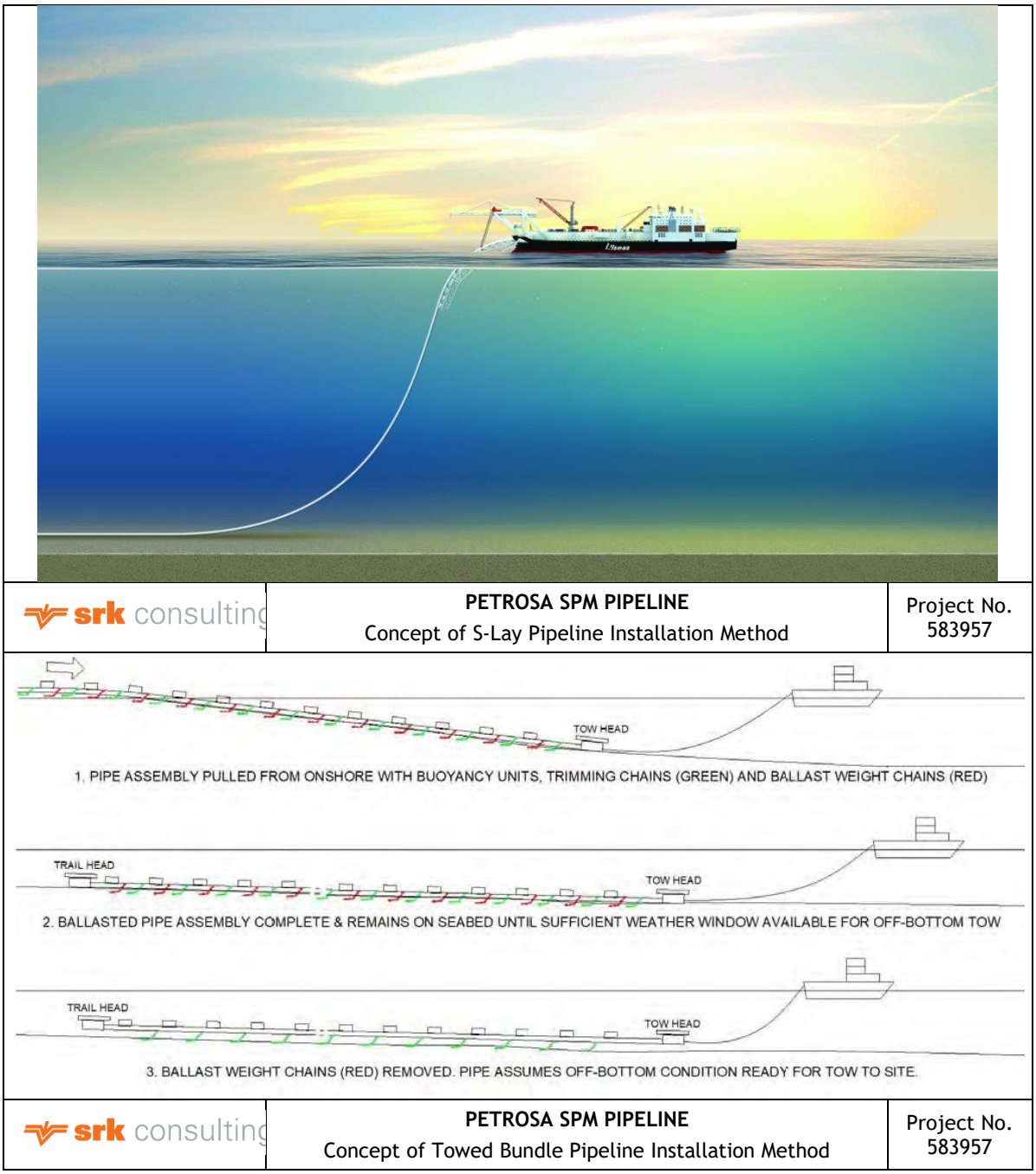


Figure 3-7: Concept of s-lay and towed bundle pipeline installation methods

The S-Lay alternative has been eliminated, therefore no pipeline installation method alternatives are assessed.

3.3.5 The No-Go Alternative

The No-Go alternative has been considered in the BAR in accordance with the requirements of the EIA Regulations, 2014. The No-Go alternative implies that the bypass dual pipeline will not be constructed, attendant environmental impacts will not occur, and security of fuel supply to the Southen Cape region and to the rest of South Africa from this SPM system will not be provided as the last remaining pipeline would need be taken out of service at some stage due to corrosion. The socio-economic benefits to PetroSA, and to the local economy and the country would be forgone.

3.4 Pre-construction Activities

3.4.1 Hydrographic Surveys

Prior to the installation of the dual pipelines and associated infrastructure (post EA) on the seabed, a hydrographic survey Contractor will survey the proposed area for the dual pipelines and associated infrastructure to confirm:

- The location of existing pipeline infrastructure;
- Geophysical and geotechnical properties of the seabed; and
- Unexpected debris.

The hydrographic surveys will inform the detailed design for the dual pipelines and associated infrastructure.

3.5 Infrastructure and Construction Activities

3.5.1 Onshore Activities

Onshore infrastructure will comprise (see Figure 3-2 and Figure 3-8):

- A fabrication shelter, preparation stalls, pipe string roller line, pipe string storage berms, pipe storage area, workshop and office, parking and vehicle access point, all within the existing PetroSA Tank Farm; and
- Launch way (~12 m wide), including space for vehicles and construction workers, comprising a pipe storage plinth and dual roller line for the 12” and 14” pipelines – on the dune and beach area in front of PetroSA’s Tank Farm.

Key onshore activities, described in more detail in the sections that follow, include:

- Site demarcation and vegetation clearance;
- Pipeline and associated infrastructure assembly at the fabrication site; and
- Pipeline launch via elevated roller line.

3.5.1.1 Site demarcation and vegetation clearance

The development footprint for the launch way, from the pipe string fabrication site to the LWM of the sea will be demarcated with fencing prior to vegetation clearance. Vegetated areas outside of the launch way footprint will be demarcated as no-go areas. A permit will be obtained prior to the removal of the milkwood trees (*sideroxylon inerme*). Vegetation will be removed within the launch way corridor by hand as far as practically possible. Once hand clearing is completed mechanical equipment will be used to remove remnant vegetation if necessary.

The alien invasive plant material will be removed and destroyed (burned off site or cut into firewood) to limit re-introduction of seeds into the dune system. The indigenous vegetation will be chipped for use as much to stabilise the disturbed surfaces after construction.

3.5.1.2 Pipeline and associated infrastructure assembly

The new pipelines will be welded together in strings of approximately 200 m at the fabrication (pipeline assembly) site at PetroSA’s Tank Farm. Pipe string lengths and two tow head structures will be pre-fabricated.

Earth moving vehicles will profile the launch way site and install the necessary facilities, including launch way roller lines, within the launch way corridor (Figure 3-3). Vehicle access will be from PetroSA's Tank Farm.

Pipeline and infrastructure assembly is expected to last ~eight days.

3.5.1.3 Pipeline launch

The pipelines will be pulled (launched) to sea by a tugboat across an elevated launch way roller line (see Figure 3-8) on the beach (see Figure 3-2). The launch way will comprise elevated rollers (approximately 1.28 m in height and 8.5 m wide) spaced apart to support the dual pipeline.

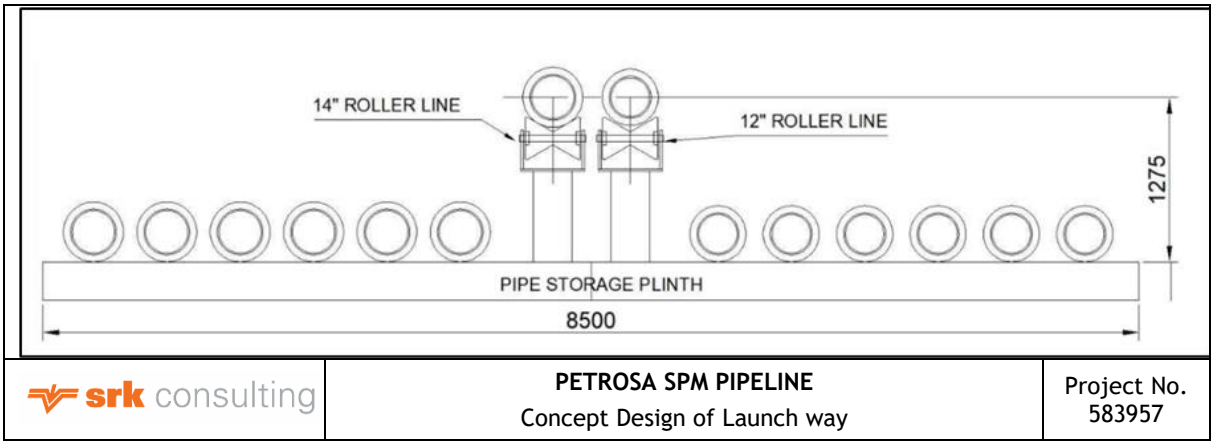


Figure 3-8: Concept design of launch way roller line

3.5.2 Offshore Activities

The new bypass pipeline system will comprise the following infrastructure (see Figure 3-9):

- Dual pipeline assembly consisting of 1 400 m x 12" pipeline strapped to 1 400 m x 14" pipeline;
- Tow head structure for the front end of the towed assembly serving as a replacement PLEM structure to connect the new pipelines to the existing SPM;
- Trail head structure for the tail end of the towed assembly serving as a tie in point to the truncated bundle;
- 12" rigid tie in spool between the existing 12" bundle pipeline and the newly installed 12"pipeline;
- 14" rigid tie in spool between the existing 14" bundle pipeline and the newly installed 14"pipeline;
- 12" flange termination on the existing 12" bundle pipeline to provide a means of connection to the rigid 12" tie in spool;
- 14" flange termination on the existing 14" bundle pipeline to provide a means of connection to the rigid 14" tie in spool; and
- A mechanical barrier (bulkhead) on the end of the cut bundle carrier pipe to retain the chemically treated water inside the carrier pipe annulus and prevent ingress of sea water.

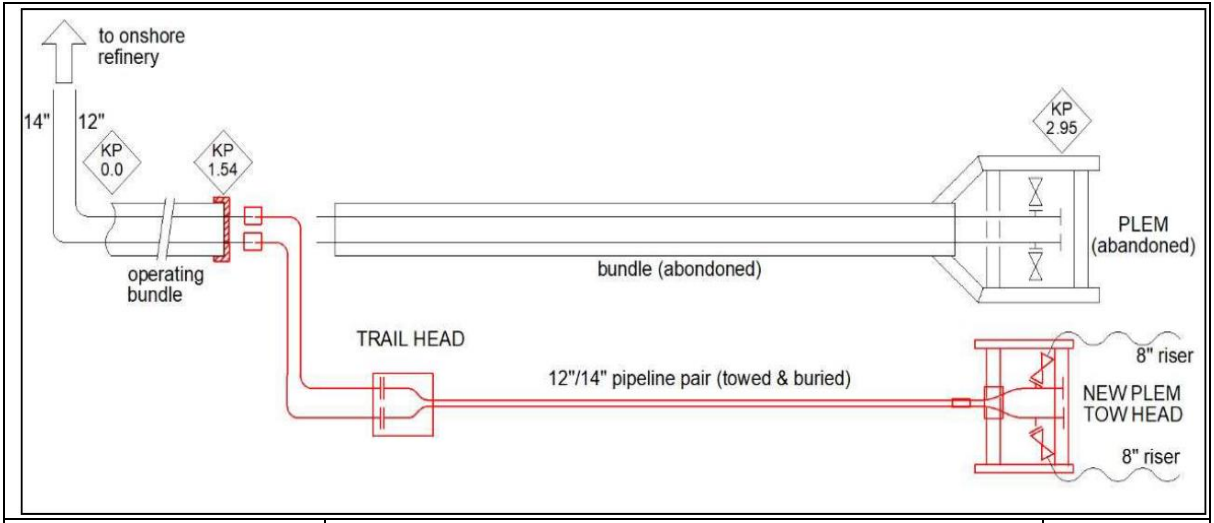


Figure 3-9: New infrastructure (red) and existing infrastructure

Key aspects of the projects offshore activities, described in more detail in the sections that follow, include:

- Pipeline tow, installation and burial;
- PLEM installation; and
- Repositioning of the existing SPM buoy.

3.5.2.1 Pipeline tow, installation and burial

The dual pipelines will be fitted with buoyancy tanks, trimming chains and ballast weights chains (see Figure 3-10). Once the weather is suitable, selected weight chains will be removed to achieve the required off bottom condition prior to tow.

The dual bypass pipelines will be towed out to sea using a lead tug (LT), trail tug (TT) and remote survey vessel (RSV).

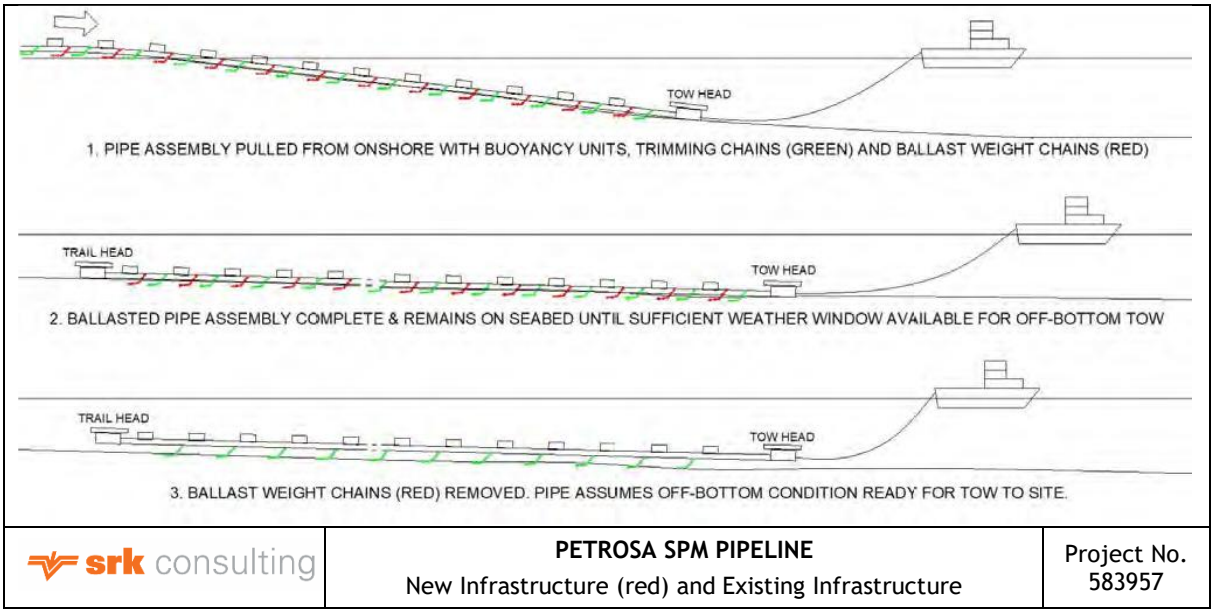


Figure 3-10: Ballast sequence prior to tow

It is expected to take ~ two days to tow, stabilise and flood the pipe assembly. Weights will be temporarily landed onto the pipeline to anchor it to the seabed. The pipeline will be jetted in below the seabed surface (buried) and sediment allowed to backfill naturally.

3.5.2.2 PLEM installation

To terminate the new bypass pipelines, a new PLEM structure will be installed and tied into the SPM buoy via new 8” riser hoses to allow complete bypass of a section of the existing bundle and existing PLEM (see **Error! Reference source not found.**).

3.5.2.3 Repositioning of the existing SPM buoy

The delivery end of the existing pipeline bundle arrangement is attached to the surface SPM buoy via 8” hose risers from the existing PLEM. The existing SPM buoy will be repositioned above the new PLEM re-using the existing anchoring lines.

3.5.3 Waste

Waste management procedures during construction are specified in the EMPr (refer to Appendix E), and waste will be minimised or recycled (where possible).

Waste produced during construction will include general construction waste (e.g. building rubble, packaging and domestic waste from activities at the site camp) and vegetation cuttings.

Construction waste will be collected in weather- and vermin- proof bins / skips located at laydown areas and the site camp. Waste will be stored centrally within or adjacent to the site camp before regular disposal to an appropriate licensed waste disposal facility. Waste will not be disposed of, burned, or buried on site. Waste management will be the responsibility of the contractors and vessel operators.

The volume of waste cannot be estimated at this stage, but is not expected to be significant or place strain on local waste management and disposal facilities.

3.5.4 Workforce

As work will be carried out by contractors and vessel operators, it is not possible to accurately estimate the size of the workforce, but few temporary jobs will be created during construction.

3.5.5 Construction Hours

The construction activities are expected to occur during normal working hours (07h00 - 18h00), mostly Mondays to Saturdays. Construction activities will only be allowed on Sundays if essential.

3.6 Post Construction Rehabilitation Activities

Upon completion of the launch of the pipelines, all materials, temporary structures, temporary fences, plant, equipment and waste will be removed from the site. All areas affected during construction will be reprofiled and stockpiled topsoil will be replaced on all affected areas.

Where heavy equipment has traversed the beach, the beach will be ripped to loosen compacted areas and the sand will be raked to achieve a profile that is consistent with the surrounding beach.

Indigenous vegetation removed during vegetation clearing will be chipped and stockpiled. Once the construction phase is completed the chipped material will be spread over the disturbed areas as a much.

Indigenous vegetation (Hartenbos Strandveld) will be replanted by a landscape rehabilitation professional in all disturbed areas.

