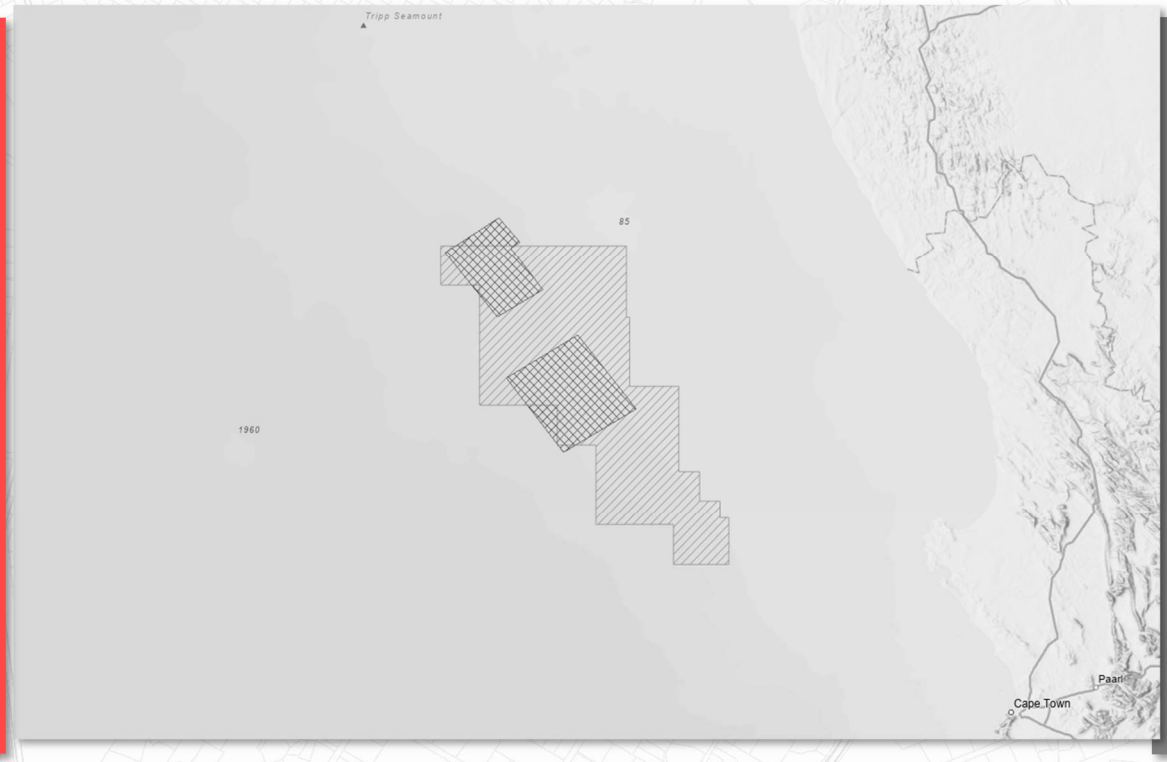
Report Prepared For:

EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

May **2024**



Africa Oil South Africa Corp's Block 3B/4B Offshore Exploration

Economic Impact Assessment

Report

DEMACON market studies

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About Us

We provide accurate & independent market insight solutions

DEMACON is a specialist research firm with a focus on topics in the fields of Demographics, Mapping (i.e., GIS – geographic information systems) and Economics, including real estate economics. Hence the acronym, DE-MA-CON.

The company is privately owned and offers clients the benefit of extensive in-house databases, including responses from more than 100 000 consumer surveys conducted all over South Africa and in time series format. DEMACON delivers a highly specialised product range of custom designed research reports, tailored to each client's unique research needs. The company's analytical processes are supported by specialised expertise, extensive experience, multi-variable databases, and advanced information technology systems. In addition to our focused research reports, the company offers high calibre industry insights and project specific solutions.

Services & Solutions

Advanced market potential modelling techniques were developed for all sectors, based on international best practice and leading methods globally. The services offered by the company include:

- Market research
- Economic analyses (Macro, meso and micro level)
- Socio-economic analyses (Macro, meso and micro level)
- Feasibility studies
- Business plans
- Real estate market analyses (Macro, meso and micro level)
- Urban and rural markets (Including township and traditional area)

DEMACON has developed specialised expertise and technically sound methodologies, aligned with international best practice, to address the complex research needs of our clients in a highly effective and efficient manner.

In this respect, we have developed a unique, customisable, and flexible research system - deploying a combination of primary and secondary data assimilation techniques, tailored to suit, respectively, the client's and project's specific requirements.

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EXECUTIVE SUMMARY

Purpose of the Report

DEMACON Market Studies has been appointed by Environmental Impact Management Services (EIMS) as a sub-consultant to offer specialist inputs and analyses for a scoping and environmental impact assessment (EIA) required to support Africa Oil South Africa Corp's (AOSAC) Offshore Exploration of Block 3B/4B.

At present, AOSAC is the holder of an exploration right for the above-mentioned area and as a result can undertake exploration activities, i.e., the proposed project is currently in the exploration phase. Although AOSAC has completed a reprocessing project of 3D seismic datasets for the area affected, further appraisal is proposed by drilling several wells to confirm the hydrocarbon prospect of the exploration right area.

DEMACON Market Studies' role is to undertake an Economic Impact Assessment of the proposed offshore exploration activity (drilling of exploration wells) proposed by AOSAC. The purpose of the economic impact assessment is to assess the likely effect that the proposed exploration activity could have on the receiving environment's overarching economic context. The assessment, therefore, assists with the quantification of the overall economic impact of exploration activities by identifying and measuring impacts that could contribute or subtract from the established economic ecosystem of the project's receiving environment.

Considering the preceding, the economic impact assessment forms part of a range of specialist studies that will inform the overall outcome and conclusions of the EIA report.

Project Specific Terms of Reference

The following provides an overview of the scope and terms of reference for which DEMACON Market Studies have been appointed as a sub-contracted service provider:

a. Economic Impact Assessment;
b. Alternative Assessment and Impact rating (as per provided methodology);
c. Recommended Mitigation measures and rehabilitation measures where required for inclusion in the Environmental Management Programme;
d. Provision of GIS information for the features identified, clearly indicating feature sensitivity as per EIMS Mapping Methodology;

i. The Sub-Contracted Services shall be rendered at the following Site(s): Block 3B/4B Offshore South Africa and adjacent communities.

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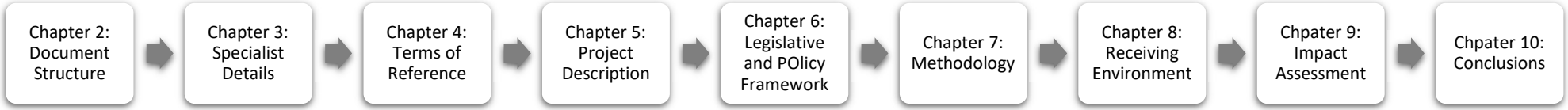
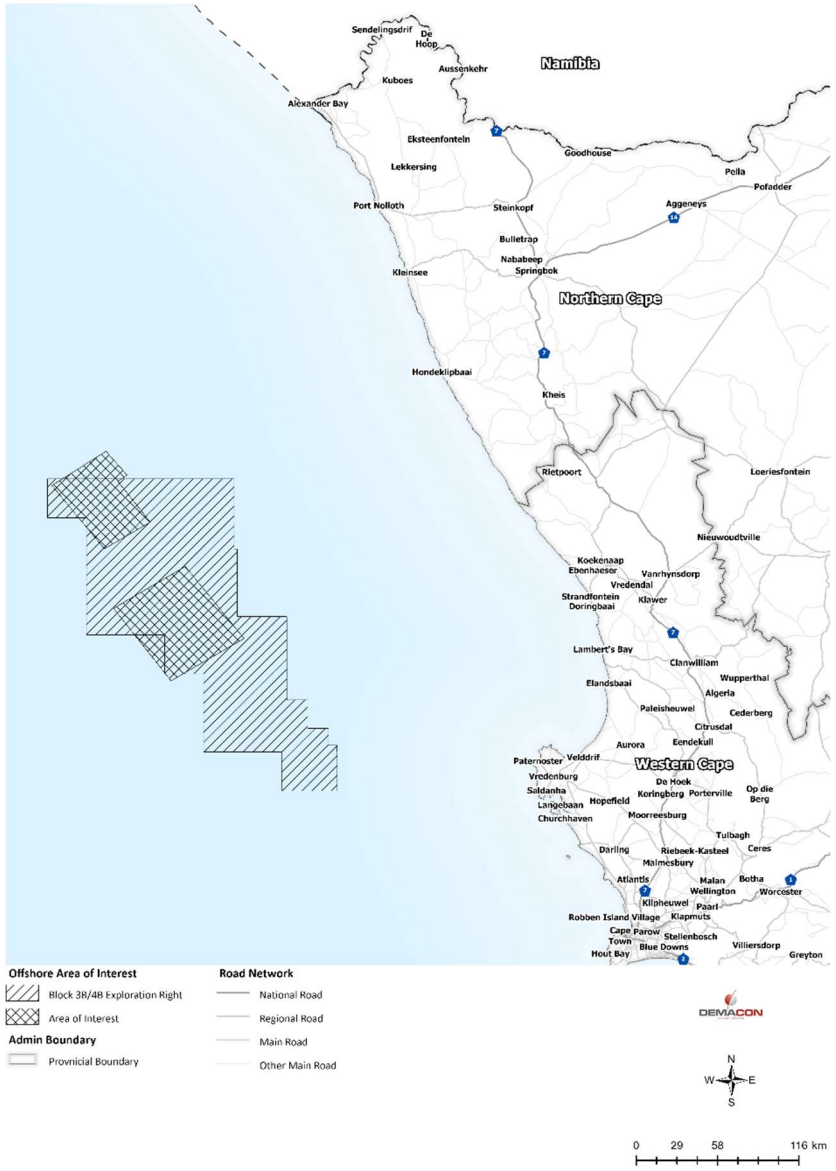


PROJECT DESCRIPTION

Project Area	Block 3B/4B is situated between latitudes 31°S and 33°S on the continental shelf in water depths ranging from 200 m to 2 000 m. The area of primary interest in the north of this block, but this could also cover other areas in future. As part of the process of applying for the Exploration Right, the JV Partners undertook and completed the reprocessing project covering 2 000 km^2, which is a subset of the 10 000 km^2 BHP/Shell 3D seismic datasets, focussed primarily on the most northern portion of Block 3B/4B.
Application Area	Block 3B/4B Approximately 1 100 000 ha covers an area of approximately 11 100 km^2, and
Magisterial District	Adjacent to the Namaqualand and West Coast District Municipalities
District Municipality	Adjacent to the Namaqualand and West Coast District Municipalities
Local Municipalities	Adjacent to the Kamiesberg; Richtersveld; Nama Khoi; Matzikama; Cederberg; Bergrivier; Saldanha Bay; Swartland; and City of Cape Town Local Municipalities.

Application Area Coordinates

Point	Latitude	Longitude	Point	Latitude	Longitude
1	-31.00030518	14.74908447	12	-32.70800781	16.60467529
2	-31.00030518	15.94488525	13	-33.00018311	16.60467529
3	-31.45031738	15.94488525	14	-33.00030518	16.24932861
4	-31.45031738	15.96588135	15	-32.75030518	16.24932861
5	-31.88360596	15.96588135	16	-32.75030518	15.74908447
6	-31.88360596	16.2824707	17	-32.25030518	15.74908447
7	-32.41699219	16.2824707	18	-32.25030518	15.49908447
8	-32.41699219	16.41589356	19	-32.00030518	15.49908447
9	-32.60028076	16.41589356	20	-32.00030518	14.99908447
10	-32.60028076	16.54931641	21	-31.25030518	14.99908447
11	-32.70800781	16.54931641	22	-31.25030518	14.74908447



PROJECT DESCRIPTION

Description of Activities to be Undertaken

For a full project description please refer to the relevant section in the ESIA Report.

- **Pre-Drilling Surveys**

Pre-drilling surveys will be undertaken prior to drilling in order to confirm baseline conditions at the drill site and to identify and delineate any seabed and sub-seabed geo-hazards that may impact the proposed exploration drilling operations. Pre-drilling surveys may involve a combination of sonar surveys, sediment sampling, water sampling and ROV activities.

- **Well Location and Drilling Programme**

AOSAC is proposing to drill up to five exploration wells within an Area of Interest within Block 3B/4B. The expected target drilling depth is not confirmed yet and a notional well depth of 3 570 m below sea floor (Water depth range 500 -1700m) is assumed at this stage. It is expected that it would take approximately three to four months to complete the physical drilling and testing of each well (excluding mobilisation and demobilisation). AOSAC's strategy for future drilling is that drilling could be undertaken throughout the year (i.e. not limited to a specific seasonal window period). The schedule for drilling the wells is not confirmed yet; however, the earliest anticipated date for commencement of drilling is Q1-Q2, 2025.

- **Drilling Unit Options**

Various types of drilling technology can be used to drill an exploration well (e.g. barges, jack-up rigs, semi-submersible drilling units (rigs) and drill-ships) depending on, inter alia, the water depth and marine operating conditions experienced at the well site. Based on the anticipated sea conditions, AOSAC is proposing to utilise a semi-submersible drilling unit or a drill-ship, both with dynamic positioning system suitable for the deep-water harsh marine environment. The final rig selection will be made depending upon availability and final design specifications.

- **Mobilisation Phase**

The mobilisation phase will entail the required notifications, establishment of the onshore base, appointment of local service providers, procurement and transportation of equipment and materials from various ports and airports, accommodation arrangements and transit of the drilling unit and support vessels to the drilling area

- **Operational Phase**

The selection of the specific well locations will be based on a number of factors, including further detailed analysis of the seismic and pre-drilling survey data and the geological target. A Remote Operating Vehicle (ROV) will be used to finalise the well position based on inter alia the presence of any seafloor obstacles or the presence of any sensitive features that may become evident The well will be created by drilling a hole into the seafloor with a drill bit attached to a rotating drill string, which crushes the rock into small particles, called "cuttings". After the hole is drilled, casings (sections of steel pipe), each slightly smaller in diameter, are placed in the hole and permanently cemented in place (cementing operations are described below). The hole diameter decreases with increasing depth. Once the target depth is reached, the well would be logged and could be tested dependent on the drilling results. The purpose of well sealing and plugging is to isolate permeable and hydrocarbon bearing formations. Well sealing and plugging aims to restore the integrity of the formation that was penetrated by the wellbore. The principal technique applied to prevent cross flow between permeable formations is plugging of the well with cement, thus creating an impermeable barrier between two zones.

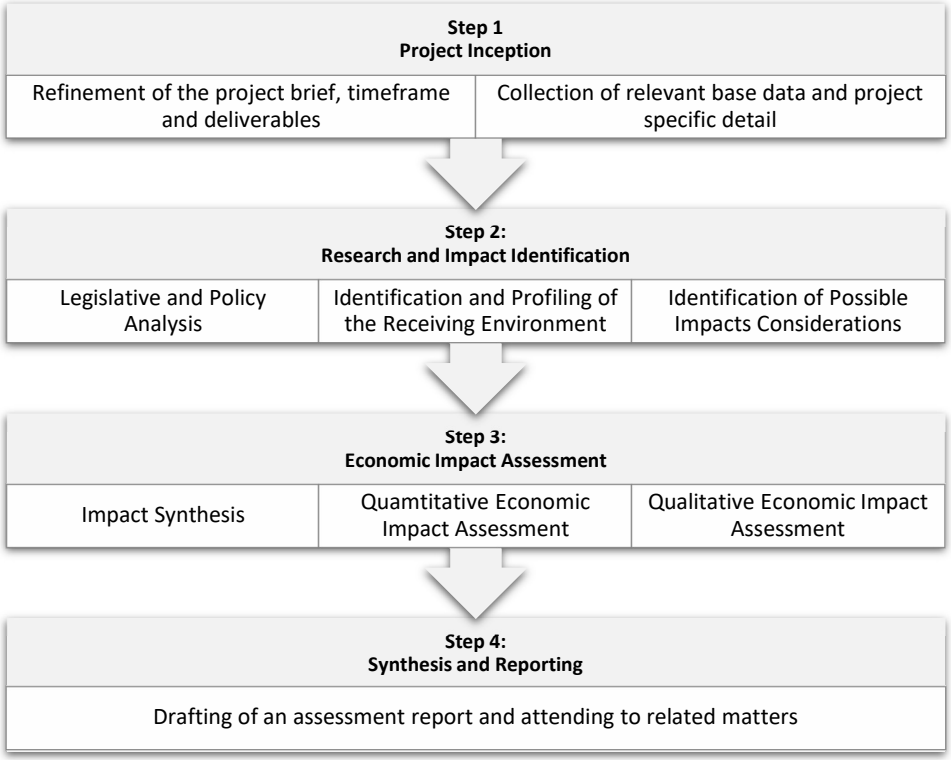
- **Demobilisation Phase**

After the exploration wells have been sealed and tested for integrity the intention is to either remove wellheads or leave wellheads in an abandoned state after installation of trawlable protective equipment. On productive wells, it may be decided to abandon the wellheads on the seafloor after installation of over trawlable protective equipment. The risk assessment criteria will consider factors such as the water depth and use of the area by other sectors (e.g., fishing).

PROJECT METHODOLOGY

The purpose of the study is to undertake an economic impact assessment of the proposed exploration activity in Exploration License Block 3B/4B. In order to achieve the economic impact assessment, an overarching project methodology has been adopted that identifies and informs key aspects of the impact assessment and focusses the outcomes of the assessment on the project specific terms of reference and its expected outcomes.

The diagram provides a diagrammatical representation of the methodology used to conduct the economic impact assessment contained in this report. After the diagram, a short description is provided of each step to highlight the key components that make up each step of the methodology and to emphasize whether any limitations are associated with each step.



The project methodology of the economic impact assessment consists of the following four steps:

- Step 1: Project Inception
  - Step 1 entails the inception of the project. The step focusses on refinement of the project brief, the project timeframe and the deliverables required. Furthermore, the step also collates relevant base data and documents and seeks to acquire any project specific detail and information relevant to the study.
- Step 2: Research and Impact Identification
  - The step focusses on conducting necessary base research to inform the analyses of the project and its economic impacts.
  - An overview of relevant legislation and policies is undertaken to understand the strategic relevance of the proposed project and to determine any current and future planning aspects that may impact on the project and its intended outcomes.
  - The identification of the receiving environment is also undertaken in this step. The purpose of the analysis is to determine the relevant economic environment that will be impacted by the proposed project. The receiving environment is identified by determining the project's areas of influence (whether offshore or onshore) and delineating a receiving economy based on the propensity of the proposed project to influence the economic activities of economic geographies within its area of influence.
  - Once the receiving economy has been identified, a profiling analysis is undertaken to identify the macro and micro economic context of the receiving economy. The economic context is assessed by profiling the receiving economy in relation to different metrices such as economy size, distribution, growth, composition, basic and non-basic sectors, tress index concentration, labour absorption and key spatial considerations.
  - Based on the outcome of the profiling analyses, several potential economic impacts that may arise from the proposed project's operation is identified. The purpose is to highlight

PROJECT METHODOLOGY

potential areas of impact that can be assessed in greater detail in subsequent analyses for inclusion into the economic impact assessment.

- Step 3: Economic Impact Assessment
  - Step 3 of the project methodology focusses on the economic impact assessment of the proposed project. The economic impact assessment consists of three assessment phases and culminates in a perspective on the impact (and extent thereof) of the proposed project within the receiving economy.
  - The impact assessment first undertakes a synthesis of the potential impacts identified from the profiling analyses of the receiving economy. The purpose of the synthesis is to identify areas of impact or key impact themes that is relevant to the proposed project and that can be included into the economic impact assessment.
  - Once the synthesis of potential economic impacts has been completed and the key impact themes have been identified, impacts associated with each theme is identified and described.
  - By making use of the key impact themes (and associated impacts per theme), quantitative economic impact of the proposed project is modelled to determine the quantified net gains or loss imposed by the proposed project on the receiving economy. The quantitative economic impact assessment is based on a bespoke input-output model developed for the economic impact assessment. The model quantifies the economic impact of each impact theme (and relevant impacts) based on several metrices (additional business sales, additional GDP, additional employment, additional fiscal benefits, SMME opportunities and household income growth) and determines the total net economic impact of the proposed project and the gains and/or losses it poses to the receiving economy.
  - The key impact themes and relevant impacts per theme is then assessed within the qualitative economic impact assessment framework. The qualitative analysis makes use of an impact significance rating methodology. The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).
  - The quantitative and qualitative impact assessment is then synthesised to provide a holistic view on the range and potential impact of the proposed project on the receiving economy.
- Step 4: Synthesis and Reporting
  - Step 4 focusses on the synthesis and reporting of the outcome of the analyses undertaken in Steps 2 and 3.

DEFINING THE RECEIVING ENVIRONMENT

In this report, the receiving environment is separated into an offshore and onshore area of influence. This distinction is made because, although exploration activities occur offshore, they influence an extended area around exploration locations (offshore area of influence). The economic output produced by exploration activities, however, is measured onshore as part of a defined economic geography (onshore area of influence).

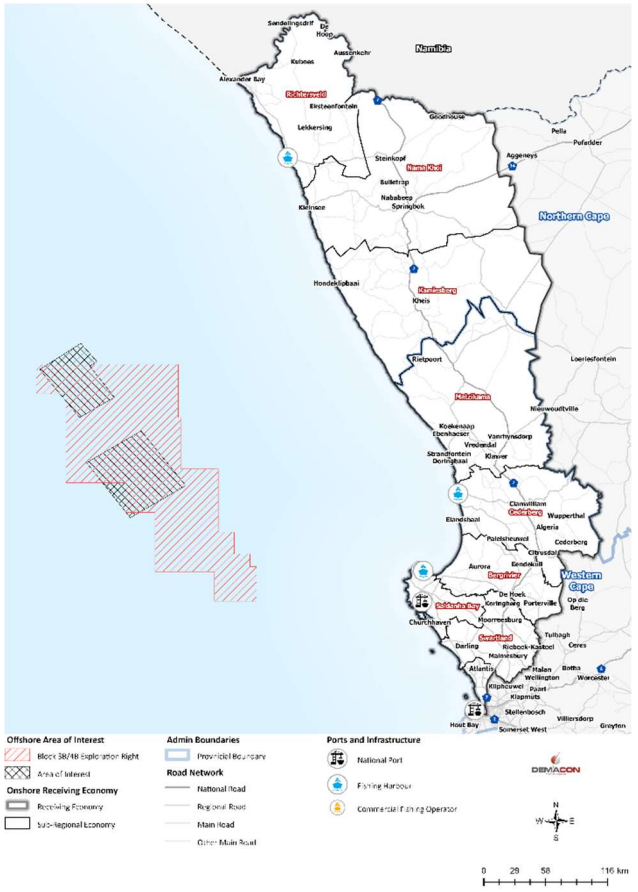
The offshore area of influence represents the receiving environment where exploration activities will take place. This includes the area of interest where exploration wells will be drilled, as well as offshore areas for refuelling, maintenance, a safety exclusion zone, and marine traffic routes between base harbours and drilling operations. The offshore area of influence also caters for the potential impacts that may result from exploration drilling, such as direct and indirect impacts on ecosystems (e.g., fishing areas, marine mammals, etc.).

The onshore area of influence represents the receiving environment where the output of economic activities/industries are measured and primarily situated. Although exploration activities occur offshore, their economic output is registered within an onshore economic geography, typically based on the port used as the base port of operations or where a business is registered.

In addition to the base port of operations, economic geographies along the extent of the exploration right and area of interest are also included as part of the onshore area of influence. These economic geographies are included because exploration operations could influence the normal economic activity of economies that, to some degree, make use of and benefit from sea-based economic resources.

Initial information provided regarding the operational planning of the exploration activity identifies that the base of operations for the project will originate from the existing major ports in the Western Cape, i.e., the Port of Cape Town and/or the Port of Saldanha Bay. The Port of Cape Town is identified as the primary preferred choice from which the operational base of the exploration activity will be managed. The Port of Saldanha Bay is identified as the preferred alternative to the Port of Cape Town.

Furthermore, the exploration right extends between the southern regions of the Northern Cape to Saldanha Bay in the Western Cape. Therefore, the local economies situated along the Western Coast of South Africa could potentially be affected by exploration activities. Given the preceding, the onshore area of influence will primarily represent economic geographies that are situated along the West Coast of the country. Economic profiling will focus on the Western Cape and Northern Cape economies, with reference to regional and sub-regional economies where necessary.

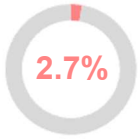


RECEIVING ECONOMY CONTEXT – ECONOMY SIZE AND CONTRIBUTION

The receiving economy consists of ten sub-regional economies that represent the economic output region of the western coast of South Africa (not to be confused with the West Coast District economy). The receiving economy generated R153.0 billion (current prices) Gross Value Added (GVA) in 2021 contributing approximately 2.7% to the National economy and 17.4% to the combined output of the Western and Northern Cape economies. The receiving economy's contribution to the National economy remained consistent between 2015 and 2021, fluctuating between a contribution of 2.74% and 2.77% per annum. The receiving economy's contribution to the combined economies of the Western and Northern Cape has continually increased, reaching 17.4% in 2021. The sub-regional economies of Blaauwberg and Table Bay (situated in the Cape Town Metropolitan Area) are the primary economic output generating regions of the receiving economy, contributing more than 68% to the total receiving economy's GVA. Furthermore, the Saldanha Bay, Swartland and Nama Khoi sub-regional economies represent secondary economic contributors.

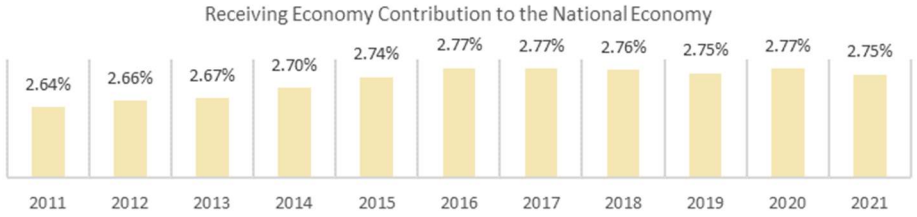
Receiving Economy Size and Contribution

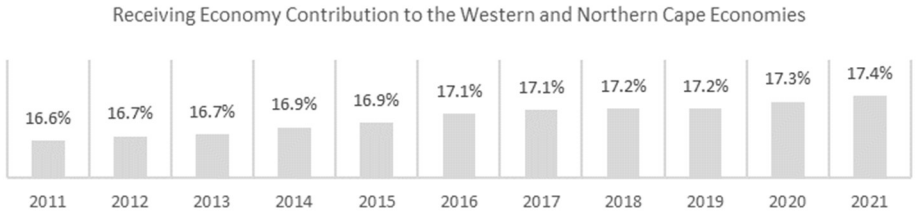
Receiving Economy GVA
(2021 Current Prices)
R153.0 billion



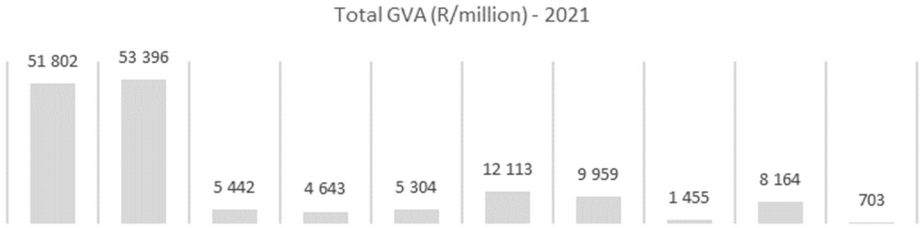
contribution to the **National Economy**

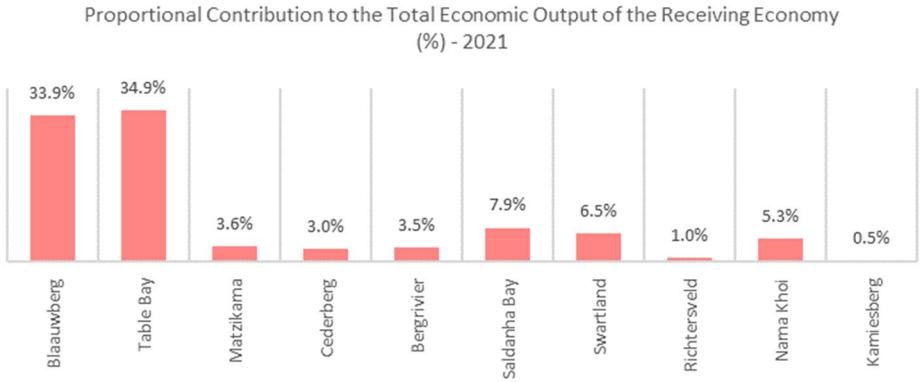
contribution to the **Western and Northern Cape Economies**





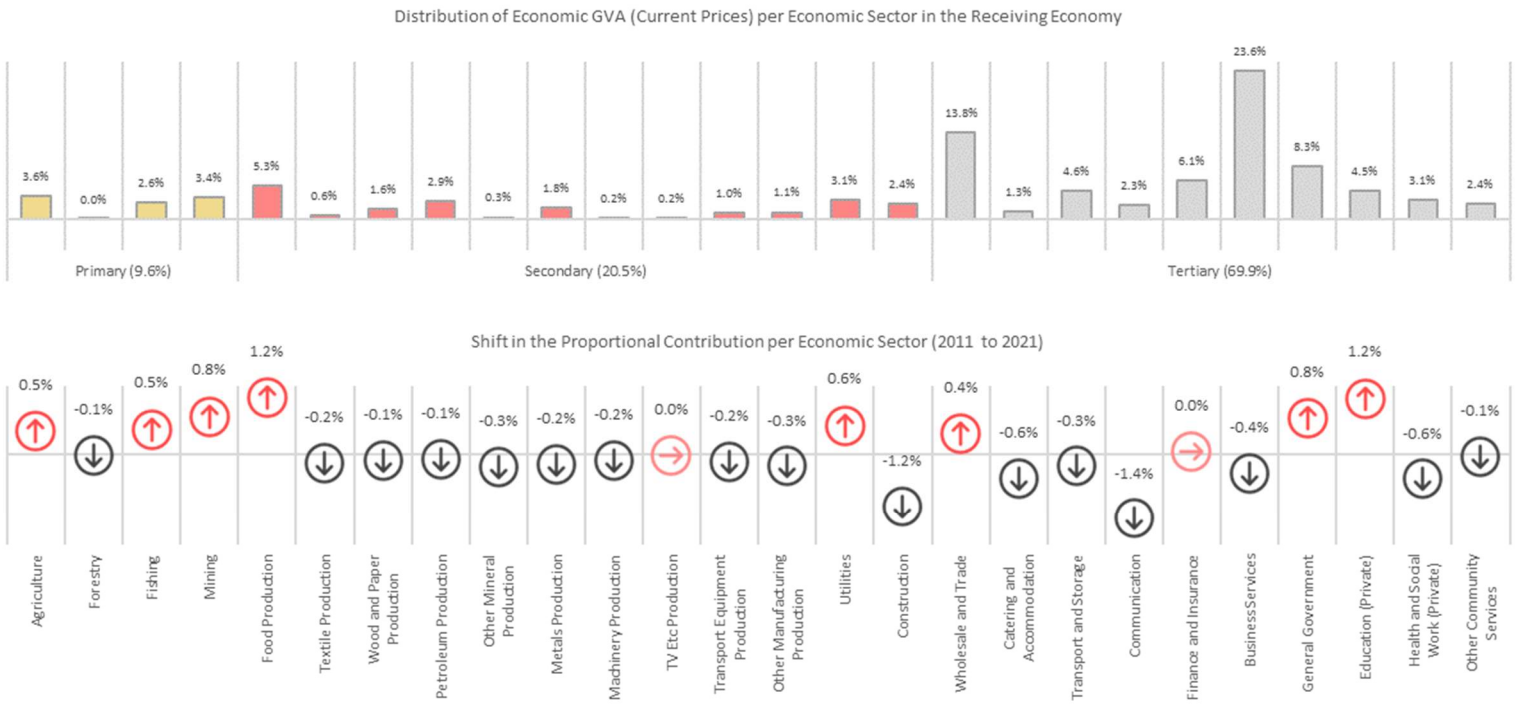
Sub-Regional Economy Size and Contribution

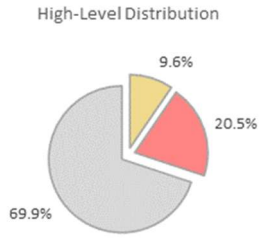




RECEIVING ECONOMY CONTEXT – STRUCTURE AND BASIC SECTORS

Structure of the Receiving Economy





The **BULK** of the receiving economy's output is produced in the **TERIARY ECONOMY**

69.9%

The **PRIMARY SECTOR** has **INCREASED** its proportional share of output produced indicating that the sector is one of the **STRONGEST GROWING** sectors in the Receiving Economy

1.8%
share increase

The fluctuation in the proportional contribution by sectors of the economy to total output of the economy is expected, given changes to macro-economic conditions and local economic trends. The concentration of economic activity in select sectors, however, could impact on the capacity of the receiving economy to be diversified and not dependent on a select sector for economic output and growth. Data shows that the proportional share of the majority of economic sectors have decreased which could be an indication of the concentration of economic output.

The receiving economy is primarily tertiary economy-orientated with the majority of economic output being generated by the business services and wholesale and retail trade sectors. Although almost all sub-regional economies have sizeable business services and wholesale and retail trade sectors, the bulk of these sectors' output is

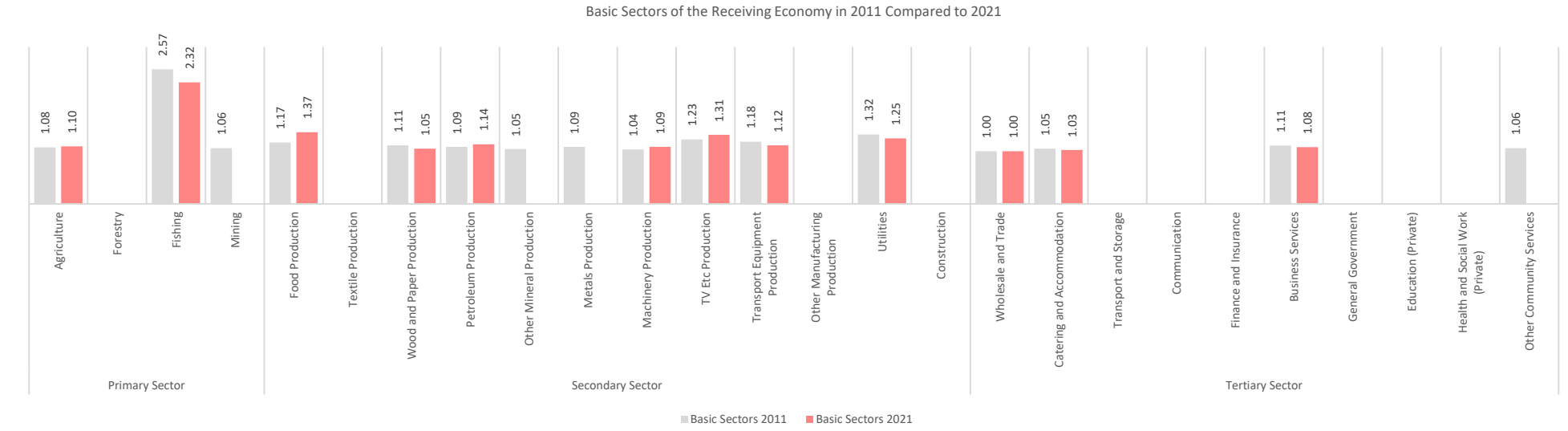
RECEIVING ECONOMY CONTEXT – STRUCTURE AND BASIC SECTORS

produced in the Table Bay and Blaauwberg sub-regional economies – Table Bay and Blaauwberg sub-regional economies represent nearly 69% of the total output produced by the receiving economy and, therefore, has a significant influence on the structure and functionality of the receiving economy. Nevertheless, the tertiary economy is supported by a sizeable secondary and primary economy, where manufacturing, especially the production of food products, and agriculture, specifically land based farming and fishing, play vital roles in the output produced by the overarching economy.

It is, however, important to note that although sub-regional economies such as Blaauwberg and Table Bay are the largest contributors to the total production of the receiving economy, these areas' influence is primarily concentrated in the tertiary (all sub-sectors) and secondary sectors (all sub-sectors except food production). West Coast sub-regional economies such as Bergrivier, Saldanha and Swartland play important roles in not only agricultural production and fishing industry output but are core locations where the bulk of food production output is concentrated.

An analysis of the receiving economy's comparative advantage of economic sectors shows that the receiving economy, within the context of the Western and Northern Cape economies have a comparative advantage in several sectors, especially fishing, food production and electrical equipment production. The Tress Index for the receiving economy does, however, show that the economy is becoming more concentrated. Data suggests that since 2011 sectors such as mining, mineral production, metals production and other community services have lost their comparative advantage and consequently indicates a move toward a concentrated economy. The receiving economy does, however, have several prominent sectors that maintains a level of diversity in the economy, and that act as the basis for economic production and employment. Core among these is the fishing industry, agriculture, manufacturing, food production and business services.

Basic Sectors of the Receiving Economy



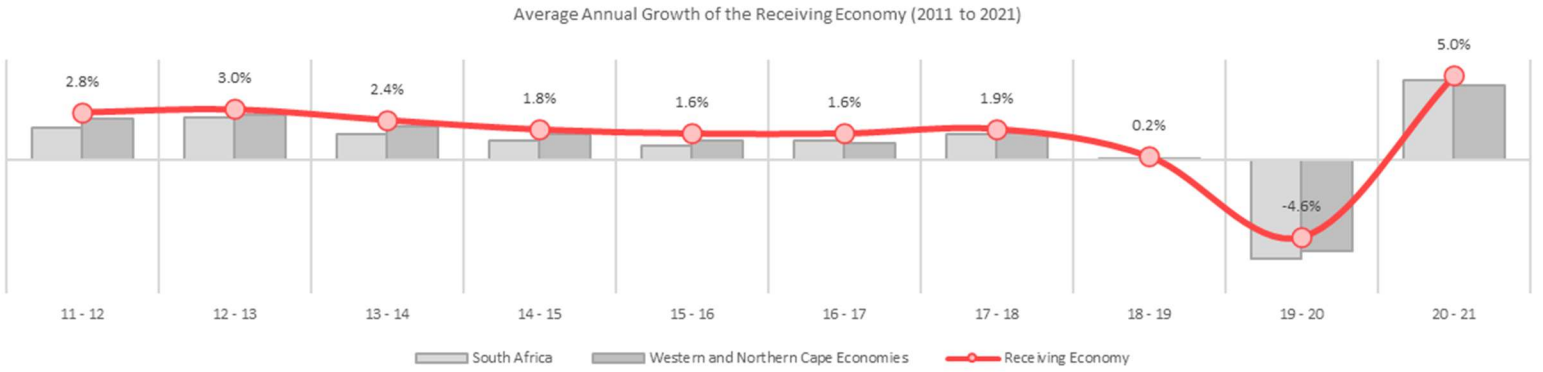
RECEIVING ECONOMY CONTEXT – GROWTH TRENDS

The receiving economy's average annual growth has steadily decelerated since 2011, achieving an average annual growth rate of approximately 1.5% between 2011 and 2021. The Covid-19 pandemic produced sizeable shocks throughout the macro- and micro-economy in 2020 and had an effect of the receiving economy's capacity to produce output – the receiving economy contracted by 4.6% in real terms in 2020. In spite of the effects of Covid-19 in 2020, the receiving economy rebounded in 2021 to its pre-pandemic economic output levels. Because of the rebound, the effects on long-term growth were limited and moderate average annual growth is recorded between 2011 and 2021.

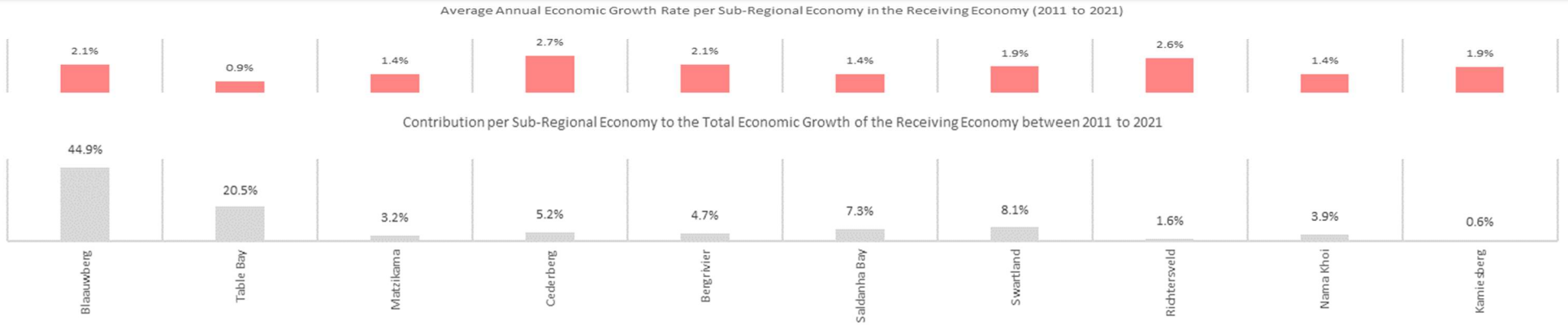
Average Annual Growth of the Receiving Economy between 2011 to 2021

1.5% (2011 – 2021) average annual growth rate of the receiving economy over the previous 10-years

0.8% (2016 – 2021) average annual growth rate of the receiving economy over the previous 5-years



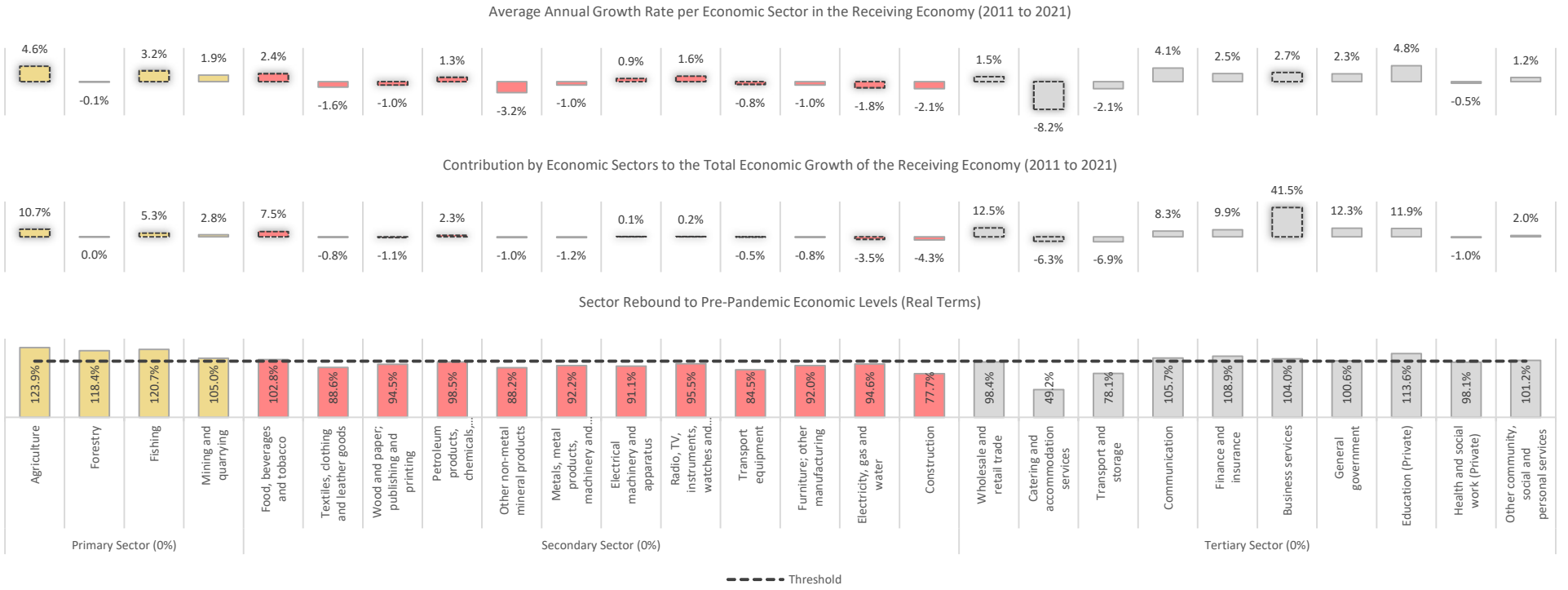
Average Annual Growth of the Sub-Regional Economies in the Receiving Economy



RECEIVING ECONOMY CONTEXT – GROWTH TRENDS

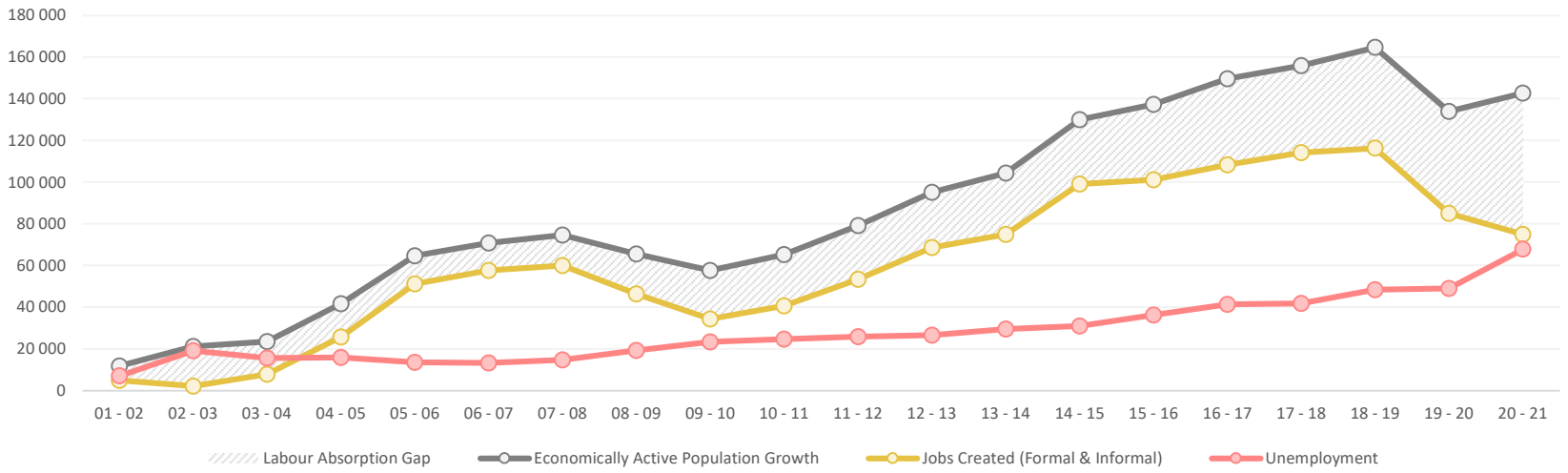
Furthermore, since 2021 the macro-economy of South Africa has been subjected to several economic growth constraints (loadsheddding, rising interest rates that seek to curb rising inflation, accelerated food and logistics inflation due to infrastructural and internal demand and supply effects, vulnerable logistics infrastructure and inefficient operational capacity; South Africa's credit downgrade, the war in Ukraine, OPEC price volatility, policy inefficiency, shrinking consumer disposable income and spending patterns, etc.) that will have had a considerable impact on the receiving economy's capability (and its sub-regional economies) to maintain moderate to strong economic growth.

In real terms (constant 2015 prices) economic sectors such as agriculture, fishing, mining, the production of food products, finance and business services, communication and community services have rebounded to pre-pandemic economic production levels. The tourism sector has been, until most recently, one of the hardest hit economic sectors with the sector only reaching approximately 49% of its pre-pandemic economic production levels in 2021. Other sector that also lagged behind in recovery include the construction sector, the manufacturing of textiles and the manufacturing of non-metal mineral products. In essence, the recovery of the receiving economy has largely been on account of the primary and tertiary economy with the assistance of the food production sector of the secondary economy.



RECEIVING ECONOMY CONTEXT – LABOUR FORCE PARTICIPATION

Labour Demand



77 435 people became economically active since 2011

34 266 people became employed since 2011

43 169 people became unemployed since 2011

The preceding information shows that although the receiving economy's average annual growth of economic production has been decelerating, the creation of jobs has remained consistent over the same time period. Up to 2019, the receiving economy maintained a low- to moderate- unemployment rate because the receiving economy was able to create jobs in response to individuals who became new economically active participants. The unemployment rate of the receiving economy has, however, been influenced by the pandemic, which caused a contraction of the economy and subsequently a loss in employment. The labour absorption gap present in the receiving economy in 2019 has been exacerbated by the pandemic and consequently lead to a shortfall of employment in the receiving economy. Present macro-economic conditions and constraints (as identified previously) further underpin the incapacity of the macro-economy to create jobs. Macro-economic factors are inhibiting local growth and the historic labour absorption gap in the receiving economy could remain present for the foreseeable future.

The **BULK** of the receiving economy's employment is created in the **TERIARY ECONOMY**

68.2%

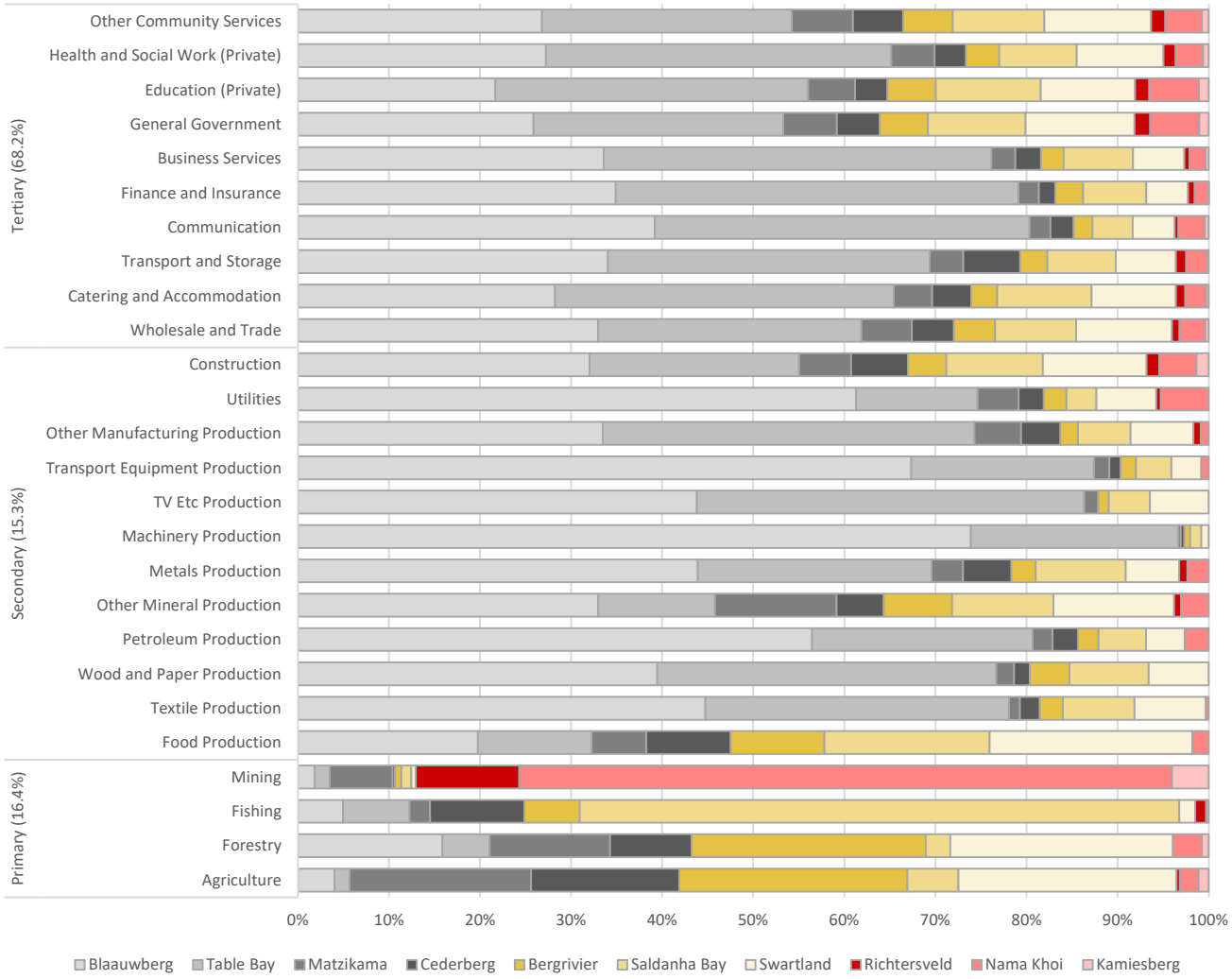
The **PRIMARY SECTOR** has **INCREASED** its proportional share of employment created indicating that the sector is one of the **STRONGEST GROWING** sectors in the Receiving Economy

1.0%
share increase

The fluctuation in the proportional contribution by sectors of the economy to total output of the economy is expected, given changes to macro-economic conditions and local economic trends. The concentration of employment in select sectors, however, could impact on the capacity of the receiving economy to not be subjected to economic shocks. Data shows that the proportional share of the majority of economic sectors have decreased which could be an indication of the concentration of employment.

RECEIVING ECONOMY CONTEXT – LABOUR FORCE PARTICIPATION

Contribution of Sub-Regional Economies to Each Economic Sector in the Receiving Economy



The bulk of employment in the receiving economy is created and sustained in the tertiary economy with the majority of employment opportunities occuring in the business services and wholesale and retail trade sectors.

Although almost all sub-regional economies have established business services and wholesale and retail trade sectors, the bulk of these sectors' employment is created in the Table Bay and Blaauwberg sub-regional economies – Table Bay and Blaauwberg sub-regional economies create more than 68% of all jobs created by the receiving economy and, therefore, has a significant influence on the structure and functionality of the receiving economy.

Nevertheless, a sizeable amount of employment opportunities are created by the secondary and primary economy, where manufacturing, especially the production of food products, construction and agriculture, specifically land based farming and fishing, play vital roles in providing employment.

It is, however, important to note that although sub-regional economies such as Blaauwberg and Table Bay are the largest contributors of employment in the receiving economy, these areas' influence is primarily concentrated in the tertiary (all sub-sectors) and secondary sectors (all sub-sectors except food production). West Coast sub-regional economies such as Bergrivier, Saldanha and Swartland play important roles in creating employment in the agricultural sector, the fishing industry and essential industries such as food production.

KEY SPATIAL CONSIDERATIONS OF THE RECEIVING ECONOMY

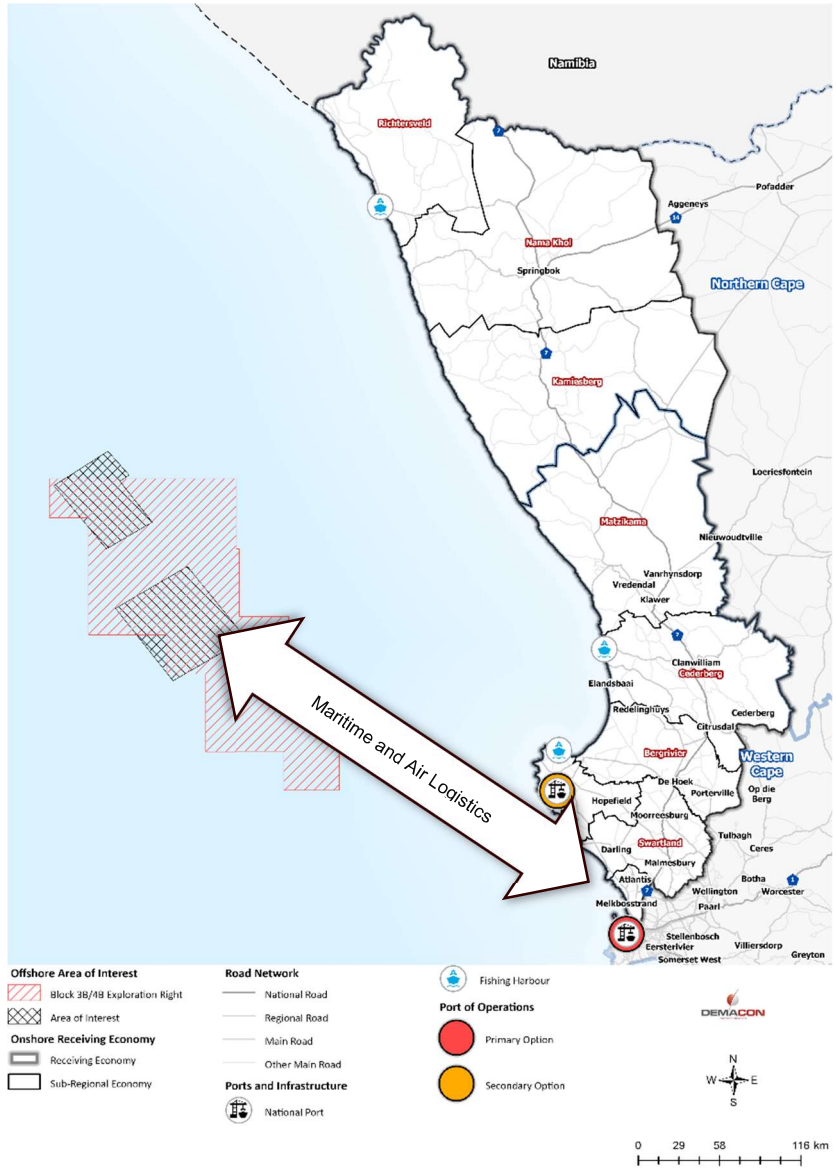
Exploration Operations Considerations

The proposed exploration activity, although located offshore, will have an onshore base of operations that will facilitate the day-to-day operational requirements of the exploration activity. According to information received from EIMS (2023), the primary onshore logistics base will most likely be located at the Port of Cape Town (preferred option), but alternatively at the Port of Saldanha. Logistical operations to and from the exploration activity's area of interest will most likely operate from the Port of Cape Town and therefore maritime logistics will be established between the Port of Cape Town and the exploration's area of interest.

The shore base would provide for the storage of materials and equipment that would be shipped to the drilling unit and back to storage for onward international freight forwarding. The shore base would also be used for offices, waste management services, bunkering vessels, and stevedoring / customs clearance services.

According to currently available operational information the drilling schedule has not yet been finalised but is expected to commence In the first half of 2025. Information indicates that 5 wells will be drilled and that the physical drilling and testing of each well will take approximately 3 to 4 months to complete. Given the information provided, it is assumed that the start of physical drilling of exploration activities will occur between Quarter 1 and Quarter 3 of 2025 and will take up to 4 months per well to complete – taking into account that the first extension of the exploration right expires on 26 October 2024.

Taking into consideration the preceding, the establishment of a base of operations that will operate from the Port of Cape Town will, as a result of the value chain of the exploration activity, directly and indirectly contribute to the economic output produced by the Table Bay sub-regional economy and by extension contribute to the overall economic output produced by the City of Cape Town and Western Cape.



KEY SPATIAL CONSIDERATIONS OF THE RECEIVING ECONOMY

Commercial and Small-Fishing Considerations

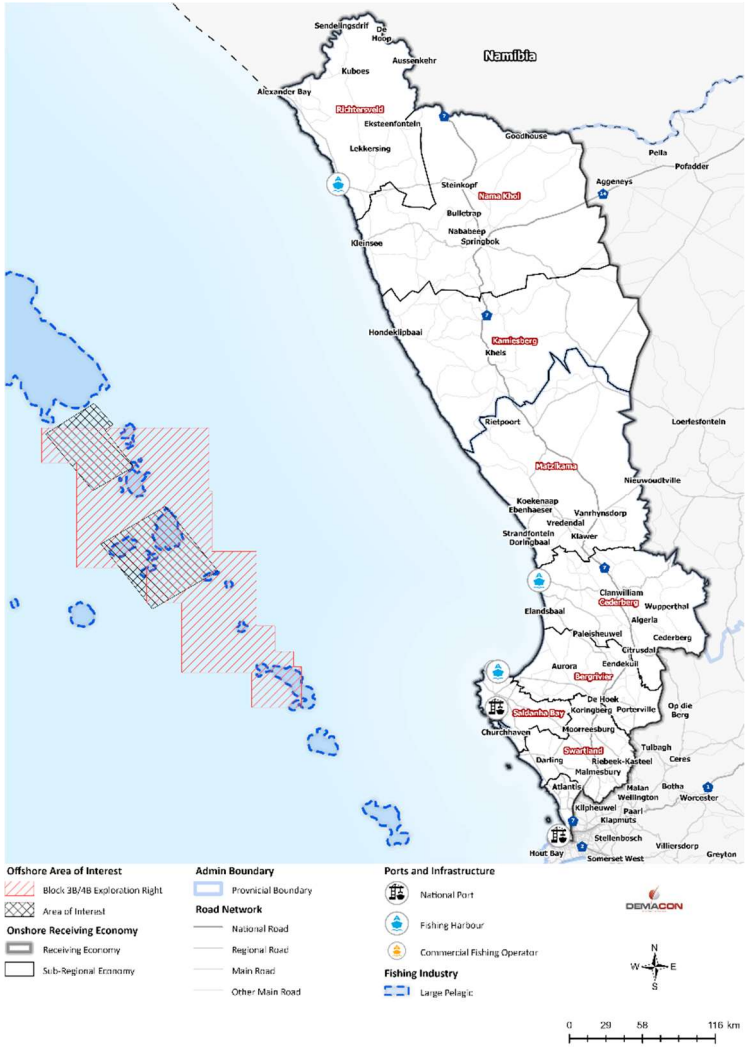
The fishing industry represents one of the basic sectors of the receiving economy, i.e., is one of the core industries that supports the receiving economy and produces output that is exported to the broader national and international economy. In 2022 the fishing industry of the receiving economy represented approximately 31.2% of the national fishing industry gross value added and contributed more than 40% to the Western and Northern Cape's fishing industry. Furthermore, the fishing industry of the receiving economy contributes 3.2% to the total gross value added by the receiving economy, 0.6% to the total gross value added by the Western and Northern Cape economies and 0.1% of the total gross value added by the National economy. The receiving economy also plays a critical role in the supply of employment opportunities, contributing 34% to the national fishing industry's employment and 0.1% to nationally available jobs.

The preceding identifies that the fishing industry plays a vital role in the broader receiving economy, and especially impacts on the economy as a result of its backward and forward linking industries (wholesale and retail trade - backward linking, professional business services - backward linking, fishing industries - backward and forward linking, non-durable goods such as food - forward linking and food manufacturing - forward linking).

Given the location of the areas of interest within the exploration right, the spatial relationship that the areas of interest could have with typical/general commercial and small-scale fishing locations along the West Coast of the receiving economy was considered.

Utilising the general fishing effort data from the Marine Spatial Planning's Decision-Making Tool and National Oceans and Coastal Information Management System (OCIMS), the spatial relationship between the proposed exploration activity's area of interest and fishing effort along the West Coast of South Africa can be ascertained. Spatial data indicates that while there is some overlap between the exploration right area of the proposed activity and general fishing locations along the West Coast, the interaction between the area of interest of the exploration activity and general fishing areas is limited.

A significant overlap does, however, exist between fishing efforts of large pelagic longline catching locations and the areas of interest of the proposed exploration activity.



KEY SPATIAL CONSIDERATIONS OF THE RECEIVING ECONOMY

Sea-Based Logistics Considerations

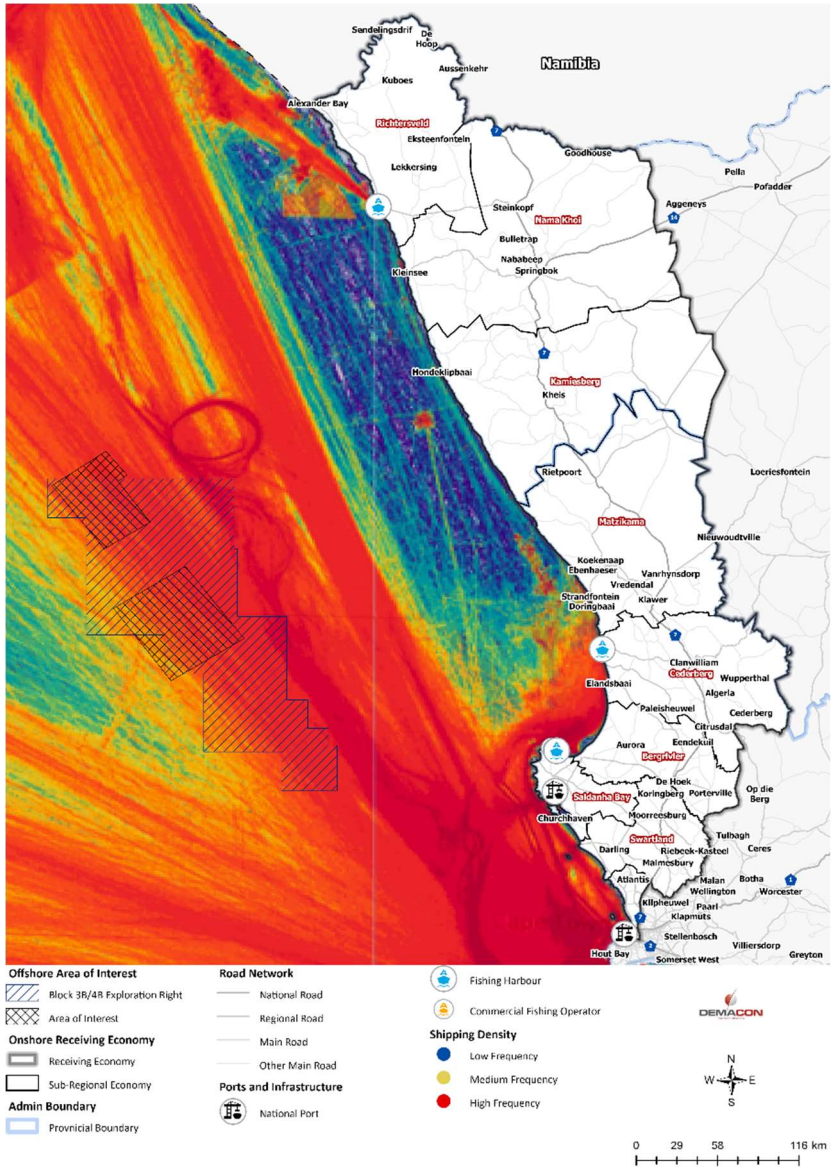
The movement of goods and services is an important consideration when identifying the role and function of aspects within an economy or specific economic region. Given that the proposed exploration activity is situated within an offshore location close to two main seaports of the South African economy, the relationship that the area of interest of the proposed exploration activity has with sea-based logistics is important.

Approximately 68.1% of the total value of South Africa's imports and 51.1% of the total value of South Africa's exports travel through the 9 main seaports of South Africa. The Port of Cape Town and the Port of Saldanha Bay are key ports within the context of the South Africa as the Port of Cape Town handles approximately 10.3% of South Africa's import value whilst the Port of Saldanha Bay handles approximately 15.6% of the value of South Africa's exports.

The Port of Cape Town and the Port of Saldanha Bay are also two ports that have been selected as the preferred and alternative ports from which a base of operations for the proposed exploration activity will be established.

The proximity of the Port of Cape Town and Port of Saldanha Bay to the areas of interest for the proposed exploration activity may lead to potential disruptions in normal sea-based logistical operations, such as imports and exports. In this analysis, "disruption" refers to the possibility of altering sea routes due to the proposed exploration activity restricting the use of normal shipping lanes.

Spatial data shows that the proposed exploration activity's areas of interest overlap with established shipping lanes, indicating a potential impact on the normal operations of sea-bearing vessels that traverse these routes.



KEY SPATIAL CONSIDERATIONS OF THE RECEIVING ECONOMY

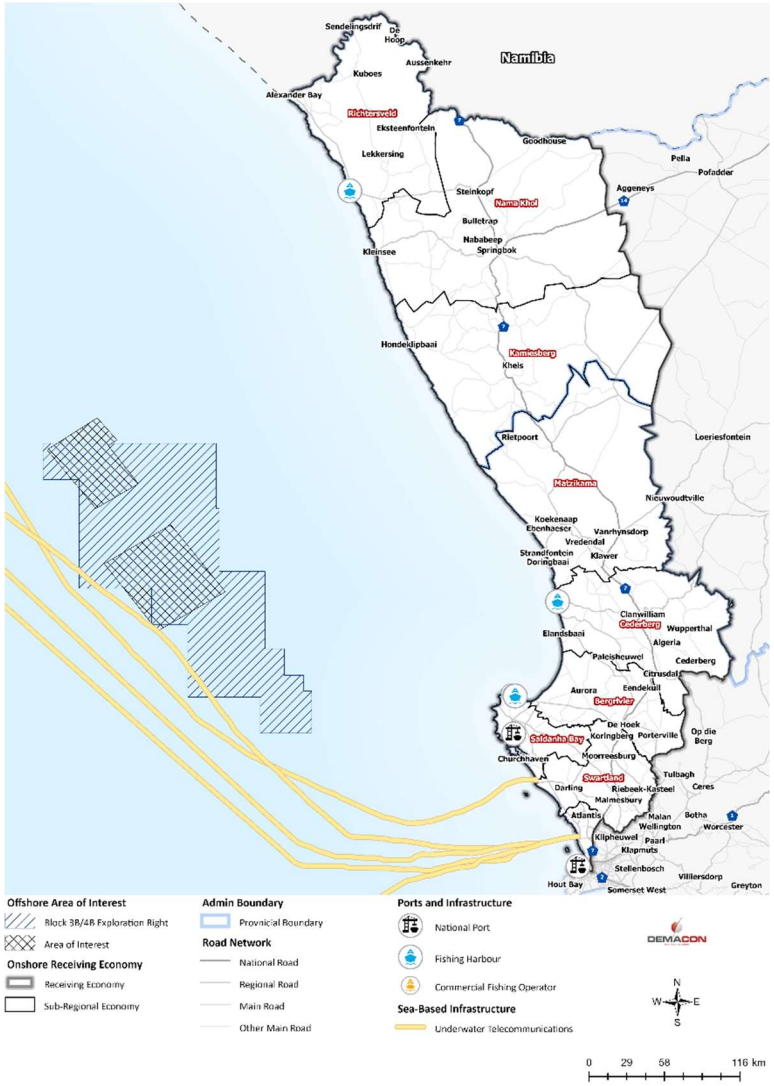
Sea-Based Infrastructure Considerations

The West Coast of South Africa is served by a network of vital underwater telecommunications cables that connect the region to various parts of the world. Some of the key submarine cable systems include:

- SAT3/WASC/SAFE: This extensive cable system consists of two sub-systems, SAT3/WASC in the Atlantic Ocean and SAFE in the Indian Ocean. It links Portugal (Sesimbra) with South Africa (Melkbosstrand). From Melkbosstrand, the cable extends via the SAFE sub-system to Malaysia (Penang), with intermediate landing points at Mtunzini East South Africa, Saint Paul Reunion, Bale Jacot Mauritius, and Cochin India.
- West Africa Cable System (WACS): Stretching over 14,530 km, WACS connects South Africa (Yzerfontein) to the United Kingdom (London). It boasts 14 landing points, with 12 along the western coast of Africa (including Cape Verde and Canary Islands) and 2 in Europe (Portugal and England), concluding on land at a cable termination station in London.
- African Coast to Europe (ACE): Covering an impressive 17,000 km, the ACE submarine communications cable runs along the West Coast of Africa, linking France and South Africa (Yzerfontein).
- Equiano: This private subsea cable, funded by Google, will traverse the West Coast of Africa, connecting Portugal and South Africa with branching units along the route. The first phase, linking South Africa (Melkbosstrand) and Portugal, was expected to be completed by 2021.
- 2Africa: The 2Africa subsea cable project aims to interconnect Europe (eastward via Egypt), the Middle East (via Saudi Arabia), and 21 landings in 16 African countries, including South Africa. The system is expected to go live in 2023/2024.

These underwater telecommunications infrastructure projects play a critical role in ensuring reliable and high-speed communication services, supporting various sectors and reinforcing South Africa's global connectivity.

An examination of the spatial relationship between underwater telecommunications cables and the proposed exploration area's area of interest reveals that there are no existing cables crossing through this region.



KEY SPATIAL CONSIDERATIONS OF THE RECEIVING ECONOMY

Tourism Considerations

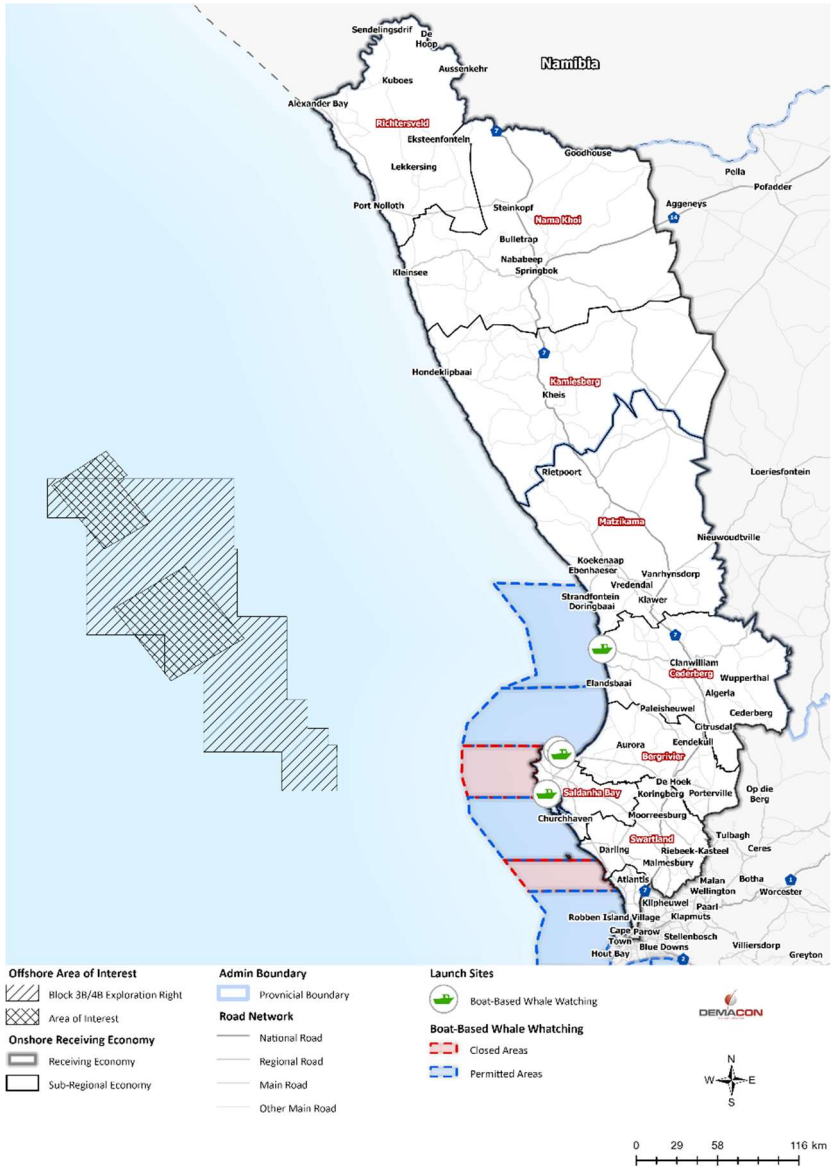
The Western and Northern Cape Provinces are prominent tourism destinations for domestic and international travellers. The Western and Northern Cape provinces attract approximately 18% of all international tourists travelling to South Africa and 12% of all domestic trips undertaken by South Africans.

Economic data for the receiving economy identifies that the catering and accommodation industry (which represents a portion of the total tourism industry but provides a proxy indication of tourist activity) is a basic sector of the receiving economy (i.e. foundational sector for the receiving economy) and contributes approximately 1.2% to the total economic output produced by the receiving economy. The tourism industry is therefore a key component of the receiving economy.

Tourism is a combination of visitors' consumption of goods and services which include transportation, accommodation, food and beverage, recreation and entertainment, travel and tour operations, and souvenirs. Within the context of the proposed exploration activity, interest is afforded to the potential impact that the exploration activity could have on the tourism industry as a whole in the receiving economy. Interest is specifically afforded to the potential of the proposed project to influence sea-based tourist activities.

The exploration right of the project (including its areas of interest) is between 120 km and 150 km from the western coast of South Africa and, therefore, sighting of exploration activities would not have a visual impact on aspects such as the scenic quality of a tourist location (a person standing at sea level will typically only be able to see approximately 4.8 km when looking out to sea), the attractiveness of a location's product offering and the potential of onshore activities to maintain their current functionality and levels of services. The potential for a well blow-out exists but research suggests that no such occurrence has yet been recorded in South Africa and that the chances of such an occurrence is fairly low.

Furthermore, spatial data shows that sea-based activities such as whale watching and cage diving do not interact and as a result will not necessarily affect the potential of these industries to maintain operations.



IDENTIFICATION OF IMPACTS

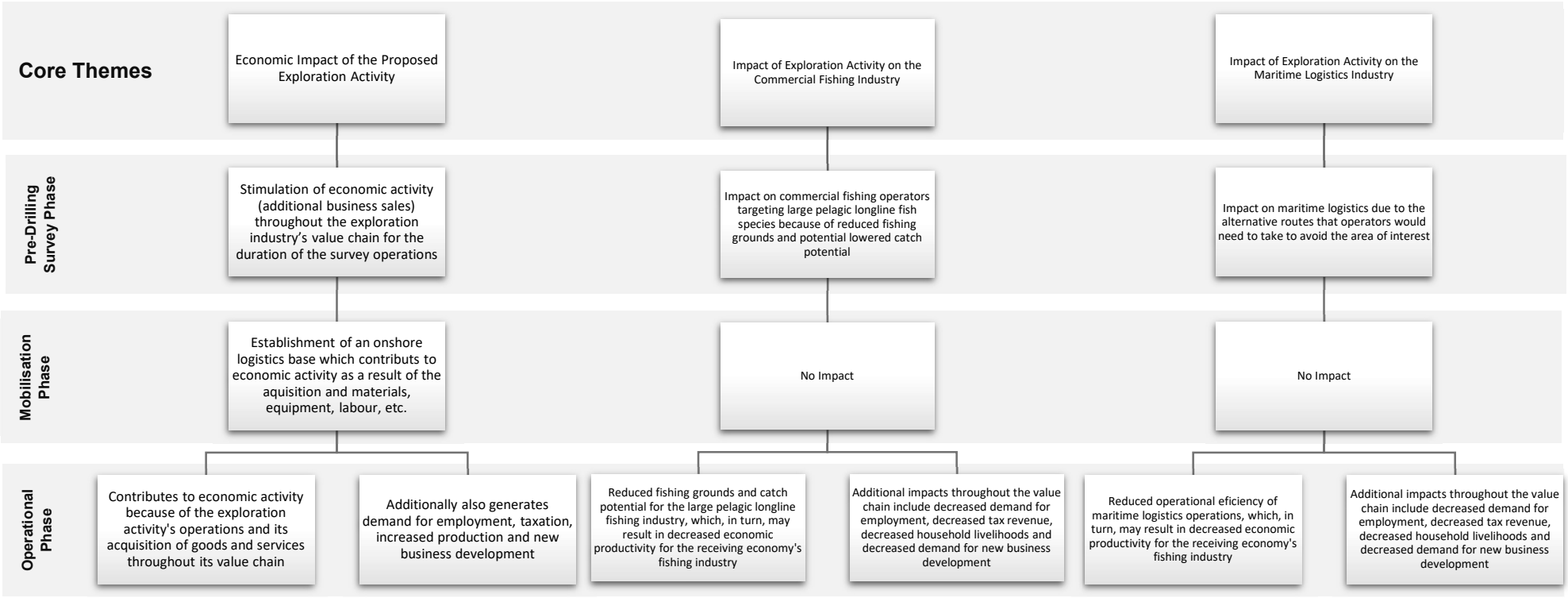
The preceding sections identified several economic impacts that may arise as a result of the proposed exploration activity. A summary of the key potential impacts is provided in the following table. The economic impact summary provides input into the quantitative and qualitative economic impact assessment.