3.7 Operation and Decommissioning Activities

Following the completion of the construction phase, the bypass pipeline and associated infrastructure will be commissioned into operation. No physical operational activities are anticipated other than ongoing maintenance and repairs.

It is anticipated that the bypass dual pipeline and associated infrastructure will be operational for the foreseeable future / in the long-term.

The corroded / non-operational sections of the existing SPM system pipelines (to be bypassed with new pipelines) will not be removed as part of the project. PetroSA will decommission the existing and proposed infrastructure as part of a separate environmental process when the PetroSA Tank farm is decommissioned. Decommissioning activities are therefore also excluded from the scope of the project / BAR.

3.7.1 Emergency Response to Pipeline Leaks

Since the SPM pipeline is operational, and PetroSA operate other subsea pipelines and mooring facilities in the area, an Emergency Contingency Plan is in place outlining the procedure to follow in the case of uncontrolled release of hydrocarbons to the marine environment. The Emergency Contingency Plan is implemented by PetroSA, its contractors and appointed vessel operators.

4 Description of the Affected Environment

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed project is located to:

- Understand the general sensitivity of, and pressures on, the affected environment;
- Inform the identification of potential issues and impacts associated with the proposed project; and
- Start conceptualising practical mitigation measures.

The region has previously been widely studied and is recorded in various sources. Consequently, some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been supplemented or generated by specialists appointed to undertake baseline and impact assessments for the proposed project.

The specialist baseline and impact studies undertaken for the BA process are listed in Table 4-1.

Table 4-1: Specialist baseline studies undertaken for the BA

Specialist Study	Specialist	Organisation
Terrestrial Ecology Assessment	Dr. Gareth Coombs	Umsintsi Consulting (CC)
Underwater Heritage Impact Assessment	Vanessa Maitland	Contract Maritime archaeologist
Marine Ecology Specialist Statement	Andrea Pulfrich	Pisces Environmental Services (Pty) Ltd

Final specialist studies are attached as Appendices D1 to D3.

4.1 Biophysical Environment

4.1.1 Geology and Soils

The geology of Mossel Bay Municipality predominantly comprises of Arenite and Conglomerate (Mossel Bay Municipality, 2022). The Outeniqua Mountains, recessed some distance from the coastline, form part of the Cape Fold Belt and the Greater Mossel Bay area is characterised by steeply dipping quartzitic sandstone and shale beds of the Table Mountain Bokkeveld Groups. An outcrop of conglomerates, sandstones, mudrocks and clays can be seen offshore as what is known as Seal Island (SRK, 2001).

The launch way assembly site is located on a low marine terrace below the Mossel Bay coastal plateau. The launch way corridor is on a continuous aeolian dune ridge that stretches between Mossel Bay and the Hartenbos River mouth. On either side of the aeolian dune ridge, Enon Formation outcrop, which contain calcareous sands and gravels, are present. Further offshore is characterised by thin, predominantly unconsolidated sediments (extending about 20 – 30 km to sea). They are underlain by variable cemented calcarenites of the Pleistocene age and extend to the current beach as reefs in places (referred to as “beach rock”) and continue under the dune ridge. The sediments are remnant of wind-blown foredune systems and beach deposits from migrating intertidal and nearshore foredune environments during periods of fluctuating sea level (SRK, 2001).

4.1.2 Topography and Bathymetry

Mossel Bay is located south of the Outeniqua Mountains on a coastal plateau with a maximum height of 191 masl. The launch way corridor is located on the coast, on a fairly continuous aeolian dune ridge (~15 masl), and extends to the sealine.

The Mossel Bay marine environment is comprised of the Eastern Aghulhas Bank which is characterised by a very wide continental shelf that protects the inshore area from the Agulhas Current.

Seal Island, located ~700 m off the coast, has a sandy bottom with sandstone outcrops present near its shore. The island is part of an east-west striking elongated trough of rock of Cretaceous Tertiary age. The bay itself is relatively shallow, with a -25 m depth contour at approximately 3.5 km offshore where the existing SPM buoy is located (Pisces Environmental, 2022).

The bathymetry of the area proposed for the dual pipelines ranges from a depth of ~3 m to approximately 19 m

4.1.3 Climate

Mossel Bay's climate is ocean-moderate semi-arid and partially temperate oceanic. Average temperatures range from 10°C to 25°C. Water temperatures range between 16.4°C (in July) and 21.8°C (in January) with an average temperature of 18.6°C. The area receives less than 600 mm of rainfall per annum. Rainfall is highest during the area's winter period, with an average of 78 mm during June. The lowest average of 32 mm is recorded in December (Figure 4-2). South westerly winds are common throughout the year, with north-easterly winds occurring in winter and south-easterly winds predominant during summer months (Mossel Bay Municipality, 2022).

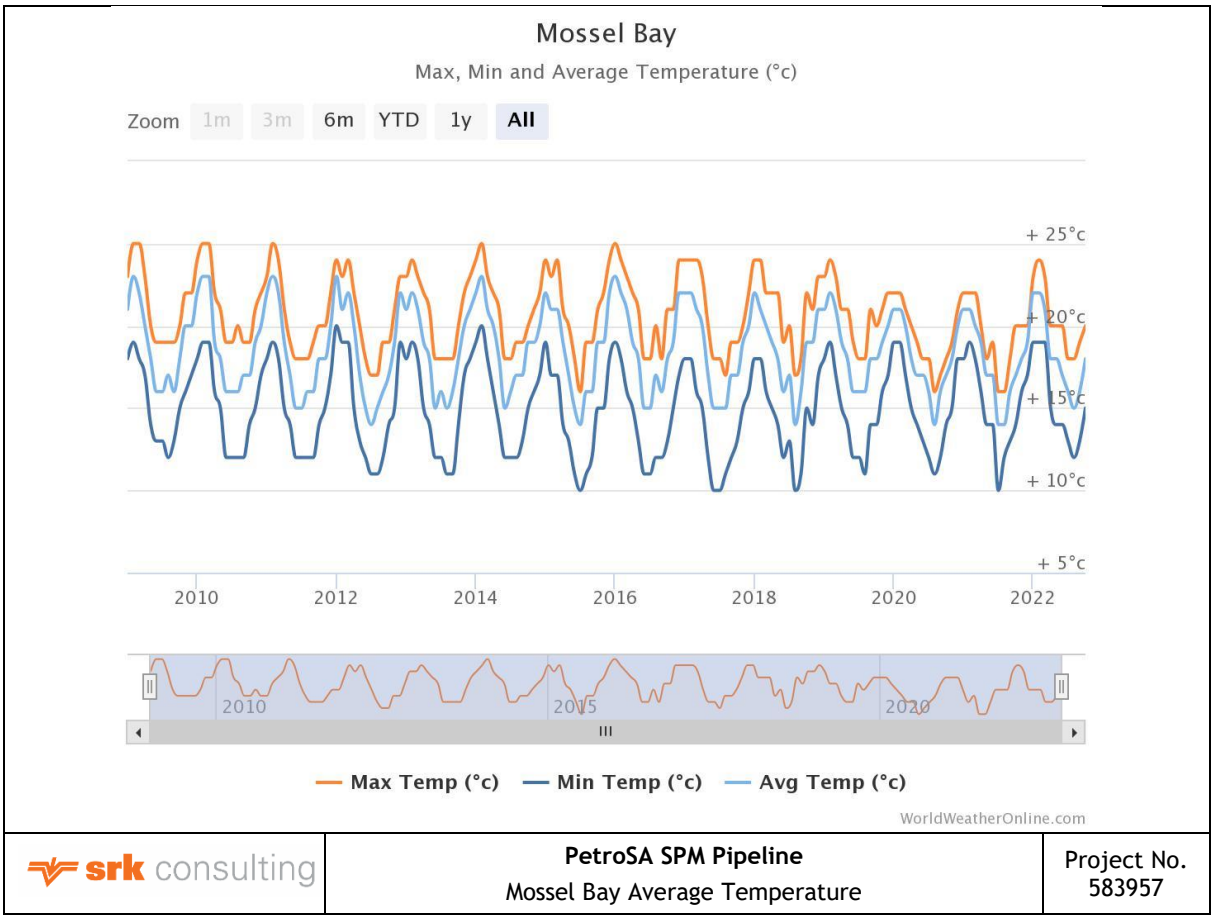
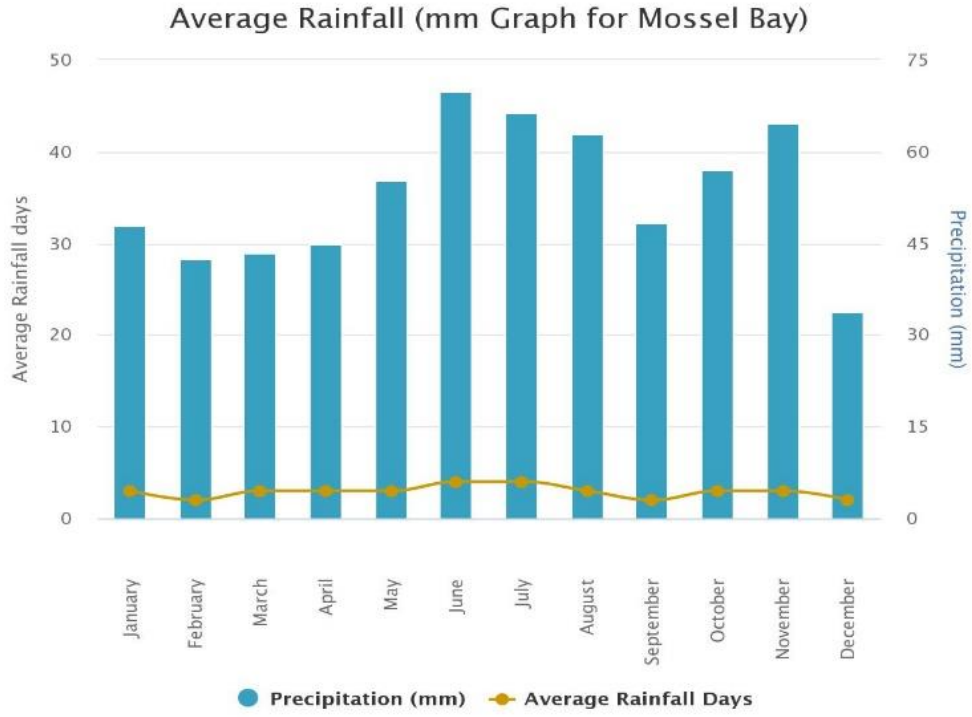


Figure 4-1: Average temperate in Mossel Bay

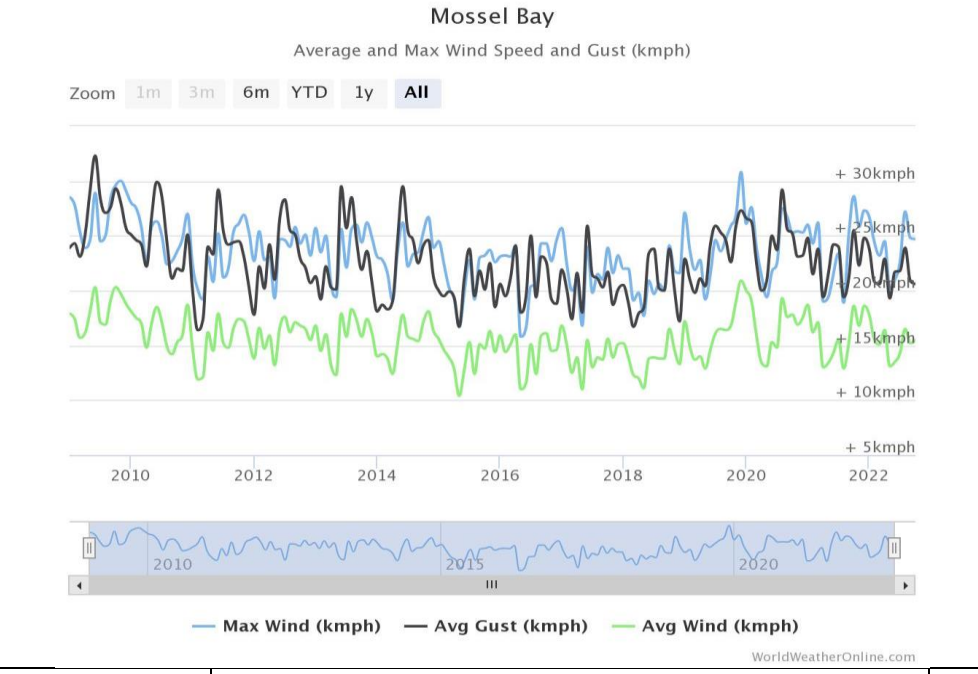
Source: World Weather Online, 2022



srk consulting	**PetroSA SPM Pipeline** Mossel Bay Average Rainfall	Project No. 583957

Figure 4-2: Average rainfall in Mossel Bay

Source: Weather Data Online, 2022



srk consulting	**PetroSA SPM Pipeline** Mossel Bay Wind	Project No. 583957

Figure 4-3: Average wind speed in Mossel Bay

Source: Weather Data Online, 2022

4.1.4 Hydrology

4.1.4.1 Catchment

The onshore component of the project is located in the Breede-Gouritz Catchment Management Area, in the Coastal Gouritz sub-water management area. The catchment area includes the Hartenbos River which is located ~ 3.5 km north of the launch way site (see Figure 4-4). At a more localised scale, the launch way site is located within the Department of Water and Sanitation (DWS) quaternary catchment K10A (see Figure 4-4).

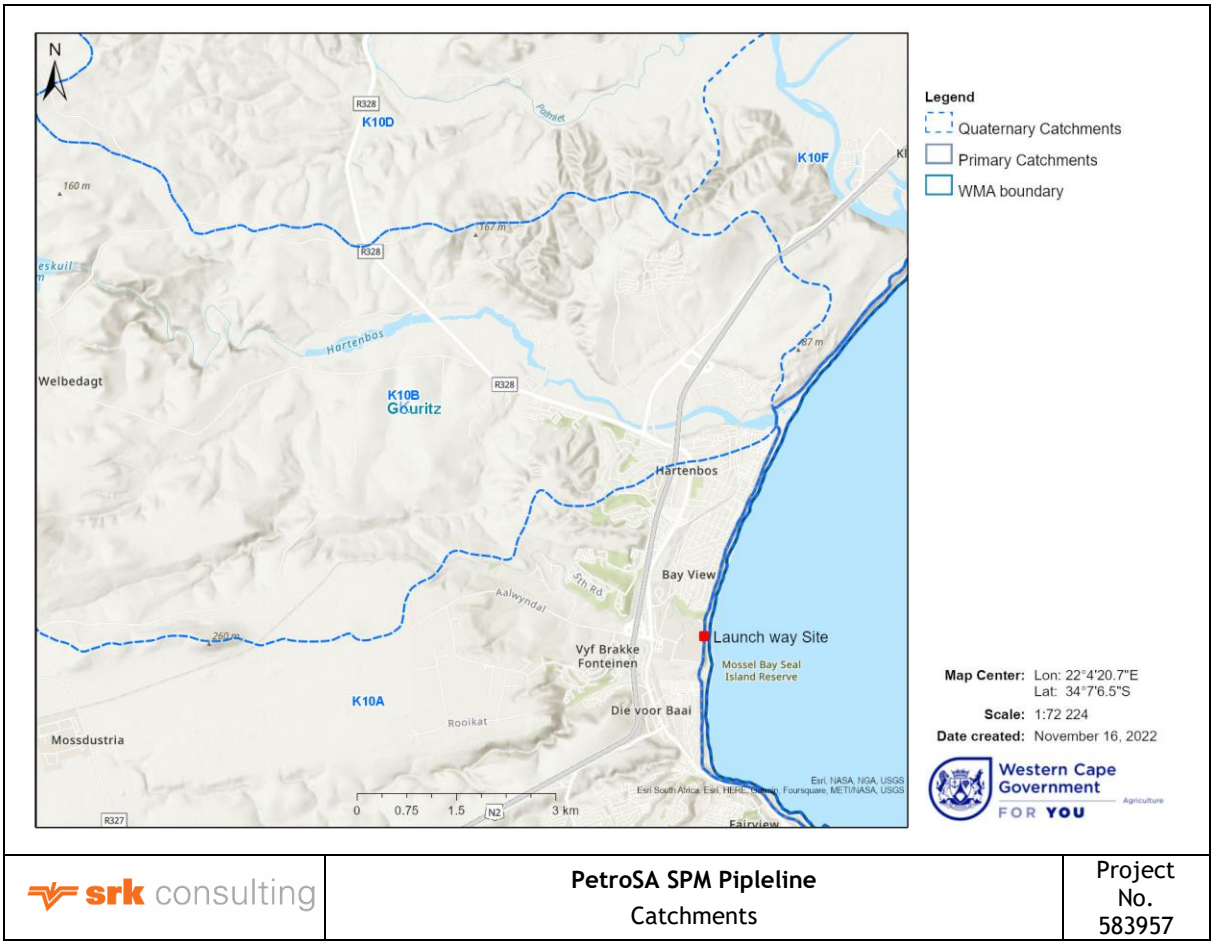


Figure 4-4: Catchment of the Mossel Bay region around the project site

Source: Cape Farm Mapper, 2022

4.1.4.2 Estuaries

The launch way site is located in between the Gericke Estuary (~230 m north of the launch way site and the Tweekuilen Estuary (~550 m south of the launch way site) (see Figure 4-5). The estuaries are both classified as South Strandveld and Western Strandveld wetland ecosystem types. They are also classified as National Freshwater Ecosystem Priority Area (NFEPAs) wetlands. NFEPAs are strategic spatial priorities designated for the preservation of South Africa's freshwater ecosystems and promote the sustainable use of water resources (EOH Coastal & Environmental Services, 2015).

Figure 4-5: NFEPA rivers and wetlands

Source: Cape Farm Mapper, 2022

4.1.5 Vegetation

Mossel Bay is located within the Fynbos Biome, a biodiversity hotspot which supports a high diversity of fynbos species. According to the Western Cape Biodiversity Spatial Plan (2017) (see Figure 4-6), and confirmed in the Biodiversity Compliance Statement (Appendix D1), the launch way corridor comprises Cape Seashore Vegetation (*Least Threatened*) and Hartenbos Dune Thicket (*Endangered*), the latter only recently being classified as *Endangered* in the Revised National List of Ecosystems that are Threatened and in Need of Protection (2022), promulgated in terms of NEM:BA. Hartenbos Dune Thicket spans the coast from the Outeniqua Strand area (northeast of the project site) to the Duiwenhoksriviermond Nature Reserve, southwest of the project site.

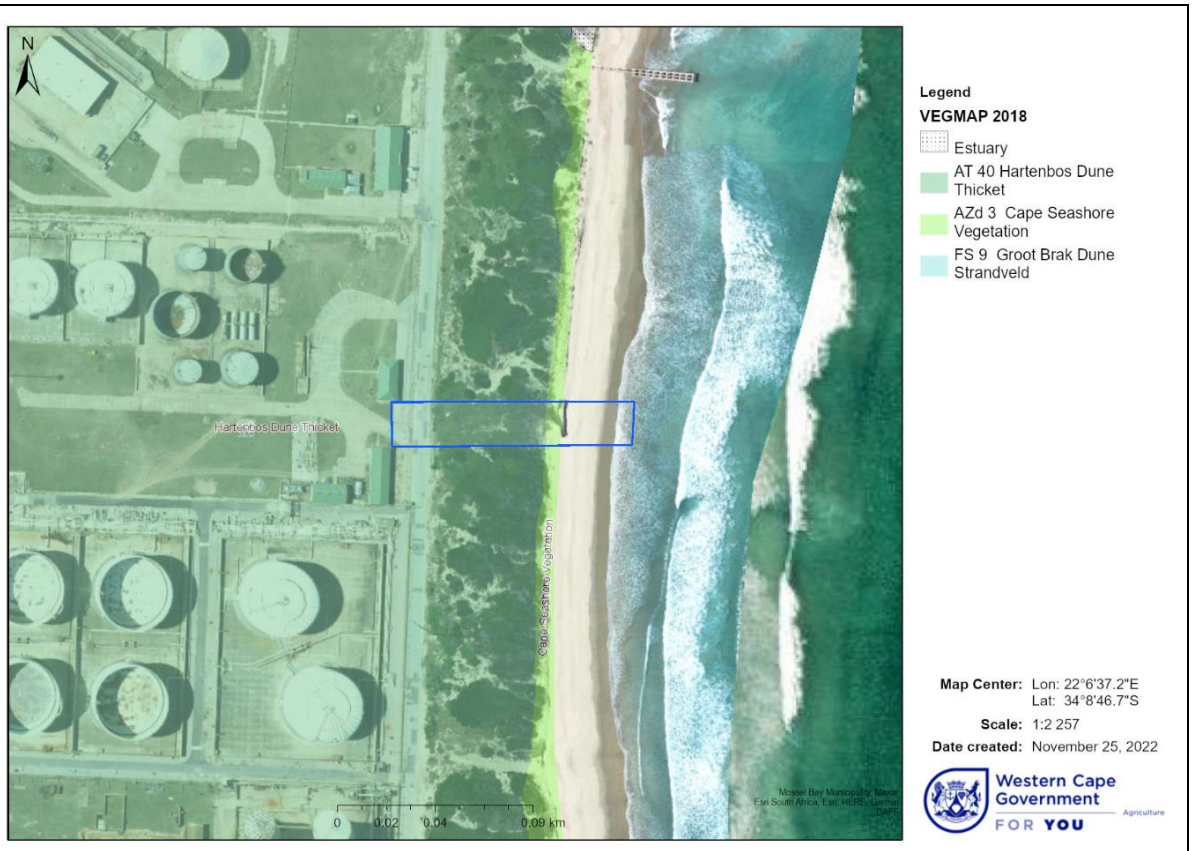


Figure 4-6: Vegetation type in the launch way corridor and surrounds

Source: Cape Farm Mapper, 2022

Despite Hartenbos Dune Thicket';s *Endangered* status, the terrestrial plant theme sensitivity is considered to be *low* (Coombs, 2022). Coombs (2022) explains that only 15 plant species were recorded within the launch way corridor, none of which are SCC. The vegetation on site is not typical of Hartenbos Dune Thicket and is not dominated by a rich mixture of diverse microphyllous (small leaved) shrubs as would be expected in Hartenbos Dune Thicket. Common taller shrub species that were present and expected to occur within Hartenbos Dune Thicket include species such as *Searsia crenata* and *Sideroxylon inerme,* but these are not unique to this vegetation type.

Although shrubs typical of Hartenbos Dune Thicket are found in the back dune area, the vegetation is degraded due to development in the area. The vegetation within the launch way corridor is more similar to the more widespread Cape Seashore Vegetation (Coombs, 2022).

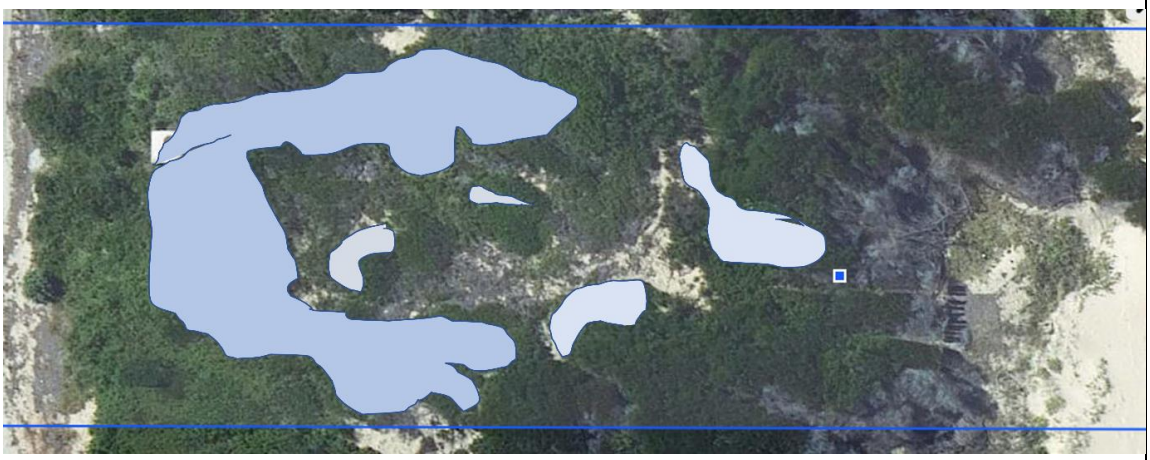
Plant species within the proposed launch way site are characterised by small trees, lower growing shrubs and succulent shrubs. The launch way corridor is invaded by *Acacia cyclops*, a Category 1b invasive species originally introduced as a dune stabiliser. The foredune area is covered with common foredune species and dune pioneer plant species including *Sporobolus virginicus, Zygophyllum morgsana, Arctotheca populifolia, Acacia cyclops* (invasive) and *Oenothera drummondi* (invasive). Vegetation of the stabilised back dune areas predominantly consists of higher growing trees (maximum height of 2.5 to 3 m) and various lower growing shrubs particularly *Acacia cyclops* (invasive), *Sideroxylon inerme* (milkwood) and *Searsia crenata*. The most abundant indigenous species present were *Searsia crenata, Sideroxylon inerme*, *Carpobrotus edulis, Passerina rigida* and *Lampranthus amoenus*. Other species present were *Helichrysum teretifolium, Crassula expansa* and *Pelargonium capitatum* and *Tarconanthus camphoratus*. (Coombs, 2022).

Approximately 15 milkwood trees were recorded within the launch way corridor. *Sideroxylon inerme* is listed as LC in the IUCN Red List, and is therefore not a SCC.

srk consulting	PetroSA SPM Pipeline Plant Species in the Foredune Area	Project No. 583957

Figure 4-7: Plant species in the foredune area

Source: (Coombs, 2022)



srk consulting	PetroSA SPM Pipeline Location of Milkwood Trees	Project No. 583957

Figure 4-8: Location of milkwood tree

Source: (Coombs, 2022)

4.1.6 Fauna

As the project comprises offshore and onshore components, the affected marine fauna environment and terrestrial fauna environment is described below. The marine fauna environment includes the sea shore up to HWM of the sea.

4.1.6.1 Marine Fauna

Mossel Bay's coastline is characteristic of aeolianite reefs in the off-shore zone, which contain red-bait, encrusting monaxonid type sponges, sea-anemones, soft corals, and star fish. These are important for fish such as Toman, Santer, Red stumpnose, Red Steenbras, Poenskop, Panga, Yellowtail, Geelbek, Kob, Dageraad and Carpenter. A number of fish species occur in and just beyond the surf zone (Pisces Environmental, 2022).

The reefs also attract great white sharks, which migrate along the coast of South Africa and are present at seal colonies during winter months and nearshore during summer. They use the reefs as a resting area when hunting for seals, which have a breeding colony at Seal Island. Various sharks are known to occur in coastal waters along the south coast, many of which are considered globally threatened (Pisces Environmental, 2022).

Other marine fauna that occur in the region include sea turtles (Green turtle, Olive Ridley, Leatherback, Hawksbill and Loggerhead), cetaceans (Southern Right whales, Humpback whales, Bryde's whales, Indo-Pacific bottlenose dolphins, Indian Ocean humpback dolphins), chokka squid (*Loligo vulgaris reynaudii*), isopod species, nemertean worm species *Cerebratulus* sp. and polychaete *Nephtys* sp. and the filter feeding sand mussel (Pisces Environmental, 2022).

Nearshore marine habitats on the South Coast are characterised by relatively robust fauna. They are naturally adapted to a dynamic environment where physical disturbances are common. Communities in the region are largely ubiquitous and found in sandy, intertidal and subtidal substrates, intertidal rocky platforms and subtidal reefs, and open ocean (Pisces Environmental, 2022).

Part of the pipelines fall within an area mapped as CBA 2 Restore (see Figure 4-9). These are areas no longer in a natural ecological condition and that need to be restored meet biodiversity targets.

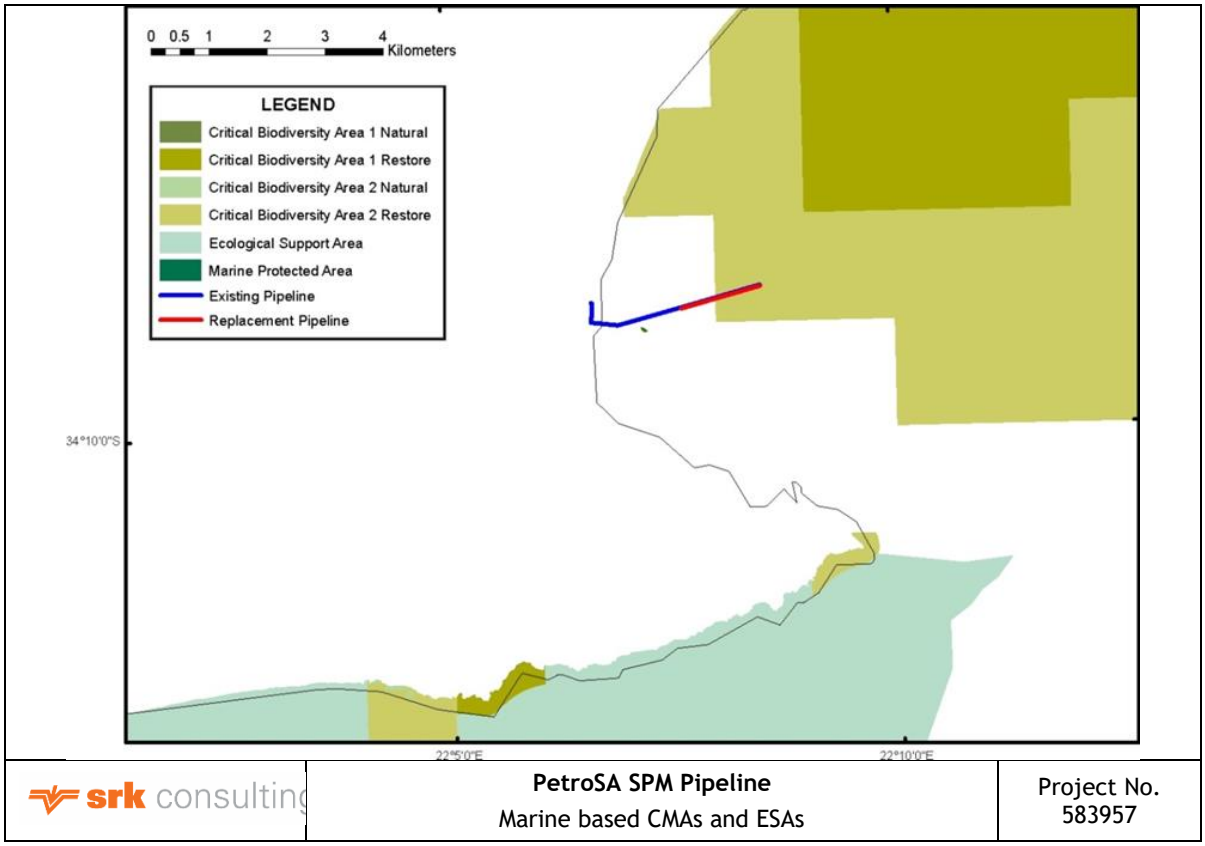


Figure 4-9: Marine based CBAs and ESAs.

Adapted from Harris *et al.* 2022.

Activities within these management zones are classified into those that are "compatible", those that are “not compatible”, and those that have “restricted compatibility”. Oil and gas pipelines are classified as having “restricted compatibility”. Activities with restricted compatibility require a detailed assessment to determine whether they should be permitted (general), permitted subject to additional regulations (consent), or prohibited, depending on a variety of factors (Pisces Environmental, 2022).

4.1.6.2 Terrestrial Fauna

Birds

Common widespread small and medium sized passerine bird species have been recorded in the region such as the Black Capped Bulbul (*Pycnonotus barbatus*), Cape White Eye (*Zosterops capensis*), Bokmakierie (*Telephorus zeylonus*), Southern Boubou (*Lanniarius ferruguneus*) Neddicky (*Cisticola fulvicapilla*), Barthroated Apalis (*Apalis thoracica*), Forest Canary (*Crithagra scotops*), Red Eyed Dove (*Streptopelia semitorquata*), Olive Thrush (*Turdus olivaceus*), Fork Tailed Drongo (*Dicrurus adsmilis*) (Coombs, 2022).

African Oystercatcher (*Haematopus moquini*), Karoo Prinia (*Prinia maculosa*), Bar Throated Apalis (*Apalis thoracica*), Fork Tailed Drongo (*Dricrurus adsimilis*), Kelp Gull (*Larus dominicanus*), Speckled Mousebird (*Colius striatus*) and Cape White Eye (*Zosterops capensis*) were observed during the site inspection. Birds are highly mobile and will fly away during construction works (Coombs, 2022).

Reptiles

Thirty seven reptiles have been recorded in the project area. These include tortoise species such as Leopard Tortoise (*Stigmochelys pardalis*), Angulate Tortoise (*Chersine angulata*) and Parrot Beaked Tortoise (*Homopus areolatus*). Snake species recorded include Red Lipped Herald (*Crotaphopeltis hotamboeia*), Boomslang (*Dispholidus typus*), Western Natal Green snake (*Philothamnus occidentalis*), Cape Cobra (*Naja nivea*), house snakes (*Lycodonomorups inornatus*, *Boaedon capensis, Lamprophis aurora*) and grass and sand snakes such as the Cross Marked Grass Snake (*Pssamophis crucifer*) and Karoo Sand Snake (*Pssamamophis notostictus*). Other snake species recorded here include Cape Wolf Snake (*Lycophidion capense capense*), Puff Adder (*Bitis arietans*), Spotted Grass Snake (*Pssamophylax rhombeatus*) and Delalandes Beaked Blind Snake (*Rhinotyphops lalandei*) (Coombs, 2022)

No reptiles were observed during the inspection of the project site (Coombs, 2022).

Mammals

Accessible areas such as the site provide habitat for smaller mammals which include antelopes such as Blue Duiker (*Philantomba monticola*), Cape Grysbok (*Raphicerus melanotis*), mongoose species such as Cape Grey Mongoose (*Herpestes pulverulentus*), Marsh Mongoose (*Atilax paludinosus*), Slender Mongoose (*Herpestes sanguineus*), Striped Polecat (*Ictonyx striatus*), smaller mammals such as diversity of rats including South African Vlei Rat (*Ottomy irroratus*), Cape Gerbil (*Gerbilisscus afra*), Xeric Four Striped Grass Rat (*Rhabdomys pumilio*), Grey African Climbing Mouse (*Dendromis melanotis*), and South African Pouched Mouse (*Saccostomus campestris*). Other mammals that could be present include Cape Porcupine (*Hystrix africaeustralis*), Honey Badger (*Mellivora capensis*), Chacma Baboon (*Papio ursinus*) and Cape Genet (*Genetta tigrina*) (Coombs, 2022).