Impact Theme	Predicted Impacts
Economic impacts created as a result of the normal operation of the exploration activity	• Temporary increase of economic output of the professional business services sector due to the operational expenditure of the exploration activity between the mobilisation phase and the demobilisation phase • The temporary increase in economic output in the professional business services sector stimulates the temporary demand for products and services from backward linking industries (inputs) • The temporary increase of economic output in the professional business services sector also temporarily stimulates increased economic productivity in forward linking industries (i.e., industries that generate economic output from inputs derived from the professional business services sector) • The temporary increase in economic output produces unsustained additional gross domestic product • As a result of the additional unsustained economic activity, fiscal benefits in the form of taxes are generated that contribute towards the national fiscus • The temporary nature of the exploration activity will, for the duration of exploration activities, stimulate additional temporary employment opportunities at various skills levels • Because of the employment opportunities created by the exploration activity and its value-chain, temporary upgrades to household livelihoods could be generated
Normal operations of the exploration activity could temporarily disrupt commercial fishing operations that overlap with the project's area of interest	• Temporary disruption of commercial fishing operations in the area of interest could influence the economic output generated by the large pelagic longline fishing industry during the exploration activity • The temporary disruption of commercial fishing activities could temporarily impact on the economic productivity of backward and forward linking industries (value chain) • The temporary disruption of commercial fishing activities could create unsustained impacts on the potential of the value chain to generate fiscal benefits in the form of taxes – detracts from the total amount of tax revenue generated by the national fiscus • The temporary disruption of commercial fishing activities could, for the duration of exploration activities, lower the demand for employment throughout the value chain • Because demand for employment could be lowered temporarily, the livelihood of households could be affected because less renumeration is generated throughout the value chain
Normal operations of the exploration activity could temporarily disrupt commercial maritime logistics operations because of an overlap between the general routes travelled by cargo and tanker ships to the main ports of Cape Town and Saldanha Bay	• Temporary disruption of maritime logistics operations in the area of interest could influence the economic output generated by the transport and storage industry during the exploration activity • The temporary disruption of maritime logistics along general routes travelled could temporarily impact on the economic productivity of backward and forward linking industries (value chain) • The temporary disruption of maritime logistics could create unsustained impacts on the potential of the value chain to generate fiscal benefits in the form of taxes, import levies, customs duties, etc. – detracts from the total amount of tax revenue generated by the national fiscus • The temporary disruption of maritime logistics could, for the duration of exploration activities, lower the demand for employment throughout the value chain • Because demand for employment could be lowered temporarily, the livelihood of households could be affected because less renumeration is generated throughout the value chain

CORE ECONOMIC IMPACT THEMES

Based on the profiling and analysis of the receiving economy, a range of overarching economic impacts associated with the exploration activity has been identified. These overarching impacts serve as core themes within which specific economic impacts related to each theme have been identified. The identified impacts are also associated with specific project phases, allowing for a comprehensive review of economic impacts throughout the project process.

The diagram presents an overview of the core economic impact themes associated with the proposed exploration activity, along with the specific economic impacts identified for each theme.



UNPLANNED EVENTS

Apart from the potential impacts that could arise during the exploration activity, it is necessary to consider any effects that could result from unplanned events. Unplanned events in this instance refers to unlikely events or occurrences that could generate economic and associated impacts on the receiving economy and its value chains as a result of the exploration activity.

For the purposes of this study, the analysis of unplanned events focusses on the economic impacts that may arise from a subsea blow-out of an exploration well being drilled in the area of interest of the exploration activity (otherwise referred to as a 'blow-out'). Two oil spill scenarios have been identified from the updated Oil Spill Drift Modelling Report (2024). The first scenario refers to a subsea blow-out of a condensate hydrocarbon whilst the second scenario considers a subsea blow-out of crude oil. Because of the capacity of such scenarios to create far reaching environmental, social and economic impacts, the potential of such scenarios must be considered.

Based on the considerations of the Technical Report, two unplanned event scenarios are considered in this Report. The first scenario is the economic impact assessment of a condensate hydrocarbon subsea blow-out event, and the second scenario is an economic impact assessment of a crude oil subsea blow-out event.

The following diagrams present an overview of the core economic impact themes associated with each well blow-out scenario modelled for the proposed exploration activity, along with the specific economic impacts identified for each theme.

Condensate and Crude Oil Hydrocarbon Oil Spill Event Scenario Core Themes

Core Themes	Economic Impact of the Capping Only Oil Spill Response Strategy		Impact of Well Blow-Out Event on the Commercial Fishing Industry		Impact of Well Blow-Out Event on the Maritime Logistics Industry		Impact of Well Blow-Out Event on the Maritime Tourism Industry	
Impact Description	Stimulation of economic activity (additional business sales) throughout the response activity's value chain for the duration of the response operations		Impact on commercial fishing operators because of reduced fishing grounds and potential lowered catch potential		Impact on maritime logistics due to the alternate routes that operators would need to take to avoid oil spill affected areas		Impact on maritime tourism (cruise tourism) due to disruptions to cruise line operations, as vessels may need to use alternative routes, or temporarily postpone trips along popular routes	
Blow-Out Response Phase	Contributes to economic activity because of the exploration activity's operations and its acquisition of goods and services throughout its value chain	Additionally also generates demand for employment, taxation, increased production and new business development	Reduced fishing grounds and catch potential for the several commercial fishing industries, which in turn, may reault in decreased economic productivity for the receiving eocnomy's fishing industry	Additional impacts throughout the value chain include decreased demand for employment, decreased tax revenue, decreased household livelihoods and decreased demand for new business development	Reduced operational efficiency of maritime logistics operations, which in turn, may result in decreased economic productivity for the receiving economy's logistics industry	Additional impacts throughout the value chain include decreased demand for employment, decreased tax revenue, decreased household livelihoods and decreased demand for new business development	Reduced operational efficiency of maritime tourism operations, which in turn, may result in decreased economic productivity for the receiving economy's tourism industry	Additional impacts throughout the value chain include decreased demand for employment, decreased tax revenue, decreased household livelihoods and decreased demand for new business development

QUANTITATIVE ECONOMIC IMPACT ASSESSMENT

The exploration activity is expected to positively impact the receiving, provincial, and national economy. However, there may be temporary disruptions to commercial fishing operations and maritime logistics due to restricted access to current fishing areas and shipping routes. The estimated cost of drilling five wells over a four-month period is approximately R799.3 million, which would significantly contribute to the economy. On the other hand, temporary disruptions to the commercial fishing industry and maritime logistics could lead to a loss of around R166.2 million in the economy during the same period.

The economic impact model shows that the exploration activity's net operational value added would result in a gain for the economy, temporarily contributing approximately R4.1 billion in additional business sales and R2.2 billion in gross domestic product during the four-month period. However, the fishing and maritime logistics industries may temporarily experience a decrease of R783.9 million in business sales and R392.0 million in gross domestic product.

The exploration activity is expected to stimulate about 4 960 temporary formal and informal employment opportunities, but the fishing and maritime logistics industries may witness a temporary decrease in the demand for jobs (approximately 905 employment opportunities during the exploration period).

In terms of increasing livelihoods, the exploration activity is projected to temporarily stimulate additional compensation for temporary jobs (approximately R1.0 billion) and increase household incomes by R2.0 billion during the four-month period. However, compensation of employees in basic sectors such as fishing and logistics may be temporarily disrupted, potentially leading to a temporary burden on the community in terms of access to services and amenities. The exploration activity could also result in the temporary subtraction of around R184.1 million in employee compensation from the national economy and more than R362 million from household incomes.

The increased economic activity could lead to demand for new businesses. Given the impact of the project, new business opportunities could be established but given the temporary nature of the exploration activity, the realisation of long-term business establishment may be limited.

Economic Impact Name	Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Economic Value Added/Subtracted by Each Industry	R799 312 500	-R8 073 606	-R158 110 447	R633 128 447
Additional Business Sales	R4 061 029 119	-R40 170 864	-R743 737 363	R3 277 120 893
Additional Gross Domestic Product	R2 167 557 675	-R20 519 290	-R371 494 208	R1 775 544 176
Additional Taxes	R457 531 182	-R5 598 161	-R85 238 226	R366 694 794
Additional Formal Employment Compensation	R894 220 316	-R8 121 259	-R152 769 752	R733 329 305
Additional Household Income	R2 037 219 144	-R19 511 928	-R342 823 163	R1 674 884 053
Additional Formal Employment	4 196	-51	-692	3 454
Additional SMME Opportunities	50	-1	-10	40
Additional SMME Opportunities (Black Owned)	37	0	-7	29

QUANTITATIVE IMPACT ASSESSMENT OF A CONDENSATE WELL BLOW-OUT SCENARIO

The occurrence of a condensate well blowout scenario has the potential to generate economic activity through expenditure on oil spill response strategies, while simultaneously disrupting the economic activity of industries such as commercial fishing, maritime logistics, and maritime tourism, which are affected by an oil spill event.

Expenditure on an oil spill response strategy, estimated to be approximately R342.6 million over a 2-month period, contrasts with disruptions to the economic output of the commercial fishing and maritime logistics industries. This may lead to a combined reduction in economic activity of approximately R16.6 million during the same period.

According to the economic impact model, oil spill response expenditure could generate economic activity that, due to the multiplier effect throughout the economy, contributes approximately R1.7 billion in additional business sales and R929.0 million in gross domestic product over the two-month period. However, the fishing, maritime logistics, and maritime tourism sectors may experience temporary disruptions totalling R78.4 million in business sales and R39.2 million in gross domestic product.

Expenditure on an oil spill response strategy is projected to temporarily stimulate additional compensation for temporary jobs (approximately R383.2 million) and increase household incomes by R873.1 million during the two-month period. Conversely, compensation for employees in sectors such as fishing and logistics may experience temporary disruptions, resulting in reduced employee compensation (R16.1 million) and household income (R36.2 million) across all disrupted industries.

While the heightened economic activity may stimulate demand for new businesses, the temporary nature of the response strategy may limit the realisation of long-term business establishment. In summary, expenditure on an oil spill response strategy could generate multiplier effects throughout the economy due to increased economic activity, while disruptions to several economic sectors resulting from an oil spill event could reduce economic output and activity in affected industries and their value chains.

Economic Impact Name	Economic Impacts Created as a Result of the Capping Only Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Economic Value Added/Subtracted by Each Industry	R342 562 500	-R807 361	-R15 811 045	R325 944 095
Additional Business Sales	R1 740 441 051	-R4 017 086	-R74 373 736	R1 662 050 228
Additional Gross Domestic Product	R928 953 289	-R2 051 929	-R37 149 421	R889 751 939
Additional Taxes	R196 084 792	-R559 816	-R8 523 823	R187 001 153
Additional Formal Employment Compensation	R383 237 278	-R812 126	-R15 276 975	R367 148 177
Additional Household Income	R873 093 919	-R1 951 193	-R34 282 316	R836 860 410
Additional Formal Employment	1 798	-5	-69	1 724
Additional SMME Opportunities	22	0	-1	20
Additional SMME Opportunities (Black Owned)	16	0	-1	15

QUANTITATIVE IMPACT ASSESSMENT OF A CRUDE OIL WELL BLOW-OUT SCENARIO

The occurrence of a crude oil well blowout scenario has the potential to generate economic activity through expenditure on oil spill response strategies, while simultaneously disrupting the economic activity of industries such as commercial fishing, maritime logistics, and maritime tourism, which are affected by an oil spill event.

Expenditure on an oil spill response strategy, estimated to be approximately R342.6 million over a 2-month period, contrasts with disruptions to the economic output of the commercial fishing industry, maritime logistics, and maritime tourism industry. This may lead to a combined reduction in economic activity of approximately R231.8 million during the same period.

According to the economic impact model, oil spill response expenditure could generate economic activity that, due to the multiplier effect throughout the economy, contributes approximately R1.7 billion in additional business sales and R929.0 million in gross domestic product over the two-month period. However, the fishing, maritime logistics, and maritime tourism sectors may experience temporary disruptions totalling R1.1 billion in business sales and R559.1 million in gross domestic product.

Expenditure on an oil spill response strategy is projected to temporarily stimulate additional compensation for temporary jobs (approximately R383.2 million) and increase household incomes by R873.1 million during the two-month period. Conversely, compensation for employees in sectors such as fishing, logistics, and tourism may experience temporary disruptions, resulting in reduced employee compensation (R257.1 million) and household income (R521.4 million) across all disrupted industries.

While the heightened economic activity may stimulate demand for new businesses, the temporary nature of the response strategy may limit the realisation of long-term business establishment. In summary, expenditure on an oil spill response strategy could generate multiplier effects throughout the economy due to increased economic activity, while disruptions to several economic sectors resulting from an oil spill event could reduce economic output and activity in affected industries and their value chains.

Economic Impact Name	Economic Impacts Created as a Result of a Full Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Maritime Tourism Operations	Total Quantified Economic Impact
Economic Value Added/Subtracted by Each Industry	R342 562 500	-R75 567 254	-R36 487 026	-R119 742 857	R110 765 363
Additional Business Sales	R1 740 441 051	-R375 990 840	-R171 631 699	-R563 259 661	R629 558 851
Additional Gross Domestic Product	R928 953 289	-R192 056 244	-R85 729 433	-R281 346 228	R369 821 384
Additional Taxes	R196 084 792	-R52 397 609	-R19 670 360	-R64 554 044	R59 462 779
Additional Formal Employment Compensation	R383 237 278	-R76 013 277	-R35 254 558	-R115 698 152	R156 271 291
Additional Household Income	R873 093 919	-R182 627 539	-R79 113 038	-R259 632 591	R351 720 751
Additional Formal Employment	1 798	-475	-160	-524	640
Additional SMME Opportunities	22	-5	-2	-8	7
Additional SMME Opportunities (Black Owned)	16	-3	-2	-5	5

QUALITATIVE IMPACT ASSESSMENT

The following table presents an overview of the qualitative impact assessment, emphasising the final impact significance rating along with its descriptive context.

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Stimulation of economic activity (additional business sales) throughout the exploration industry's value chain for the duration of the survey operations	Pre-Drilling Surveys	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on commercial fishing operators targeting large pelagic longline fish species because of reduced fishing grounds and potential lowered catch potential	Pre-Drilling Surveys	-1	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on maritime logistics operations because of disrupted shipping routes to major ports along the South African coast. Alternate routes could impact on the economic efficiency of maritime logistics	Pre-Drilling Surveys	-1	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The establishment of the onshore logistics base could create temporary employment opportunities for skilled labour	Mobilisation Phase	11	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Employment opportunities created by the logistics base could provide compensation to employees that could contribute toward household livelihoods and their access to services and amenities	Mobilisation Phase	8	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The economic activity stimulated by the sourcing of inputs for exploration activities could increase the fiscus of government through fiscal benefits in the form of taxation (personal, business, production, product, imports, etc)	Mobilisation Phase	12	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The sourcing of materials, equipment and associated services could generate additional business sales throughout the exploration industry's value chain – businesses providing inputs to the exploration industry could benefit from an increase in sales and economic output	Mobilisation Phase	12	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Additional employment opportunities could be created throughout the exploration industry's value chain due to increased demand generated for goods and services	Mobilisation Phase	6	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Mobilisation Phase	9	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Mobilisation Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

QUALITATIVE IMPACT ASSESSMENT

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Proposed Exploration Activity	The operational phase of the exploration activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the operational period of exploration could lead to additional business sales throughout the exploration industry's value chain (increased economic output, production and gross value added)	Operational Phase	15	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	New employment opportunities throughout the exploration industry's value chain could be stimulated as a result of the increased demand generated by the proposed exploration activity	Operational Phase	10	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The logistics base of the exploration activity sustains skilled employment opportunities for the duration of exploration activities	Operational Phase	10	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The employment opportunities created directly (i.e., through the projects logistics base) or indirectly (i.e., throughout the exploration industry's value chain) by the proposed exploration activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	14	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The exploration activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result increases the fiscal value (i.e., taxes) collected by government	Operational Phase	14	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The exploration activity further contributes toward a basic sector of the economy and therefore assists with maintaining the economic functionality of the receiving economy by providing a basis from which SMME development could occur	Operational Phase	8	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Operational Phase	9	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	The proposed exploration activity could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that exploration activities could not be a long-term sustained operation	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

QUALITATIVE IMPACT ASSESSMENT

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	The temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	The proposed exploration activities' area of interest overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities could not be a long-term sustained operation	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decrease of economic productivity in the receiving economy's transport and storage industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	The temporary decrease of economic productivity in the receiving economy's transport and storage industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Given the analyses provided in this section, the data suggests that the proposed exploration activity could create net benefits to the receiving economy and as result offer enhanced economic output and development. The negative effects created by the exploration project on the receiving economy and specific industries in the receiving economy could be minimised through effective and coordinated planning (which includes coordinated planning with interested and affected parties).

QUALITATIVE IMPACT ASSESSMENT OF A CONDENSATE AND CRUDE OIL WELL BLOW-OUT SCENARIO

Supplementing the quantitative analysis, the qualitative impact assessment of each oil spill scenario highlights the contrast between the economic effects of expenditure during an oil spill response and the disruptions to economic activity and output caused by industries affected by such an event.

The qualitative analysis reveals that expenditure during an oil spill response could trigger multiplier effects throughout the economy, particularly by increasing demand for goods and services essential for addressing oil spill incidents. This heightened demand is intertwined with impacts on the value chain supporting oil spill responses, potentially leading to temporary increases in employment and subsequent compensation within the economy.

Conversely, a well blowout event could disrupt industries such as commercial fishing, maritime logistics, and maritime tourism (including cruise tourism), resulting in decreased economic output and activity. These disruptions could ripple through the value chains supporting these sectors. In the case of a condensate hydrocarbon spill scenario, the impact is generally confined to a smaller area compared to a crude oil hydrocarbon spill event. However, the severity, duration, and reversibility of impacts are amplified in the context of a crude oil hydrocarbon spill.

Nevertheless, it's crucial to emphasize that implementing a robust oil spill response strategy, coupled with effective coordination with relevant industries, has the potential to mitigate some of the disruptive effects on fishing locations, shipping lanes, and cruise tourism activities. Additionally, mitigation measures identified within environmental, marine ecology, fishing industry, and social specializations could further aid in mitigating potential disruptive effects of oil spills on economic output and activity.

The following tables present an overview of the qualitative impact assessment of a condensate and crude oil well blow-out scenario, emphasising the final impact significance rating along with its descriptive context.

Qualitative Impact Assessment of a Condensate Hydrocarbon Blow-Out Scenario

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The capping only Oil Spill Response Strategy for a well blow-out scenario could generate demand for goods and services necessary to sustain operational activities. The demand created during the response period could lead to additional business sales throughout the response activity's value chain (increased economic output, production and gross value added)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

QUALITATIVE IMPACT ASSESSMENT OF A CONDENSATE AND CRUDE OIL WELL BLOW-OUT SCENARIO

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event	Operational Phase	-2	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-2	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Qualitative Impact Assessment of a Crude Oil Hydrocarbon Blow-Out Scenario

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The oil spill response activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the response period of exploration could lead to additional business sales throughout the response industry's value chain (increased economic output, production and gross value added)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

QUALITATIVE IMPACT ASSESSMENT OF A CONDENSATE AND CRUDE OIL WELL BLOW-OUT SCENARIO

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline, tuna pole-line, demersal trawl and demersal longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	The occurrence of a well blow-out event and the resultant presence of crude oil could impact the recruitment and replacement of commercial fish stocks. An overlap exists between passively drifting spawn products (eggs and larvae) and areas with a low to moderate probability of oil spills (20% to 40%). This overlap could potentially lead to reduced recruitment rates and/or loss of stock of commercial fish species. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential		-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of a Well Blow-Out Event on the Maritime Tourism Industry	· The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used cruise tourism routes. This overlap may result in disruptions to cruise line operations, as vessels may need to use alternative routes, or temporarily postpone trips along popular routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's tourism and transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event		-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

CONCLUSION

National and provincial development planning identify the need to undertake exploration activities to identify and quantify natural gas and associated petroleum resources and exploitation opportunities. The National Marine Spatial Planning Framework acknowledges the need for a regulatory framework within which exploration can occur, especially within offshore locations where a sizeable concentration of South Africa's hydrocarbon deposits are located. Furthermore, the National Development Plan identifies the potential of hydrocarbon reserves along the West Coast of South Africa as a commercial option within the South African economy and its potential as a long-term growth driver.

Although the production of petroleum resources in South Africa's offshore economic zones is limited, data suggests that exploration activities have been accelerating over the past 10-years. Data shows that approximately 50% of the South African Maritime Exclusive Economic Zone (EEZ) has been allocated to either an exploration right, production right or has some form of exploration or production right pending. The West Coast of South Africa represents a prominent offshore exploration area within which new production locations are being established and which could, in future, be a key location where offshore production activities are located.

Given that exploration of hydrocarbon resources is identified at various planning levels as a key development opportunity for the national economy and given the accelerating interest in offshore exploration in South Africa, the proposed exploration activity within the Block 3B/4B Exploration Right algins with national and provincial development aspirations and trends.

Besides the exploration activity's alignment with national and provincial planning objectives and aspirations, the exploration activity could impact on the receiving environment/economy within which it is located. Analysis of the proposed exploration activity within the context of the receiving economy shows that exploration activities could directly and indirectly impact on the receiving economy. The direct impact could manifest in the form of the multiplier effect of economic output generated by the industry throughout its value chain and consequently encourage additional output, gross value added, livelihood improvements, and employment. Indirect impacts occur as a result of the exploration activity altering key inputs and dependencies of the receiving economy by disrupting the status quo of industries and in effect creating a multiplier effect throughout an industry's value chain.

Further analyses of the exploration activity within the context of the receiving economy identified various economic impacts associated with the exploration activity. These impacts fall under three core themes: direct economic impact from the exploration activity itself, the exploration activity's impact on the commercial fishing industry, and the exploration activity's impact on the maritime logistics industry.

Considering the preceding impacts within the context of the quantitative impact assessment reveals that during the exploration project's lifespan, the commercial fishing and maritime logistics industries may experience temporary reductions in economic productivity. The reduction of economic productivity is a result of operational disruptions caused by the exploration activity in the form of reduced fishing areas and limited access to traditional shipping routes. The disruptions lead to impacts on the industries' (and their value chains) capacity to produce economic output and as a result sustain employment demand, generate new business opportunities, support household livelihoods and the generation of taxes. However, the positive gains from the exploration activity are expected to outweigh these negative impacts. The economic impact model shows that the economy could experience a net gain during the project's operation, with increased business sales, GDP, and job opportunities created as a result of the sizeable operational expenditure required to undertake the exploration activity.

Additionally, the qualitative impact assessment indicates that the proposed exploration activity could have a positive impact on the receiving economy during its operation. While negative effects on the commercial fishing and maritime logistics industries are anticipated, these impacts can be managed through coordinated mitigation strategies.

During the pre-drilling phase, the survey of drilling locations by a survey vessel may disrupt fishing and logistics operations, but coordinating survey activities with these industries can minimise the impact.

CONCLUSION

The mobilization phase, focused on establishing an onshore logistics base, is expected to generate positive economic benefits such as additional business transactions throughout the exploration industry's value chain, additional employment, and increased taxes. However, it may also impose additional stresses on bulk infrastructure, leading to an increased maintenance burden.

The qualitative analysis also identifies that the operational phase is expected to have overall positive impacts on the receiving, provincial, and national economy. It could stimulate demand for goods, services, and employment throughout the value chain, leading to business growth and additional tax revenue. Nevertheless, it may negatively affect the commercial fishing and logistics industries, impacting production, employment, GDP, and business growth. Coordinating exploration activities and fishing/logistics operations coupled with strategies for job retention and skills development can mitigate these negative effects.

Based on the analyses conducted in this report, outcomes suggest that the proposed exploration activity has the potential to create net benefits for the receiving economy during its operational period. The positive impacts identified in the economic impact assessments indicate that the exploration activity could generate additional economic value, stimulate various sectors, and contribute to overall economic growth. It is, however, important to note that the exploration activity offers short-term economic benefits (i.e., operational period of between 20 and 24 months) and therefore would only create additional value for a defined period of time.

Furthermore, exploration activities can also have negative effects on the receiving economy and specific industries within it. These potential negative impacts include disruptions to commercial fishing and maritime logistics operations, which can lead to temporary reductions in economic output, employment, and growth in these industries.

To mitigate these negative effects and maximise the positive outcomes, effective and coordinated planning is crucial. This entails collaborating with all interested and affected parties, including local communities, businesses, and relevant government agencies. By involving stakeholders from the outset, it is possible to assess potential challenges and identify strategies to minimise adverse impacts. Coordinated planning can ensure that exploration activities are carefully scheduled and coordinated with fishing and logistics operations to minimise disruptions. It is also important to acknowledge that because the exploration activity's operational period is defined, the disruptive effects of the exploration activity is temporary and not sustained.

Apart from the potential impacts that could arise during the exploration activity, it is necessary to consider any effects that could result from unplanned events. Unplanned events in this instance refers to unlikely events or occurrences that could generate economic and associated impacts on the receiving economy and its value chains as a result of the exploration activity.

For the purposes of this study, the analysis of unplanned events focusses on the economic impacts that may arise from a subsea blow-out of an exploration well being drilled in the area of interest of the exploration activity (otherwise referred to as a 'blow-out'). Two oil spill scenarios have been identified from the updated Oil Spill Drift Modelling Report (2024). The first scenario refers to a subsea blow-out of a condensate hydrocarbon whilst the second scenario considers a subsea blow-out of crude oil. Because of the capacity of such scenarios to create far reaching environmental, social and economic impacts, the potential of such scenarios must be considered.

The economic impact of a well blow-out event on the economy can influence the equilibrium of an economy based on changes to economic activity within the sectors or industries affected by an oil spill event. In the context of this report, economic activity in the receiving economy is influenced by expenditure on spill response strategies whilst industries such as commercial fishing, maritime logistics and maritime tourism could experience reduced operational efficiency which could impact on the economic output produced by these industries and their value chains.

The economic impact model demonstrates the ripple effect of oil spill response expenditure (multiplier effect) within the South African economy. An estimated South African expenditure of approximately R342.6 million, could generate approximately R1.7 billion in additional business sales and contribute approximately R929.0 million to the gross domestic product over the total response period. Heightened economic activity may create demand for 1,800

CONCLUSION

temporary jobs, resulting in over R383.2 million in employee compensation and potentially stimulating more than R196.1 million in additional taxes throughout the response period.

However, the potential disruptions caused by oil spill events, particularly for industries like commercial fishing, maritime logistics, and maritime tourism, could hinder operational efficiency and affect economic output. In the case of a condensate hydrocarbon spill, disruptions to affected industries totalling approximately R16.6 million could occur, while in the context of a crude oil hydrocarbon spill scenario, greater disruptions totalling approximately R231.8 million in economic output could occur across the affected industries. Based on the multiplier effect of changes to economic activity and given the context of the condensate and crude oil spill scenarios, between R78.4 million and R1.1 billion in additional business sales and between R39.2 and R559.1 million additional gross domestic product could be disrupted in affected industries (commercial fishing, maritime logistics and maritime tourism) throughout the economy per scenario tested.

The quantitative economic impact modelling of condensate and crude oil hydrocarbon spill scenarios reveals potential reductions in economic output and activity across commercial fishing, maritime logistics, and maritime tourism industries during a well blowout and response phase. Conversely, expenditures on oil spill response strategies can stimulate additional economic activity through the multiplier effect. Yet, disruptions and changes are temporary, tied directly to the response period lasting 1 to 2 months. Residual impacts, notably in the commercial fishing industry, may persist due to crude oil spills' effects on fish recruitment rates, particularly evident in crude oil hydrocarbon spill scenarios.

These shifts in economic productivity and output extend to various levels—receiving, provincial, and national economies—driven by expenditures across industry value chains affected by or benefiting from oil spill responses. This economic activity not only affects employment demand but also entails fiscal implications and encourages additional consumption expenditure. However, the implementation of a robust oil spill response strategy, coupled with effective coordination with relevant industries, holds promise in mitigating disruptive effects on fishing locations, shipping lanes, and cruise tourism activity.

1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

DEMACON Market Studies have been appointed by Environmental Impact Management Services (EIMS) as a sub-consultant to offer specialist inputs and analyses for a scoping and environmental impact assessment (EIA) process related to an EIA required to support Africa Oil South Africa Corp's (AOSAC) Offshore Exploration of Block 3B/4B.

At present, AOSAC is the holder of an exploration right for the above-mentioned affected area and as a result can undertake exploration activities, i.e., the proposed project is currently in the exploration phase. Although AOSAC has completed a reprocessing project of 3D seismic datasets for the area affected, further appraisal is proposed by drilling several wells to confirm the hydrocarbon prospect of the exploration right area.

Diagram 1.1: Simplified Establishment Process

Source: DEMACON ex LRC, 2023

DEMACON Market Studies' role is to undertake an Economic Impact Assessment of the proposed offshore exploration activity (drilling of exploration wells) proposed by AOSAC. The purpose of the economic impact assessment is to assess the likely effect that the proposed exploration activity could have on the receiving environment's overarching economic context. The assessment, therefore, assists with the quantification of the overall economic impact of exploration activities by identifying and measuring impacts that could contribute or subtract from the established economic ecosystem of the project's receiving environment.

Considering the preceding, the economic impact assessment forms part of a range of specialist studies that will inform the overall outcome and conclusions of the EIA report.

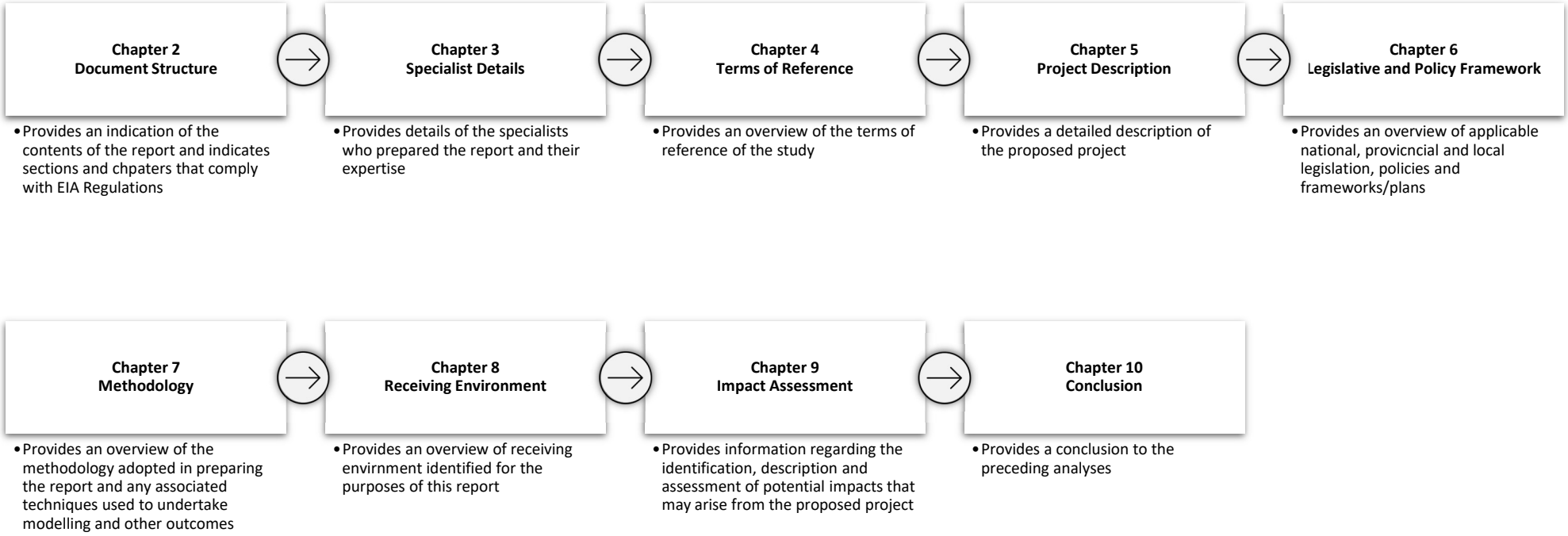
1.2 REPORT LAYOUT

The purpose of this section is to provide an overview of the layout of the report and to provide an indication of the high-level purpose of each chapter in the document.

The report's layout seeks to, so far as possible, align with the reporting requirements identified by EIMS and if necessary certain sections/chapters as identified by the EIMS reporting structure have been combined in order to facilitate the analyses contained in the report.

The following diagram (overleaf) provides a high-level outline of the following report and briefly describes the content of each chapter of the report.

Diagram 1.2: Report Outline



2 DOCUMENT STRUCTURE

2.1 INTRODUCTION

Chapter 2 of the report provides a guide to the structure of the report. The purpose of the structure guide is to highlight the location of information within this document that corresponds with the requirements of the EIA Regulations of 2014 (as amended).

2.2 DOCUMENT STRUCTURE

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 2.1 below.

Table 2.1: Report Structure

Environmental Regulation	Description	Section in Report
NEMA EIA Regulations 2014 (as amended)		
Appendix 6 (1)(a):	Details of – the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section3.2 Section 3.3
Appendix 6 (1)(b):	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
Appendix 6 (1)(c):	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1 Section 4.2
Appendix 6 (1)(cA):	an indication of the quality and age of base data used for the specialist report;	Section 8.4 Section 9.2 Section 9.4.1
Appendix 6 (1)(cB):	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 9.5
Appendix 6 (1)(d):	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
Appendix 6 (1)(e):	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 7.2
Appendix 6(1)(f):	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 8.4
Appendix 6(1)(g):	an identification of any areas to be avoided, including buffers;	Section 8.4
Appendix 6(1)(h):	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 8.4
Appendix 6(1)(i):	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 9.2 Section 9.4 Section 9.5
Appendix 6(1)(j):	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section9.4.2 Section 9.6

Environmental Regulation	Description	Section in Report
		Section 10.2
Appendix 6(1)(k):	any mitigation measures for inclusion in the EMPr;	Section 9.5
Appendix 6(1)(l):	any conditions for inclusion in the environmental authorisation;	Section 10.2
Appendix 6(1)(m):	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9.5.4
Appendix 6(1)(n):	a reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 9.6 Section 10.2
Appendix 6(1)(o):	a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
Appendix 6(1)(p):	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
Appendix 6(1)(q):	any other information requested by the competent authority.	N/A

3 SPECIALIST DETAILS

3.1 INTRODUCTION

Chapter 3 provides an overview of the specialists who form part of the team that participated in preparing this report. A curriculum vitae for each of the team embers is attached as annexures for this report.

3.2 DR. HEIN DU TOIT

Economic Assessment Specialist

Name: Dr Hein du Toit

Date of Birth: 12 February 1972

Profession: Development Economist and Market Analyst

Years of Experience: 28 years

Education:

- University of Pretoria (Cum Laude), 1991 – 1994 BTRP
- University of Pretoria (Cum Laude), 1999 – 2002 MSc (Real Estate)
- University of Pretoria in association with SAPOA, 2005 (Cum Laude) Certificate in Shopping Centre Management (CSCM)
- University of Pretoria (2018) PhD (Real Estate)

Dr Hein du Toit. Hein du Toit is the Managing Director and founding member of DEMACON Market Studies. Hein is a specialist development economist and expert real estate analyst. He obtained a degree in Town and Regional Planning (Cum Laude) at the University of Pretoria in 1994 and a Masters Degree (MSc) in real estate market studies in 2002 (Cum Laude). He has completed specialist courses in, inter alia, Industrial Cluster Development for Cluster Practitioners (1999) and Shopping Centre Management – the Certificate in Shopping Centre Management (CSCM) in 2005 (Cum Laude). Hein completed his PhD in real estate market analytical techniques in 2018 and was awarded Academic Honorary colours by the University of Pretoria in 2002 and in 2018. His research has been published in, inter alia, the South African Journal of Economic and Management Sciences as well as the international Journal of Business and Retail Management Research. Hein was invited to read a paper on his research at the International Real Estate Conference in Brisbane in January 2003. He has also been invited as presenter to the South African Council of Shopping Centres' Research Conference. Hein has more than 26 years field related experience. He has over the years been affiliated with various professional bodies and organisations, including the SA Property Owners Association (SAPOA), the SA Council of Shopping Centres (SACSC), the International Council of Shopping Centres (ICSC), SA Planning Institution (SAPI) and the South African Research and Innovation Management Association (SARIMA). He has been extensively involved in real estate market studies both locally and beyond SA borders including Angola, Botswana, Burundi, Central African Republic, Ghana, Mozambique, Namibia, People's Republic of China, Swaziland, The Gambia and Zambia. His fields of expertise include, inter alia, real estate market studies, urban and rural economics, as well as economic and fiscal impact assessments. Hein regularly consults to SA's leading commercial banks, listed funds, private funds, investors and developers, advocates' chambers, attorneys, economic development agencies, all tiers of government (national, provincial, metropolitan/local) as well as parastatals, etc. Hein is part-time lecturer and guest lecturer for Bachelor and Master degree students. Hein periodically acts as external examiner and study leader for post graduate students.

3.3 JEAN-PIERRE DU PLESSIS

Economic Assessment Specialist

Name: Jean-Pierre du Plessis

Date of Birth: 03 May 1986

Profession: GIS Specialist and Market Analyst

Years of Experience: 11 years

Education:

- University of Pretoria (2005 – 2008) - Bachelors Degree – Town and Regional planning
- ESRI South Africa (2014) - SAQA Accredited ArcGIS Basic Course: NQF 5 and 6

- ESRI South Africa (2014) - SAQA Accredited ARCGIS Standard Course: NQF 4 and 6

Jean-Pierre du Plessis joined Demacon Market Studies in 2016. Jean-Pierre obtained his Baccalaureus Degree in Town and Regional Planning (including economics, statistics & sociology) from the University of Pretoria in 2008. In Jean-Pierre's second year of study he was inducted into the Golden Key International Honour Society for excellence in his chosen field of study. The Town Planning course taught Jean-Pierre skills in verbal and graphic representation, strategic knowledge and approaches to urban and rural planning and skills pertaining to data gathering, capturing and analysis. Jean-Pierre is now furthering his career on a full-time basis at Demacon Market Studies. In the years following the completion of his degree, Jean-Pierre has been part of various studies and has gained excellent skills and expertise in the field of Geographic Information Systems (GIS). He has also recently completed multiple SAQA Accredited ArcGIS courses with Esri South Africa. He has ±12 years of field related experience.

In 2013, Jean-Pierre registered as a Professional Planner (PR. PLN 1/1768/2013) with the South African Council for Planners (SACPLAN).

4 TERMS OF REFERENCE

4.1 INTRODUCTION

Chapter 4 provides a detailed description of the terms of reference for the economic impact assessment. The economic impact assessment forms part of a broader scoping and EIA process and, therefore, the scope and contracted services of the economic impact assessment relates to the overarching goal and outcomes of the EIA.

4.2 PROJECT SPECIFIC TERMS OF REFERENCE

The following provides an overview of the scope and terms of reference for which DEMACON Market Studies have been appointed as a sub-contracted service provider:

a. Economic Impact Assessment;
b. Alternative Assessment and Impact rating (as per provided methodology);
c. Recommended Mitigation measures and rehabilitation measures where required for inclusion in the Environmental Management Programme;
d. Provision of GIS information for the features identified, clearly indicating feature sensitivity as per EIMS Mapping Methodology;
e. The Sub-Contracted Services shall be rendered at the following Site(s): Block 3B/4B Offshore South Africa and adjacent communities.

4.3 SYNTHESIS

The preceding shows that the focus of this report is an Economic Impact Assessment of the proposed offshore exploration activities of AOSAC in Block 3B/4B along the western coast of South Africa.

5 PROJECT DESCRIPTION

5.1 INTRODUCTION

This chapter of the report focusses on defining the proposed project. The intent of the chapter is to describe the overarching purpose of the project and its immediate and future objectives. By identifying and defining the objectives of the project and its ultimate intent, future analyses, the interpretation of data and the identification of impacts can be guided by the context of the project and its desired outcomes.

Furthermore, the chapter spatially references the project in order to understand the project's relative positioning in relation to probable areas of impact and influence. By spatially referencing the project areas of economic sensitivity can be spatially defined and measured.

5.2 DESCRIPTION OF THE PROJECT AREA

This section of the chapter provides an overview of the project area. The information contained in this section defines and describes the project area and highlights key locational characteristics that define the project's spatial considerations.

Table 2 indicates the details of the project area for the proposed project including details on the project location as well as the distance from the proposed project area to the nearest towns.

Project Area	Block 3B/4B is situated between latitudes 31°S and 33°S on the continental shelf in water depths ranging from 200 m to 2 000 m. The area of primary interest is in the north of this block, but this could also cover other areas in future. As part of the process of applying for the Exploration Right, the JV Partners undertook and completed the reprocessing project covering 2 000 km^2, which is a subset of the 10 000 km^2 BHP/Shell 3D seismic datasets, focussed primarily on the most northern portion of Block 3B/4B.
Application Area	Block 3B/4B covering an area of approximately 11 100 km^2 (approximately 1 100 000 ha)
Magisterial District	Adjacent to the Namaqualand and West Coast District Municipalities
District Municipality	Adjacent to the Namaqualand and West Coast District Municipalities
Local Municipalities	Adjacent to the Kamiesberg; Richtersveld; Nama Khoi; Matzikama; Cederberg; Bergrivier; Saldanha Bay; Swartland; and City of Cape Town Local Municipalities.

Application Area Coordinates

Point	Latitude	Longitude	Point	Latitude	Longitude
1	-31.00030518	14.74908447	12	-32.70800781	16.60467529
2	-31.00030518	15.94488525	13	-33.00018311	16.60467529
3	-31.45031738	15.94488525	14	-33.00030518	16.24932861
4	-31.45031738	15.96588135	15	-32.75030518	16.24932861
5	-31.88360596	15.96588135	16	-32.75030518	15.74908447
6	-31.88360596	16.2824707	17	-32.25030518	15.74908447
7	-32.41699219	16.2824707	18	-32.25030518	15.49908447
8	-32.41699219	16.41589356	19	-32.00030518	15.49908447
9	-32.60028076	16.41589356	20	-32.00030518	14.99908447
10	-32.60028076	16.54931641	21	-31.25030518	14.99908447
11	-32.70800781	16.54931641	22	-31.25030518	14.74908447

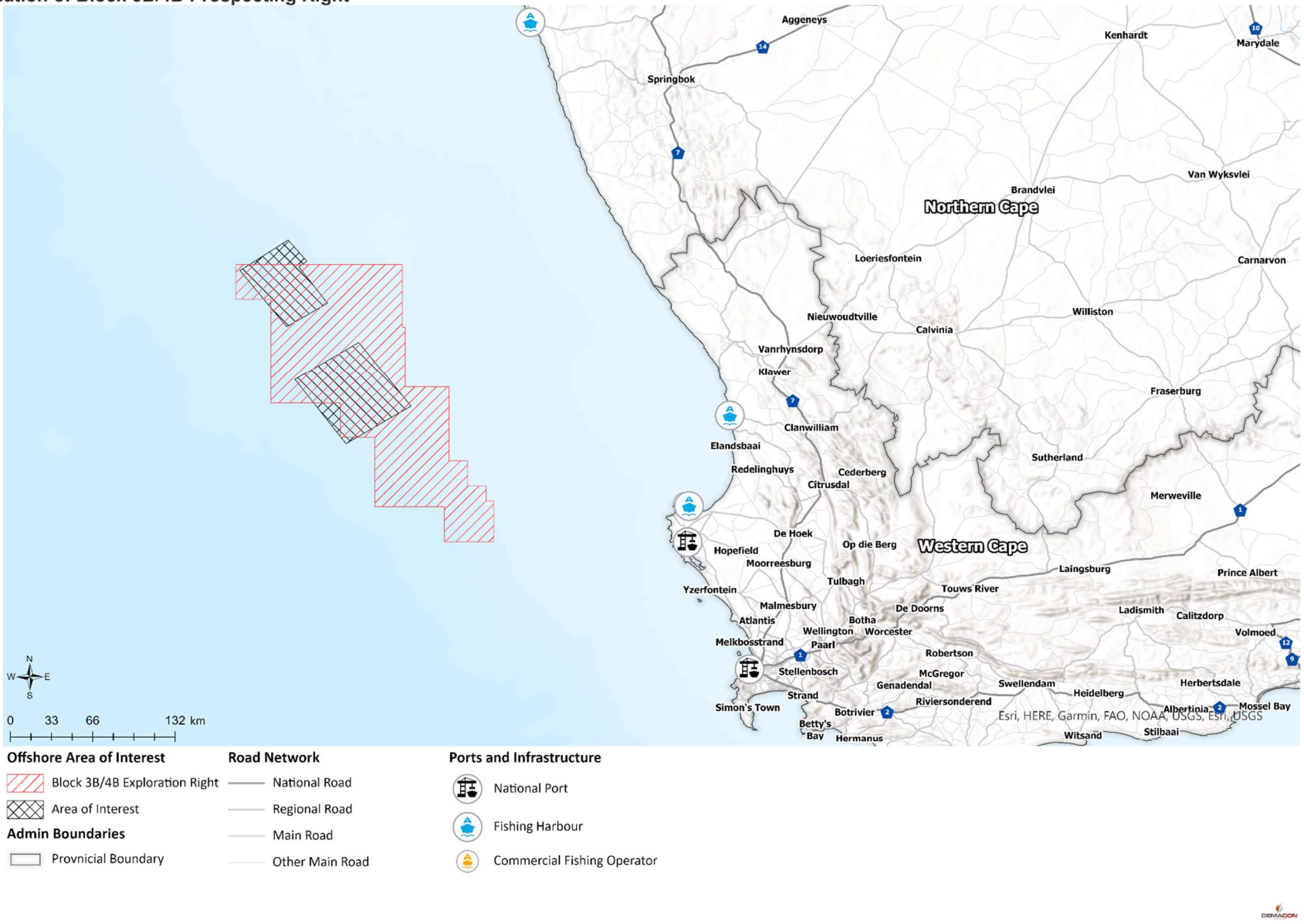
Demacon ex EIMS, 2023

The following map (overleaf) provides a spatial overview of the location of the application area (Block 3B/4B) and its relative positioning along the western coast of South Africa.

5.3 DESCRIPTION AND SCOPE OF THE PROPOSED ACTIVITY

This section provides an overview of the proposed activity. A brief history of the applicant's involvement in Block 3B/4B is provided followed by the proposed activities to be undertaken as part of this application.

Map 5.1: Location of Block 3B/4B Prospecting Right



Source: DEMACON ex EIMS, 2023

5.3.1 DESCRIPTION OF PREVIOUS ACTIVITIES UNDERTAKEN

A number of previous investigations and exploration activities have been undertaken within Block 3B/4B in the past. Approximately 14,000 km^2 of 2D seismic and 10,800 km^2 of 3D seismic data exists over Block 3B/4B. While a number of key 2D seismic lines have been acquired, the subsurface evaluation has largely utilized the extensive 3D seismic data that was acquired by PGS in 2013 for BHP Petroleum. This single 3D survey covers approximately 65% of the block and is joined in the northern part of the block by an overlapping 3D seismic survey acquired by Dolphin in 2013 for Shell. In 2022, a subset of the BHP survey was reprocessed by Down Under Geophysical (DUG) through Pre-Stack Depth Migration on behalf of the JV Partners.

An ER for Block 3B/4B was granted to Ricocure (a company that is part of the JV Partners) by the South African Agency for Promotion of Petroleum Exploration and Exploitation in terms of Section 80 of the Mineral and Petroleum Resources Development Act, 2002. The ER was signed on 9 May 2019 with an effective start date of the Initial Period of 27 March 2019 and recorded as file reference number 12/3/339. The ER allows for two additional renewal periods, each with a two-year duration. The work programme for each renewal period is negotiable. The Block 3B/4B ER requires a 20% relinquishment upon completion of the Initial Exploration Period which equates to approximately 3,516 km^2. The Applicant did not relinquish according to clause 10 of the Right, however, the Applicant applied for a waiver to the Regulator, which was granted, to allow for the finalization of the delineation of the Marine Protected Areas before selecting any areas to be relinquished.

The initial three-year exploration period expired on 26 March 2022. The Initial work programme included the following:

- Regional interpretation and mapping of key horizons and faults
- Detailed petrophysical analysis tying to neighbouring wells
- Quantitative interpretation work of the physical properties
- Basin model update integrating the regional studies
- Prospect maturation and
- Prospect ranking and final report compilation

During the Initial Exploration Period, the JV Partners purchased and acquired digital copies of 2D and 3D seismic data, well data, and regional reports from the Petroleum Agency of South Africa (PASA). As part of the minimum work programme the JV Partners performed regional mapping, basin modelling studies, well log interpretation, and quantitative rock physics and AVO seismic attribute analysis on legacy 2D and 3D seismic data. In 2022, the JV Partners completed reprocessing 2,020 km^2 of legacy 3D seismic survey, exceeding the minimum work commitment for the exploration period.

The remaining work programme for that exploration period includes the interpretation of recently reprocessed 3D seismic, geologic studies to rank prospects, and recommendations for exploratory drilling candidates. The reprocessing effort was successful in terms of providing improved seismic imaging and further de-risking the existing prospect inventory and has helped the JV Partners identify new prospects.

On expiry of the Initial Exploration Period of the ER the JV applied and were granted the First Renewal Period which equates to an additional two-year term from 27 October 2022 to 26 October 2024 with a minimum work commitment that includes the following:

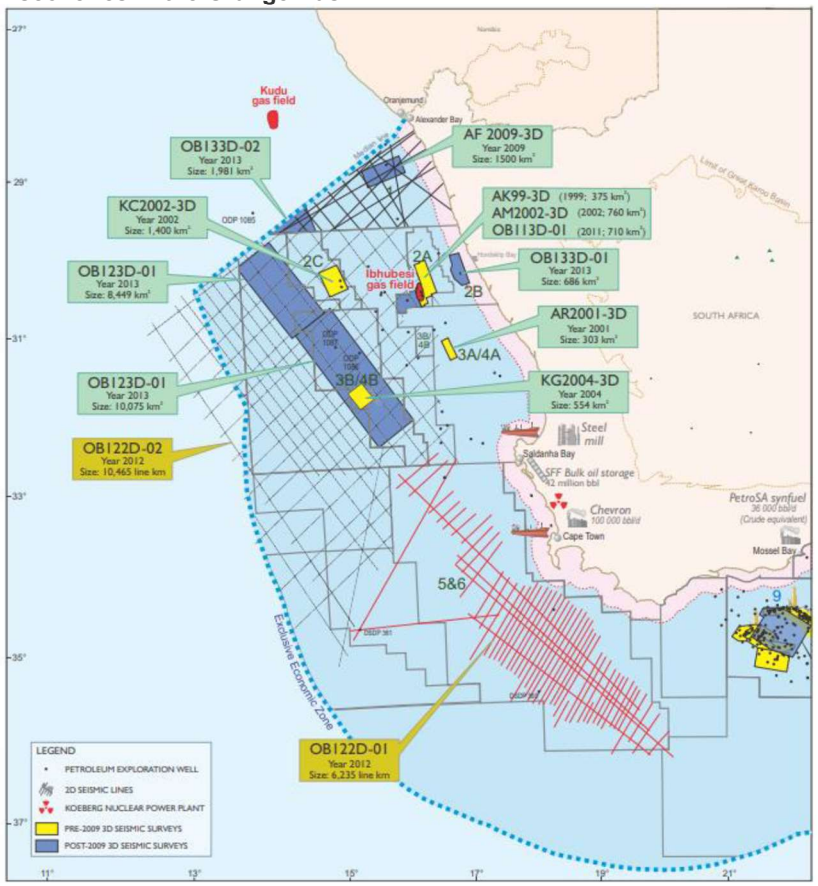
- Reprocess 1,500 km^2 of 3D Seismic applying Pre-stack Depth Migration
- Seismic Interpretation of the newly reprocessed seismic data in the Northern Area
- Seismic Amplitude Versus Offset analysis of prospects identified on the newly re-processed seismic data
- Update regional source rock and reservoir models developed during the Initial Exploration Phase with results from the recent wells in the Deepwater Orange Basin
- Update Prospect Inventory (Volumes and Ranking) and
- Conduct commercial evaluation of high-graded prospects to determine the risked value, or the risk versus reward of the best prospects.

5.3.1.1 REGIONAL SETTING OF THE ORANGE BASIN

According to the literature and exploration activity associated with Block 3B/4B to date, it was reported that there is evidence and confirmation that several petroleum systems sourced from known source rocks are developed in the Orange Basin as shown in Map 5.2 (overleaf). Evidence for Aptian source rocks has been reported by a number of authors and there is also evidence for the presence of an active Cenomanian/Turonian source rock. These oil and gas systems contain a number of exploration plays and several prospects and leads were identified, which have been evaluated and reviewed by a number of

companies previously active in exploration in South Africa. The Albian stratigraphic structural play has been confirmed in several gas discoveries off South Africa, the best of which is the A-K1 (Ibhubesi gas field), as shown in Map 5.3.

Map 5.2: Regional Setting Highlighting Wells, Seismic Surveys, Exploration Wells and Discoveries in the Orange Basin



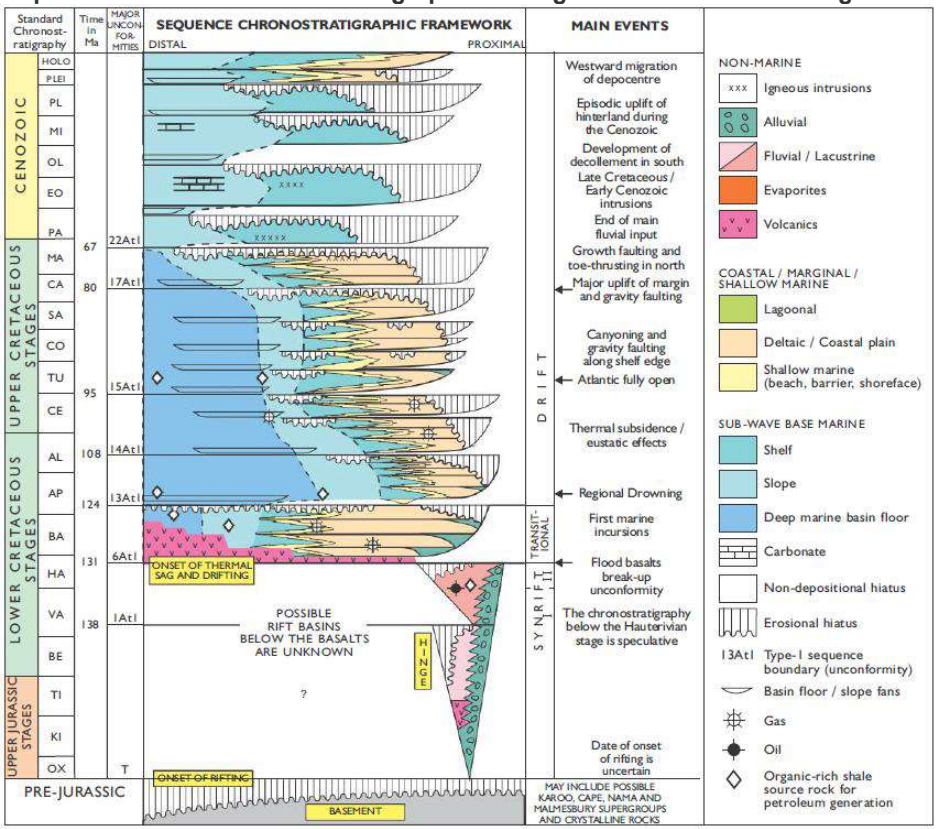
Source: DEMACON ex EIMS, 2023

The A-F1 gas discovery confirmed the following key parameters:

- Tested approximately 32 MMscf/d
- 17 m fluvial sandstone
- Albian play
- Porosities 20-26% and
- Incised valley system.

Within the syn-rift succession, the only oil system confirmed to-date occurs in the isolated A-J half-graben (Map 5.4). The oil is sourced from typically rich Hauterivian lacustrine shales within the half-graben and is trapped stratigraphically within lake shore-line sandstones interbedded with the source shales. The maximum flow rate reached whilst testing was approximately 200 barrels per day of viscous oil.

Map 5.3: Generalised Chronostratigraphic Geological Column of the Orange Basin



Source: DEMACON ex EIMS, 2023

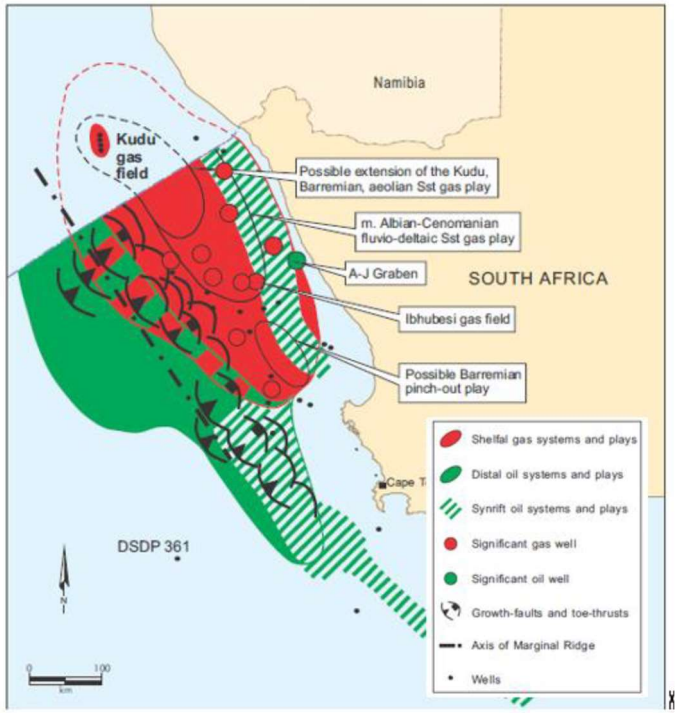
It is anticipated that there is also significant potential in other syn-rift grabens to the north and south of the A-J Graben and there is potential for significant gas and light oil discoveries in the shallower sequences above the rift graben succession in the outboard areas of Block 3B/4B.

Two main source rock units are known to occur in the Orange Basin which includes:

- Late Hauterivian synrift source rock
- Barremian-early Aptian source rock and
- Indication of a regionally developed Cenomanian-Turonian source rock

Each of these marine condensed sequences is associated with the three main phases of basin development in the Orange Basin, namely the rift, early drift, complete drift phases.

Map 5.4: Main and Postulated Petroleum Systems in the Southern Orange Basin



Source: DEMACON ex EIMS, 2023

5.3.1.2 Regional Setting and Geology Associated with Block 3B/4B

Exploration in the Orange Basin has historically targeted Cretaceous shelf sequences in shallow water areas, inboard of Block 3B/4B. Before the major Graff and Venus discoveries in 2022, very few discoveries had been made. Early exploration had focused mainly on targets in relatively shallow water, the most notable being the Kudu gas discovery in southern Namibia (in aeolian, shallow-marine Barremian reservoirs), the Ibhubesi gas discovery (in Aptian-Albian shallow-marine fluvio-deltaics) and the small A-J1 oil field (in Hauterivian syn-rift and lacustrine clastics).

In 2009, Shell were granted an Exploration Right to explore the deepwater area to the west in deep and ultra-deep water. Shell expanded their exploration activity into Namibia which has led to their recent light oil and gas discoveries in Cretaceous age turbidite reservoirs as encountered in the Graff-1, La Rana-1 and Jonkers-1 discovery wells in 2022 and 2023. Similarly TotalEnergies have joined this activity and maintain a large position in the deep water and ultra-deepwater licenses of the Orange Basin. In Namibia, TotalEnergies and partners announced a significant light oil discovery in Cretaceous turbidite fans. These along with Luiperd and Brulpadda discoveries reportedly benefit from strong seismic amplitude, or AVO seismic signatures.

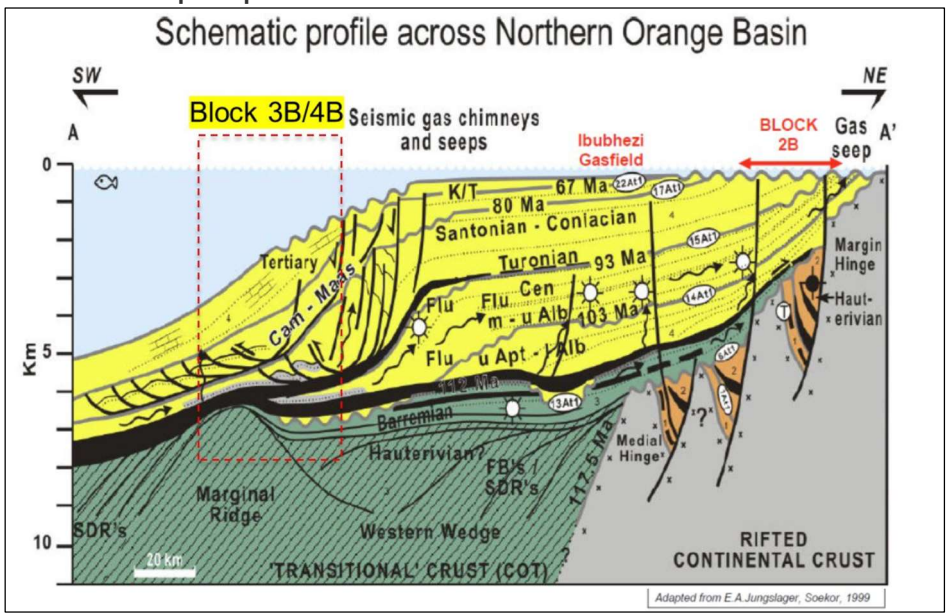
Prospects in Block 3B/4B will target turbidite fan deposits of similar age and seismic response to the discoveries made by both TotalEnergies and Shell. Traps are generally combination structural-stratigraphic traps, with siliciclastic reservoirs confined within channels, or deposited as turbidite fans fully encased in shales.

Block 3B/4B lies within the Orange Basin which extends from South Africa as far north as the Luderitz Arch in Namibia. The basin formed from the breakup of the African and South American continents starting in Jurassic time. The early syn-rift basin fill consists of both siliciclastics, and carbonates deposited during the Late Jurassic and Early Cretaceous eras (Map 5.5: Note multiple unconformities occur through the Upper Cretaceous transporting sands into the deepwater basin. This was followed by deposition of Aptian-Albian aged organic-rich shales deposited in a marine restricted environment. These regionally extensive marine shales are the primary source rock for the Orange Basin.

Following deposition of the Aptian-Albian marine source rocks, separation of the continents continued during what is referred to the 'drift' stage, where sediments

from major proto rivers deposited large quantities of clastic sediments as fluvial-deltaic deposits in the nearshore areas. Further offshore, where Block 3B/4B is located, Cretaceous clastic sediments were deposited at the paleo shelf edge and slope as turbidites. Two ancient river systems provided sediments to the nearshore and offshore areas of Block 3B/4B during the Upper Cretaceous, the Orange River to the north, and the Olifants River located immediately east of Block 3B/4B.

Map 5.5: Schematic Seismic Profile Showing the Location of Block 3B/4B within Continental Slope Deposits



Source: DEMACON ex EIMS, 2023

The shelf areas of the Orange Basin east of Block 3B/4B have been explored with more than 38 wells, most of which were drilled in water depths of 500 m or less. While these wells did not target the same depositional environments that are being targeted in Block 3B/4B, the wells do provide information about the stratigraphy of the Upper Cretaceous sediments east of Block 3B/4B. For example, wells located on the shelf confirm the presence of sandstone input into the area, and also confirm the presence of Cretaceous source rocks that are key to a working petroleum system.

Sediments of Albian age were deposited in the shelfal areas by distributary meandering channels on the lower to middle shoreface of a delta front. Proportions of sand up to 63% are noted and a general trend of decreasing sand proportions across the shelf is observed, with approximately 60% sand in proximal wells such as A-K1 and P-FI, and very low proportions sand (4% to 5%) deposited in distal wells such as A-C3 and K-A2. Where tested, these Albian sandstones have good porosity and permeability and good flow rates.

In Ibhuhesi field, located east of Block 3B/4B, Albian deltaic sandstone reservoirs achieved rates greater than 30 MMscf/d from individual reservoir zones.

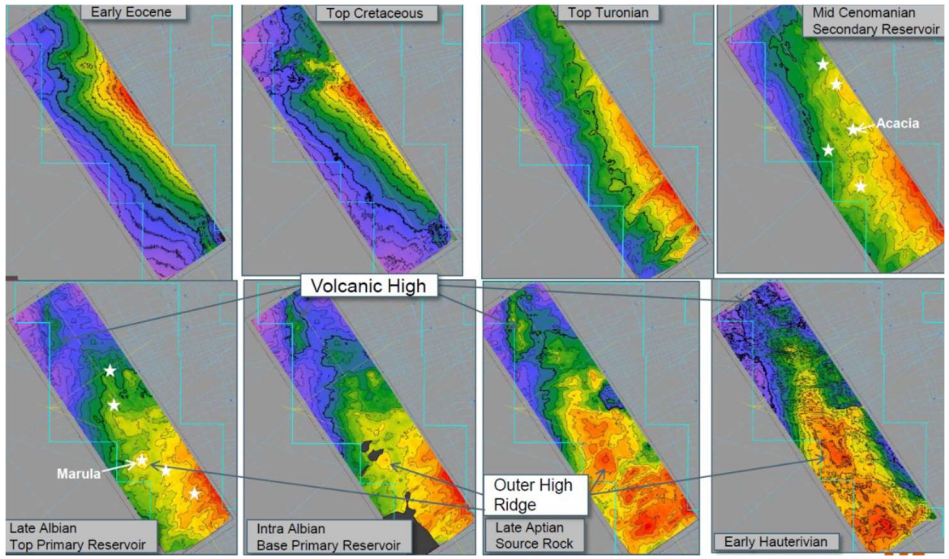
Structural deformation, or faulting is not prominent in Cretaceous sediments of Block 3B/4B although some minor faulting and soft-sediment deformation has occurred in some rather limited intervals within the Cretaceous or Tertiary sections. However, a prominent topographic high referred to as the 'Outer Ridge' or 'Outer High' provides an important structural element for Block 3B/4B. This feature was a topographic high during deposition of the Aptian-Albian time and in some areas the key source rock interval is thin or absent over this Outer High.

Similarly, the Outer High affected deposition of Albian turbidite fans which in some areas ponded, thinned, or pinched-out against this topographic feature. Lower areas or 'gaps' in the Outer High allowed turbidite sediments to more easily reach deepwater areas. The Venus and Graff discoveries in Namibia are located seaward of one these 'gaps' in the Outer Ridge where sediments could more easily funnel through to more distant slope and deepwater areas. In Block 3B/4B one of the larger prospects in the inventory, 'Fan-S', is a turbidite fan that thins and truncates against the Outer High, forming a combination structural-stratigraphic trap. Further offshore, and in the area of Block 3B/4B, these Albian sandstones were deposited as turbidite channels and fans and form one of the principal reservoir targets.

Following deposition of Cretaceous sediments, Tertiary deposition continued with the development of an aggrading shelf margin with little or no deformation. Later phases of deposition during the Tertiary are characterized in some areas by instability resulting in development of a coupled growth fault and toe thrust system but these are not prominent in Block 3B/4B and have not been a focus for developing the prospect inventory. The current prospect inventory does not include any prospects of Tertiary age, but this shallow section could contain thermogenic gas generated deeper in the Cretaceous section. Tertiary

deposition is most significant from the prospective of source maturation in Block 3B/4B, as it is the timing and thickness of Tertiary deposition that drives the maturation of Cretaceous source rocks in Block 3B/4B.

Map 5.6: Blockwide Structure Maps from Early Cretaceous through Eocene Time for Block 3B/4B



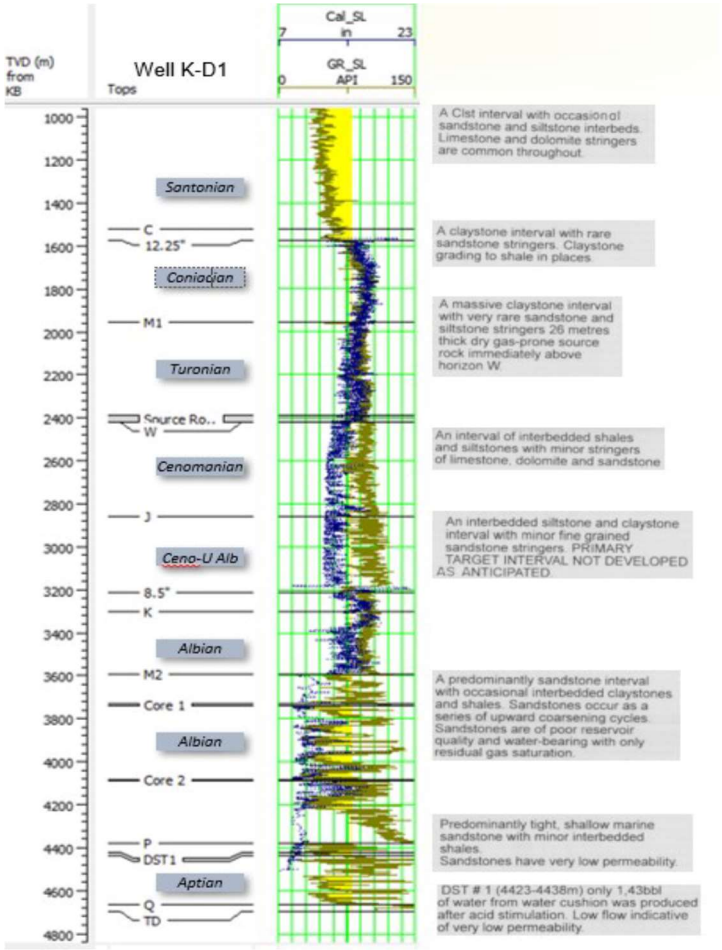
Source: DEMACON ex EIMS, 2023

Shelfal well K-D1, was used as a key well for well-ties into Block 3B/4B seismic because of the total depth of penetration (Map 5.6). Unfortunately, well K-D1 did not penetrate the Late Cretaceous turbidite feeder channels that would have helped the correlation of sands in the deepwater section.

5.3.1.3 Source Rocks

Cretaceous Aptian-Albian and Barremian shales have been identified as the primary source rocks in the Orange basin. Wells located inboard and adjacent to Block 3B/4B provide key evidence for source rock quality and maturity. Potential source rocks of Aptian and or Albian age are penetrated in wells A-F1, A-E1, K-A2, A-C2, PA-1, 0-A1, and DSDP-360. These source rocks are generally characterized by modest TOC's (2% to 3%) with kerogen types that are indicative of mixed oil and gas-prone source rocks. To the west of the Outer High, source rocks are expected to be more oil prone due both to their lower maturity and less terrigenous clastic input. This interpretation is based not only on the recent light oil and west gas discoveries by Shell and TotalEnergies, but by data provided by DSDP8-361 located southwest of Block 3B/4B which encountered Aptian organic-rich black shales with TOC9 content up to 25% with a thermal maturity capable of oil and wet gas generation.

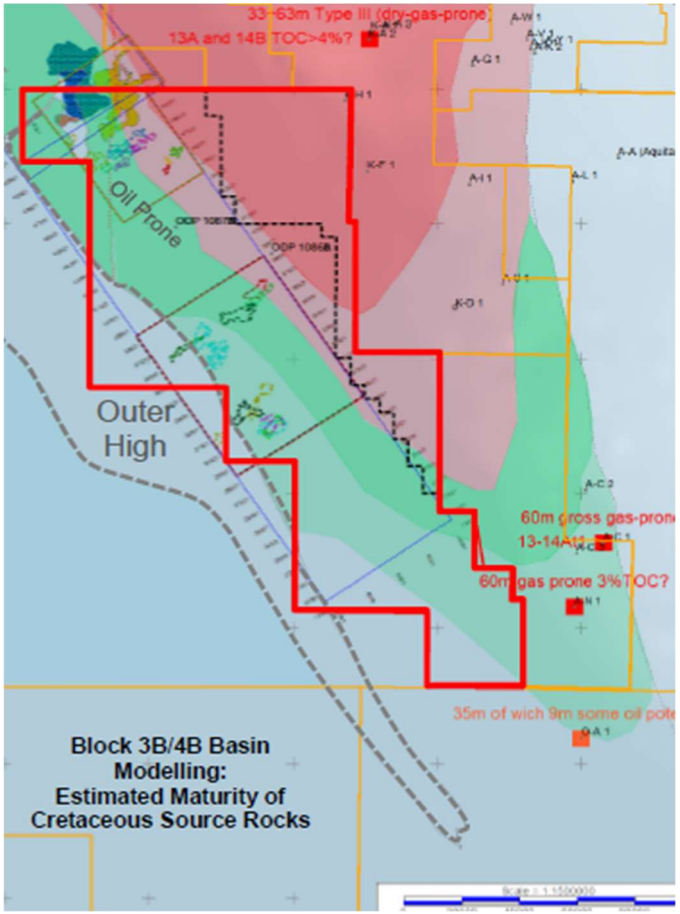
Map 5.7: Summary Log from the Shelfal Well K-D1 Used as a Key Well for Well-Tie Into Block 3B/4B Seismic Data



Source: DEMACON ex EIMS, 2023

Inboard of Block 3B/4B basin these source rocks are in the gas window as evidenced by the discoveries to date. However, Tertiary and Late Cretaceous overburden thins westwards towards Block 3B/4B, and basin models suggest that source rocks are less mature and in the oil window (Map 5.8: Note absence of source rocks on Outer High). This Modelling prediction is supported by the recent light oil and wet gas discoveries by Shell and TotalEnergies along trend in Namibia.

Map 5.8: Source Rock Maturity Map for Aptian-Albian Source Rocks in the Southern Orange Basin



Source: DEMACON ex EIMS, 2023

5.3.1.4 RESERVOIRS

Expected porosity and permeability ranges for potential Cretaceous reservoirs in Block 3B/4B have been derived from depth versus porosity cross plots based on available well control, most of which are located to the east of Block 3B/4B. Since prospects in Block 3B/4B are targeting different facies (turbidite sandstones versus fluvial-deltaics), analog data from other deepwater discoveries has also been incorporated into estimates for reservoirs parameters. The work of Bjorkum et al. (1998) for example provides a useful reference for estimating porosity of Upper Cretaceous sandstones deposited in a turbidite setting and buried to depths of 3 km to 4 km with a temperature gradient of circa 30°C/ km.

Primary reservoir targets in Block 3B/4B are as follows:

- Santonian or 'Upper Cretaceous' age sandstones deposited in turbidite channel and fan systems at the slope margin.
- Cenomanian-Turonian age sandstones deposited in turbidite channel and fan systems at the slope margin and outer slope.
- Albian sandstones deposited as turbidites as basin floor fans.

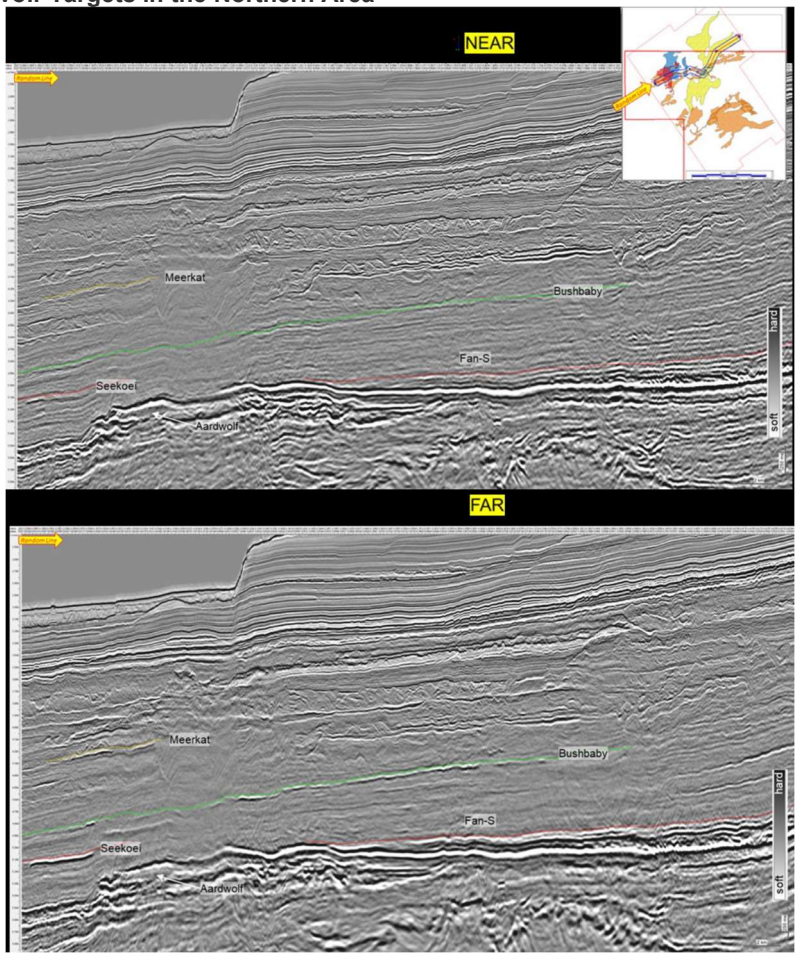
Studies of analog reservoirs in the Orange Basin have shown that diagenetic alteration can reduce porosity and permeability by quartz overgrowth and authigenic chlorite precipitation. In some cases, the presence of chlorite has proven to inhibit quartz overgrowths, thereby preserving porosity. However, an abundance of chlorite can reduce permeability, which can also be improved or degraded by other factors such as sorting. For prospects in Block 3B/4B porosities are generally considered to have a P50 of 20%, increasing to 25% where reservoirs are shallower and thickest.

Permeabilities are expected to be in the 10's to 100's of millidarcies based on limited well penetrations and analog data. The expectation for low viscosity light oil is expected to offset lower permeabilities and flow rates above 10,000 bopd can be achieved based on analog data from similar reservoirs, pressures, and fluid characteristics.

Seismic attributes and particularly AVO analysis has been a particularly good tool for identifying potential reservoir targets in the upper Cretaceous sequences of the Orange Basin. While calibration to well control is required for porosity and fluid prediction, in the absence of nearby well control and as a qualitive indicator, AVO analysis forms the most robust exploration tool for identifying sandstone

turbidites in Block 3B/4B. Although seismic amplitude responses are non-unique, when AVO anomalies conform to depth this may be indicative of fluid contacts, which greatly increases the chance of encountering hydrocarbons. Several prospects within the Block 3B/4B prospect inventory exhibit some conformance to depth contours.

Map 5.9: Example of Near and Far Offset Seismic Data Showing Prospective Reservoir Targets in the Northern Area



Source: DEMACON ex EIMS, 2023

5.3.1.5 PLAY TYPES

Prospects within the Block 3B/4B inventory all target Cretaceous reservoirs that are expected to contain hydrocarbons sourced from Aptian-Albian source rocks below, and therefore all part of a single proven petroleum system. Inboard of Block 3B/4B, source rocks have more overburden and deeper burial has pushed source rocks into the gas window. Within Block 3B/4B and source rocks are generally in the oil, or wet gas window, becoming more oil prone to the west as overburden is thinner.

Within this proven petroleum system there are at least four general play types (Map 5.10 and Map 5.11). The first three are similar in that they all rely on stratigraphic trapping and the key tools for identifying prospects rely on seismic attributes. Sand bodies are identified based on amplitude, relative impedance, AVO characteristics, shear modulus, and cross plots of these various attributes to produce relationships such as 'Fluid Factor' that can provide insight to fluid composition within reservoir targets.

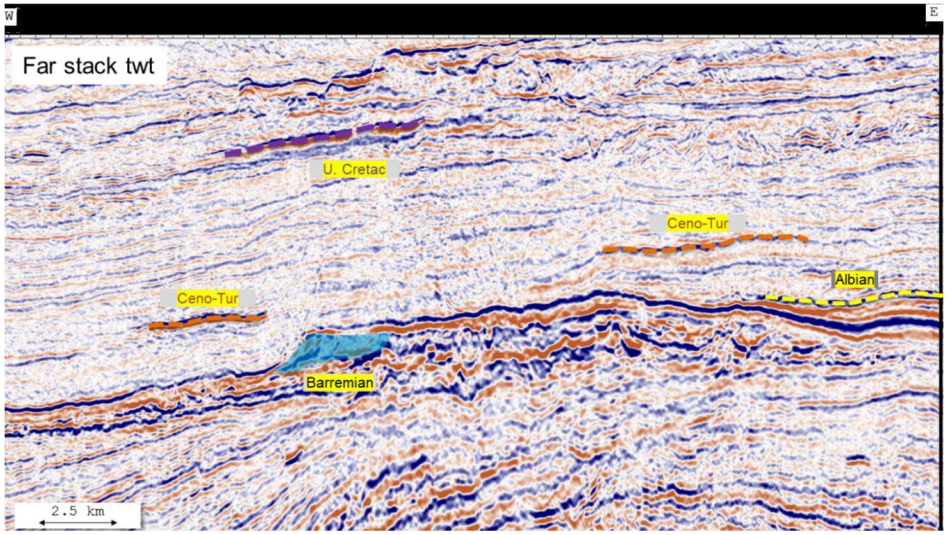
Prospects are high graded if they show evidence of an up-dip pinchout for trapping. AVO anomalies with strong increase in FAR angle gathers are ranked higher, and AVO anomalies that have conformance to depth, indicative of a possible fluid contact, are ranked with the highest chance of success.