No mammals were observed during the inspection of the project site, however scat characteristic of a Cape Clawless Otter was found at the site.

4.2 Socio-Economic Environment

4.2.1 Local Economy

Between 2015 and 2019, the economy of the Mossel Bay Local Municipality (MBLM) grew at an annual rate of 0.7% and is projected to grow at an annual rate of 2.32% between 2020 and 2025. MBLM's Gross Domestic Product (GDP) was valued at R8 billion in 2019 and is forecast to reach R13.6 billion by 2025, accounting for 23.7% of the Garden Route District Municipality's GDP (Mossel Bay Municipality, 2022).

The finance, insurance, real estate and business services sector makes the largest sectoral contribution to the local economy (R2.28 billion), followed by the wholesale and retail trade, and catering accommodation (R1.421 billion) and manufacturing (R1.162 billion) sectors. Although the local economy contracted by 6.8% in 2020, the agricultural sector saw positive growth which can be attributed to wetter conditions and favourable commodity prices (Western Cape Government, 2021).

4.2.2 Employment

Approximately 30 200 people were employed in MBLM in 2020 (approximately 26 000 in the formal sector and 4 210 in the informal sector). Due to declining economic growth in the Municipality, an estimated 2 613 jobs were shed following the start of the COVID-19 pandemic with the tertiary sector being most impacted (estimated 1 668 workers in the sector lost their jobs). The high number of job losses is attributed to the poor performance of the tourism sector as a result of COVID-19 restrictions, and declining standards of living (less people were able to afford services that were deemed unnecessary). The general government sector was the only sector to create additional employment (21 jobs) (Mossel Bay Municipality, 2022).

4.2.3 Education

In 2020, 17 458 learners were enrolled in school in the MBLM The learner teacher to ratio was 1:33 and learner retention rate was 69% in 2020. There are 24 public schools in Mossel Bay and 13 of them were equipped libraries and media centres in 2020 (Western Cape Government, 2021).

Mossel Bay has the highest literacy rate (91.64%) compared to other local municipalities in the Garden Route District Municipality. About 74 600 people in MBLM were deemed functionally literate in 2020, with 6 800 people deemed illiterate. Roughly 1 130 people in MBLM have no formal schooling, 28 100 completed grade 12 only, 3 220 have a Bachelor's degree, and 1 580 have a Postgraduate degree (Mossel Bay Municipality, 2022).

4.3 Heritage Environment

There are approximately 42 shipwrecks in the Mossel Bay region. Twelve shipwrecks may occur within the impact zone (the zone generally defined as the area of consideration shown in Figure 4-10). Of these 12 shipwrecks, five are unlikely to be present, four are probably present and three are very probably present in the impact zone (on the beach / near Seal Island / within tow corridor) (Maitland, 2022).

srk consulting	**PetroSA SPM Pipeline** Mossel Bay Shipwrecks	Project No. 583957

Figure 4-10: Mossel Bay shipwrecks that may be in the Impact Zone

Source: (Maitland, 2022)

Table 4-2: Four probable shipwrecks present in the impact zone

Source: (Maitland, 2022)

#	Name	Events	Nation	Date	Type	History	Location
1	*Kate*	Aground, wrecked	Britain	1849-07-16	Wood schooner	The *Kate* of 271 tons was built by Hutchinson in 1849 at Peterhead. Under Captain Kirby, on a voyage from London, she was wrecked at night during a south-easterly gale. No lives were lost and reportedly lies next to the *Mary* (1853) (Turner 1988; Levine 1989). The wreck and stores were sold on the beach by public auction (van den Bosch 2009)	On the beach
2	*Kimon*	Abandoned, towed, beached	Norway	1890-01	Wood brig	The *Kimon* was on a voyage from Natal to Grimstad, when she was abandoned 75 miles (c. 120 km) south-west of Port Elizabeth, she had a cargo of deals (timber). The crew were rescued by the *Robert* and taken to Cape Town. In the meantime, the *Hawarden Castle* found the abandoned vessel and towed it to Mossel Bay. There, after an inspection, the vessel was beached at Holgat (now Dias Beach) and the cargo salvaged (van den Bosch 2009)	Dias Beach
3	*Mary*	Aground, wrecked	Britain	1853-02-16	Wood schooner	This vessel was built in 1847 by Simpson & Co., in Perth, Scotland. Under Captain J. Wood, this 117-ton vessel was anchored in Mossel Bay when her anchor cables parted during a south-easterly gale. One crew member was drowned. The wreck lies near the *Kate* (1849) (Turner 1988; Levine 1989; van den Bosch 2009)	On the Beach
4	*Nancy*	Aground, wrecked		1848-04-05	Wood schooner	This 38-ton vessel under the command of Captain T. Metcalf was grounded and wrecked during a south-easterly gale. One man drowned. Most of the cargo had been unloaded (Turner; 1988; Levine 1989; van den Bosch 2009)	Mossel Bay

Table 4-3: Three highly probable shipwrecks present in the impact zone

Source: (Maitland, 2022)

#	Name	Events	Nation	Date	Type	History	Location
1	*Da Gama's Supply Ship*	Abandoned, burnt	Portugal	1497	Wood supply ship	On 8 July 1497, Vasco da Gama left Portugal. He was in command of four vessels. One of these vessels was a supply ship. In November 1497, the vessel entered the bay. The flotilla stayed in the bay for 13 days. During this time, they unloaded the supply ship, loading the contents onto the other three vessels. They filled their casks with fresh water and managed to barter for some livestock. However, the Khoe were apparently unhappy with the Portuguese taking water without permission and a fight ensued. The seamen fired their cannon at the herders and onto Seal Island amongst the seals. During their stay, they killed penguins on the island and erected a stone padrão and wood cross. They set fire to the abandoned supply ship and left the bay.	Possibly near Seal Island

						It is probable that they anchored near Seal Island as it offered some protection from the wind, had a steady supply of food and allowed them to stay aboard, protecting them from the Khoe.	
2	*Martha*	Aground, wrecked	Britain	1845-08-30	Wood brig	This vessel, built in Devon, England in 1835 was under the command of Captain Boustead. was on her way from Sydney to Table Bay with 20 immigrants and the mail. They were putting into Mossel Bay to stock up on provisions during a south-easterly gale. Apparently wrecked between 3 and 5 km of the landing place, depending on the database (Levine 1989; van den Bosch 2009; Turner 1988).	On the beach
3	*Poseidon*	Aground, wrecked	Norway	1902-09-02	Wood barque	This 606-ton vessel was built in 1890 at Arendal. Under the command of Captain C. Clausen its cargo consisted of 1500 bags of coffee. A south-east gale was blowing, and the vessel began to drag anchor, eventually, "…the ship striking the rocks − in the bight of the Bay, inside Seal Island" (Mossel Bay Advertiser 02-09-1902 in van den Bosch 2009). Everyone aboard was saved by the rocket brigade. (Turner 1988; Levine 1989)	Dias Beach near Seal Island

Since the onshore component of the project within the launch way corridor (see Section 3.1.2) has been disturbed before to some extent to install an underground stormwater drain and associated infrastructure) it is unlikely that material of heritage value is present. However, since the surrounding marine environment comprises several shipwrecks it is possible that material has been washed to shore / buried.

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5 Stakeholder Engagement

Stakeholder engagement forms a key component of the BA process and is undertaken in accordance with Chapter 6 of the EIA Regulations, 2014 and the Protection of Personal Information Act 4 of 2013 (POPIA). The objectives of stakeholder engagement are outlined in this section, followed by a summary of the approach followed and issues raised by the public with regard to the proposed development.

As of 1 July 2021, sections of the POPIA, which aims to promote protection of personal information, came into effect. The EIA Regulations, 2014 require, *inter alia*, transparent disclosure of registered stakeholders and their comments. In terms of the EIA Regulations, 2014, stakeholders who submit comments, attend a meeting or request registration in writing are deemed registered stakeholders who must be added to the project's Registered Stakeholder Database with their contact details. Therefore, **registered stakeholders are deemed to give their consent for relevant information (including name and contact details) to be processed and disclosed, in fulfilment of the requirements of the EIA Regulations, 2014 and the National Appeal Regulations, 2014.**

5.1 Objectives and Approach to Stakeholder Engagement

The overall aim of public consultation is to ensure that all stakeholders have adequate opportunity to provide input into the process and raise their comments and concerns. More specifically, the objectives of public consultation are to:

- Identify IAPs and inform them about the proposed development and BA process;
- Provide the public with the opportunity to participate effectively in the process and identify relevant issues and concerns;
- Coordinate cooperation between organs of state in the consideration of the assessment; and
- Provide the public with the opportunity to review documentation and assist in identifying mitigation and management options to address potential environmental issues.

5.2 Stakeholder Engagement during the Basic Assessment Phase

Public participation is currently being undertaken to raise public and authority awareness of the proposed project. Table 5-1 outlines the activities planned during the BA Process.

Table 5-1: Activities planned during the BA process

Task	Objectives	Dates
Place posters at the entrance to the PetroSA Tank Farm and at the Langeberg Mall	To notify potential IAPs of the commencement of the BA process, the availability of the BA Report and the opportunity to register as an IAP and / or provide comments. To notify the Mossel Bay community, including the nearest residential suburbs of Die Voor Bay, Sea Cottages and Bay View of the proposed development.	24 February 2023
Advertise commencement of BA process and release BAR for public comment period		24 February 2023
Submit EA Application Form to DFFE	Register the application for EA	24 February 2023
Public comment period	To provide stakeholders with the opportunity to review and comment on the results of the BA Report.	24 February 2023 =- 27 March 2023
Compile Issues and Responses Summary and finalise BAR	To record all issues and concerns raised and collate these comments in the final report which provides DFFE with information to decide whether to authorise the project.	27 March 2023 - 7 April 2023

Task	Objectives	Dates
Submit BAR (and Issues and Responses Summary) to DFFE	To provide authorities with information for decision-making.	Before 30 April 2023

The key activities (that will be) undertaken in the stakeholder engagement process during the BA process are described further below.

5.2.1 Newspaper Advertisements and Posters / Site Notice

A newspaper advertisement (in English) announcing the commencement of the BA process, the availability of the BAR and inviting IAPs to register on the project database was placed in the Mossel Bay Advertiser.

In addition to the advertisement, posters were placed at key locations at the Langeberg Mall, and a Site Notice was placed at the entrance to PetroSA's existing Tank Farm (the construction phase pipeline assembly yard). These posters and the site notice will contain brief details of the proposed project and process and the contact details of the consultant.

5.2.2 Identification of Key Stakeholders and IAPs

Regulation 42 of the EIA Regulations, 2014, as amended, provides for the opening and maintenance of a Registered Stakeholder (IAP) Database, which must contain personal information (names and contact details). Relevant IAPs from local, provincial and national authorities, conservation bodies, Non-Governmental Organisations (NGO) groups, local businesses and forums and surrounding landowners and occupants were therefore considered for inclusion on the Registered Stakeholder Database for the project and notified (see Section 5.2.3) of the opportunity to register on the Registered Stakeholder Database and / or to provide comment on the BA Report. Relevant authorities were automatically included as registered stakeholders and contact details added to the Registered Stakeholder Database.

As specified in the EIA Regulations, 2014, registered stakeholders and their contact details have been (and will be) included on the Registered Stakeholder Database to be submitted to the competent authority. However, to comply with POPIA, the Registered Stakeholder Database is not provided in reports or attached to reports made available in the public domain. However, the Registered Stakeholder Database (including name and contact information) will need to be provided to the appellant(s) if the EA is appealed, and it may also need to be provided to other consultants if, for example, they are required to notify adjacent landowners of matters arising during project implementation or of the findings of an external audit report.

The Registered Stakeholder Database will be attached to the Final BAR as Appendix C1 and will be updated throughout the process.

5.2.3 Notification of BAR for Public Comment

Taking account of POPIA constraints, the release of the BAR for public review was communicated to IAPs, in the following manner:

- Posting or emailing the Bay Dunes Home Owners Association (HoA), Twee Kuilen HoA and Sea Cottages HoA (the nearest residential complexes to the site proposed for the project);
- Emailing automatically registered IAPs (Organs of State which have jurisdiction in respect of any aspect of the relevant activity) and other identified potential IAPs, including Rate Payers Associations in the area and nearby businesses;
- Publishing a notice in the Mossel Bay Advertiser, a local newspaper; and

- Erecting posters in the Langeberg Mall and a site notice at the entrance to the PetroSA Tank Farm.

The BAR is accessible as an electronic copy on SRK's website www.srk.co.za (via the "Knowledge Centre" and then "Public Documents" links), and available on CD, or hardcopy on request. An electronic copy of the BAR was made available to the following authorities, to facilitate comment:

- DFFE: Integrated EA Department;
- DFFE: Oceans and Coasts;
- DFFE: Biodiversity and Conservation;
- DWS;
- DEA&DP: Development Management Region 3;
- DEA&DP: Coastal Management;
- DEA&DP: Waste Management;
- DEA&DP: Pollution and Chemicals Management;
- Breede Gouritz Catchment Management Agency (BGCMA)
- Western Cape Department of Transport and Public Works (WCDTPW);
- GRDM;
- MBLM;
- TNPA;
- South African Civil Aviation Authority (SACAA);
- SAHRA; and
- CapeNature.

The 30-day comment period commenced on 24 February 2023. IAPs are asked to submit comments to SRK by no later than 27 March 2023. Comments received in response to the draft BAR / EMPr will be included in an BA Report Issues and Responses Summary and attached to the Final BAR / EMPr.

5.2.4 Next steps

Following initial review of the BAR, issues raised by authorities and the public will be summarised and responded to in an Issues and Responses Summary, which will be appended to the Final BAR. The BAR will be updated (if necessary) taking stakeholder input into account. The Final BAR will then be submitted to the DFFE for decision making. IAPs will be informed of the submission of the Final BAR, including the Issues and Responses Summary, to the DFFE.

6 Environmental Impact Assessment

6.1 Introduction

6.1.1 Environmental Impacts Identified

Based on the professional experience of the EIA team, legal requirements (Section 2), the nature of the proposed activity (Section 3) and the nature of the receiving environment (Section 4) the following key environmental issues – potential negative impacts and potential benefits – were identified:

- **Terrestrial ecology** – loss and / or disturbance of terrestrial fauna and flora habitat and species associated with construction of the onshore activities (Section 3.5.1);
- **Marine ecology** – potential loss or disturbance of marine habitat and fauna, and pollution of the marine environment during the Construction and Operational Phases of the project;
- **Socio Economic** - potential socio-economic benefits to the wider community in the form of secured employment and economic growth; and
- **Heritage** – potential destruction of heritage resources associated with earthworks on land and on the seabed during the Construction Phase.

6.1.2 Specialist Studies Undertaken

A number of specialist studies (see Table 4-1 and below) were undertaken to investigate the key potential direct, indirect and cumulative impacts (negative and positive). These specialist impact studies are as follows:

- Terrestrial Ecology Assessment;
- Marine Ecology Specialist Statement; and
- Heritage Impact Assessment.

These specialist reports are included as Appendices D1 to D3 to this report. Socio-economic impacts were assessed by SRK specialists and EAPs, although a stand-alone specialist study was not considered necessary.

Certain impacts which SRK believes to be less significant and do not warrant specialist investigation are assessed in Section 6.2. These impacts include:

- Increased windblown sand and associated impacts on air quality; and
- Increased noise due to project activities.

6.1.3 Impact Rating Methodology

The assessment of impacts was based on specialists' expertise, SRK's professional judgement, field observations and desk-top analysis.

The significance of potential impacts that may result from the proposed project was determined in order to assist decision-makers (typically by a designated competent authority or state agency, but in some instances, the applicant).

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur.

The criteria used to determine impact consequence are presented in the table below.

Table 6-1: Criteria used to determine the consequence of the impact

Rating	Definition of Rating	Score
A. *Extent* *– the area over which the impact will be experienced*		
Local	Confined to project or study area or part thereof (e.g. the development site and immediate surrounds)	1
Regional	The region (Municipality or catchment)	2
(Inter) national	Nationally or beyond	3
B. ***Intensity*** *– the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. ***Duration*** *– the timeframe over which the impact will be experienced and its reversibility*		
Short-term	Up to 2 years and reversible	1
Medium-term	2 to 15 years and reversible	2
Long-term	More than 15 years and irreversible	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 6-2: Method used to determine the consequence score

***Combined Score* (A+B+C)**	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence was derived, the probability of the impact occurring was considered, using the probability classifications presented in the table below.

Table 6-3: Probability classification

Probability *– the likelihood of the impact occurring*	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall **significance** of impacts was determined by considering consequence and probability using the rating system prescribed in the table below.

Table 6-4: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	**INSIGNIFICANT**	**INSIGNIFICANT**	**VERY LOW**	**VERY LOW**
	Low	**VERY LOW**	**VERY LOW**	**LOW**	**LOW**
	Medium	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**
	High	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**
	Very High	**HIGH**	**HIGH**	**VERY HIGH**	**VERY HIGH**

Finally, the impacts were also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below.

Table 6-5: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity/development.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity/development.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity/development.
- **HIGH**: the potential impact **will** affect the decision regarding the proposed activity/development.

6.1.4 Integration of Studies into the BAR and Review

The completed specialist studies and their findings have been integrated into the BAR. The key findings of each specialist were evaluated in relation to each other to provide an overall and integrated assessment of the project impacts.