- Santonian or 'Upper Cretaceous' Turbidite Play - target reservoirs are turbidite sandstones deposited in an outer slope environment
  - Reservoir: turbidite sandstones 10 m to 30 m thick, often stacked
  - Reservoir Geometry: channelized, overbank, splays, and basin-floor fans
  - Traps: stratigraphic or combination traps relying on up-dip truncation of feeder channels
  - De-risking Elements: clear imaging of updip pinchout, strong AVO anomalies (Class II or III), conformance of AVO anomaly with depth contours
- Cenomanian-Turonian Turbidite Play - turbidite sandstones deposited in an outer slope environment; with the same prospecting characteristics as above
- Albian Basin Floor Fan - similar characteristics to Plays 1 and 2, except that sand bodies tend to be more widespread and fan-shaped due to

their deposition on the basin floor. In these low gradient areas sand deposition is heavily influenced by subtle changes in topography, such as the Outer High

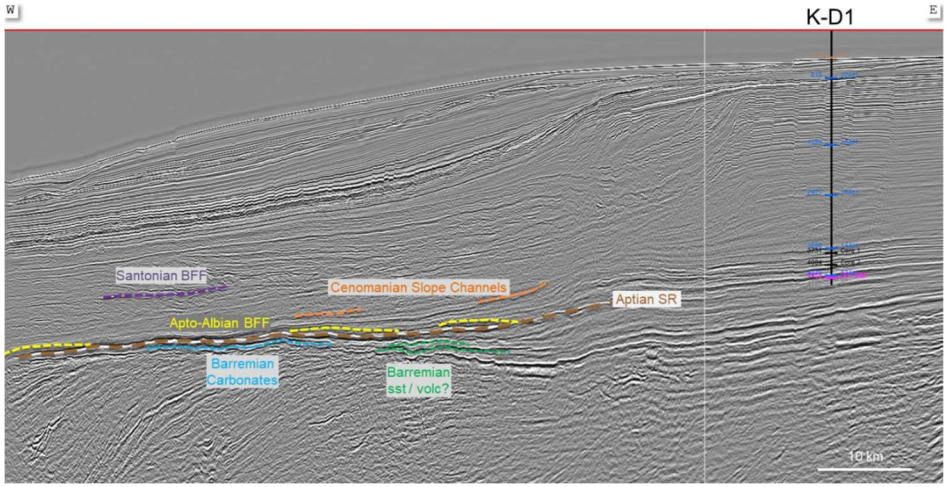
- Barremian-Aptian Carbonate Ramp Play - characterized by positive features of Albian age located in close association with the Outer High and interpreted as isolated carbonate platforms or ramps. Prospects often exhibit internal seismic reflections with clinoform geometry. Similar leads have been recognized along the Outer High and into Namibia. No carbonates have been encountered at this stratigraphic level in any of the inboard wells. The closest penetration of carbonates in the deepwater trend is Moosehead- 1 and reservoir risk is deemed high as a result

Map 5.10: Examples of the Four Primary Play Types in Block 3B/4B



Source: DEMACON ex EIMS, 2023

Map 5.11Examples of the Four Primary Play Types in Block 3B/4B Showing Tie to Well K-D1



Source: DEMACON ex EIMS, 2023

5.3.2 Description of Activities to be Undertaken

Block 3B/4B off the West Coast of South Africa has an area of approximately 11 100 km2. The Area of Interest for drilling is located in the northern portion of the licence area and covers 9 711.21 km2 ranging in water depths between 1 000 m and 3 000 m.

The project description below is summarised from the Scoping Report. For a full project description please refer to the relevant section in the ESIA Report.

5.3.2.1 Pre-Drilling Surveys

Pre-drilling surveys will be undertaken prior to drilling in order to confirm baseline conditions at the drill site and to identify and delineate any seabed and sub-seabed geo-hazards that may impact the proposed exploration drilling operations. Pre-drilling surveys may involve a combination of sonar surveys, sediment sampling, water sampling and ROV activities.

5.3.2.2 Sonar Surveys

Pre-drilling sonar surveys may involve multi- and single beam echo sounding and sub-bottom profiling. These surveys would not be limited to a specific time

of the year but would be of short duration (around 10 days per survey) and focused on selected areas of interest within the block. The interpretation of the survey would take up to four weeks to complete.

5.3.2.3 Echo Sounders

The majority of hydrographic depth/echo sounders are dual frequency, transmitting a low frequency pulse at the same time as a high frequency pulse. Dual frequency depth/echo sounding has the ability to identify a vegetation layer or a layer of soft mud on top of a layer of rock. AOSAC is proposing to utilise a single beam echo-sounder with a frequency range of 38 to 200 kHz. In addition, it is proposed to also utilise multibeam echo sounders (70 - 100 kHz range and 200 dB re 1µPa at 1m source level) that are capable of receiving many return "pings". This system produces a digital terrain model of the seafloor.

5.3.2.4 Sub-bottom Profilers

Sub-bottom profilers are powerful low frequency echo-sounders that provide a profile of the upper layers of the ocean floor. Bottom profilers emit an acoustic pulse at frequencies ranging between 2 and 16 kHz, typically producing sound levels in the order of 200-230 db re 1µPa at 1m.

5.3.2.5 Seabed Sediment Coring

Seabed sediment sampling may involve the collection of sediment samples in order to characterise the seafloor and for laboratory geochemical analyses in order to determine if there is any naturally occurring hydrocarbon seepage at the seabed or any other type of contamination prior to the commencement of drilling.

No specific target area has as yet been identified for the sediment sampling. It is currently anticipated that up to 20 samples could be taken across the entire area of interest potentially removing a cumulative volume of ~ 35 m3. The sediment sampling process would take between three to five weeks to complete, depending on weather conditions.

Piston and box coring (or grab samples) techniques may be used to collect the seabed sediment samples. These techniques are further described below.

5.3.2.6 Piston Coring

Piston coring (or drop coring) is one of the more common methods used to collect seabed geochemical samples. The piston coring rig is comprised of a trigger assembly, the coring weight assembly, core barrels, tip assembly and piston. The core barrels are 6 - 9 m in lengths with a diameter of 10 cm.

The recovered cores are visually examined at the surface for indications of hydrocarbons (gas hydrate, gas parting or oil staining) and sub-samples retained for further geochemical analysis in an onshore laboratory.

5.3.2.7 Box Coring

Box corers are lowered vertically to the seabed from a survey vessel by. At the seabed the instrument is triggered to collect a sample of seabed sediment. The recovered sample is completely enclosed thereby reducing the loss of finer materials during recovery. On recovery, the sample can be processed directly through the large access doors or via complete removal of the box and its associated cutting blade. AOSAC is proposing to take box core samples (50 cm x 50 cm) at a depth of less than 60 cm.

5.3.2.8 Well Location and Drilling Programme

AOSAC is proposing to drill up to five exploration wells within an Area of Interest within Block 3B/4B. The expected target drilling depth is not confirmed yet and a notional well depth of 3 570 m below sea floor (Water depth range 500 -1700m) is assumed at this stage. It is expected that it would take approximately three to four months to complete the physical drilling and testing of each well (excluding mobilisation and demobilisation). AOSAC's strategy for future drilling is that drilling could be undertaken throughout the year (i.e. not limited to a specific seasonal window period).

The schedule for drilling the wells is not confirmed yet; however, the earliest anticipated date for commencement of drilling is between first quarter of 2024 (Q1 2024) and third quarter of 2024 (Q3 2024).

5.3.2.9 Main Project Components

5.3.2.9.1 Drilling Unit Options

Various types of drilling technology can be used to drill an exploration well (e.g. barges, jack-up rigs, semi-submersible drilling units (rigs) and drill-ships) depending on, inter alia, the water depth and marine operating conditions experienced at the well site. Based on the anticipated sea conditions, AOSAC is proposing to utilise a semi-submersible drilling unit or a drill-ship, both with dynamic positioning system suitable for the deep-water harsh marine

environment. The final rig selection will be made depending upon availability and final design specifications.

A semi-submersible drilling unit (Figure 5.1, right) is essentially a drilling rig located on a floating structure of pontoons. When at the well location, the pontoons are partially flooded (or ballasted), with seawater, to submerge the pontoons to a pre-determined depth below the sea level where wave motion is minimised. This gives stability to the drilling vessel thereby facilitating drilling operations.

A drill-ship (Figure 5.1, left) is a fit for purpose built drilling vessel designed to operate in deep water conditions. The drilling "rig" is normally located towards the centre of the ship with support operations from both sides of the ship using fixed cranes. The advantages of a drill-ship over the majority of semi-submersible units are that a drill-ship has much greater storage capacity and is independently mobile, not requiring any towing and reduced requirement of supply vessels.

Figure 5.1: Example of a drill rig, the Noble Globetrotter II (left) and of a semi-submersible, the Deepwater Nautilus, being transported on a heavy-lift ship

Source: DEMACON ex EIMS, 2023

5.3.2.9.2 SUPPORT VESSELS

The drilling unit would be supported / serviced by up to three support vessels, which would facilitate equipment, material and waste transfer between the drilling unit and onshore logistics base. A supply vessel will always be on standby near the drilling unit to provide support for firefighting, oil containment / recovery, rescue in the unlikely event of an emergency and supply any additional equipment that may be required. Support vessels can also be used for medical evacuations or transfer of crew if needed.

5.3.2.9.3 HELICOPTERS

Transportation of personnel to and from the drilling unit would be provided by helicopter from Springbok Airport (fixed wing trip from Cape Town) using local providers. It is estimated that there may be up to four return flights per week between the drilling unit and the helicopter support base at Springbok (i.e. 17 weeks (˜120 days) x 4 = 68 trips per well). The helicopters can also be used for medical evacuations from the drilling unit to shore (at day- or night-time), if required, in which case the flights are likely to be directly to Cape Town.

5.3.2.9.4 ONSHORE LOGISTICS BASE

The primary onshore logistics base will most likely be located at the Port of Cape Town (preferred option), but alternatively at the Port of Saldanha.

The shore base would provide for the storage of materials and equipment that would be shipped to the drilling unit and back to storage for onward international freight forwarding. The shore base would also be used for offices, waste management services, bunkering vessels, and stevedoring / customs clearance services.

5.3.2.10 MOBILISATION PHASE

The mobilisation phase will entail the required notifications, establishment of the onshore base, appointment of local service providers, procurement and transportation of equipment and materials from various ports and airports, accommodation arrangements and transit of the drilling unit and support vessels to the drilling area.

The drilling unit and supply vessels could sail directly to the well site from outside South African waters or from a South African port, depending on which drilling unit is selected, and where it was last used.

Core specialist and skilled personnel would arrive in South Africa onboard the drilling unit and the rest of the personnel will be flown to Cape Town.

Drilling materials, such as casings, mud components and other equipment and materials will be brought into the country on the drilling unit itself or imported via a container vessel directly to the onshore logistics base from where the supply vessels will transfer it to the drilling unit. Cement and chemicals will be sourced locally.

5.3.2.11 Operation Phase

5.3.2.11.1 Final Site Selection and Seabed Survey

The selection of the specific well locations will be based on a number of factors, including further detailed analysis of the seismic and pre-drilling survey data and the geological target. A Remote Operating Vehicle (ROV) will be used to finalise the well position based on inter alia the presence of any seafloor obstacles or the presence of any sensitive features that may become evident.

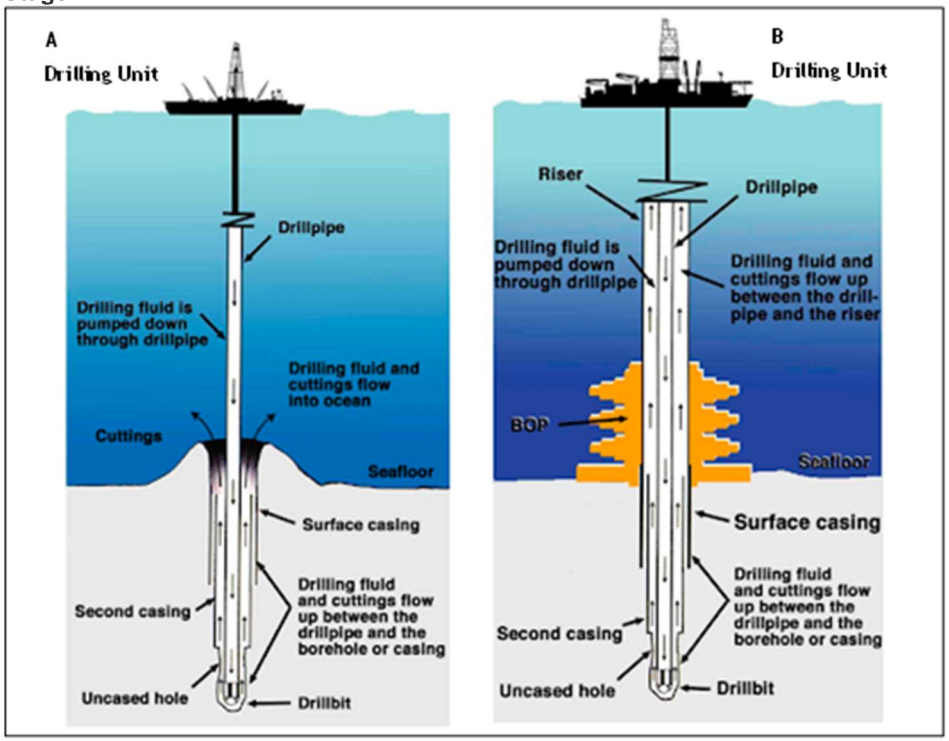
5.3.2.11.2 Well Drilling Operation

The well will be created by drilling a hole into the seafloor with a drill bit attached to a rotating drill string, which crushes the rock into small particles, called "cuttings". After the hole is drilled, casings (sections of steel pipe), each slightly smaller in diameter, are placed in the hole and permanently cemented in place (cementing operations are described below). The hole diameter decreases with increasing depth.

The casings provide structural integrity to the newly drilled wellbore, in addition to isolating potentially dangerous high-pressure zones from each other and from the surface. With these zones safely isolated, and the formation protected by the casing, the well will be drilled deeper with a smaller drill bit, and also cased with a smaller sized casing. For the current project, it is anticipated that there will be five sets of subsequently smaller hole sizes drilled inside one another, each cemented with casing, except the last phase that will remain an open hole.

Drilling is essentially undertaken in two stages, namely the riserless and risered drilling stages (Figure 3).A typical well design is summarised in Table 1 below. The well design ultimately depends upon factors such as planned depths, expected pore pressures and anticipated hydrocarbon-bearing formations. Several types of drilling fluids with different compositions and densities would be used for drilling operations. The composition of the muds is provided in Table 4 of the drillings discharge modelling Report (Livas 2023a). This may vary slightly depending on the contractor's selection and may be modified to suit operational needs.

Figure 5.2: Drilling stages: (a) Riserless Drilling Stage; and (b) Risered Drilling Stage



Source: DEMACON ex EIMS, 2023

Table 5.1: Cuttings and mud volumes per phase for notional base case well design and estimated drilling discharges

Drill Section	Hole diameter (inches)	Depth of section (m)	Type of drilling fluid used	Mass of drilling fluid discharged (tonnes)	Volume of cuttings released (m^3)	Drilling fluid and cuttings discharge location
Riserless drilling stage						
1	36"	70	Seawater, viscous sweeps & WBM	209	55	At sea bottom
2	26"	320		135	76	
-	Suspension / Displacement before drilling Section 3	-	High Viscous Gel sweeps / KCl Polymer PAD mud	30	-	1 m above seabed
Total Riserless		**390**		374	131	
Risered drilling stage						
3	17.5"	700	KCl/Glycol WBM	189*	107	10 m below mean sea level
4	12.25"	1 250		166*	94	
5	8.5"	1 410		89*	56	
Total Risered		**3 360**		**444**	**257**	
Total		**3 750**	-	**818**	**388**	-

Note: * Total quantity of mud discharged including Oil On Cuttings (OOC) @ 6% by weight of cuttings (metricT) + Other constituents.

Source: DEMACON ex EIMS, 2023

Initial (riserless) drilling stage

The process of preparing the first section of a well is referred to as "spudding." Sediments just below the seafloor are often very soft and loose, thus to keep the well from caving in and to carry the weight of the wellhead, a 30- or 36 inch diameter structural conductor pipe is drilled and cemented into place or in some cases jetted.

For the proposed wells, the drill and cement option is preferred. It is usually implemented where the nature of the seafloor sediments (hard sediments) necessitate drilling. A hole of diameter 36 inches will be drilled and the conductor pipe will be run into the hole and cemented into place. The cement returns exit the bottom of the conductor and travel up the annular space between the conductor and the hole with some cement being deposited on the seabed around the conductor pipe.

When the conductor pipe and low-pressure wellhead are at the correct depth, approximately 70 m deep (depending upon substrate strength), a new drilling assembly will be run inside the structural conductor pipe and the next hole section will be drilled by rotating the drill string and drill bit.

Below the conductor pipe, a hole of approximately 26 inches in diameter will be drilled to a depth of approximately 320 m below the seabed. The rotating drill string causes the drill bit to crush rock into small particles, called "cuttings". While the wellbore is being drilled, drilling fluid is pumped from the surface down through the inside of the drill pipe, the drilling fluid passes through holes in the drill bit and travels back to the seafloor through the space between the drill string and the walls of the hole, thereby removing the cuttings from the hole. At a planned depth the drilling is stopped and the bit and drill string is pulled out of the hole. A surface casing of 20 inch diameter is then placed into the hole and

secured into place by pumping cement through the casing at the bottom of the hole and back up the annulus (the space between the casing and the borehole). The 20-inch casing will have a high-pressure wellhead on top; which provides the entry point to the subsurface and it is the connection point to the Blow-out Preventor (BOP).

These initial hole sections will be drilled using seawater (with viscous sweeps) and WBM. All cuttings and WBM from this initial drilling stage will be discharged directly onto the seafloor adjacent to the wellbore.

Risered Drilling Stage

The risered drilling stage commences with the lowering of a BOP and installing it on the wellhead. The BOP is designed to seal the well and prevent any uncontrolled release of fluids from the well (a 'blow-out'). A lower marine riser package is installed on top of the BOP and the entire unit is lowered on riser joints. The riser isolates the drilling fluid and cuttings from the external environment, thereby creating a "closed loop system".

Drilling is continued by lowering the drill string through the riser, BOP and casing, and rotating the drill string. During the risered drilling stage, should the WBMs not be able to provide the necessary characteristics, a low toxicity Non-aqueous Drilling Fluid (NADF) will be used. The drilling fluid emerges through nozzles in the drill bit and then rises (carrying the rock cuttings with it) up the annular space between the sides of the hole to the drilling unit.

The cuttings are removed from the returned drill mud, sampled for analysis and discharged overboard. In instances where NADFs are used, cuttings will be treated to reduce oil content and discharged overboard. Operational discharges are discussed further in Section 2.6.1.

The hole diameter decreases in steps with depth as progressively smaller diameter casings are inserted into the hole at various stages and cemented into place. The expected target drilling depth is not yet confirmed but the notional well depth is 3 570 m below the seafloor with a final hole diameter between of 8.5 and 12.25 inches and a casing diameter of between 7 and 9.6 inches.

Cementing Operation

Cementing is the process of pumping cement slurry through the drill pipe and / or cement stinger at the bottom of the hole and back up into the space between the casing and the borehole wall (annulus). Cement fills the annulus between the casing and the drilled hole to form an extremely strong, nearly impermeable seal, thereby permanently securing the casings in place. To separate the cement from the drilling fluid in order to minimise cement contamination a cementing plug and/or spacer fluids are used. The plug is pushed by the drilling fluid to ensure the cement is placed outside the casing filling the annular space between the casing and the hole wall.

Cementing has four general purposes: (i) it isolates and segregates the casing seat for subsequent drilling, (ii) it protects the casing from corrosion, (iii) it provides structural support for the casing, and (iv) it stabilises the formation.

To ensure effective cementing, an excess of cement is often used. Until the marine riser is set, excess cement from the first two casings emerges out of the top of the well onto the seafloor. This cement does not set and is slowly dissolved into the seawater.

Offshore drilling operations typically use Portland cements, defined as pulverised clinkers consisting of hydrated calcium silicates and usually containing one or more forms of calcium sulphate. The raw materials used are lime, silica, alumina and ferric oxide. The cement slurry used is specially designed for the exact well conditions encountered.

Additives can be used to adjust various properties in order to achieve the desired results. There are over 150 cementing additives available. The amount (concentrations) of these additives generally make up only a small portion (<10%) of the overall amount of cement used for a typical well. Usually, there are three main additives used: retarders, fluid loss control agents and friction reducers. These additives are polymers generally made of organic material and are considered non-toxic.

Once the cement has set, a short section of new hole is drilled, then a pressure test is performed to ensure that the cement and formation are able to withstand the higher pressures of fluids from deeper formations.

5.3.2.11.3 Well Logging and Testing

Once the target depth is reached, the well would be logged and could be tested dependent on the drilling results.

Well logging involves the evaluation of the physical and chemical properties of the sub-surface rocks, and their component minerals, including water, oil and gas to confirm the presence of hydrocarbons and the petrophysical characteristics of rocks. It is undertaken during the drilling operation using Wireline Logging or Logging While Drilling (LWD) to log core data from the well. Information from engineering and production logs, as well as mud logging, may also be used.

Vertical Seismic Profiling (VSP) is an evaluation tool used to generate a high-resolution seismic image of the geology in the well's immediate vicinity. The VSP images are used for correlation with surface seismic images and for forward planning of the drill bit during drilling. VSP uses a small airgun array with a gun pressure of 450 per square inch (psi), which is operated from the drilling unit at a depth of between 7 m and 10 m. During VSP operations, four to five receivers are positioned in a section of the borehole and the airgun array is discharged approximately five times at 20 second intervals at each station. The generated sound pulses are reflected through the seabed and are recorded by the receivers to generate a profile along a 60 to 75 m section of the well. This process is repeated for different stations in the well and may take up to six hours to complete approximately 125 shots, depending on the well's depth and number of stations being profiled.

Well or flow testing is undertaken to determine the economic potential of the discovery before the well is either abandoned or suspended. One test would be undertaken per exploration well should a resource be discovered and up to two tests per appraisal well. Each test would take up to 7 days to complete (5 days of build-up and 2 days of flowing and flaring). For well flow-testing, hydrocarbons would be burned at the well site. A high-efficiency flare is used to maximise combustion of the hydrocarbons. Burner heads which have a high burning efficiency under a wide range of conditions will be used.

The volume of hydrocarbons (to be burned) and possible associated produced water from the reservoir which could be generated during well testing cannot be reliably predicted due to variations in gas composition, flow rates and water content. Burners are manufactured to ensure emissions are kept to a minimum. The estimated volume of hydrocarbons to be burned cannot be predicted with much accuracy because the actual test requirements can only be established after the penetration of a hydrocarbon-bearing reservoir. However, an estimated 10 000 bbl oil could be flared per test, i.e. up to 20 000 bbl over the two tests associated with an appraisal well. If produced water is generated during well testing, it will be separated from the hydrocarbons.

5.3.2.11.4 Well Sealing and Plugging

The purpose of well sealing and plugging is to isolate permeable and hydrocarbon bearing formations. Well sealing and plugging aims to restore the integrity of the formation that was penetrated by the wellbore. The principal technique applied to prevent cross flow between permeable formations is plugging of the well with cement, thus creating an impermeable barrier between two zones.

Once drilling and logging have been completed, the exploration wells will be sealed with cement plugs, tested for integrity and abandoned according to international best practices. Cement plugs will be set to isolate hydrocarbon bearing and / or permeable zones and cementing of perforated intervals (e.g. from well logging activities) will be evaluated where there is the possibility of undesirable cross flow. These cement plugs are set in stages from the bottom up. Three cement plugs would be installed: i.e. one each for isolation of the deep reservoir and the main reservoir; and a third as a second barrier for the main reservoir.

The integrity of cement plugs can be tested by a number of methods. The cement plugs will be tag tested (to validate plug position) and weight tested, and if achievable then a positive pressure test (to validate seal) and/or a negative pressure test will be performed. Additionally, a flow check may be performed to ensure sealing by the plug. Once the well is plugged, seawater will be displaced before disconnecting the riser and the BOP.

5.3.2.12 Demobilisation Phase

After the exploration wells have been sealed, tested for integrity and abandoned, the intention is to remove the wellheads from the sea floor on non productive wells. On productive wells, it may be decided to abandon the wellheads on the seafloor after installation of over trawlable protective equipment. The risk assessment criteria will consider factors such as the water depth and use of the area by other sectors (e.g., fishing).

Monitoring gauges to monitor pressure and temperature through wireless communication with frequencies between the transmitter and the receiver in the 12.75 to 21.25 kHz range may be installed on wells where AOSAC will return in

the future for appraisal / production purposes. The gauges will be placed and remain on the wellhead. Monitoring gauges will not be installed on exploration wells which are earmarked for abandonment

With the exception of the over trawlable protective equipment over abandoned wellheads and drilling discharges deposited on the seabed, no further physical remnants of the drilling operation will be left on the seafloor. A final clearance survey check will be undertaken using an ROV. The drilling unit and supply vessels will demobilise from the offshore licence area and either mobilise to the following drilling location or relocate into port or a regional base for maintenance, repair or resupply.

5.3.2.13 Discharges, Wastes and Emissions

The proposed drilling operations (including mobilisation and demobilisation) will result in various discharges to water, the generation of waste and emissions. All vessels will have equipment, systems and protocols in place for prevention of pollution by oil, sewage and garbage in accordance with international MARPOL requirements. Any oil spill related discharges would be managed by an Oil Spill Contingency Plan (OSCP). Onshore licenced waste disposal sites and waste management facilities will be identified, verified and approved prior to commencement of drilling operations.

5.3.2.14 Discharges to Sea

Drilling Cuttings and Mud

Drill cuttings, which range in size from clay to coarse gravel and reflect the types of sedimentary rocks penetrated by the drill bit, are the primary discharge during well drilling. Drilling discharges would be disposed at sea in line with accepted drilling practices as defined by the UK and Norway. This is in line with most countries (including South Africa) for early exploration development phases. The rationale for this is based on the low density of drilling operations in the vast offshore area and the high energy marine environment. As such, AOSAC proposes to use the "offshore treatment and disposal" option for their drilling campaign in Block 3B/4B in the Deep Water Orange Basin. The same method was applied and approved for drilling other deep water exploration wells in Block 11B/12B (namely Brulpadda and Luiperd wells) off the South Coast of South Africa.

During the riserless drilling stage, all cuttings and WBM will be discharged directly onto the seafloor adjacent to the wellbore. An estimated volume of 131 m3 of cuttings and 374 t of drilling fluid will be discharged per well during the riserless drilling stage (based on notional depth of 3 570 m) (refer to Table 1).

Where NADFs are used (possibly during the risered drilling stage, if WBMs are not able to provide the necessary characteristics), these are treated onship and disposed. For the current project, in instances where NADFs are used, cuttings will be treated offshore to reduce oil content to <6.9% Oil On Cutting (OOC) and discharged overboard. During the risered drilling stage, an estimated volume of 257 m3 of cuttings and 444 t of drilling fluid will be discharged per well (based on notional depth of 3 570 m) (refer to Table 1). During this drilling stage the circulated drilling fluid will be cleaned and the cuttings discharged into the sea at least 10 m below sea level. The drill cuttings will be treated to reduce their mud content using shakers and a centrifuge.

Cuttings released from the drilling unit during the risered drilling stage will be dispersed by the current and settle to the seafloor. The rate of cuttings discharge decreases with increasing well depth as the hole diameter becomes smaller and penetration rates decrease. Discharge is intermittent as actual drilling operations are not continuous while the drilling unit is on location. Discharge is 10m below sea level

Further drilling fluid totalling 200 bbl will be released 1 m above the seafloor during well suspension and displacement (between drilling section 2 and 3). The mud used during these processes is a High Viscous Gel sweeps / KCl Polymer PAD mud.

The expected fall and spatial extent of the deposition of discharged cuttings have been investigated in the Drilling Discharges Modelling Study (Livas 2023a), the results of which will inform the marine biodiversity assessment.

Cement and Cement Additives

Typically, cement and cement additives are not discharged during drilling. However, during the initial cementing operation (i.e. surface casing), excess cement emerges out of the top of the well and onto the seafloor in order to ensure that the conductor pipe is cemented all the way to the seafloor. During this operation a maximum of 150% of the required cement volume may be pumped into the space between the casing and the borehole wall (annulus). In the worst-

case scenario, approximately 50 m3 of cement could be discharged onto the seafloor.

BOP Hydraulic Fluid

As part of routine opening and closing operations the subsea BOP stack elements will vent some hydraulic fluid into the sea at the seafloor. It is anticipated that between approximately 500 and 1 000 litres of oil-based hydraulic emulsion fluid could be vented per month during the drilling of a well. BOP fluids are completely biodegraded in seawater within 28 days.

Produced Water

If water from the reservoir arises during well flow testing, these would be separated from the oily components and treated onboard to reduce the remaining hydrocarbons from these produced waters. The hydrocarbon component will be burned off via the flare booms, while the water is temporarily collected in a slop tank. The water is then either directed to:

- a settling tank prior to transfer to supply vessel for onshore treatment and disposal; or
- a dedicated treatment unit where, after treatment, it is either:
    - if hydrocarbon content is < 30 mg/l, discharged overboard; or
    - if hydrocarbon content is > 30 mg/l, subject to a 2nd treatment or directed to tank prior to transfer to supply vessel for onshore treatment and disposal.

Reinjection of the produced water may be considered if volumes are large and cannot be managed onboard the drilling unit.

Vessel Machinery Spaces (Bilge Water)

Vessels will occasionally discharge treated bilge water. Bilge water is drainage water that collects in a ship's bilge space (the bilge is the lowest compartment on a ship, below the waterline, where the two sides meet at the keel). In accordance with MARPOL Annex I, bilge water will be retained on board until it can be discharged to an approved reception facility, unless it is treated by an approved oily water separator to <15 ppm oil content and monitored before discharge. The residue from the onboard oil/water separator will be treated / disposed of onshore at a licenced hazardous landfill site.

Deck Drainage

Deck drainage consists of liquid waste resulting from rainfall, deck and equipment washing (using water and a water-based detergent). Deck drainage will be variable depending on the vessel characteristics, deck activities and rainfall amounts.

In areas of the drilling unit where oil contamination of rainwater is more likely (i.e. the rig floor), drainage is routed to an oil / water separator for treatment before discharge in accordance with MARPOL Annex I (i.e. 15 ppm oil and grease maximum). There will be no discharge of free oil that could cause either a film, sheen or discolouration of the surface water or a sludge or emulsion to be deposited below the water's surface. Only non-oily water (i.e. <15 ppm oil and grease, maximum instantaneous oil discharge monitor reading) will be discharged overboard. If separation facilities are not available (due to overload or maintenance) the drainage water will be retained on board until it can be discharged to an approved reception facility. The oily residue from the onboard oil / water separator will be treated / disposed of onshore at an approved hazardous landfill site.

Brine generated from onboard desalination plant

The waste stream from the desalination plant is brine (concentrated salt), which is produced in the reverse osmosis process. The brine stream contains high concentration of salts and other concentrated impurities that may be found in seawater. Water chemical agents will not be used in the treatment of seawater and therefore the brine reject portion would be in a natural concentrated state. Based on previous well drilling operations, freshwater production amounts to approximately 40 m3/day, which will result in approximately 35 g salt for each litre water produced (i.e. approx. 1 400 kg salt/brine per day).

Sewage and Grey Water

Discharges of sewage (or black water) and grey water (i.e. wastewater from the kitchen, washing and laundry activities and non-oily water used for cleaning) will occur from vessels intermittently throughout the project and will vary according to the number of persons on board, estimated at an average of 200 litres per person. All sewage discharges will comply with MARPOL Annex IV.

Sewage and grey water will be treated using a marine sanitation device to produce an effluent with:

- A Biological Oxygen Demand (BOD) of <25 mg/l (if the treatment plant was installed after 1/1/2010) or <50 mg/l (if installed before this date);
- Minimal residual chlorine concentration of 0.5 mg/l; and
- No visible floating solids or oil and grease.

Food (Galley) Wastes

The disposal into the sea of food waste is permitted, in terms of MARPOL Annex V, when it has been comminuted or ground to particle sizes smaller than 25 mm and the vessel is en route more than 3 nautical miles (approximately 5.5 km) from land. Disposal overboard without macerating is permitted for moving vessels greater than 12 nautical miles (approximately 22 km) from the coast. On the drilling unit, all food waste will be macerated to particles sizes <25 mm and the daily discharge is typically about seven tonnes per month.

Ballast Water

Ballast water is used during routine operations to maintain safe operating conditions onboard a ship by reducing stress on the hull, providing stability, improving propulsion and manoeuvrability, and compensating for weight lost due to fuel and water consumption.

Ballast water is discharged subject to the requirements of the 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments. The Convention stipulates that all ships are required to implement a Ballast Water Management Plan and that all ships using ballast water exchange will do so at least 200 nautical miles (nm) (± 370 km) from nearest land in waters of at least 200 m deep when arriving from a different marine region. Where this is not feasible, the exchange should be as far from the nearest land as possible, and in all cases a minimum of 50 nm (±93 km) from the nearest land and preferably in water at least 200 m in depth. Project vessels will be required to comply with this requirement.

Detergents

Detergents used for washing exposed marine deck spaces will be discharged overboard. The toxicity of detergents varies greatly depending on their composition. Water-based detergents are low in toxicity and are preferred for use. Preferentially biodegradable detergents should be used. Detergents used on work deck space will be collected with the deck drainage and treated as described under deck drainage above.

Noise Emissions

The key sources generating underwater noise are vessel propellers (and positioning thrusters), with a contribution from the pontoons (e.g. noise originating from within the pontoons and on-deck machinery), supply vessels and from drilling activities. This is expected to result in highly variable sound levels, being dependent on the operational mode of each vessel. The pre-drilling sonar surveys and VSP survey would generate a short-term noise, taking 4 weeks and less than nine hours to complete, respectively.

The main sources of noise from these activities are categorised below.

- Pre-drilling sonar surveys may involve multi- and single beam echo sounding and sub-bottom profiling. These surveys would be undertaken between the 700 m and 1900 m depth ranges covering a survey area of approximately 150 km2. Each wellsite survey would take up to 10 days to complete. A single beam echo-sounder operates within a frequency range of 38 to 200 kHz, whereas multibeam echo sounders operate in the 70 - 100 kHz range and have a 200dB re 1µPa at 1m source level. Sub-bottom profilers emit an acoustic pulse at frequencies ranging between 2 and 16 kHz, typically producing sound levels in the order of 200-230 db re 1µPa at 1m.
- Drilling noise: Drilling units generally produce underwater noise in the range of 10 Hz to 100 kHz (OSPAR commission, 2009) with major frequency components below 100 Hz and average source levels of up to 190 dB re 1 µPa at 1 m (rms) (the higher end of this range from use of bow thrusters). These noise levels will be assumed as indicative for the current project.
- Propeller and positioning thrusters: Noise from propellers and thrusters is predominately caused by cavitation around the blades whilst transiting at speed or operating thrusters under load in order to maintain a vessel's position. The noise produced by a drilling unit's dynamic positioning systems can be audible for many kilometres. Noise produced is typically broadband noise, with some low tonal peaks. The supply vessels will also contribute to an overall propeller noise generation.
- Machinery noise: Machinery noise is often of low frequency and can become dominant for vessels when stationary or moving at low speeds. The source of this type of noise is from large machinery, such as large power generation units (diesel engines or gas turbines), compressors

and fluid pumps. Sound is transmitted through different paths, i.e. structural (machine to hull/pontoons to water) and airborne (machine to air to hull to water) or a mixture of both. The nature of sound is dependent on a number of variables, such as the type and size of machinery operating; and the coupling between machinery and the vessel body. Machinery noise is typically tonal in nature. A ROV will be used to conduct a sweep of the drilling site to identify any debris; however, this is not expected to form a significant noise source.

- Well logging noise: If relevant, VSP will be undertaken in order to generate a high-resolution image of the geology in the well's immediate vicinity. It is expected to use a small dual airgun array, comprising a system of three 150 cubic inch airguns and three 150 cubic inch airguns with a total volume of 450 cubic inches of compressed nitrogen at about 2 000 psi. VSP source will generate a pulse noise level in the 5 to 1 000 Hz range. The volumes and the energy released into the marine environment are significantly smaller than what is required or generated during conventional seismic surveys. The airguns will be discharged approximately five times at 20 second intervals. This process is repeated, as required, for different sections of the well for a total of approximately 150 shots. A VSP is expected to take up to six hours per well to complete, depending on the well's depth and number of stations being profiled.
- Well testing noise: Flaring would produce some air-borne noise above the sea level where flaring is implemented for up to two days of flowing and flaring.
- Equipment in water: Noise is produced from equipment such as the drill string. The noise produced will be low relative to the drilling noise and the dynamic positioning system.
- Helicopter noise: Helicopters will also form a source of noise, which can affect marine fauna both in terms of underwater noise beneath the helicopter and airborne noise.

The extent of project-related noise above the background noise level may vary considerably depending on the specific vessels used and the number of supply vessels operating. It will also depend on the variation in the background noise level with weather and with the proximity of other vessel traffic (not associated with the project).

An Underwater Noise Modelling Study has been undertaken to determine the underwater noise transmission loss with distance from well site and compare results with threshold values for marine fauna to determine zones of impact. These modelling results will be used in the assessment of impacts on marine fauna.

Light Emissions

Operational lighting will be required on the drilling unit and supply vessels for safe operations and navigation purposes during the hours of darkness. Where feasible, operational lights will be shielded in such a way as to minimise their spill out to sea.

Heat Emissions

Flaring during well testing generates heat emissions from the combustion of hydrocarbons at the burner head.

6 LEGISLATIVE AND POLICY FRAMEWORK

6.1 INTRODUCTION

The development of any geography's space economy is guided by a framework of policies and strategies that identify not only a spatial vision for a specific geographic area but also the strategic intent for factors such as economic growth, socio-economic development, resource management, environmental protection, etc.

The overarching objectives of a geography's strategic initiatives are guided and informed by short- and long-term planning frameworks that offer a broad and encompassing future direction for growth and development of the space economy, the economy and demography.

It is within the context of the preceding that is important to consider the alignment between the proposed exploration activities and the strategic intent of local, regional and national planning frameworks. From an economic perspective, exploration activities could create economic opportunities and impacts that, within the context of long-term strategic and economic planning, are necessary catalytic drivers that can establish a permanent economic function in support of economic growth and development.

This chapter therefore provides an overview of the strategic alignment between the proposed exploration activity and local, regional and national planning and policy frameworks.

6.2 NATIONAL POLICY AND STRATEGIC PLANNING CONSIDERATIONS

This section focusses on providing an overview of the key national policy and strategy related to the economy and gas production and exploration in South Africa.

6.2.1 NATIONAL DEVELOPMENT PLAN (2010 TO 2030)

The National Development Plan (NDP) is the primary planning instrument that informs and guides the key development choices and actions of South Africa by providing a broad strategic framework within which these choices can be made, and actions undertaken.

The NDP identifies that in order to address contextual issues related to socio-economic development, an economy is required that can grow, generate jobs, promote skills development and that can integrate into the global economy through trade and specialised skills.

In order to secure economic growth and stimulate socio-economic development, economic infrastructure (electricity, water, roads, rail, etc.) should be developed as the foundation upon which growth is cemented. The deployment of economic infrastructure and concomitant development and resource usage should, ideally, be balanced with the effect that the utilisation of resources could have on the state and quality of the natural environment. Therefore, the NDP furthermore identifies the requirement that the growth of the economy should ensure sustainable usage of the natural environment's resources and that the economy should over time transition to a low-carbon economic model.

Given the preceding, the NDP identifies that gas and other renewable energy sources should play a larger role in energy sector and should ideally form part of the overarching strategy to reduce carbon emissions. In effect, the plan identifies that gas should be explored as an alternative to coal for energy production.

Considering the role of gas as a potential energy source and the potential the resource has as a possible contributor to diversifying the country's energy-mix, the exploitation of localised resources should be considered alongside the importation of the resource. The NDP identifies that gas extraction opportunities exist in the country and the gas resources should be confirmed on- and off-shore. Specific focus is places on resource in off-shore locations along the West Coast – this is further confirmed by the NDP's intent to focus on conformation of the resource and development of its production capacity in the West Coast over the short-term.

From an economic perspective the NDP recognises the potential that natural gas could play not only as a source by which energy security in the country could be created, but also the downstream opportunities that could be unlocked from its beneficiation. At present the country has the capacity to beneficiate the resource, but limited resources inhibit the industry and its value chain to expand and play a greater role in the country's economy.

Key Takeaways:

- Natural gas is seen as a potential resource that can contribute to the country's energy security – which ultimately supports economic growth and socio-economic development
- The exploration and confirmation of the resource is necessary to establish its commercialisation capacity
- Specific focus is placed on gas resources along the West Coast of the country and the shale resources present in the Kalahari

6.2.2 Industrial Policy Action Plan (2018/19 to 2020/21)

The Industrial Policy Action Plan (IPAP) synthesises the National Industrial Policy Framework's main thrusts into a policy action plan that stipulates and coordinates government's broad approach to industrialisation. Industrialisation, and the policy that guides it, seeks to enhance the production capabilities of the broader economy by diversifying the production capacity of the economy whilst also driving the continuous development of more complex and value-adding processes that unlocks efficiency and productivity.

IPAP identifies the need for gas as a role-player within the industrialisation effort of the national economy. The Department of Trade and Industry (DTI) within the IPAP states that the intention of the IPAP is to stimulate gas-based industrialisation within the South African economy over time. Gas based industrialisation will focus on several aspects that includes, but is not limited to, the development of the domestic industrial gas market by investing in critical infrastructure to support the processing and import/export of gas resources and final products in support of heavy industry, manufacturing and transport sector demand; the development and diversification of the gas industry value chain to support cluster development and enable economies of scale principles to regulate and maintain gas affordability and; allowing for further upstream exploration and production of on-shore and off-shore gas resources by creating an investor friendly environment.

Given the preceding, IPAP identifies that gas could play a role in the industrialisation of the economy and could offer sizeable economic benefit as a result of its continued exploration and production. Value chain development and cluster establishment could enhance the economic output the resource offers.

Key Takeaways:

- Natural gas is identified as a key resource that could assist with industrialisation of the economy by stimulating gas-based industrialisation
- Exploration and production of the resource is noted as a key milestone to achieving long-term and sustainable economic benefits from the resource

6.2.3 Integrated Resource Plan (2019)

The Integrated Resource Plan (IRP) provides a national planning framework within which electricity infrastructure can be planned whilst taking due cognisance of a least-coast electricity supply and demand balance, the security of supply and the protection of the natural environment.

The IRP of 2019 is an updated report that builds upon the requirements and forward-looking planning for energy production as outlined by the IRP for 2010 to 2030. The IRP, therefore, provides a long-term plan within which the energy-mix of the country can realised and provides several key considerations and actions to support the development of infrastructure in support of the plan's long-term goals.

According to the plan, the use of natural gas as an energy production resource is a flexible option that can be implemented to complement and support renewable energy production. The plan notes that an opportunity exists to convert existing diesel and kerosene powered open-cycle gas turbines (OCGT) to gas powered closed-cycle gas turbines (CCGT).

Given the preceding, the plan notes that gas infrastructure and resources at present cannot support the development of new gas-orientated power plants and therefore new gas orientated electricity generation should not be considered. Gas powered energy production should, however, focus on the conversion of existing diesel-powered Peaker plants. New investment into gas powered energy production can be considered when sufficient infrastructure is in place to support a larger gas industry and whether the import or domestic production of gas can supply sufficient volumes.

The plan does note that in order to support the preceding, exploration and confirmation of gas resources on-shore and off-shore should be done to accurate

determine the extent to which localised gas industries and energy production can be implemented.

Key Takeaways:

- The use of gas as an energy production resource should be driven by the conversion of existing Peaker plants to gas-fired modules
- Exploration should confirm existing resources in order for long-term planning to be carried out and the use of gas-fired power generation capacity confirmed
- The development of gas related infrastructure is limiting the potential of energy sector to implement and make use of gas as an energy resource

6.2.4 Integrated Energy Plan (2016)

The Integrated Energy Plan (IEP) provides a roadmap of the future energy landscape of South Africa which in turn assists with guiding energy infrastructure investment and policy development. In essence, the IEP models the future energy requirements of the economy (within the context of overarching policy) and estimates the energy required to support the growth of the economy and its sub-sections. Furthermore, the IEP determines the optimal energy mix that is required over time given requirements to preserve the environment, ensure socio-economic development, create economic growth and implement cost-effective solutions.

The IEP determines that South Africa should continue to pursue a diversified energy mix in order to reduce the reliance on a single or few primary energy sources by the energy sector. The varied application of natural gas creates the potential for natural gas to play a sizeable role in the South African energy sector. The IEP identifies that natural gas could contribute to CCGT in the electricity sector, gas-to-liquid (GTL) plants in the fuel sector and direct thermal applications in the industrial and residential sectors.

The significance of natural gas is not only supported by its varied applications but also because the resource offers a cleaner energy source when compared to coal.

The IEP does, however, note that the infrastructure capacity of the country to support a sizeable transition to gas is limited. In order to stimulate a larger gas market, the conversion, use and new development of CCGTs could offer the most significant demand river for gas in South Africa and could in effect assist with further developing the gas industry in South Africa. Furthermore, increased use of gas by the industrial sector could also support and expand the gas market and industry in South Africa.

The IEP does not make mention of the need to undertake the exploration and confirmation of gas resources in South Africa. Exploration is noted as a requirement in order to promote the development of GTL industry in the country. Nevertheless, exploration of gas resources in country is essential to understand the extent to which domestic resources could be committed to support the industry or whether infrastructure should be developed to support the import of resources.

Key Takeaways:

- Natural gas is identified as one of the key resources that should be used to underscore the diversification of the South African energy mix
- The gas industry should be expanded in the country by expanding the use of gas for electricity production, via the direct use of gas resources in the industrial sector

6.2.5 Operation Phakisa (2014)

Operation Phakisa was launched in 2014 as one of the mechanisms through which the objectives and intended development aspirations of the National Development Plan can be achieved.

The purpose of Operation Phakisa is to fast-track mechanism that seek to boost economic growth and job creation by organising cross-sector role-players to implement initiatives and actions that can realise outcomes within targeted sectors and strategic development focus areas.

One of the key focus areas of Operation Phakisa is the ocean economy. Government's intent is to generate economic opportunity from the resources that ocean economy offers whilst also maintaining long-term sustainability and conservation of the ocean's environment.

Within the context of the NDP and Operation Phakisa, four critical areas were identified that could be used to unlock economic opportunities. these four critical areas include:

- Marine transport and manufacturing
- Offshore oil and gas exploration
- Aquaculture
- Marine protection services and ocean governance

The main objectives for the offshore oil and gas exploration sector according to Operation Phakisa is to:

"Create an enabling environment for exploration of oil and gas wells resulting in an increased number of exploration wells drilled while simultaneously maximising the value captured in South Africa. The plan is to create 130 000 jobs, add an annual contribution to the GDP of $2.2 billion, while reducing the dependence on oil and gas imports during the production phase."

Key Takeaways:

- Natural gas is identified as one of four strategic focus areas with which the NDP can stimulate economic growth and create employment opportunities

6.2.6 Marine Spatial Planning Framework (2017)

The Marine Spatial Planning Framework provides a regulatory framework within which relevant and directed spatial planning can occur for the marine resources available to South Africa and through which the potential of the economy can be unlocked and management in a sustainable way.

The framework provides high-level direction for undertaking Marine Spatial Planning in the context of the South African legislation and policies as well as existing planning regimes. It describes the process for the preparation of Marine Area Plans, their implementation, evaluation and revision in order to ensure sustainable development of South Africa's ocean space through consistent and adaptive Marine Spatial Planning.

The framework seeks to establish a basis within which benefits for South Africa can be unlocked:

- Facilitate the unlocking of the ocean economy and sustainable ocean economic development
- Enhance the achievement of societal benefits and strengthen the level of society's interaction with the ocean
- Promote a healthy marine environment and the sustainable use of marine resources and
- Contribute to good ocean governance

Furthermore, the goals of the Framework aim to:

- Unlock the ocean economy by stimulating the sustainable economic growth of South Africa's marine sectors to increase the ocean's contribution to the national Gross Domestic Product, create jobs, and, ultimately, eradicate poverty
- Engaging with the ocean in order to increase our awareness of the value, opportunities and societal benefits of South Africa's ocean space
- Ensuring healthy marine ecosystems by protecting, conserving and restoring South Africa's rich marine biodiversity by managing its living and non-living resources in a harmonious manner and
- Contributing to good ocean governance and includes collaboration between organs of state relating to ocean management, achieved through the establishment of formal and informal relations

The framework recognises that mineral and petroleum resources exploration and exploitation is an existing interest and spatial consideration within the context of the South African ocean economy.

In terms of the hydrocarbon exploration and exploitation sectors the Marine Spatial Planning Framework's Draft Offshore Oil and Gas Sector Plan identifies that the industry should have an enabling environment, prioritise domestic oil and gas exploration and be able to attract foreign direct investment. The Plan also identifies the following sector development objectives:

- Create an enabling environment for the exploration and development of oil and gas resources within South Africa's offshore Exclusive Economic Zone (EEZ)
- Prioritise the exploration and development of domestic oil and gas reserves to support the broader economic growth objectives of South Africa
- Prioritise early phase exploration with the intention of locating leads and prospectivity in the greater part of the EEZ
- Attract foreign investment interest by international petroleum companies to further develop South Africa's underexplored hydrocarbon reserves,

in addition to contributing positively towards job creation and skills development in South Africa, including attracting global service companies to set-up regional hub in South Africa
- Create an industry which delivers effective risk management across all its operations, and which is especially vigilant in testing operational impacts on current and future environments
- Maximize the recovery of potential hydrocarbon reserves sustainably and efficiently through a focus on industry-led innovation, enhancing the skills base and ensuring supply chain growth for the benefit of ordinary South Africans
- Contribute to satisfying the future energy demands for the country while balancing this with the protection of the marine environment and those communities who rely on it
- Exploration and production of oil and gas resources is developed in an orderly and sustainable manner, consistent with section 24 of the Constitution of the Republic of South Africa and environmental legislative framework, to ensure that while benefits are realised, environmental and socio-economic concerns are addressed
- The security of tenure for oil and gas rights holders as provided for in terms of section 2(g) of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) must be safeguarded

The Plan furthermore identifies several guidelines and spatial regulations within which oil and gas exploration and exploitation can occur.

Key Takeaways:

- The framework aims to provide a regulatory framework within which a sector such as offshore oil and gas exploration can be facilitated and managed from a spatial, environmental and developmental perspective
- The oil and gas exploration industry are identified as an important opportunity area for the country's economy and should ultimately prioritise domestic exploration and production, attraction of foreign direct investment, maximise hydrocarbon reserve recovery sustainably and efficiently and contributes to the country's energy needs

6.3 Provincial Policy and Strategic Planning Considerations

This section focusses on providing an overview of the key provincial policy and strategy related to the economy and gas production and exploration in the Western Cape Province. A review of the Western Cape is done because offshore related gas planning heavily focusses on the Port of Saldanha Bay and the Industrial Development Zone that will support the ports oil and gas industries. Furthermore, Saldanha Bay has been identified as the primary catalytic location where gas industries along the West Coast could focus their attention.

The Northern Cape Provincial Government has identified that the province could benefit from the offshore gas industry but would need to expand ports to be able to provide supporting services. Furthermore, the province is primarily focused on onshore renewal able energy production focus areas and the potential for shale gas extraction in the Karoo.

6.3.1 Western Cape Provincial Strategic Plan (2019 to 2024)

The Western Cape Provincial Strategic Plan (PSP) provides a framework within which the short- to medium-term vision of the province is defined and the strategic priorities that support the vision are identified.

A priority for the Western Cape Government based on their PSP vision is to facilitate the growth of the economy and as a consequence generate more employment opportunities. The growth of the economy is a factor which should be development by means of an enabling environment within which the private sector and associated markets can operate.

The use of natural gas has been identified as a resource that could assist with economic growth. one of the focus areas for natural gas in the provincial growth objectives is to enable its use as a vehicle through which investment can be increased. The Saldanha Bay IDZ has been identified as a development zone within which gas related industries should be established. The IDZ has focused on implementing the first components of customised infrastructure for the oil, gas and marine engineering industries.

Furthermore, natural gas as a resource could be used to assist with creating an enabling environment for economic growth. natural gas's role in this focus area is to assist with energy security. A well-balanced energy mix is essential

according to the plan and gas has been identified as one of the key role players to support this drive.

The PSP does, however, not make mention of exploration and the importance thereof.

Key Takeaways:

- Natural gas is considered to be a resource that could assist with the growth of the provincial economy, either by way of expanding resource industries in established development zones or by assisting with energy security

6.3.2 Western Cape Green Economy Strategy Framework (2013)

The Western Cape Green Economy Strategy Framework (GESF) seeks to provide a framework within which the Western Cape can optimise economic opportunities within the green economy whilst also enhancing the natural environment and its performance. The performance of the environment as well as making use of green economic opportunities are all framed within the context of global warming and the province identifying that it will in all likelihood be one of the foremost impact areas.

The GESF seeks to position the Western Cape as the lowest carbon province in South Africa and the leading green economic hub of the African continent. Within trying to achieve the aforementioned ambition, natural gas is identified as a priority for green growth.

The GESF identifies that Atlantis could become a key green economy hub in the country and could be a core location within which gas related services and activities could be located. Furthermore, the Western Cape Infrastructure Framework proposes that natural gas processing could be introduced and used as a transition fuel whilst larger scale renewable energy products are still being developed.

Natural gas is also identified as a key role-player in diversifying the province's energy mix. To support gas as an alternative energy mode largescale infrastructure investment will be required. An extensive study into the potential value of gas has revealed that natural gas provides a sizeable opportunity for the province that the use of the gas should be prioritised for the Saldanha Bay Port.

Key Takeaways:

- Natural gas is considered an important factor to diversify the province's energy mix and to assist with positioning the province as one of the lowest carbon emitters in South Africa.
- Investment is primarily focussed on the Port of Saldanha Bay with supporting industries focussed on the Atlantis Special Economic Zone
- The framework has not identified exploration as a core concern

6.4 Synthesis

At a national and provincial planning level, natural gas as a resource that can be used to support a multitude of economic and infrastructure development initiatives, is not necessarily assessed in terms of the strategic aspects required to support exploration for resources and the confirmation of resources available for exploitation.

Although the majority of plans do highlight the location and distribution of existing resources, resources being exploited and exploration rights, strategies to promote and/or manage exploration is not provided. The significance of exploration as a national driver for natural gas development is not fully acknowledged in national and provincial strategies and therefore the importance of exploration is not expressed and/or acknowledged.

National and provincial strategy do, to some degree, acknowledge the importance of exploration and the confirmation of resources on- and offshore. The exploration and confirmation of resources is primarily identified as an important element to natural gas because of the commercialisation potential of the resource in support of diversifying the country's energy mix. The commercialisation of the resource also becomes important when considering a shift to gas-based industrialisation.

Natural gas as a resource is an important consideration for the country in light of securing energy reliance and repurposing inefficient and outdated energy generation capacity in the energy network of the country. The growth and establishment of natural gas as an industry in the country is seen to be dependent on the conversion of OCGT to CCGT. In order to support his conversion, natural gas pricing would need to be cost effective, for which domestic commercial production of natural gas is an important contributor.

Infrastructure development is also a requirement. Although the country does have a natural gas network, the network is underdeveloped and requires significant investment to support a natural gas industry.

The need to establish domestic commercialised products is evident from national and provincial planning. But sizeable investment is required to support the growth of the gas industry. Furthermore, a detailed strategy for the development of the resource is not available, which ultimately hampers the effective growth of the industry and limits the potential for public and private investment.

7 METHODOLOGY

7.1 INTRODUCTION

Chapter 7 of the report provides a description of the methodology used to inform the economic impact assessment. The chapter provides a description of the methodology adopted in preparing the report and includes a brief description of any specialised processes uses to undertake the assessment.

7.2 PROJECT METHODOLOGY

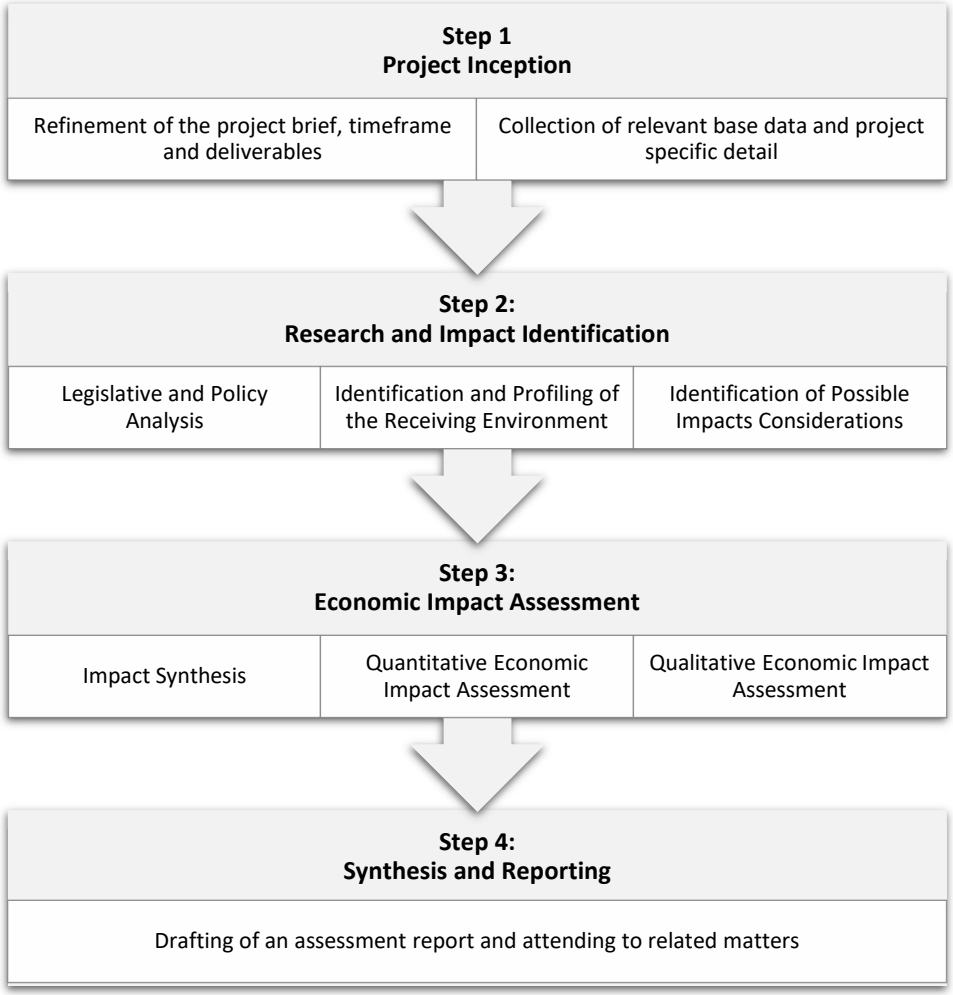
The purpose of the study is to undertake an economic impact assessment of the proposed exploration activity in Exploration License Block 3B/4B. In order to achieve the economic impact assessment, an overarching project methodology has been adopted that identifies and informs key aspects of the impact assessment and focusses the outcomes of the assessment on the project specific terms of reference and its expected outcomes.

Diagram 7.1 provides a diagrammatical representation of the methodology used to conduct the economic impact assessment contained in this report. Prior to the diagram, a short description is provided of each step to highlight the key components that make up each step of the methodology and to emphasize whether any limitations are associated with each step.

The project methodology of the economic impact assessment consists of the following four steps:

- Step 1: Project Inception
  - Step 1 entails the inception of the project. The step focusses on refinement of the project brief, the project timeframe and the deliverables required. Furthermore, the step also collates relevant base data and documents and seeks to acquire any project specific detail and information relevant to the study.
- Step 2: Research and Impact Identification
  - The step focusses on conducting necessary base research to inform the analyses of the project and its economic impacts.
  - An overview of relevant legislation and policies is undertaken to understand the strategic relevance of the proposed project and to determine and current and future planning aspects that may impact on the project and its intended outcomes.

Diagram 7.1: Project Methodology Overview



Source: DEMACON, 2023

- The identification of the receiving environment is also undertaken in this step. The purpose of the analysis is to determine the relevant economic environment that will be impacted by the proposed project. The receiving environment is identified by determining the project's areas of influence (whether offshore or onshore) and delineating a receiving economy based on the propensity of the proposed project to influence the economic activities of economic geographies within its area of influence.
- Once the receiving economy has been identified, a profiling analysis is undertaken to identify the macro and micro economic context of the receiving economy. The economic context is assessed by profiling the receiving economy in relation to different metrices such as economy size, distribution, growth, composition, basic and non-basic sectors, tress index concentration, labour absorption and key spatial considerations.
- Based on the outcome of the profiling analyses, several potential economic impacts that may arise from the proposed project's operation is identified. The purse is to highlight potential areas of impact that can be assessed in greater detail in subsequent analyses for inclusion into the economic impact assessment.

- Step 3: Economic Impact Assessment
  - Step 3 of the project methodology focusses on the economic impact assessment of the proposed project. The economic impact assessment consists of three assessment phases and culminates in a perspective on the impact (and extent thereof) of the proposed project within the receiving economy.
  - The impact assessment first undertakes a synthesis of the potential impacts identified from the profiling analyses of the receiving economy. The purpose of the synthesis is to identify areas of impact or key impact themes, that is relevant to the proposed project and that can be included into the economic impact assessment.
  - Once the synthesis of potential economic impacts has been completed and the key impact themes have been identified, impacts associated with each theme is identified and described.
  - By making use of the key impact themes (and associated impacts per theme), quantitative economic impact of the proposed project is modelled to determine the quantified net gains or loss imposed by the proposed project on the receiving economy. The quantitative economic impact assessment is based on a bespoke input-output model developed for the economic impact assessment. The model quantifies the economic impact of each impact theme (and relevant impacts) based on several metrices (additional business sales, additional GDP, additional employment, additional fiscal benefits, SMME opportunities and household income growth) and determines the total net economic impact of the proposed project and the gains and/or losses it poses to the receiving economy.
  - The key impact themes and relevant impacts per theme is then assessed within the qualitative economic impact assessment framework. The qualitative analysis makes use of an impact significance rating methodology. The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).
  - The quantitative and qualitative impact assessment is then synthesised to provide a holistic view on the range and potential impact of the proposed project on the receiving economy.
- Step 4: Synthesis and Reporting

Step 4 focusses on the synthesis and reporting of the outcome of the analyses undertaken in Steps 2 and 3.

8 DEFINING THE RECEIVING ENVIRONMENT AND PROFILING ITS ECONOMIC CONTEXT

8.1 INTRODUCTION

The purpose of the economic impact assessment is to evaluate the potential effect that the proposed exploration activity could have on the receiving environment's overarching economic context. It is therefore necessary to establish the baseline or status quo of the receiving environment's economy and to determine the underlying characteristics and/or trends that define the economy.

Given the preceding, the purpose of this chapter is to outline the salient features of the receiving economy in terms of selected time series economic indicators, most notably the economic profile and growth trends within the receiving environment economy. The chapter will also define the receiving environment in order to spatially define potential areas of impact.

8.2 ECONOMIC CONTEXT OF EXPLORATION

In order to understand the economic context of exploration, and more specifically exploration for natural gas, it is necessary to understand how the exploration industry is classified as an economic activity. By understanding the classification of the industry within the broader economy's structural framework, it is possible to continuously assess and review the role that the industry plays as part of the receiving economy's economic output, growth and development.

The Standard Industrial Classification (SIC) is the primary framework within which all economic industries and related activities is classified. In essence, the SIC is a coherent and consistent classification structure of economic activities based on a set of agreed concepts, definitions, principles and classification rules. Each country, including South Africa, develops a version of the SIC based on the classification of industrial activity in the International Standard Industrial Classification of All Economic Activities (fourth edition) published by the United Nations Economic and Social Council.

For the purposes of this assessment, the Standard Industrial Classification of All Economic Activities (Fifth Edition)[1] is used. Economic data published by Quantec make use of the Fifth Edition to classify economic information. Hence, reference is made to the SIC Fifth Edition until such time that updated economic information becomes available based on alternative SIC iterations.

According to the SIC, exploration activities, which includes exploration for natural gas, is classified as part of the Architectural and Engineering Activities and Related Technical Consultancy Industry. The industry is the function of other business activities within the economy and primarily contributes to the Financial Intermediation, Insurance, Real Estate and Business Services economic sector.

Reference to the prospecting and exploration industry will make use of the afore mentioned classification. The classification does, however, reference all types of exploration and prospecting and therefore serves as a baseline within which an assessment of the economy and the industry as a whole can be done.

Please refer to Diagram 8.1 (overleaf) for a full layout of where gas exploration is classified within the economy.

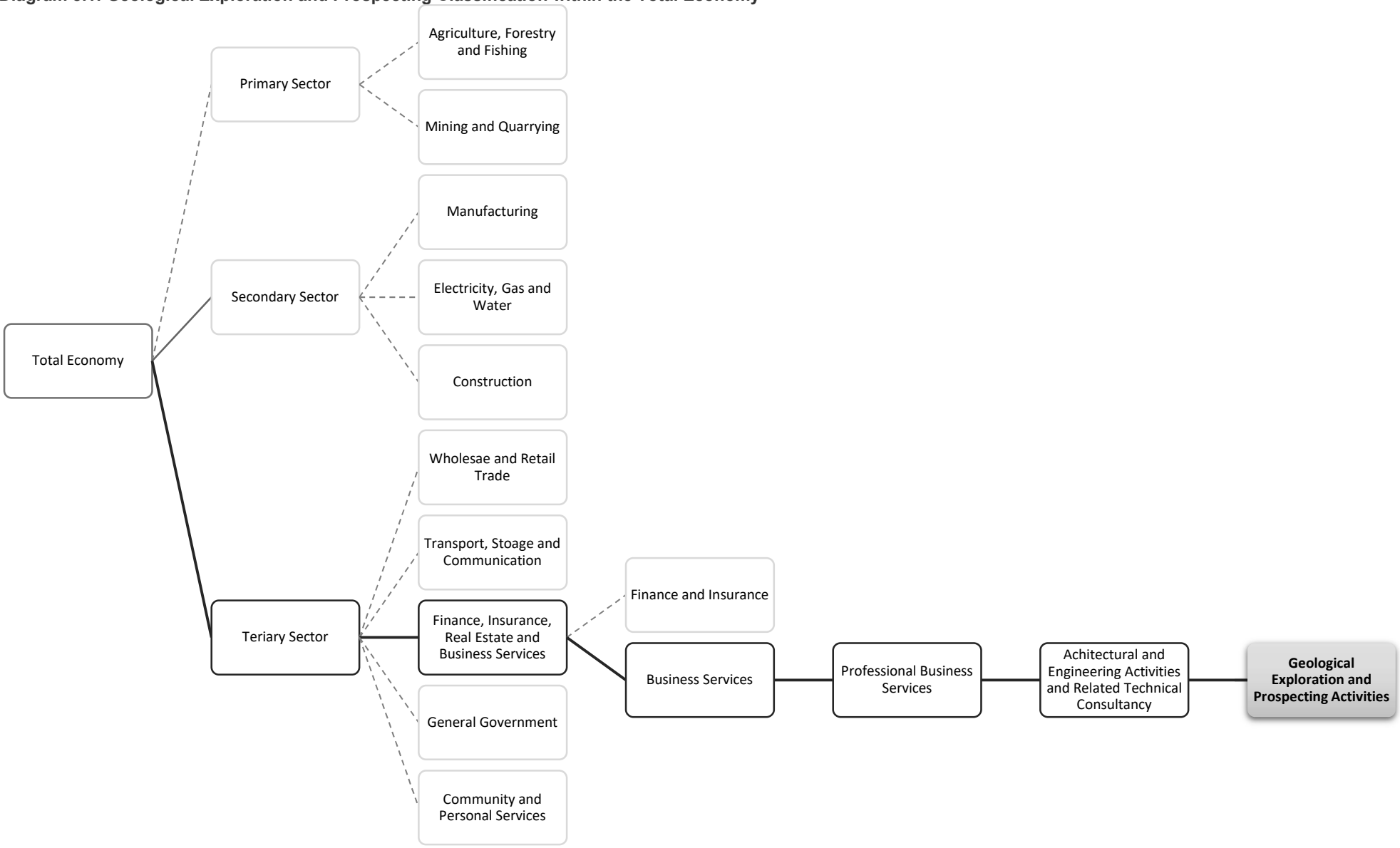
8.2.1 CONTEXTUALISING THE PROJECT WITHIN THE EXISTING GAS EXPLORATION INDUSTRY OF SOUTH AFRICA

8.2.1.1 GAS VALUE CHAIN, PRODUCTION AND CONSUMPTION

The natural gas industry in South Africa represents a small portion of the overall energy mix and petroleum utilisation of the country. The South African Energy Sector Report (2021)[2] identifies that natural gas represented approximately 3% of the energy supply of the country in 2018 (approximately 65% of the energy supply is sourced from coal and 18% from crude oil) and has maintained a steady presence between 2% and 3% since 2007.

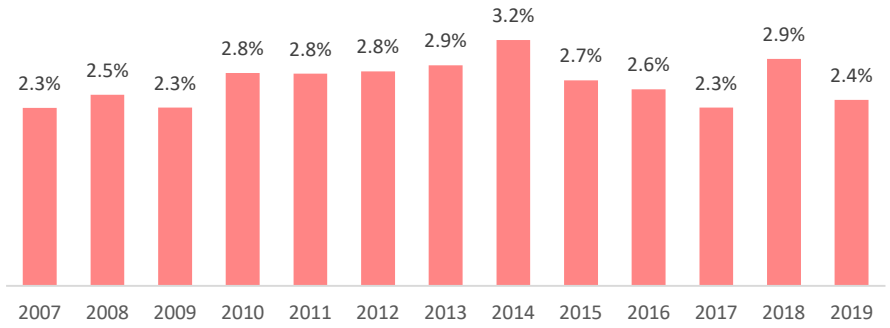
[1] Source: Statistics South Africa (www.statssa.gov.za/additional_services/sic/contents.htm)
[2] https://www.energy.gov.za/files/media/explained/2021-South-African-Energy-Sector-Report.pdf

Diagram 8.1: Geological Exploration and Prospecting Classification within the Total Economy



Source: DEMACON ex Statistics South Africa, 2023

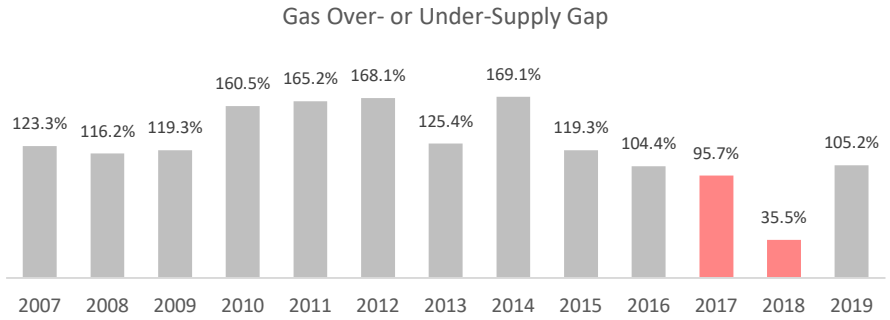
Figure 8.1: Percentage Contribution of Gas to the South African Energy System



Source: DEMACON ex Department of Energy, 2023

Historic data does, however, suggest that the supply of gas may over time reach levels of saturation and under-supply. Data from the Department of Energy[3] shows that since 2013 the demand for gas has steadily been increasing whilst supply has remained consistent. The data suggests that current supply levels are becoming insufficient to accommodate demand for gas.

Figure 8.2: Percentage Over- or Under-Supply of Gas Consumption

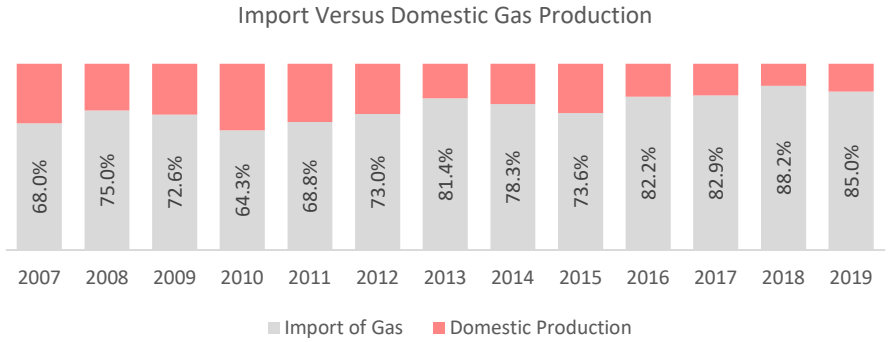


Source: DEMACON ex Department of Energy, 2023

Given the potential supply deficit, it is important to consider the sourcing of gas supply for production in the domestic market. The bulk of gas used within the domestic energy system (approximately 85%) is imported from Mozambique via the Pande and Temane Gas Pipeline which services the Sasol Gas-to-Liquid refinery in Secunda. Approximately 50% of imported supply is used for petroleum production whilst remaining imported gas supply is distributed to commercial and industrial customers in KwaZulu-Natal, Mpumalanga, Gauteng and the Free State via a network of inland gas networks.

Domestic production (approximately 15.0% of all gas supply in the country) is sourced primarily from the FA Offshore Platform (E-M / F-A Gas Fields) which supplies natural gas from a domestic offshore production area south of the country to the Gas-to-Liquid refinery in Mossel Bay.

Figure 8.3: Import versus Domestic Gas Production



Source: DEMACON ex Department of Energy, 2023

Although domestic production represents a small portion of the domestic gas market, the South African value chain does contain the full spectrum of down-, mid- and up-stream industries.

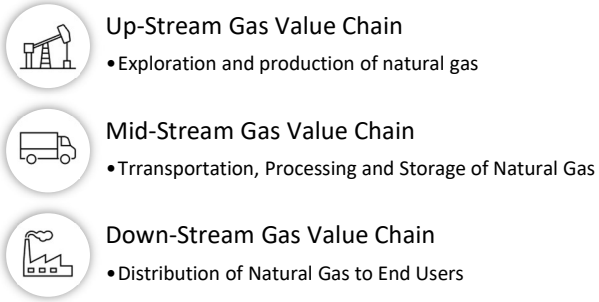
The **up-stream gas value chain** represents the exploration and production activities of gas fields on- and off-shore. Within the South African context up-stream industries include PetroSA's FA Platform (Offshore), Sasol's Pande and Temane Gas field in Mozambique and Terta4's compressed natural gas production (onshore).

[3] https://www.energy.gov.za/files/media/Energy_Balances.html

The **mid-stream gas value chain** represents the transportation, processing and storage of gas. Within South Africa the mid-stream portion of the value chain consists of large-scale gas transmission pipelines (ROMPCO, Lily Pipeline and Sasol Gas), PetroSA's subsea gas transmission pipeline from the FA Platform to the GTL refinery in Mossel Bay and above-ground natural gas holder facilities such as Egoli Gas, Cottesloe and Langlaagte.

The **down-stream gas value chain** represents the distribution of gas products to end-users. The distribution of natural gas is done via several pipelines to industrial and other commercial users in KwaZulu-Natal, Mpumalanga, Free State and Gauteng, the GTL refinery in Mossel Bay and the GTL plant in Secunda.

Figure 8.4: South Africa Gas Value Chain



Source: DEMACON ex Department of Mineral Resources and Energy, 2023

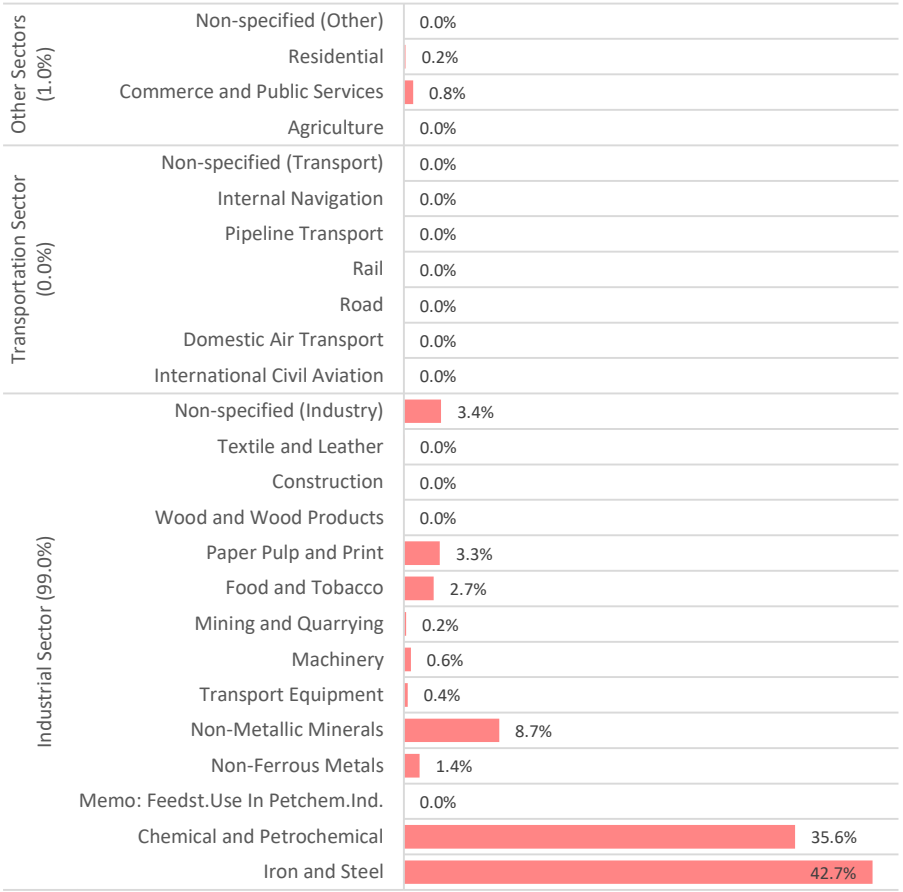
Map 8.1: Gas Import and Domestic Production Infrastructure

Source: DEMACON ex Petroleum Agency of South Africa

The down-stream gas value chain consists of end users that apply gas resources and products in order to support industrial activity, transportation services and other localised commercial activities.

The bulk of gas consumption (99%) occurs within the industrial sector with end users such as the iron and steel industry and chemical and petrochemical industries utilising the majority of final customer consumption.

Figure 8.5: Final Consumption Customers of Gas Supply in South Africa



Source: DEMACON ex Department of Energy, 2023

According to the Department of Energy, in 2019 no end-users in the transport sector made use of gas as petroleum resource. The data does, however, indicate that approximately 1.0% of gas consumption in South Africa is as a result of commerce and public services and residential uses.

8.2.1.2 GAS EXPLORATION

The offshore petroleum exploration industry in South Africa has been accelerating over the last 5- to 10-years because of continuous new hydrocarbon discoveries. As of March 2023, approximately 50% of the South African Maritime Exclusive Economic Zone (EEZ) has been allocated to either an exploration right, production right or has some form of exploration or production right pending.

Exploration activity occurs along the eastern, southern and western coasts of South Africa with the majority of exploration and production clusters situated along the southern and western coasts. These exploration activities occur in four offshore basins known as the Orange, Bredasdorp, Outeniqua and Durban & Zululand Basins.

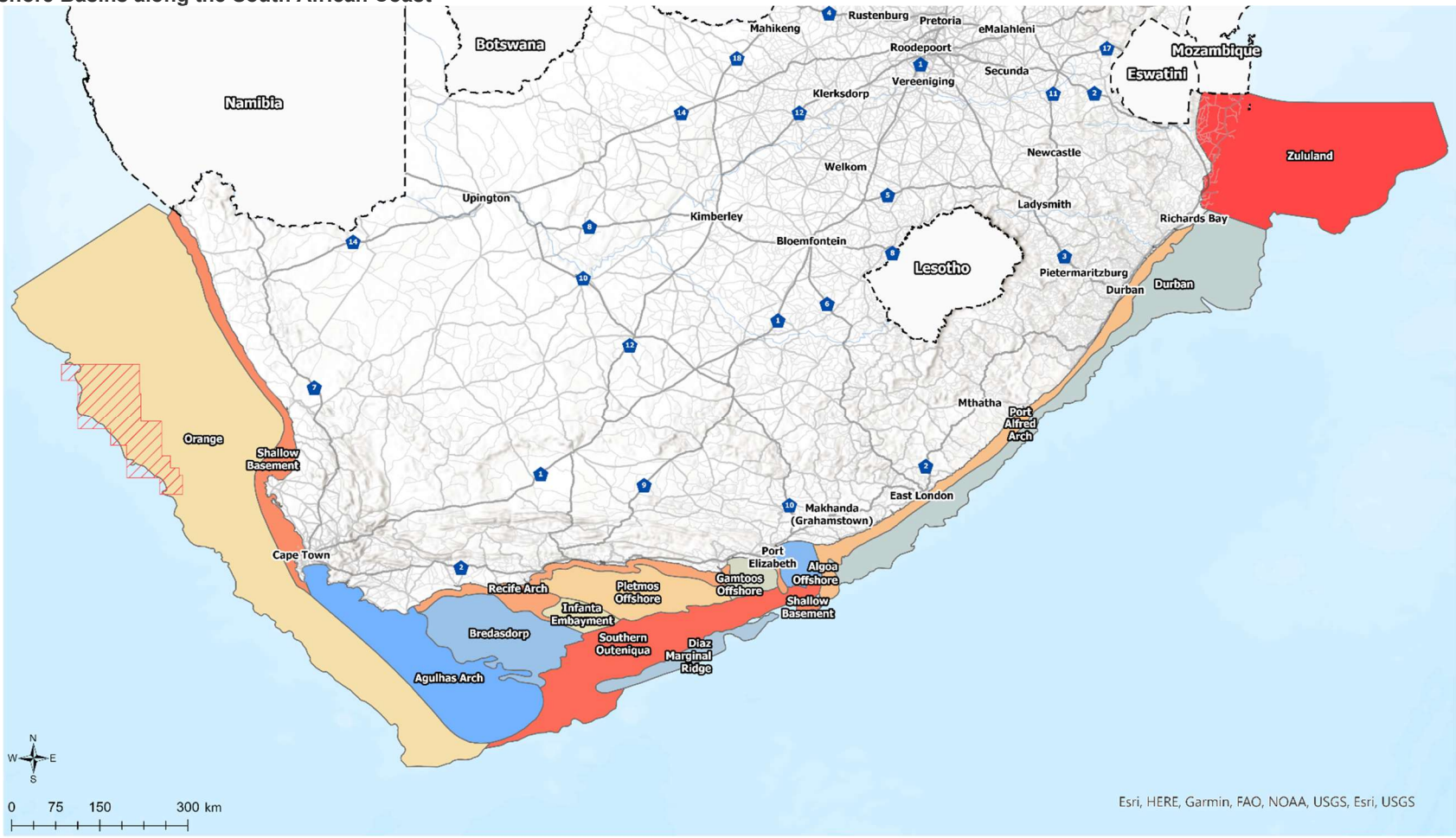
Approximately 300 exploration, appraisal and production wells exist within the EEZ. More than half of exploration drilled wells were drilled between 1981 and 1990 whereafter the bulk of seismic surveys and drilling activities occurred within the Bredasdorp Basin.

A number of small oil and gas fields were discovered during this exploration, and oil and gas are now being produced commercially in the Bredasdorp Basin. The Pletmos Basin contains two undeveloped gas fields and six gas discoveries. Orange Basin in South Africa has yielded one oil discovery and several gas discoveries - Production of gas from the Ibhubesi Gas Field could come online in the foreseeable future as well.

Major exploration role-players in the South African offshore market consist of PetroSA, Sunbird, Shell, Total Energies, Impact Africa, African Oil, Sungu-Sungu, Silver Wave Energy and Sasol.

The gas industry, as noted above, has a variety of forward and backward linkages that deal with the exploration and extraction of gas, transport, processing and storage of gas and the sale of gas. Gas exploration forms part of the gas industries backward linkages which, in itself, has a variety of forward and backward linkages.

Map 8.2: Offshore Basins along the South African Coast



Legend

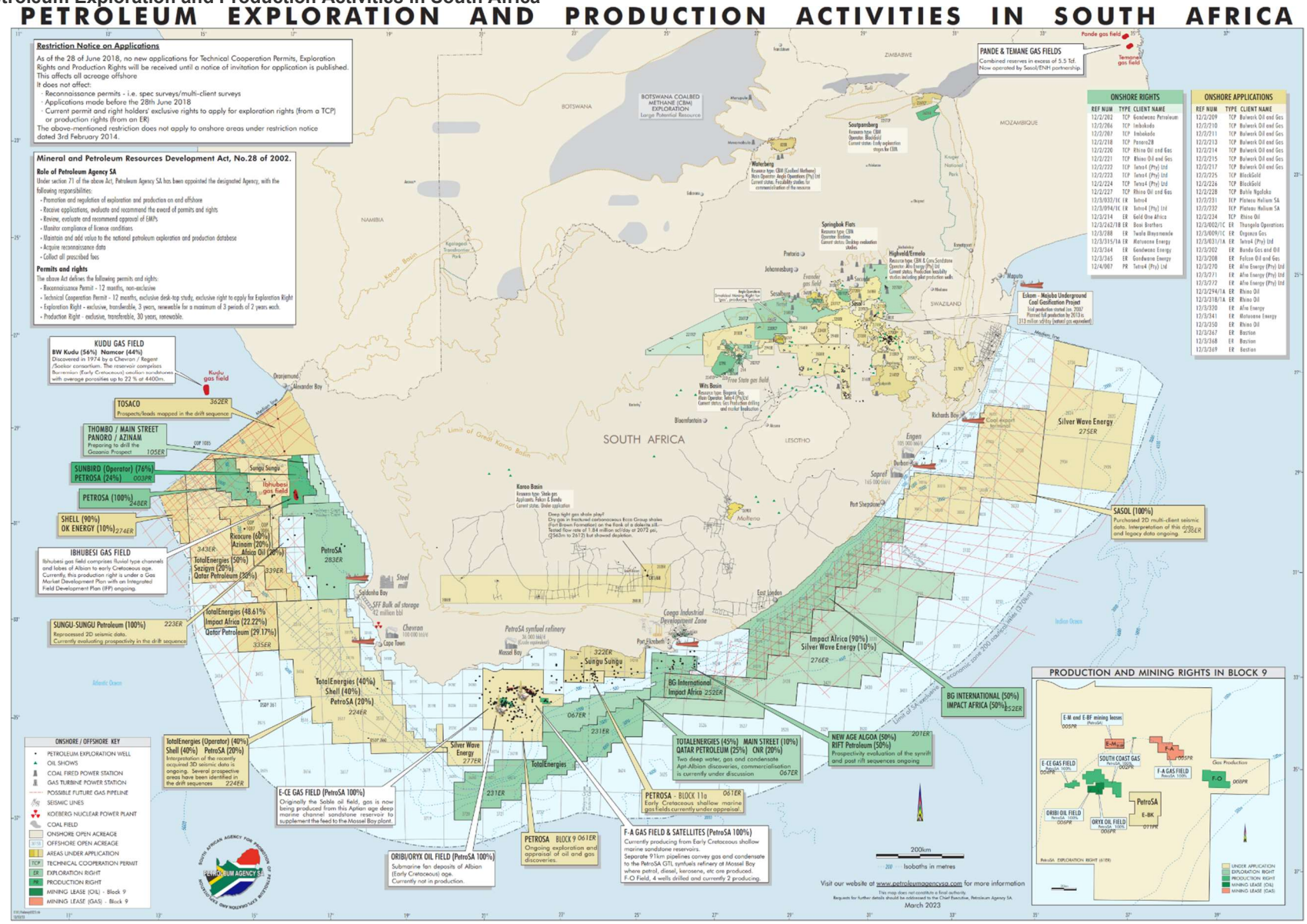
Exploration Right
- Block 3B/4B

Road Network
- National Road
- Regional Road
- Main Road
- Other Main Road

Offshore Basins
- Agulhas Arch
- Algoa Offshore
- Bredasdorp
- Diaz Marginal Ridge
- Durban
- Gamtoos Offshore
- Infanta Embayment
- Orange
- Pletmos Offshore
- Port Alfred Arch
- Recife Arch
- Shallow Basement
- Southern Outeniqua
- Zululand

Source: DEMACON ex Petroleum Agency of South Africa, 2023

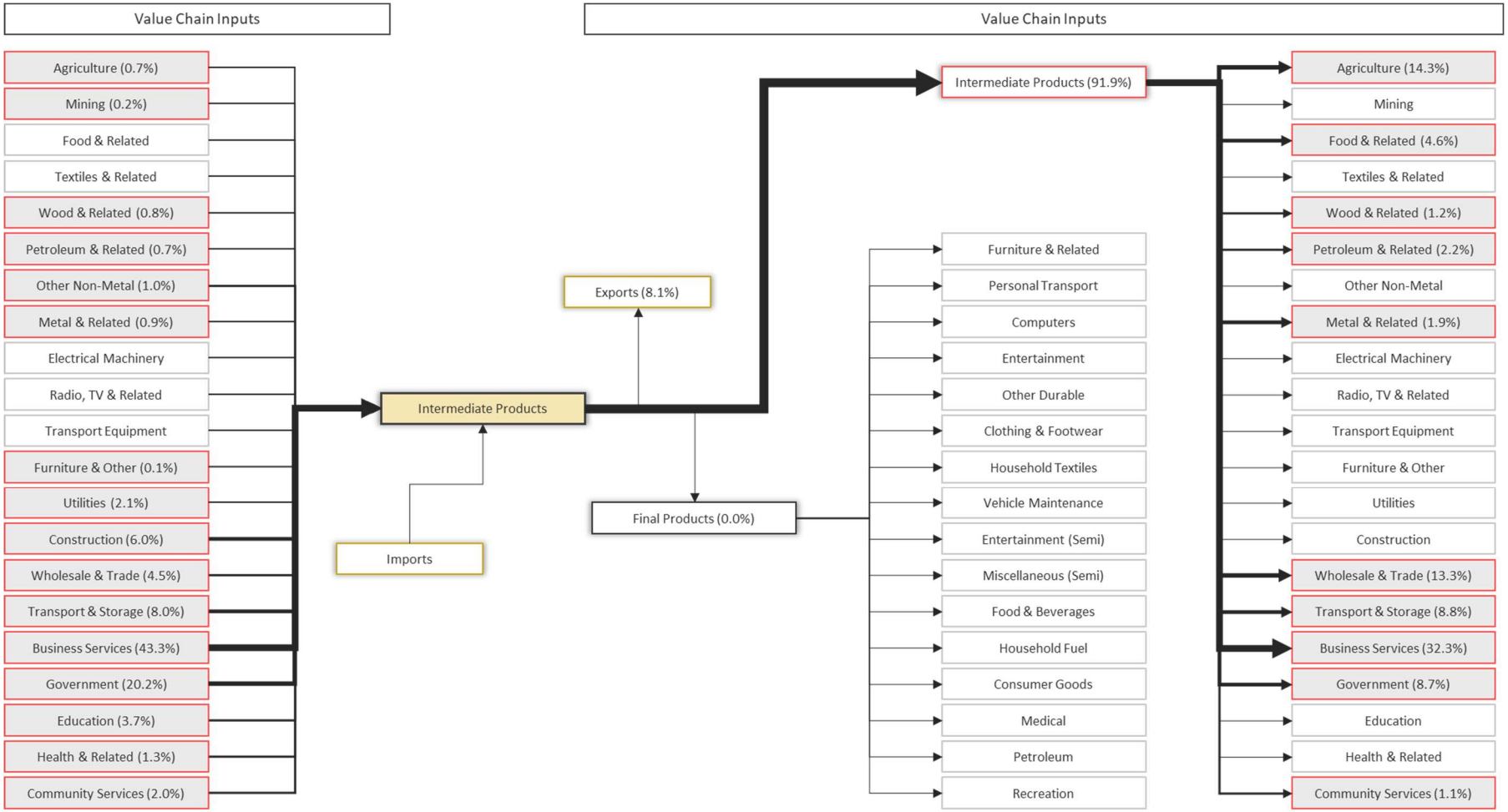
Map 8.3: Petroleum Exploration and Production Activities in South Africa



Source: DEMACON ex Petroleum Agency of South Africa, 2023

Gas exploration, as part of the Professional Business Services sector of the economy has forward and backward linkages that support the industry's operation (primary input and output sectors are coloured grey and red for ease of reference). The Professional Business Services sector draws inputs from the primary, secondary and tertiary economy with the bulk of inputs originating from other professional business services activities, the government sector and transport and storage. The sectors forward linkages concentrate on intermediate products and services where the sector provides inputs to other professional business services industries, wholesale and retail trade, transport and storage and agriculture. The forward and backward linkages of gas exploration could generate economic impacts that influence a variety of sectors.

Diagram 8.2: Structure and Value Chain of the Professional Business Services Sector



Source: DEMACON, 2023

8.3 IDENTIFYING AND DEFINING THE RECEIVING ECONOMIC ENVIRONMENT OF THE PROJECT

A receiving environment is the area within which a proposed activity could influence the normal state of social, physical, environmental, cultural, or economic resources. It is important to identify and define a receiving environment in order to assess and understand the core contextual components that make up the baseline characteristics, processes, and sensitivities of an affected environment.

In this report, the receiving environment is separated into an offshore and onshore area of influence. This distinction is made because, although exploration activities occur offshore, they influence an extended area around exploration locations (offshore area of influence). The economic output produced by exploration activities, however, is measured onshore as part of a defined economic geography (onshore area of influence).

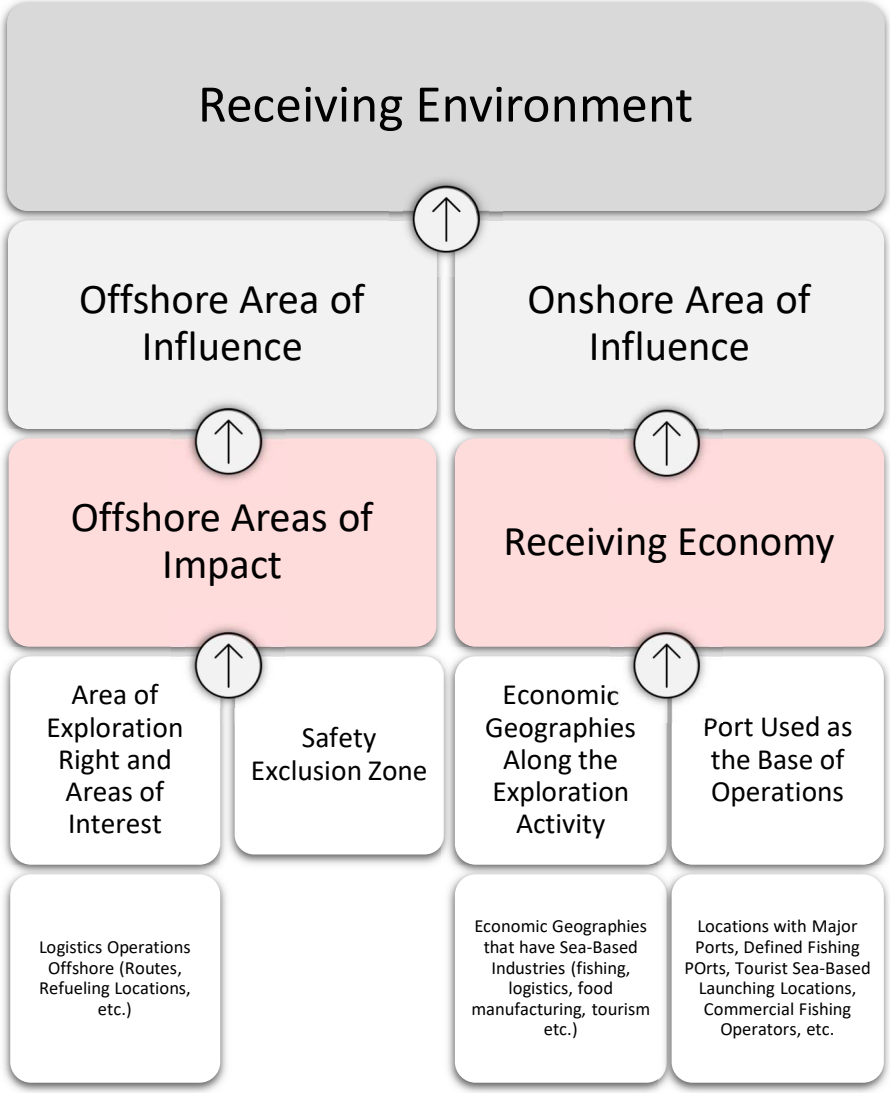
The offshore area of influence represents the receiving environment where exploration activities will take place. This includes the area of interest where exploration wells will be drilled, as well as offshore areas for refuelling, maintenance, a safety exclusion zone, and marine traffic routes between base harbours and drilling operations. The offshore area of influence also caters for the potential impacts that may result from exploration drilling, such as direct and indirect impacts on ecosystems (e.g., fishing areas, marine mammals, etc.).

The onshore area of influence represents the receiving environment where the output of economic activities/industries are measured and primarily situated. Although exploration activities occur offshore, their economic output is registered within an onshore economic geography, typically based on the port used as the base port of operations or where a business is registered.

In addition to the base port of operations, economic geographies along the extent of the exploration right and area of interest are also included as part of the onshore area of influence. These economic geographies are included because exploration operations could influence the normal economic activity of economies that, to some degree, make use of and benefit from sea-based economic resources.

Initial information provided regarding the operational planning of the exploration activity identifies that the base of operations for the project will originate from the existing major ports in the Western Cape, i.e., the Port of Cape Town and/or the Port of Saldanha Bay. The Port of Cape Town is identified as the primary preferred choice from which the operational base of the exploration activity will be managed. The Port of Saldanha Bay is identified as the preferred alternative to the Port of Cape Town.

Diagram 8.3: Identification of the Receiving Environment



Source: DEMACON, 2023

Furthermore, the exploration right extends between the southern regions of the Northern Cape to Saldanha Bay in the Western Cape. Therefore, the local economies situated along the Western Coast of South Africa could potentially be affected by exploration activities. Given the preceding, the onshore area of influence will primarily represent economic geographies that are situated along the West Coast of the country. Economic profiling will focus on the Western Cape and Northern Cape economies, with reference to regional and sub-regional economies where necessary.

Map 8.4 provides an overview of the offshore and onshore areas of influence as discussed above.

8.4 Context of the Receiving Environment Economy

As alluded to previously, it is necessary to profile the status quo of the receiving environment's economy. The status quo provides an overview of the inherent and established characteristics that define the receiving environment's economic context and assists with identifying the possible aspects and factors that could be influenced by the project's introduction into the established economic frame of the receiving economy.

The following section, therefore, profiles the economic context that defines the receiving environment. The profiling will focus on a macro and regional context. The macro-context provides a perspective on the overarching macro-economic trends that influences the national economy and by extension impacts on provincial and regional economic indicators as well.

The regional context focusses on profiling the receiving environment by referencing the economic indicators available for the provincial and regional economic geographies that form part of the receiving environment (refer to the receiving environment's definition in Section 8.3 of this Chapter).

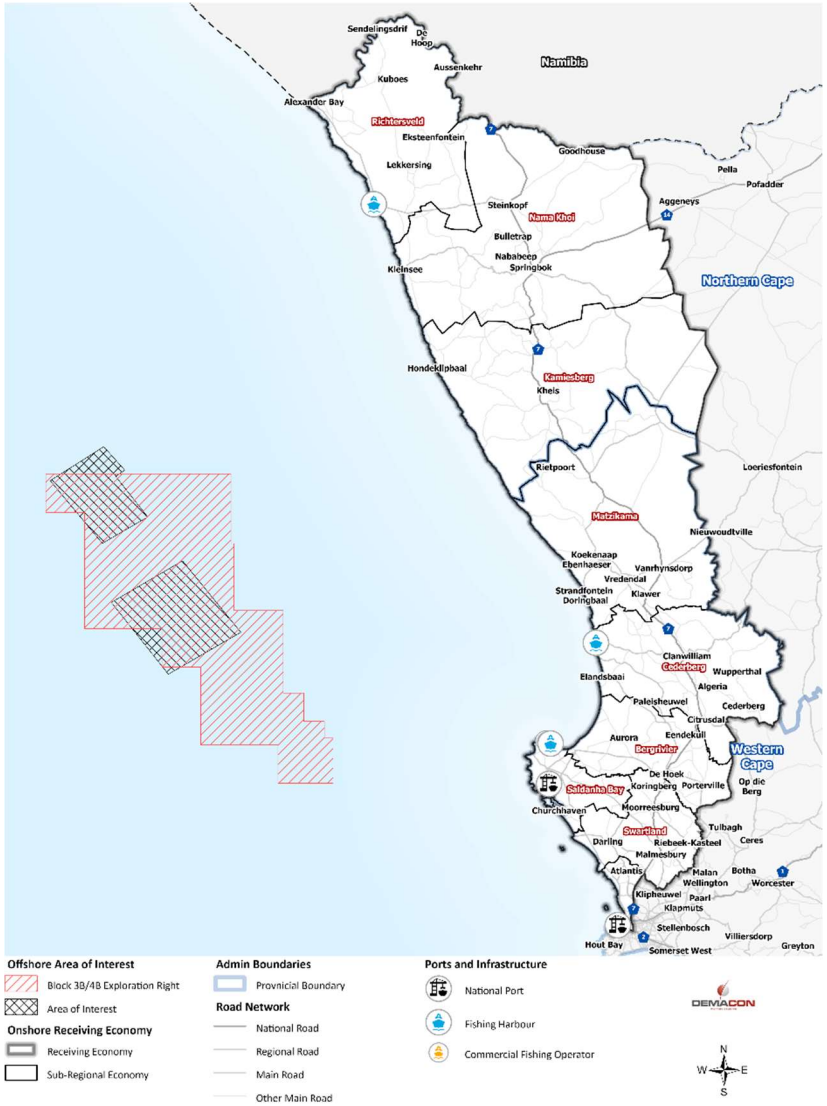
8.4.1 Macro-Economic Trends and Factors Affecting the Receiving Economy

This section provides an overview of the current macro-economic trends and factors influencing national and regional economic growth prospects and development opportunities.

The data assists with providing a contextual perspective of the national factors influencing economic growth and development and assist with interpreting micro-economic trends at a regional and sub-regional scale.

Subsequent to this analysis, detailed economic data will be provided in order to determine the status quo of the receiving environment's economy.

Map 8.4: Offshore and Onshore Receiving Environment

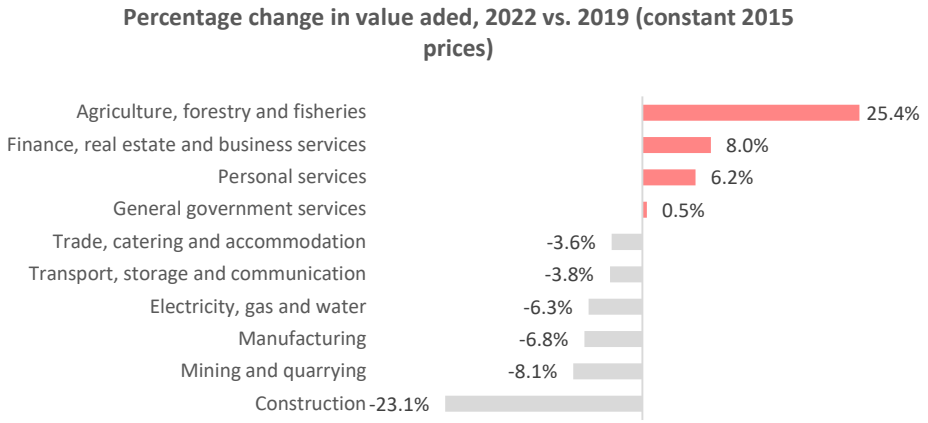


Source: DEMACON, 2023

8.4.1.1 ECONOMIC OUTLOOK FOR SOUTH AFRICA

South Africa's Economic Disruptions

- South African Economy faced a series of global and local disruptions, including:
  - Slowing global growth
  - Geopolitical tensions
  - Acute power challenges
  - Inefficiencies in state-owned enterprises
  - Climate change, to list a few.
- No growth could be a reality for South Africa in 2023.
- To minimise further deterioration and create conditions for future growth, urgent action is required to address supply-side constraints – with emphasis on stable electricity access and improving of freight and logistics.



Source: DEMACON ex Statistics South Africa, 2023

GDP Growth Trends

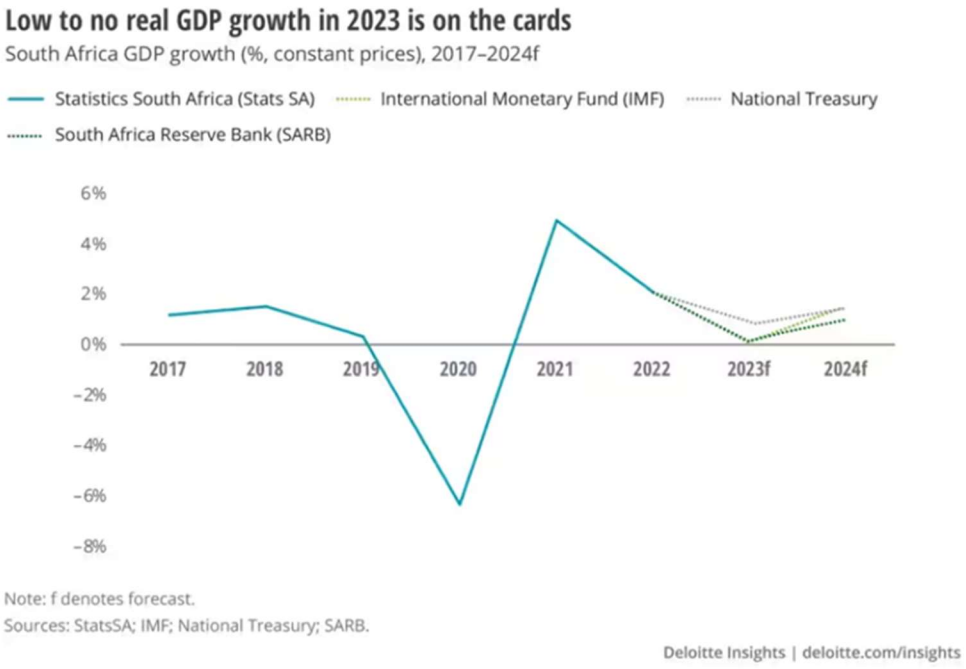
- As per StatsSA, the economy expanded by 0.3% since the outbreak of COVID (between 2019 and 2022).
- Six industries still lag pre-pandemic output levels:
  - Construction
  - Mining
  - Manufacturing
  - Utilities
  - Transport
  - Trade.
- The mining and manufacturing sectors have been the hardest hit by loadshedding challenges.
- The year 2022 experienced 200 days of loadshedding. Quarter 4 experienced only 2 of the 92 days without loadshedding.
- The first quarter of 2023 experienced only one day without loadshedding, and blackout periods are longer.
- Mining (-1.9%) and manufacturing (-3.7%) production was lower compared to a year-ago.
- Freight and logistics bottlenecks with flatter commodity prices further undermined the growth prospects of the mining sector.

Retail Sales

- Retail sales deteriorated by -0.8% in January Year-on-Year.
  - Mostly due to constrained household finances:
  - Ongoing cost-of-living increases
  - Higher inflation
  - More expensive credit conditions
  - Loadshedding.
- With loadshedding expected to continue into at least the second half of 2023, consumers are likely to face more price hikes due to:
  - Retailers and consumer goods companies spend more on power back-up
  - Increasing cost of doing business
  - Exerting additional pressure on input costs

GDP Growth Expectations

- A growth scenario of flat to no growth is a real possibility for 2023 according to Deloitte.
- The country could already be in a technical recession in 2023: Q1 (two consecutive negative quarters of growth)
- National Treasury forecast for 2023 is 0.9%.
- South African Reserve Bank forecast for 2023 was 0.3% in January, revised downward to 0.2% end of March.
- The International Monetary Fund forecast for 2023 was 1.2% in January, revised downwards to 0.1% end of March.
- Given lower net exports (logistical bottlenecks), easing of commodity prices, higher power-related imports the current account deficit is projected to
- Increase to -1.8% of GDP in 2023 and -2.0% of GDP in 2024.



Subdued Growth in Household Consumption Expenditure

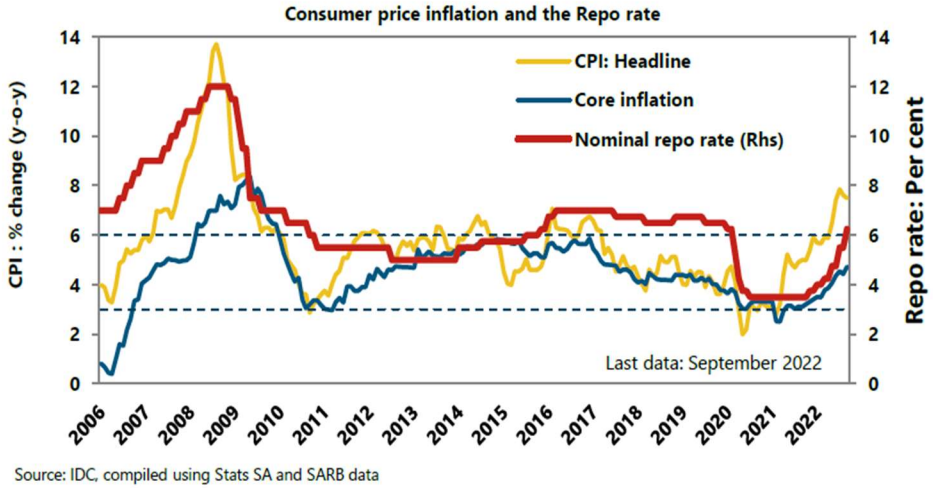
- SA consumers are under financial strain.
- End of February 2023, the Deloitte South African Consumer Tracker highlighted that 41% of consumers feel that their financial position has worsened over the past year and that they are concerned about their financial circumstances.
- Consumers are making greater trade-offs (buying lower-cost items and store brands) and are being for frugal (buying only essentials).
- FNB/ BER Consumer Confidence Index declined to -23 points in 2023: Q1 (down from -8 points in 2022: Q4).
- Third lowest CCI since 1994, with likely repercussions on lower durable goods sales this year.
- Consumers have already/ thinking of investing in backup renewable power solutions (given the recent tax rebate for the fiscal year of 2024).

Inflation Pressures

- Increased global food and fuel prices forced inflation rates beyond the target band.
- Headline inflation increased from 6.9% Year-on-Year in January 2023 to 7.0% Year-on-year in February 2023.

SA Reserve Bank

- The Monetary Policy Committee raised the repo rate by 75 basis points on 22 September 2022, followed by another hike of 75 basis points on 24 November 2022 and another 25 basis points on 26 January 2023, bringing the repo rate to 7.25%.
- It Is expected that the repo rate will be further increased by between 25 and 50 basis points on the 25th of May meeting, 2023.



Source: IDC, compiled using Stats SA and SARB data

Repo Rate	Prime Lending Rate
7.25%	**10.75%**

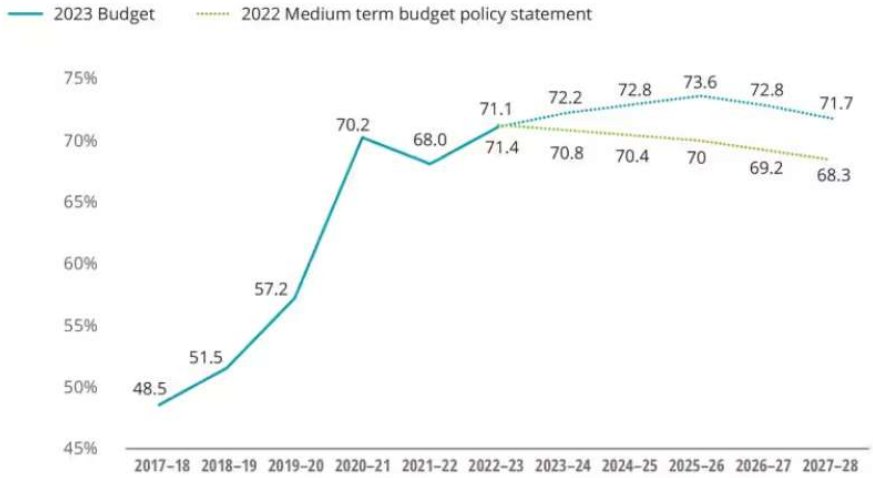
Source: IDC, 2022 & 2023
OECD, 2023
Investec, 2022 & 2023

Public Finances

- Consolidated budget deficit forecast expected to decrease to 4.2% of GDP in 2022 to 2023, 4.0% in 2023-2024 and 3.2% in 2025-2026.
- Despite an average annual increase of 4.5% in consolidated expenditure over the next three years, a primary budget surplus is still expected for 2023 to 2024.
- Government's decision to provide debt relief to Eskom (taking on more than 50% of Eskom's debt over three years) will result in a deterioration of the debt-to-GDP ratio.
- This will result in an increase in debt-service costs, while crowding out other expenditure.

Government's debt relief to Eskom will result in debt-to-GDP ratio stabilizing only in 2025–2026

Gross debt-to-GDP (% of GDP), 2017–2027f



Note: f denotes forecast.
Source: National Treasury.

Deloitte Insights | deloitte.com/insights

Grey Listing of South Africa

- Grey listing of South Africa by the FATF in February 2023.
- While not expected to have permanent effects on the growth outlook, it could imply potential risks such as reputational damage, increased transaction costs for businesses and negative impact on foreign flows, posing additional burdens on the national economy.
- Significant progress has already made in addressing some of the concerns of the FATF.

Addressing Power Outages

- A National Energy Crisis Committee has been established and is taking on debt from Eskom to free up resources at the utility.
- The National Energy Crisis Committee (Necom) intends to recover and add 8 800 megawatts (MW) of generating capacity this year in an effort to reduce the intensity of load shedding.
- There are eight interventions in 2023:
  - Bring Kusile units 1, 2 and 3 back online, plus achieve commercial operation for Unit 5 (2 880MW).
  - Additional imports from neighbours (up to another 1 325MW).
  - An emergency generation programme and a standard offer from Eskom to buy excess capacity from commercial/industrial customers (1 000MW).
  - Utility-scale private embedded generation projects (up to 1 600MW).
  - Using feed-in tariffs to unlock supply from commercial and household rooftop solar (850MW).
  - Ramp up demand-side and energy efficiency programmes to cut demand (250MW).
  - Complete first phase of Eskom's battery energy storage system (200MW); and
  - Contract surplus supply from existing renewable producers (70MW).
- Private Sector:
  - Government has also continued driving reforms and introduced rooftop solar incentive programs for households and businesses. The latter includes a one-year tax relief.
  - To eliminate loadshedding, about 18 000MW of renewable energy and storage are needed.
  - The private sector is making progress to bridge the country's 6 000 MW baseload energy gap.
  - Once 5 000 MW of renewables had been installed loadshedding can be cut by 61%

Logistics Crises

- Plans are co-ordinated under Operation Vulindela to include:
  - upgrading of rail and ports infrastructure
  - increasing the number of goods transported by rail
  - enabling private sector investment.
- This will be supported by R903 billions of investments in infrastructure over the next three years.

"One of these reforms is to enable third party access to the freight rail network by private rail operators, while the network itself remains in the ownership of the state," the President said.

He noted the progress that has been made to establish a separate Infrastructure Manager within Transnet Freight Rail by October this year as a crucial step towards creating a level playing field for public and private operators.

The President said that strong collaboration with the private sector, organised labour and other social partners is vital to improving logistics performance.

He referred to the strong willingness shown by members of the Minerals Council and others to invest in rolling stock and other equipment, to contribute skills and resources and to pursue opportunities for collaboration.

These collaborative efforts are essential to formulating workable solutions that will form part of a collective national effort to fix the country's transport system.

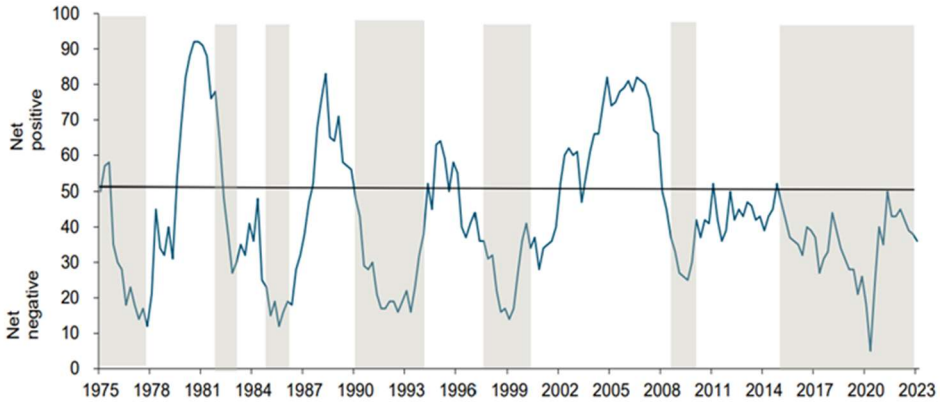
"Despite the crisis facing Transnet we must acknowledge the important progress that has been made in reversing the damage that was inflicted during state capture and recognise that there are many dedicated and hard-working people in the company that are committed to restoring Transnet to its potential.

"Transnet must quickly embark on a clear path to take us out of this crisis and ensure that the operation of our railways and ports contributes to the growth of our economy," said President Ramaphosa.

Business Confidence Index

- The business confidence index (BCI) slipped to 36 in the first quarter of 2023. The index has not been in positive trajectory for the larger part of the past decade.
- Power outages and deteriorating household income impacted confidence in the manufacturing and retail sectors hard. While sentiment among wholesalers and new vehicle dealers improved slightly according to the BER.
- Confidence Improvement:
  - Wholesaler confidence increased with three points.
  - New vehicle dealer confidence up with three points.
- Confidence Decrease driven by:
  - Manufacturing declined by nine points in the first quarter (largely due to intense load sheading and dilapidated and poorly managed logistic infrastructure).
  - Retail declined by eight points (largely due to loadshedding, reduced trading hours, increased operating costs due to diesel generators, high consumer price inflation, increased pressure on household disposable income.
  - Building confidence declined by three points (a silver lining relates to the installation of backup power).

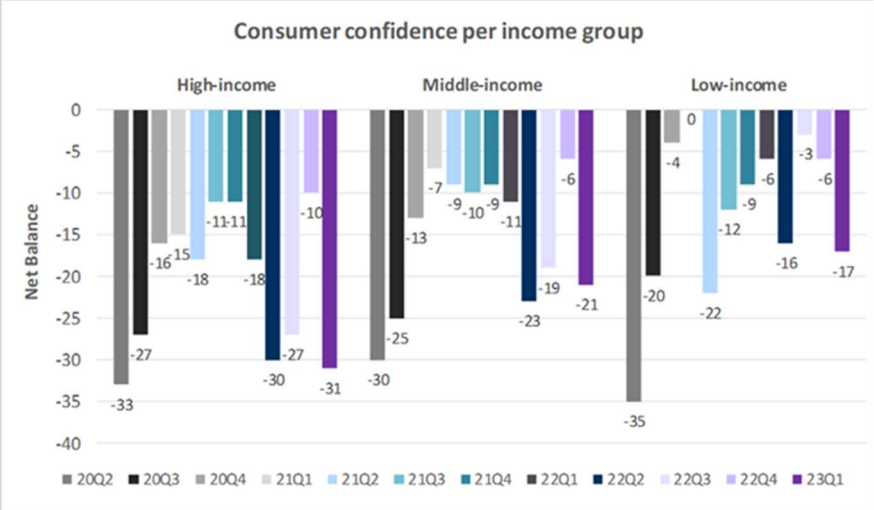
Figure 1: RMB/BER Business Confidence Index



Source: BER & Trade Economics, 2023

Consumer Confidence Index

- The consumer confidence index (CCI), sponsored by the First National Bank (FNB) and compiled by the Bureau for Economic Research (BER), decreased to -23 Index Points during the first quarter of 2023.
- Confidence Decrease driven by:
  - All three sub-indices of the CCI declined during 2023: Q1.
  - The economic outlook declined
  - Time to buy durable goods declined
  - Households do not expect their household finances to improve over the next year.
  - Confidence levels of high-income consumers declined to -31 index points.
  - Confidence levels of middle-income consumers declined to -21 index points.
  - Confidence levels of low-income consumers declined to -17 index points.



Source: FNB, BER & tide Economics, 2023

CREDIT RATINGS

South Africa Economic Credit Rating

	Rating	Outlook
S & P	BB-	Positive
Moody's	Ba2	Stable
Fitch	BB-	Stable

Dates:
S & P – May 2022
Moody's – April 2022
Fitch – December 2021

Eskom Credit Ratings

	Rating	Outlook
S & P	B	Stable
Moody's	Caa1	Positive
Fitch	CCC+	Stable

Dates:
S & P – September 2022
Moody's – November 2022
Fitch – November 2022

South African Bank Credit Ratings

	Rating	Outlook
ABSA Bank Ltd	AA/ A-1+	-
Capitec Bank Ltd	AA/ A-1+	BB-B
First Rand Bank Ltd	AA/ A-1+	BB-B
Investec Bank Ltd	AA/ A-1+	BB-B
Nedbank Ltd	AA/ A-1+	BB-B

Dates:
S & P – May 2022

How does this 'marking system' work?

- *The rating system varies between the three rating agencies.*
- *The highest-rated investment grade securities are AAA or Aaa (triple A).*
- *An investment grade rating lies within the range of Aaa to Baa3 (Moody's) or AAA to BBB- (S&P). The lowest possible investment grade rating is BBB- (S&P) and Baa3 (Moody's).*
- *Credit ratings for bonds below these designations ('BB', 'B', 'CCC', etc.) are considered low credit quality, also known as high yield or junk bonds.*

POTENTIAL IMPLICATIONS 2023

- Deteriorating domestic economic climate will affect the performance of many SA businesses, particularly in the manufacturing sector, certain mining industries and service sectors.
- Sentiment of consumers, businesses, and investors at low levels, spending on goods and services, production activity and capital deployment on investment projects are likely to remain relatively subdued.
- Businesses that rely on the investment cycle for their production activities may experience challenges considering the subdued rates of growth in fixed investment spending from the private sectors, as well as the financial difficulties experienced by several key state-owned companies.
- South Africa's long-awaited economic reforms may yet gain momentum, but the age-old problems of political uncertainty, corruption and a failing power system pose significant risks.
- As per political speak, the suite of reforms is focused on energy security, infrastructure development, food security, job creation and the green transition and is designed to create a "sustainable, resilient and inclusive economy".
- As for practical reality and the real world, what may be required of the State, more than anything, is simply a return to "doing the basics right".

8.4.2 PROFILING OF THE RECEIVING ENVIRONMENT'S ECONOMY

This section of the chapter profiles the receiving environment's economy. The profiling focusses on establishing the economic status quo of the receiving environment and serves as a platform from which impacts and other associated factors can be identified, reviewed and contextualised. The analysis contained in this section consists of a variety of economic indicators such as size, growth, structure, labour take-up, basic versus non-basic sectors, etc. and aims to provide a holistic perspective on the key elements that underpin and define the receiving economy (nationally and regionally). Furthermore, the data assists with determining factors that could be influenced/modified by the proposed exploration activities.

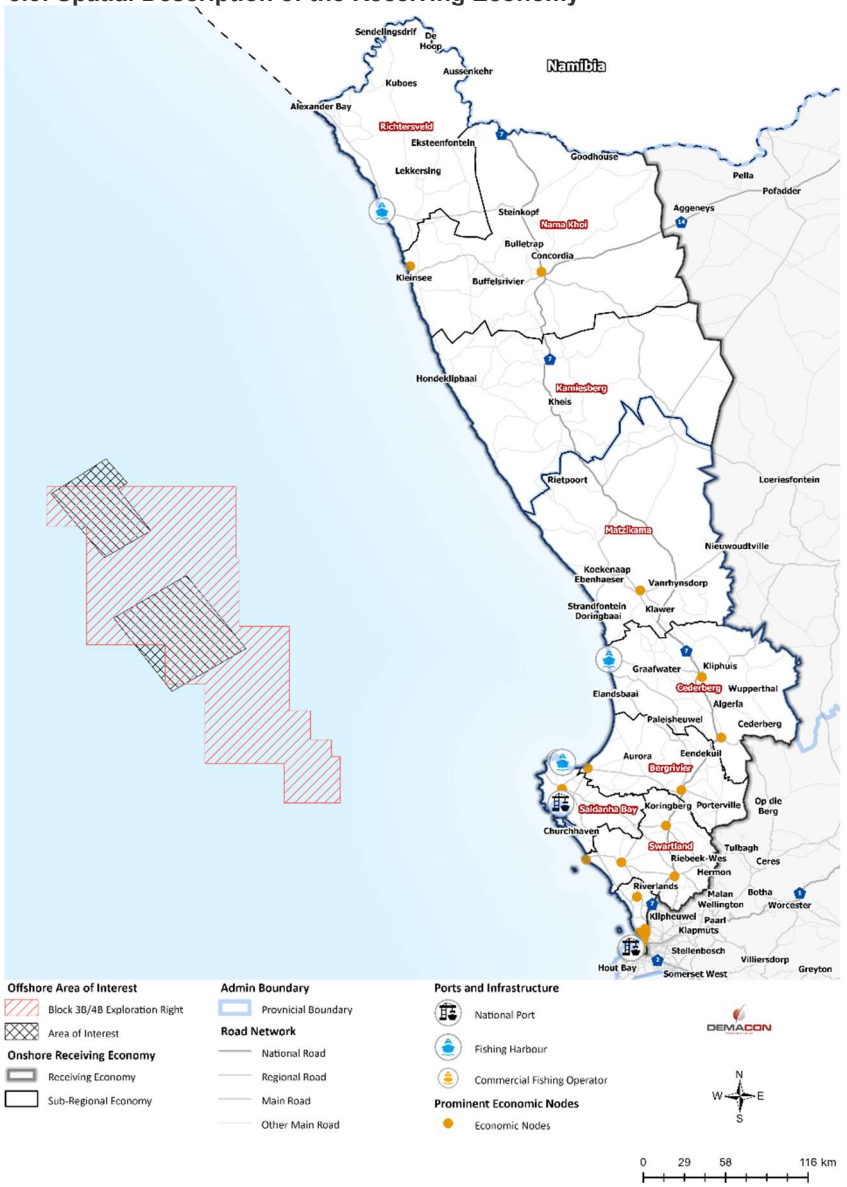
8.4.2.1 RECEIVING ECONOMY SPATIAL STRUCTURE AND PROMINENT NODES

The following section provides information regarding the spatial structure of the receiving economy. The purpose of the information is to provide a spatial perspective on the location and distribution of prominent economic nodes and functions throughout the receiving economy in order to establish core areas of economic production, importance and development.

The following map provides an overview of the distribution of economic activity areas in the receiving economy. The map shows that the receiving environment consists of 10 sub-regional economies that primarily represent the West Coast of South Africa (a combination of economic regions from the Western and Northern Cape Provinces). Furthermore, key economic nodes concentrate at strategic locations inland along the western coast. The largest cluster of economic activity areas are found within the Table Bay and Blaauwberg economic sub-regions. These areas form part of the larger metropolitan economy of Cape Town and is influenced by the Port of Cape Town and related manufacturing and business activities. Other major nodes include the Atlantis special economic zone located in the northern most area of the Blaauwberg sub-regional economy, the Saldanha Bay Port and manufacturing hubs, select manufacturing hubs in the St Helena Bay region.

Economic nodes north of the Saldanha Bay sub-regional economy are primarily focused on inland locations and related manufacturing and food processing activities associated with farming. Very few prominent economic nodes are present in the Kamiesberg, Nama Khoi and Richtersveld sub-regional economies.

Map 8.5: Spatial Description of the Receiving Economy



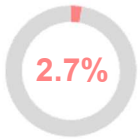
Source: DEMACON GIS, 2023

8.4.2.2 RECEIVING ECONOMY SIZE AND CONTRIBUTION

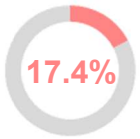
This section of the Chapter focusses on defining the size of the receiving economy and the role every sub-regional economy plays in the total output produced by the receiving economy. The purpose of the information is to highlight importance of the receiving economy (and its sub-regional economies) in terms of sub-regional, regional and national economic output and also identify the spatial distribution of economic output and the relative extent to which economic impacts and shocks could occur within the receiving economy.

Receiving Economy Size and Contribution

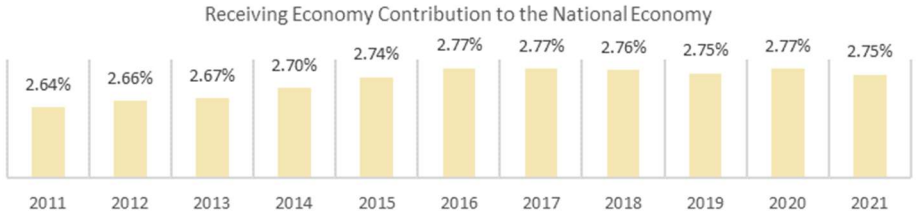
Receiving Economy GVA
(2021 Current Prices)
R153.0 billion

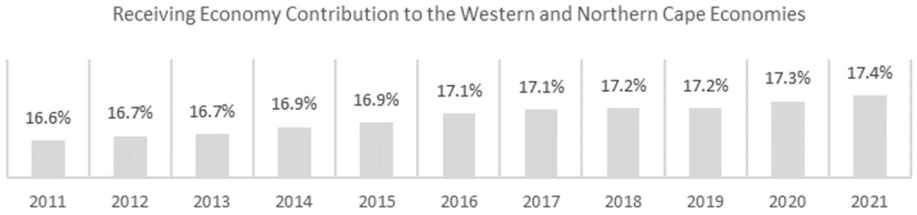


contribution to the **National Economy**

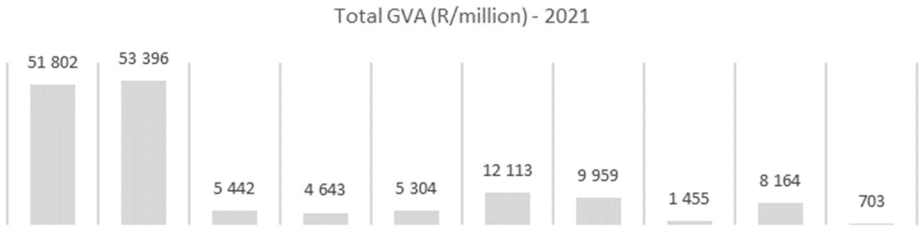


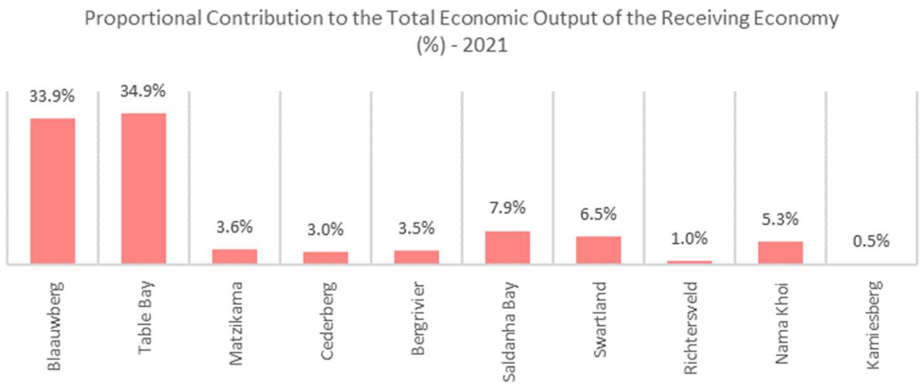
contribution to the **Western and Northern Cape Economies**





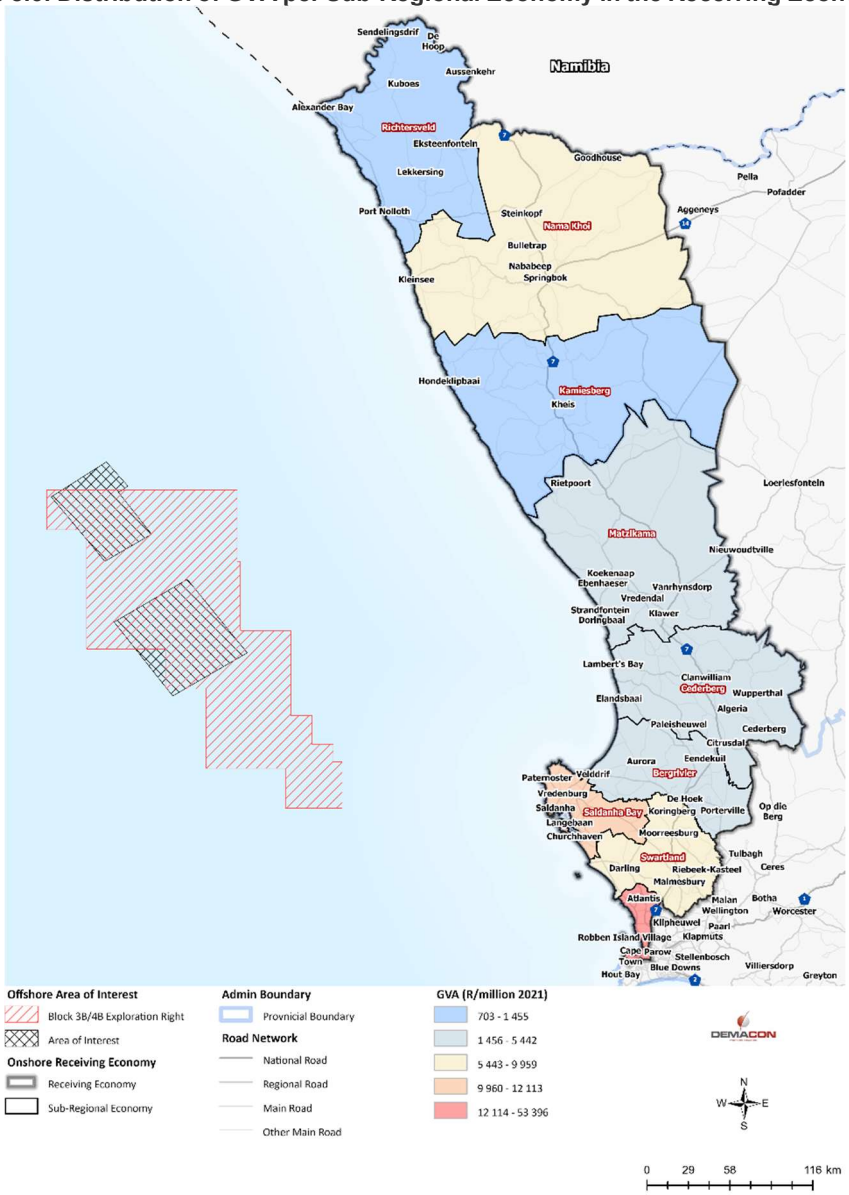
Sub-Regional Economy Size and Contribution





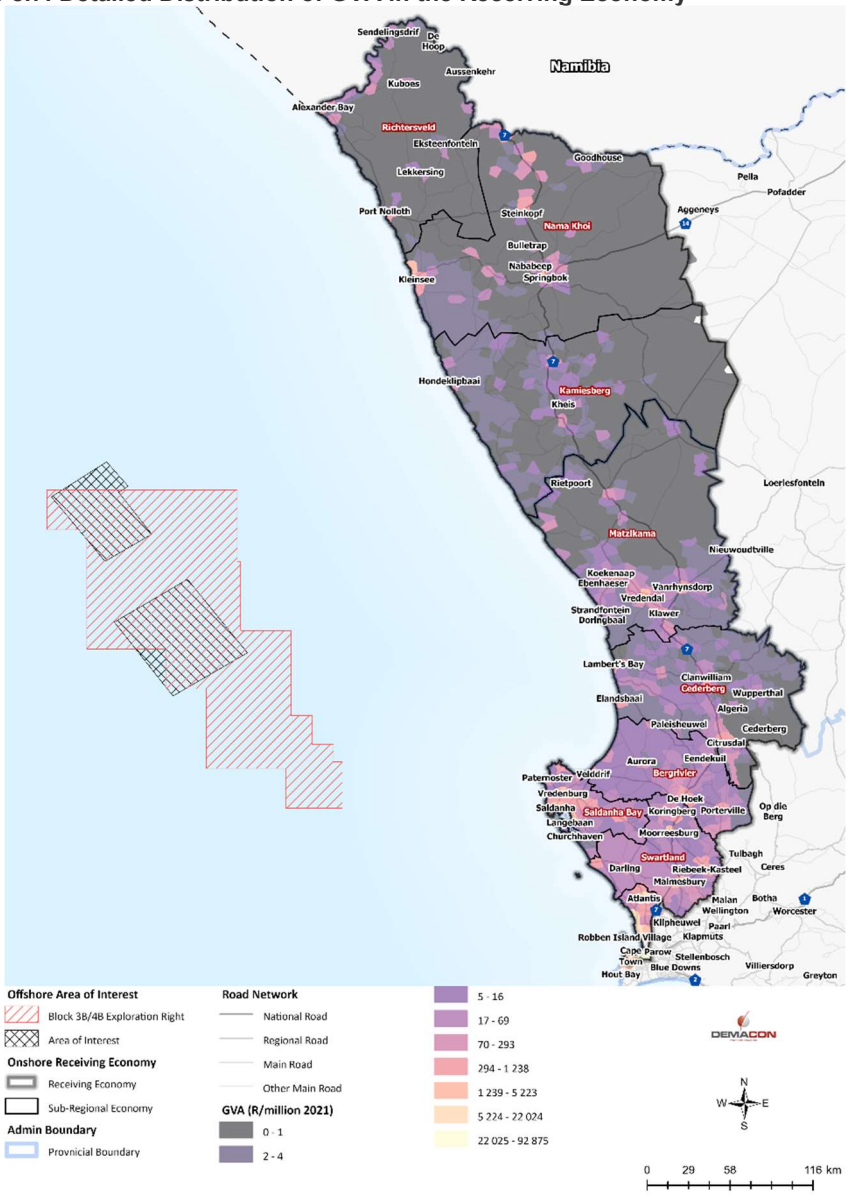
The receiving economy consists of ten sub-regional economies that represent the economic output region of the western coast of South Africa (not to be confused with the West Coast District economy). The receiving economy generated R153.0 billion in current prices gross value added (GVA) in 2021 contributing approximately 2.7% to the National economy and 17.4% to the combined output of the Western and Northern Cape economies. The receiving economy's contribution to the National economy remained consistent between 2015 and 2021, fluctuating between a contribution of 2.74% and 2.77% per annum. The receiving economy's contribution to the combined economies of the Western and Northern Cape has continually increased, reaching 17.4% in 2021. The sub-regional economies of Blaauwberg and Table Bay (situated in the Cape Town Metropolitan Area) are the primary economic output generating regions of the receiving economy, contributing more than 68% to the total receiving economy's GVA. Furthermore, the Saldanha Bay, Swartland and Nama Khoi sub-regional economies represent secondary economic contributors.

Map 8.6: Distribution of GVA per Sub-Regional Economy in the Receiving Economy



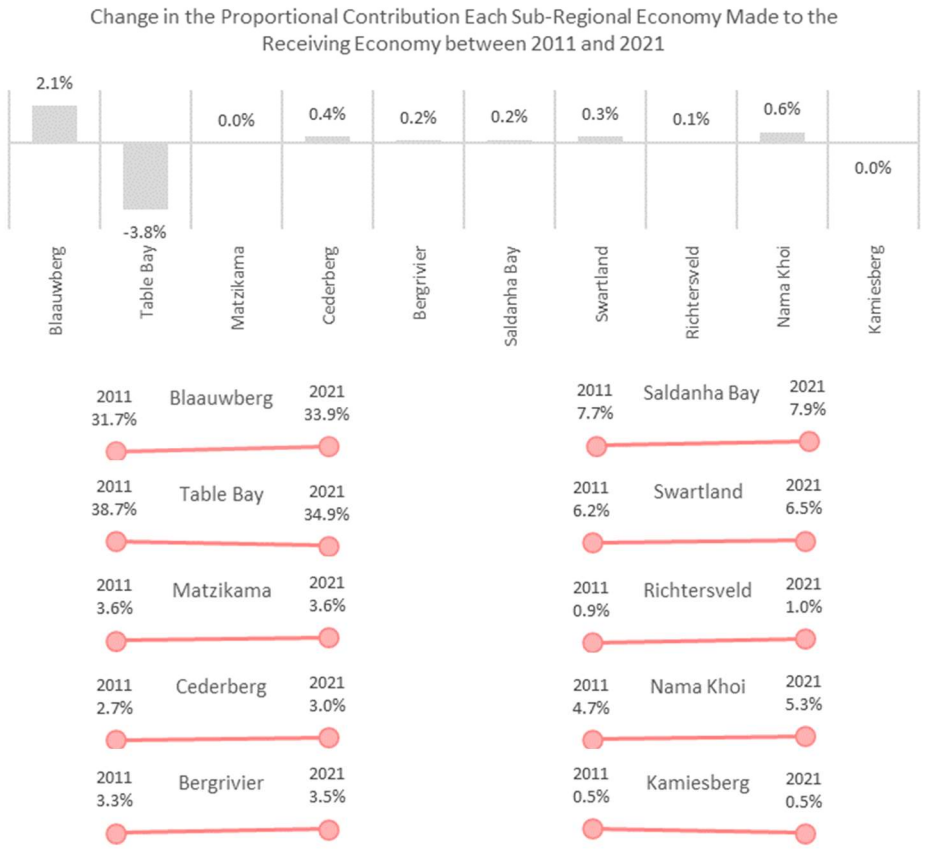
Source: DEMACON ex Stats SA, CSIR, 2023

Map 8.7: Detailed Distribution of GVA in the Receiving Economy



Source: DEMACON ex Stats SA, CSIR, 2023

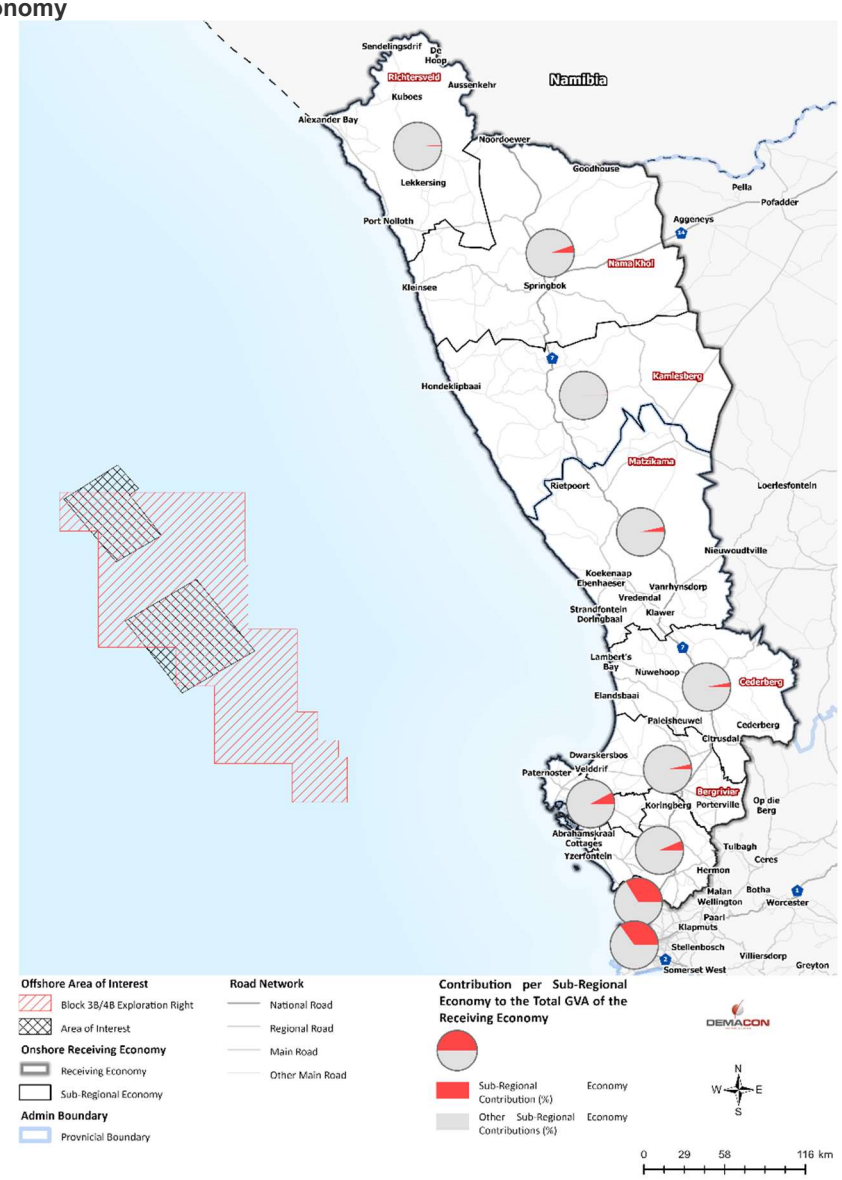
Change in the Contribution of Sub-Regional Economies to the Receiving Economy



Since 2011, all sub-regional economies have increased their proportional contribution to the receiving economy. The Table Bay sub-regional economy is the only exception, as it saw a decrease in its proportional share.

The data suggests that two sub-regional economies, Table Bay and Kamiesberg, may have expanded at rates slower than other sub-regional economies. This could likely be due to a decline in economic activity in key sectors affected by, and recovering from, the effects of past and current macro-economic pressures.

Map 8.8: Contribution per Sub-Regional Economy to the Total GVA of the Receiving Economy

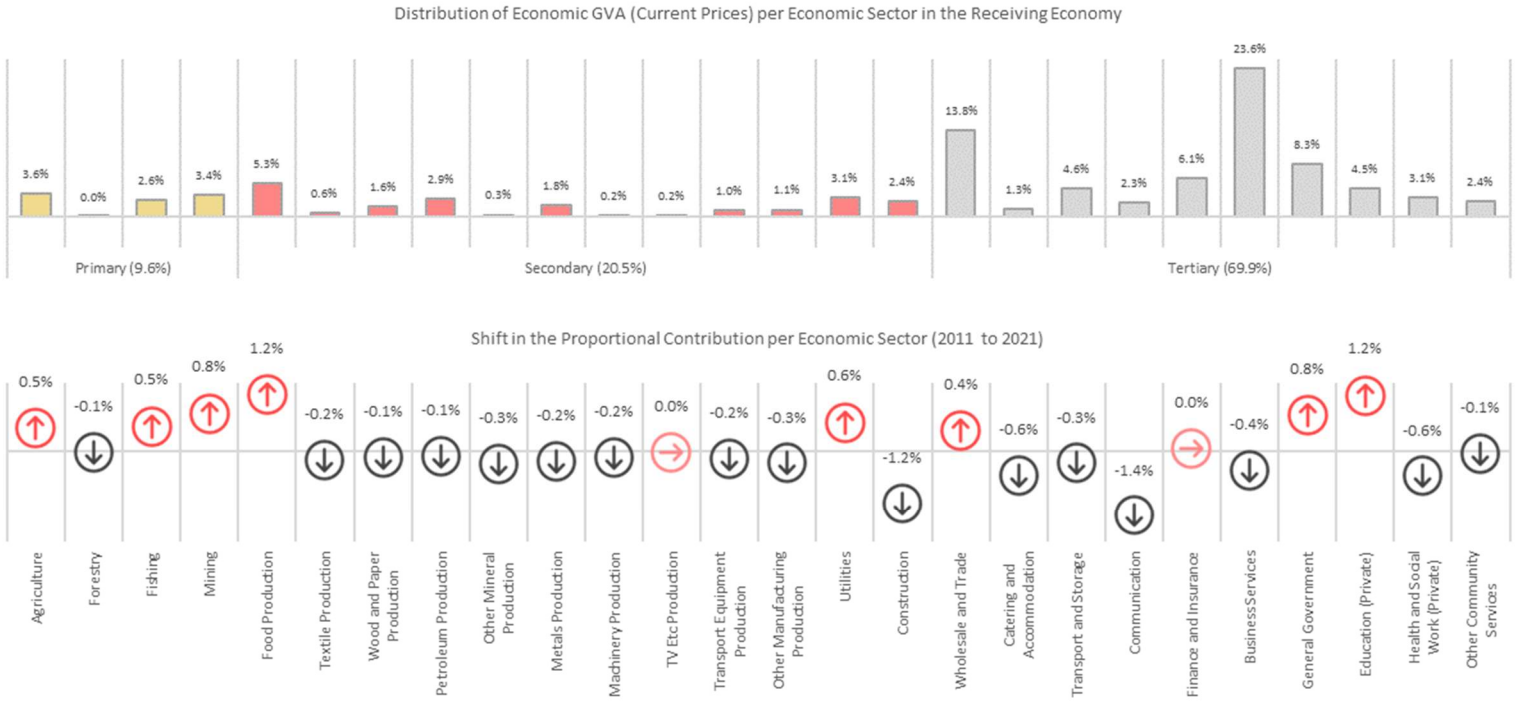


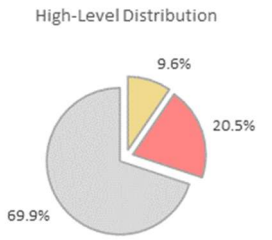
Source: DEMACON ex Stats SA, CSIR, 2023

8.4.2.3 RECEIVING ECONOMY STRUCTURE AND BASIC SECTORS

The total output of the receiving economy is influenced by the structure of the economy, the performance of individual sectors and the distribution and contribution of individual sub-regional economies to each sector of the receiving economy. Furthermore, exploration activities could potentially impact on select economic sectors because of the offshore nature of the exploration activity and certain sectors' linkage with sea-based industries. Therefore, it is important to consider the structure of the receiving economy and the sectors that form the basis of the economy's structure and output.

Structure of the Receiving Economy





The **BULK** of the receiving economy's output is produced in the **TERIARY ECONOMY**

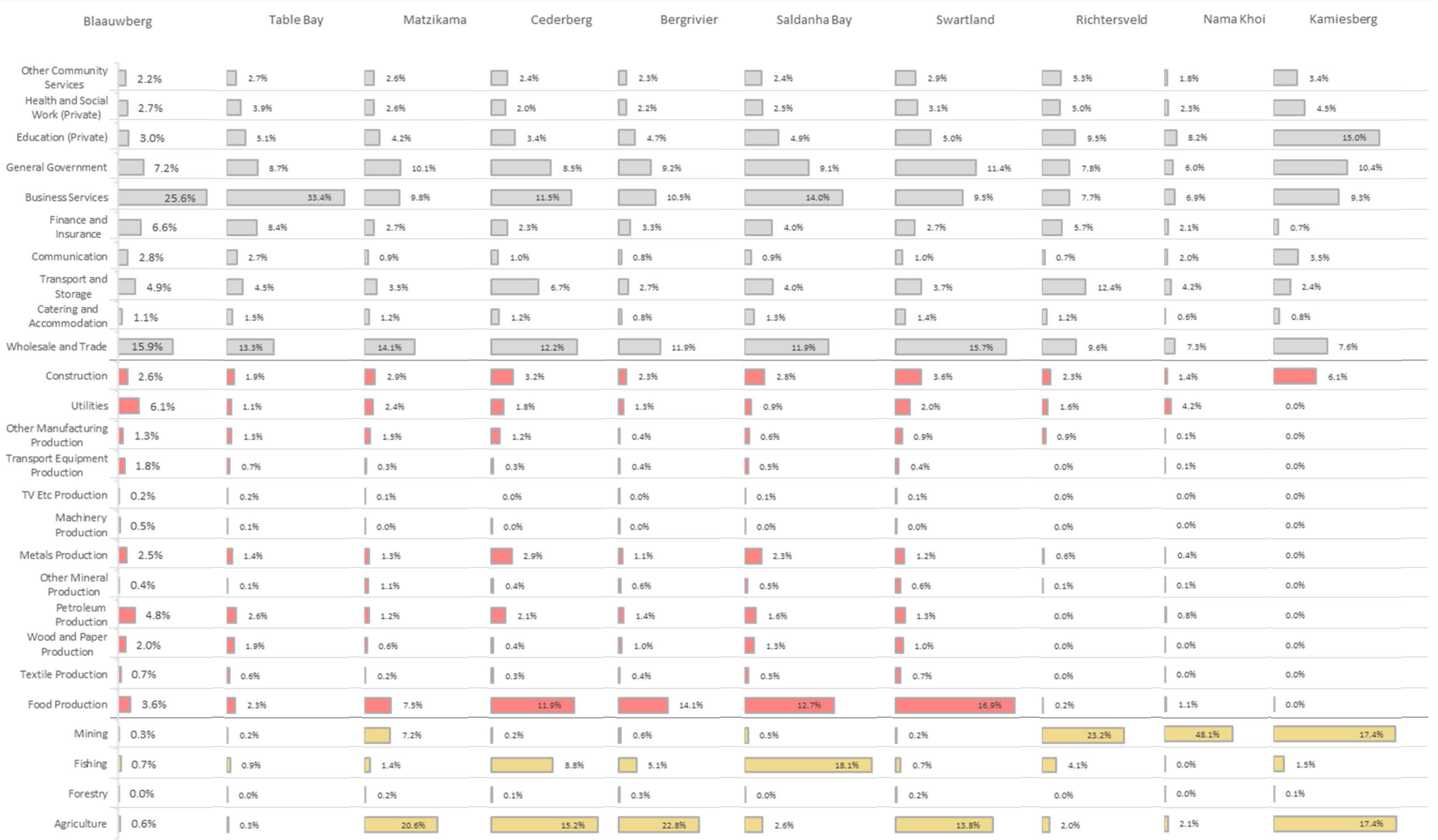
69.9%

The **PRIMARY SECTOR** has **INCREASED** its proportional share of output produced indicating that the sector is one of the **STRONGEST GROWING** sectors in the Receiving Economy

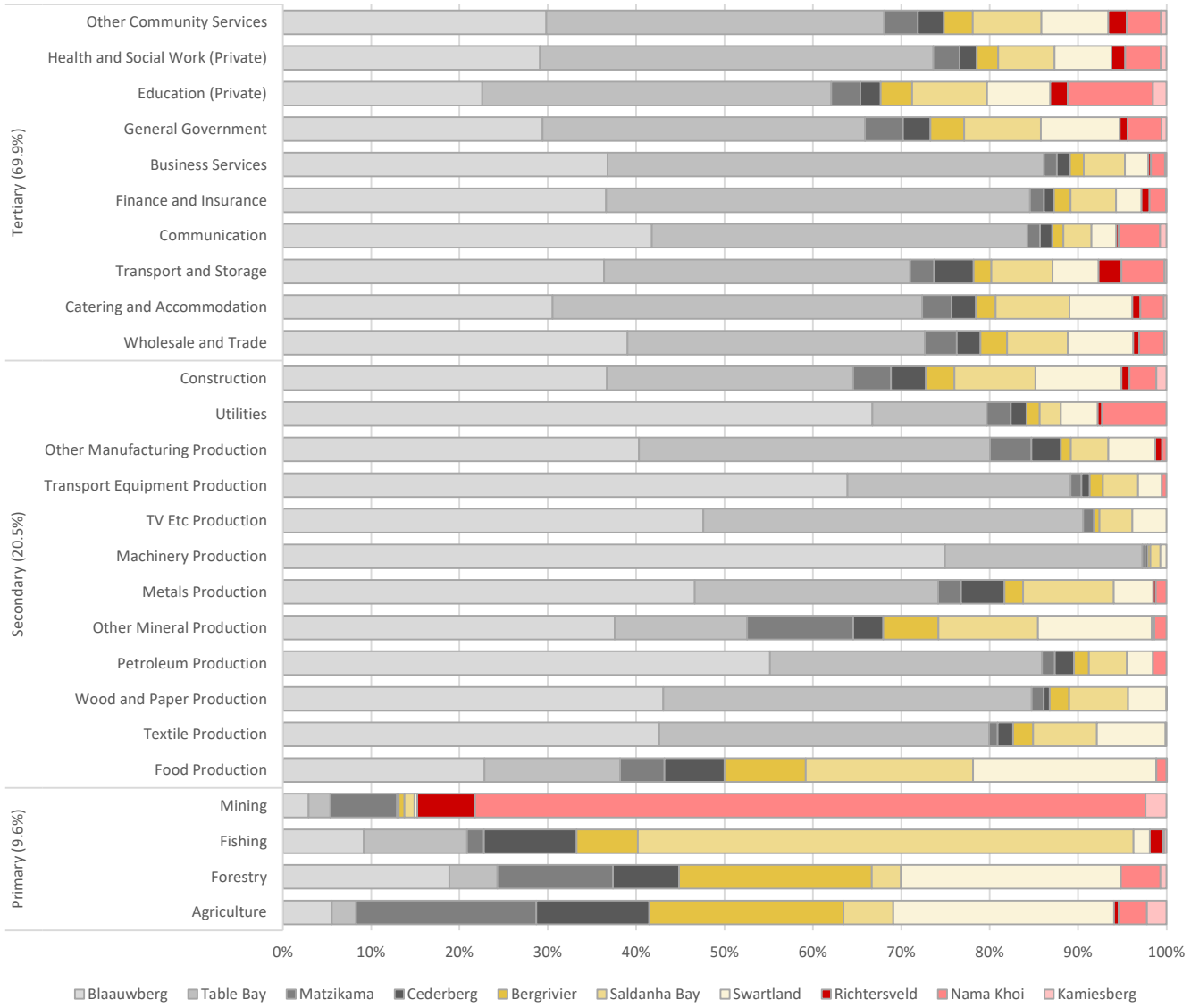
1.8%
share increase

The fluctuation in the proportional contribution by sectors of the economy to total output of the economy is expected, given changes to macro-economic conditions and local economic trends. The concentration of economic activity in select sectors, however, could impact on the capacity of the receiving economy to be diversified and not dependent on a select sector for economic output and growth. Data shows that the proportional share of the majority of economic sectors have decreased which could be an indication of the concentration of economic output.

Structure of Sub-Regional Economies in the Receiving Economy



Contribution of Sub-Regional Economy to Each Economic Sector in the Receiving Economy



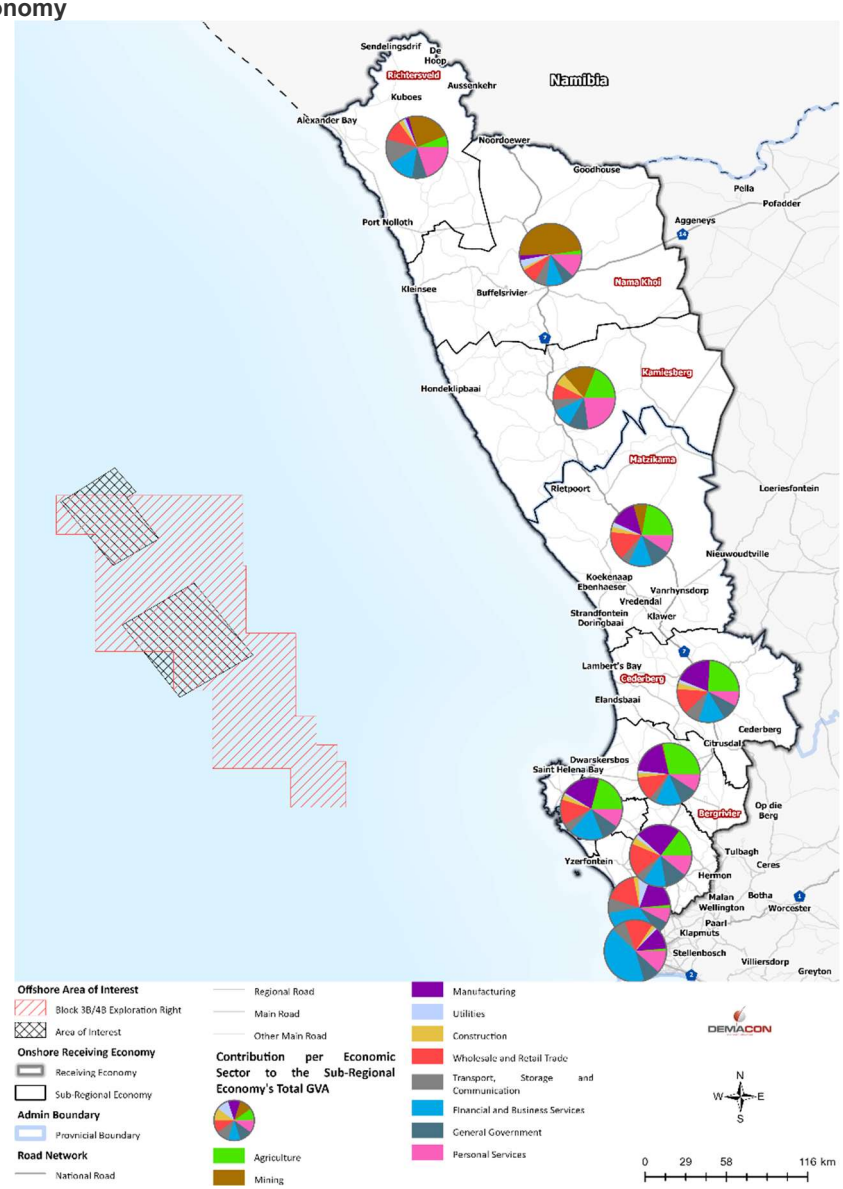
The receiving economy is primarily tertiary economy orientated with the majority of economic output being generated by the business services and wholesale and retail trade sectors.