SRK has considered the suite of potential impacts in a holistic manner and in certain instances, based on independent professional judgment and this integrated approach, may have altered impact significance ratings provided by the specialist. Where this has been done it is indicated in the relevant section of the report.

Specialists have made recommendations for the management of impacts, and the EAP has assessed these recommendations. For the sake of brevity, only **key** (i.e. non-standard essential) mitigation measures are presented in impact rating tables (later in this section), with a collective summary of all recommended mitigation measures presented at the end of each discipline.

6.2 Less Significant (or Minor) Impacts

Certain impacts, while important, are considered likely to be less significant based on the impact rating criteria. These impacts, all associated with on shore activities during the Construction Phase, include:

- **Air Quality –** Impaired air quality from windblown sand generated by vegetation clearing and earth moving activities; and
- **Noise** – Increased noise levels in the area during the Construction Phase;

These impacts are not expected to be significant and have therefore not been subjected to detailed impact analysis. However, they have been assessed by the EAPs through desktop investigation and ground-truthing, and are discussed below. Mitigation measures are also identified.

6.2.1 Potential Impact A1: Impaired Air Quality due to Windblown Sand

Vegetation clearing and earthworks associated with the construction of the launch way are expected to generate dust (windblown sand) in the construction area, temporarily affecting air quality in the area immediately surrounding the construction site.

PetroSA's Tank Farm and the beach, surround the site. The area therefore receives windblown sand from the beach already. Windblown sand generated from clearance of vegetation on the dune is unlikely to cause annoyance given the small footprint of the launch way and the distance to the nearest surrounding residents (~360 m north of the site and ~700 m south of the site).

The impact is assessed to be of ***very low*** significance and with the implementation of mitigation is reduced to ***insignificant.***

6.2.1.1 Mitigation Measures: Potential Air Quality Impact

Essential air quality mitigation measures during **construction** are as follows:

- Erect the launch way as soon as practically possible after vegetation clearing.
- Avoid excavation and handling and transport of materials which may generate dust during windy conditions or when a visible dust plume is present.
- Reduce airborne dust by covering stockpiles of loose material with plastic sheeting or netting, especially during windy conditions.
- Restrict vegetation clearance to the launch way corridor.
- Clear vegetation by hand rather than with heavy machinery, as far as practically possible.
- Stabilise exposed surfaces following construction as soon as is practically possible.
- Rehabilitate areas with indigenous vegetation as soon as practically possible.
- Investigate and respond to complaints about excessive dust and take appropriate corrective action.

6.2.2 Potential Impact N1: Increased Noise Levels due to Project Activities

Noise pollution results from unwanted or excessive noise with effects that range from causing a nuisance to more harmful effects such as sleep disturbance, high stress levels and impaired hearing.

Existing noise levels in the area are typical of an industrial area with noise mostly generated by the movement of trucks and vehicles. Noise generated by Construction Phase traffic, pipeline assembly and during installation of the launch way and rollers will not be out of character with ambient noise in the industrial area and is unlikely to be discernible to the nearest residential communities during the short-term construction period given the distance to the nearest receptors. Residents are therefore unlikely to be affected by noise.

The impact is assessed to be of ***insignificant*** with and without the implementation of mitigation.

6.2.2.1 Mitigation Measures: Noise Impact

Essential noise impact mitigation measures during **construction** are as follows:

- Limit construction activities to Mondays to Saturdays, 07h00 - 18h00, or in compliance with relevant municipal bylaws, if applicable.
- Maintain construction equipment and vehicles in good working order to prevent unnecessary noise.

- Investigate and respond to complaints about excessive noise and take appropriate corrective action.

6.3 Potential Terrestrial Ecology Impacts

6.3.1 Introduction, Terms of Reference and Methodology

The assessment is based on the Terrestrial Ecology Specialist Study undertaken by Umsintsi Consulting CC (see Appendix D1). The ToR for the study were to:

- Undertake a desktop assessment and field assessment of the launch way site which includes:
  - Ground-truthing baseline assessment;
  - Undertaking site sensitivity verification;
  - Providing photographic evidence of the baseline environment;
  - Determining the presence or likely presence of SCC and
  - Providing baseline data (including mapping) where necessary;
- Compile a Report compliant with the Environmental Assessment Protocols (GN R320 of 2020 and GN 1150 of October 2020) relevant to the terrestrial biodiversity, plant species and animal species themes;
- Identify and delineate habitats and any unique or protected habitat features and sensitive habitats; and
- Identify mitigation measures for the reduction of the significance of negative impacts for inclusion in the EMPr.

6.3.2 Assessment of Impacts: Construction Phase

The following potential direct Construction Phase terrestrial ecology impacts were identified:

- T1: Degradation and / or loss of terrestrial habitat and endangered and protected species;
- T2: Displacement and / or loss of terrestrial fauna; and
- T3: Spread of terrestrial alien and invasive plant species.

6.3.2.1 Potential Impact T1: Degradation and / or Loss of Terrestrial Habitat

During the Construction Phase the ~ 720m^2 site (12 m wide X 60 m long to include space for vehicles and construction workers) for the construction of the launch way will be cleared of vegetation, destroying and fragmenting habitats and ecosystems. Soil stripping, if required in some areas to re-profile the dune prior to the placement of the pipe string roller line, also removes the seedbank in the affected area, and the exposed areas are more susceptible to wind and water erosion as well as alien invasion.

The terrestrial habitat sensitivity is considered to be low due to the limited number of species on site, none of which are SCC. The launch way site was previously disturbed and it mostly in a degraded condition invaded by *Acacia cyclops*, an invasive species (Coombs, 2022). However, some shrubs typical of Hartenbos Dune Thicket (an *Endangered* Ecosystem), occur in the back dune area and ~15 milkwood trees will be lost. The number of species expected to be lost is relatively low.

The impact is assessed to be of ***low*** significance with and without the implementation of mitigation. (Table 6-6).

Table 6-6: Significance of degradation and / loss of terrestrial habitat

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Medium	Medium-term	Low	Definite	**LOW**	Negative	High
	1	2	2	5				
Essential Mitigation Measures: • Obtain a permit from DFFE prior to the removal of the Milkwood trees (*sideroxylon inerme).* • Restrict the width of the launch way development footprint to 12 m within the launch way corridor. • Clear vegetation by hand rather than with heavy machinery, as far as practically possible. • Demarcate with fencing all areas outside of the development footprint as no-go areas. • Erect the site camp and material lay down area within PetroSA's Tank Farm. • Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas. • Chip cleared indigenous vegetation for use as mulch to stabilise the disturbed surfaces after construction. • Install temporary windbreaks (shade netting) to stabilise the dune during construction, if necessary. • Provide environmental awareness training (by ECO) to all construction staff prior to construction. • Implement best practice measures to manage dust. • Strip topsoil and stockpile separately for use during rehabilitation, only in areas where the ground cover will be disturbed by vehicles during dune profiling. Do not strip topsoil if dune profiling is not required (i.e if the rollers are placed directly on the surface). • Store all vehicles, machinery and equipment within the PetroSA Tank Farm. • Prohibit damage to adjacent vegetation outside the demarcated development footprint. • Appoint and ECO to undertake regular site inspections during the Construction Phase. • Remove all materials, temporary structures, temporary fences, plant, equipment and waste upon completion of construction. • Rip compacted areas on the beach compacted by heavy machinery and profile the sand to mimic the surrounding beach profile.								
With mitigation	Local	Medium	Medium-term	Low	Definite	**LOW**	Negative	High
	1	2	2	5				

6.3.2.2 Potential Impact T2: Displacement and / or Loss of Terrestrial Fauna

Displacement and / or loss of terrestrial fauna is mostly a direct consequence of very localised loss of terrestrial habitat and vegetation (Coombs, 2022). Clearance of vegetation during the Construction Phase of the launch way corridor will destroy and fragment faunal habitats resulting in faunal displacement.

Terrestrial fauna sensitivity is considered to be low due to the limited fauna on site, none of which are SCC. Terrestrial faunal species adapted to the foredune environment do not utilise the thicket zone. Birds will fly away during construction works while reptiles and mammals will take refuge in the surrounding area during the short Construction Phase and may return thereafter.

The impact is assessed to be of ***low*** significance and with the implementation of mitigation is reduced to ***insignificant*** (Table 6-7).

Table 6-7: Displacement and / or loss of terrestrial fauna

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Medium-term	Low	Definite	**VERY LOW**	Negative	High
	1	1	2	4				
Essential Mitigation Measures: • Restrict the width of the development footprint to 12 m within the launch way corridor. • Clear vegetation by hand rather than with heavy machinery, as far as practically possible. • Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas. • Demarcate all areas outside of the development footprint as no-go areas.								
With mitigation	Local	Low	Short-term	Very Low	Possible	**INSIGNIFICANT**	Negative	High
	1	2	1	4				

6.3.2.3 Potential Impact T3: Spread of Alien and Invasive Terrestrial Plant Species

The launch way corridor is invaded by *Acacia cyclops*, a Category 1b invasive species originally introduced as a dune stabiliser. All vegetation, including alien invasive vegetation will be removed from the development footprint during the Construction Phase of the project and indigenous plant species will be planted after the Construction Phase to maintain dune stability.

The disturbance of vegetation and soils and the movement of construction staff and vehicles onto and across the site increase the potential for alien and invasive vegetation to establish. This can exacerbate the degradation and loss of habitats and ecosystems on the site. The Mossel Bay Municipality is responsible for monitoring and management of alien vegetation on the dune since they are the property owners. PetroSA will however rehabilitate the disturbed area with indigenous vegetation to prevent alien invasion.

The impact is assessed to be of ***very low*** significance and with the implementation of mitigation is reduced to ***insignificant*** (Table 6-8).

Table 6-8: Spread of alien and invasive terrestrial plant species

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Short-term	Very Low	Definite	**VERY LOW**	Negative	High
	1	1	1	3				
Essential Mitigation Measures: • Remove alien invasive species cleared from the development footprint from the site. • Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction, which may require seed propagation from surrounding areas.								
With mitigation	Local	Medium	Medium-term	Very Low	Possible	**INSIGNIFICANT**	Negative	High
	1	1	1	3				

6.3.3 The No-Go Alternative

The No-Go alterative implies that the project is not implemented, and the assessed impacts on terrestrial ecology will not be incurred.

6.3.4 Mitigation Measures: Terrestrial Ecology Impacts

Essential terrestrial ecology mitigation measures during **construction** are as follows:

- Obtain a permit from DFFE prior to the removal of the Milkwood trees (*sideroxylon inerme*).

- Restrict the width of the launch way development footprint to 12 m within the launch way corridor.
- Clear vegetation by hand rather than with heavy machinery, as far as practically possible.
- Demarcate with fencing all areas outside of the development footprint as no-go areas.
- Erect the site camp and material lay down area within PetroSA's Tank Farm.
- Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas.
- Chip cleared indigenous vegetation for use as mulch to stabilise the disturbed surfaces after construction.
- Install temporary windbreaks (shade netting) to stabilise the dune during construction, if necessary.
- Provide environmental awareness training (by ECO) to all construction staff prior to construction.
- Implement best practice measures to manage dust.
- Strip topsoil and stockpile separately for use during rehabilitation, only in areas where the ground cover will be disturbed by vehicles during dune profiling. Do not strip topsoil if dune profiling is not required (i.e if the rollers are placed directly on the surface).
- Store all vehicles, machinery and equipment within the PetroSA Tank Farm.
- Prohibit damage to adjacent vegetation outside the demarcated development footprint.
- Appoint and ECO to undertake regular site inspections during the Construction Phase.
- Remove all materials, temporary structures, temporary fences, plant, equipment and waste upon completion of construction.
- Rip compacted areas on the beach compacted by heavy machinery and profile the sand to mimic the surrounding beach profile.
- Remove alien invasive species cleared from the development footprint from the site.

Best practice terrestrial ecology mitigation measures during **construction** are as follows:

- Implement good housekeeping practices.

6.4 Potential Marine Ecology Impact

6.4.1 Introduction, Terms of Reference and Methodology

The assessment is based on the Marine Ecology Specialist Study undertaken by Pisces Environmental Services (see Appendix D3). The ToR for the study were to:

- Provide a general description of the marine biodiversity and ecosystem goods and services in the project area;
- Describe the marine habitats that are likely to be affected by project;
- Identify sensitive marine species (receptors);
- Confirm the presence and / or status of priority biodiversity features, marine habitats and species in the impact area, and contextualise the assessment within local, regional and national conservation priorities;

- Highlight the implications of gaps in information, uncertainty and / or risks in terms of irreversibility of impacts, irreplaceable loss of resource, etc.;
- Assess whether there are any secondary, indirect, induced and / or cumulative impacts;
- Identify, describe and assess the significance of potential impacts of the proposed installation of the pipeline and associated infrastructure on the marine environment;
- Systematically apply the mitigation hierarchy for avoidance and reduction of any negative impacts across all phases of the project; and
- Specify and identify all mitigation with reference to the options in the mitigation hierarchy when making recommendations.

6.4.2 Assessment of Impacts: Construction Phase

The following potential direct Construction Phase marine ecology impact was identified:

- M1: Displacement and / or loss of marine fauna.

6.4.2.1 Potential Impact M1: Displacement and / or Loss of Marine Fauna

Displacement or loss of marine fauna could take place as a result of the following indirect impacts / activities (described further below) associated with the installation of the sub-sea pipeline and associated infrastructure:

- Loss or disturbance of intertidal and subtidal sediment (and associated faunal communities);
- Faunal strikes by vessels;
- Increased turbidity due to displaced sediment;
- Noise and lighting from construction activities; and
- Marine water quality impacts from effluent discharges to sea from pipeline deployment vessels, unplanned hydrocarbon spills, litter or waste entering the marine environment.

The installation of subsea pipelines and associated infrastructure will result in the physical disturbance of subtidal soft-sediment habitats. Trenching of the seabed by jetting to install the new pipelines will result in the removal and redistribution of at least ~2 000 m^3 of sand. Benthic macrofauna typically inhabit only the top 20 – 30 cm of sediment, and redistribution of the sediment by jetting will thus displace the benthic infaunal and epifaunal biota in the pipeline corridor footprint.

Noise generated by large vessels and increased ambient lighting could disturb the natural breeding and/or feeding behaviours in fish, seabirds, seals, turtles and cetaceans. The ambient (existing) marine noise in the area is however expected to be significant since the project is located in close proximity to Mossel Bay Harbour.

The presence of surface and sub-surface plumes has the potential to reduce the ability of certain marine mammals (e.g. seals and dolphins) and diving seabirds (e.g. Damara terns, Cape Cormorants, African Penguins) to locate their prey, thereby diminishing their feeding success and potentially negatively affecting reproductive success. Turbidity around the pipeline corridor is unlikely to exceed background levels from wave action or seasonal inputs from river discharges.

Tug and diver support vessels undertake routine discharges to sea which could result in a reduction in water quality, affecting marine fauna. Water quality impacts could also occur due to litter or hydrocarbon spills from land-based construction activities entering the marine environment.

The sensitivity of the marine fauna in the area is considered low since the fauna have a fast recolonisation rate, are mobile and no endangered species are expected to be affected.

The impact is assessed to be ***very low*** with and without mitigation (Table 6-9).

Table 6-9: Significance of displacement and / or loss of marine fauna

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Short-term	Very Low	Definite	**VERY LOW**	Negative	High
	1	1	1	3				
Essential Mitigation Measures: • Undertake activities in accordance with the requirements of the EMPr. • Provide environmental awareness training to construction personnel and vessel operators. • Restrict vehicles to clearly demarcated areas on the beach. • Maintain all generators, vehicles, and other equipment in good working order. • Reduce lighting in non-essential areas. • Prohibit direct light in water, except during safety inspections. • Ensure vessel operators have a lighting plan or procedure in place to minimise or avoid impacts associated with operational night-time lighting on avian species, fish species and marine mammals. • Ensure vessel operators have a waste management procedure in place to avoid waste discharges to sea. • Implement the waste management measures provided in the EMPr. • Ensure availability of a spill kit at the site camp in the event of a hydrocarbon spill during land-based activities. • Ensure the appointed vessel operators have the requisite Safety Certificate and Emergency Contingency Plan to cover potential risks associated with oil discharge incidents.								
With mitigation	Local	Low	Short-term	Very Low	Probable	**VERY LOW**	Negative	Medium
	1	1	1	3				

6.4.3 Assessment of Impacts: Operational Phase

The following potential direct Operational Phase marine ecology impact was identified:

- M2: Displacement and / or loss of marine fauna due to release of hydrocarbons into the marine environment from pipeline leaks.

6.4.3.1 Potential Impact M2: Displacement and / or Loss of Marine Fauna from Leaks

Leaks may develop in the pipeline and associated infrastructure which could result in the release of hydrocarbons (diesel or condensate) to the marine environment. Hydrocarbons spilled in the marine environment will have an immediate detrimental effect on water quality, with the toxic effects potentially resulting in mortality (e.g. suffocation and poisoning) of marine fauna or affecting faunal health (e.g. respiratory damage).

The probability of a leak is highly unlikely. The duration of the impact would be limited to the short-term and likely remain localised.

The impact is assessed to be ***insignificant*** with and without mitigation (Table 6-10).

Table 6-10: Significance of displacement or loss of marine fauna from leaks

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Medium	Short-term	Very Low	Possible	**INSIGNIFICANT**	Negative	Medium
	1	2	1	4				
Essential Mitigation Measures: • Compile an Emergency Contingency Plan (or implement the existing one) to manage potential risks associated with oil discharge incidents during the Operational Phase. • Undertake regular infrastructure maintenance inspections.								
With mitigation	Local	Low	Short-term	Very Low	Improbable	**INSIGNIFICANT**	Negative	Medium
	1	1	1	3				

6.4.4 The No-Go Alternative

The No-Go alterative implies that the project is not implemented, and the assessed impacts on marine ecology will not be incurred.

6.4.5 Mitigation Measures: Marine Ecology Impact

Essential marine ecology mitigation measures during **construction** are as follows:

- Undertake activities in accordance with the requirements of the EMPr.
- Provide environmental awareness training to construction personnel and vessel operators.
- Restrict vehicles to clearly demarcated areas on the beach.
- Maintain all generators, vehicles, and other equipment in good working order.
- Reduce lighting in non-essential areas.
- Prohibit direct light in water, except during safety inspections.
- Ensure vessel operators have a lighting plan or procedure in place to minimise or avoid impacts associated with operational night-time lighting on avian species, fish species and marine mammals.
- Ensure vessel operators have a waste management procedure in place to avoid waste discharges to sea.
- Implement the waste management measures provided in the EMPr.
- Ensure availability of a spill kit at the site camp in the event of a hydrocarbon spill during land-based activities.
- Ensure the appointed vessel operators have the requisite Safety Certificate and Emergency Contingency Plan to cover potential risks associated with oil discharge incidents.

Essential marine ecology mitigation measures during **operation** are as follows:

- Compile an Emergency Contingency Plan (or implement the existing one) to manage potential risks associated with oil discharge incidents during the Operational Phase.
- Undertake regular infrastructure maintenance inspections.

Best practice marine ecology mitigation measures during **operation** are as follows:

- Report any collisions with whales to the International Whaling Commission (IWC) database.

6.5 Potential Socio-Economic Impacts

6.5.1 Introduction, Terms of Reference and Methodology

Potential socio-economic impacts were assessed by the EAP based on information provided by PetroSA.

6.5.2 Assessment of Impacts: Construction Phase

One direct construction phase socio-economic benefit was identified:

- SE1: Increased employment, income and skills development.

6.5.2.1 Potential Impact SE1: Increased Employment, Income and Skills Development

Approximately 80 temporary employment opportunities will be created over the eight month Construction Phase. These temporary employment opportunities would support the local construction industry to a limited extent in the short term if local contractors and sub-contractors were employed.

The capital investment (CapEX) of R260 million will also lead to indirect economic benefits through the multiplier effect. Although a limited number of new employment opportunities will be created, the use of local contractors and sub-contractors will support the regional construction industry during the short term and will contribute to skills development and income generation. The proposed project will to a limited extent indirectly contribute to job creation and poverty alleviation in the MBLM.

The *benefit* is assessed to be ***low*** (positive) with and without the implementation of mitigation (Table 6-11).

Table 6-11: Significance of increased employment and income

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Regional 1	Medium 2	Medium -term 2	**Low** **5**	Probable	**LOW**	+ve	Medium
Essential Optimisation Measures: • Employ local contractors and sub-contractors, if possible.								
With mitigation	Regional 1	Medium 2	Medium -term 2	**Low** **5**	Probable	**LOW**	+ve	Medium

6.5.3 Assessment of Impacts: Operational Phase

One potential direct operational phase impact was identified:

- SE2: Economic growth from increased fuel supply.

6.5.3.1 Potential Impact E2: Economic Growth from Increased Fuel Supply

The project will help to secure fuel supply to Eskom's OCGT peaking power plant, reducing the intensity of loadshedding in the country.

As secured fuel supply support direct, indirect and induced economic activity and growth in the region, and may in turn increase employment and income, and maintain the community's standard of living.

The *benefit* of economic growth facilitated by the project is assessed to be of ***medium*** significance and no optimisation is necessary or possible (Table 6-12).

Table 6-12: Significance of economic growth from increased fuel supply

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without optimisation	Regional	Low	Long-term	Medium	Probable	**MEDIUM**	Positive	Medium
	3	1	3	6				
Essential Optimisation Measures: • None.								
With optimisation	Regional	Low	Long-term	Medium	Probable	**MEDIUM**	Positive	Medium
	3	1	3	6				

6.5.4 The No-Go Alternative

The No-Go alternative would put PetroSA in a vulnerable situation as only a single pipeline would continue to be used for product import and export. If this (corroded) pipeline fails it will jeopardise the import and export of hydrocarbons, with detrimental socio-economic impacts such as job losses and to the local, regional and national economy.

The No-Go alternative will bring none of the socio-economic benefits of the project such as employment and economic growth.

6.5.5 Optimisation Measures: Socio-Economic Impact

Essential socio-economic optimisation measures during **construction** are as follows:

- Employ local contractors and sub-contractors, if possible.

6.6 Potential Heritage Impacts

6.6.1 Introduction, Terms of Reference and Methodology

The assessment of potential heritage impacts associated with earthworks on land and on the seabed is based on the desktop based HIA undertaken by Vanessa Maitland (Contract Maritime archaeologist) (see Appendix D2). The ToR for the study were to:

- Compile the Notice of Intent to Develop for submission to Heritage Western Cape;
- Identify and describe any underwater heritage resources in the area by identifying (mapping) maritime heritage sensitivities (known and/or suspected wrecks in the area);
- Identify and describe terrestrial maritime heritage sensitivities, through study of available written and oral resources;
- Identify potential impacts of the proposed project on heritage resources;
- Assess the impacts of the proposed project on heritage resources in the area using the prescribed impact assessment methodology; and
- Recommend practicable mitigation measures to avoid and/or minimise/reduce impacts and enhance benefits. Assess the effectiveness of proposed mitigation measures using the prescribed impact assessment methodology.

6.6.2 Assessment of Impacts: Construction Phase

The following potential direct Construction Phase impacts were identified:

- H1: Loss or damage to land-based heritage resources; and
- H2: Loss or damage to marine-based heritage resources.

6.6.2.1 Potential Impact H1: Loss or Damage to Land-Based Heritage Resources

As wrecks are usually found close to the shore and several wrecks are reported in the Shipwreck Database as “being on the beach”, MUCH resources could be found on the beach / buried. Since the onshore component of the project within the launch way corridor (see Section 3.1.2) has been disturbed before to some extent to install an underground stormwater drain and associated infrastructure) and no excavation will take place it is unlikely that material of heritage value will be found during the construction of the land-based activities. However, since the surrounding marine environment comprises several shipwrecks, it is possible that material has been washed to shore / buried and could be uncovered during dune reprofiling / vegetation removal.

With mitigation there is the possibility of a benefit to heritage through the discovery and recording of previously unknown heritage resources (Maitland, 2022).

The impact is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***insignificant*** (Table 6-13).

Table 6-13: Significance of loss or damage to land-based heritage resources

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	High	Long-term	High	Possible	**MEDIUM**	Negative	High
	1	3	3	7				
Essential Mitigation Measures: • Provide Environmental Awareness training to contractors that includes awareness on artefact identification and management. • Cease work and consult a suitably qualified heritage professional if potential shipwreck artefacts are encountered. • Do not remove or destruct cultural, historical or archaeological artefacts from the beach without the necessary permit in terms of Section 35 of NHRA.								
With mitigation	Local	Medium	Short-term	Very Low	Possible	**INSIGNIFICANT**	Negative	High
	1	2	1	4				

6.6.2.2 Potential Impact H2: Loss or Damage to Marine-Based Heritage Resources

The original SPM pipeline was installed in the early 1990s, prior to promulgation of the NHRA: it is therefore assumed that an HIA was neither required nor undertaken at the time. The project, although a modification / upgrade of existing infrastructure, therefore, has the potential to destroy or damage MUCH sites (Maitland, 2022).

Wrecks are usually found close to the shore and therefore could be present next to or under the existing pipeline. Wrecks, or remains thereof, are likely to be identified during pre-construction hydrographic surveys (Maitland, 2022) and therefore can be removed before construction activities take place on the seabed.

With mitigation there is the possibility of a benefit to heritage through the discovery and recording of previously unknown heritage resources (Maitland, 2022).

The impact is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***insignificant*** (Table 6-14).

Table 6-14: Significance of loss or damage to marine-based heritage resources

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	High	Long-term	High	Possible	**MEDIUM**	Negative	High
	1	3	3	7				
Essential Mitigation Measures: • Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the proposed bypass pipeline route prior to commencement of construction. • Appoint a maritime archaeologist to assess the find, if potential MUCH resources are identified during the Hydrographic Surveys, prior to commencement of construction. • Do not remove or destruct cultural, historical or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • Provide Environmental Awareness training to contractors to include awareness on heritage sensitivity of the area.								
With mitigation	Local	Medium	Short-term	Very Low	Possible	**INSIGNIFICANT**	Negative	High
	1	2	1	4				

6.6.3 The No-Go Alternative

The No-Go alterative implies that the project is not implemented, and the assessed impacts on heritage resources will not be incurred. There potential benefit to heritage through the discovery and recording of previously unknown heritage resources will also not be realized.

6.6.4 Mitigation Measures: Heritage Impacts

Essential heritage mitigation measures during **construction** are as follows:

- Provide Environmental Awareness training to contractors that includes awareness on artefact identification and heritage sensitivity of the area.
- Cease work and consult a suitably qualified heritage professional if potential shipwreck artefacts are encountered.
- Do not remove or destruct cultural, historical or archaeological artefacts from the beach without the necessary permit in terms of Section 35 of NHRA.
- Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the proposed bypass pipeline route prior to commencement of construction.
- Appoint a maritime archaeologist to assess the find, if potential MUCH resources are identified during the Hydrographic Surveys, prior to commencement of construction.
- Do not remove or destruct cultural, historical or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA.

6.7 Cumulative Impacts

Anthropogenic activities can result in numerous and complex effects on the natural and social environment. While many of these are direct and immediate, the environmental effects of individual activities (or projects) can combine and interact with other activities in time and space to cause incremental or aggregate effects. Effects from disparate activities may accumulate or interact to cause additional effects that may not be apparent when assessing the individual activities one at a time (Canadian Environmental Protection Agency, date unknown). Cumulative impacts can also be defined as the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time (DEAT IEM Guideline 7, Cumulative effects assessment, 2004).

For the most part, cumulative impacts or aspects thereof are too uncertain to be quantifiable, due mainly to a lack of data availability and accuracy. This is particularly true of cumulative impacts arising from potential or future projects, the design or details of which may not be envisaged, finalised or available and the direct and indirect impacts of which have not yet been assessed. Given the limited detail available regarding such future developments, the analysis will be of a more generic nature and focus on key issues and sensitivities for the project and how these might be influenced by cumulative impacts with other activities.

Cumulative impacts associated with the construction phase of this project are limited.

Table 6-15: Cumulative impacts during the Construction Phase

Aspect	Cumulative Impact	Significance
Air Quality (windblown sand)	Windblown sand occurs in the area during windy periods since the site is partly on the beach. Therefore, earthmoving land-based activities will add to the cumulative windblown sand levels in the area.	Low (-ve)
Noise	Existing noise levels in the area are typical of an industrial area with noise mostly generated by the movement of trucks and vehicles. The noise generated by construction activities will add to the cumulative noise level. Given the distance to the nearest residents they are unlikely to be affected.	Insignificant
Terrestrial Ecology	Loss / degradation of vegetation will result from clearing of vegetation for the launch way and vehicle access adjacent to the launch way. Although the footprint area associated with the construction of the launch way is not deemed significant (~720m^2) in extent it may add to the cumulative effect of loss / degradation of vegetation and loss of endangered and protected species (Milkwood trees) that has taken place on the dune system seawards of PetroSA (i.e for the installation of stormwater infrastructure and for launching of other subsea pipelines in the past).	Low (-ve)
Socio-economic	The project will contribute to job creation in the area in the short term (i.e. during the construction phase).	Very Low (+ve)
Socio-economic	The project will contribute to economic growth due to the continued (and increase in) export and import of hydrocarbons and reduce the possibility of existing load-shedding. The significant CapEX (~R260 million) contribution to the economy will contribute to economic growth through the multiplier effect.	Medium (+ve)
Heritage	Loss or damage to shipwreck artefacts may have already occurred in the area as PetroSA have installed other infrastructure on the seabed. Therefore, the project may add to the cumulative heritage impact if heritage resources are damaged.	Low (-ve)

6.8 Climate Change Impacts

6.8.1 Introduction, Terms of Reference and Methodology

Potential climate change impacts were qualitatively assessed by the EAP based on information provided by PetroSA.

Climate change is widely recognised as a serious potential threat to the world's environment. Climate change differs fundamentally from other potential environmental considerations in that it has global impacts that cannot be directly linked to one specific source. The majority of projects subject to EIA are likely to either contribute to or be affected by climate change, or both. Two aspects of climate change thus need to be addressed when considering project impacts: firstly, the contribution of a specific project toward global climate change, and secondly the vulnerability or resilience of the project to the effects of projected climate change in the region.

Assessment of climate change impacts is thus likely to comprise:

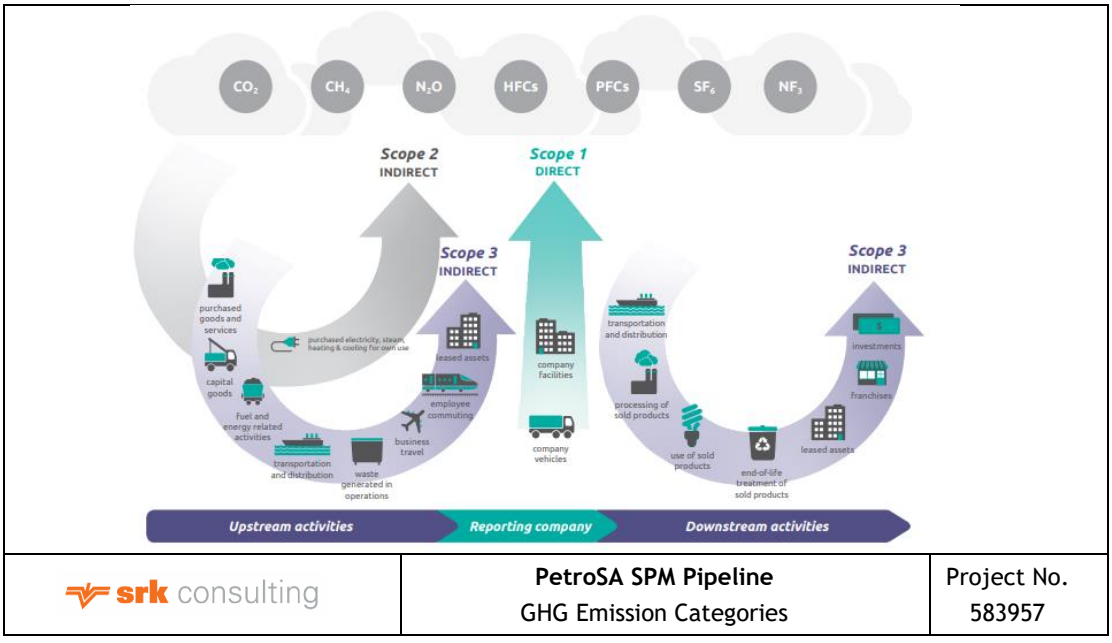
- *Climate change impacts **of** the project*: an assessment of the project's prospective contribution to climate change through the emission of greenhouse gases (GHGs), including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O);
- *Climate change risks **to** the project*: an assessment of the impact of climate change on the project's life and operations in terms of its vulnerability/resilience to climate change; and
- An indication of the possible mitigation or adaptation measures that can be adopted to ensure minimised impact on/by climate change.

SRK's impact rating methodology is not suited to evaluating climate change impacts or evaluating resilience and vulnerability risks; therefore a qualitative description of the risks is apposite.

6.8.2 Contribution to Climate Change

As indicated above, the contribution of any project or activity to climate change is a function of the GHG emissions associated with the project. GHG emissions can be grouped into three categories or scopes, as defined by the GHG Protocol (2019) (see Figure 6-1):

- **Scope 1** emissions are direct GHG emissions from sources owned or controlled by the owner of the project. They can include emissions from combustion in owned or controlled boilers, furnaces, vehicles and emissions from chemical production in owned or controlled process equipment;
- **Scope 2** emissions are indirect emissions from the generation of purchased energy consumed by a company / project. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated; and
- **Scope 3** emissions are all indirect emissions (not included in Scope 2) in the value chain of the reporting company, including upstream and downstream emissions. Scope 3 emissions are a consequence of the activities of the company but emanate from sources not owned or controlled by the company. Examples of Scope 3 activities are extraction and production of procured materials, transportation of procured fuels and use of products and services.



srk consulting	PetroSA SPM Pipeline GHG Emission Categories	Project No. 583957

Figure 6-1: GHG emission categories

Source: Greenhouse Gas Protocol (2019a)

In addition to emitting GHGs, projects may lead to an increase or (more often) loss of **carbon sequestration capacity**. Vegetation removes carbon (in the form of CO_2) from the atmosphere during photosynthesis. Until the carbon is cycled back into the atmosphere, it resides in one of a number of "carbon pools" or "carbon sinks" including: above ground biomass (e.g. vegetation), below ground biomass (e.g. roots) and biomass products (e.g. wood products). Carbon can remain in some of these pools for long periods of time.

An increase in the stock of sequestered carbon stored in these pools represents a net removal of carbon from the atmosphere; a decrease in the stock represents a net addition of carbon to the atmosphere (Greenhouse Gas Protocol, 2019b).