Although almost all sub-regional economies have sizeable business services and wholesale and retail trade sectors, the bulk of these sectors' output is produced in the Table Bay and Blaauwberg sub-regional economies – Table Bay and Blaauwberg sub-regional economies represent nearly 69% of the total output produced by the receiving economy and, therefore, has a significant influence on the structure and functionality of the receiving economy.

Nevertheless, the tertiary economy is supported by a sizeable secondary and primary economy, where manufacturing, especially the production of food products, and agriculture, specifically land based farming and fishing, play vital roles in the output produced by the overarching economy.

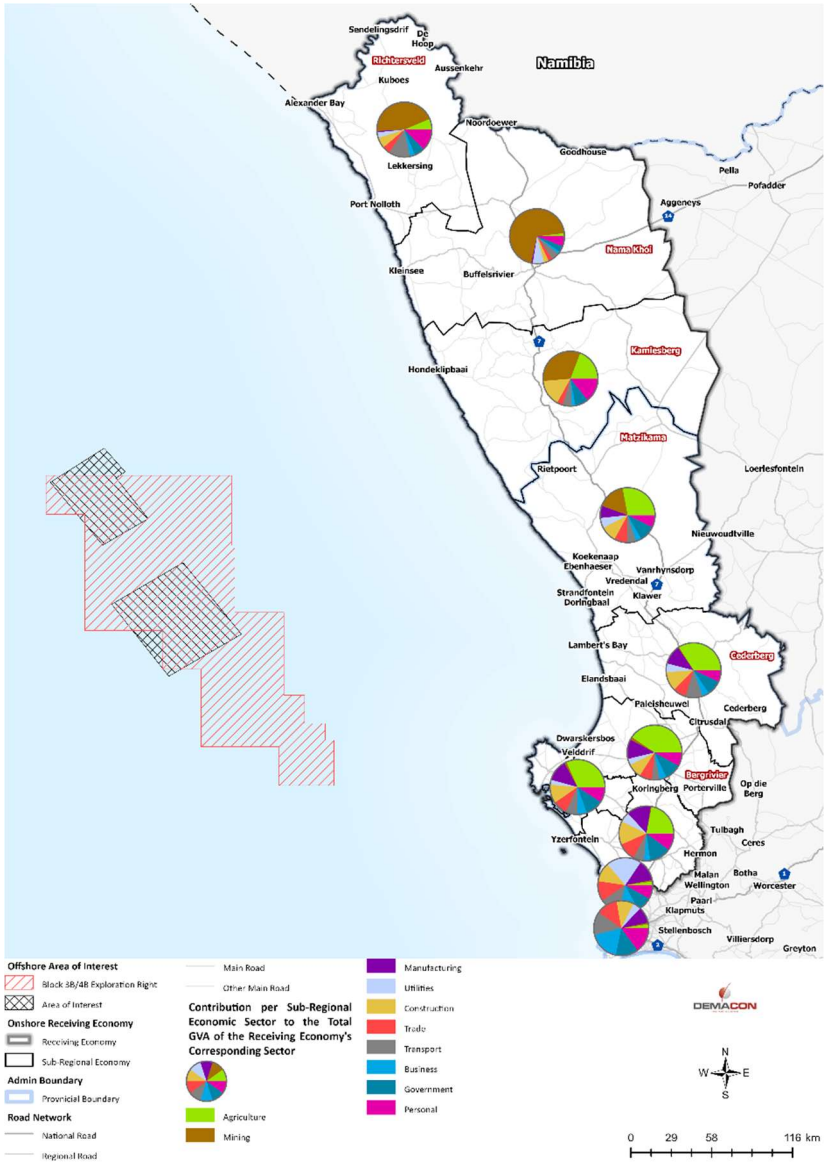
It is, however, important to note that although sub-regional economies such as Blaauwberg and Table Bay are the largest contributors to the total production of the receiving economy, these areas' influence is primarily concentrated in the tertiary (all sub-sectors) and secondary sectors (all sub-sectors except food production). West Coast sub-regional economies such as Bergrivier, Saldanha and Swartland play important roles in not only agricultural production and fishing industry output but are core locations where the bulk of food production output is concentrated.

Map 8.9: Contribution per Economic Sector to the Total GVA of Each Sub-Regional Economy



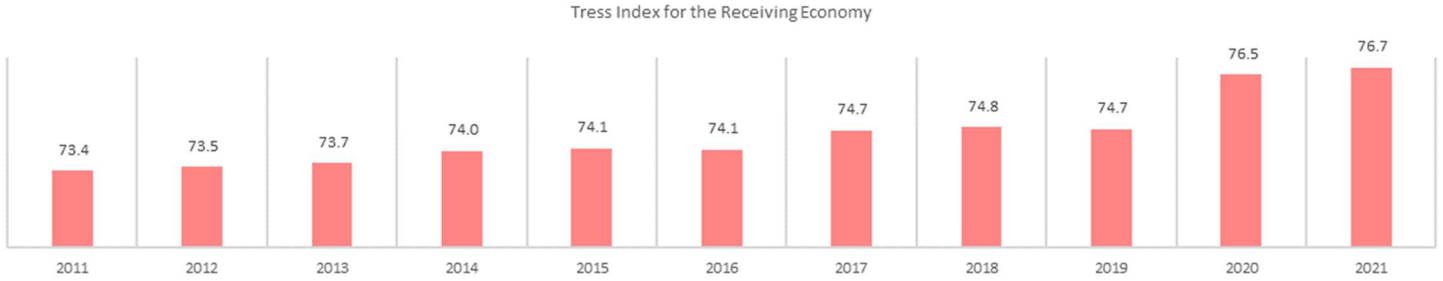
Source: DEMACON ex Stats SA, CSIR, 2023

Map 8.10: Contribution per Sub-Regional Economy to Each Economic Sector in the Receiving Economy

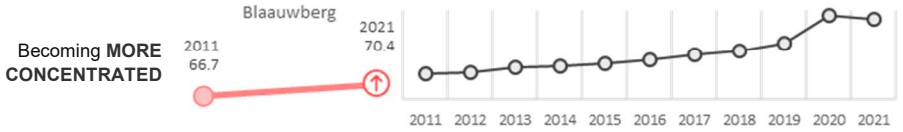


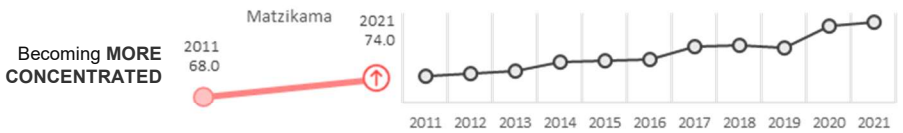
Source: DEMACON ex Stats SA, CSIR, 2023

Tress Index Trend of the Receiving Economy and its Sub-Regional Economies

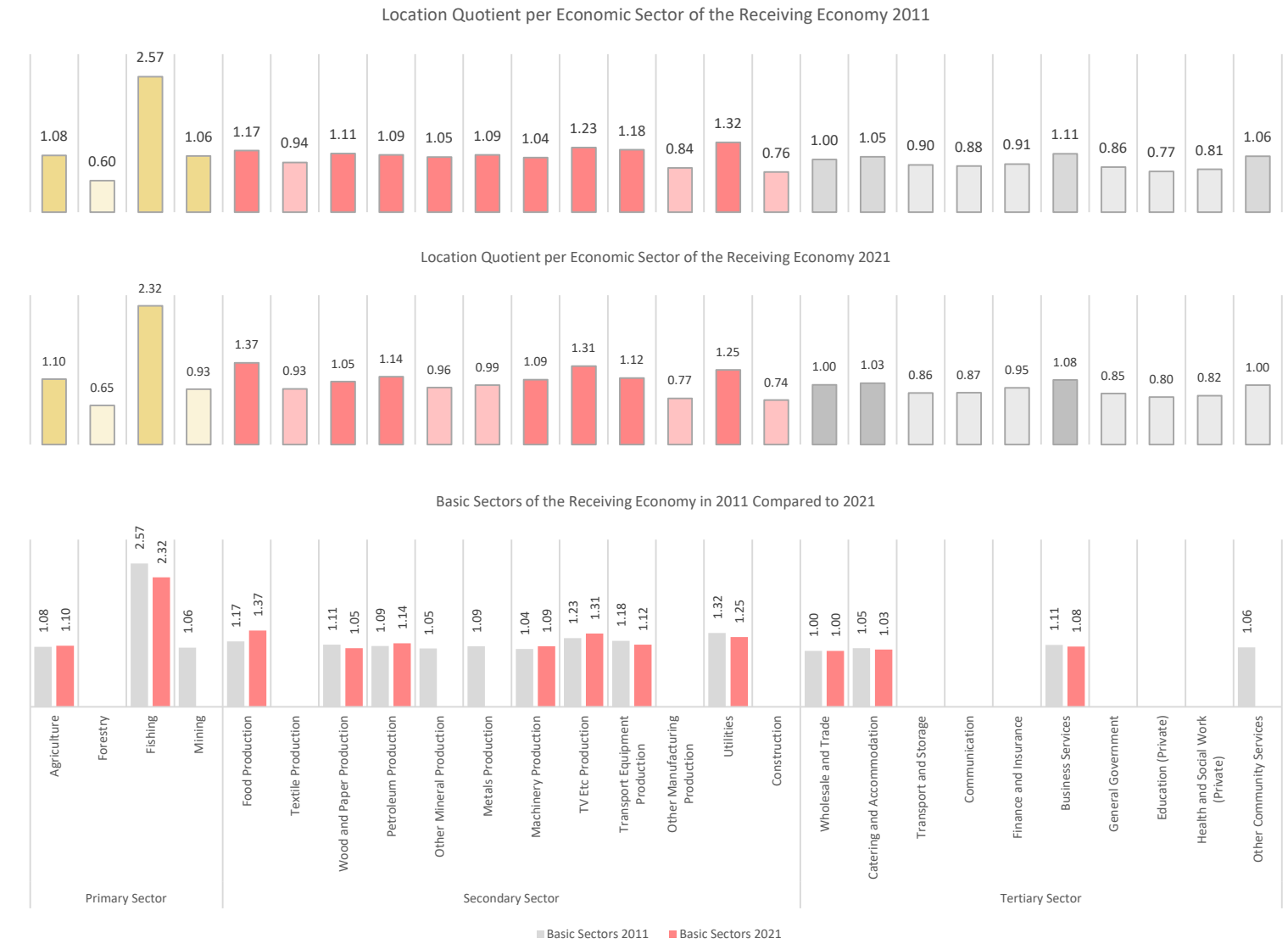


UPWARD Tress Index trend indicating that the Receiving Economy is becoming **MORE CONCENTRATED** and consequently more dependent on select sectors for growth and employment





Basic Sectors of the Receiving Economy

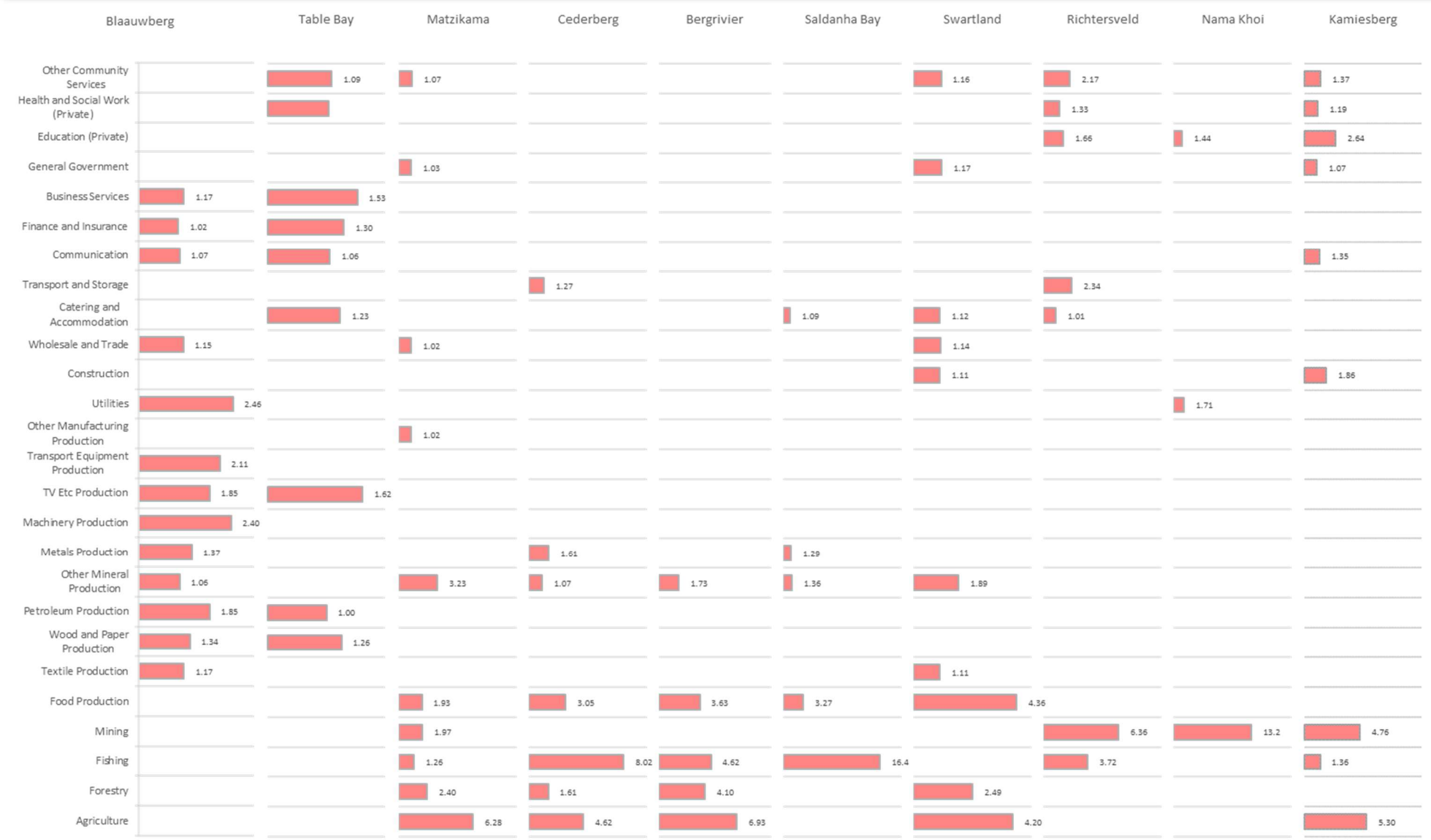


An analysis of the receiving economy's comparative advantage of economic sectors shows that the receiving economy, within the context of the Western and Northern Cape economies have a comparative advantage in several sectors, especially fishing, food production and electrical equipment production.

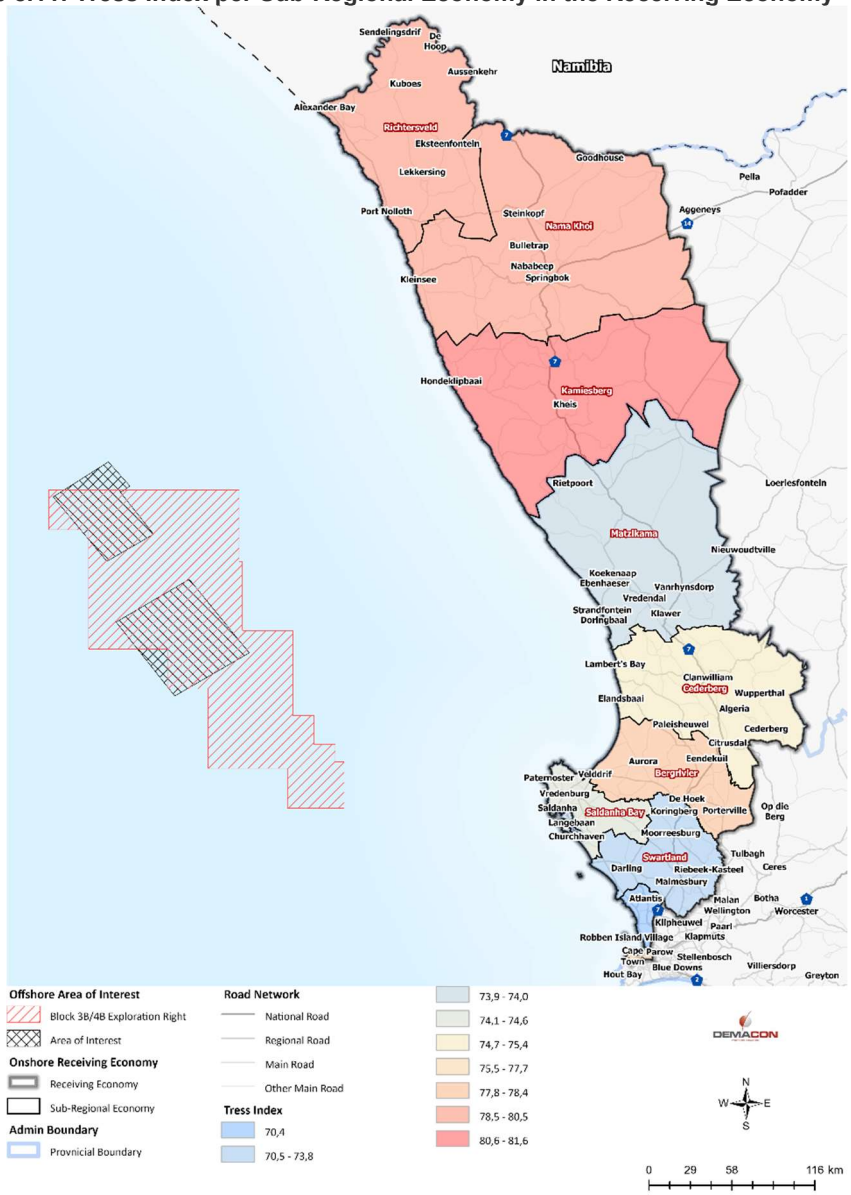
The Tress Index for the receiving economy does, however, show that the economy is becoming more concentrated. Data suggests that since 2011 sectors such as mining, mineral production, metals production and other community services have lost their comparative advantage and consequently indicates a move toward a concentrated economy.

The receiving economy does, however, have several prominent sectors that maintains a level of diversity in the economy, and that act as the basis for economic production and employment. Core among these is the fishing industry, agriculture, manufacturing, food production and business services.

Basic Sectors in Sub-Regional Economies of the Receiving Economy



Map 8.11: Tress Index per Sub-Regional Economy in the Receiving Economy



Source: DEMACON ex Stats SA, CSIR, 2023

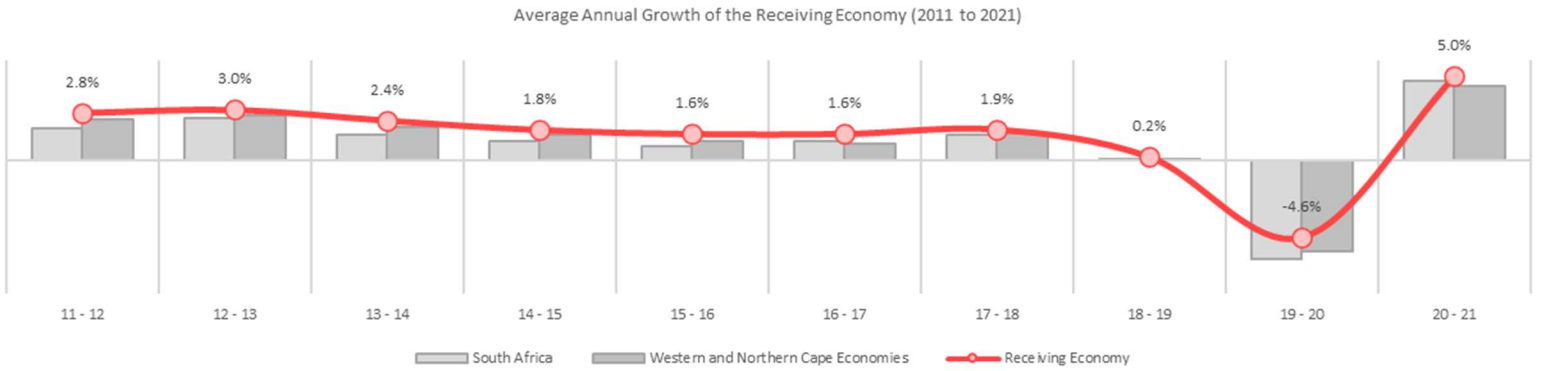
8.4.2.4 RECEIVING ECONOMY GROWTH TRENDS

The structure of the receiving economy shows that all three broad economic sectors (primary, secondary and tertiary) play varied roles in the production of output in the receiving economy. Although the individual sub-regional economies of the receiving economy contribute to overall economic output, several basic sectors (business services, wholesale and retail trade, fishing, food production, etc.) form the basis of the receiving economy's output capacity and growth potential. Given the preceding, this section provides an overview of the economic growth trends of the receiving economy in order to understand key aspects that make-up and drive economic growth in the receiving economy.

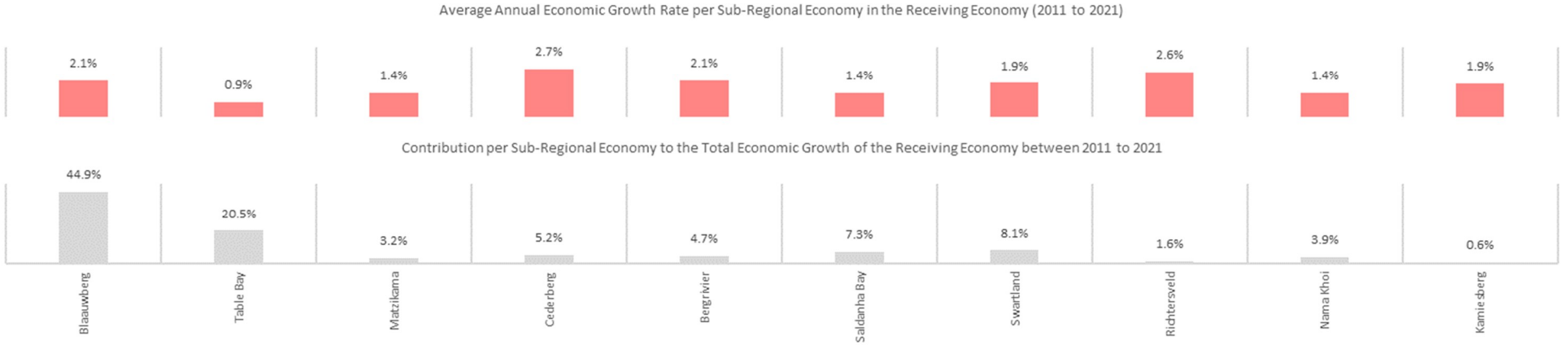
Average Annual Growth of the Receiving Economy between 2011 to 2021

1.5% (2011 – 2021) average annual growth rate of the receiving economy over the previous 10-years

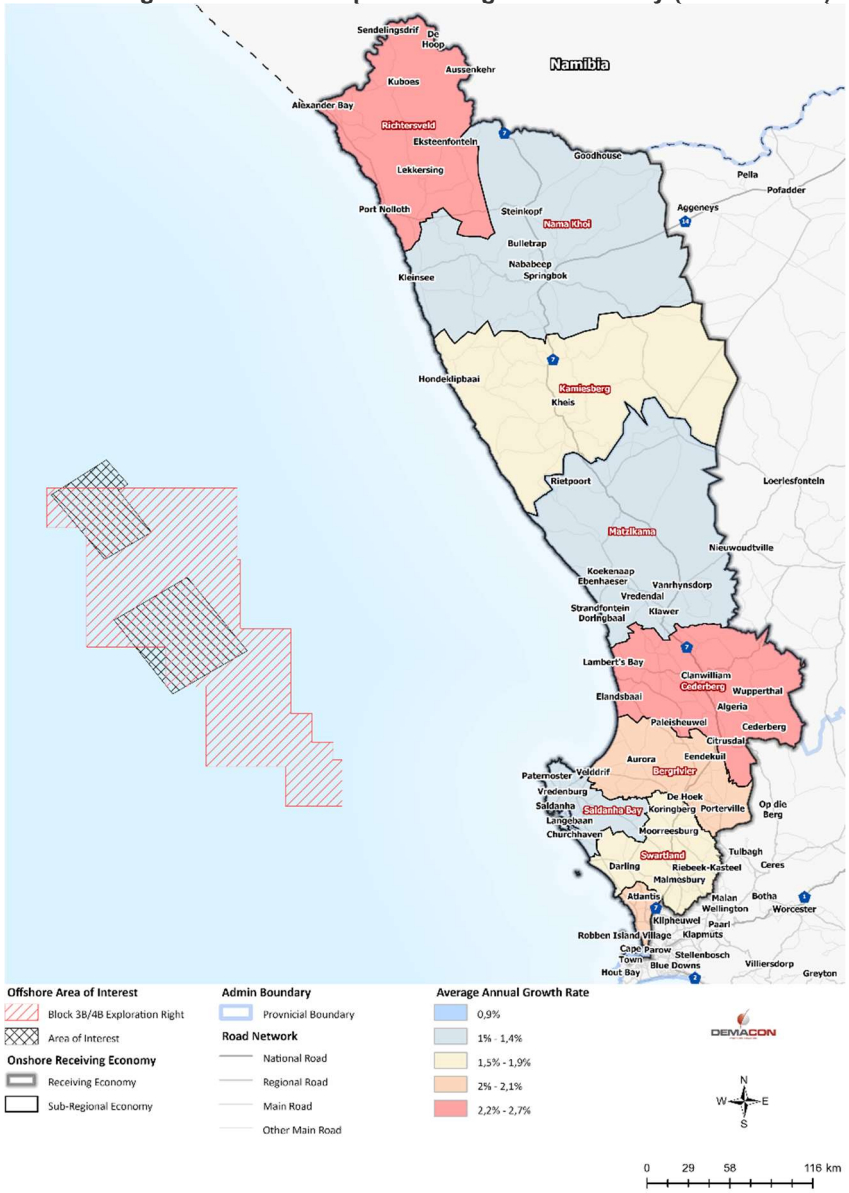
0.8% (2016 – 2021) average annual growth rate of the receiving economy over the previous 5-years



Average Annual Growth of the Sub-Regional Economies in the Receiving Economy

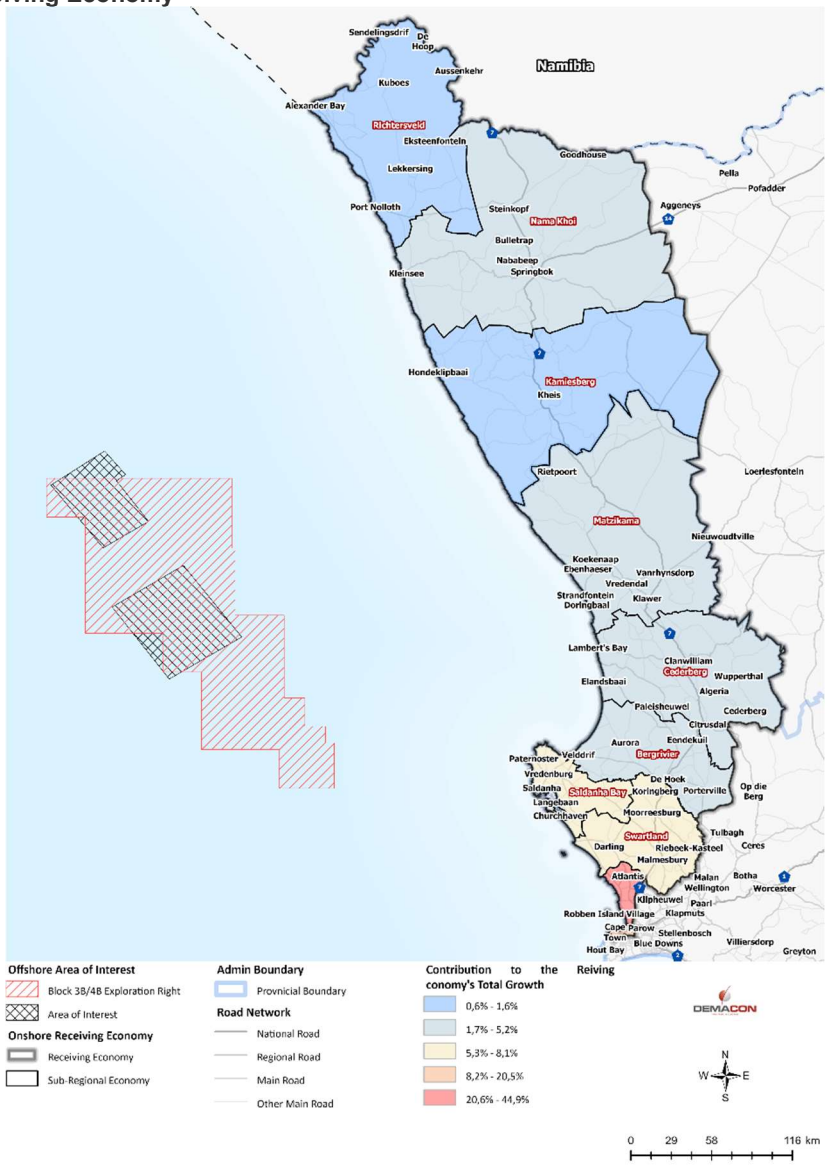


Map 8.12: Average Annual Growth per Sub-Regional Economy (2011 to 2021)



Source: DEMACON ex Stats SA, CSIR, 2023

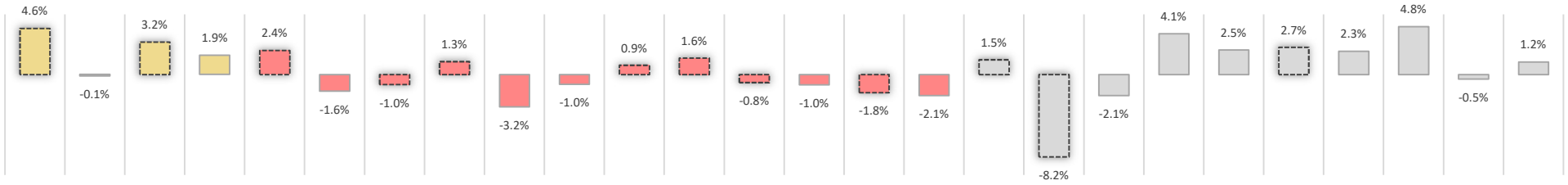
Map 8.13: Contribution per Sub-Regional Economy to the Total Growth of the Receiving Economy



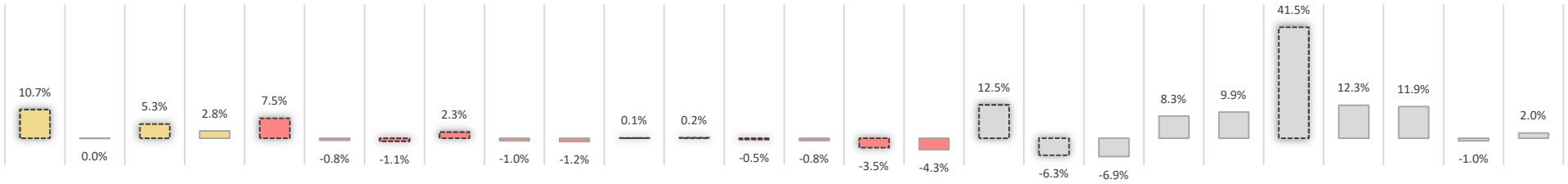
Source: DEMACON ex Stats SA, CSIR, 2023

Average Annual Growth of Economic Sectors in the Receiving Economy

Average Annual Growth Rate per Economic Sector in the Receiving Economy (2011 to 2021)



Contribution by Economic Sectors to the Total Economic Growth of the Receiving Economy (2011 to 2021)



Sector Rebound to Pre-Pandemic Economic Levels (Real Terms)

The receiving economy's average annual growth has steadily decelerated since 2011, achieving an average annual growth rate of approximately 1.5% between 2011 and 2021. The Covid-19 pandemic produced sizeable shocks throughout the macro- and micro-economy in 2020 and had an effect of the receiving economy's capacity to produce output – the receiving economy contracted by 4.6% in real terms in 2020. In spite of the effects of Covid-19 in 2020, the receiving economy rebounded in 2021 to its pre-pandemic economic output levels. Because of the rebound, the effects on long-term growth were limited and moderate average annual growth is recorded between 2011 and 2021.

Furthermore, since 2021 the macro-economy of South Africa has been subjected to several economic growth constraints (loadsheddding, rising interest rates that seek to curb rising inflation, accelerated food and logistics inflation due to infrastructural and internal demand and supply effects, vulnerable logistics infrastructure and inefficient operational capacity; South Africa's credit downgrade, the war in Ukraine, OPEC price volatility, policy inefficiency, shrinking consumer disposable income and spending patterns, etc.) that will have had a considerable impact on the receiving economy's capability (and its sub-regional economies) to maintain moderate to strong economic growth.

In real terms (constant 2015 prices) economic sectors such as agriculture, fishing, mining, the production of food products, finance and business services, communication and community services have rebounded to pre-pandemic economic production levels. The tourism sector has been, until most recently, one of the hardest hit economic sectors with the sector only reaching approximately 49% of its pre-pandemic economic production levels in 2021. Other sector that also lagged behind in recovery include the construction sector, the manufacturing of textiles and the manufacturing of non-metal mineral products. In essence, the recovery of the receiving economy has largely been on account of the primary and tertiary economy with the assistance of the food production sector of the secondary economy.

The aforementioned is underpinned by the contribution that each economic sector has made to economic growth in the receiving economy since 2011. Data shows that the business services, wholesale and retail trade, general government, private education and agriculture have been the primary contributor to economic growth since 2011 (accounting for 88.9% of economic growth). other prominent sectors include communication, financial services, food production, fishing and mining.

Sectors in the secondary economy are the primary detractors of economic growth in the receiving economy, with a multitude of sectors contracting since 2011. The catering and accommodation and transport and storage sectors have also contracted since 2011.

The Blaauwberg and Table Bay sub-regional economies are the largest contributors to the overall growth of the receiving economy and because of the size of the sub-regional economies' contribution to the receiving economy's output, changes to the growth of output in these sub-regional economies have sizeable impacts on the growth prospects of the receiving economy. The Saldanha Bay and Swartland sub-regional economies are the third and fourth largest contributors to economic growth and much like the Blaauwberg and Table Bay sub-regional economies, have experienced moderate average annual growth when compared to smaller sub-regional economies in the receiving economy. It is important to note that, outside of the four largest contributors to economic growth in the receiving economy, the remaining sub-regional economies have smaller economic production bases and as a result moderate to high economic growth rates are generally recorded in these areas.

The business services sector of the economy is a key contributor and driver of economic production and growth. Exploration as an economic activity forms part of the business services sector and, therefore, is an important component within the receiving economy. Although exploration services may not represent the bulk of economic output produced by the sector, its role as a specialisation and factor in the base of the economy is important.

8.4.2.5 LABOUR FORCE PARTICIPATION

An analysis of the structure and growth of the receiving economy has revealed the importance of the primary and tertiary economy (as well as select secondary economy activities such as food production) as core components to the receiving economy and in effect the creation and maintenance of employment opportunities.

Given that exploration activities could contribute to, or subtract from, the receiving economy's capability to generate and sustain jobs, it is important to contextualise the current status quo so that the effects of the proposed project can be measured and understood.

Labour Force Participation Rate (%)

60.9% of the potential labour force participate in the **receiving economy**

61.8% of the potential labour force participate in the **regional economy**

57.7% of the potential labour force participate in the **provincial economy**

Structure of Employment

Formal employment accounts for **84.3%** of all jobs

Informal employment accounts for **15.7%** of all jobs

63 219 informal jobs exist in the receiving economy

The **informal economy** lost 26 573 jobs since 2011 at an average rate of 2 657 jobs per year

338 940 formal jobs exist in the receiving economy

The **formal economy** gained 60 839 jobs since 2011 at an average rate of 6 084 jobs per year

Skilled Jobs

102 850 jobs
21 584 jobs added since 2011
2 158 jobs gained per annum

Semi-Skilled Jobs

135 282 jobs
23 037 jobs added since 2011
2 304 jobs gained per annum

Low-Skilled Jobs

100 808 jobs
16 218 jobs added since 2011
1 622 jobs gained per annum

The unemployment rate of the receiving economy is **15.7%**

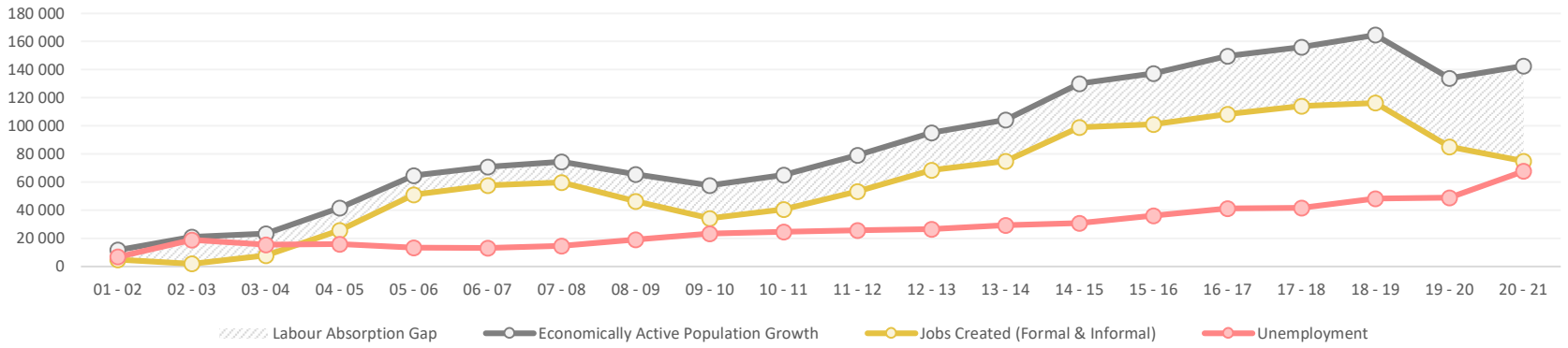
The unemployment rate has started to increase from a low of **13.0%** in 2016

The data shows that the receiving economy is experiencing a slowdown in the rate at which the economy can produce jobs

95 540
EA population Unemployed

402 159
EA population Employed

Labour Demand



77 435 people became economically active since 2011

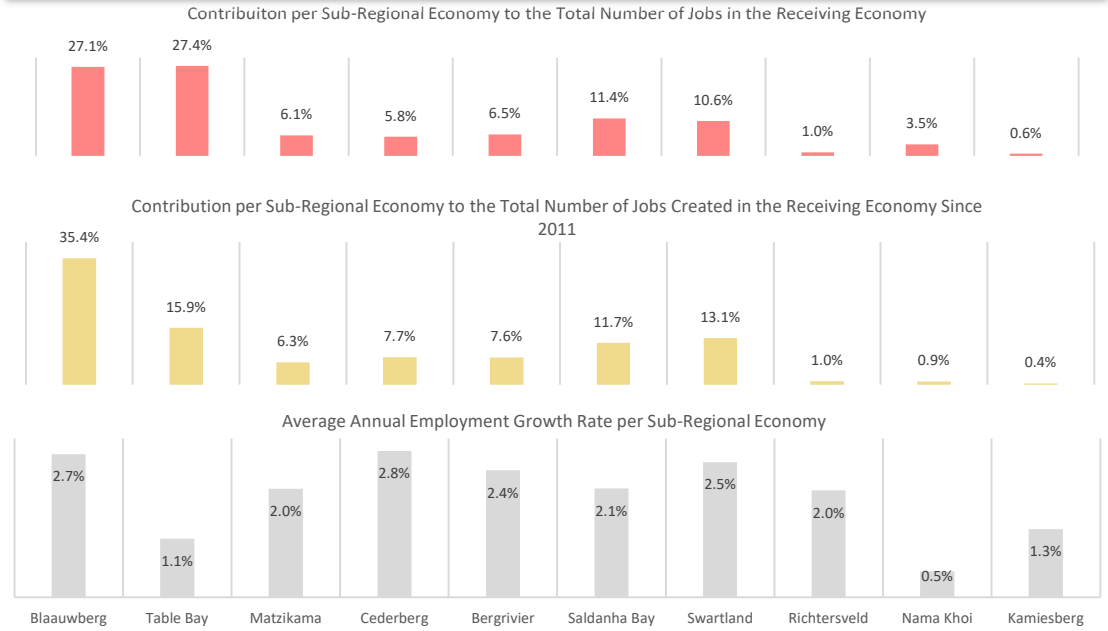
34 266 people became employed since 2011

43 169 people became unemployed since 2011

The preceding information shows that although the receiving economy's average annual growth of economic production has been decelerating, the creation of jobs has remained consistent over the same time period. Up to 2019, the receiving economy maintained a low- to moderate- unemployment rate because the receiving economy was able to create jobs in response to individuals who became new economically active participants. The unemployment rate of the receiving economy has, however, been influenced by the pandemic, which caused a contraction of the economy and subsequently a loss in employment. The labour absorption gap present in the receiving economy in 2019 has been exacerbated by the pandemic and consequently lead to a shortfall of employment in the receiving economy. Present macro-economic

conditions and constraints (as identified previously) further underpin the incapacity of the macro-economy to create jobs. Macro-economic factors are inhibiting local growth and the historic labour absorption gap in the receiving economy could remain present for the foreseeable future.

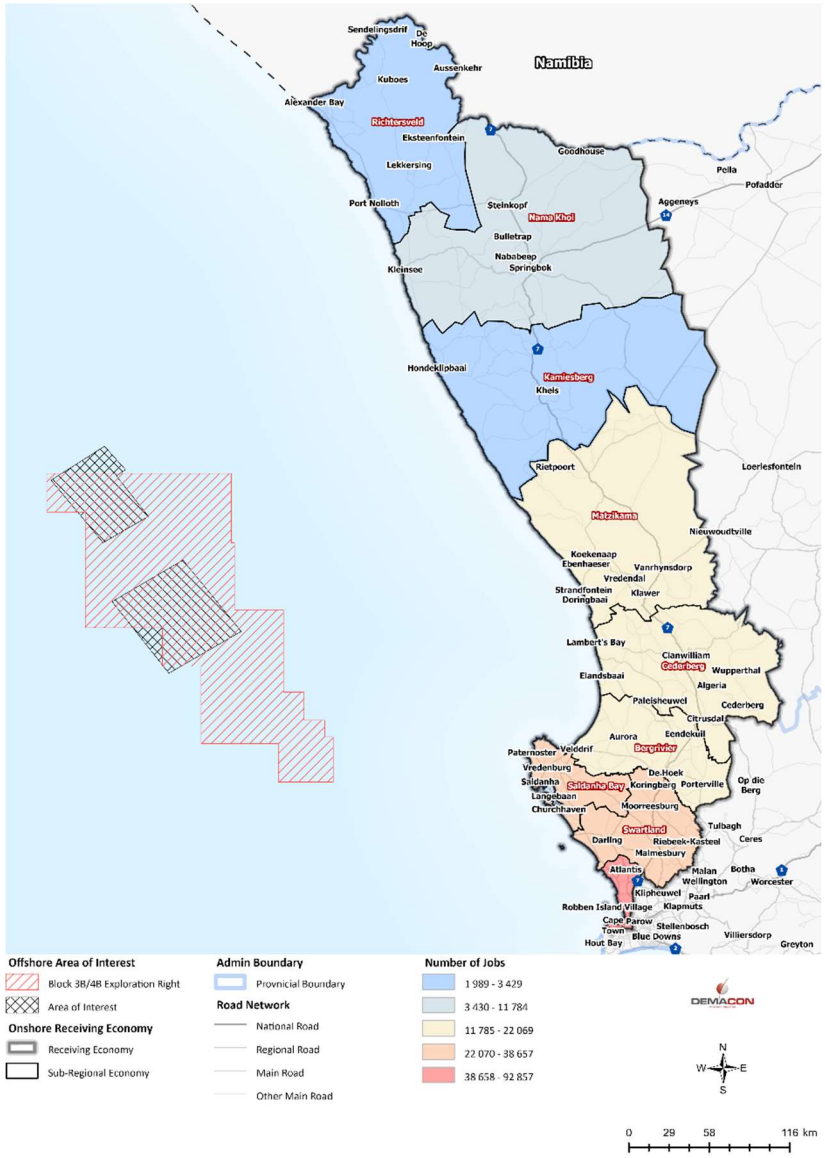
Distribution and Contribution of Sub-Regional Economies to Employment in the Receiving Economy



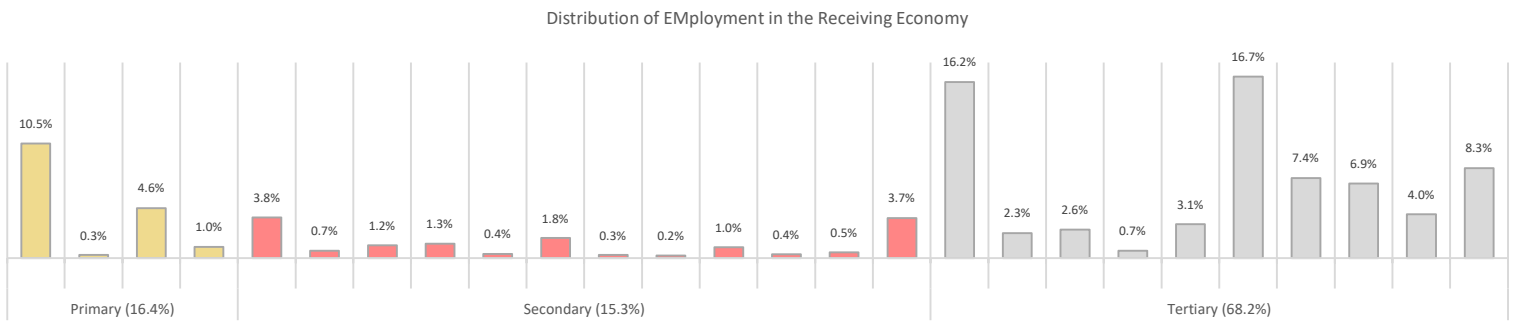
The preceding information shows that the bulk of employment in the receiving economy is located in the Blaauwberg and Table Bay sub-regional economies, with other major economic regions such as Saldanha Bay and Swartland making sizeable contributions as well.

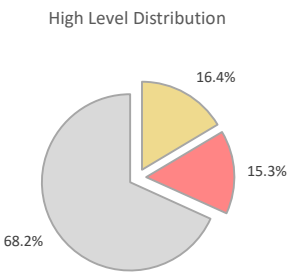
Although sub-regional economies such as Cederberg, Bergrivier, Richtersveld and Kamiesberg had average annual employment growth rates in excess of the receiving economy's overall average annual growth rate of 2.0%, these sub-regional economies created only 16% of new employment opportunities in the receiving economy. Major economic regions such as Blaauwberg, Table Bay, Saldanha Bay and Swartland created more than three quarters of employment opportunities in the receiving economy.

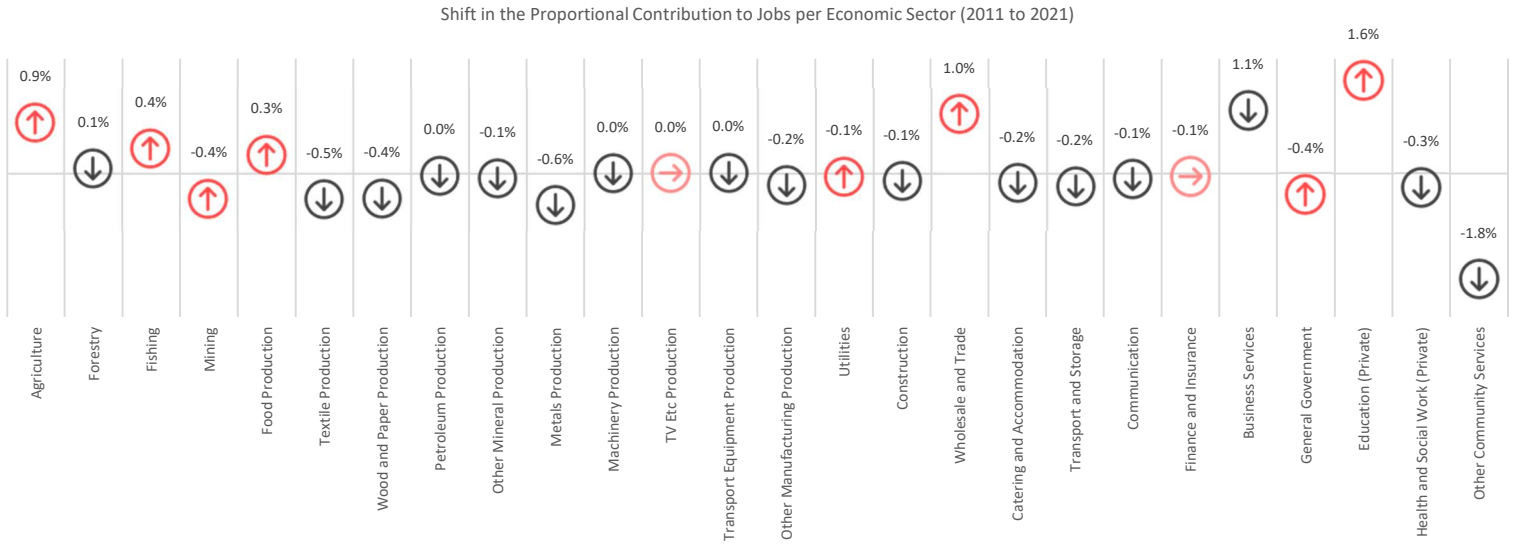
Map 8.14: Distribution and Contribution of Sub-Regional Economies to Employment in the Receiving Economy

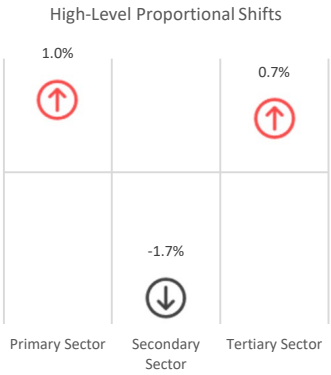


Structure of Employment in the Receiving Economy









The **BULK** of the receiving economy's employment is created in the **TERIARY ECONOMY**

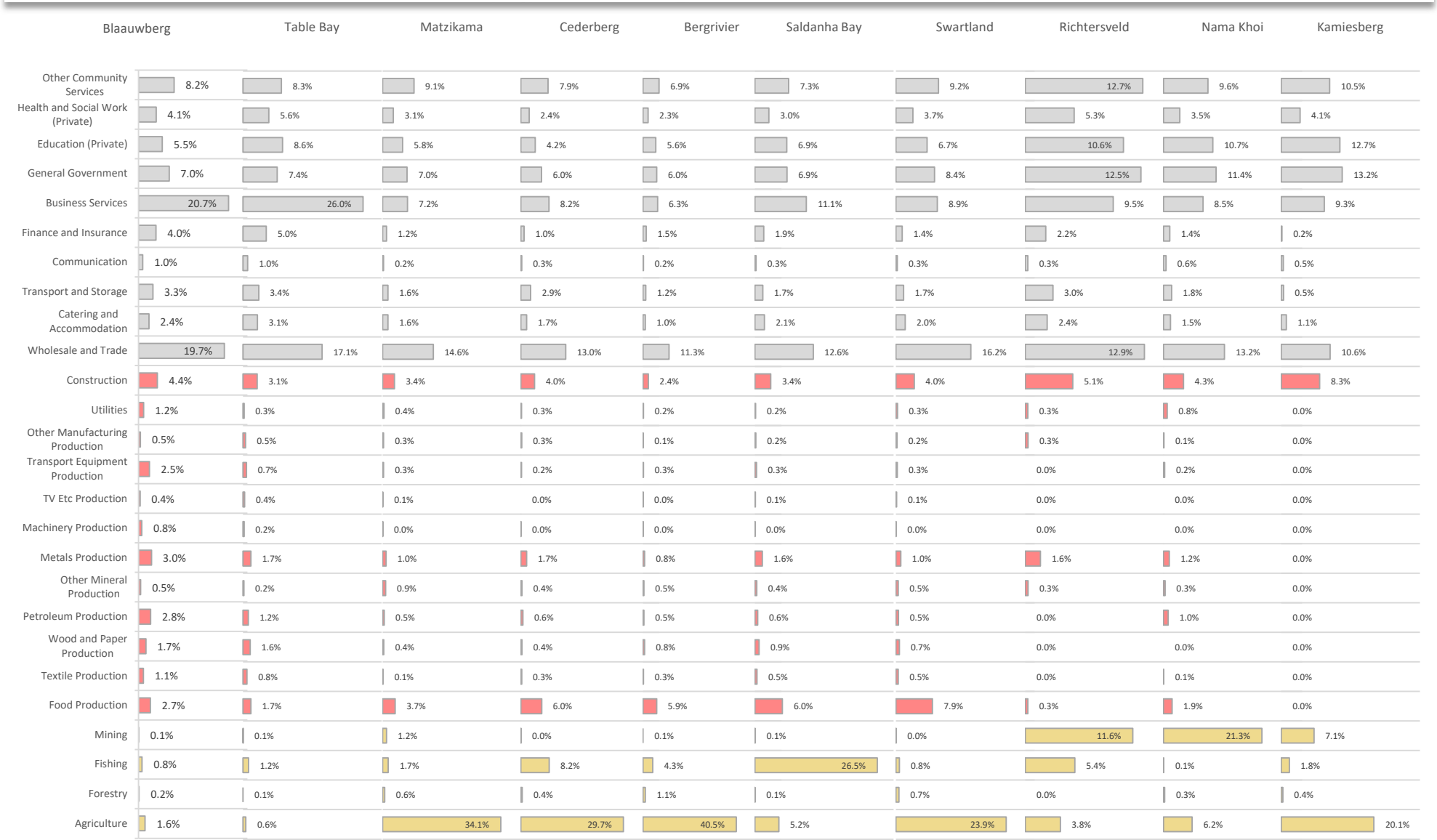
68.2%

The **PRIMARY SECTOR** has **INCREASED** its proportional share of employment created indicating that the sector is one of the **STRONGEST GROWING** sectors in the Receiving Economy

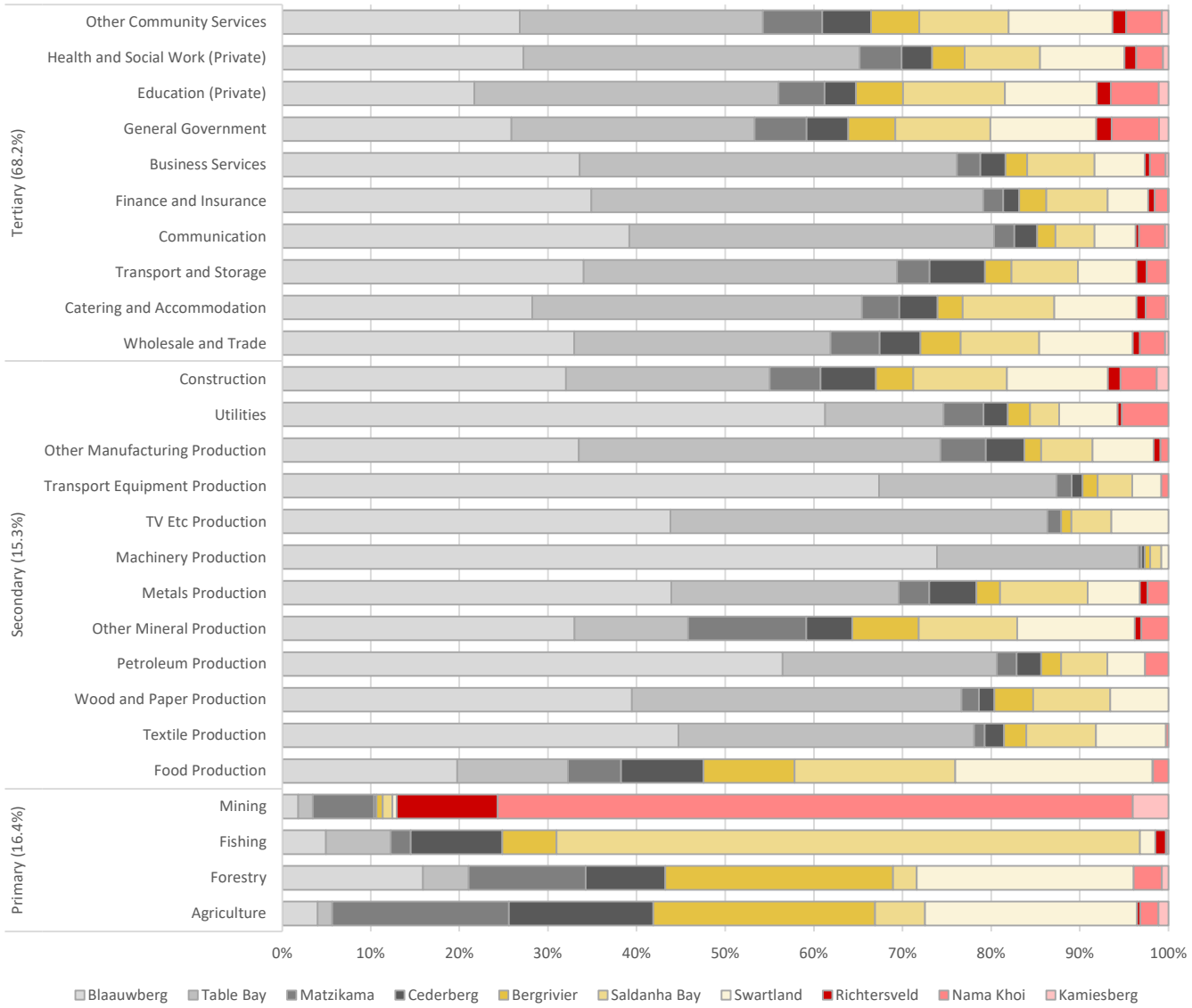
1.0%
share increase

The fluctuation in the proportional contribution by sectors of the economy to total output of the economy is expected, given changes to macro-economic conditions and local economic trends. The concentration of employment in select sectors, however, could impact on the capacity of the receiving economy to not be subjected to economic shocks. Data shows that the proportional share of the majority of economic sectors have decreased which could be an indication of the concentration of employment.

Structure of Employment in Sub-Regional Economies in the Receiving Economy



Contribution of Sub-Regional Economies to Each Economic Sector in the Receiving Economy



The bulk of employment in the receiving economy is created and sustained in the tertiary economy with the majority of employment opportunities exist in the business services and wholesale and retail trade sectors.

Although almost all sub-regional economies have established business services and wholesale and retail trade sectors, the bulk of these sectors' employment is created in the Table Bay and Blaauwberg sub-regional economies – Table Bay and Blaauwberg sub-regional economies create more than 68% of all jobs created by the receiving economy and, therefore, has a significant influence on the structure and functionality of the receiving economy.

Nevertheless, a sizeable amount of employment opportunities are created by the secondary and primary economy, where manufacturing, especially the production of food products, construction and agriculture, specifically land based farming and fishing, play vital roles in providing employment.

It is, however, important to note that although sub-regional economies such as Blaauwberg and Table Bay are the largest contributors of employment in the receiving economy, these areas' influence is primarily concentrated in the tertiary (all sub-sectors) and secondary sectors (all sub-sectors except food production). West Coast sub-regional economies such as Bergrivier, Saldanha and Swartland play important roles in creating employment in the agricultural sector, the fishing industry and essential industries such as food production.

8.4.3 KEY SPATIAL CONSIDERATIONS OF THE RECEIVING ECONOMY

The following section discusses key spatial elements that should be considered in conjunction with the profiling of the receiving economy. The analyses provide a perspective on several aspects that as a result of their spatial relationship with the offshore area of influence of the proposed exploration activity could impact on the normal operation of the receiving economy and its basic sectors.

8.4.3.1 EXPLORATION OPERATIONS CONSIDERATIONS

The proposed exploration activity, although located offshore, will have an onshore base of operations that will facilitate the day-to-day operational requirements of the exploration activity. According to information received from EIMS (2023), the primary onshore logistics base will most likely be located at the Port of Cape Town (preferred option), but alternatively at the Port of Saldanha. Logistical operations to and from the exploration activity's area of interest will most likely operate from the Port of Cape Town and therefore maritime logistics will be stablished between the Port of Cape Town and the exploration's area of interest.

The shore base would provide for the storage of materials and equipment that would be shipped to the drilling unit and back to storage for onward international freight forwarding. The shore base would also be used for offices, waste management services, bunkering vessels, and stevedoring / customs clearance services.

According to currently available operational information the drilling schedule has not yet been finalised but is expected to commence between first quarter of 2024 (Q1 2024) and third quarter of 2024 (Q3 2024). Information indicates that 5 wells will be drilled and that the physical drilling and testing of each well will take approximately 3 to 4 months to complete. Given the information provided, it is assumed that the start of physical drilling of exploration activities will occur between Quarter 1 and Quarter 3 of 2024 and will take up to 4 months per well to complete – taking into account that the first extension of the exploration right expires on 26 October 2024.

Taking into consideration the preceding, the establishment of a base of operations that will operate from the Port of Cape Town will, as a result of the value chain of the exploration activity, directly and indirectly contribute to the economic output produced by the Table Bay sub-regional economy and by extension contribute to the overall economic output produced by the City of Cape Town and Western Cape.

Map 8.15: Exploration Operations Considerations

Source: DEMACON GIS, 2023

8.4.3.2 COMMERCIAL AND SMALL-FISHING CONSIDERATIONS

The identification of the receiving environment noted that economic geographies close to the area of interest/exploration right could be influenced by the exploration activity because exploration operations could influence the normal economic activity of economies that, to some degree, make use of and benefit from sea-based economic resources.

In light of the preceding, the fishing industry represents one of the basic sectors of the receiving economy, i.e., is one of the core industries that supports the receiving economy and produces output that that is exported to the broader national and international economy. In 2022 the fishing industry of the receiving economy represented approximately 31.2% of the national fishing industry gross value added and contributed more than 40% to the Western and Northern Cape's fishing industry. Furthermore, the fishing industry of the receiving economy contributes 3.2% to the total gross value added by the receiving economy, 0.6% to the total gross value added by the Western and Northern Cape economies and 0.1% of the total gross value added by the National economy. The receiving economy also plays a critical role in the supply of employment opportunities, contributing 34% to the national fishing industry's employment and 0.1% to nationally available jobs.

The preceding identifies that the fishing industry plays a vital role in the broader receiving economy, and especially impacts on the economy as a result of its backward and forward linking industries (wholesale and retail trade - backward linking, professional business services - backward linking, fishing industries - backward and forward linking, non-durable goods such as food - forward linking and food manufacturing - forward linking).

Given the location of the areas of interest within the exploration right, the spatial relationship that the areas of interest could have with typical/general commercial and small-scale fishing locations along the West Coast of the receiving economy was considered.

Utilizing the general fishing effort data from the Marine Spatial Planning's Decision-Making Tool and National Oceans and Coastal Information Management System (OCIMS), we can ascertain the spatial relationship between the proposed exploration activity's area of interest and fishing effort along the West Coast of South Africa.

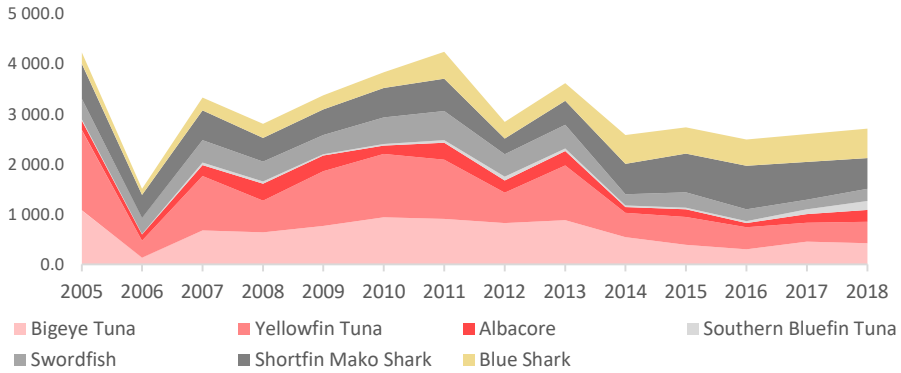
Spatial data indicates that while there is some overlap between the exploration right area of the proposed activity and general fishing locations along the West Coast, the interaction between the area of interest of the exploration activity and general fishing areas is limited.

A significant overlap does, however, exist between fishing efforts of large pelagic longline catching locations and the areas of interest of the proposed exploration activity.

The large pelagic longline sector of the fishing industry focus on the catching of tuna species (albacore, yellowfin, bigeye and bluefin tuna), swordfish and certain shark species (shortfin mako shark and blue shark). According to the Department of Forestry, Fisheries and the Environment's (DFFE) Status of the South African Marine Fisheries Resources (2020) the fishing pressure status of species targeted by the large pelagic longline sector range from optimal to heavy. Optimal fishing pressure exists for species such as albacore, yellowfin tuna, swordfish, and the southern bluefin tuna. Heavy fishing pressure, however, exists for yellowfin tuna and bigeye tuna.

Approximately 3 064.4 tonnes of large longline pelagic species are caught by the fishing industry per year of which Yellowfin Tuna, Bigeye Tuna and Shortfin Mako Sharks are the most common.

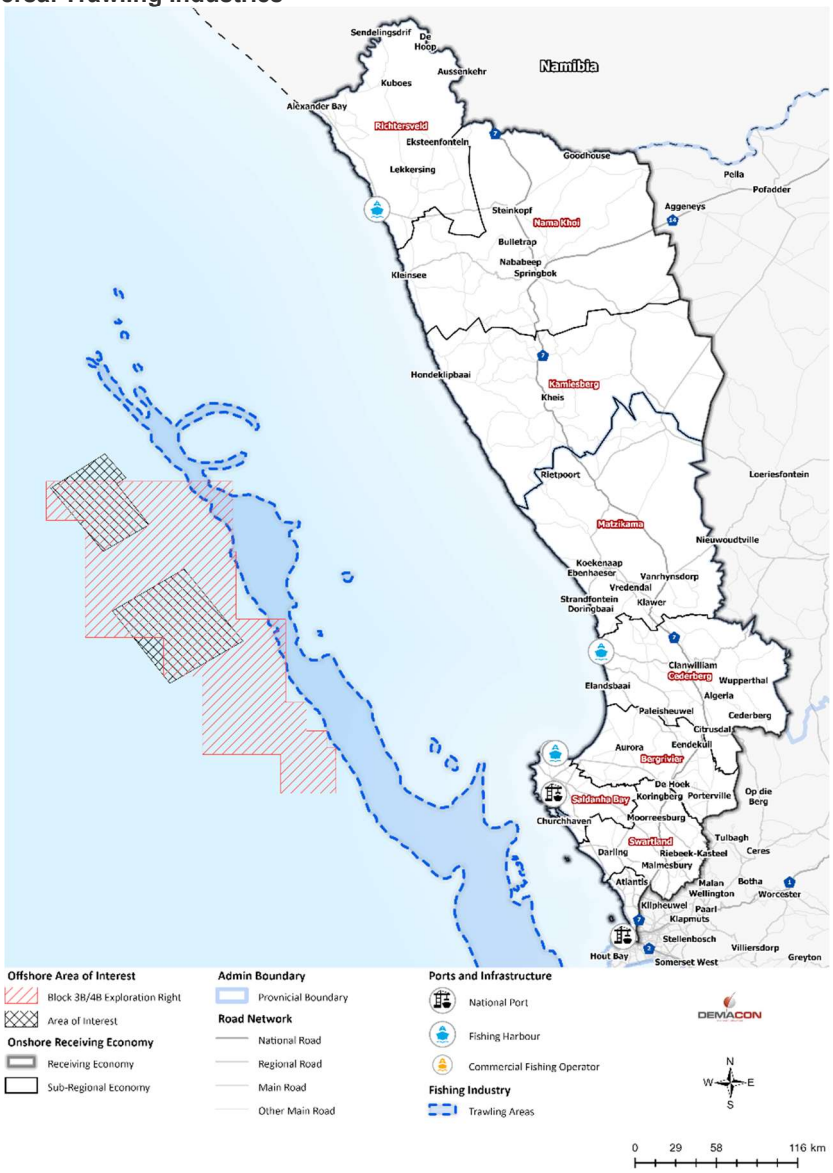
Figure 8.6: Total Catch (Tonnes) of Long Line Pelagic Species between 2005 and 2018



Source: DEMACON ex DFFE, 2023

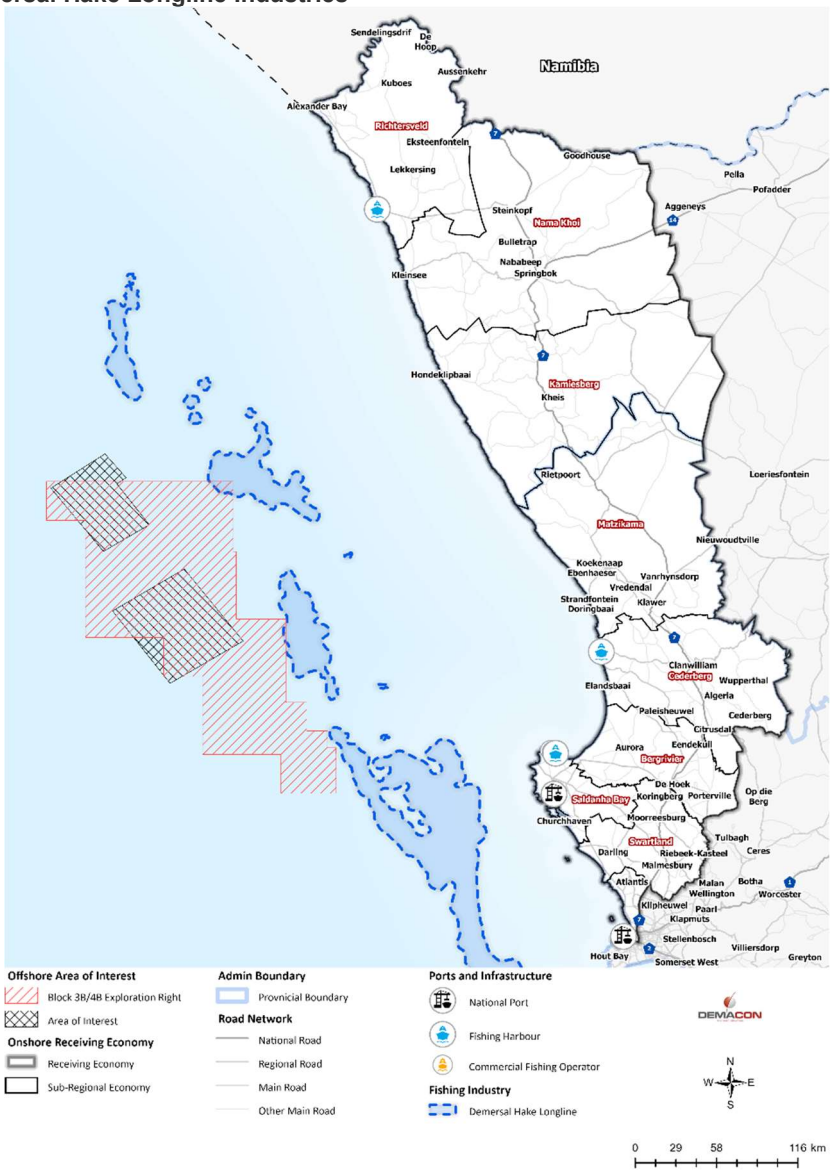
The following maps provide an overview of the spatial relationship that the area of interest of the proposed exploration has in relation to various fishing activities.

Map 8.16: Exploration Area of Interest and Receiving Economy in relation to Demersal Trawling Industries



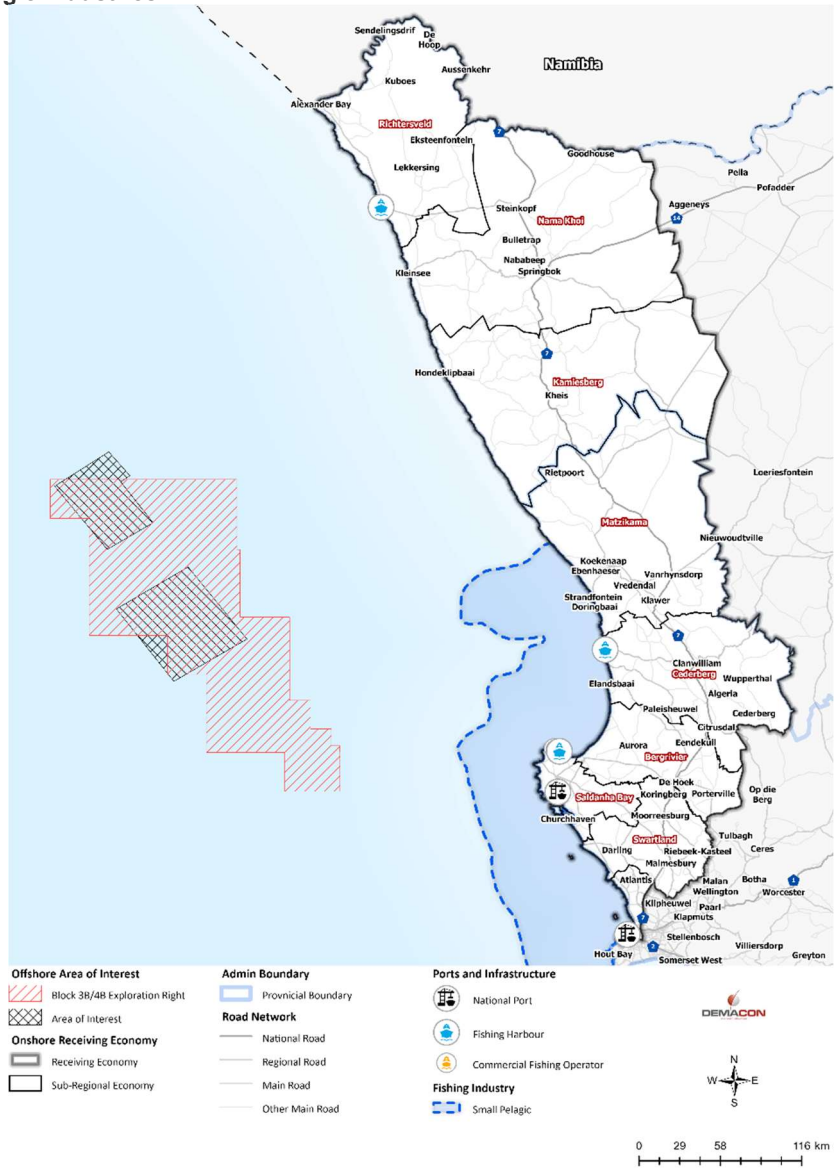
Source: DEMACON ex DFFE, 2023

Map 8.17: Exploration Area of Interest and Receiving Economy in relation to Demersal Hake Longline Industries



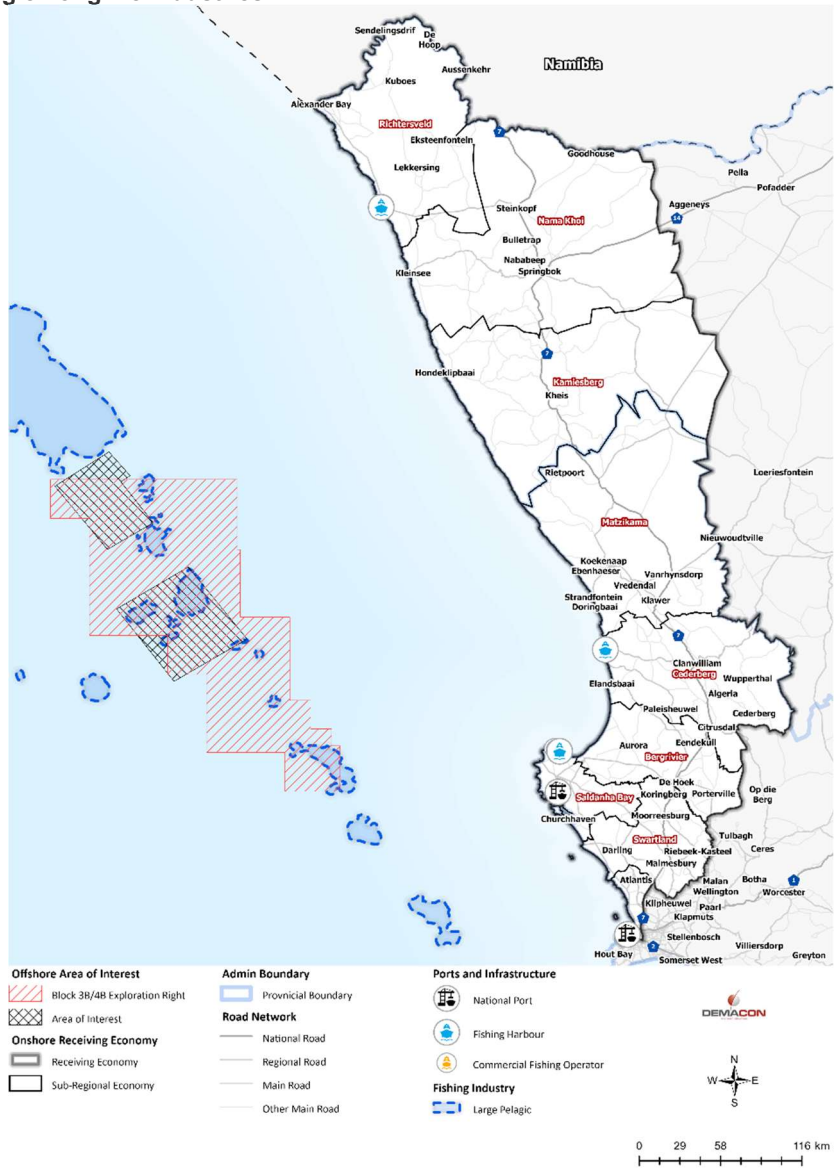
Source: DEMACON ex DFFE, 2023

Map 8.18: Exploration Area of Interest and Receiving Economy in relation to Small Pelagic Industries



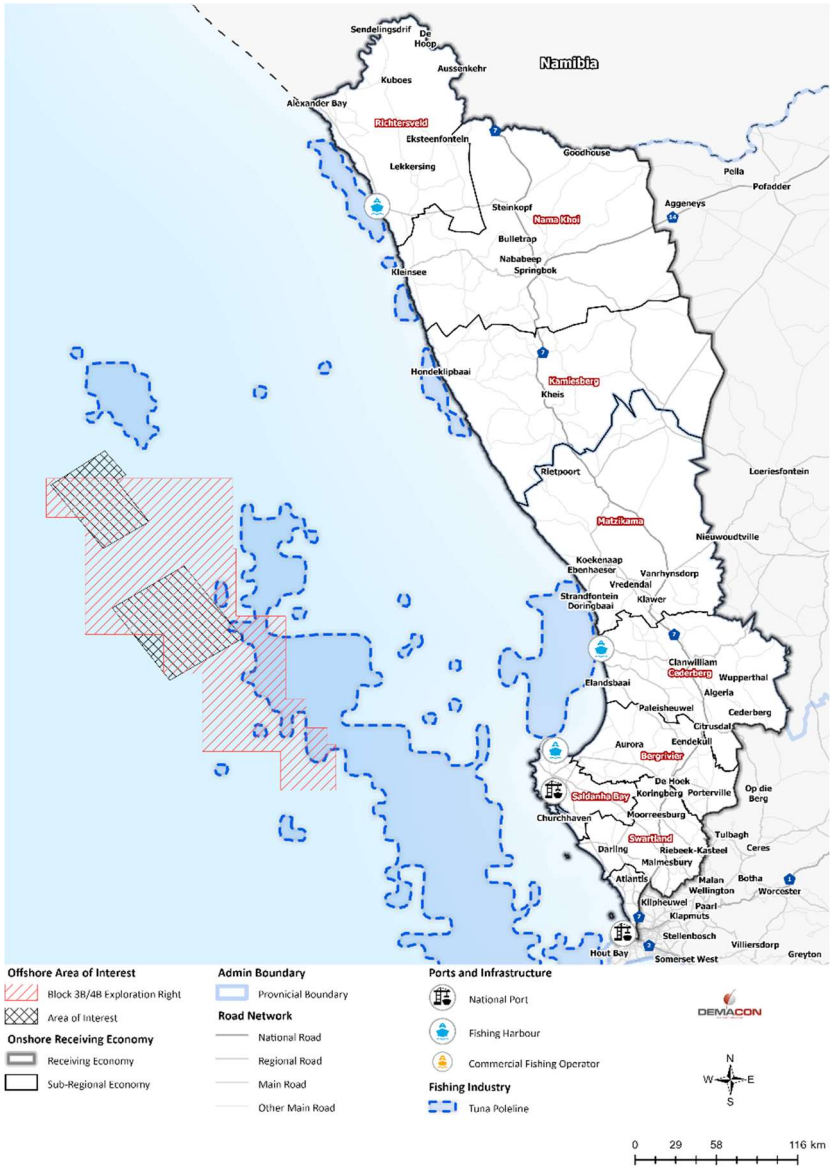
Source: DEMACON ex DFFE, 2023

Map 8.19: Exploration Area of Interest and Receiving Economy in relation to Large Pelagic Longline Industries



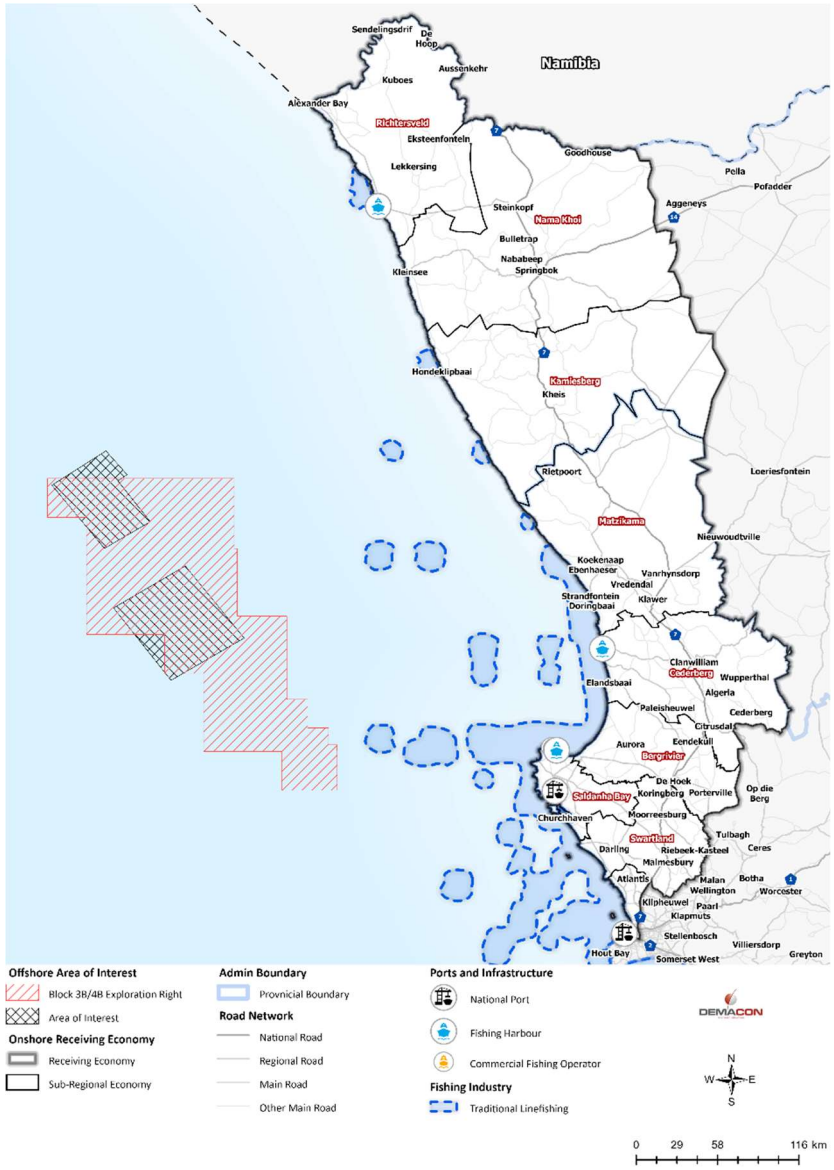
Source: DEMACON ex DFFE, 2023

Map 8.20: Exploration Area of Interest and Receiving Economy in relation to Tuna Pole-Line Industries



Source: DEMACON ex DFFE, 2023

Map 8.21: Exploration Area of Interest and Receiving Economy in relation to Traditional Linefish Industries



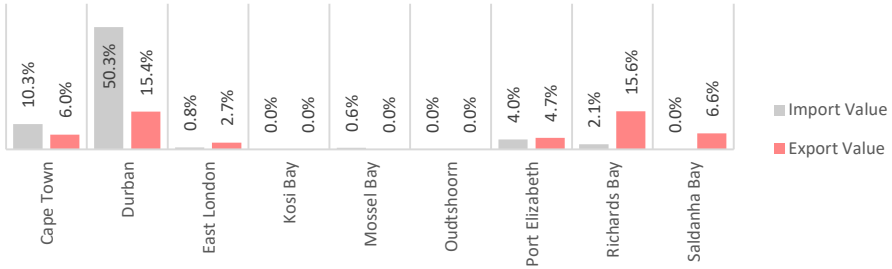
Source: DEMACON ex DFFE, 2023

8.4.3.3 SEA-BASED LOGISTICS CONSIDERATIONS

The movement of goods and services is an important consideration when identifying the role and function of aspects within an economy or specific economic region. Given that the proposed exploration activity is situated within an offshore location close to two main seaports of the South African economy, the relationship that the area of interest of the proposed exploration activity has with sea-based logistics is important.

Approximately 68.1% of the total value of South Africa's imports and 51.1% of the total value of South Africa's exports travel through the 9 main seaports of South Africa. The Port of Cape Town and the Port of Saldanha Bay are key ports within the context of the South Africa as the Port of Cape Town handles approximately 10.3% of South Africa's import value whilst the Port of Saldanha Bay handles approximately 15.6% of the value of South Africa's exports.

Figure 8.7: Distribution of the Total Value of South African Imports and Exports per Sea Port (2022)



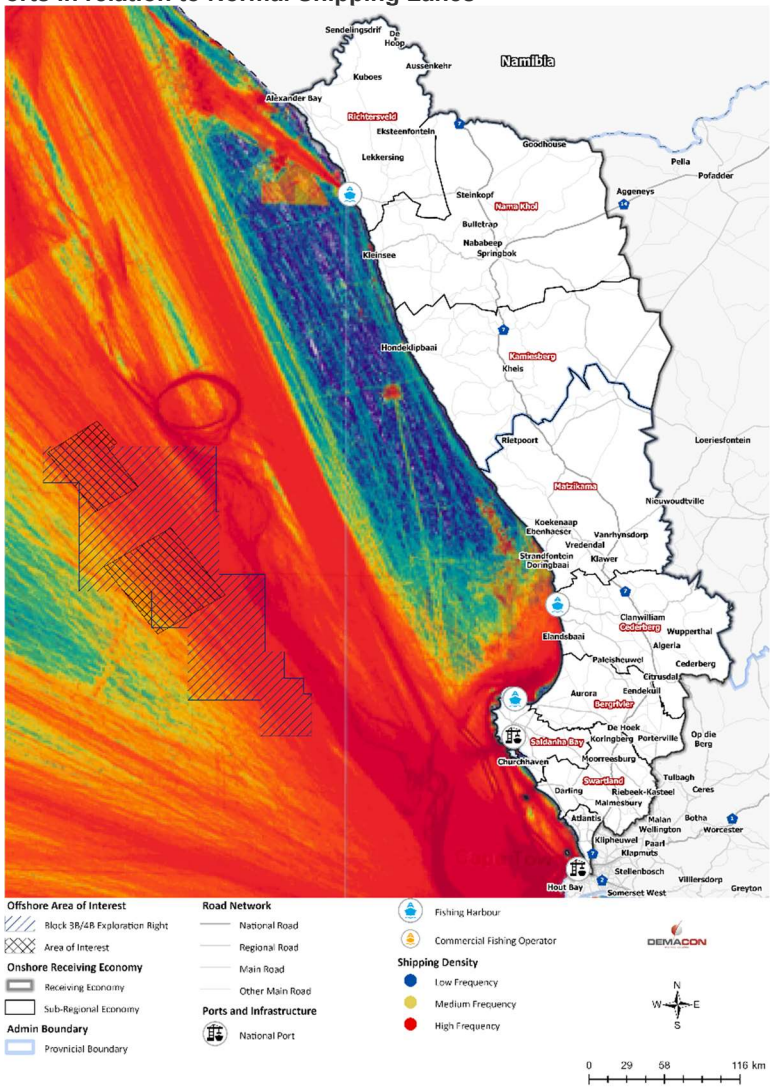
Source: DEMACON ex South African Revenue Service, 2023

The Port of Cape Town and the Port of Saldanha Bay are also two ports that have been selected as the preferred and alternative ports from which a base of operations for the proposed exploration activity will be established.

The proximity of the Port of Cape Town and Port of Saldanha Bay to the areas of interest for the proposed exploration activity may lead to potential disruptions in normal sea-based logistical operations, such as imports and exports. In this analysis, "disruption" refers to the possibility of altering sea routes due to the proposed exploration activity restricting the use of normal shipping lanes.

Spatial data shows that the proposed exploration activity's areas of interest overlap with established shipping lanes, indicating a potential impact on the normal operations of sea-bearing vessels that traverse these routes.

Map 8.22: Location of the Exploration Area of Interest, Receiving Economy and Major Ports in relation to Normal Shipping Lanes



Source: DEMACON ex DFFE, 2023

8.4.3.4 SEA-BASED INFRASTRUCTURE CONSIDERATIONS

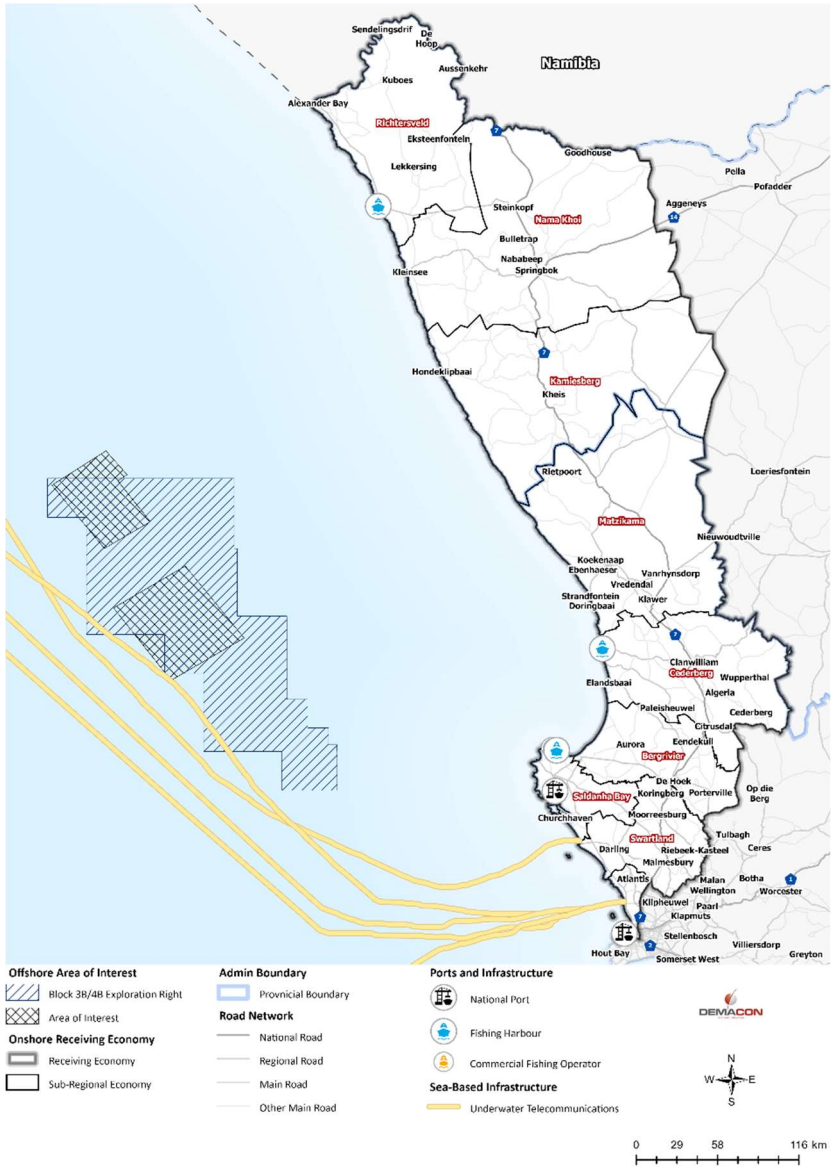
The West Coast of South Africa is served by a network of vital underwater telecommunications cables that connect the region to various parts of the world. Some of the key submarine cable systems include:

- SAT3/WASC/SAFE: This extensive cable system consists of two sub-systems, SAT3/WASC in the Atlantic Ocean and SAFE in the Indian Ocean. It links Portugal (Sesimbra) with South Africa (Melkbosstrand). From Melkbosstrand, the cable extends via the SAFE sub-system to Malaysia (Penang), with intermediate landing points at Mtunzini East South Africa, Saint Paul Reunion, Bale Jacot Mauritius, and Cochin India.
- West Africa Cable System (WACS): Stretching over 14,530 km, WACS connects South Africa (Yzerfontein) to the United Kingdom (London). It boasts 14 landing points, with 12 along the western coast of Africa (including Cape Verde and Canary Islands) and 2 in Europe (Portugal and England), concluding on land at a cable termination station in London.
- African Coast to Europe (ACE): Covering an impressive 17,000 km, the ACE submarine communications cable runs along the West Coast of Africa, linking France and South Africa (Yzerfontein).
- Equiano: This private subsea cable, funded by Google, will traverse the West Coast of Africa, connecting Portugal and South Africa with branching units along the route. The first phase, linking South Africa (Melkbosstrand) and Portugal, was expected to be completed by 2021.
- 2Africa: The 2Africa subsea cable project aims to interconnect Europe (eastward via Egypt), the Middle East (via Saudi Arabia), and 21 landings in 16 African countries, including South Africa. The system is expected to go live in 2023/2024.

These underwater telecommunications infrastructure projects play a critical role in ensuring reliable and high-speed communication services, supporting various sectors and reinforcing South Africa's global connectivity.

An examination of the spatial relationship between underwater telecommunications cables and the proposed exploration area's area of interest reveals that there are no existing cables crossing through this region.

Map 8.23: Location of the Exploration Area of Interest and Receiving Economy in relation to Underwater Telecommunications Cables



Source: DEMACON ex DFFE, 2023

8.4.3.5 TOURISM CONSIDERATIONS

The Western and Northern Cape Provinces are prominent tourism destinations for domestic and international travellers. The Western and Northern Cape provinces attract approximately 18% of all international tourists travelling to South Africa and 12% of all domestic trips undertaken by South Africans.

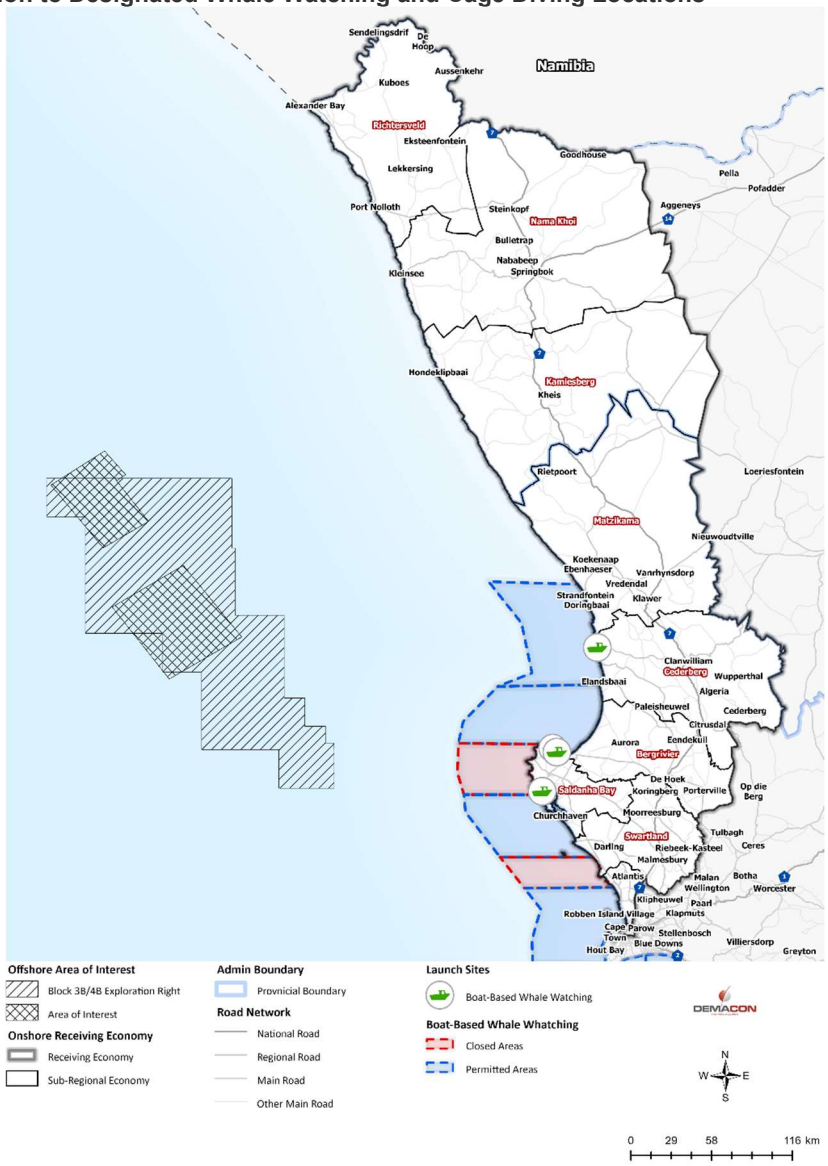
Economic data for the receiving economy identifies that the catering and accommodation industry (which represents a portion of the total tourism industry but provides a proxy indication of tourist activity) is a basic sector (foundational sector for the local economy) of the receiving economy and contributes approximately 1.2% to the total economic output produced by the receiving economy. The tourism industry is therefore a key component of the receiving economy.

Tourism is an amalgam of visitors' consumption of goods and services which include transportation, accommodation, food and beverage, recreation and entertainment, travel and tour operations, and souvenirs. Within the context of the proposed exploration activity, interest is afforded to the potential impact that the exploration activity could have on the tourism industry as a whole in the receiving economy. Interest is specifically afforded to the potential of the proposed project to influence sea-based tourist activities.

The exploration right of the project (including its areas of interest) is between 120 km and 150 km from the western coast of South Africa and, therefore, sighting of exploration activities would not have a visual impact on aspects such as the scenic quality of a tourist location (a person standing at sea level will typically only be able to see approximately 4.8 km when looking out to sea), the attractiveness of a location's product offering and the potential of onshore activities to maintain their current functionality and levels of services. The potential for a well blow-out exists but research suggests that no such occurrence has yet been recorded in South Africa and that the chances of such an occurrence is fairly low.

Furthermore, spatial data shows that sea-based activities such as whale watching and cage diving do not interact and as a result will not necessarily affect the potential of these industries to maintain operations.

Map 8.24: Location of the Exploration Area of Interest and Receiving Economy in relation to Designated Whale Watching and Cage Diving Locations



Source: DEMACON ex DFFE, 2023

8.4.4 RECEIVING ENVIRONMENT ECONOMIC PROFILING SYNTHESIS

The following provides a summary of the preceding analysis:

Location

- The receiving environment, as defined in Section 8.3, represents an offshore and onshore area of influence. The economic profiling of the receiving environment focusses on identifying the core underlying attributes that define the onshore area of influence of the exploration activity.
- The onshore area of influence or receiving economy consists of several economic sub-regions that are situated along the west coast of the country. The onshore area of influence consists of the following sub-regional economies:
    - Table Bay (Part of City of Cape Town Regional Economy)
    - Blaauwberg (Part of City of Cape Town Regional Economy)
    - Matzikama (Part of West Coast Regional Economy)
    - Cedeberg (Part of West Coast Regional Economy)
    - Bergrivier (Part of West Coast Regional Economy)
    - Saldanha Bay (Part of West Coast Regional Economy)
    - Swartland (Part of West Coast Regional Economy)
    - Richtersveld (Part of Namakwa Regional Economy)
    - Nama Khoi (Part of Namakwa Regional Economy)
    - Kamiesberg (Part of Namakwa Regional Economy)

Economy Size and Distribution

- The size of the receiving economy in relation to other economic geographies provides an indication of the relative significance of an economy in the context of the broader economic environment within which it operates.
- The receiving economy proportionally contributes 17.4% to the provincial economies of the Western and Northern Cape combined and approximately 2.7% to the National economy.
- The receiving economy is, therefore, a major economic output region considering its size and contribution to not only provincial but the national economy as well
- The Blaauwberg and Table Bay sub-regional economies contribute slightly more than 69% of the total economic output produced by the receiving economy. The Saldanha Bay and Swartland sub-regional economies contribute the third and fourth largest contributions to the receiving economy (8.0% and 6.5% respectively) whilst the remaining sub-regional economies combined contribute nearly 17% of total economic output produced.

Economic Profile

- To highlight the economic growth trends of the receiving economy, reference is made to the growth and associated trends of sub-sectors that make up the economy. The reference focuses on the proportional contribution made by each economic sub-sector to the total receiving economy.
- Historic trends for the receiving economy as well as contributions made by each economic sub-sector to the receiving economy show that in 2021, the tertiary economic sector proportionally contributed more than 69% to the receiving economy, while the secondary sector proportionally contributed 20.5% and the primary sector 9.6%.
- Proportionally, the business services sector (29.7%) is the largest contributor to the receiving economy. Economic sub-sectors such as Wholesale and trade (15.1%) and manufacturing (15.0%) contribute the second and third largest proportions of economic output.
    - The business services sector as well as wholesale and retail trade are the primary contributors of the teriary economy
    - The manufacturing sector is an established sector and is largely driven by output generated by the food production industry, and manufacturing of petroleum products
- Economic sub-sectors such as construction (2.4%), utilities (3.1%) and mining (3.4%) proportionally contribute the least to economic output.
- Important sectors to take note of includes agriculture of which land-based farming and fishing are key economic activities of sub-regional economies.
- Economic base theory asserts that the means of strengthening and growing the local economy is to develop and enhance the basic sector. The basic sector is therefore identified as the engine of the local economy and called the economic base of the local economy. If an economic sector is non-basic, the sector primarily produces for consumption within the local economy. When an economic sector is

basic, the economic sector focuses on production and consumption within the local economy and can export excess to regional markets.

- Industries such as fishing, other mining, electricity and gas production, the manufacturing of food, radios and related equipment, wood and paper products and petroleum products, wholesale and trade, accommodation and professional business services form the base of the receiving economy. The exploration of gas and related hydrocarbon resources as an industry forms part of the professional business services sector which is one of the largest contributors to economic output and is a basic sector of the receiving economy

Economic Growth

- Between 2011 and 2021, the receiving economy expanded at an average annual rate of 1.5%. In contrast, between 2016 and 2021, the receiving economy expanded by 0.8%.
- It should be noted that the level 5 and level 4 lock down regulations in the early stages of 2020 (March to June) impeded the normal operation of the majority of the economy. As a result, the economy of the country contracted and, therefore, the receiving economy was also impacted – primarily the reason why the average annual growth of the receiving economy expanded at a rate sizeably smaller than long-term growth trends between 2016 and 2021. If economic data for the year 2020 is excluded from the analysis, the receiving economy expanded by 1.9% between 2011 and 2019. Likewise, the receiving economy expanded between 2016 and 2019 by 1.2%.
- The fastest growing sub-regional economies of the receiving economy are Blaauwberg (2.1%), Cederberg (2.7%) and Bergrivier (2.1%). What should be borne in mind is that smaller economies such as Cedeberg and Bergrivier may experience sizeable growth but are growing from small economic output bases, i.e., a marked jump in output could generate sizeable economic output when existing output is small – in comparison a larger economy may experience moderate growth but because its size is substantial, the value of growth is significantly larger than in a smaller economy.
- The receiving economy has experienced a slowdown in growth since 2011. The Covid-19 pandemic had a significant impact on the receiving economy in 2020, but it rebounded in 2021. However, several economic growth constraints have affected the receiving economy since 2021.
- The tourism sector has been one of the hardest hit by the pandemic, but other sectors such as agriculture, fishing, mining, and the production of food products have rebounded to pre-pandemic levels. The business services, wholesale and retail trade, general government, private education, and agriculture have been the primary contributors to economic growth since 2011.
- The Blaauwberg and Table Bay sub-regional economies are the largest contributors to the overall growth of the receiving economy. The Saldanha Bay and Swartland sub-regional economies are also important contributors to economic growth.
- The business services sector is a key driver of economic production and growth. Exploration as an economic activity forms part of the business services sector and, therefore, is an important component within the receiving economy.

Employment and Labour Participation

- The average labour force participation rate for the receiving economy amounts to 60.9%. The receiving economy underperforms regionally but is greater than the provincial labour force participation trend.
- It should be noted that the impact of lockdown regulations can be observed when comparing labour force participation in 2020 to 2021.
- A total of 60 839 formal jobs have been created between 2011 and 2021 in the receiving economy - is approximately 6 084 formal employment opportunities gained per year.
- The number of skilled employment increased at an average of 2 158 jobs per year, while semi-skilled employment gained 2 304 jobs per year, and low skilled employment gained 1 622 jobs per year.
- The informal sector decreased by 26 573 jobs between 2011 and 2021 - is approximately – 2 657 informal jobs per year.
- The economically active segment of the labour force increased by 77 435 people between 2011 and 2021. Approximately 34 266 people were employed in the receiving economy between 2011 and 2021.
- It is evident that the economically active segment of the population is growing faster than the absorption capacity of the receiving economy, meaning that potential jobs seekers are growing faster than the rate at

which the receiving economy is creating employment. This could force job seekers to look for employment outside the receiving economy.

- The main employment creating sectors within the receiving economy are the business services, wholesale and trade and agriculture, contributing more than 75% to the jobs created within the receiving economy

8.5 SYNTHESIS

This chapter reviews and contextualizes the receiving economy to establish the baseline or status quo of the receiving environment's economy and to determine the underlying characteristics and trends that inform the basis and core structure of the economy.

The analysis identified that the area of influence, i.e., the receiving environment, consists of two areas of influence: an onshore and offshore area of influence. This distinction is made because, although exploration activities occur offshore, they influence an extended area around exploration locations (offshore area of influence). The economic output produced by exploration activities as well as the effects of external economic impacts, however, are measured onshore as part of a defined economic geography (onshore area of influence).

Therefore, for the purposes of this economic impact assessment, the receiving economy of the proposed exploration activity is defined by the onshore area of influence through which the economic impacts of the proposed activity can be related and measured. The onshore area of influence (receiving economy) consists of 10 sub-regional economic geographies along the western coast of South Africa and represent areas that will either contribute toward the operational activities of the exploration effort, are economies along the extent of the exploration right and exploration focus area, and/or economies that, to some degree, make use of and benefit from sea-based economic resources.

The receiving economy consists of economic activity areas between the Richtersveld sub-regional economy (Port Nolloth, Alexander Bay, and Springbok) in the north to the Table Bay sub-regional economy (Cape Town City Centre, Port of Cape Town, and City of Cape Town northern suburbs) in the south. The receiving economy represents a major economic activity area within the context of the Western and Northern Cape provincial economies, whereby more than 17% of the economic output produced by the Western and Northern Cape provincial economies is concentrated in the receiving economy.

Although the receiving economy's production output is primarily concentrated in the tertiary economy (specifically within the professional business services and wholesale and retail trade sectors), a competitive advantage analysis of the receiving economy identifies that the basic sectors of the economy primarily consist of primary and secondary sector industries such as fishing, agriculture, food production, overall manufacturing, and utilities production and sales. Furthermore, although the tourism sector has not fully recovered to post-pandemic levels and considering that the industry has continually contracted in terms of output and employment, the industry (catering and accommodation sector) remains a basic sector of the receiving economy and should be considered in terms of its importance as an exporter of economic goods and services.

Sub-regional economies such as Blaauwberg and Table Bay consist of basic sectors that drive economic output and growth in terms of the secondary and tertiary economy. When considering the remaining sub-regional economies of the receiving economy, the importance of the primary and secondary economy as the basis of the economy can be observed. Sub-regional economies such as Matzikama, Cederberg, Bergrivier, Saldanha Bay, Richtersveld, and Kamiesberg rely on the agricultural sector, and specifically onshore farming and fishing as basic sectors of economic production. Additionally, food production represents a core economic sector for Western Cape economies and specifically areas such as Matzikama, Cederberg, Bergrivier, and Saldanha Bay.

Given the preceding, offshore exploration activities could directly and indirectly impact on the receiving economy. The direct impact of exploration activities could manifest in the form of the multiplier effect of economic output generated by the industry throughout its value chain and consequently encourage additional output, gross value added, livelihood improvements, and employment.

Offshore exploration activities could also indirectly influence the receiving economy by altering key inputs and dependencies of the receiving economy. The analysis of the receiving economy identified that economic sectors such as fishing, food production, catering and accommodation, and general manufacturing represent the basis of the receiving economy. Offshore exploration, in essence, could influence commercial and small-scale fishing operations, sea-based tourism activities, and offshore logistical operations and consequently impact on the existing economic base and the efficiency thereof to create economic output and employment opportunities, albeit temporarily.

9 IMPACT ASSESSMENT

9.1 INTRODUCTION

The profiling of the receiving economy (as undertaken in Chapter 8 of this report) provides a platform from which the economic impact of the proposed exploration activity can be measured. The profiling of the receiving economy identified that exploration activity could positively and/or negatively impact on the basic sectors that underpin the receiving economy. As a result, the efficiency of the basic sectors of the economy could be influenced by the proposed exploration activity and therefore the economic impact of the exploration activity on the receiving economy must be assessed.

Against this backdrop, the primary objective of this chapter is to evaluate the economic impact that may arise from the proposed exploration activity. This assessment encompasses both quantitative and qualitative perspectives, providing a well-rounded view of the diverse positive and/or negative impacts associated with the project.

9.2 IMPACT ASSESSMENT METHODOLOGY

This section of the chapter seeks to provide an overview of the methodology used to undertake an economic impact assessment of the proposed exploration activity.

The section also provides a detailed breakdown of the individual methodologies employed in undertaking the economic impact assessment and seeks to outline the key attributes of each methodology used in order to provide an overview of the aspects used to model and measure economic impacts.

Diagram 9.1 (overleaf) provides a diagrammatical representation of the methodology used to conduct the economic impact assessment. Prior to the diagram, a short description is provided of the general structure of the methodology and each step contained in the methodology. The purpose is to highlight the key components that make up each step of the methodology and to emphasise any considerations associated with a step.

The impact assessment methodology consists of three steps that, in turn, contribute to the overall economic impact assessment of the proposed exploration activity.

Step 1: Research and Impact Identification

- The step assists with the identification of impacts that could be used to review and measure the economic impact of the proposed exploration activity.
- The step combines research from the profiling of the receiving environment (includes offshore and onshore areas of influence) and identifies economic impacts that could arise during the operation of the project.
- The impacts identified within the receiving environment are assessed in terms of whether they can be measured within the context of quantitative or qualitative methodologies. In the event that an impact can be measure in terms of both methodologies, the impact is measured quantitatively, and the extent of the impact is further expanded on in terms of a qualitative analysis.

Step 2: Quantitative Impact Assessment

- Each impact that can be quantifiably measured is subjected to the quantitative impact assessment methodology.
- The methodology firstly seeks to measure the net benefits or costs of the impacts identified in Step 1. The assessment measures each impact based on several metrics and determines whether an impact offers a gain or loss to the economy.
- Based on the outcome of the preceding, the total net economic impact of quantified gains and losses is calculated. The result of the analysis provides a perspective, based on several metrices, on whether the proposed exploration activity offers a net gain or loss to the economy.
- Based on the nature of the quantified impact measured, mitigation measures are identified to potentially enhance positive impacts and reduce negative impacts.

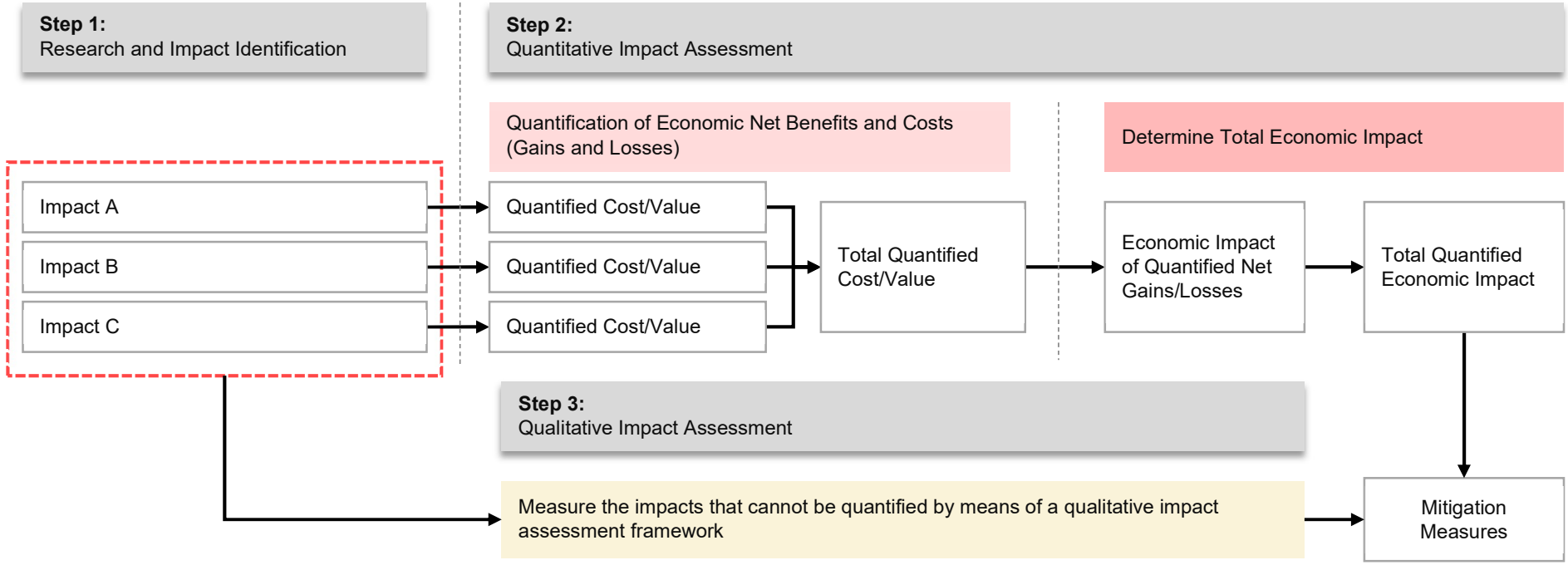
Step 3: Qualitative Impact Assessment

- Each impact that has been identified in Step 1 as being an impact that can be measured qualitatively will be subjected to the qualitative impact assessment methodology.

- The assessment seeks to evaluate each relevant impact based on an impact assessment framework that measures the risk of an impact based on factors such as nature, extent, duration, probability and magnitude.
- A significance rating is determined for each impact and based on the nature of the impact mitigation measures and alternatives are considered.

Diagram 9.1: Overarching Impact Assessment Methodology

Source: DEMACON, 2023



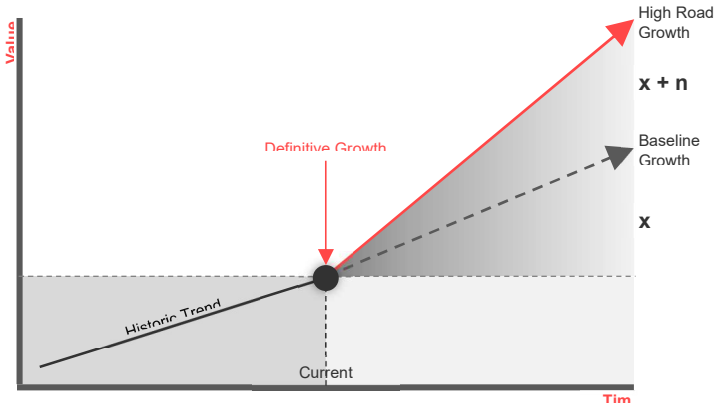
9.2.1 Quantitative Impact Assessment Methodology

The following section provides an overview of the quantitative impact assessment methodology used to measure the economic significance of impacts generated by the proposed exploration activity and its direct and indirect impacts on the receiving environment/economy.

9.2.1.1 Input-Output Model Methodology

The following figure conceptually illustrates the economic impact that the proposed gas exploration activity could have on the economy in terms of additional GDP.

Diagram 9.2: Economic Impact of a Development

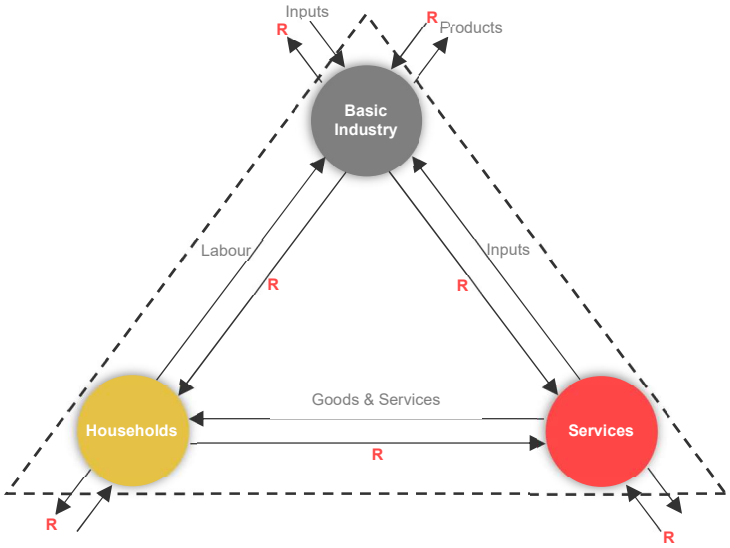


x = Baseline Economic Impact

x + n = High Road Economic Impact

Before the input-output model is discussed it is necessary to understand the community economic system and underlying interrelationships (Refer to Diagram 5.2).

Diagram 9.3: Community Economic System



There is a strong interrelationship and interdependence between the three dominant sectors of the local economy: Basic industry, households, and services. These interrelationships refer to sectors purchasing from other sectors, sectors selling to other sectors, sectors selling outside of the local economy and sectors buying outside of the local economy.

This results in the flow of labour, inputs, goods, and services as well as money within and beyond the local economy. The input-output analysis creates a picture of a provincial economy describing the flows to and from industries and institutions. In other words, it describes the provincial economy and predicts the estimated impacts resulting from a change in the economy.

The Input-Output Model depicts economic relationships between different components of an economy by identifying monetary flows (expenditures, receipts) between various units. The relationship between the initial spending and the total effects generated by the spending is known as the multiplier effect of the sector, or more generally as the impact of the sector on the economy. The input-output table represents the nucleus of the Inset-Output Model – as reflected in Table 9.1.

Table 9.1: Schematic Presentation of the Input-Output Model

	Intermediate Outputs	Final Demand	Total Production
Intermediate Inputs	**Quadrant I** x11 x12 x21 x22 xn1 xn2 m11 m12	**Quadrant II** C1 G1 I1 IC1 E1 C2 G2 I2 IC2 E2 Cn Gn In ICn En MC MG	 X1 X2 Xn Mn
Primary Inputs	**Quadrant III** A1 A2 B1 B2 T1 T2	**Quadrant IV** VC VG Vi VIC VE	 A B T
Total Production	X1 X2 Xn	C G | IC E	Z

Final demand (Y) can be presented by the following formula:

Y = C + I + G + (X - Z) where:

C: Private consumption expenditure
I: Gross domestic fixed investment
G: Government consumption expenditure
X: Exports
Z: Imports

Both the intermediate inputs as well as intermediate outputs for the different production sectors are shown in Quadrant I. This quadrant is usually referred to as the transaction table or transaction matrix and is an indication of the transfer of goods and services between the industrial sectors for production purposes.

The different final demand components as applied in the input-output table are shown in Quadrant II. Components of final demand are private consumption expenditure (C), government consumption expenditure (G), gross domestic fixed investment (I), change in inventories (IC) and total exports (E).

Quadrant III represents the demand for primary inputs by the industrial sector. The elements of primary input, which are referred to are the remuneration of employees (A), the gross operating surplus (B) as well as net indirect taxes (T).

Quadrant IV is that portion of primary input, which is part of the final demand.

The linkage effects between the various sectors in the transaction matrix can be presented by xij, which shows the flow of goods from sector i to sector j.

The input-output model consists of three basic components:

- Transaction Table: illustrate the monetary flows of goods and services in a local economy for a given period
- Direct Requirements Table: indicates the purchases of resources (inputs) by a sector from all sectors to produce one Rand of output (creating a production recipe)
- Total Requirements Table: indicates the indirect and induced transactions caused by the purchases of resources (inputs) by a sector from all sectors

The input-output table is also based on certain basic assumptions:

- It is possible to group the different production activities in homogeneous industries
- The demand for intermediates by a particular sector will change in direct proportions to the specific sector's change in output
- No substitution of intermediates is possible due to price changes
- No technological change takes place
- Each sector produces only one primary product

It should be noted that:

- All rand values in the report represent 2023 current prices
- The different measures of economic impact cannot be added together and should be interpreted separately
- The model quantifies the economic impacts for a specific amount of time, and it is not derived gradually over time
- The input-output table is based on provincial supply and use tables, therefore, the multipliers and other related data measure economic impacts throughout the provincial economy (Quantec derived multipliers based on StatsSA Annual Financial Statistics, GDP at various economic levels, employment data and quarterly labour force surveys, 2023).

Impacts are traced through the provincial economy in terms of the application of a set of multipliers derived from provincial economic accounts (only local transactions are used to create the multiplier effect).

A multiplier summarises the total impact that can be expected throughout the economy from one-unit change for a given sector. There are several types of multipliers used by the model:

- Output multipliers (Business revenue or sales): it estimates the total change in sales volume
- Employment multipliers: measures the total change in employment resulting from an initial change in output/production of a specific industry
- Value-added multiplier (GDP): provides an estimate of the additional value added to the products as a result of this economic activity. Value-added includes employee compensations, corporate profits, indirect business taxes, and proprietary and other property income. It is the sum of the remuneration of employees and the gross operating surplus.
- Income multiplier: measures the total increase in income in the local economy resulting from a 1 Rand increase in total output/production
- Taxation multiplier: measures the increase in tax revenue that the national treasury could collect from the operation of business activities
- SMME opportunities measure the potential of the economy to create opportunities for new SMME's based on the causal relationship with an increase in the GDP of the economy. The analysis also considers the relationship between SMME growth and black ownership. The relationship takes into consideration GDP growth (StatsSA) and concomitant business registration and ownership data (SARS).

- Potential skills requirements: measures the demand for jobs based on different skill levels, i.e., low, semi and skilled jobs
- Sector profiling: measures the linkage of defined land uses with sectors of the economy and estimates the impact that increased economic activity could have on the various components of the economy.
- In addition to the preceding multipliers, reference is also made to the need and demand for social amenities based on economic growth. The growth of the economy increases the demand for jobs. Consequently, an increased demand for jobs, aligned with increased livelihoods increases demand for social amenities. The impact tool seeks to measure the increased demand for a spectrum of social amenities.

Difference between multipliers and turnover:

Turnover is typically used as a synonym for the output or production of business. Turnover refers to the number of times some of the initial Rand that is received from outside the community, changes hands within the community. Example: 1 Rand received from a new investment changes hands five times within the local economy. The multiplier is 1.66, although some portion of the initial Rand turns over five times.

During each exchange of money for goods or services, some of the original Rand leaves the local economy, which reduces the amount spent locally during the next exchange. Multipliers measure the full impact of a Rand on the local economy, whereas turnover merely indicates the number of times some of the initial Rand is spent locally.

The economic impact can be measured in terms of three effects:

- Direct effects: those economic effects caused by the new investment or proposed project
- Indirect effects: occurs to industries in the backward linked industries that supply goods and services to the proposed development. Economic activity triggered by the purchases made as a result of the initial round of project expenditure
- Induced effects: result from households spending some of the additional income they receive on goods and services within the local, regional, and provincial economies.

There are two types of multipliers:

- Type 1 multipliers: Include direct or initial spending, as well as indirect spending or business buying and selling to each other
- Type 2 multipliers: Include Type 1 multiplier effects, plus household spending based on the income earned from the direct and indirect effects – the induced effects

In summary: Economic impacts represent the positive or negative effects caused by the expansion or contraction of an area's economy, resulting from the changes in a facility or project. In the case of the proposed project, it represents the impacts caused by the proposed construction activities.

Subsequent sections provide an overview of the estimated socio-economic impacts that could be caused by the implementation and operation of the proposed mixed-use development. The impact is also estimated in terms of two project phases – the construction and the operational phases.

9.2.2 Qualitative Impact Assessment Methodology

The following section provides an overview of the qualitative impact assessment methodology used to measure significance of an economic impact based on the consequence of each impact in relation to the probability of an impact occurring.

The methodology has been designed by EIMS and has been based on the GNR. 982 National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014. Additional guidelines and references (not exhaustive) to the methodology include:

- Compulsory Compliance: GNR. 982 National Environmental Management Act (Act No. 107 of 1998 - NEMA): Environmental Impact Assessment Regulations, 2014
- Companion Guideline for Implementation: Environmental Management Assessment Regulations, 2010 - GN 805/2012 (NEMA)
- DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria

The following sections provide an overview of the procedure of the qualitative impact assessment methodology.

9.2.2.1 IMPACT ASSESSMENT PROCEDURE

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives.

Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C=(E+D+M+R)*N4$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1 below.

Table 9.2: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	-1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e., limited to the area applicable to the specific activity)
	2	Site (i.e., within the development property boundary)
	3	Local (i.e., the area within 5 km of the site)
	4	Regional (i.e., extends between 5 and 50 km from the site)
	5	Provincial / National (i.e., extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction)
Magnitude / Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way, moderate improvement for +ve impacts)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts)
Reversibility	1	Impact is reversible without any time and cost
	2	Impact is reversible without incurring significant time and cost
	3	Impact is reversible only by incurring significant time and cost
	4	Impact is reversible only by incurring prohibitively high time and cost
	5	Irreversible Impact

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 9.3.

Table 9.3: Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%)
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%)
	3	Medium probability (the impact may occur; >50% and <75%)
	4	High probability (it is most likely that the impact will occur- > 75% probability)
	5	Definite (the impact will occur)

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 9.4: Determination of Environmental Risk

Consequence						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 9.5.

Table 9.5: Environmental Risk Scores

ER Score	Description
<9	Low (i.e., where this impact is unlikely to be a significant environmental risk/ reward)
≥9≤17	Medium (i.e., where the impact could have a significant environmental risk/ reward)
>17	High (i.e., where the impact will have a significant environmental risk/ reward)

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

Impact Prioritisation

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 9.6: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but

	the value (services and/or functions) of these resources is limited.
High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$Priority = CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 2 (Refer to Table 9.7).

Table 9.7: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 9.8: Final Environmental Significance Rating

Significance Rating	Description
<-17	High negative (i.e., where the impact must have an influence on the decision process to develop in the area).
≥-17, ≤-9	Medium negative (i.e., where the impact could influence the decision to develop in the area).
>-9, < 0	Low negative (i.e., where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
>0, <9	Low positive (i.e., where this impact would not have a direct influence on the decision to develop in the area).
≥9, ≤17	Medium positive (i.e., where the impact could influence the decision to develop in the area).
>17	High positive (i.e., where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

9.3 Identification of Impacts

This section focusses on identifying and outlining the key impacts that the proposed exploration activity could have on the receiving economy. Although impacts have been highlighting in preceding chapters, this section seeks to synthesise preceding information in order to provide an overview of the range of impacts, their applicability to the assessment and their role in determining the economic impact of the proposed exploration activity.

9.3.1 Description of Impacts Identified

The identification of impacts on the receiving economy centres upon highlighting the potential effects that the proposed exploration activity could have on the receiving economy and its function as a source of economic production, employment and fiscal output.

Furthermore, the identification of impacts focusses on assessing whether the impact generated could contribute to, or subtract from, the current economic context of the receiving economy based on the duration of the exploration activity.

The following provides an overview of the potential impacts that may arise from the proposed exploration activity and also provides an indication of whether the impact has been taken into consideration for quantitative and/or qualitative measurement.

9.3.1.1 Economic Impact of the Proposed Exploration Activity

The proposed exploration activity could, as a result of its operations, impact on the current functioning of the receiving economy by generating additional economic output. The generation of additional economic output is the result of operational expenditure throughout the value chain (backward and forward linkages) of the exploration industry and could, as a result of its direct, indirect and induced effects, generate the need for additional economic production and related services and inputs.

The operational impact that the proposed exploration activity could influence several aspects of the economy, which includes, but is not limited to:

- Increased economic output (increased production)
- Increased gross domestic product
- Increased fiscal output as a result of increased taxes on products, production, personal taxes and businesses
- Increased number of jobs required to support increased economic production
- Increased demand for sector specific skills
- Increased employee renumeration as a result of new employment created
- Increased household income as a result of increased economic production

The exploration activity is, according to information received, expected to take between 3 to 4 months per well. Because of the period of operations, the impact is anticipated to be temporary and not a continued and sustained impact on the receiving economy.

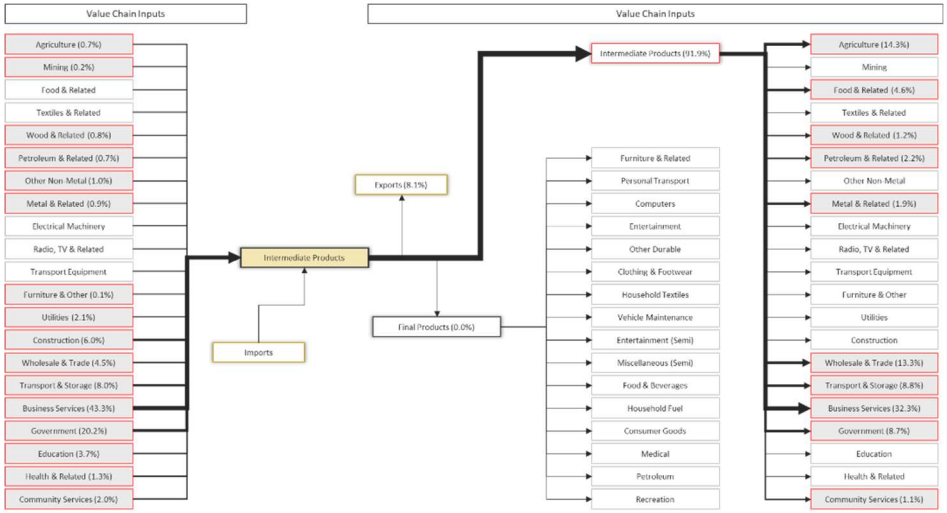
Furthermore, the base of operations of the exploration activity will be situated within the City of Cape Town or Saldanha Bay, and therefore could primarily impact on the economic context of the Western Cape Province. The exploration industry's (professional business services sector) is anticipated to generate economic impacts throughout the South African economy given that a portion of the inputs required to support the industry originates from outside the Western Cape. Additionally, a portion of the industry's output is consumed outside the Western Cape, identifying that the exploration activity could influence areas beyond the provincial economy.

The impact generated by the exploration activity could contribute to the overall output of the broader provincial and national economy and consequently could offer an overall benefit to businesses and local communities.

Additionally, the following economic impacts could arise as a result of the proposed exploration activity:

- Increased pressure on infrastructure in onshore logistics base and areas of base operation
- Increased demand from backward linking suppliers and the potential needs required to support operations
- Potential skill mismatches and temporary attraction of migratory workers

Figure 9.1: Backward and Forward Linkages of the Professional Business Services Sector (Exploration Industry)



Source: DEMACON ex StatsSA, 2023

The preceding identifies that the proposed exploration activity could have several impacts on the receiving, provincial and national economy. Individual impacts

(as noted previously) originating from the overall operation of the exploration activity will be measured quantitatively and qualitatively as necessary.

9.3.1.2 Economic Impact of the Exploration Activity on Commercial Fishing

Previous analysis identifies that the proposed exploration activity could impact on the normal operational context of the commercial fishing industry of the receiving economy. Spatial data shows that the large pelagic longline fishing industry overlaps with the exploration right's areas of interest and consequently could influence the extent with which the fishing industry can operate at normal levels. Because the exact locations of the exploration wells have not yet been identified and considering that a general kick-off period is provided, it is assumed that the totality of the areas of interest could impact on the fishing industry.

The impact, furthermore, identifies that the commercial fishing industry could, for a temporary period of between 4 to 20 months, loose operational efficiency by not having access to the areas of interest of the exploration activity. As a consequence, the loss of operational efficiency (reduced fishing grounds) impacts on the economic function of the receiving economy's commercial fishing industry and could likely impact on the economic output produced by the fishing industry's value chain (backward and forward linkages).

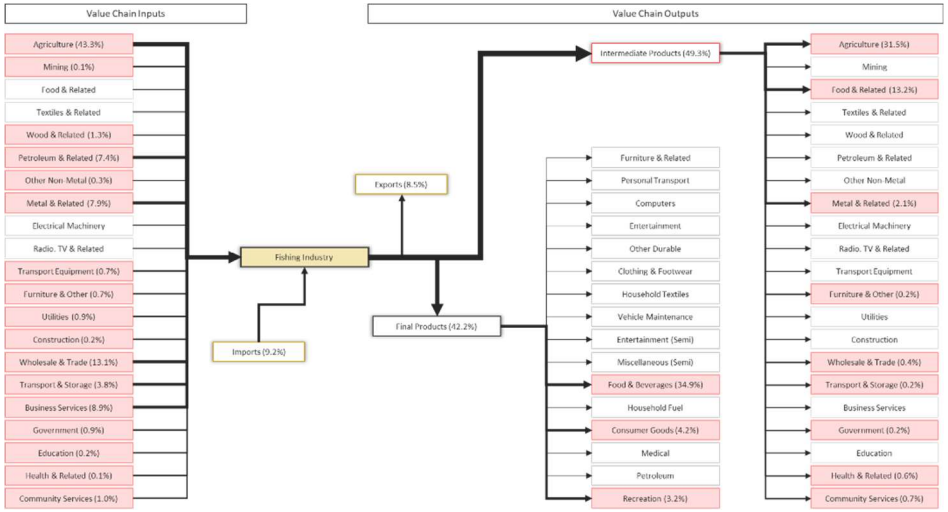
The operational impact of the proposed exploration activity on the large pelagic longline fishing industry could influence several aspects of the economy, which includes, but is not limited to:

- Temporary loss of economic output (decreased production)
- Temporary loss of gross domestic product
- Temporary loss of fiscal output as a result of increased taxes on products, production, personal taxes and businesses
- Temporary loss of number of jobs required to support increased economic production
- Temporary loss of demand for sector specific skills
- Temporary loss of employee renumeration as a result of new employment created
- Temporary loss of household income as a result of increased economic production

Furthermore, the bulk of commercial fishing operators and fishing industry economic production are located in the Saldanha Bay, Blaauwberg, Table Bay, Swartland, Bergrivier and Cederberg sub-regional economies, and therefore, could primarily impact on the economic context of the Western Cape Province. The fishing industry is anticipated to generate economic impacts throughout the South African economy given that a portion of the inputs required to support the industry originates from outside the Western Cape. Additionally, a portion of the industry's output is consumed outside the Western Cape, identifying that the exploration activity could influence areas beyond the provincial economy.

The impact generated by the loss of operational efficiency could temporarily subtract from the overall output of the broader provincial and national economy and consequently could temporarily reduce the benefit that businesses and local communities gain from the industry.

Figure 9.2: Backward and Forward Linkages of the Fishing Industry



Source: DEMACON ex StatsSA, 2023

Additionally, the following economic impacts could arise as a result of the proposed exploration activity:

- Impact on the operational capacity of downstream industries which may temporarily lead to a decreased demand for employment

- Impact on the value chain of downstream industries due to a loss of operational capacity
- Lowered demand from backward linking industry inputs (includes the demand for employment)

The preceding identifies that the proposed exploration activity could influence the fishing industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall impact on the fishing industry will be measured quantitatively and qualitatively as necessary.

9.3.1.3 Economic Impact of the Exploration Activity on Maritime Logistics

Previous analysis identifies that the proposed exploration activity could impact on the normal operational context of the maritime logistics industry of the receiving economy. Spatial data shows that the exploration right's areas of interest overlap with prominent maritime logistics routes between the major ports along the West Coast of South Africa (i.e., Port of Cape Town and Port of Saldanha Bay) and trading areas such as North America, Africa and Europe. Because the exact locations of the exploration wells have not yet been identified and considering that a general kick-off period is provided, it is assumed that the totality of the areas of interest could impact on the maritime logistics industry.

The impact, furthermore, identifies that the maritime logistics industry could, for a temporary period of between 4 to 20 months, loose operational efficiency by not having access to the areas of interest of the exploration activity. As a consequence, the loss of operational efficiency impacts on the economic function of the receiving economy's logistics industry and could likely impact on the economic output produced by the industry's value chain (backward and forward linkages).

The operational impact of the proposed exploration activity on the logistics industry could influence several aspects of the economy, which includes, but is not limited to:

- Temporary loss of economic output (decreased production)
- Temporary loss of gross domestic product
- Temporary loss of fiscal output as a result of increased taxes on products, production, personal taxes and businesses
- Temporary loss of number of jobs required to support increased economic production
- Temporary loss of demand for sector specific skills
- Temporary loss of employee renumeration as a result of new employment created
- Temporary loss of household income as a result of increased economic production

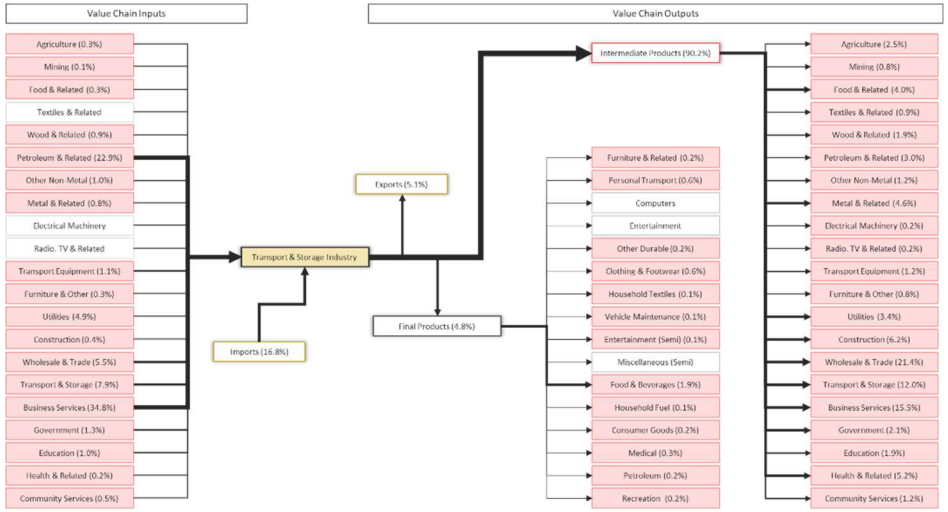
Furthermore, the bulk of the transport and storage industry economic production is located in the Saldanha Bay, Blaauwberg and Table Bay sub-regional economies, and therefore, could primarily impact on the economic context of the Western Cape Province. The transport and storage industry is anticipated to generate economic impacts throughout the South African economy given that a portion of the inputs required to support the industry originates from outside the Western Cape. Additionally, a portion of the industry's output is consumed outside the Western Cape, identifying that the exploration activity could influence areas beyond the provincial economy.

The impact generated by the loss of operational efficiency could temporarily subtract from the overall output of the broader provincial and national economy and consequently could temporarily reduce the benefit that businesses and local communities gain from the industry.

Additionally, the following economic impacts could arise as a result of the proposed exploration activity:

- Impact on the operational capacity of downstream industries which may temporarily lead to a decreased demand for employment
- Impact on the value chain of downstream industries due to a loss of operational capacity
- Lowered demand from backward linking industry inputs (includes the demand for employment)

Figure 9.3: Backward and Forward Linkages of the Fishing Industry



Source: DEMACON ex StatsSA, 2023

The preceding identifies that the proposed exploration activity could influence the maritime logistics industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall impact on the industry will be measured quantitatively and qualitatively as necessary.

9.3.1.4 Economic Impact of the Exploration Activity on the Tourism Industry

Previous analysis identifies that the proposed exploration activity could likely have minimal, if any, impact on the overall tourism industry of the receiving economy. Within the context of the receiving economy tourism consist of onshore and offshore activities.

Onshore tourism generally refers to accommodation services, catering and related entertainment services, travel services, attractions and cultural and heritage activities, entertainment and related attractions and travel for business purposes. Coastal locations within the receiving economy rely not only on the value of the onshore environment, but also on the amenity value that a coastal location offers. In the event that the amenity value of the tourist destination is devalued, tourism as a feeder industry is disrupted and economic value lost.

Because the proposed exploration activity is situated more than 100 km from coastal communities and key tourist destinations, the exploration activity could likely have minimal effect on the visual and audio quality of the tourist location (observers from the coast could likely view between 5 and 20 km onto the ocean) and, onshore activities could not necessarily be influenced by exploration operations and logistical movements.

Offshore tourism along the Western and Southern Coast of South Africa includes several adventure and ecological tourism activities that prominently features whale watching and shark diving. These industries along with offshore tours could be influenced by the exploration activity in the event that an overlap of operation activity exists.

Spatial data shows that although several boat-based whale watching launch sites exist along the West Coast of South Africa, the operational area of boat-based whale watching does not overlap with, and is a significant distance from, the proposed exploration activity. No shark diving locations exist along the receiving economy.

Because of the considerable distance of exploration activities from the West Coast shoreline and due to the limited overlap between offshore boat-based tourist activities, limited to no economic impact is expected between the exploration activity and the tourism industry.

9.3.1.5 Economic Impact of the Exploration Activity on Telecommunications

Previous analysis identifies that several below sea telecommunications cables enter the receiving economy at the Yzerfontein (Swartland Sub-Regional Economy) and Melkbosstrand (Blaauwberg Sub-Regional Economy) areas of the Receiving Economy. Because of the potential interaction with telecommunication cables, the probability of interfering with critical telecommunications infrastructure was considered.

Spatial data identifies that the proposed exploration activity's proximity to existing telecommunications infrastructure is limited, i.e., telecommunications infrastructure does not traverse the exploration right or area of interest of the exploration activity. the analysis therefore suggests that there is limited to no economic impact that could arise from the proposed exploration activity.

9.3.2 SUMMARY OF IMPACTS IDENTIFIED

The preceding sections identified several economic impacts that may arise as a result of the proposed exploration activity. A summary of the key potential impacts is provided in the following table. The economic impact summary provides input into the quantitative and qualitative economic impact assessment.

Table 9.9: Summary of Key Impacts Identified

Impact Theme	Predicted Impacts
Economic impacts created as a result of the normal operation of the exploration activity	• Temporary increase of economic output of the professional business services sector due to the operational expenditure of the exploration activity between the mobilisation phase and the demobilisation phase • The temporary increase in economic output in the professional business services sector stimulates the temporary demand for products and services from backward linking industries (inputs) • The temporary increase of economic output in the professional business services sector also temporarily stimulates increased economic productivity in forward linking industries (i.e., industries that generate economic output from inputs derived from the professional business services sector) • The temporary Increase in economic output produces unsustained additional gross domestic product • As a result of the additional unsustained economic activity, fiscal benefits in the form of taxes are generated that contribute toward the national fiscus • The temporary nature of the exploration activity could, for the duration of exploration activities, stimulate additional temporary employment opportunities at various skills levels • Because of the employment opportunities created by the exploration activity and its value-chain, temporary upgrades to household livelihoods could be generated
Normal operations of the exploration activity could temporarily disrupt commercial fishing operations that overlap with the project's area of interest	• Temporary disruption of commercial fishing operations in the area of interest could influence the economic output generated by the large pelagic longline fishing industry during the exploration activity • The temporary disruption of commercial fishing activities could temporarily impact on the economic productivity of backward and forward linking industries (value chain) • The temporary disruption of commercial fishing activities could create unsustained impacts on the potential of the value chain to generate fiscal benefits in the form of taxes – detracts from the total amount of tax revenue generated by the national fiscus • The temporary disruption of commercial fishing activities could, for the duration of exploration activities, lower the demand for employment throughout the value chain • Because demand for employment could be lowered temporarily, the livelihood of households could be affected because less renumeration is generated throughout the value chain
Normal operations of the exploration activity could temporarily disrupt commercial maritime logistics operations because of an overlap between the general routes travelled by cargo and tanker ships to the main ports of Cape Town and Saldanha Bay	• Temporary disruption of maritime logistics operations in the area of interest could influence the economic output generated by the transport and storage industry during the exploration activity • The temporary disruption of maritime logistics along general routes travelled could temporarily impact on the economic productivity of backward and forward linking industries (value chain) • The temporary disruption of maritime logistics could create unsustained impacts on the potential of the value chain to generate fiscal benefits in the form of taxes, import levies, customs duties, etc. – detracts from the total amount of tax revenue generated by the national fiscus • The temporary disruption of maritime logistics could, for the duration of exploration activities, lower the demand for employment throughout the value chain • Because demand for employment could be lowered temporarily, the livelihood of households could be affected because less renumeration is generated throughout the value chain

Other Impacts	• Increased pressure on infrastructure in onshore logistics base and areas of base operations – pressure on road, bulk and related infrastructure • Increased demand from backward linking suppliers and the potential needs required to support operations – could lead to new SMME demand • Potential skill mismatches and temporary attraction of migratory workers which may require the import of skilled labour to the local economy • Opportunity for skills development in the local economy via apprenticeships and skills training programmes • Because of household livelihood improvements, the demand for social services and amenities could, al be it temporarily, increase

Source: DEMACON, 2023

9.4 Quantitative Impact Assessment

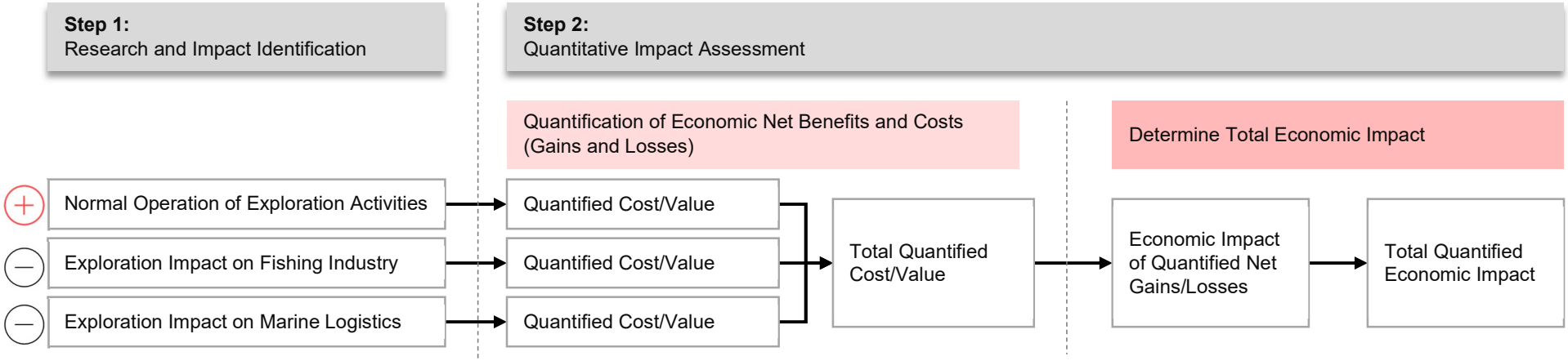
The economic impact assessment aims to gauge the potential effect of the proposed exploration activity on the receiving economy and its linkages. This section conducts a quantitative impact assessment, measuring the net gain or loss to the economy resulting from the exploration activity. It compares the economic benefits generated by the exploration activity to any potential burdens it may impose on the economy.

9.4.1 Assessment Overview and Key Inputs

In this section, an overview of the quantitative economic impact model employed to assess the overall economic impact of the proposed exploration activity is presented. Additionally, an outline of the key impacts considered in the assessment and the core assumptions that inform the basic inputs for each impact is provided. For further details on the core assumptions underlying the quantitative economic impact model, please see Section 9.2.1.

The following diagram provides a high-level overview of the quantitative economic impact model and the impacts that inform the impact assessment.

Diagram 9.4: High-Level Overview of the Quantitative Economic Impact Assessment



Source: DEMACON, 2023

The diagram presents three overarching impacts selected for the quantitative economic impact assessment. These impacts encompass both potential gains and losses that the economy may experience if they come to fruition. The economic impacts included as part of the quantitative economic impact assessment include:

- Economic impacts created as a result of the normal operation of the exploration activity
- Normal operations of the exploration activity could temporarily disrupt commercial fishing operations that overlap with the project's area of interest
- Normal operations of the exploration activity could temporarily disrupt commercial maritime logistics operations because of an overlap between the general routes travelled by cargo and tanker ships to the main ports of Cape Town and Saldanha Bay

9.4.1.1 ASSUMPTIONS

Given the preceding economic impacts, the following section provides an overview of the underlying assumptions that define each impact. These assumptions serve as the basis for measuring the effect of each impact on the economy, whether it results in a gain or a loss.

Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity

- The impact identifies that the proposed exploration activity could drill 5 wells in the designated areas of interest of the project over a 20-month period (starting date undefined)[4]
- No cost data has yet been provided and therefore an estimated cost has been calculated
    - The total cost to undertake and complete exploration drilling each exploration well location is estimated at approximately US$35 000 000[5]
    - An exchange rate of R18.27 (Average between November 2022 and November 2023) per US$ has been used to convert UD$ to South African Rand[6]
- The total cost per well is therefore estimated at approximately R639.5 million. 5 wells are planned and an estimated 25% of all capital expenditure will occur in South Africa (total capital expenditure of 799.3 million)

Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest

- The impact identifies that an overlap exists between the proposed exploration activity's area of interest and the normal operational areas of the large pelagic longline fishing industry. Because of exploration activities coupled with safety exclusion zones, it is expected that normal fishing operations of the industry could be disrupted in the project's area of interest due to limited access. The disruption is expected to be temporary and to last for the duration of exploration (4-months)
- Spatial data shows that on average approximately 127 tons of large pelagic fish species are caught in the area of interest of the exploration activity per year (approximately 220 tons over the project's operational period) [7]
- The value of the large pelagic longline fishing industry was determined to be approximately R38 143 per ton of fish caught (approximately 3 510 tons of fish caught at a value of R133 882 000)[8]
- The total value of the disrupted fishing industry amounts to R8 073 606

Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations

- The impact identifies that the exploration activity's area of interest overlaps with common and regularly used marine logistics passageways. Because of this overlap, cargo, tankers and other related shipping would need to make use of alternate routes to access the Port of Cape Town and Port of Saldanha Bay. It is estimated that approximately 125 ships traverse the area of interest per month[9]
- the operational efficiency lost by the shipping industry was based on the average hourly operational cost of a typical cargo ship and the total distance lost as a result of no access to the area of interest

[4] Data provided by EIMS, 2023
[5] Data provided by EIMS, 2023
[6] South African Reserve Bank Exchange Rate Data, 2023 (https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates)
[7] Data Sourced from DFFE and CapMarine
[8] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)
[9] National Oceans and Coastal Information System, 2023

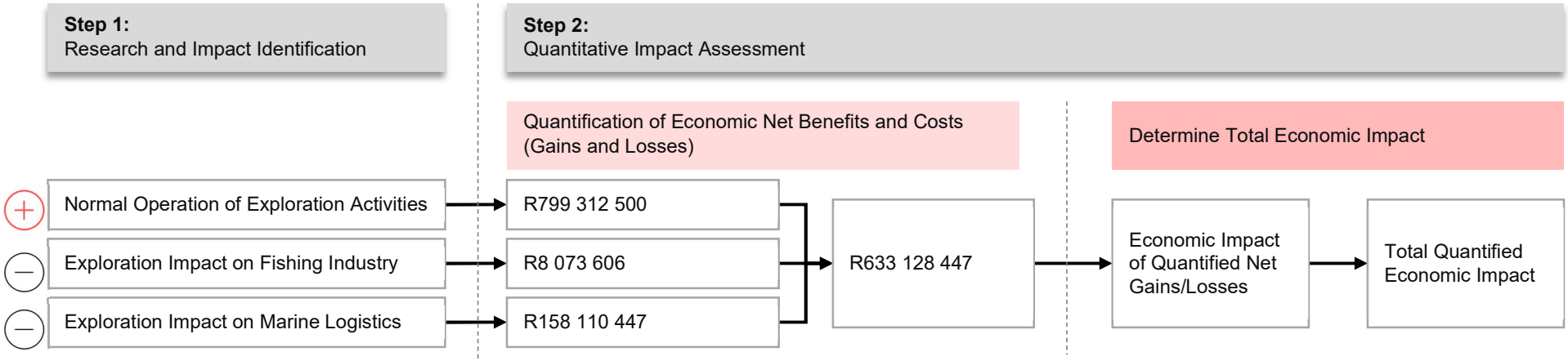
- The average annual operational cost of a typical cargo ship is approximately US$9 000 000 per annum (R164 430 000), which translates to approximately R18 771 per hour[10]
- The total distance that a ship could lose when not being able to traverse the area of interest approximately 156 km[11]. As of the completion of this report, the specific locations for the planned exploration wells have not yet been confirmed. While a 500-meter exclusion zone is typically established around drilling rigs to control vessel movement near drilling sites, the precise locations of the drilling operations within the area of interest remain unconfirmed. Consequently, the exclusion zones associated with drilling locations have not yet been confirmed. Therefore, the assumption identifies that the entirety of the area of interest is used as an area through which commercial shipping operations cannot travel during exploration activities
- An average cargo ship travels at approximately 46.3 km per hour[12]
- In total, a cargo ship loses approximately 3.4 hours of travel time due to not being able to traverse the project's area of interest.
- The impact is expected to be temporary, lasting for the duration of the exploration activity (20-months)
- Total hours lost because of the proposed exploration activity amounts to 8 423

- The total value of the disrupted logistics industry amounts to R158 110 447

9.4.1.2 Quantified Economic Benefits and Costs

The underlying assumptions provided in the preceding section allowed for the quantification of each overarching economic impact. The following diagram provides a simplified overview of the quantified economic impacts within the context of the overarching quantitative economic impact assessment process.

Diagram 9.5: High-Level Overview of the Quantitative Economic Costs and Benefits in the Economic Impact Assessment



Source: DEMACON, 2023

[10] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter5/maritime-transportation/containerships-operating-costs-panamax-post-panamax/#:~:text=A%20standard%20Panamax%20containership%20has,of%20about%20%242%2C314%20per%20TEU.)

[11] Based on DEMACON geographic information system measurements

[12] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter4/transportation-and-energy/fuel-consumption-containerships/)

The preceding table shows that the total quantified cost/value of economic impacts associated with the proposed exploration activity is approximately R633 million. The net economic gain is primarily as a result of the sizeable, although temporary, operational value that the exploration activity could contribute to the South African economy, whilst disruptions to the commercial fishing and maritime logistics industries could be marginal and temporary in comparison. The quantification of each impact enables the measurement of the impact in terms of several metrices that will be discussed in subsequent sections.

9.4.2 Measurement of the Total Economic Impact of the Exploration Activity

The subsequent section quantifies the economic gains and losses resulting from the proposed exploration activity. It accomplishes this by measuring each impact associated with the exploration activity, as discussed earlier, using various metrics. The objective of this analysis is to estimate the magnitude and scope of the economic impact generated by the proposed exploration activity in terms of its potential contribution to, or reduction from, the receiving economy and its linkages.

The table below presents a detailed analysis of each impact, utilising specific metrics to calculate the economic impact's magnitude. It is important to acknowledge that the exploration activity's temporary nature, lasting approximately four months, means that the economic impacts indicated in the data are also temporary. These impacts are contingent upon the duration of the exploration activities and are not sustainable or measurable as long-term outcomes.

Table 9.10: Quantitative impact Assessment

	Impact Name	Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Impact Definition	Impact Effect	⊕ Temporary	⊖ Temporary	⊖ Temporary	**Total** Temporary
	Economic Value Added/Subtracted from the Economy	R799 312 500	-R8 073 606	-R158 110 447	R633 128 447
Financial Impact (Taxes)	VAT	R65 698 580	-R660 428	-R12 337 211	R52 700 941
	Custom Duties	R3 511 297	-R42 454	-R812 067	R2 656 777
	Excise Levies	R1 972 087	-R18 536	-R359 284	R1 594 266
	Fuel Levies	R16 190 338	-R242 546	-R8 321 742	R7 626 051
	Other Taxes	R14 177 123	-R143 958	-R2 733 849	R11 299 317
	Production Taxes	R61 131 150	-R379 835	-R9 387 408	R51 363 906

	Impact Name	Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
	Corporate Taxes	R89 500 220	-R2 160 703	-R16 621 934	R70 717 583
	Personal Taxes	R205 350 387	-R1 949 701	-R34 664 733	R168 735 953
	Total Taxes	R457 531 182	-R5 598 161	-R85 238 226	R366 694 794
Economic Impact	Gross domestic product at market prices	R2 167 557 675	-R20 519 290	-R371 494 208	R1 775 544 176
	Additional Business Sales	R4 061 029 119	-R40 170 864	-R743 737 363	R3 277 120 893
Increased Employment Demand and Specialisation	Formal skilled	1 411	-12	-213	1 186
	Formal semi-skilled	1 743	-23	-306	1 413
	Formal low-skilled	1 042	-15	-173	854
	Total Formal Employment	4 196	-51	-692	3 454
	Informal Jobs	763	-11	-151	601
Compensation of Employees	Formal skilled	R470 846 307	-R3 912 607	-R75 282 343	R391 651 357
	Formal semi-skilled	R309 256 266	-R2 868 086	-R55 842 275	R250 545 904
	Formal low-skilled	R114 117 743	-R1 340 566	-R21 645 133	R91 132 044
	Total Compensation	R894 220 316	-R8 121 259	-R152 769 752	R733 329 305
	Informal Jobs	R114 310 993	-R862 808	-R22 362 011	R91 086 174

	Impact Name	Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Increased Household Livelihoods	Household Income	R2 037 219 144	-R19 511 928	-R342 823 163	R1 674 884 053
Business Development Potential	Micro Enterprise Opportunities	24	0	-5	19
	Small Enterprise Opportunities	18	0	-4	14
	Medium Enterprise Opportunities	8	0	-2	6
	Total SMME Opportunities	50	-1	-10	40
	Total SMME Opportunities (Black Owned)	37	0	-7	29

Source: DEMACON Modelling, 2023

The exploration activity is expected to positively impact the receiving, provincial, and national economy. However, there may be temporary disruptions to commercial fishing operations and maritime logistics due to restricted access to current fishing areas and shipping routes. The estimated cost of drilling five wells over a four-month period is approximately R799.3 million, which would significantly contribute to the economy. On the other hand, temporary disruptions to the commercial fishing industry and maritime logistics could lead to a loss of around R166.2 million in the economy during the same period.

The economic impact model shows that the exploration activity's net operational value added would result in a gain for the economy, temporarily contributing approximately R4.1 billion in additional business sales and R2.2 billion in gross domestic product during the four-month period. However, the fishing and maritime logistics industries may temporarily experience a decrease of R783.9 million in business sales and R392.0 million in gross domestic product.