6.8.3 Bypass Pipelines and Associated Infrastructure Climate Change Impact Assessment Boundary

Synthetic fuels from offshore gas are currently produced at PetroSA's existing GTL refinery at Mossel Bay, with associated GHG emissions. Insofar as they may be considered Scope 3 emissions, they are not considered in this BAR. In other words, GHGs from the combustion of diesel and LPG for electricity generation from end users of the hydrocarbons being imported and exported by the project's infrastructure (Eskom's OSGT's and businesses and residents in the Southern Cape Region and beyond) are not included in this climate change impact assessment

The consideration of climate change impacts for this project are limited to the GHG emissions (Scope 1 emissions) from vehicles, equipment and vessels (tugboats, diver support vessel, remote survey vessel), associated with the Construction Phase of the project (i.e the launch way and the subsea infrastructure modifications), since the offshore bypass pipelines and associated infrastructure in themselves do not emit GHGs.

Reduced carbon sequestration capacity from removal of vegetation is a potential impact, but the removal of ~ 0.8 ha of vegetation is expected to have a negligible reduction in carbon sequestration capacity and is not assessed further.

6.8.4 Assessment of Impacts: Construction Phase

The following potential direct Construction Phase impact was identified:

- CC1: Contribution to global warming from emission of GHGs.

6.8.4.1 Potential Impact CC1: Global Warming from Emission of GHGs

The effects of climate change are global, and GHGs are emitted worldwide from a vast number of sources. Seldom is any one source a significant emitter, but combined they emit enormous quantities of GHGs. GHG emissions from vehicles, equipment and vessels associated with the project, will contribute only marginally to South Africa's total GHG emissions per year.

The impact is assessed to be ***insignificant*** with and without the implementation of mitigation.

Best practice climate change mitigation measures to reduce GHG emissions during **construction** are as follows:

- Implement measures to increase energy efficiency / reduce energy wastage; and
- Maintain vehicles, equipment and vessels to reduce emissions.

6.8.5 Climate Change Vulnerability and Resilience

Understanding the vulnerability of a project to climate change requires an understanding of the observed and predicted climate change trends in the area.

6.8.5.1 Climate Change Trends in the Western Cape

The Western Cape has a very diverse climate, with vast variations in annual rainfall. Temperatures also range widely from cool coastal mountains where summer temperatures rarely exceed 25 °C, through to semi-arid Karoo valleys where summer temperatures can average 35 °C (Department of Environmental Affairs, 2017).

Some locations in the Western Cape have experienced temperature increases of more than 2 °C between 1931-2015, with an increased incidence of very hot days over the same period. Annual rainfall has increased significantly over the eastern interior of the province over the last few decades, with the rate of increase as high as 10 mm/decade. Associated with this, the number of days with extreme rainfall (daily rainfall above the 90th percentile threshold) has increased at a rate of about 2 days per decade. The measured rate of sea-level rise along the Western Cape coast over the last five decades is in the order of 20 cm/century, and 15 cm/century along the south coast (Department of Environmental Affairs, 2019).

Given the uncertainties in future climate change trends, *South Africa's Third National Communication under the United Nations Framework Convention on Climate Change* (DEA, 2017) presents two climate change scenarios for the Western Cape: *a drier, hotter, windier future*; and a *warmer, wetter future*.

Predicted future climate change trends in the Western Cape under a ***drier, hotter, windier future*** scenario include:

- Cycles of drier years and wetter years for the next 20 to 30 years;
- Increases in average temperatures of around 0.5 °C per decade, with the average temperatures reaching 1.5 °C higher than recent historical averages somewhere between 2040 and 2060;
- Increases in frequency and duration of hot spells in summer, and a decrease in the frequency and duration of cold spells in winter;
- Stronger summer south-easterly winds, which together with higher temperatures will strongly influence (increase) evaporation and evapotranspiration; and
- Higher evaporation from dams, combined with competing demands from agriculture and rapidly growing urban populations placing significant strain on urban water supply systems.

Toward the middle of the 21st century, more frequent and consecutive dry years are predicted, which, with continued increases in temperature and high summer wind speeds and reduced rainfall, will exacerbate the challenge of increased evaporation. Competition for water between agriculture, industry and urban water supply could become critical with water cuts becoming the only viable solution during extreme dry years.

With average temperatures now reaching 2 °C higher than the recent past, agricultural activities will become unviable. Added to these summer stresses, winter storm intensity begins to increase resulting in more frequent heavy rainfall events in winter which produce flooding and related damage.

Predicted future climate change trends in the Western Cape under a ***warmer, wetter future*** scenario are aligned with those predicted under ***drier, hotter, windier future*** scenario, with key changes in average rainfall emerging towards the middle of the 21st century.

During this period, rainfall in the mountains increases due to more moist and energetic winter storms, as well as increased moist warm southerly flow off the ocean in the summer months. While coastal and inland plains do not experience these changes directly, they have important impacts on water supply and irrigation as river flows and runoff into dams increase.

Increased rainfall is however offset by increased evaporation due to higher temperatures (reaching 2 °C higher than current) and stronger winds. While the relatively small increases in rainfall may partly delay the need for adaptation measures, adaption to reduce water demands is still required. Inland plains are not predicted to receive increased rainfall, and will experience similar conditions to the drier scenario above.

For the City of Cape Town, the GreenBook tool[9] (which indicates the projected impact that climate change will have on various regions of South Africa by 2050[10]) predicts that average temperature will increase by around 1.2 -1.9 ℃ under the Representative Concentration Pathway (RCP) 4.5 scenario[11] and around 1.5 - 2.2 ℃ under an RCP 8.5, and average rainfall will decrease by between ~ 90 to 120 mm under the same scenarios. Negligible changes to extreme rainfall events [12]are expected with an increase in the number of very hot days[13] by 20 per year.

6.8.5.2 Vulnerability to Climate Change

The IPCC Fifth Assessment Report (2014) defines vulnerability as: "the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including *sensitivity* or susceptibility to harm and lack of *capacity* to cope and *adapt*."

Sustained warming and increased rainfall vulnerability over the short term (i.e. the next decade) will have increasingly adverse effects on key sectors of South Africa's economy in the absence of effective adaptation responses.

Impacts of climate change will initially largely be experienced by poor and vulnerable groups in society, who are both more exposed and more sensitive to fluctuations in weather patterns and climatic events such as droughts and floods (Promethium, 2018). Water, health and human settlements are key sectors negatively affected by climate change, with increases in droughts, high temperatures and rainfall variability posing a significant risk to the agricultural sector and food security in the country (Department of Environmental Affairs, 2019).

Highly populated regions are most vulnerable to climate change effects. In areas with high population growth, such as the Western Cape, climate change is expected to exacerbate high unemployment and rising urban poverty rates and further intensify the competition for basic resources such as water, healthcare, sanitation and electricity (Department of Environmental Affairs, 2019).

6.8.5.3 Bypass Pipelines and Associated Infrastructure Vulnerability to Climate Change

The launch way will be temporarily erected from PetroSA's Tank Farm over an existing dune to the beach, and will be removed after a few months. The pipelines will be pulled (launched) to sea by a tugboat across the launch way roller line on the beach. The launch way infrastructure and pipelines may therefore be vulnerable to extreme / stormy weather compounded by climate change.

The vulnerability of the project to climate change is low i.e. the potential effects of climate change on and/or risks to the project are expected to be minimal. A summary of the potential effects of climate change related events on the project with recommended mitigation and adaptation strategies is presented in Table 6-16 below. The majority of adaptation strategies identified have already been accommodated in project design.

[9] CSIR, 2019, [Website] GreenBook, Available at: https://riskprofiles.greenbook.co.za/
[10] Considering risks associated with climate change impacts on temperature, water, biodiversity, transitional risks and the social context
[11] The RCP 4.5 (as adopted by the IPCC Fifth Assessment Report) assumes a high mitigation scenario with emissions peaking around the middle of the 21st century and RCP 8.5 assumes business as usual/ worst-case scenario.
[12] i.e. 20 mm of rain occurring within 24 hours over the 8 x 8 km grid point.
[13] Temperature exceeding 35 ℃

Table 6-16: Potential climate change project impacts and adaptation measures

Event	Vulnerability	Adaptation Strategies and Recommendations
Extreme weather / wind	Extreme weather / wind may cause damage to project infrastructure, affecting the construction and operation of the subsea infrastructure.	• Jet the pipeline between end structures down to a depth just below the seabed to protect the sub sea pipelines from the effects of extreme weather / stormy seas; and • Monitor the weather forecast and install the launch way and tow the pipelines during a suitable weather window to avoid damage to project infrastructure.

7 Conclusions and Recommendations

This chapter evaluates the impact of the proposed offshore bypass pipelines and associated onshore and offshore infrastructure. The principal findings are presented in this chapter, followed by an analysis of the need and desirability of the project and a discussion of the key factors DFFE will consider in order to take a decision which is aligned with the principles of sustainable development. Key recommendations are also presented.

The project has potential to cause impacts, both negative and positive. The BA has examined the available project information and drawn on both available (secondary) and specifically collected (primary) baseline data to identify and evaluate environmental (biophysical and socio-economic) impacts of the proposed project. The BAR aims to inform stakeholders and decision-makers of the key considerations by providing an objective and comprehensive analysis of the potential impacts and benefits of the project, and has created a platform for the formulation of mitigation measures to manage these impacts, presented in the EMPr (see Appendix E).

This chapter presents the general conclusions drawn from the BA process, which should be considered in evaluating the project. It should be viewed as a supplement to the detailed assessment of individual impacts presented in Chapter 6.

7.1 Environmental Impact Statement

The EIA Regulations, 2014 prescribe the required content of a BAR, including, *inter alia*, an EIS, which is presented in the section below.

7.1.1 Evaluation and Summary of Positive and Negative Impacts

The evaluation is undertaken in the context of:

- The project information provided by the proponent;
- The assumptions made for this BAR;
- The assumption that the recommended (essential) mitigation measures will be effectively implemented; and
- The assessments provided by specialists.

This evaluation aims to provide answers to a series of key questions posed as objectives at the outset of this report, which are repeated here:

- Assess in detail the environmental and socio-economic impacts that may result from the project;
- Identify environmental and social mitigation measures to address the impacts assessed; and

- Produce BAR that will assist DFFE to decide whether (and under what conditions) to authorise the proposed development.

The evaluation and the basis for the subsequent discussion are represented concisely in Table 7-1, which summarises the potentially significant impacts and their significance ratings before and after application of mitigation and/or optimisation measures.

Table 7-1: Summary of potential impacts of the offshore bypass pipelines and associated infrastructure

Potential negative impacts are shaded in reds, benefits are shaded in greens. Insignificant impacts have not been shaded. Only ***key (non-standard essential)*** *mitigation/optimisation measures are presented.*

ID #	Impact	Significance rating		Key mitigation/optimisation measures
		Before mitigation/ optimisation	After mitigation/ optimisation	
CONSTRUCTION PHASE IMPACTS				
A	**Air Quality Impacts**			
A1	Impaired air quality due to dust fallout	Very Low	Insignificant	• Erect the launch way as soon as practically possible after vegetation clearing. • Avoid excavation and handling and transport of materials which may generate dust during windy conditions or when a visible dust plume is present. • Reduce airborne dust by covering stockpiles of loose material with plastic sheeting or netting, especially during windy conditions. • Restrict vegetation clearance to the launch way corridor. • Clear vegetation by hand rather than with heavy machinery, as far as practically possible. • Stabilise exposed surfaces following construction as soon as is practically possible. • Rehabilitate areas with indigenous vegetation as soon as practically possible. • Investigate and respond to complaints about excessive dust and take appropriate corrective action.
N	**Noise Impacts**			
N1	Increased noise levels due to project activities	Insignificant	Insignificant	• Limit construction activities to Mondays to Saturdays, 07h00 - 18h00, or in compliance with relevant municipal bylaws, if applicable. • Maintain construction equipment and vehicles in good working order to prevent unnecessary noise. • Investigate and respond to complaints about excessive noise and take appropriate corrective action.
T	**Terrestrial Ecology Impacts**			
T1	Degradation and / or loss of terrestrial habitat and endangered and protected species	Low	Low	• Obtain a permit from DFFE prior to the removal of the Milkwood trees (*sideroxylon inerme*). • Restrict the width of the launch way development footprint to 12 m within the launch way corridor. • Clear vegetation by hand rather than with heavy machinery, as far as practically possible. • Demarcate with fencing all areas outside of the development footprint as no-go areas. • Erect the site camp and material lay down area within PetroSA's Tank Farm. • Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas. • Chip cleared indigenous vegetation for use as mulch to stabilise the disturbed surfaces after construction. • Install temporary windbreaks (shade netting) to stabilise the dune during construction, if necessary. • Provide environmental awareness training (by ECO) to all construction staff prior to construction. • Implement best practice measures to manage dust.

ID #	Impact	Significance rating		Key mitigation/optimisation measures
		Before mitigation/ optimisation	After mitigation/ optimisation	
				• Strip topsoil and stockpile separately for use during rehabilitation, only in areas where the ground cover will be disturbed by vehicles during dune profiling. Do not strip topsoil if dune profiling is not required (i.e if the rollers are placed directly on the surface). • Store all vehicles, machinery and equipment within the PetroSA Tank Farm. • Prohibit damage to adjacent vegetation outside the demarcated development footprint. • Appoint and ECO to undertake regular site inspections during the Construction Phase. • Remove all materials, temporary structures, temporary fences, plant, equipment and waste upon completion of construction. • Rip compacted areas on the beach compacted by heavy machinery and profile the sand to mimic the surrounding beach profile.
T2	Displacement and / or loss of terrestrial fauna	Low	Insignificant	• Restrict the width of the development footprint to 12 m within the launch way corridor. • Clear vegetation by hand rather than with heavy machinery, as far as practically possible. • Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction which may require seed propagation from surrounding areas. • Demarcate all areas outside of the development footprint as no-go areas.
T3	Spread of terrestrial alien and invasive plant species	Very Low	Insignificant	• Remove alien invasive species cleared from the development footprint from the site. • Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction, which may require seed propagation from surrounding areas.
M	**Marine Ecology Impact**			
M1	Displacement and / or loss of marine fauna	Very Low	Very Low	• Undertake activities in accordance with the requirements of the EMPr. • Provide environmental awareness training to construction personnel and vessel operators. • Restrict vehicles to clearly demarcated areas on the beach. • Maintain all generators, vehicles, and other equipment in good working order. • Reduce lighting in non-essential areas. • Prohibit direct light in water, except during safety inspections. • Ensure vessel operators have a lighting plan or procedure in place to minimise or avoid impacts associated with operational night-time lighting on avian species, fish species and marine mammals. • Ensure vessel operators have a waste management procedure in place to avoid waste discharges to sea. • Implement the waste management measures provided in the EMPr. • Ensure availability of a spill kit at the site camp in the event of a hydrocarbon spill during land-based activities. • Ensure the appointed vessel operators have the requisite Safety Certificate and Emergency Contingency Plan to cover potential risks associated with oil discharge incidents.
H	**Heritage Impacts**			

ID #	Impact	Significance rating		Key mitigation/optimisation measures
		Before mitigation/ optimisation	After mitigation/ optimisation	
H1	Loss or damage to land-based heritage resources	Medium	Insignificant	• Provide Environmental Awareness training to contractors that includes awareness on artefact identification and management. • Cease work and consult a suitably qualified heritage professional if potential shipwreck artefacts are encountered. • Do not remove or destruct cultural, historical or archaeological artefacts from the beach without the necessary permit in terms of Section 35 of NHRA.
H2	Loss or damage to marine-based heritage resources	Medium	Insignificant	• Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the proposed bypass pipeline route prior to commencement of construction. • Appoint a maritime archaeologist to assess the find, if potential MUCH resources are identified during the Hydrographic Surveys, prior to commencement of construction. • Do not remove or destruct cultural, historical or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • Provide Environmental Awareness training to contractors to include awareness on heritage sensitivity of the area.
SE	**Socio-Economic Impact**			
SE1	Increased employment, income and skills development	Low	Low	• Employ local contractors and sub-contractors, if possible.
OPERATIONAL PHASE IMPACTS				
M	**Marine Ecology Impacts**			
M2	Displacement and / or loss of marine fauna due to release of hydrocarbons into the marine environment from pipeline leaks	Insignificant	Insignificant	• Compile an Emergency Contingency Plan (or implement the existing one) to manage potential risks associated with oil discharge incidents during the Operational Phase. • Undertake regular infrastructure maintenance inspections.
SE	**Socio-Economic Impacts**			
SE2	Economic growth from increased fuel supply	Medium	Medium	▪ None.