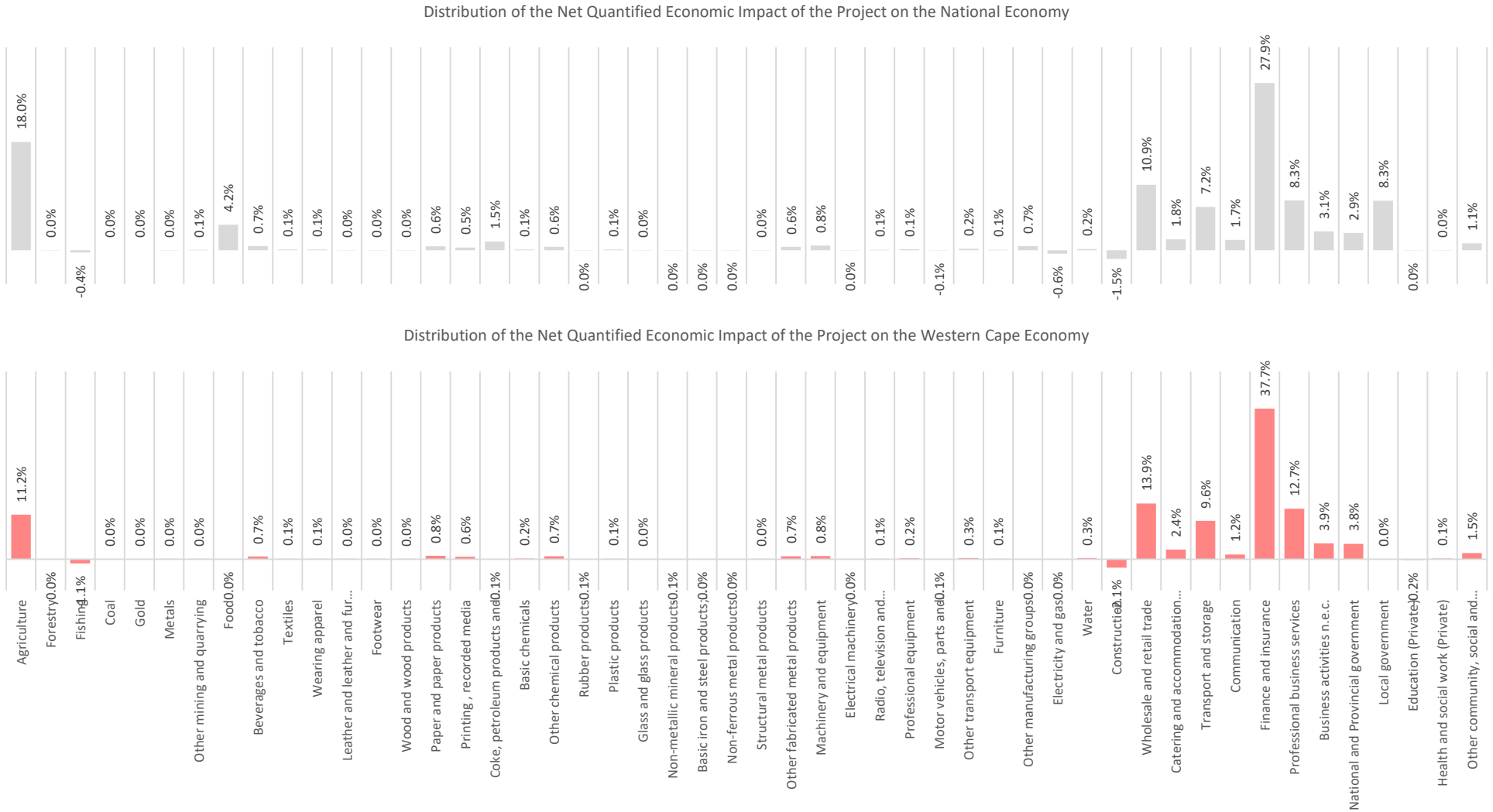
The exploration activity is expected to stimulate about 4 960 temporary formal and informal employment opportunities, but the fishing and maritime logistics industries may witness a temporary decrease in the demand for jobs (approximately 905 employment opportunities during the exploration period).

In terms of increasing livelihoods, the exploration activity is projected to temporarily stimulate additional compensation for temporary jobs (approximately R1.0 billion) and increase household incomes by R2.0 billion during the four-month period. However, compensation of employees in basic sectors such as fishing and logistics may be temporarily disrupted, potentially leading to a temporary burden on the community in terms of access to services and amenities. The exploration activity could also result in the temporary subtraction of around R184.1 million in employee compensation from the national economy and more than R362 million from household incomes.

The increased economic activity could lead to demand for new businesses. Given the impact of the project, new business opportunities could be established but given the temporary nature of the exploration activity, the realisation of long-term business establishment may be limited.

In summary, the exploration activity is expected to have significant economic benefits, but it may temporarily impact certain industries and livelihoods during its course. The following figures offer an overview of how the net total quantified gross value added by the project is distributed at both the national and provincial economic levels.

Figure 9.4: Detailed Distribution of the Total Quantified Economic Impact on the National and Western Cape Provincial Economy



Source: DEMACON Modelling, 2023

9.5 Qualitative Impact Assessment

The purpose of the qualitative economic impact assessment is to complement and enhance the quantitative assessment by providing a comprehensive understanding of the broader range of potential impacts that could result from the exploration activity. The purpose of the qualitative economic impact assessment is to:

- Assess each relevant impact identified based on an impact assessment framework that measures the risk of an impact based on factors such as nature, extent, duration, probability and magnitude and
- Determine a significance rating for each impact and based on the nature of the impact identify and provide mitigation measures and alternatives

The section outlines the potential qualitative impacts that could arise during the operational phase of the proposed exploration activity. Additionally, potential mitigation measures to ensure that negative impacts are minimised, and positive impacts are enhanced within the local community and economy are identified.

The following sections will provide a qualitative impact assessment of potential impacts that may arise from the pre-drilling survey, mobilisation, operation and demobilisation of the exploration activity. The assessment is based on the methodology outlined in Section 9.2.2 of this report.

9.5.1 Pre-Drilling Survey Phase Qualitative Impact Assessment

9.5.1.1 Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations

The impact recognises that a survey vessel will undertake pre-surveys of chosen drill locations to establish and delineate any seabed and sub-seabed geo-hazards that may impact the proposed exploration drilling operations. Pre-drilling surveys may include a myriad of surveying techniques and could include sonar surveys, sediment sampling, water sampling and ROV activities.

The pre-drilling survey activity offers an economic benefit in the form of additional economic activity stimulated within the receiving economy of the exploration activity. The economic value, al be it temporary and for a short duration of time, could create additional economic value throughout the exploration value chain.

Analyses of the exploration right area and its areas of interest has revealed that the area of interest targeted by exploration activities overlap with general commercial fishing operations in the large pelagic longline industry and with normal operational routes for cargo and tanker shipping (logistics).

The survey vessel's confirmation of the drilling locations within the area of interest, coupled with a safety exclusion zone around the survey vessel may, impede the access of commercial fishing operators to fishing areas and consequently influence the capacity of fishing operators to maintain optimal levels of operational efficiency and economic value extraction. Likewise, maritime logistics in the form of cargo and tanker vessels may need to make use of alternative/adjusted routing options to the Port of Cape Town or Port of Saldanha Bay. The adjusted routing removes the economic efficiency of the logistics operation and by consequence diminishes the economic value of the logistics operations.

It should, however, be borne in mind that the pre-drilling survey period is temporary and would not impose long-term economic changes and/or alterations.

Considering the preceding, the following economic impacts occur during the pre-drilling phase:

- Stimulation of economic activity (additional business sales) throughout the exploration industry's value chain for the duration of the survey operations
- Impact on commercial fishing operators targeting large pelagic longline fish species because of reduced fishing grounds and potential lowered catch potential
- Impact on maritime logistics operations because of disrupted shipping routes to major ports along the South African coast. Alternate routes could impact on the economic efficiency of maritime logistics

Mitigation Measures

- To ensure the safety and efficiency of the survey and minimize any potential disruptions to pelagic long-line vessels, it is important to notify the operators of such vessels about the survey timing, area, and safety clearance requirements in advance. The notification can be sent through the South Africa Tuna Longline Association.

- Daily Coastal Navigational Warnings issued via the South African Navy Hydrographic Office.
- Maintain continuous communications between the survey vessel and any commercial fishing operators
- Ensure that an efficient and effective operational plan is developed for pre-drilling surveys to ensure that the disruption to ocean-based industries is limited

Cumulative Impacts

- The reduced capacity of commercial fishing operators to catch targeted fish species and maritime logistics operators that may be required to make use of alternative routes may lead to reduced productivity throughout the value chain of the domestic large pelagic longline fishing and logistics industry. Given that survey operations are temporary and of a short duration, the cumulative impacts are expected to be negligible. Likewise, shipping operators could also experience a similar impact for the duration of the survey activity.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.5.2 Mobilisation Phase Qualitative Impact Assessment

9.5.2.1 Establishment of an Onshore Logistics Base at the Preferred or Alternative Port

The impact recognises that as part of the mobilisation process an onshore logistics base will be established from which future exploration drilling activities will be managed and supplied. According to information received, the onshore logistics base will be established in the Port of Cape Town (preferred location) or alternatively at the Port of Saldanha Bay.

The shore base would provide for the storage of materials and equipment that would be shipped to the drilling unit and back to storage for onward international freight forwarding. The shore base would also be used for offices, waste management services, bunkering vessels, and stevedoring / customs clearance services.

The onshore logistics base will provide a pivot axis point between the offshore exploration activity and the sourcing of inputs that support exploration activities.

The onshore logistics base will therefore establish a centralised control location within which several employment opportunities could be generated to support logistics and operations over a short-term period. Furthermore, the requisite inputs and services will be sourced from the exploration industry's value chain (domestically or internationally) which will result in increased economic activity (additional business sales for suppliers and other service providers) for the duration of the exploration activity.

Furthermore, the drilling rig and operator will be sourced and positioned at the location of where well drilling activity will need to take place.

The time-period for the mobilisation phase has not yet been established, but general information suggests that mobilisation can occur within a 45-day period.

Considering the preceding, the following economic impacts occur during the pre-drilling phase:

- The establishment of the onshore logistics base could create temporary employment opportunities for skilled labour
- Employment opportunities created by the logistics base could provide compensation to employees that will contribute toward household livelihoods and their access to services and amenities
- The economic activity stimulated by the sourcing of inputs for exploration activities could increase the fiscus of government through fiscal benefits in the form of taxation (personal, business, production, product, imports, etc)
- The sourcing of materials, equipment and associated services could generate additional business sales throughout the exploration industry's value chain – businesses providing inputs to the exploration industry could benefit from an increase in sales and economic output
- Additional employment opportunities could be created throughout the exploration industry's value chain due to increased demand generated for goods and services
- The logistics base could increase the demand for bulk services within its port of operations.
    - The demand for bulk services contributes to the fiscus of the local authority or providing agent but also places additional strain on existing infrastructure

- The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden.

Mitigation Measures

- Labour to be employed at the onshore logistics facility should so far as possible be sourced from local markets. The sourcing of employment from the local market is dependent on the availability of skills. Should the necessary skills not be available, skilled labour should be sourced from beyond the receiving economy. The sourcing of labour should also consider the role of woman and other previously disadvantaged communities
- The temporary nature of the employment opportunity would provide labourers at the project to benefit from temporary income generation. Should the operator of the exploration activity be in a position to provide longer term employment opportunities, local labour should be considered
- The mobilisation phase should, as far as possible, focus on sourcing inputs from the receiving economy, i.e., businesses located in the immediate economy. Localised sourcing enables local businesses to benefit from economic opportunities in the receiving economy
- The operator of the exploration activity should confirm with provider of space for the logistics base whether sufficient bulk supply to the logistics operation is available. A clear understanding of additional supply requirements should be identified so that effective and efficient planning to support operations can be undertaken

Cumulative Impacts

- The establishment of an operational base that will support operational requirements of the exploration activity will act as a centralised point between exploration activities and value chain inputs. The overall impact could create value throughout the backward linking industries required to support operations and therefore could generate additional economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.5.3 Operational Phase Qualitative Impact Assessment

9.5.3.1 Economic Impact of the Proposed Exploration Activity

The proposed exploration activity could have a sizeable impact on the receiving economy by generating additional economic output – the quantitative analysis reveals that the operational expenditure of the exploration activity could be as much as R800 million, stimulating nearly R2.2 billion in additional GDP and R4.1 billion in additional business sales). This additional output will be the result of operational expenditures across the entire value chain of the exploration industry, including both backward and forward linkages. These expenditures could create direct, indirect, and induced effects, leading to increased economic production and the demand for related services and inputs.

The exploration activity's direct effects refer to the immediate economic activities directly related to the exploration process itself. This includes the expenditure on drilling operations, exploration equipment, and personnel hiring.

The indirect effects arise from the interconnections and transactions between the exploration activity and other sectors of the economy. For instance, the increased demand for goods and services from suppliers and contractors who provide equipment, transportation, and support services for the exploration project.

The induced effects occur as a result of increased spending by employees and businesses associated with the value chain of the exploration industry. Employees have increased disposable income which could lead to increased consumption expenditure.

The impact generated by the exploration activity could contribute to the overall output of the broader provincial and national economy and consequently could offer an overall benefit to businesses and local communities.

The following economic impacts could occur as a result of the operation of the proposed exploration activity:

- The operational phase of the exploration activity could generate demand for goods and services necessary to sustain operational activities. This

sustained demand over the operational period of exploration could lead to additional business sales throughout the exploration industry's value chain (increased economic output, production and gross value added)

- New employment opportunities throughout the exploration industry's value chain could be stimulated as a result of the increased demand generated by the proposed exploration activity
- The logistics base of the exploration activity sustains skilled employment opportunities for the duration of exploration activities
- The employment opportunities created directly (i.e., through the projects logistics base) or indirectly (i.e., throughout the exploration industry's value chain) by the proposed exploration activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)
- The exploration activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result increases the fiscal value (i.e., taxes) collected by government
- The exploration activity further contributes toward a basic sector of the economy and therefore assists with maintaining the economic functionality of thew receiving economy by providing a basis from which SMME development could occur
- The logistics base could sustain increased demand for bulk services within its port of operations throughout the operational period of exploration activities
    - The demand for bulk services contributes to the fiscus of the local authority or providing agent but also places additional strain on existing infrastructure
    - The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden

Mitigation Measures

- The operational phase should, as far as possible, focus on sourcing inputs from the receiving economy, i.e., businesses located in the immediate economy. Localised sourcing enables local businesses to benefit from economic opportunities in the receiving economy
- The temporary nature of the employment opportunity offered directly by the onshore logistics base and exploration activity provides labourers the benefit of a stable income during the exploration phase. Should the operator of the exploration activity be in a position to provide longer term employment opportunities, local labour should be considered
- The exploration operator should liaise with local training institutions or service providers to determine whether there are any opportunities to offer internships and practical experience for their students
- Employment sourced for the proposed exploration activity should, as far as possible, be sourced from the receiving economy and its immediate markets. The sourcing of local labour should be cognisant of key issues such as youth unemployment, woman in the workforce and other pertinent national employment targets
- The operator of the exploration activity should confirm with provider of space for the logistics base whether sufficient bulk supply to the logistics operation is available. A clear understanding of additional supply requirements should be identified so that effective and efficient planning to support operations can be undertaken

Cumulative Impacts

- The overall impact could create value throughout the backward linking industries required to support operations and therefore could generate additional economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.5.3.2 Impact of the Exploration Activity on the Commercial Fishing Industry

Based on previous analysis, it is evident that the proposed exploration activity has the potential to impact the normal operational context of the commercial fishing industry in the receiving economy. Spatial data reveals that the areas of interest for the exploration right coincide with the large pelagic longline fishing industry's operations. Consequently, the fishing industry may face limitations on its usual operations and may not be able to operate at normal levels within the areas of interest.

The consequence of this reduced fishing grounds is expected to have an economic impact on the receiving economy's commercial fishing industry. With limited access to fishing areas, the industry's operational efficiency could be adversely affected, leading to a reduction in the economic output produced by the fishing industry's value chain, including demand for employment.

Furthermore, the fishing industry in the receiving economy is identified as a basic sector of the economy, which positions the industry as a core component of the receiving economy's production and employment potential and offers the receiving economy a competitive advantage over other economic regions. This is especially true for several smaller sub-regional economies in the overarching economy where the fishing industry is a key producer of economic output and employment.

It should be borne in mind that the location of wells has not yet been confirmed and therefore the total area of interest in the exploration right is used to identify areas where fishing industry operations could be disrupted.

The following economic impacts could occur as a result of the proposed exploration activity's impact on the receiving economy's fishing industry:

- The proposed exploration activity could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation
- Due to the temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities
- Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods
- Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished
- The temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated

Mitigation Measures

- Ensure that an efficient and effective operational plan is developed for operations to ensure that the disruption to ocean-based industries is limited
- Coordination should be done between the exploration activity operator and relevant large pelagic longline industry associations (such as the South Africa Tuna Longline Association) to coordinate exploration activities and fishing schedules to minimise and reduce the impact that the proposed exploration activity could have on the industry's fishing grounds and their catch potential
- Daily Coastal Navigational Warnings issued via the South African Navy Hydrographic Office

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the fishing industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.5.3.3 Impact of the Exploration Activity on the Maritime Logistics Industry

The proposed exploration activity has the potential to impact the normal operational context of the maritime logistics industry in the receiving economy.

Spatial data reveals that the exploration right's areas of interest coincide with crucial maritime logistics routes connecting major ports along the West Coast of South Africa (e.g., Port of Cape Town and Port of Saldanha Bay) to important trading regions like North America, Africa, and Europe. Although the precise locations of the exploration wells are yet to be determined, the overall areas of interest are expected to affect the prominent shipping routes used by the maritime logistics industry.

Even though the transport and storage industry of the receiving economy is not identified as a basic sector (i.e., a sector that forms the foundation of an economy because of its potential to service local and external demand), approximately 10% of the value of imports to the country and 6% of the value of exports from South Africa travel through the Port of Cape Town, whilst the Port of Saldanha Bay exports approximately 15% of the total value of exports from South Africa. Hence, several important shipping routes travel along the West Coast of South Africa and to and from the Port of Cape Town and the Port of Saldanha Bay. Furthermore, many shipping routes travel between the Port of Cape Town and other major ports along the southern coast of South Africa.

During the exploration activity, the maritime logistics industry may experience a temporary decline in operational efficiency due to restricted access to the exploration areas and charting of alternative routes to reach destinations along the West Coast of South Africa. This loss of efficiency could have broader consequences for the receiving economy's logistics industry and is likely to impact the economic output generated by the industry's value chain, including both backward and forward linkages.

The following economic impacts could occur as a result of the proposed exploration activity's impact on the receiving economy's fishing industry:

- The proposed exploration activities' area of interest overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation
- Due to the temporary decrease of economic productivity in the receiving economy's transport and storage industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities
- Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods
- Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished
- The temporary decrease of economic productivity in the receiving economy's transport and storage industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated

Mitigation Measures

- Ensure that an efficient and effective operational plan is developed for operations to ensure that the disruption to ocean-based industries are limited
- Coordination should be done between the exploration activity operator and relevant shipping industry associations (such as the South African Association of Ship Operators and Agents and the South African Association of Ship Operators and Agents) to coordinate exploration activities and maritime logistics operations to minimise and reduce the impact that the proposed exploration activity could have on the industry's operational efficiency and value generation
- Daily Coastal Navigational Warnings issued via the South African Navy Hydrographic Office

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the maritime logistics

industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.5.4 MEASUREMENT OF QUALITATIVE IMPACTS

The preceding sections discussed and identified economic impacts that may arise during the pre-drilling, mobilisation, operation and demobilisation phases of the proposed exploration activity. The sections explored different economic impacts as part of several economic impact themes and identified the cumulative and loss of resource potential of the different impact themes. Mitigation measures were also identified.

Considering the preceding, the following table provides information regarding the measurement of economic impacts within the qualitative impact assessment framework. Information provided by the table include:

- A description of the relevant impact theme and the economic impacts that relate to the impact theme
- The phase in which the impact will likely occur
- The measurement of the impact in accordance with the qualitative impact assessment framework pre-mitigation
- The measurement of the impact in accordance with the qualitative impact assessment framework post-mitigation
- The measurement of the impact in regard to priority factor criteria and
- A final significance rating that identifies the significance of the impact in terms of its contribution or detraction to the overall receiving economy

Subsequent to Table 9.11, Table 9.12 provides an overview of the final significance rating of each impact and the context of each rating's value.

Table 9.11: Measurement of Qualitative Impacts

			Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		
Theme	**Impact**	**Phase**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	**Final Impact Significance**
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Stimulation of economic activity (additional business sales) throughout the exploration industry's value chain for the duration of the survey operations	Pre-Drilling Surveys	2	1	2	1	1	1	**2**	2	1	2	1	1	1	**2**	1	1	2
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of	Impact on commercial fishing operators targeting large pelagic longline fish species because of reduced fishing	Pre-Drilling Surveys	2	1	2	1	-1	1	**-2**	2	1	1	1	-1	1	**-1**	1	1	-1

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
Interest from performing Normal Operations	grounds and potential lowered catch potential																		
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on maritime logistics operations because of disrupted shipping routes to major ports along the South African coast. Alternate routes could impact on the economic efficiency of maritime logistics	Pre-Drilling Surveys	2	1	2	1	-1	1	**-2**	2	1	1	1	-1	1	**-1**	1	1	-1
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The establishment of the onshore logistics base could create temporary employment opportunities for skilled labour	Mobilisation Phase	3	1	2	2	1	4	**8**	4	1	3	2	1	4	**10**	2	1	11
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Employment opportunities created by the logistics base could provide compensation to employees that could contribute toward household livelihoods and their access to services and amenities	Mobilisation Phase	3	1	3	2	1	3	**7**	3	1	4	2	1	3	**8**	2	1	8
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The economic activity stimulated by the sourcing of inputs for exploration activities could increase the fiscus of government through fiscal benefits in the form of taxation (personal, business, production, product, imports, etc)	Mobilisation Phase	5	1	3	1	1	4	**10**	5	1	4	1	1	4	**11**	2	1	12

			Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		
Theme	**Impact**	**Phase**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	**Final Impact Significance**
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The sourcing of materials, equipment and associated services could generate additional business sales throughout the exploration industry's value chain – businesses providing inputs to the exploration industry could benefit from an increase in sales and economic output	Mobilisation Phase	5	1	3	1	1	4	**10**	5	1	4	1	1	4	**11**	2	1	12
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Additional employment opportunities could be created throughout the exploration industry's value chain due to increased demand generated for goods and services	Mobilisation Phase	5	1	2	2	1	2	**5**	5	1	2	2	1	2	**5**	2	1	6
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Mobilisation Phase	3	1	2	1	1	4	**7**	3	1	3	1	1	4	**8**	2	1	9
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Mobilisation Phase	3	1	2	1	-1	3	**-5**	3	1	2	1	-1	3	**-5**	2	1	-6
Economic Impact of the Proposed Exploration Activity	The operational phase of the exploration activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the operational period of exploration could lead to additional business sales throughout the exploration industry's value chain	Operational Phase	5	2	4	1	1	4	**12**	5	2	5	1	1	4	**13**	2	1	15

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
	(increased economic output, production and gross value added)																		
Economic Impact of the Proposed Exploration Activity	New employment opportunities throughout the exploration industry's value chain could be stimulated as a result of the increased demand generated by the proposed exploration activity	Operational Phase	5	2	3	1	1	3	**8**	5	2	4	1	1	3	**9**	2	1	10
Economic Impact of the Proposed Exploration Activity	The logistics base of the exploration activity sustains skilled employment opportunities for the duration of exploration activities	Operational Phase	2	2	3	1	1	4	**8**	2	2	4	1	1	4	**9**	2	1	10
Economic Impact of the Proposed Exploration Activity	The employment opportunities created directly (i.e., through the projects logistics base) or indirectly (i.e., throughout the exploration industry's value chain) by the proposed exploration activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	5	2	3	1	1	3	**8**	5	2	4	1	1	4	**12**	2	1	14

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
Economic Impact of the Proposed Exploration Activity	The exploration activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result increases the fiscal value (i.e., taxes) collected by government	Operational Phase	5	2	4	1	1	4	**12**	5	2	4	1	1	4	**12**	2	1	14
Economic Impact of the Proposed Exploration Activity	The exploration activity further contributes toward a basic sector of the economy and therefore assists with maintaining the economic functionality of the receiving economy by providing a basis from which SMME development could occur	Operational Phase	4	2	2	1	1	2	**5**	4	2	3	1	1	3	**8**	2	1	8
Economic Impact of the Proposed Exploration Activity	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Operational Phase	3	1	2	1	1	4	**7**	3	1	3	1	1	4	**8**	2	1	9
Economic Impact of the Proposed Exploration Activity	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Operational Phase	3	1	2	1	-1	3	**-5**	3	1	2	1	-1	3	**-5**	2	1	-6
Impact of Exploration Activity on the Commercial Fishing Industry	The proposed exploration activity could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the	Operational Phase	4	2	3	2	-1	2	**-6**	4	2	2	2	-1	1	**-3**	2	1	-3

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	
	industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation																		
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	5	2	2	2	-1	2	**-6**	5	2	1	1	-1	1	**-2**	2	1	-3
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	5	2	2	2	-1	2	**-6**	5	2	1	2	-1	2	**-5**	2	1	-6
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry, the fiscal value that government receives (e.g., taxation of	Operational Phase	5	2	2	1	-1	2	**-5**	5	2	2	1	-1	2	**-5**	2	1	-6

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
	productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished																		
Impact of Exploration Activity on the Commercial Fishing Industry	The temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	5	2	1	1	-1	1	**-2**	5	2	1	1	-1	1	**-2**	2	1	-3
Impact of the Exploration Activity on the Maritime Logistics Industry	The proposed exploration activities' area of interest overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	5	2	3	1	-1	3	**-8**	5	2	2	1	-1	2	**-5**	2	1	-6

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decrease of economic productivity in the receiving economy's transport and storage industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	5	2	2	1	-1	2	**-5**	5	2	1	1	-1	1	**-2**	2	1	-3
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	5	2	2	2	-1	2	**-6**	5	2	1	2	-1	2	**-5**	2	1	-6
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	5	2	3	1	-1	2	**-6**	5	2	3	1	-1	2	**-6**	2	1	-6

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
Impact of the Exploration Activity on the Maritime Logistics Industry	The temporary decrease of economic productivity in the receiving economy's transport and storage industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	5	2	1	1	-1	1	**-2**	5	2	1	1	-1	1	**-2**	2	1	-3

Source: DEMACON, 2023

The following table presents an overview of the previous table's outcomes, emphasising the final impact significance rating along with its descriptive context.

Table 9.12: Overview of the Final Impact Significance Rating of Each Impact Measured

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Stimulation of economic activity (additional business sales) throughout the exploration industry's value chain for the duration of the survey operations	Pre-Drilling Surveys	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on commercial fishing operators targeting large pelagic longline fish species because of reduced fishing grounds and potential lowered catch potential	Pre-Drilling Surveys	-1	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on maritime logistics operations because of disrupted shipping routes to major ports along the South African coast. Alternate routes could impact on the economic efficiency of maritime logistics	Pre-Drilling Surveys	-1	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The establishment of the onshore logistics base could create temporary employment opportunities for skilled labour	Mobilisation Phase	11	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Employment opportunities created by the logistics base could provide compensation to employees that could contribute toward household livelihoods and their access to services and amenities	Mobilisation Phase	8	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The economic activity stimulated by the sourcing of inputs for exploration activities could increase the fiscus of government through fiscal benefits in the form of taxation (personal, business, production, product, imports, etc)	Mobilisation Phase	12	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The sourcing of materials, equipment and associated services could generate additional business sales throughout the exploration industry's value chain – businesses providing inputs to the exploration industry could benefit from an increase in sales and economic output	Mobilisation Phase	12	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Additional employment opportunities could be created throughout the exploration industry's value chain due to increased demand generated for goods and services	Mobilisation Phase	6	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Mobilisation Phase	9	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Mobilisation Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The operational phase of the exploration activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the operational period of exploration could lead to additional business sales throughout the exploration industry's value chain (increased economic output, production and gross value added)	Operational Phase	15	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	New employment opportunities throughout the exploration industry's value chain could be stimulated as a result of the increased demand generated by the proposed exploration activity	Operational Phase	10	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The logistics base of the exploration activity sustains skilled employment opportunities for the duration of exploration activities	Operational Phase	10	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The employment opportunities created directly (i.e., through the projects logistics base) or indirectly (i.e., throughout the exploration industry's value chain) by the proposed exploration activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	14	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The exploration activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result increases the fiscal value (i.e., taxes) collected by government	Operational Phase	14	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The exploration activity further contributes toward a basic sector of the economy and therefore assists with maintaining the economic functionality of the receiving economy by providing a basis from which SMME development could occur	Operational Phase	8	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Operational Phase	9	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Proposed Exploration Activity	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	The proposed exploration activity could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	The temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	The proposed exploration activities' area of interest overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decrease of economic productivity in the receiving economy's transport and storage industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
	income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods			
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	The temporary decrease of economic productivity in the receiving economy's transport and storage industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

9.6 Unplanned Events

This section of the chapter focusses on providing an assessment of the economic impacts that may arise from unplanned events associated with the exploration activity. Unplanned events in this instance refers to unlikely events or occurrences that could generate economic and associated impacts on the receiving economy and its value chains.

For the purposes of this study, the analysis of unplanned events focusses on the economic impacts that may arise from a subsea blow-out of an exploration well being drilled in the area of interest of the exploration activity (otherwise referred to as a 'blow-out scenario'). Because of the capacity of such a scenario to create far reaching environmental, social and economic impacts, the potential of such a scenario must be considered.

In order to consider the effects of such a subsea blow-out scenario, an Oil Spill Drift Modelling Condensate and Crude Oil Technical Report[13] was drafted. The report modelled the possible fates and trajectories of an oil spill from a subsea blow-out during exploration operations in the area of interest of the of the Block 3B/4B exploration right area. The Technical Report identifies two spill scenarios. The first scenario refers to a subsea blow-out of a condensate hydrocarbon whilst the second scenario considers a subsea blow-out of crude oil.

Based on the considerations of the Technical Report, two unplanned event scenarios are considered in this Report. The first scenario is the economic impact assessment of a condensate hydrocarbon subsea blow-out event and the second scenario is an economic impact assessment of a crude oil subsea blow-out event.

The economic impacts associated with unplanned events are, as far as possible, measured within the same methodology as discussed in Section 9.2 of this chapter.

9.6.1 Subsea Condensate Hydrocarbon Blow-Out of an Exploration Well (Blow-Out Scenario)

For the purposes of assessing the extent and potential impacts of the proposed exploration activity, an Oil Spill Drift Modelling Technical Report [14] was completed. The purpose of the technical report is to determine and describe the possible fates and trajectories of an oil spill from a subsea blow-out of a well in the area of interest of Block 3B-4B.

The Technical Report undertook oil spill drift modelling based on two methodologies, Stochastic simulations (performing statistical modelling which provides insight into how typical oil spill scenarios unfold under a wide range of weather or seasonal conditions) and deterministic simulations (provides an example of what could be the evolution of one single spill).

The modelling made use of a hydrocarbon profile (Condensate SKARV 13 DEG-2014) similar to the properties of the hydrocarbon that is expected to be encountered during the exploration activity. The profile was also informed by the

[13] Source: Oil Spill Drift Modelling Condensate and Crude Oil Technical Report v4

[14] Source: HES Expertise Services, October 2023

hydrocarbon's release properties. Based on the Technical report the condensate hydrocarbon could have a flow rate of 238.8 cubic meters per day whilst the associated gas release of the hydrocarbon spill could be 930 000 Sm^3/day.

The Technical Report made use of two oil spill response strategies to test the effectiveness with which a potential well blow-out could be managed. The strategies include:

- a capping only response to the well blow-out
    - Capping Stack deployed at the end of the 20th day stopping the release. According to two local Blow Out Contingency Plans in the 11B/12B Block and Venus Well Drilling in Namibia a capping stack could be mobilised from Saldanha. The capping time would be between 13 and 20 days respectively. Here the most conservative duration was considered.
- a combined response strategy that incorporates a capping of the well, a subsea dispersant injection kit (SSDI) and surface dispersion.
    - The subsea dispersion consists of injecting a surfactant that reduces the oil droplet size in the water column whilst surface responses incorporate chemical dispersion using aircraft and vessels and containment and recovery using 5 vessels.

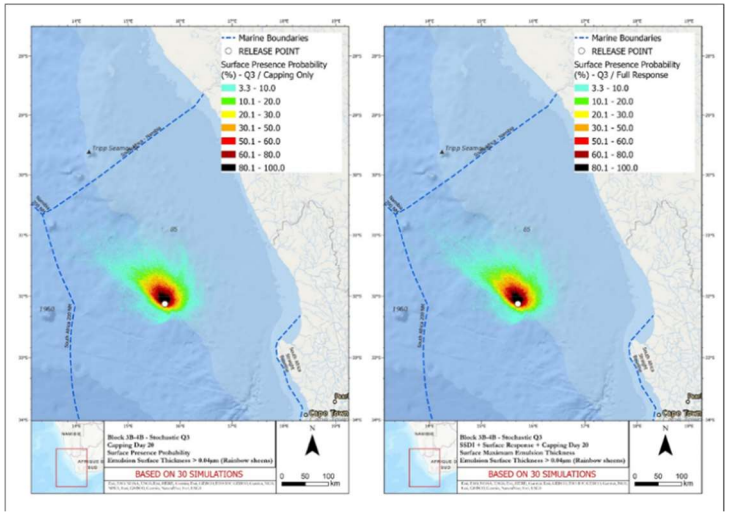
The two oil spill response strategies, or scenarios, were applied to the oil spill drift modelling methodologies (Stochastic and deterministic simulation methodologies) to provide a perspective on the effects of the oil spill scenario and its response strategies.

Given the preceding, the following provides an overview of the outcome of the oil spill simulations and the response strategy scenarios that can be used to mitigate against a blow-out scenario.

- Stochastic Simulation:
    - The main drift direction of the spill simulated is towards N to NNW for July to September. This is due to the main surface currents towards NW and winds from S to SSE for this season.
    - Between July and September, the absence of onshore oil presence can be attributed to the prevailing main currents and strong winds that direct the spill away from the coastline, primarily towards the northwest. However, the potency of these currents and winds allows the oil to travel over longer distances. Remarkably, even with the implementation of surface response and SSDI measures, there is a 100% certainty that the oil will cross the offshore border between Namibia and South Africa and may occasionally venture into international waters, although with a minimal probability of approximately 3.3% for both scenarios. The maximum distance at which there is an 80% to 100% probability of oil presence at the water's surface remains within South African Waters, typically spanning from 30 to 33 kilometers north of the release point.
    - The region of the water column with the highest contamination is found between depths of 725 to 900 meters for the capping-only scenario, while it shifts slightly to depths of 775 to 875 meters when employing a full response. This difference is likely attributed to the significant quantity of gas present in the release, which accelerates the rise of the condensate, leading to its accumulation in the mid-water column before proceeding to ascend more gradually toward the surface.
    - Importantly, the deployment of response measures has a subtle impact. It results in minor variations in the dispersed portion of the oil. However, it does contribute to a slight reduction in the atmospheric component, owing to the modest increase in dispersion. Additionally, the presence of response measures enhances biodegradation, primarily due to the slight increment in dispersion within the water column, as these two parameters consistently exhibit a positive correlation.
- Deterministic Simulation
    - The primary drift direction leads the oil spill towards the northwest and west from the release point, effectively preventing it from reaching the coastline.
    - The predominant portion of the oil, as observed in the maps provided, is found to be dissolved within the water column, largely owing to the specific characteristics of the condensate and the natural dispersion processes at play.

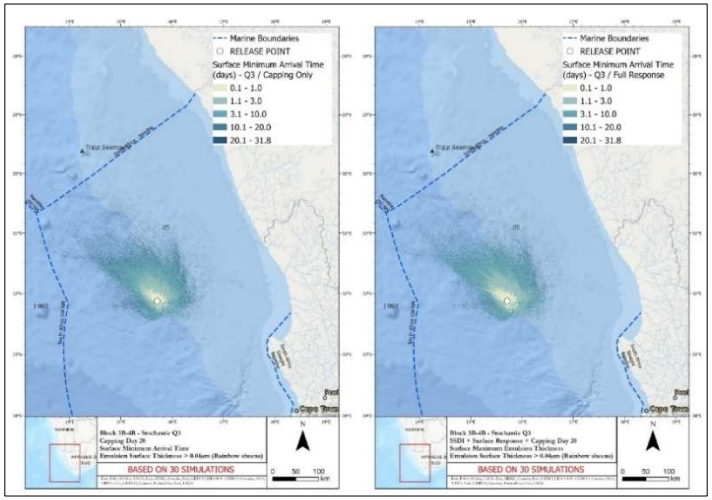
By the conclusion of the simulation on day 60, there is no longer any visible oil on the water's surface. However, some dispersed oil remains within the water column, extending into both International and Namibian Waters.

Map 9.1: Surface Presence Probabilities - Stochastic Simulation – Capping Only vs. Surface Response and SSDI and Capping



Source: DEMACON ex HES Expertise Services, 2023

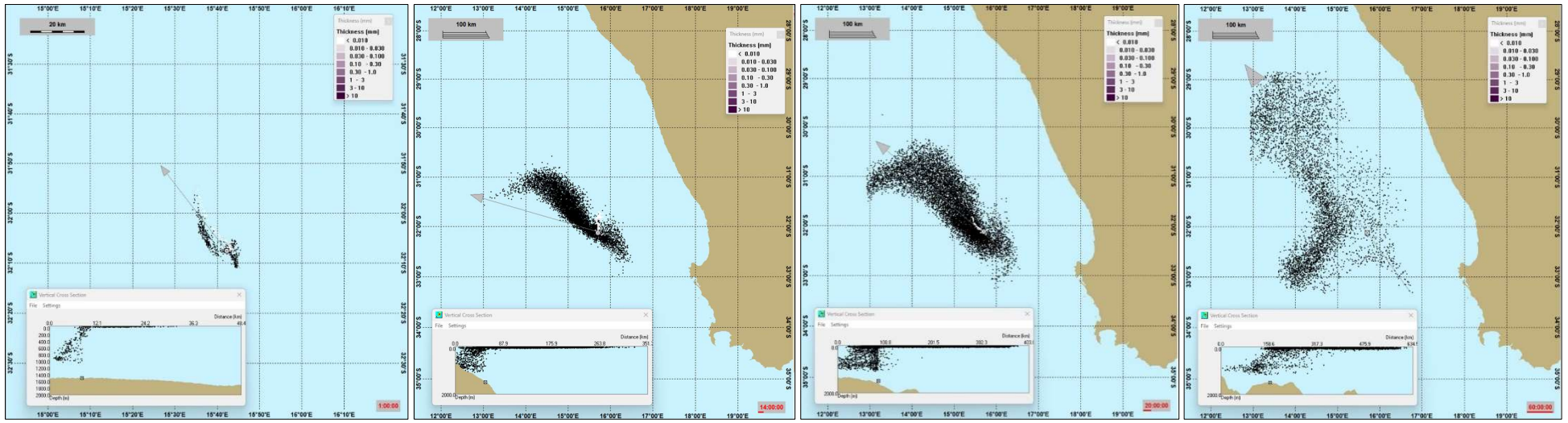
Map 9.2: Arrival Time - Stochastic Simulation – Capping Only vs. Surface Response and SSDI and Capping



Source: DEMACON ex HES Expertise Services, 2023

Map 9.3: Deterministic Simulation with Surface thickness and dissolved particles for Capping Only

Day 1 **Day 14** **Day 20** **Day 60**



Source: DEMACON ex HES Expertise Services, 2023

Based on the preceding information and analyses it is evident that in the event of a well blow-out during the exploration activity and the subsequent oil spill that could result, surface and sub-surface oil slick and contamination could be present in the area of interest and within a 30 to 33 km direction north and northwest of the modelled well location. In essence, the Technical Report identifies that in the event of a blow-out scenario no oil will impact the shoreline.

Additionally, the Technical Report notes that according to the Deterministic Model that no oil will be present on the surface of the ocean but that some oil will remain dispersed within the water column away from area of interest of the proposed exploration activity within 60 days of a blow-out event occurring.

The data contained in the Technical Report therefore suggests that the impact generated by the blow-out scenario could primarily affect ocean orientated industries such as fishing, shipping and tourism.

9.6.1.1 Identification of Unplanned Event Impacts

The following section provides an overview of the identification of potential unplanned economic impacts that may result from a well blow-out scenario.

Given that the results of the Technical Report suggest that a well blow-out scenario could primarily affect the ocean environment (modelling results in the report indicate that no onshore locations could be impacted by oil spillage), the extent of economic impacts associated with a well-blow out scenario could be focused on industries that operate within the ocean economy. Disruptions to ocean-based industries, al be it temporary, could have an impact on the economic productivity of affected industries which in turn impacts on the productivity of their associated value chains. In essence, a blow-out scenario could, as consequence, generate an economic disruption to select ocean-based industries that make use of the potential areas that could be affected by a well blow-out event.

In light of the preceding and taking into consideration the impacts identified for the exploration activity, it is evident that a well blow-out scenario could affect the same industries as what the proposed exploration activity could affect, i.e. influence the economic output of the exploration related industries, commercial fishing industries and maritime logistics industries.

The identification of impacts on the receiving economy centres upon highlighting the potential effects that the proposed well blow-out scenario and its associated response mechanism could have on the receiving economy and its function as a source of economic production, employment and fiscal output.

Furthermore, the identification of impacts focusses on assessing whether the impact generated could contribute to, or subtract from, the current economic context of the receiving economy based on the duration of the exploration activity.

The following provides an overview of the potential impacts that may arise from the proposed exploration activity and also provides an indication of whether the impact has been taken into consideration for quantitative and/or qualitative measurement.

9.6.1.1.1 Economic Impact of the Well Blow-Out Capping Only Response Strategy

In the unlikely event that a well blow-out was to occur, the resulting spillage requires a concomitant oil spill response strategy. The Technical Report has identified that most likely response strategy that could be applied to a well blow-out scenario in the area of interest is a capping only response.

As a consequence of deploying such a response strategy the proposed activity could generate additional economic output as the result of operational expenditure throughout the value chain (backward and forward linkages) of the exploration industry and could, as a result of its direct, indirect and induced effects, generate the need for additional economic production and related services and inputs.

The operational impact of the response activity could influence several aspects of the economy, which includes, but is not limited to increased economic output, increased gross domestic product, additional fiscal output, the potential to stimulate employment opportunities and concomitantly stimulate additional household income.

The capping response strategy is, according to the Technical Report, expected to take approximately 20 days. Because of the period of operations, the impact is anticipated to be temporary and not a continued and sustained impact on the receiving economy.

The preceding identifies that the proposed response mechanism could have several impacts on the receiving, provincial and national economy. Individual

impacts (as noted previously) originating from the overall operation of the response strategy will be measured quantitatively and qualitatively as necessary.

9.6.1.1.2 Economic Impact of the Exploration Activity on Commercial Fishing

Previous impact analysis identifies that the area of interest of the exploration activity is the likely area within which disruptions to commercial fishing operations could occur. Within this context, the area of interest of the project could be the most likely the location where a possible well blow-out scenario could occur and as a result could also impact on similar commercial fishing operations in the area, i.e., the large pelagic longline fishing industry.

The impact, furthermore, identifies that the commercial fishing industry could, for a temporary period of between 1 to 2 months, loose operational efficiency by not having access to the areas of interest affected by a well blow-out event. As a consequence, the loss of operational efficiency (reduced fishing grounds) impacts on the economic function of the receiving economy's commercial fishing industry and could likely impact on the economic output produced by the fishing industry's value chain (backward and forward linkages).

The operational impact of the proposed exploration activity on the large pelagic longline fishing industry could influence several aspects of the economy, which includes, but is not limited to, increased economic output, increased gross domestic product, additional fiscal output, the potential to stimulate employment opportunities and concomitantly stimulate additional household income

The impact generated by the loss of operational efficiency could temporarily subtract from the overall output of the broader provincial and national economy and consequently could temporarily reduce the benefit that businesses and local communities gain from the industry.

The preceding identifies that a well blow-out event could influence the fishing industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall impact on the fishing industry will be measured quantitatively and qualitatively as necessary.

9.6.1.1.3 Economic Impact of the Exploration Activity on Maritime Logistics

Previous impact analysis identifies that the area of interest of the exploration activity is the likely area within which disruptions to commercial fishing operations could occur. Within this context, the area of interest of the project could be the most likely the location where a possible well blow-out scenario could occur and as a result could also impact on similar commercial fishing operations in the area, i.e., the large pelagic longline fishing industry.

Previous impact analysis identifies that the area of interest of the exploration activity is the likely area within which disruptions to the maritime logistics industry of the receiving economy could occur. Within this context, the area of interest of the project could be the most likely the location where a possible well blow-out scenario could occur and as a result could also impact on the maritime logistics operations in the area, i.e., the movement of freight and related shipping vessels between ports along the coast and international origin or destination locations.

The impact, furthermore, identifies that the maritime logistics industry could, for a temporary period of between 1 to 2 months, loose operational efficiency by not having access to the areas of interest affected by a well blow-out event. As a consequence, the loss of operational efficiency impacts on the economic function of the receiving economy's logistics industry and could likely impact on the economic output produced by the industry's value chain (backward and forward linkages).

The operational impact of the maritime logistics industry could influence several aspects of the economy, which includes, but is not limited to increased economic output, increased gross domestic product, additional fiscal output, the potential to stimulate employment opportunities and concomitantly stimulate additional household income.

The impact generated by the loss of operational efficiency could temporarily subtract from the overall output of the broader provincial and national economy and consequently could temporarily reduce the benefit that businesses and local communities gain from the industry.

The preceding identifies that the proposed exploration activity could influence the maritime logistics industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously)

originating from the overall impact on the industry will be measured quantitatively and qualitatively as necessary.

9.6.1.1.4 Economic Impact of the Exploration Activity on the Tourism Industry

The Technical Report identifies that a well blow-out event is unlikely to have an effect on the coastal ocean and shoreline territories along the south African coast. As a result, a well blow-out scenario could likely have minimal, if any, impact on the overall tourism industry of the receiving economy, onshore and offshore.

Onshore tourism generally refers to accommodation services, catering and related entertainment services, travel services, attractions and cultural and heritage activities, entertainment and related attractions and travel for business purposes. Coastal locations within the receiving economy rely not only on the value of the onshore environment, but also on the amenity value that a coastal location offers. In the event that the amenity value of the tourist destination is devalued, tourism as a feeder industry is disrupted and economic value lost.

Because a well blow-out event could potentially not generate any coastal and onshore effects and impacts, the blow-out scenario could likely have minimal effect on the visual and audio quality of the tourist location and, onshore activities might not necessarily be influenced by oil spills and response operations.

Because a blow-out event might not affect coastal locations and given the considerable distance of blow-out affected areas from the West Coast shoreline, limited to no economic impact is expected between the exploration activity and the tourism industry. It is however important to note that business tourism could benefit from a blow-out scenario because of the need for specialist and associated professionals engaged with the response plan to travel and stay in the receiving economy. These benefits are, however, accounted for in the economic impact generated by the blow-out scenario response strategy.

9.6.1.2 Quantitative Impact Assessment of a Well Blow-Out Scenario

This section provides an overview of the quantified economic impact assessment of the impacts associated with a well blow-out scenario (impacts have been identified and discussed in Section 9.6.2)

The purpose of the quantitative impact assessment is to measure the net gain or loss to the economy resulting from the well blow-out scenario. It compares the economic benefits generated by the oil spill response strategy to any potential burdens on the economy that may arise from a well blow-out and resulting oil spill.

9.6.1.2.1 Assessment Overview and Key Inputs

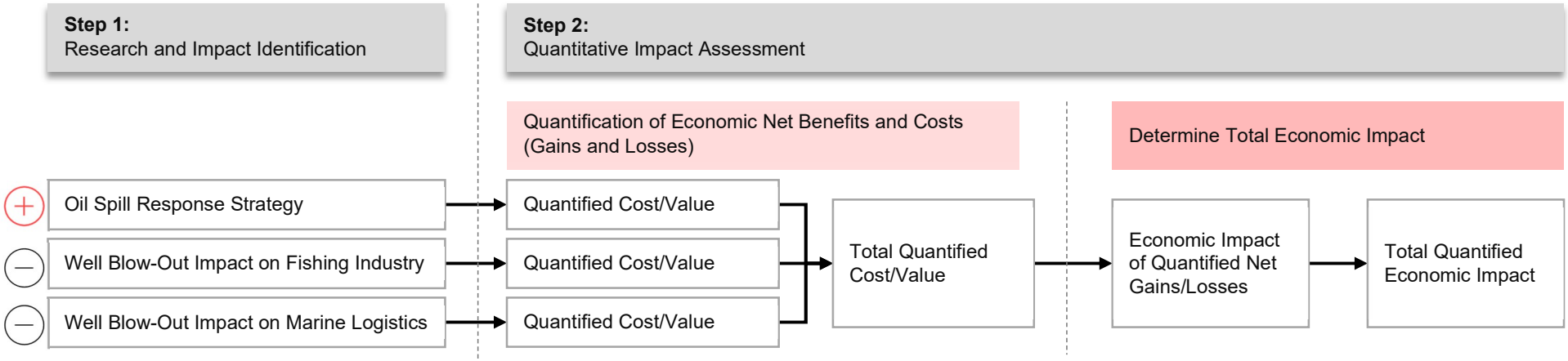
In this section, an overview of the quantitative economic impact model employed to assess the overall economic impact of the well blow-out scenario is presented. Additionally, an outline of the key impacts considered in the assessment and the core assumptions that inform the basic inputs for each impact is provided. For further details on the core assumptions underlying the quantitative economic impact model, please see Section 9.2.1.

The following diagram provides a high-level overview of the quantitative economic impact model and the impacts that inform the impact assessment.

The diagram presents three overarching impacts selected for the quantitative economic impact assessment. These impacts encompass both potential gains and losses that the economy may experience if they come to fruition. The economic impacts included as part of the quantitative economic impact assessment include:

- Economic impacts created as a result of the capping only oil spill response strategy proposed by the Technical Report
- A well blow-out event could temporarily disrupt commercial fishing operations that overlap with the impacted area
- A well blow-out event could temporarily disrupt commercial maritime logistics operations because of an overlap between the general routes travelled by cargo and tanker ships to the main ports of Cape Town and Saldanha Bay

Diagram 9.6: High-Level Overview of the Quantitative Economic Impact Assessment of the Well Blow-Out Scenario



Source: DEMACON, 2023

9.6.1.2.2 ASSUMPTIONS

Given the preceding economic impacts, the following section provides an overview of the underlying assumptions that define each impact. These assumptions serve as the basis for measuring the effect of each impact on the economy.

Economic Impacts Created as a Result of a Capping Only Oil Spill Response Strategy

- The impact identifies that the Technical Report identifies that a capping only oil spill response strategy is the best suite response to a well blow-out event in the area of interest of the proposed exploration activity
- Cost estimates for the response strategy was received from EIMS
    - The total cost to undertake a capping only response to a well blow-out scenario is 75 million US$[15] of which 25% could be spent in South Africa
    - An exchange rate of R18.27 (Average between November 2022 and November 2023) per US$ has been used to convert US$ to South African Rand[16]
- The total response strategy cost for one blow-out event is therefore estimated at approximately R342.6 million.

Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Area

- The impact identifies that a well-blowout event could disrupt commercial fishing operations because a well blow-out event is likely to occur within the project's area of interest and the normal operational areas of the large pelagic longline fishing industry. It is anticipated that normal fishing operations of the industry could be disrupted. The disruption is expected to be temporary and to last for 1 to 2 months
- Fishing industry data shows that on average approximately 127 tons of large pelagic fish species are caught in the area of interest of the

[15] EIMS Data Response, 2023

[16] South African Reserve Bank Exchange Rate Data, 2023 (https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates)

exploration activity per year (approximately 21 tons over the well blow-out impact period) [17]

- The value of the large pelagic longline fishing industry was determined to be approximately R38 143 per ton of fish caught (approximately 3 510 tons of fish caught at a value of R133 882 000)[18]
- The total value of the disrupted fishing industry amounts to R807 361

Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations

- The impact identifies that a well blow-out event is likely to occur within the project's area of interest which overlaps with common and regularly used marine logistics passageways. Because of this overlap, cargo, tankers and other related shipping would need to make use of alternate routes to access the Port of Cape Town and Port of Saldanha Bay. It is estimated that approximately 125 ships traverse the area of interest per month[19]
- the operational efficiency lost by the shipping industry was based on the average hourly operational cost of a typical cargo ship and the total distance lost as a result of no access to the area of interest
    - The average annual operational cost of a typical cargo ship is approximately US$9 000 000 per annum (R164 430 000), which translates to approximately R18 771 per hour[20]
    - The total distance that a ship could lose when not being able to traverse the area of interest approximately 156 km[21]. The assumption is based on the information contained in the Oil Spill Drift Modelling Technical Report (2023). Given the results of the Technical Report, the entirety of the area of interest is used as an area through which commercial shipping operations cannot travel during a well blow-out event
    - An average cargo ship travels at approximately 46.3 km per hour[22]
    - In total, a cargo ship loses approximately 3.4 hours of travel time due to not being able to traverse affected areas.
    - The impact is expected to be temporary, lasting for the duration of the well blow-out event duration of 1 to 2 months
    - Total hours lost because of the well blow-out event amounts to 8 423
- The total value of the disrupted logistics industry amounts to R15 811 045

9.6.1.2.3 Quantified Economic Benefits and Costs

The underlying assumptions provided in the preceding section allowed for the quantification of each overarching economic impact. The following diagram provides a simplified overview of the quantified economic impacts within the context of the overarching quantitative economic impact assessment process.

[17] Data Sourced from DFFE and CapMarine

[18] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

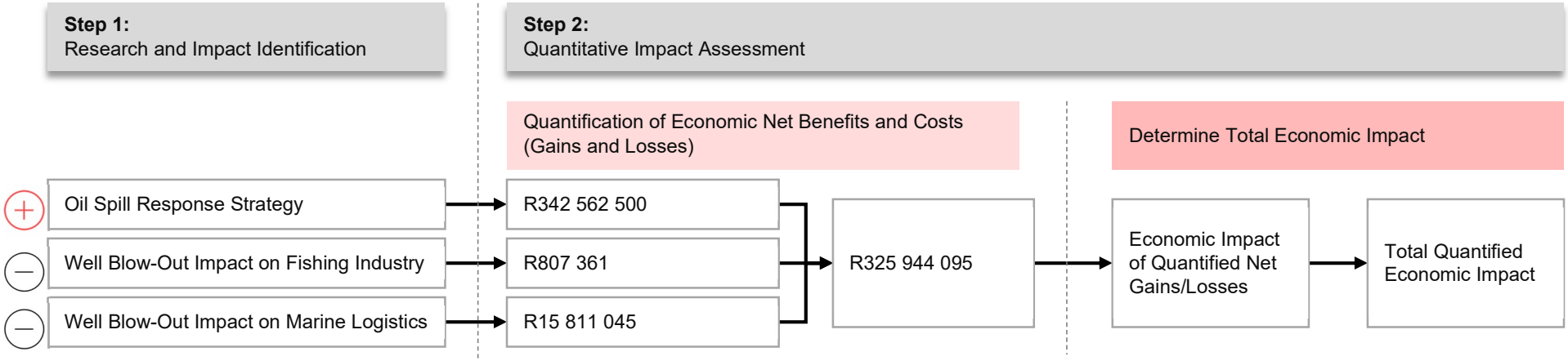
[19] National Oceans and Coastal Information System, 2023

[20] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter5/maritime-transportation/containerships-operating-costs-panamax-post-panamax/#:~:text=A%20standard%20Panamax%20containership%20has,of%20about%20%242%2C314%20per%20TEU.)

[21] Based on DEMACON geographic information system measurements

[22] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter4/transportation-and-energy/fuel-consumption-containerships/)

Diagram 9.7: High-Level Overview of the Quantitative Economic Costs and Benefits in the Economic Impact Assessment of the Well Blow-Out Scenario



Source: DEMACON, 2023

The preceding table shows that the total quantified cost/value of economic impacts associated with the well blow-out event is approximately R325.9 million. The net economic gain is primarily as a result of the sizeable, although temporary, operational value that the oil spill response strategy could contribute to the South African economy, whilst disruptions to the commercial fishing and maritime logistics industries could be marginal and temporary in comparison. The quantification of each impact enables the measurement of the impact in terms of several metrices that will be discussed in subsequent sections.

9.6.1.3 Measurement of the Total Economic Impact of the Well Blow-Out Scenario

The subsequent section quantifies the economic gains and losses resulting from the well blow-out event. It accomplishes this by measuring each impact associated with the well blowout event, as discussed earlier, using various metrics. The objective of this analysis is to estimate the magnitude and scope of the economic impact generated by the event in terms of its potential contribution to, or reduction from, the receiving economy and its linkages.

The table below presents a detailed analysis of each impact, utilising specific metrics to calculate the economic impact's magnitude. It is important to acknowledge that the effect of the well blow-out is temporary, lasting approximately two months. In essence the temporary effect of the scenario means that the economic impacts indicated in the data are also temporary. These impacts are contingent upon the duration of the well blow-out event and are not sustainable or measurable as long-term outcomes.

Table 9.13: Quantitative Impact Assessment of the Well Blow-Out Scenario

	Impact Name	Economic Impacts Created as a Result of the Capping Only Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Impact Definition	Impact Effect	⊕ Temporary	⊖ Temporary	⊖ Temporary	**Total** Temporary
	Economic Value Added/Subtracted from the Economy	R342 562 500	-R807 361	-R15 811 045	R325 944 095
Financial Impact (Taxes)	VAT	R28 156 534	-R66 043	-R1 233 721	R26 856 770
	Custom Duties	R1 504 842	-R4 245	-R81 207	R1 419 390
	Excise Levies	R845 180	-R1 854	-R35 928	R807 398
	Fuel Levies	R6 938 716	-R24 255	-R832 174	R6 082 288
	Other Taxes	R6 075 910	-R14 396	-R273 385	R5 788 129
	Production Taxes	R26 199 064	-R37 984	-R938 741	R25 222 340
	Corporate Taxes	R38 357 237	-R216 070	-R1 662 193	R36 478 973
	Personal Taxes	R88 007 309	-R194 970	-R3 466 473	R84 345 865
	Total Taxes	R196 084 792	-R559 816	-R8 523 823	R187 001 153
Economic Impact	Gross domestic product at market prices	R928 953 289	-R2 051 929	-R37 149 421	R889 751 939
	Additional Business Sales	R1 740 441 051	-R4 017 086	-R74 373 736	R1 662 050 228
Increased Employment Demand and Specialisation	Formal skilled	605	-1	-21	582
	Formal semi-skilled	747	-2	-31	714
	Formal low-skilled	447	-2	-17	428
	Total Formal Employment	1 798	-5	-69	1 724
	Informal Jobs	327	-1	-15	311

	Impact Name	Economic Impacts Created as a Result of the Capping Only Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Compensation of Employees	Formal skilled	R201 791 275	-R391 261	-R7 528 234	R193 871 780
	Formal semi-skilled	R132 538 400	-R286 809	-R5 584 228	R126 667 363
	Formal low-skilled	R48 907 604	-R134 057	-R2 164 513	R46 609 034
	Total Compensation	R383 237 278	-R812 126	-R15 276 975	R367 148 177
	Informal Jobs	R48 990 425	-R86 281	-R2 236 201	R46 667 944
Increased Household Livelihoods	Household Income	R873 093 919	-R1 951 193	-R34 282 316	R836 860 410
Business Development Potential	Micro Enterprise Opportunities	10	0	0	10
	Small Enterprise Opportunities	8	0	0	7
	Medium Enterprise Opportunities	4	0	0	3
	Total SMME Opportunities	22	0	-1	20
	Total SMME Opportunities (Black Owned)	16	0	-1	15

Source: DEMACON Modelling, 2023

The occurrence of a condensate well blowout scenario has the potential to generate economic activity through expenditure on oil spill response strategies, while simultaneously disrupting the economic activity of industries such as commercial fishing, maritime logistics, and maritime tourism, which are affected by an oil spill event.

Expenditure on an oil spill response strategy, estimated to be approximately R342.6 million over a 2-month period, contrasts with disruptions to the economic output of the commercial fishing and maritime logistics industries. This may lead to a combined reduction in economic activity of approximately R16.6 million during the same period.

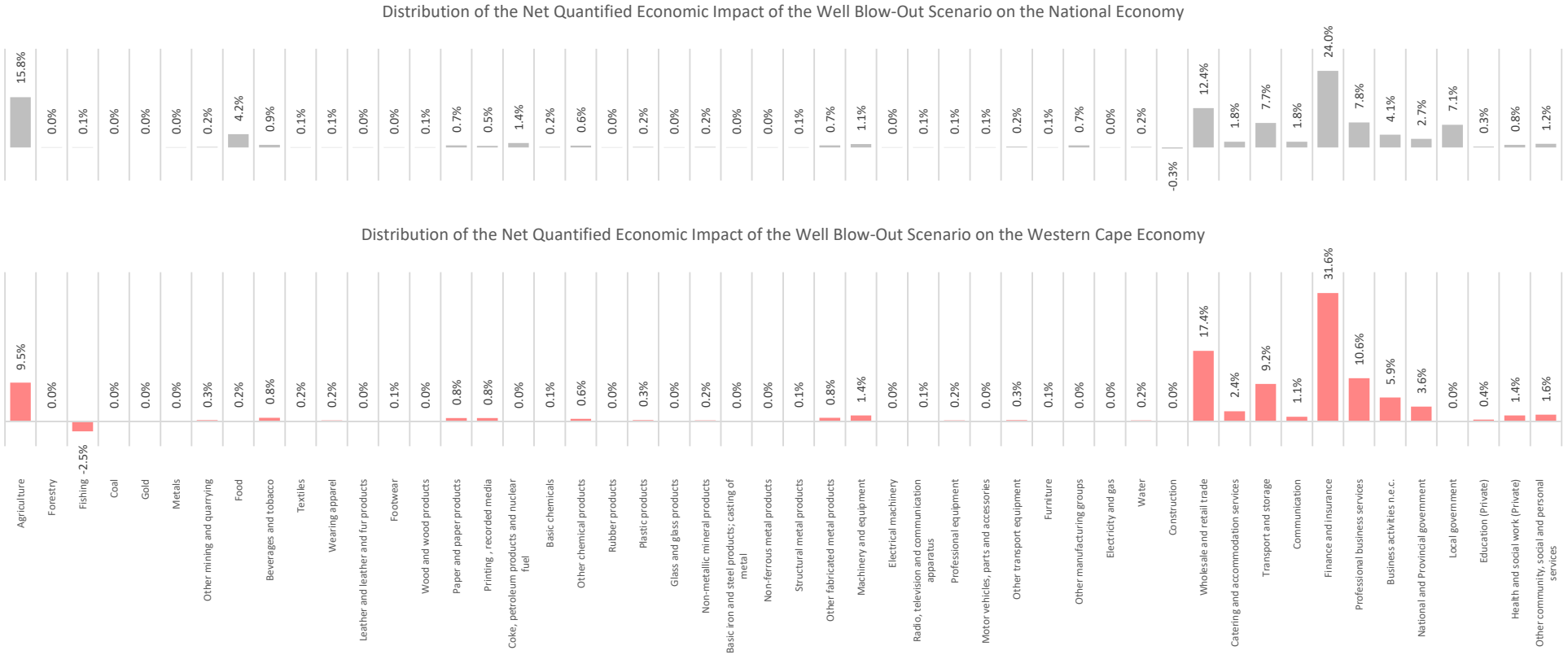
According to the economic impact model, oil spill response expenditure could generate economic activity that, due to the multiplier effect throughout the economy, contributes approximately R1.7 billion in additional business sales and R929.0 million in gross domestic product over the two-month period. However, the fishing, maritime logistics, and maritime tourism sectors may experience

temporary disruptions totalling R78.4 million in business sales and R39.2 million in gross domestic product.

Expenditure on an oil spill response strategy is projected to temporarily stimulate additional compensation for temporary jobs (approximately R383.2 million) and increase household incomes by R873.1 million during the two-month period. Conversely, compensation for employees in sectors such as fishing and logistics may experience temporary disruptions, resulting in reduced employee compensation (R16.1 million) and household income (R36.2 million) across all disrupted industries.

While the heightened economic activity may stimulate demand for new businesses, the temporary nature of the response strategy may limit the realisation of long-term business establishment. In summary, expenditure on an oil spill response strategy could generate multiplier effects throughout the economy due to increased economic activity, while disruptions to several economic sectors resulting from an oil spill event could reduce economic output and activity in affected industries and their value chains.

Figure 9.5: Detailed Distribution of the Total Quantified Economic Impact on the National and Western Cape Provincial Economy



Source: DEMACON Modelling, 2023

9.6.1.4 QUALITATIVE IMPACT ASSESSMENT

The purpose of the qualitative economic impact assessment is to complement and enhance the quantitative assessment by providing a comprehensive understanding of the broader range of potential impacts that could result from the well blow-out scenario. The purpose of the qualitative economic impact assessment is to:

- Assess each relevant impact identified based on an impact assessment framework that measures the risk of an impact based on factors such as nature, extent, duration, probability and magnitude and
- Determine a significance rating for each impact and based on the nature of the impact identify and provide mitigation measures and alternatives

The section outlines the potential qualitative impacts that could arise during the unlikely event that a well-blow out event occurs during the operational phase of the exploration activity. Additionally, potential mitigation measures to ensure that negative impacts are minimised, and positive impacts are enhanced within the local community and economy are identified.

The assessment is based on the methodology outlined in Section 9.2.2 of this report.

9.6.1.4.1 OPERATIONAL PHASE QUALITATIVE IMPACT ASSESSMENT

9.6.1.4.1.1 Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario

The capping only oil spill response strategy for an unlikely well blow-out event could have a sizeable impact on the receiving economy by generating additional economic output – the quantitative analysis reveals that the operational expenditure of the oil spill response for a single well blow-out could be as much as R1.37 billion, stimulating nearly R3.7 billion in additional GDP and R7.0 billion in additional business sales). This additional output could be the result of operational expenditures across the entire value chain of the capping oil spill response strategy, including both backward and forward linkages. These expenditures could create direct, indirect, and induced effects, leading to increased economic production and the demand for related services and inputs.

The capping only oil spill response strategy's direct effects refer to the immediate economic activities directly related to the oil spill response process itself. This includes the expenditure on equipment, personnel, input and output requirements, etc.

The indirect effects arise from the interconnections and transactions between the oil spill response strategy activities and other sectors of the economy. For instance, the increased demand for goods and services from suppliers and contractors who provide equipment, transportation, and support services for the response activity.

The induced effects occur as a result of increased spending by employees and businesses associated with the value chain of the oil spill response industry. Employees have increased disposable income which could lead to increased consumption expenditure.

The impact generated by the oil spill response activity could contribute to the overall output of the broader provincial and national economy and consequently could offer an overall benefit to businesses and local communities.

The following economic impacts could occur as a result of the operation of the proposed exploration activity:

- The oil spill response activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the response period of exploration could lead to additional business sales throughout the response industry's value chain (increased economic output, production and gross value added)
- New employment opportunities throughout the response industry's value chain could be stimulated as a result of the increased demand generated by the response activity
- The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)
- The response activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result increases the fiscal value (i.e., taxes) collected by government

Mitigation Measures

- The operational phase should, as far as possible, focus on sourcing inputs from the receiving economy, i.e., businesses located in the

immediate economy. Localised sourcing enables local businesses to benefit from economic opportunities in the receiving economy

Cumulative Impacts

- The overall impact could create value throughout the backward linking industries required to support operations and therefore could generate additional economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.6.1.4.1.2 Impact of a Well Blow-Out Event on the Commercial Fishing Industry

Preceding analysis identifies that a well blow-out event could have the potential to impact the normal operational context of the commercial fishing industry in the receiving economy. Consequently, the fishing industry may face limitations on its usual operations and may not be able to operate at normal levels within the areas of interest and associated areas of impact.

The consequence of this reduced fishing grounds could have an economic impact on the receiving economy's commercial fishing industry. With limited access to fishing areas, the industry's operational efficiency could be adversely affected, leading to a reduction in the economic output produced by the fishing industry's value chain, including demand for employment.

Furthermore, the fishing industry in the receiving economy is identified as a basic sector of the economy, which positions the industry as a core component of the receiving economy's production and employment potential and offers the receiving economy a competitive advantage over other economic regions. This is especially true for several smaller sub-regional economies in the overarching economy where the fishing industry is a key producer of economic output and employment.

It should be noted that because a well blow-out event is likely to occur within the area of interest of exploration activities, the potential area effects of a well blow-out event could place limitations on operational locations that can be accessed for fishing operations.

The following economic impacts could occur as a result of the proposed well blow-out's impact on the receiving economy's fishing industry:

- A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event

Mitigation Measures

- Ensure that a complete and approved oil spill response strategy is in place to assist with quick response times to limit the extent with which the industry is disrupted
- Coordination should be done between the exploration activity operator and relevant large pelagic longline industry associations (such as the South Africa Tuna Longline Association) to inform the industry of relevant oil spill scenarios and response plans
- The operator is to submit all forms of financial insurance and assurances to PASA to manage all damages and compensation requirements in the event of an unplanned pollution event

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the fishing industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.6.1.4.1.3 Impact of a Well Blow-Out Event on the Maritime Logistics Industry

The preceding analysis identifies that a well blow-out event could have the potential to impact the normal operational context of the maritime logistics industry in the receiving economy.

Even though the transport and storage industry of the receiving economy is not identified as a basic sector (i.e., a sector that forms the foundation of an economy because of its potential to service local and external demand), approximately 10% of the value of imports to the country and 6% of the value of exports from South Africa travel through the Port of Cape Town, whilst the Port of Saldanha Bay exports approximately 15% of the total value of exports from South Africa. Hence, several important shipping routes travel along the West Coast of South Africa and to and from the Port of Cape Town and the Port of Saldanha Bay. Furthermore, many shipping routes travel between the Port of Cape Town and other major ports along the southern coast of South Africa.

During a well blow-out event, the maritime logistics industry may experience a temporary decline in operational efficiency due to restricted access to the affected areas and charting of alternative routes to reach destinations along the West Coast of South Africa. This loss of efficiency could have broader consequences for the receiving economy's logistics industry and is likely to impact the economic output generated by the industry's value chain, including both backward and forward linkages.

The following economic impacts could occur as a result of the proposed exploration activity's impact on the receiving economy's fishing industry:

- The potential area that is affected by a well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation

Mitigation Measures

- Ensure that a complete and approved oil spill response strategy is in place to assist with quick response times to limit the extent with which the industry is disrupted
- Coordination should be done between the exploration activity operator and relevant shipping industry associations (such as the South African Association of Ship Operators and Agents and the South African Association of Ship Operators and Agents) to inform the industry of relevant oil spill scenarios and response plans
- The operator is to submit all forms of financial insurance and assurances to PASA to manage all damages and compensation requirements in the event of an unplanned pollution event

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the maritime logistics industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.6.1.4.2 Measurement of Qualitative Impacts

The preceding sections discussed and identified economic impacts that may arise during the unlikely event that a well blow-out scenario occurs. The sections explored different economic impacts as part of several economic impact themes and identified the cumulative and loss of resource potential of the different impact themes. Mitigation measures were also identified.

Considering the preceding, the following table provides information regarding the measurement of economic impacts within the qualitative impact assessment framework as described and applied in Sections 9.2 and 9.5 of this report

Subsequent to Table 9.11, Table 9.12 provides an overview of the final significance rating of each impact and the context of each rating's value.

Table 9.14: Measurement of the Well Blow-Out Scenario Qualitative Impacts

			Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		
Theme	**Impact**	**Phase**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	**Final Impact Significance**
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The capping only Oil Spill Response Strategy for a well blow-out scenario could generate demand for goods and services necessary to sustain operational activities. The demand created during the response period could lead to additional business sales throughout the response activity's value chain (increased economic output, production and gross value added)	Operational Phase	5	1	2	1	1	1	2	5	1	3	1	1	1	3	2	1	3
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	5	1	1	1	1	1	2	5	1	1	1	1	1	2	2	1	2
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	5	1	1	1	1	1	2	5	1	2	1	1	1	2	2	1	3
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence,	Operational Phase	4	1	2	1	-1	1	-2	4	1	1	1	-1	1	-2	2	1	-2

			Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		
Theme	**Impact**	**Phase**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	**Final Impact Significance**
	the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event																		
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	5	1	2	1	-1	1	-2	5	1	1	1	-1	1	-2	2	1	-2

Source: DEMACON, 2023

The following table presents an overview of the previous table's outcomes, emphasising the final impact significance rating along with its descriptive context.

Table 9.15: Overview of the Final Impact Significance Rating of Each Impact Measured for the Well Blow-Out Scenario

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The capping only Oil Spill Response Strategy for a well blow-out scenario could generate demand for goods and services necessary to sustain operational activities. The demand created during the response period could lead to additional business sales throughout the response activity's value chain (increased economic output, production and gross value added)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event	Operational Phase	-2	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-2	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Source: DEMACON, 2023

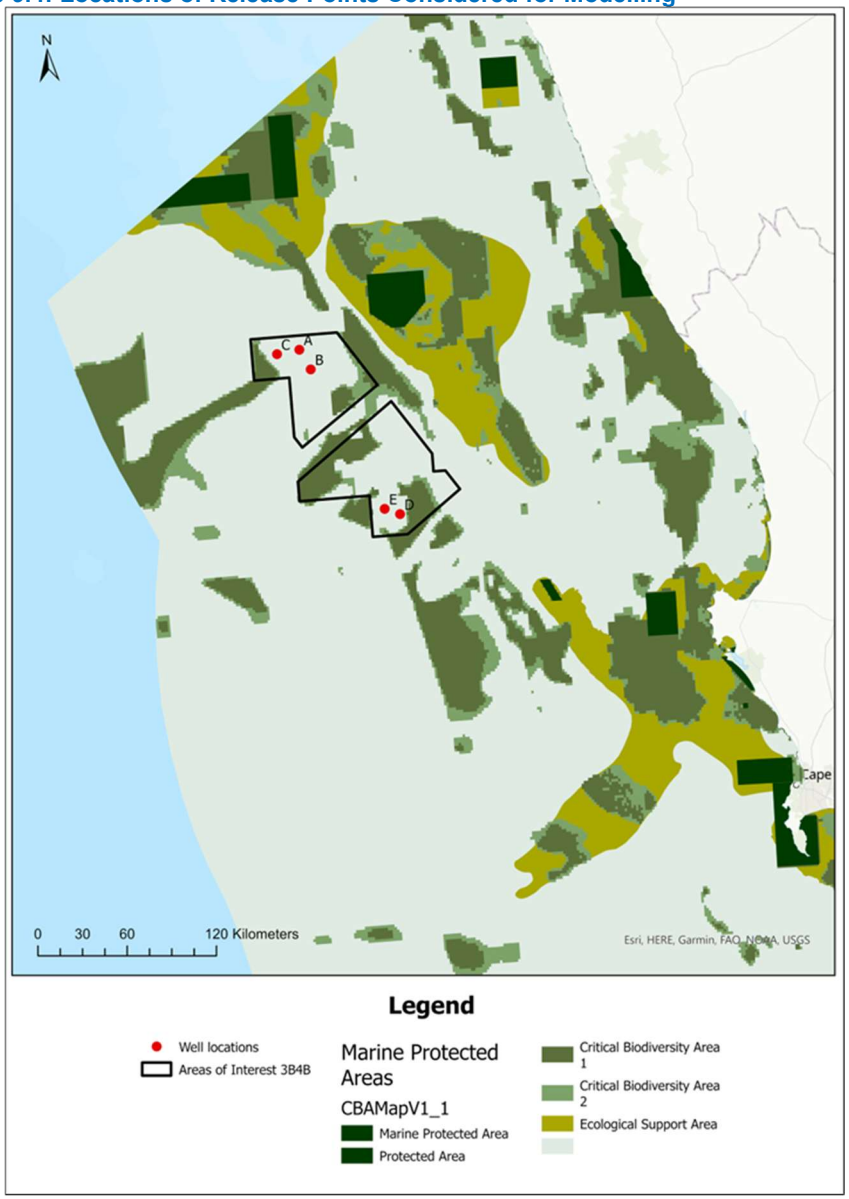
9.6.2 Subsea Crude Oil Hydrocarbon Blow-Out of an Exploration Well

For the purposes of assessing the extent and potential impacts of the proposed exploration activity, an updated Oil Spill Drift Modelling Condensate and Crude Oil Technical Report[23] was completed. The purpose of the updated technical report is to determine and describe the possible fates and trajectories of a crude oil spill from a subsea blow-out of a well in the area of interest of Block 3B/4B.

The updated Technical Report undertook oil spill drift modelling based on two methodologies, Stochastic simulations (performing statistical modelling which provides insight into how typical oil spill scenarios unfold under a wide range of weather or seasonal conditions) and deterministic simulations (provides an example of what could be the evolution of one single spill).

[23] Source: HES Expertise Services, October 2024

Map 9.4: Locations of Release Points Considered for Modelling



Source: DEMACON ex HES Expertise Services, 2024

The modelling made use of a crude oil hydrocarbon profile (Crude Oseberg Blend 2006) similar to the properties of the DWOB hydrocarbon that is expected to be encountered during the exploration activity. The profile is also informed by the hydrocarbon's release properties. Based on the updated Technical Report the crude oil hydrocarbon could have a flow rate of 34 000 barrels of oil per day whilst the associated gas release of the hydrocarbon spill could be 1 443 243 Sm^3/day.

Additionally, the updated modelling is based on two release points. The Technical Report considered multiple potential release points because the exact locations of the wells to be drilled within the area of interest are not yet known. From these multiple points, two have been selected for modelling purposes (please refer to the technical report for a detailed account of the selection process of Point A and D). Point D has been selected as the worst-case scenario for a crude oil subsea well blow-out scenario, whilst Point A was selected as a secondary worst-case scenario consideration.

The updated Technical Report made use of two oil spill response strategies to test the effectiveness with which a potential well blow-out could be managed. For the purposes of the crude oil subsea blow-out scenario, a capping only response was modelled. The capping only strategy includes the deployment of a capping stack at the end of the 20th day stopping the release. According to two local Blow Out Contingency Plans in the 11B/12B Block and Venus Well Drilling in Namibia a capping stack could be mobilised from Saldanha. The capping time would be between 13 and 20 days respectively. Here the most conservative duration was considered.

The capping only oil spill response strategy, or scenario, was applied to the updated oil spill drift modelling methodologies (Stochastic and deterministic simulation methodologies) to provide a perspective on the effects of the crude oil spill scenario and its response strategies.

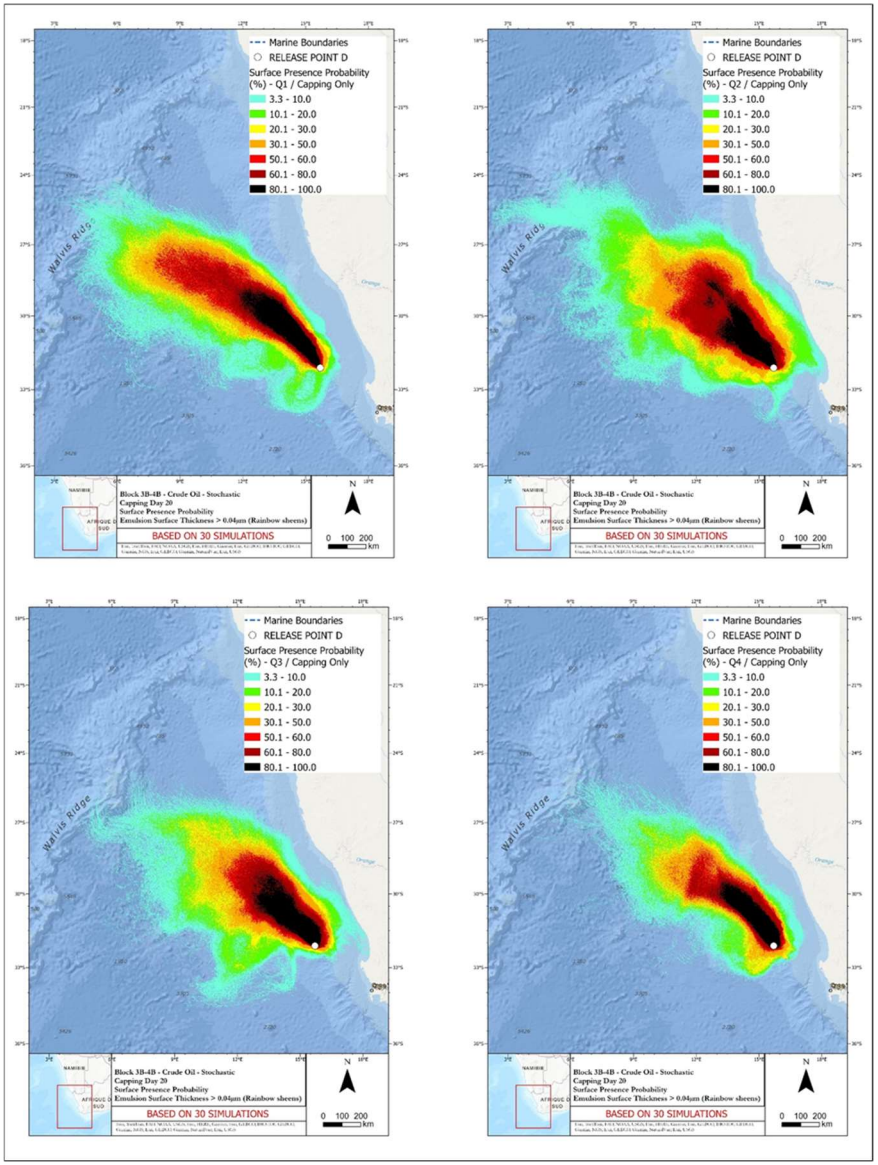
Given the preceding, the following provides an overview of the outcome of the oil spill simulations and the response strategy scenarios that can be used to mitigate against a blow-out scenario.

- Stochastic Simulation:
  - The main drift direction of the spill simulated is towards WNW to NNW for all quarters. This is due to the main surface currents towards NW and winds from S to SSE in this area.