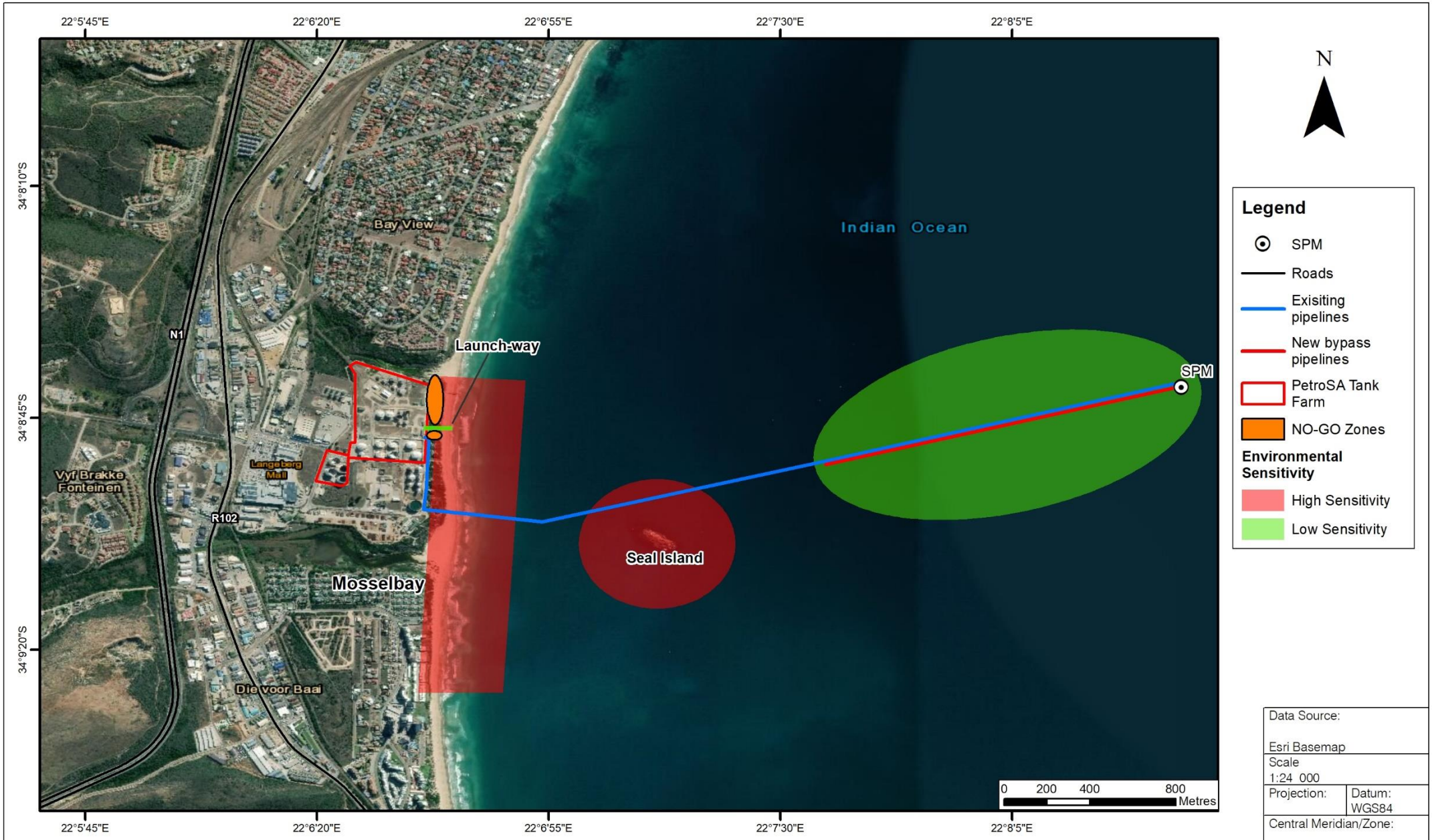
Relevant observations with regard to the overall impact ratings, assuming mitigation measures are effectively implemented, are:

- The predicted *air quality* impacts, associated with entrainment of windblown sand are rated as *insignificant* since the launch way will be erected on the beach, windblown sand is a common occurrence in the area and the nearest receptors are too far away to be affected.
- The predicted *noise* impacts are rated as *insignificant,* due to the absence of sensitive receptors in the area and because industrial activities already occur adjacent to the launch way site, at PetroSA.
- The predicted *terrestrial ecology* impacts are rated as *low*. Impacts are mainly associated with the degradation and / or loss of habitat due to the installation of the launch way and, to a lesser degree, displacement of fauna due to habitat disturbance and the spread of invasive vegetation during the Construction Phase.
- The predicted *marine ecology* impacts are rated as *very low* during construction and *negligible* during operations since the sensitivity of the marine fauna in the area is considered low, fauna have a fast recolonisation rate, are mobile and no endangered species are expected to be affected.
- The predicted *socio-economic benefits* are rated as *low* during construction and *medium* during operations because of the job opportunities, significant capital investment value of the project (~R240 million) and continued (and likely increase in) fuel supply to Eskom's OCGT. No adverse socio-economic impacts were identified.
- The predicted *heritage* impacts are rated as *insignificant* during construction if the essential mitigation measures are implemented. Impacts are mainly associated with the damage to, and loss of artefacts associated with several shipwrecks in the area, while effective documentation and / or recovery of resources would present a benefit.

Cumulative biophysical impacts are of relatively low significance given the very limited scale of the planned development. Cumulative socio-economic benefits are considered more significant. Project CapEx will contribute to economic growth through the multiplier effect.

7.1.2 Integrated Project and Sensitivity Map

The EIA Regulations, 2014 prescribe that an integrated map at an appropriate scale is presented in the EIS. The map should, so far as it is applicable, superimpose the proposed activity and associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers – see Figure 7-1.



Data Source:	Esri Basemap
Scale	1:24 000
Projection:	Datum: WGS84
Central Meridian/Zone:	
Date: 02/02/2023	Compiled by: LEKT
Project No. 583957	Fig No.

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PETRO SA SPM PIPELINE

ENVIRONMENTAL SENSITIVITY MAP

Path: \\Ctn-svr0.ctn.za.srk.ad\vol1\Root\Proj\New Proj\583957_PetroSA SPM Pipeline BA\8GIS\GISPROJ\MXD\583957_PetroSA_SPM_Pipeline_Environmental_Sensitivity_Map_20230202.mxd

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7.1.3 Principal Findings

The project will entail so-called triple bottom line costs and/or benefits. The triple bottom line reflects the three pillars of sustainability and concerns itself with environmental (taken to mean biophysical) sustainability, social equity and economic efficiency and (together with governance) is typically employed by companies seeking to report on their performance. The concept serves as a useful construct to frame the evaluation of the effects of the project.

The challenge for DFFE is to take a decision which is sustainable in the long term and which will probably entail trade-offs between environmental, social and economic costs and benefits. The trade-offs are documented in the report, which assesses environmental impacts and benefits and compares these to the No-Go alternative. SRK believes it will be instructive to reduce the decision factors to the key points which the authorities should consider. These points constitute the principal findings of the BA:

1. PetroSA intends to modify an existing SPM subsea bundle by installing a dual pipeline on the seabed, parallel to the existing pipeline housing structure, to bypass the corroded section of the existing pipelines. The project includes the installation of a new PLEM seabed structure to align with the end of the new dual pipeline, and the repositioning of the existing SPM buoy.
2. The new pipelines will be assembled at PetroSA's Tank Farm and launched to sea, via a temporary launch way, on the dune and beach area in front of PetroSA's Tank Farm.
3. The main purpose of the project is to ensure the structural integrity of existing infrastructure. The project will however also reduce the vulnerability / economic risk to PetroSA should the existing pipeline fail, and improve the reliability and capacity of electricity supply to South Africa (by continuing to provide diesel [to Eskom's s OCGT] and LNG as alternative energy supply options to coal).
4. The project is located offshore, in coastal public property except for the temporary launch way site owned by the Mossel Bay Municipality.
5. Potential environmental aspects considered include air quality, noise, terrestrial and marine ecology, socio-economic, heritage and climate.
6. The No-Go alternative implies that the existing SPM system will not be repaired / modified placing PetroSA in a vulnerable situation with only one operational subsea pipeline. Significant socio-economic benefits will not be realised and increased security of fuel supply to generate power (at the OCGT) will not be secured, while (acceptable) adverse impacts will also not materialise.
7. A number of mitigation and monitoring measures have been identified to avoid, minimise and manage potential environmental impacts associated with the proposed development. These are further laid out in the EMPr.

7.2 Analysis of Need and Desirability of the Project

Best practice as well as the EIA Regulations, 2014 (Appendix 3 Section 3 [f]) requires that the need and desirability of a project (including viable alternatives) are considered and evaluated against the tenets of sustainability. This requires an analysis of the effect of the project on *social, economic and ecological* systems; and places emphasis on consideration of a project's *justification* not only in terms of financial viability (which is often implicit in a [private] proponent's intention to implement the project), but also in terms of the specific needs and interests of the community and the opportunity cost of development (DEA&DP, 2013).

The principles in NEMA (see Section 2.1.1) serve as a guide for the interpretation of the issue of "need", but do not conceive "need" as synonymous with the "general purpose and requirements" of

the project. The latter might relate to the applicant's project motivation, while the "need" relates to the interests and needs of the broader public. In this regard, an important NEMA principle is that environmental management must ensure that the environment is "held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage" (DEA, 2014).

There are various proxies for assessing the need and desirability of a project, notably national and regional planning documents which enunciate the strategic needs and desires of broader society and communities: project alignment with these documents must therefore be considered and reported on in the EIA process. With the use of these documents or - where these planning documents are not available - using best judgment, the EAPs (and specialists) must consider the project's strategic context, or justification, in terms of the needs and interests of the broader community (DEA&DP, 2013).

The consideration of need and desirability in EIA decision-making therefore requires the consideration of the strategic context of the project along with broader societal needs and the public interest (DEA, 2017). However, it is important to note that projects which deviate from strategic plans are not necessarily undesirable. The DEA notes that more important are the social, economic and ecological impacts of the deviation, and "the burden of proof falls on the applicant (and the EAP) to show why the impacts…might be justifiable" (DEA, 2010).

The need of the project in terms of motivation for the project is discussed in Section 3.2. The desirability in terms of the different environmental aspects is discussed below.

7.2.1 Alignment with Policy and Planning Documentation

Section 2.2 implicitly examines the extent to which the proposed project is consistent with relevant planning policy.

The project generally aligns well with key planning documents as it is aligned with and directly responds to Provincial and Municipal strategy as the project will contribute to energy diversification in South Africa, by providing diesel and LNG as alternative energy supply options to coal it will prevent degradation to the environment by replacing the corroded pipeline section. The project is in alignment with the MNLM's IDP as it aligns with the economic growth strategy and KPA by retaining and growing an existing economic driver.

The installation of the launch way will result in the loss of a small amount of vegetation in the coastal environment. In principle, planning policy 'actively discourages' development and impacts in the coastal zone and in ESAs; however, the area of impact is very small and based on a site investigation the ecological specialist has indicated that impacts can be mitigated (by rehabilitating the impacted area including replanting of vegetation) so that the project is acceptable.

7.2.2 Socio-Economic Need and Desirability

At a local level, the economic baseline has identified a significant need for economic growth and employment generation in the project region, arising from a struggling economy in the wake of the COVID-19 pandemic and evidenced in the number of jobs lost since 2020 (see Section 4.2.2).

The project will generate long-term economic investment to businesses selling hydrocarbon fuels in the Southern Cape region and some employment. From this perspective, the project is highly desirable.

The project will reduce PetroSA's economic risk associated with using a single pipeline. If this pipeline fails it will jeopardise import and export of hydrocarbons, with detrimental socio-economic impacts (including job losses).

At a national level, there is a clear need to produce more power (to reduce loadshedding impacts on economic production and quality of life) and cleaner power (to reduce GHG emissions as part of a transition to a low-carbon economy to address climate change). Although the hydrocarbon fuels produced by PetroSA are not regarded as low carbon fuels, the project will contribute to energy diversification in South Africa, by providing diesel and LNG as alternative energy supply options to coal. From this perspective, the project is also highly desirable.

7.2.3 Ecological Need and Desirability

It is essential that the implementation of social and economic policies take cognisance of strategic *ecological* concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of ecosystem services. Sustainable development is the process followed to achieve the goal of sustainability (DEA, 2014).

Sustainable development implies that a project should not compromise natural systems. In this regard, the Best Practicable Environmental Option (BPEO) is that which provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.

NEMA and the EIA Regulations, 2014 call for a hierarchical approach to the selection of development options, as well as impact management, which includes the investigation of alternatives to avoid, reduce (mitigate and manage) and/or remediate (rehabilitate and restore) negative (ecological) impacts (DEA, 2014).

The project will prevent degradation to the environment as replacing the corroded pipeline section will reduce the risk of hydrocarbon leaks into the marine environment.

The project is expected to have negative ecological and heritage impacts, most notably on terrestrial ecology (loss of ~15 Milkwood trees) and heritage resources (potential loss or degradation of shipwreck remains) during construction, though operation phase impacts can be mitigated to negligible significance. Furthermore, the land-based component of the project is located in an ESA and on the beach, where development is discouraged at a planning level. Based on site investigations, both specialists consider the project impacts acceptable.

The project is thus in principle ecologically desirable and is deemed acceptable on the project site.

7.2.4 Summary of Need and Desirability

In summary:

- The project complies with and responds directly to a number of social and economic principles and policies laid out in the planning framework by providing diesel and LNG as alternative energy source to coal and by maintaining and growing an existing economic driver.
- The project will prevent degradation to the environment by replacing the corroded pipeline section.
- The project will result in vegetation loss in the coastal zone, in an ESA. The vegetation in the launch way corridor is degraded with invasive vegetation and impacts are minimised through restricting the amount of vegetation removal to less than 800m^2 and by rehabilitating (including re-vegetating) all disturbed areas following construction. The project is not totally consistent with ecological planning objectives (for coastal zones and within ESAs) and policies contained in policy documents (since development and vegetation removal on the coast in an ESA is discouraged) but acceptable following mitigation.
- Social, economic, heritage and ecological factors are considered and assessed during the EIA process, to ensure that the development is sustainable. Mitigation measures are recommended in

the BAR to prevent, minimise (and optimise) impacts and to secure stakeholders' environmental rights. An EMPr has been drafted and will be implemented to ensure that potential environmental pollution and degradation can be minimised, if not prevented.

- The Project will generate impacts, both negative and positive and these should be considered in evaluating the desirability of the Project. Section 6demonstrates that most impacts can be readily managed.

7.3 Recommendations

The specific recommended mitigation and optimisation measures are presented in Chapter 6 and the EMPr (Appendix E) and key measures are summarised in Table 7-1 above. PetroSA would need to implement these mitigation measures to demonstrate compliance and adherence to best practice. Although it is in theory possible that the potential impacts (or unintended consequences) of implementing mitigation and optimisation measures could offset their intended effect, the majority of the recommendations made in this BA Report are procedural and/or can be implemented without resulting in any physical effects. The potential for such unintended consequences in the case of the proposed offshore bypass pipelines and associated infrastructure is therefore considered negligible.

Key recommendations, which are considered essential, are:

1. Implement the EMPr (including site specific mitigation) to guide construction and operation activities and to provide a framework for the ongoing assessment of environmental performance.
2. Appoint an ECO to oversee the implementation of the EMPr and supervise construction activities.
3. Restrict the width of the launch way development footprint to 12 m within the launch way corridor.
4. Appoint a qualified professional to rehabilitate all disturbed areas within the launch way corridor following construction, which may require seed propagation from surrounding areas.
5. Ensure the EMPr is included with contracts made with vessel operators and contractors for them to comply with the EMPr requirements.
6. Ensure the appointed vessel operators have the requisite Safety Certificate and Emergency Contingency Plan to cover potential risks associated with oil discharge incidents.

7.4 Conclusion and Authorisation Opinion

This Draft BAR has identified and assessed the potential biophysical and socio-economic impacts associated with the proposed offshore bypass pipelines in Mossel Bay.

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is ventured, and in this regard SRK believes that sufficient information is available for DFFE to take a decision.

The project will result in unavoidable but limited adverse biophysical and heritage impacts, but will deliver significant socio-economic benefits. Working on the assumption that PetroSA is committed to ensuring that the EMPr is strictly implemented by PetroSA, contractors and vessel operators, none of these adverse impacts are considered unacceptably significant. On this basis, the No-Go alternative is not preferred.

In conclusion, SRK is of the opinion that on purely 'environmental' grounds (i.e. the project's potential socio-economic, heritage and biophysical implications) the application as it is currently articulated should **be approved,** provided the essential mitigation measures are implemented. Ultimately, however, the DFFE will need to consider whether the project benefits outweigh the potential impacts.

7.5 Way Forward

This BAR is now available for public comment and SRK invites stakeholders to review the report and to participate in the public consultation process. An Executive Summary of this report has been distributed to registered and potential stakeholders and is available from SRK on request (details below).

The report can be downloaded from www.srk.com (via the "Knowledge Centre" and then "Public Documents" links). Hard copies of this report can be made available upon request.

Stakeholders can register[14] by:

- Submitting their name, contact details (specifying the preferred method of notification, e.g. e-mail), and an indication of any direct personal business, financial or other interest which they have in the application to the SRK contact below; **or**
- Filling in their details in the link in the box below.

Stakeholders are invited to submit comments on the Draft BA Report.

SUBMIT WRITTEN COMMENTS
AND/OR REGISTER ON THE PROJECT DATABASE
MS Forms

Alternatively send written comments to:
Lauren Elston at SRK Consulting
Email: lelston@srk.co.za

Tel: + 27 21 659 3060, Fax: +27 86 530 7003
Postnet Suite #206, Private Bag X18,
Rondebosch, 7701, South Africa

This BAR may be amended based on comments received from stakeholders. Stakeholders' comments on the BAR will assist DFFE in making a decision regarding the application. The public is therefore urged to submit comment. If you require assistance in compiling and submitting comments, please contact us and we will ensure that you receive appropriate support.

Comments must be submitted by 27 March 2023 to be incorporated into the Final BAR.

Once stakeholders have commented on the information presented in the BAR, the Final BAR will be prepared and submitted to DFFE for approval. Registered IAPs will be informed of the submission of the Final BAR and provided with the Issues and Responses Summary.

Once a decision is taken by DFFE, this decision will be communicated to registered IAPs.

[14] *By registering as a stakeholder, you consent to SRK processing and, if necessary, disclosing your personal information which SRK undertakes to do in accordance with our Protection of Personal Information Policy.*

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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