- An 80% to 100 probability exists that oil could reach the surface within a maximum of 687 km NW of release point D during Quarter 1. Within the context of release point A, the 80% to 100% probability of oil reaching the surface is reduced to 580 km NW of the release point.
- Based on the general drift direction of a potential spill, no oil is noted as reaching the shore for each of the 4 quarters modelled. However, there is a minimal probability (<10%) of detecting oil in the Eastward direction from release Point D and A, toward the shoreline, during Quarters 2 and 3. This occurrence may align with brief episodes of westward winds, but their duration is insufficient to cause oil drift towards the coast.
- Day 60 of the simulation (which is the end of the simulation), the presence of oil can still be observed on the surface of the ocean. The surface presence of oil, however, is primarily found in the Namibian exclusive economic zone and international waters.
- In the event of a blowout, oil would surface between 900 m and 1 200 m to the south and southwest of releaser Point D within 3 hours – 3 000 to 7 000 m for release point A. The maximum emulsion thickness observed at the surface is 619 µm, localized up to 40 km west from release point D (Q2) - 574 µm for release point A. Although the oil undergoes evaporation, dispersion, and biodegradation upon surfacing, residual amounts persist between 700 km and 1 000 km northwest of release point A after 60 days of simulation – 920 to 1 090 km for release point A. IN the case of release point D, for Q2 and Q3, if the oil remains uncollected from the surface, there is a potential for it to reach the shoreline north of Saldanha Bay. Surface-dispersed oil will impact the upper water layers. The high gas content in the release facilitates rapid ascent to the surface, resulting in minimal contamination of deeper layers (900 – 1 499 m). However, some oil may linger in the water column for up to 20 days post-release.

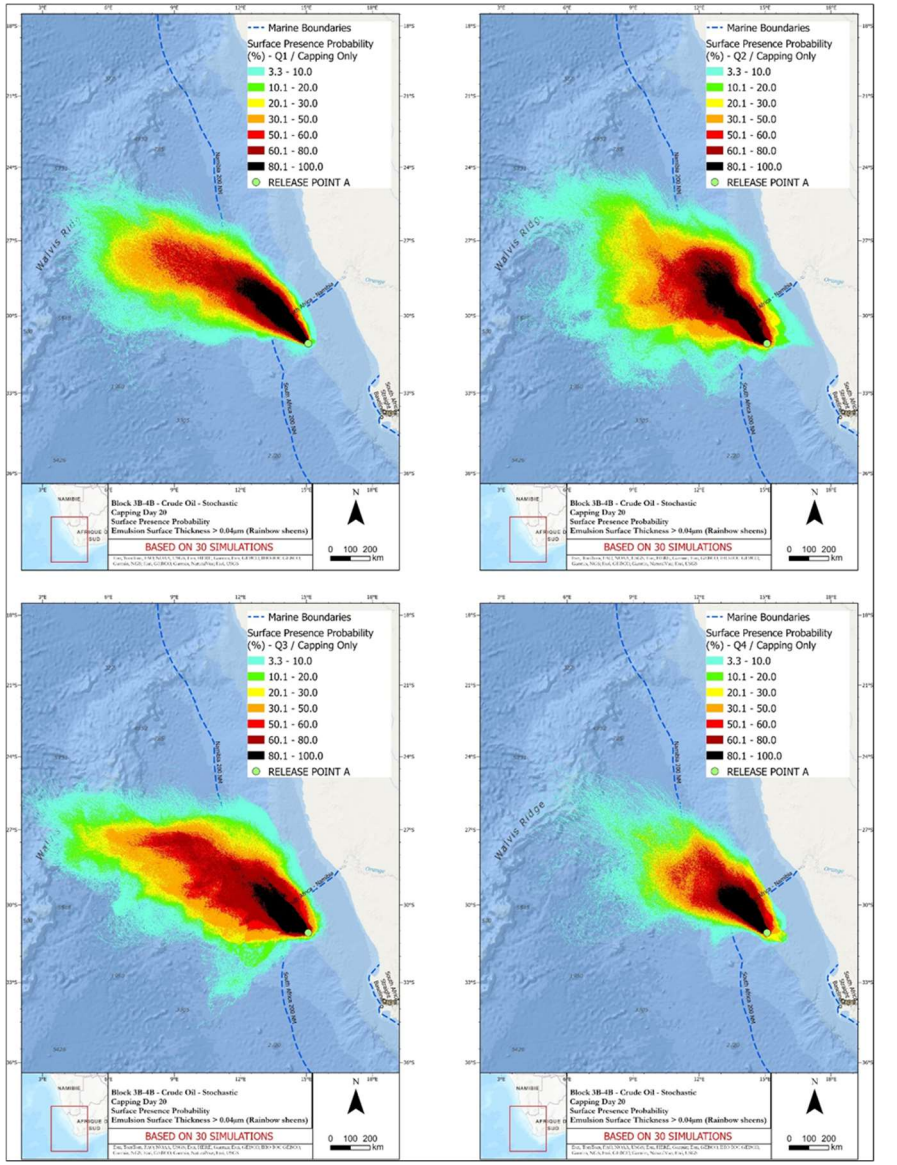
- Deterministic Simulation
  - The primary drift direction leads the oil spill north, northwest away from release point D, effectively preventing it from reaching the coastline – the same is true for release point A.
  - The predominant portion of the oil, as observed in the maps provided, is found on the surface of the ocean.
  - By the conclusion of the simulation on day 60, there is still oil with a low thickness on the water's surface, mainly extending into both International and Namibian Waters.

Map 9.5: Surface Presence Probabilities - Stochastic Simulation – Capping Only – Release Point D



Source: DEMACON ex HES Expertise Services, 2024

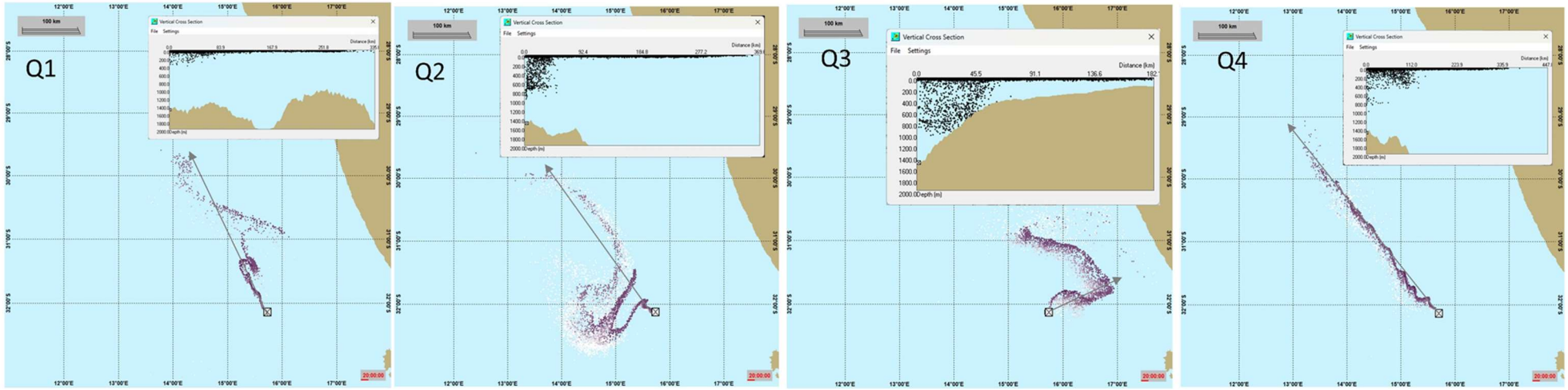
Map 9.6: Surface Presence Probabilities - Stochastic Simulation – Capping Only – Release Point A



Source: DEMACON ex HES Expertise Services, 2024

Map 9.7: Deterministic Simulation with Surface thickness and dissolved particles for Capping Only – Release Point D

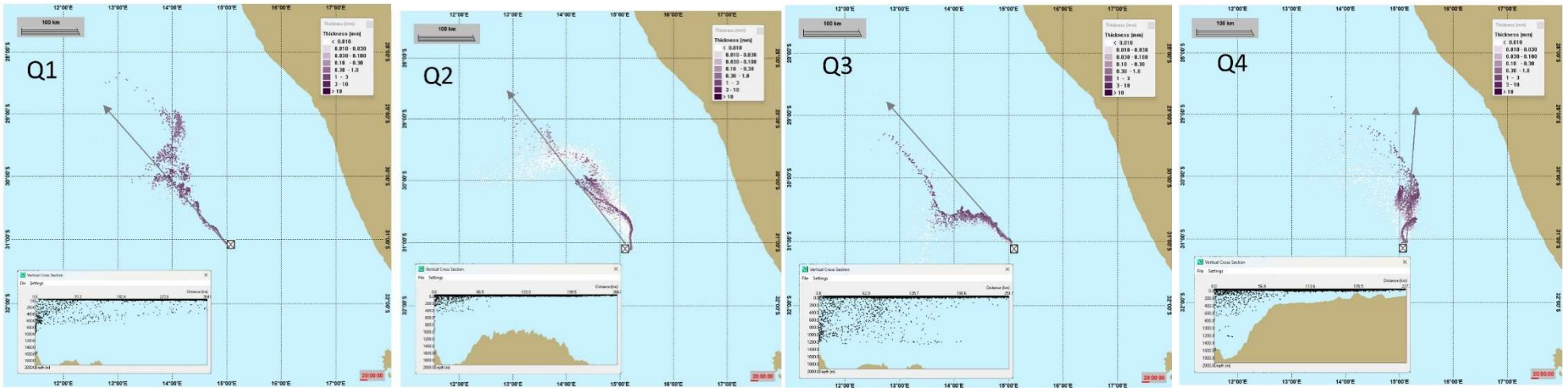
Quarter 1 **Quarter 2** **Quarter 3** **Quarter 4**



Source: DEMACON ex HES Expertise Services, 2024

Map 9.8: Deterministic Simulation with Surface thickness and dissolved particles for Capping Only – Release Point A

Quarter 1 **Quarter 2** **Quarter 3** **Quarter 4**



Based on the preceding information and analyses it is evident that in the event of a well blow-out during the exploration activity and the subsequent oil spill that could result, surface and sub-surface oil slick and contamination could be present in the area of interest and within a 580 to 687 km direction northwest of the modelled well locations. In essence, the updated Technical Report identifies that in the event of a blow-out scenario no oil will impact the shoreline. However, special consideration is warranted for Quarters 2 and 3 at release Point D, and Quarter 2 at release Point A. If the oil on the surface remains unrecovered 60 days after the spill commencement, there is a possibility of residual oil reaching the South African coastline.

Additionally, the updated Technical Report notes that due to the relatively low dispersion and dissolution rates during the ascent of crude oil compared to condensate, the impact of a crude oil release on the water column is minimal. Attention should instead be directed towards the water's surface where crude oil is likely to be found. Processes such as natural dispersion, biodegradation, and evaporation following the release could have an effect on the presence of oil on the water's surface.

The data contained in the updated Technical Report therefore suggests that the impact generated by the blow-out scenario could primarily affect ocean orientated industries such as fishing, shipping and tourism given the application of necessary oil spill responses such as subsea and surface response strategies – these should be planned for within an Oil Spill Contingency Plan.

9.6.2.1 Identification of Unplanned Event Impacts

The following section provides an overview of the identification of potential unplanned economic impacts that may result from a crude oil well blow-out scenario.

Given that the results of the updated Technical Report suggest that a well blow-out scenario of crude oil could primarily affect the ocean environment (modelling results in the report indicate that no onshore locations could be impacted by oil spillage if appropriate response strategies are employed), especially the water surface, the extent of economic impacts associated with a crude oil well-blow out scenario could primarily be focused on industries that operate within the ocean economy. The extent with which ocean industries are affected is dependent on the probability that a crude oil spill event could be present in areas where ocean-based industries operate. Disruptions to ocean-based industries, al be it temporary, could have an impact on the economic productivity of affected industries which in turn impacts on the productivity of their associated value chains. In essence, a crude oil blow-out scenario could, as consequence, generate an economic disruption to select ocean-based industries that make use of the potential areas that could be affected by a crude oil well blow-out event.

In light of the preceding and taking into consideration the impacts identified for the exploration activity, it is evident that a crude oil well blow-out scenario could affect several ocean-based industries such as commercial fishing industries, maritime logistics industries and tourism related industries.

The identification of impacts on the receiving economy centres upon highlighting the potential effects that the proposed crude oil well blow-out scenario and its associated response mechanism could have on the receiving economy and its function as a source of economic production, employment and fiscal output.

Furthermore, the identification of impacts focusses on assessing whether the impact generated could contribute to, or subtract from, the current economic context of the receiving economy based on the duration of the spill event and its residual consequences.

The following provides an overview of the potential impacts that may arise as a result of a crude oil hydrocarbon well blow-out event and also provides an indication of whether the impact has been taken into consideration for quantitative and/or qualitative measurement.

9.6.2.1.1 Economic Impact of the Crude Oil Well Blow-Out Full Response Strategy

In the unlikely event that a well blow-out was to occur, the resulting spillage requires a concomitant oil spill response strategy. Taking into consideration the worst-case scenario for a crude oil hydrocarbon spill event (Release Point D) the updated Technical Report modelled a capping only response to a well-blow out event. The updated Technical Report notes that no oil is present onshore for all simulations and all seasons. The report, however, identifies that although the main part of oil released from the spill event is evaporated, biodegraded and dispersed within 60 days, oil on the waters surface would need to be recovered within 60 days to prevent the potential of oil reaching the shore north of Saldanha Bay in the future (according to the updated Technical Report the probability of oil presence east of the release point towards the shoreline is less than 10%) .

The information contained in the updated Technical Report identifies that additional containment responses may be required to support a capping only approach to prevent the long-term and low probability of oil reaching the South African shoreline.

As a consequence of deploying an expanded response strategy the proposed activity could generate additional economic output as the result of operational expenditure throughout the value chain (backward and forward linkages) of the exploration industry and could, as a result of its direct, indirect and induced effects, generate the need for additional economic production and related services and inputs.

The operational impact of the response activity could influence several aspects of the economy, which includes, but is not limited to additional economic output, additional gross domestic product, additional fiscal output, the potential to stimulate employment opportunities and concomitantly stimulate additional household income.

The capping response strategy is, according to the updated Technical Report, expected to take approximately 20 days. Additional response mechanisms such as surface responses could be implemented as part of the capping response has been factored into the 60-day simulation period. Because of the period of operations, the impact is anticipated to be temporary and not a continued and sustained impact on the receiving economy.

The preceding identifies that the proposed response mechanism could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall operation of the response strategy will be measured quantitatively and qualitatively as necessary.

9.6.2.1.2 Economic Impact of the Exploration Activity on Commercial Fishing

In order to identify likely areas within which disruption to the commercial fishing operations could occur, reference is made to the extent of surface oiling and the probability that surface oiling could occur. In essence, the likelihood that the fishing industry is impacted varies depending on the projected scope of surface contamination relative to the proximity of fishing grounds.

Based on data from the updated Fisheries Baseline and Impact Assessment Report (2024), the worst-case scenario of surface oiling, i.e., crude oil spill event for Release Point D and Quarter 2, a probability exists that several commercial fishing industries could be affected by a crude oil spill event. These commercial fishing industries are identified as:

- Large pelagic longline industry (100% probability of an overlap with surface oiling locations)
- Tune pole-line industry (70% probability of an overlap with surface oiling locations)
- Demersal trawl industry (70% probability of an overlap with surface oiling locations)
- Demersal longline industry (70% probability of an overlap with surface oiling locations)
- Linefish and small-scale fisheries (7% probability of an overlap with surface oiling locations)
- Small pelagic purse-seine industry (7% probability of an overlap with surface oiling locations)

Based on the low probability (less than 10% probability) that a crude oil spill event could impact on the linefish, small-scale fisheries and small pelagic purse-seine industry, these industries are not included in the quantitative impact assessment of the commercial fishing industry assessment.

The impact, furthermore, identifies that the commercial fishing industry could, for a temporary period of between 1 to 2 months, loose operational efficiency by not having access to the areas of interest affected by a crude oil well blow-out event. As a consequence, the loss of operational efficiency (reduced fishing grounds) impacts on the economic function of the receiving economy's commercial fishing industry and could likely impact on the economic output produced by the fishing industry's value chain (backward and forward linkages).

Furthermore, the Marine Ecology Assessment Report (2024) as well as the Fisheries Baseline and Impact Assessment Report (2024) identify that a crude oil blow out event could have an impact on the marine ecology of the area affected by an oil spill event. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential. The impact identifies that the commercial fishing industry could, for a temporary period of between 4-to-5-year period (excluding direct oil spill events of 1 to 2 months) experience reduced fishing potential.

The impact of a crude oil spill event on several commercial fishing industries could influence several aspects of the economy, which includes, but is not limited to, economic output, gross domestic product, fiscal output, employment opportunities and household income.

The impact generated by changes to operational efficiency could temporarily influence the overall output of the broader provincial and national economy and consequently could temporarily impact on the economic productivity that businesses and local communities receive from the industry.

The preceding identifies that a well blow-out event could influence the commercial fishing industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall impact on the fishing industry is measured quantitatively and qualitatively as necessary.

9.6.2.1.3 Economic Impact of the Exploration Activity on Maritime Logistics

In order to identify likely areas within which disruption to the maritime logistics industry could occur, reference is made to the extent of surface oiling and the probability that surface oiling could occur. In essence, the likelihood that the maritime logistics industry (the movement of freight and related shipping vessels between ports along the coast and international origin or destination locations) is impacted varies depending on the projected scope of surface contamination relative to the proximity of shipping lanes.

Based on a spatial analysis of the worst-case crude oil spill scenario (crude oil spill event for Release Point D and Quarter 2) and the distribution/density of shipping lanes to and from prominent ports such as the Port of Cape Town and Port of Saldanha Bay, a high probability exists that the maritime logistics industry could be affected by a crude oil spill event.

The impact, furthermore, identifies that the maritime logistics industry could, for a temporary period of between 1 to 2 months, loose operational efficiency by not having access to key and efficient shipping lanes by a crude oil well blow-out event. As a consequence, the loss of operational efficiency impacts on the economic function of the receiving economy's logistics industry and could likely impact on the economic output produced by the industry's value chain (backward and forward linkages).

The operational impact of the maritime logistics industry could influence several aspects of the economy, which includes, but is not limited to economic output, gross domestic product, fiscal output, employment opportunities and household income.

The impact generated by changes to operational efficiency could temporarily influence the overall output of the broader provincial and national economy and consequently could temporarily impact on the economic productivity that businesses and local communities receive from the industry.

The preceding identifies that well blow-out event could influence the maritime logistics industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall impact on the industry will be measured quantitatively and qualitatively as necessary.

9.6.2.1.4 Economic Impact of the Exploration Activity on the Tourism Industry

The updated Technical Report identifies that the worst-case crude oil bow-out event could have a low or unlikely effect on the coastal ocean and shoreline territories along the South African coast. The updated Technical Report highlights that no oil reaches onshore at the end of simulations and across all seasons. The report does, however, identify that additional responses over and above a capping response may be required to ensure that no oil occurs onshore over the long-term. furthermore, modelling results from the updated Technical Report identify that a very-low probability exists for surface oiling within coastal waters near the South African West Coast coastline - modelling results indicate that a 3 to 10% probability exists that surface oil could materialise.

Onshore Tourism Industries

Onshore tourism generally refers to accommodation services, catering and related entertainment services, travel services, attractions and cultural and heritage activities, entertainment and related attractions and travel for business purposes. Coastal locations within the receiving economy rely not only on the value of the onshore environment, but also on the amenity value that a coastal location offers. In the event that the amenity value of the tourist destination is devalued, tourism as a feeder industry is disrupted and economic value lost.

Given that the presence of onshore crude oil as a result of a blow-out event is unlikely, a blow-out event could have a minimal effect on the visual and audio quality of tourist locations and onshore activities might not necessarily be influenced by oil spills and response operations.

Because a blow-out event might not affect coastal locations, limited to no economic impact is expected between an oil spill event and the onshore tourism industry. It is however important to note that business tourism could benefit from a blow-out scenario because of the need for specialist and associated professionals engaged with the response plan to travel and stay in the receiving economy. These benefits are, however, accounted for in the economic impact generated by the blow-out scenario response strategy.

Coastal and Maritime Tourism Industries

Coastal and maritime tourism represents focus areas of marine orientated tourism along the coastal areas of a country. These tourism activities represent recreational functions of marine tourism that contribute to the amenity value of a location. The amenity value of a destination represents those environmental factors (natural or physical) that contribute to people's appreciation or enjoyment of a destination/environment - in other words, it is those environmental characteristics that contribute to the pleasantness and attractiveness of an area as a place to live, work or visit. Given the preceding, amenity value represents the capacity of the West Coast to attract tourists to the area.

The amenity value of the West Coast can be influenced by coastal and maritime tourism. Coastal tourism generally refers to recreational activities that take place in proximity of the sea (e.g., swimming, sunbathing, walks, etc.) whilst maritime tourism generally refers to predominantly water-based activities close to the coast of a destination (e.g., sailing, nautical sports, cruising, etc.).

In light of the worst-case crude oil bow-out event identified by the updated Technical Report, the presence of onshore crude oil as a result of a blow-out event is unlikely. In effect, a blow-out event could have a minimal effect on the amenity value of tourist locations and coastal tourism along the West Coast. Furthermore, key tourist destinations such as Paternoster, St Helena Bay, Saldanha, Lamberts Bay, Langebaan and Yzerfontein are generally not within areas that have been identified where the presence of surface oil is a probability. It is therefore unlikely that the coastal tourism amenity value of these areas could be impacted by an oil spill event.

Maritime tourism industries, however, could operate within areas where the probability of surface oil as a result of a crude oil spill event is present. The productivity of maritime based tourism industries could temporarily be displaced or interrupted as a result of the presence of surface oil.

Recreational fishing represents a maritime tourism industry that occurs from the coast or offshore by boat. Shore based recreational fishing is limited to the coastal areas of the West Coast, whilst ocean based recreational fishing generally occurs within 5 nautical miles of the coast and up to 40 nautical miles in and around Saldanha Bay.

Data from the updated Technical Report identifies that it is unlikely that oil could reach the shore in the event of a crude oil well blow-out event and further identifies that the presence of oil near the West Coast has a probability of 3% to 10% (containment measures could further reduce the probability of surface oil presence). The probability that shore based, and ocean based recreational fishing is impacted by a crude oil spill event is therefore considered to be unlikely.

Boat based whale watching represents anther maritime tourism industry that could be affected by a crude oil spill event. Data from the Department of Forestry, Fisheries and Environmental Affairs indicate that three boat base whale watching operational areas are identified along the West Coast. Boat based whale watching industry demarcated operation areas are generally located in areas where surface oil presence (given a worst-case scenario) is considered to be less than 10% indicating that operational areas are unlikely to be affected by an oil spill event. Furthermore, no registered boat-based whale watching operators are based within potentially affected operational areas.

Lastly, cruise tourism represents a popular and functional component of maritime tourism activities along the West Coast of South Africa. Cruise tourism represents ocean-based tourism activities that occur on a cruise ship that travels between destinations within a set geography or between continents. Within the South African context, the cruise ship industry is primarily concentrated in the Port of Cape Town (Western Cape) and the Port of Durban (KwaZulu-Natal). Of particular interest to this study is the cruise industry located at the Port of Cape Town – a popular destination and departure port in Africa. In 2022 approximately 70 vessels visited the Port of Cape Town, bring nearly 78 00 tourists to the Western Cape that spent nearly R1.4 billion within the domestic economy. Estimates indicate that approximately 40% to 50% of cruise ships travelling from

the Port of Cape Town could potentially travel through possible worst case scenario oil spill affected area modelled for the Release Point D. Typical cruise ship routes indicate that cruise ships travelling northward from the Port of Cape Town stay between 80 and 90 kilometers from the South African coast, placing the general route of cruise ships within the 25% to 40% probability zone of surface oil. In the event that a cruise ship cannot navigate an oil spill affected area or the distance to circumvent an oil spill becomes financially burdensome, a cruise line route can be cancelled or postponed. Cruise industry trips are, however, highly season specific and the impact on the industry could be mitigated as a result.

The preceding identifies that a well blow-out event could influence the tourism industry and could have several impacts on the receiving, provincial and national economy. Individual impacts (as noted previously) originating from the overall impact on the industry will be measured quantitatively and qualitatively as necessary.

9.6.2.2 Quantitative Impact Assessment of a Well Blow-Out Scenario

This section provides an overview of the quantified economic impact assessment of the impacts associated with a well blow-out scenario (impacts have been identified and discussed in Section 9.6.2.1)

The purpose of the quantitative impact assessment is to measure the net gain or loss to the economy resulting from the crude oil well blow-out scenario. It compares the economic benefits generated by the oil spill response strategy to any potential burdens on the economy that may arise from a well blow-out and resulting crude oil spill.

9.6.2.2.1 Assessment Overview and Key Inputs

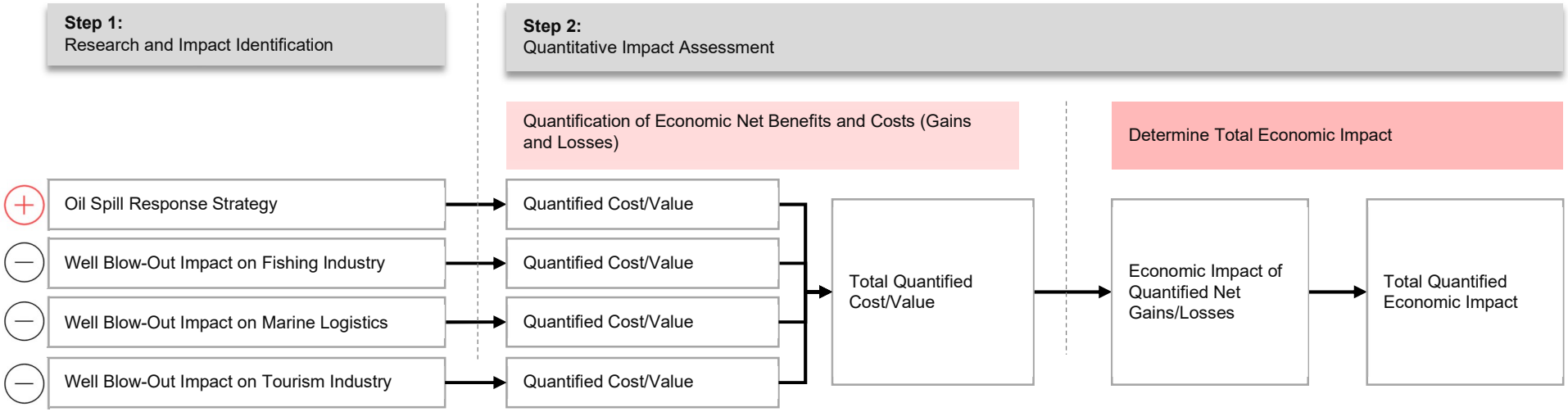
In this section, an overview of the quantitative economic impact model employed to assess the overall economic impact of the crude oil well blow-out scenario is presented. Additionally, an outline of the key impacts considered in the assessment and the core assumptions that inform the basic inputs for each impact is provided. For further details on the core assumptions underlying the quantitative economic impact model, please see Section 9.2.1.

The following diagram provides a high-level overview of the quantitative economic impact model and the impacts that inform the impact assessment.

The diagram presents four overarching impacts selected for the quantitative economic impact assessment. These impacts encompass both potential gains and losses that the economy may experience if they come to fruition. The economic impacts included as part of the quantitative economic impact assessment include:

- Economic impacts created as a result of the full response oil spill strategy proposed by the updated Technical Report
- A well blow-out event could temporarily disrupt commercial fishing operations that overlap with the impacted area
- A well blow-out event could temporarily disrupt commercial maritime logistics operations because of an overlap between the general routes travelled by cargo and tanker ships to the main ports of Cape Town and Saldanha Bay
- A well blow-out event could disrupt maritime tourism activities because of an overlap between the general routes travelled by cruise liners northward along the West Coast of South Africa

Diagram 9.8: High-Level Overview of the Quantitative Economic Impact Assessment of the Crude Oil Well Blow-Out Scenario



9.6.2.2.2 ASSUMPTIONS

Given the preceding economic impacts, the following section provides an overview of the underlying assumptions that define each impact. These assumptions serve as the basis for measuring the effect of each impact on the economy, whether it results in a gain or a loss.

Economic Impacts Created as a Result of a Full Oil Spill Response Strategy

- The impact identifies that the information presented in the updated Technical Report indicates that additional containment responses may be necessary to complement a capping-only approach in order to mitigate the long-term and low probability risk of oil reaching the South African shoreline
- Cost estimates for the response strategy was received from EIMS
  - The total cost to undertake a full response to a well blow-out scenario is 75 million US$[24] of which 25% could be spent in South Africa
  - An exchange rate of R18.27 (Average between November 2022 and November 2023) per US$ has been used to convert US$ to South African Rand[25]
- The total response strategy cost for one blow-out event is therefore estimated at approximately R342.6 million.

Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Area

- The impact identifies that a probability exists that several commercial fishing industries could be affected by a crude oil spill event. In essence, the likelihood that the fishing industry is impacted varies depending on the projected scope of surface contamination relative to the proximity of fishing grounds
- The impact identifies that a well-blowout event could disrupt commercial fishing operations because a crude well blow-out event is likely to occur within the project's area of interest and the normal operational areas of the large pelagic longline fishing industry.

[24] EIMS Data Response, 2023

[25] South African Reserve Bank Exchange Rate Data, 2023 (https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates)

- It is anticipated that normal fishing operations of all industries identified as overlapping with high surface oil probability areas (probabilities greater than 10%) could be disrupted. The disruption is expected to be temporary and to last for 1 to 2 months
- The following aspects have been considered as part of the assumptions that underpin various commercial fishing industries identified as overlapping with areas that have a high potential for surface oil presence during an oil spill event impact period[26]:
    - Data shows that that approximately 915 tons of Demersal Longline fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 152 tons)
    - Data shows that approximately 1 129 tons of Large Pelagic Longline fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 188 tons)
    - Data shows that approximately 96 tons of Demersal Trawl fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 188 tons)
    - Data shows that approximately 573 tons of Tuna Poleline fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 96 tons)
- The value of each industry is determined by:
    - The Demersal Longline industry was determined to approximately R32 856 per ton of fish caught (approximately 55 580 tons of fish caught at a value of R1 826 156 000)[27]
    - The Large Pelagic Longline and Tuna Poleline industries were determined to approximately R38 143 per ton of fish caught (approximately 3 510 tons of fish caught at a value of R133 882 000)[28]
    - The Demersal Trawl industry was determined to approximately R18 843 per ton of fish caught (approximately 307 045 tons of fish caught at a value of R5 785 808 000)[29]
- The Marine Ecology Assessment Report (2024) as well as the Fisheries Baseline and Impact Assessment Report (2024) identify that a crude oil blow out event could have an impact on the marine ecology of the area affected by an oil spill event. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential. To account for this event, a reduced productivity factor of 10% over a 4-to-5-year period (excluding direct oil spill events of 1 to 2 months) has been applied.
- The total value of the disrupted fishing industry amounts to R73 987 224 over a 4 to 5 year period

Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations

- The impact identifies that a well blow-out event is likely to occur within the project's area of interest which overlaps with common and regularly used marine logistics passageways. Because of this overlap, cargo, tankers and other related shipping would need to make use of alternate routes to access the Port of Cape Town and Port of Saldanha Bay. It is estimated that approximately 125 ships traverse the area of interest per month[30]
- the operational efficiency lost by the shipping industry was based on the average hourly operational cost of a typical cargo ship and the total distance lost as a result of no access to the area of interest
    - The average annual operational cost of a typical cargo ship is approximately US$9 000 000 per annum (R164 430 000), which translates to approximately R18 771 per hour[31]

[26] Data Sourced from DFFE and CapMarine

[27] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

[28] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

[29] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

[30] National Oceans and Coastal Information System, 2023

[31] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter5/maritime-transportation/containerships-

  - The total distance that a ship could lose when not being able to traverse the area of interest approximately 360 km[32]. The assumption is based on the information contained in the updated Oil Spill Drift Modelling Technical Report (2023). Given the results of the Technical Report, the entirety of the area of interest is used as an area through which commercial shipping operations cannot travel during a well blow-out event
  - An average cargo ship travels at approximately 46.3 km per hour[33]
  - In total, a cargo ship loses approximately 7.8 hours of travel time due to not being able to traverse affected areas.
  - The impact is expected to be temporary, lasting for the duration of the well blow-out event duration of 1 to 2 months
  - Total hours lost because of the well blow-out event amounts to 1 944
- The total value of the disrupted logistics industry amounts to R36 487 026

Well Blow-Out Event could Temporarily Disrupt Maritime Tourist Industry Operations

- The impact identifies that a well blow-out event could occur within the project's area of interest and the resulting probability of the presence of surface oil could overlap with common and regularly used cruise tourism passageways. Because of this overlap, the operational potential of cruise liners that travel between the Port of Cape Town and Port of Walvis Bay could be affected.
- It is estimated that approximately 35 ships traverse the route between the Port of Cape Town and the Port of Walvis Bay annually[34]. On average approximately 2 to 3 ships arrive or depart from the Port of Cape Town towards Namibia per month – these ships could be affected by an oil spill event.
- On average approximately 1 113 tourists arrive in the Port of Cape Town per ship. Given that 2 to 3 ships travel between the Port of Cape Town and Port of Walvis Bay per month, between 2 000 and 3 500 tourists per month could be affected by an oil spill event along the West Coast of South Africa. These tourists spend between R9 000 and R10 000 per visit to the Port of Cape Town – spend in South Africa.
- Approximately 600 crew members travel with each ship, representing additional expenditure potential within the Western Cape. It is estimated that crew members of ships spend approximately R145 per visit to the Port of Cape Town.
- Additional charges that cruise ships must pay in terms of administrative and docking fees, passenger related costs (e.g., food and beverages, fresh water, sludge, etc.) amount to R9 257 143 per ship per visit
- The operational efficiency lost by the cruise tourism industry is based on the average number of cruise vessels that could be affected as a result of limited to no access to oil spill affected areas along the West Coast of South Africa over a 2-month period. The impact considers the estimated capital expenditure that these cruise liners could generate in tourism revenue within the Western Cape
  - The average annual expenditure generated by the cruise industry in the Western Cape amounts to R1.4 billion (includes expenditure by international passengers, domestic passengers, cruise ship crew and cruise ship expenditure on administrative and passenger needs). Given that approximately 70 cruise ships dock at the Port of Cape Town per year, the average expenditure per cruise vessel arriving at the Port of Cape Town is approximately R19 957 143[35]
  - It is estimated that approximately 50% of all vessels arriving or departing from the Port of Cape Town travel northward from the Port of Cape Town along the West Coast of South Africa to the Port of Walvis Bay or other West African ports. The data suggests that approximately 35 vessels per year, or 3 vessels

operating-costs-panamax-post-panamax/#:~:text=A%20standard%20Panamax%20containership%20has,of%20about%20%242%2C314%20per%20TEU.)

[32] Based on DEMACON geographic information system measurements

[33] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter4/transportation-and-energy/fuel-consumption-containerships/)

[34] Western Cape Cruise Liner Industry Economic Contribution 2022-23 Season, Wesgro, 2023

[35] Western Cape Cruise Liner Industry Economic Contribution 2022-23 Season, Wesgro, 2023

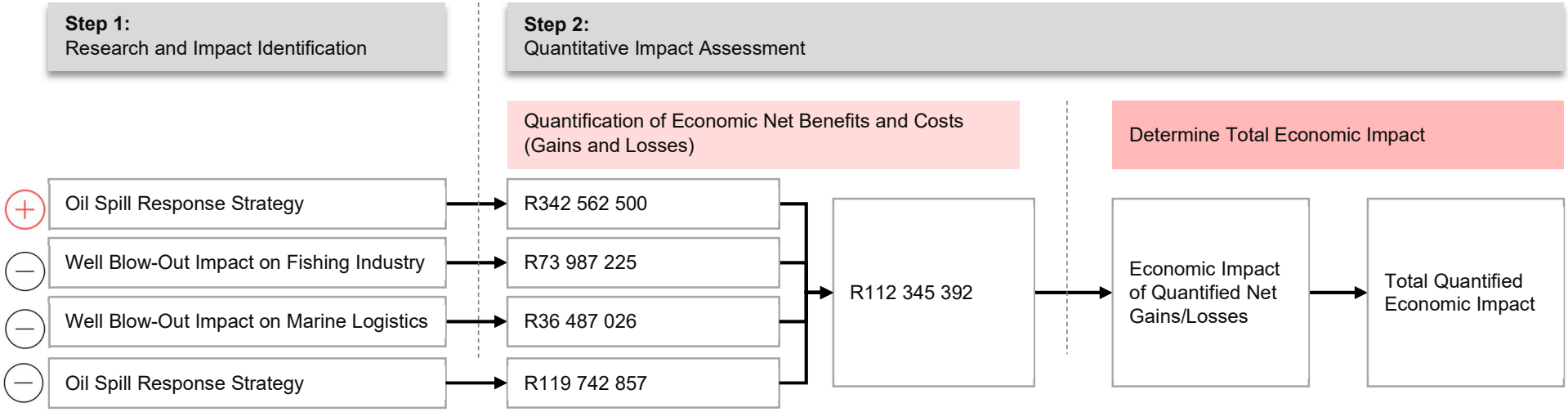
per month, depart or arrive at the Port of Cape Town from along the West Coast of Africa
- The potential that the cruise industry's operations could be disrupted during an oil spill event [36] is based on the information contained in the updated Oil Spill Drift Modelling Technical Report (2024). Given the results of the updated Technical Report, typical routes indicate that cruise ships travelling northward from the Port of Cape Town stay between 80 and 90 kilometers from the South African coast, placing the general route of cruise ships within the 25% to 40% probability zone of surface oil
- The disruption to cruise ship industry operations is anticipated to last 1- to 2-months. The updated Technical Report notes that the majority of the oil spilt during an oil spill event will have evaporated, biodegraded and dispersed after 60 days and that the remaining oil on the surface of water is located 700 to 1 000 kilometers northwest of the worst case scenario release point (Release Point D)

- The total value of the disrupted cruise tourism industry amounts to R119 742 857

9.6.2.2.3 Quantified Economic Benefits and Costs

The underlying assumptions provided in the preceding section allowed for the quantification of each overarching economic impact. The following diagram provides a simplified overview of the quantified economic impacts within the context of the overarching quantitative economic impact assessment process.

Diagram 9.9: High-Level Overview of the Quantitative Economic Costs and Benefits in the Economic Impact Assessment of the Well Blow-Out Scenario



Source: DEMACON, 2023

[36] Updated Oil Spill Drift Modelling Condensate and Crude Oil Technical Report, 2024

The preceding table shows that the total quantified cost/value of economic impacts associated with the crude oil well blow-out event is approximately R112.4 million. The net economic gain is primarily as a result of the sizeable, although temporary, operational value that a full oil spill response strategy could contribute to the South African economy. Although disruptions to the commercial fishing, maritime logistics and maritime tourism industries represent considered quantitative impacts, a full oil spill response strategy constitutes a comprehensive costing of rehabilitation and restoration activities and is not limited capping only. The quantification of each impact enables the measurement of the impact in terms of several metrices that will be discussed in subsequent sections.

9.6.2.3 Measurement of the Total Economic Impact of the Well Blow-Out Scenario

The subsequent section quantifies the economic gains and losses resulting from the well blow-out event. It accomplishes this by measuring each impact associated with the well blowout event, as discussed earlier, using various metrics. The objective of this analysis is to estimate the magnitude and scope of the economic impact generated by the event in terms of its potential contribution to, or reduction from, the receiving economy and its linkages.

The table below presents a detailed analysis of each impact, utilising specific metrics to calculate the economic impact's magnitude. It is important to acknowledge that the effect of the well blow-out is temporary, lasting approximately two months. Where necessary residual impacts are factored into impact calculations. In essence the temporary effect of the scenario means that the economic impacts indicated in the data are also temporary. These impacts are contingent upon the duration of the well blow-out event and are not sustainable or measurable as long-term outcomes.

Table 9.16: Quantitative Impact Assessment of the Well Blow-Out Scenario

	Impact Name	Economic Impacts Created as a Result of a Full Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Maritime Tourism Operations	Total Quantified Economic Impact
Impact Definition	Impact Effect	⊕ Temporary	⊖ Temporary	⊖ Temporary	⊖ Temporary	Total Temporary
	Economic Value Added/Subtracted from the Economy	R342 562 500	-R75 567 254	-R36 487 026	-R119 742 857	R110 765 363
Financial Impact (Taxes)	VAT	R28 156 534	-6 181 465	-2 847 049	-9 343 424	R9 784 597
	Custom Duties	R1 504 842	-397 359	-187 400	-615 008	R305 075
	Excise Levies	R845 180	-173 496	-82 912	-272 099	R316 674
	Fuel Levies	R6 938 716	-2 270 177	-1 920 402	-6 302 361	-R3 554 224

	Impact Name	Economic Impacts Created as a Result of a Full Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Maritime Tourism Operations	Total Quantified Economic Impact
	Other Taxes	R6 075 910	-1 347 413	-630 888	-2 070 444	R2 027 164
	Production Taxes	R26 199 064	-3 555 179	-2 166 325	-7 109 429	R13 368 131
	Corporate Taxes	R38 357 237	-20 223 725	-3 835 831	-12 588 402	R1 709 280
	Personal Taxes	R88 007 309	-R18 248 796	-R7 999 554	-R26 252 877	R35 506 082
	Total Taxes	R196 084 792	-R52 397 609	-R19 670 360	-R64 554 044	R59 462 779
Economic Impact	Gross domestic product at market prices	R928 953 289	-R192 056 244	-R85 729 433	-R281 346 228	R369 821 384
	Additional Business Sales	R1 740 441 051	-R375 990 840	-R171 631 699	-R563 259 661	R629 558 851
Increased Employment Demand and Specialisation	Formal skilled	605	-114	-49	-161	281
	Formal semi-skilled	747	-218	-71	-232	227
	Formal low-skilled	447	-143	-40	-131	133
	Total Formal Employment	1 798	-475	-160	-524	640
	Informal Jobs	327	-104	-35	-114	74
Compensation of Employees	Formal skilled	R201 791 275	-R36 621 176	-R17 372 848	-R57 014 088	R90 783 162
	Formal semi-skilled	R132 538 400	-R26 844 684	-R12 886 679	-R42 291 409	R50 515 628
	Formal low-skilled	R48 907 604	-R12 547 417	-R4 995 031	-R16 392 655	R14 972 501
	Total Compensation	R383 237 278	-R76 013 277	-R35 254 558	-R115 698 152	R156 271 291
	Informal Jobs	R48 990 425	-R8 075 699	-R5 160 464	-R16 935 573	R18 818 689

	Impact Name	Economic Impacts Created as a Result of a Full Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Maritime Tourism Operations	Total Quantified Economic Impact
Increased Household Livelihoods	Household Income	R873 093 919	-R182 627 539	-R79 113 038	-R259 632 591	R351 720 751
Business Development Potential	Micro Enterprise Opportunities	10	-2	-1	-4	3
	Small Enterprise Opportunities	8	-2	-1	-3	2
	Medium Enterprise Opportunities	4	-1	0	-1	1
	Total SMME Opportunities	22	-5	-2	-8	7
	Total SMME Opportunities (Black Owned)	16	-3	-2	-5	5

Source: DEMACON Modelling, 2024

The occurrence of a crude oil well blowout scenario has the potential to generate economic activity through expenditure on oil spill response strategies, while simultaneously disrupting the economic activity of industries such as commercial fishing, maritime logistics, and maritime tourism, which are affected by an oil spill event.

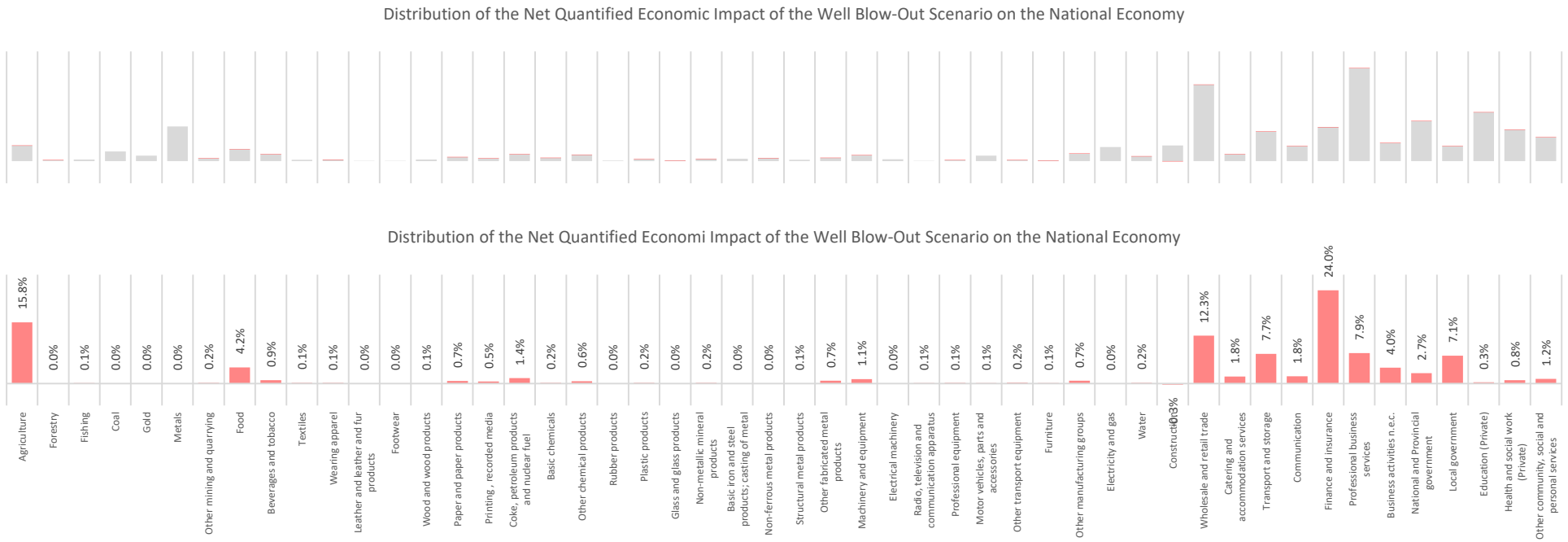
Expenditure on an oil spill response strategy, estimated to be approximately R342.6 million over a 2-month period, contrasts with disruptions to the economic output of the commercial fishing industry, maritime logistics, and maritime tourism industry. This may lead to a combined reduction in economic activity of approximately R231.8 million during the same period.

According to the economic impact model, oil spill response expenditure could generate economic activity that, due to the multiplier effect throughout the economy, contributes approximately R1.7 billion in additional business sales and R929.0 million in gross domestic product over the two-month period. However, the fishing, maritime logistics, and maritime tourism sectors may experience temporary disruptions totalling R1.1 billion in business sales and R559.1 million in gross domestic product.

Expenditure on an oil spill response strategy is projected to temporarily stimulate additional compensation for temporary jobs (approximately R383.2 million) and increase household incomes by R873.1 million during the two-month period. Conversely, compensation for employees in sectors such as fishing, logistics, and tourism may experience temporary disruptions, resulting in reduced employee compensation (R257.1 million) and household income (R521.4 million) across all disrupted industries.

While the heightened economic activity may stimulate demand for new businesses, the temporary nature of the response strategy may limit the realisation of long-term business establishment. In summary, expenditure on an oil spill response strategy could generate multiplier effects throughout the economy due to increased economic activity, while disruptions to several economic sectors resulting from an oil spill event could reduce economic output and activity in affected industries and their value chains.

Figure 9.6: Detailed Distribution of the Total Quantified Economic Impact on the National and Western Cape Provincial Economy



Source: DEMACON Modelling, 2024

9.6.2.4 Qualitative Impact Assessment

The purpose of the qualitative economic impact assessment is to complement and enhance the quantitative assessment by providing a comprehensive understanding of the broader range of potential impacts that could result from the crude oil well blow-out scenario. The purpose of the qualitative economic impact assessment is to:

- Assess each relevant impact identified based on an impact assessment framework that measures the risk of an impact based on factors such as nature, extent, duration, probability and magnitude and
- Determine a significance rating for each impact and based on the nature of the impact identify and provide mitigation measures and alternatives

The section outlines the potential qualitative impacts that could arise during the unlikely event that a crude oil well-blow out event occurs during the operational phase of the exploration activity. Additionally, potential mitigation measures to ensure that negative impacts are minimised, and positive impacts are enhanced within the local community and economy are identified.

The assessment is based on the methodology outlined in Section 9.2.2 of this report.

9.6.2.4.1 Operational Phase Qualitative Impact Assessment

9.6.2.4.1.1 Economic Impact of the Full Oil Spill Response Strategy for a Crude Oil Well Blow-Out Scenario

A full response strategy for an unlikely crude oil well blow-out event could have a sizeable impact on the receiving economy by generating additional economic

output – the quantitative analysis reveals that the operational expenditure of the full oil spill response for a single well blow-out could be as much as R342 million, stimulating nearly R1.0 billion in additional GDP and R1.7 billion in additional business sales). This additional output could be the result of operational expenditures across the entire value chain of the capping oil spill response strategy, including both backward and forward linkages. These expenditures could create direct, indirect, and induced effects, leading to increased economic production and the demand for related services and inputs.

The capping only oil spill response strategy's direct effects refer to the immediate economic activities directly related to the oil spill response process itself and the effect that it has on the industry within which it operates. This includes the expenditure on equipment, personnel, input and output requirements, etc.

The indirect effects arise from the interconnections and transactions between the oil spill response strategy activities and other sectors of the economy. For instance, the increased demand for goods and services from suppliers and contractors who provide equipment, transportation, and support services for the response activity.

The induced effects occur as a result of increased spending by employees and businesses associated with the value chain of the oil spill response industry. Employees have increased disposable income which could lead to increased consumption expenditure.

The impact generated by the full oil spill response activity could contribute to the overall output of the broader provincial and national economy and consequently could additional economic activity for businesses and local communities.

The following economic impacts could occur as a result of the full oil spill response activity:

- The oil spill response activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the response period of exploration could lead to additional business sales throughout the response industry's value chain (increased economic output, production and gross value added)
- New employment opportunities throughout the response industry's value chain could be stimulated as a result of the increased demand generated by the response activity
- The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)
- The response activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result impacts on the fiscal value (i.e., taxes) collected by government

Mitigation Measures

- The impact should, as far as possible, focus on sourcing inputs from the receiving economy, i.e., businesses located in the immediate economy. Localised sourcing enables local businesses to benefit from economic opportunities in the receiving economy
- Personnel contracted for the oil spill response of a crude oil spill should be trained to provide safe and effective oil response strategies relevant to the projects oil spill response strategy (whether capping or a combination of responses)
- Ensure that a detailed oil spill response strategy is developed that can provide a myriad of options that can enable fast and efficient situation specific oil spill responses. All contractual arrangements and coordination strategies should be in place with the providers of oil spill responses in South Africa to ensure efficiency and effectiveness.

Cumulative Impacts

- The overall impact could create value throughout the backward linking industries required to support operations and therefore could generate additional economic activity in the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.6.2.4.1.2 Impact of a Well Blow-Out Event on the Commercial Fishing Industry

An analysis of the updated Fisheries Baseline and Impact Assessment Report (2024) indicates that a crude oil well blow-out event could have the potential to

impact the normal operational context of the commercial fishing industry in the receiving economy. Consequently, the fishing industry may face limitations on its usual operations and may not be able to operate at normal levels within the areas of interest and associated areas of impact.

The commercial fishing industry could, for a temporary period, loose operational efficiency by not having access to the areas of interest affected by a crude oil well blow-out event. As a consequence, the loss of operational efficiency (reduced fishing grounds) impacts on the economic function of the receiving economy's commercial fishing industry and could likely impact on the economic output produced by the fishing industry's value chain (backward and forward linkages).

Furthermore, the fishing industry in the receiving economy is identified as a basic sector of the economy, which positions the industry as a core component of the receiving economy's production and employment potential and offers the receiving economy a competitive advantage over other economic regions. This is especially true for several smaller sub-regional economies in the overarching economy where the fishing industry is a key producer of economic output and employment.

It should be noted that the likelihood that the fishing industry is impacted varies depending on the projected scope of surface contamination relative to the proximity of fishing grounds. Data from the Fisheries Baseline and Impact Assessment Report (2024) identifies that a probability exists that several commercial fishing industries could be affected by a crude oil spill event given the aspects that inform the worst-case scenario of surface oiling.

The following economic impacts could occur as a result of a worst-case scenario well blow-out of crude oil on the receiving economy's fishing industry:

- A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline, tuna pole-line, demersal trawl and demersal longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event
- The occurrence of a well blow-out event and the resultant presence of crude oil could impact the recruitment and replacement of commercial fish stocks. An overlap exists between passively drifting spawn products (eggs and larvae) and areas with a low to moderate probability of oil spills (20% to 40%). This overlap could potentially lead to reduced recruitment rates and/or loss of stock of commercial fish species. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential

Mitigation Measures

- Ensure that a complete and approved oil spill response strategy is in place to assist with quick response times to limit the extent with which the industry and marine ecology is disrupted
- Coordination should be done between the exploration activity operator and relevant fisheries industry associations (such as the South Africa Tuna Longline Association, South African Pelagic Fihing Industry Association, etc.) to inform the industry of relevant oil spill scenarios and response plans
- The operator is to submit all forms of financial insurance and assurances to PASA to manage all damages and compensation requirements in the event of an unplanned pollution event. Develop strategies and execute responses according to the IPICEA-IOGP guideline document to assess economic impacts and provide compensation for marine oil releases

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the fishing industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.6.2.4.1.3 Impact of a Well Blow-Out Event on the Maritime Logistics Industry

Analysis contained this report identifies that a crude oil well blow-out event could have the potential to impact the normal operational context of the maritime logistics industry in the receiving economy.

Even though the transport and storage industry of the receiving economy is not identified as a basic sector (i.e., a sector that forms the foundation of an economy because of its potential to service local and external demand), approximately 10% of the value of imports to the country and 6% of the value of exports from South Africa travel through the Port of Cape Town, whilst the Port of Saldanha Bay exports approximately 15% of the total value of exports from South Africa. Hence, several important shipping routes travel along the West Coast of South Africa and to and from the Port of Cape Town and the Port of Saldanha Bay. Furthermore, many shipping routes travel between the Port of Cape Town and other major ports along the southern coast of South Africa.

During a well blow-out event, the maritime logistics industry may experience a temporary decline in operational efficiency due to restricted access to the affected areas and charting of alternative routes to reach destinations along the West Coast of South Africa. This loss of efficiency could have broader consequences for the receiving economy's logistics industry and is likely to impact the economic output generated by the industry's value chain, including both backward and forward linkages.

The following economic impacts could occur as a result of the proposed exploration activity's impact on the receiving economy's fishing industry:

- The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event

Mitigation Measures

- Ensure that a complete and approved oil spill response strategy is in place to assist with quick response times to limit the extent with which the industry is disrupted
- Coordination should be done between the exploration activity operator and relevant shipping industry associations (such as the South African Association of Ship Operators and Agents and the South African Association of Ship Operators and Agents) to inform the industry of relevant oil spill scenarios and response plans
- The operator is to submit all forms of financial insurance and assurances to PASA to manage all damages and compensation requirements in the event of an unplanned pollution event. Develop strategies and execute responses according to the IPICEA-IOGP guideline document to assess economic impacts and provide compensation for marine oil releases

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the maritime logistics industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

- The impact is unlikely to result in irreplaceable loss of resources.

9.6.2.4.1.4 Impact of a Well Blow-Out Event on the Maritime Tourism Industry

Analysis contained this report identifies that a crude oil well blow-out event could have the potential to impact the normal operational context of the maritime tourism industry, specifically the cruise tourism industry, in the receiving economy.

Cruise tourism is a popular and integral component of maritime tourism activities along the West Coast of South Africa. It encompasses ocean-based tourism activities conducted on cruise ships that traverse between destinations within a specific geographic area or across continents. Within the South African context, the cruise ship industry is primarily concentrated at the Port of Cape Town (Western Cape) and the Port of Durban (KwaZulu-Natal). Of particular interest

to this study is the cruise industry based at the Port of Cape Town – a renowned destination and departure point in Africa. In 2022, approximately 70 vessels visited the Port of Cape Town, bringing nearly 78,000 tourists to the Western Cape who spent nearly R1.4 billion within the domestic economy.

During a crude oil well blow-out event, the cruise tourism industry may experience a temporary decline in operational efficiency due to restricted access to the affected areas, the possibility that alternative routes cannot be established or because alternative routes may be financially unproductive. This loss of efficiency could have broader consequences for the receiving economy's tourism industry and is likely to impact the economic output generated by the industry's value chain, including both backward and forward linkages.

The following economic impacts could occur as a result of the proposed exploration activity's impact on the receiving economy's fishing industry:

- The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used cruise tourism routes. This overlap may result in disruptions to cruise line operations, as vessels may need to use alternative routes, or temporarily postpone trips along popular routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's tourism and transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event

Mitigation Measures

- Ensure that a complete and approved oil spill response strategy is in place to assist with quick response times to limit the extent with which the industry is disrupted
- Coordination should be done between the exploration activity operator and relevant cruise ship operators conducting tours to and from the Port of Cape Town (e.g., MSC, Whitestar, etc.) to inform the industry of relevant oil spill scenarios and response plans
- The operator is to submit all forms of financial insurance and assurances to PASA to manage all damages and compensation requirements in the event of an unplanned pollution event. Develop strategies and execute responses according to the IPICEA-IOGP guideline document to assess economic impacts and provide compensation for marine oil releases

Cumulative Impacts

- The overall impact could diminish value throughout the backward and forward linking industries required to support the cruise tourism industry and therefore could limit economic benefits to the receiving, provincial and national economy. It is, however, important to note that the impact will not necessarily result in a spatial and temporal cumulative change.

Irreplaceable Loss of Resources

The impact is unlikely to result in irreplaceable loss of resources.

9.6.2.4.2 Measurement of Qualitative Impacts

The preceding sections discussed and identified economic impacts that may arise during the unlikely event that a crude oil well blow-out scenario occurs. The sections explored different economic impacts as part of several economic impact themes and identified the cumulative and loss of resource potential of the different impact themes. Mitigation measures were also identified.

Considering the preceding, the following table provides information regarding the measurement of economic impacts within the qualitative impact assessment framework as described and applied in Sections 9.2 and 9.5 of this report.

Subsequent to Table 9.14, Table 9.15 provides an overview of the final significance rating of each impact and the context of each rating's value.

Table 9.17: Measurement of the Crude Oil Well Blow-Out Scenario Qualitative Impacts

			Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		
Theme	**Impact**	**Phase**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Pre-Mitigation Environmental Risk**	Extent	Duration	Magnitude	Reversibility	Nature	Probability	**Post-Mitigation Environmental Risk**	Cumulative Impact	Irreplaceable Loss of Resources	**Final Impact Significance**
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The oil spill response activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the response period of exploration could lead to additional business sales throughout the response industry's value chain (increased economic output, production and gross value added)	Operational Phase	5	1	2	1	1	1	**2**	5	1	3	1	1	1	**3**	2	1	**3**
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	5	1	1	1	1	1	**2**	5	1	1	1	1	1	**2**	2	1	**2**
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	5	1	1	1	1	1	**2**	5	1	2	1	1	1	**2**	2	1	**3**
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline, tuna pole-line, demersal trawl and demersal longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As	Operational Phase	5	1	4	3	-1	1	**-3**	4	1	3	3	-1	1	**-3**	2	1	**-3**

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
	a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event																		
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	The occurrence of a well blow-out event and the resultant presence of crude oil could impact the recruitment and replacement of commercial fish stocks. An overlap exists between passively drifting spawn products (eggs and larvae) and areas with a low to moderate probability of oil spills (20% to 40%). This overlap could potentially lead to reduced recruitment rates and/or loss of stock of commercial fish species. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential	Operational Phase	5	2	4	3	-1	1	**-4**	4	2	3	3	-1	1	**-3**	2	1	**-3**

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		Final Impact Significance
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event	Operational Phase	5	1	4	3	-1	1	**-3**	4	1	3	3	-1	1	**-3**	2	1	**-3**
Impact of a Well Blow-Out Event on the Maritime Tourism Industry	· The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used cruise tourism routes. This overlap may result in disruptions to cruise line operations, as vessels may need to use alternative routes, or temporarily postpone trips along popular routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and	Operational Phase	5	1	4	3	-1	1	**-3**	4	1	3	3	-1	1	**-3**	2	1	**-3**

Theme	Impact	Phase	Pre-Mitigation							Post-Mitigation							Priority Factor Criteria		
			Extent	Duration	Magnitude	Reversibility	Nature	Probability	Pre-Mitigation Environmental Risk	Extent	Duration	Magnitude	Reversibility	Nature	Probability	Post-Mitigation Environmental Risk	Cumulative Impact	Irreplaceable Loss of Resources	Final Impact Significance
	gross value added) within the receiving economy's tourism and transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event																		

Source: DEMACON, 2024

The following table presents an overview of the previous table's outcomes, emphasising the final impact significance rating along with its descriptive context.

Table 9.18: Overview of the Final Impact Significance Rating of Each Impact Measured for the Crude Oil Well Blow-Out Scenario

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The oil spill response activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the response period of exploration could lead to additional business sales throughout the response industry's value chain (increased economic output, production and gross value added)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline, tuna pole-line, demersal trawl and demersal longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	The occurrence of a well blow-out event and the resultant presence of crude oil could impact the recruitment and replacement of commercial fish stocks. An overlap exists between passively drifting spawn products (eggs and larvae) and areas with a low to moderate probability of oil spills (20% to 40%). This overlap could potentially lead to reduced recruitment rates and/or loss of stock of commercial fish species. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential		-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of a Well Blow-Out Event on the Maritime Tourism Industry	· The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used cruise tourism routes. This overlap may result in disruptions to cruise line operations, as vessels may need to use alternative routes, or temporarily postpone trips along popular routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's tourism and transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event		-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Source: DEMACON, 2024

9.7 SYNTHESIS

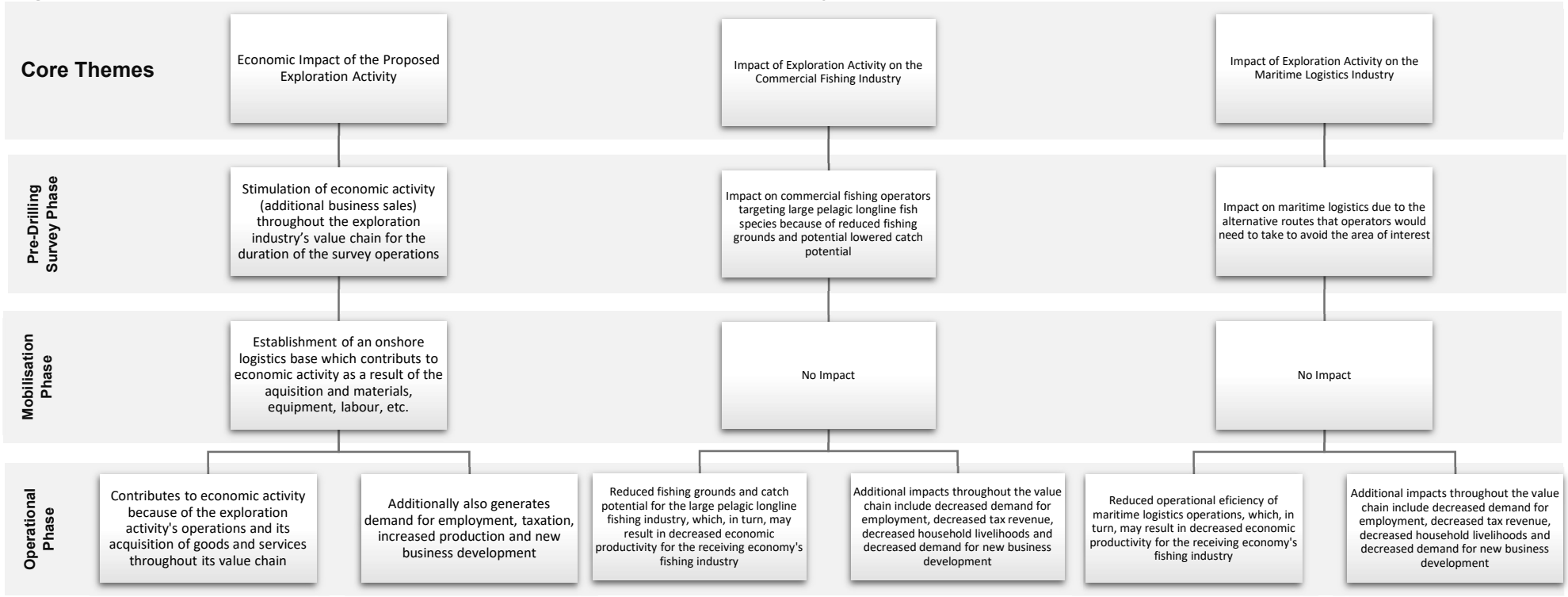
The objective of this chapter is to evaluate the economic impact that may arise from the proposed exploration activity as well as the effects that a well blow-out scenario could have on the economy by identifying economic impacts relevant to the activities and measuring these impacts within a quantitative and qualitative impact assessment methodology.

Based on the profiling and analysis of the receiving economy, a range of overarching economic impacts associated with the exploration activity and blow-out scenarios has been identified. These overarching impacts serve as core themes within which specific economic impacts related to each theme have been identified. The identified impacts are also associated with specific project phases, allowing for a comprehensive review of economic impacts throughout the project process.

Exploration Activity Synthesis and Key Outcomes

The diagram presents an overview of the core economic impact themes associated with the proposed exploration activity, along with the specific economic impacts identified for each theme.

Diagram 9.10: Core Themes of the Economic Impact Assessment of the Exploration Activity



The diagram shows that three core themes are identified in association with the economic impact that the proposed exploration activity could have on the receiving economy and its linkages.

The first core theme represents the economic impact that could arise from the proposed exploration activity and its operational lifecycle (i.e., pre-drilling surveys, mobilisation phase, operational phase and demobilisation phase). The proposed exploration activity is expected to have a positive impact on the receiving economy by generating additional economic output. This could result from operational expenditure throughout the exploration industry's value chain, creating direct, indirect, and induced effects on various aspects of the economy, including increased production, gross domestic product, fiscal output, jobs, sector-specific skills demand, employee remuneration, and household income.

However, the impact is temporary since the exploration activity could last between 3 to 4 months per well. The activity's base of operations in either the City of Cape Town or Saldanha Bay will primarily affect the economic context of the Western Cape Province. Nevertheless, the exploration industry's effects are

expected to extend beyond the province, influencing areas throughout the South African economy.

The second core economic impact theme is based on the exploration project's potential impact on the commercial fishing industry of the receiving economy, particularly the large pelagic longline fishing industry. The areas of interest for exploration overlap with the fishing industry's operations, leading to a temporary loss of operational efficiency for about 4 to 20 months. This loss affects the economic output of the fishing industry's value chain, including backward and forward linkages.

The operational impact on the fishing industry could result in temporary reductions in economic output, gross domestic product, fiscal output (taxes), jobs, sector-specific skills demand, employee remuneration, and household income.

Most of the fishing industry's operators and economic production are located in the Saldanha Bay, Blaauwberg, Table Bay, Swartland, Bergrivier, and Cederberg sub-regional economies, primarily impacting the economic context of the Western Cape Province. However, the fishing industry's effects are expected to extend beyond the province, influencing areas throughout the South African economy.

The temporary loss of operational efficiency could also lead to a temporary subtraction from the overall output of the broader provincial and national economy, potentially reducing the benefits for businesses and local communities derived from the industry.

The third core economic impact theme is based on the exploration project's potential impact on the maritime logistics industry, particularly in the areas of interest that overlap with major maritime logistics routes along the West Coast of South Africa. The exploration activity could lead to a temporary loss of operational efficiency for about 4 to 20 months, affecting the economic output of the logistics industry's value chain, including backward and forward linkages.

The operational impact on the logistics industry could result in temporary reductions in economic output, gross domestic product, fiscal output (taxes), jobs, demand for specific skills, employee remuneration, and household income.

Most of the transport and storage industry's economic production is concentrated in the Saldanha Bay, Blaauwberg, and Table Bay sub-regional economies, primarily impacting the economic context of the Western Cape Province. However, the effects of the logistics industry are expected to extend beyond the province, influencing areas throughout the South African economy.

The temporary loss of operational efficiency could also lead to a temporary subtraction from the overall output of the broader provincial and national economy, potentially reducing the benefits that businesses and local communities derive from the industry.

Other potential areas of economic impact were also explored and considered based on the potential of the exploration project to influence the economic capability of a potentially affected industry. The tourism and telecommunications industries were reviewed, and data suggests that the proposed exploration activity does not have any significant impact on the operation or potential of these sectors to generate economic output.

Considering that the proposed exploration activity could influence the economic potential of several industries in the receiving economy, the quantitative economic impact assessment revealed that the proposed exploration activity could create a net positive impact on the overall economy.

The quantitative economic impact assessment shows that although economic productivity could be reduced in the receiving economy's commercial fishing and logistics industries, the economic activity stimulated by the exploration activity could surpass the net negative impact of the project.

The economic impact model shows that the exploration activity's operational value added to the economy would result in a gain for the economy, with approximately R4.1 billion in additional business sales and R2.2 billion in gross domestic product created over the total operational lifespan of the exploration project. Additionally, increased economic activity could lead to the need for nearly 4 960 temporary jobs during the project's lifespan and more than R1.0 billion in employee compensation. The project could also stimulate more than R457.5 million in taxes throughout its value chain and during its lifespan, whilst also providing a basis from which 40 business opportunities could be expanded and/or created.

However, the fishing and maritime logistics industries may temporarily experience a decrease of economic output due to the interruption caused by the exploration activity to the normal operational efficiency of the industries. Over the

exploration project's lifespan, the commercial fishing and logistics industries could experience a decrease of R783.9 million in business sales and R392.0 million in gross domestic product. Furthermore, demand for employment could be lowered by 905 jobs accounting for more than R184 million employee compensation. As a result, the fiscal value generated by the public sector could decrease by approximately R908 million. Demand for new businesses or expansion of existing businesses could be decreased by 10 opportunities.

The quantitative economic impact model indicates that the proposed exploration activity could have an overall positive contribution to the receiving, provincial, and national economy. While the commercial fishing and maritime logistics industries may experience adverse effects during the exploration period, the economic gains from the exploration activity are expected to outweigh the negative impacts.

It's essential to recognize that the positive economic gains are temporary and directly linked to the project's lifespan, which is estimated to be between 20 and 24 months. Once the exploration operations wind down and the project concludes, the disruptions faced by the fishing and logistics industries, such as reduced fishing grounds and the use of alternative shipping routes, could cease. Over time, the economic productivity lost due to exploration activities can be regained.

Considering that the quantitative economic impact model identifies that the proposed exploration activity could generate positive economic value for the receiving economy, the qualitative impact assessment is used to complement and enhance the quantitative assessment by providing a comprehensive understanding of the broader range of potential impacts that could result from the exploration activity.

The qualitative impact assessment identifies that the proposed exploration activity could provide a positive impact on the receiving economy during its operation. The negative effects created by the exploration activity, particularly on the commercial fishing and maritime logistics industries, could be managed, and as a result mitigate the severity with which the exploration activity impacts on the economic productivity of the industries affected.

During the pre-drilling phase, the proposed exploration activity's pre-drilling surveys could disrupt commercial fishing activities and commercial logistics operations. By coordinating survey operations with fishing and logistics operations, the impact generated by pre-drilling surveys can be mitigated.

The mobilisation phase of the project could primarily generate a positive impact on the receiving and wider economy. The mobilisation phase focusses on the establishment of an onshore logistics base, and as a result, the operational expenditure of the base's establishment could stimulate positive economic benefits in the form of employment, the sourcing of goods and services from the value chain and increased taxes. The logistics base could however impose additional stresses on bulk infrastructure and could lead to an increased maintenance burden. This impact is relevant for the duration of the project's operation.

The operational phase of the exploration activity generates positive impacts on the receiving, provincial and national economy as a result of expenditure on goods and services throughout the value chain. The activity also stimulated demand for employment, business growth and additional taxes. The effects imposed on the commercial fishing industry and maritime logistics industry create negative impacts on economic function such as demand for production, employment, GDP and business growth and development. Mitigation in the form of coordinate approaches to exploration and fishing/logistics operations could limit the effects of disrupted fishing locations and shipping lands, whilst job retention strategies and skills development could create a coordinate response to potential lowered demand for employment.

Overall, the impacts of the operational phase are expected to be positive.

Given the size of the benefit that the exploration activity could add to the receiving economy, the overall outcome of the demobilisation phase is negative.

Given the analyses provided in this chapter, the data suggests that the proposed exploration activity could create net benefits to the receiving economy and as result offer enhanced economic output and development. The effects created by the exploration project on the receiving economy and specific industries in the receiving economy could be minimised through effective and coordinated planning (which includes coordinated planning with interested and affected parties).

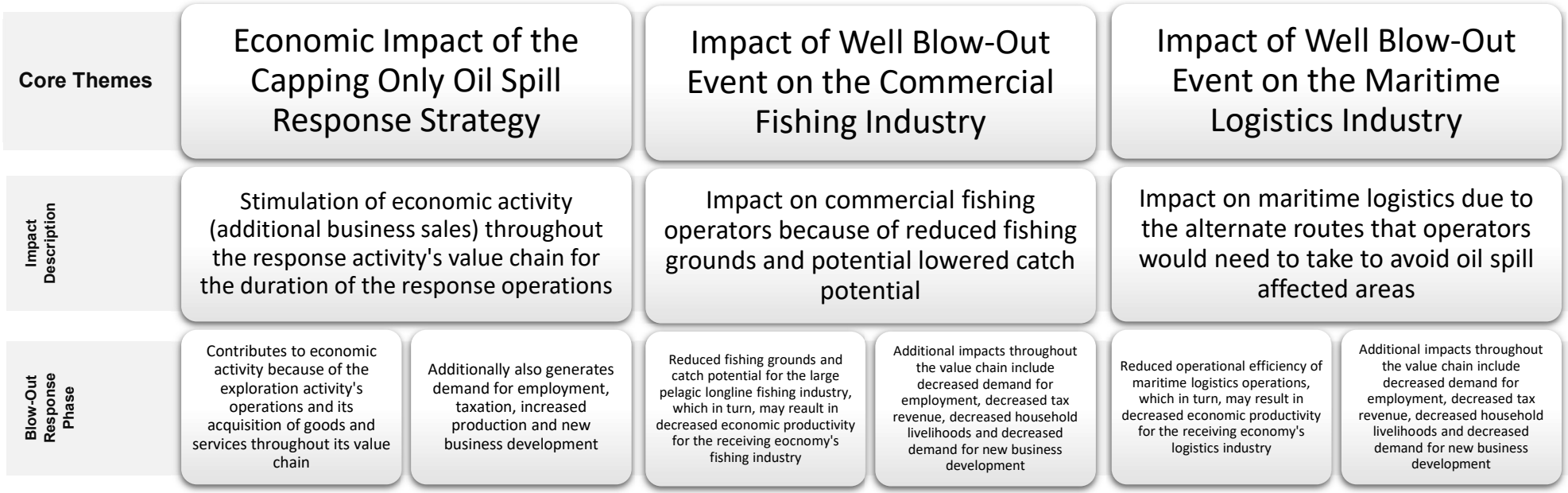
Well Blow-Out Scenarios Synthesis and Key Outcomes

In order to consider the effects of such a subsea blow-out scenario, an Oil Spill Drift Modelling Condensate and Crude Oil Technical Report[37] was drafted. The report modelled the possible fates and trajectories of an oil spill from a subsea blow-out during exploration operations in the area of interest of the of the Block 3B/4B exploration right area. The Technical Report identifies two spill scenarios. The **first scenario refers to a subsea blow-out of a condensate hydrocarbon** whilst the **second scenario considers a subsea blow-out of crude oil**.

Based on the considerations of the Technical Report, two unplanned event scenarios are considered in this Report. The first scenario is the economic impact assessment of a condensate hydrocarbon subsea blow-out event and the second scenario is an economic impact assessment of a crude oil subsea blow-out event.

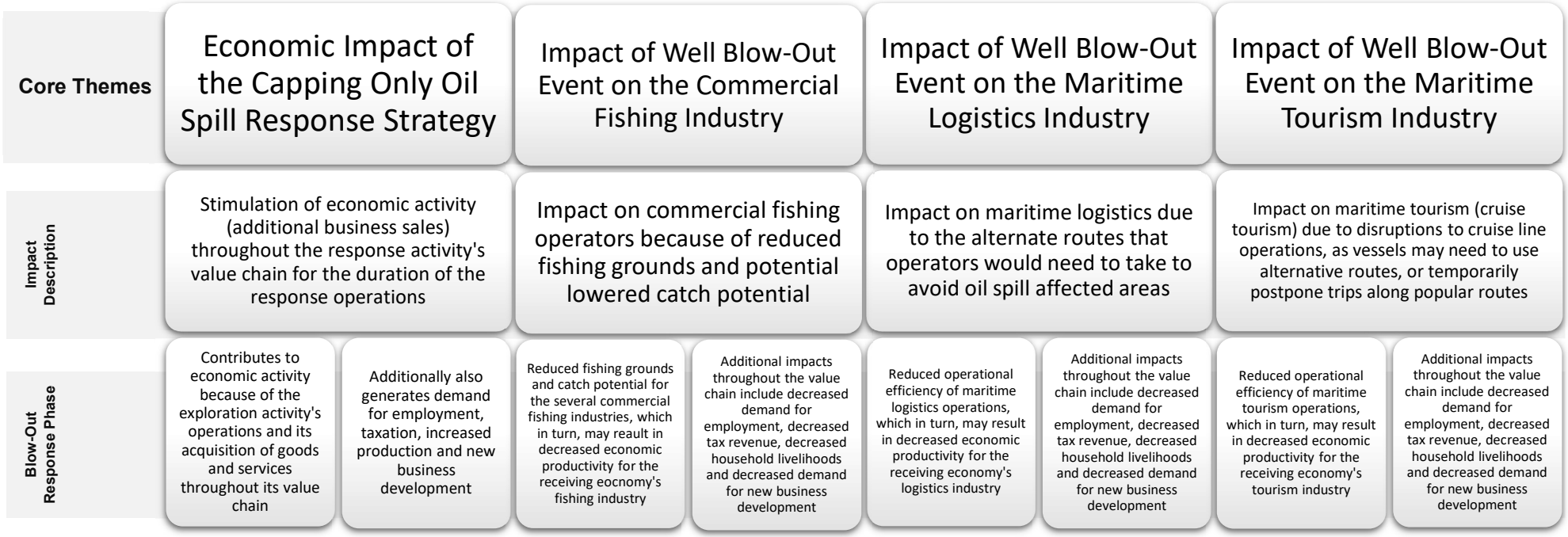
The following diagrams present an overview of the core economic impact themes associated with each well blow-out scenario modelled for the proposed exploration activity, along with the specific economic impacts identified for each theme.

Diagram 9.11: Core Themes of the Economic Impact Assessment of the Condensate Hydrocarbon Well Blow-Out Scenario



[37] Source: Oil Spill Drift Modelling Condensate and Crude Oil Technical Report v4

Diagram 9.12: Core Themes of the Economic Impact Assessment of the Crude Oil Hydrocarbon Well Blow-Out Scenario



The economic impact of a well blow-out scenario for both the condensate and crude oil hydrocarbon spill scenarios on the receiving economy and its linkages can be summarized through four core themes.

The first theme centers around the economic consequences of the oil spill response and its operations. In both the condensate and hydrocarbon spill event scenarios a capping oil spill response activity is tested, spanning an operational lifecycle of 20 days post the well blow-out event. It is identified that in the event of a crude oil hydrocarbon spill event that additional response measures may be needed to ensure that surface oil does not affect coastal locations – this event is highly unlikely. This phase yields a positive impact on the receiving economy, driven by increased economic output. The operational expenditure throughout the response activity's value chain creates direct, indirect, and induced effects on various facets of the economy. These effects encompass heightened production, gross domestic product, fiscal output, job creation, sector-specific skills demand, employee remuneration, and household income. However, it's crucial to note that this impact is temporary, as the response activity addresses the root cause of the well blow-out and subsequently ceases to provide an operational function.

The second core economic impact theme focuses on the potential ramifications for the commercial fishing industry in the affected economy. A well blowout occurring in the area of interest for exploration activity creates an overlapping impact zone with the operations of the fishing industry. The extent of the industry's disruption depends on the projected scope of surface contamination in relation to the proximity of fishing grounds. The impact on the commercial fishing industry differs between condensate and crude oil hydrocarbon scenarios, with the latter having a greater zone of impact. Nevertheless, both scenarios result in a temporary loss of operational efficiency lasting approximately 1 to 2 months. Additionally, in a crude oil hydrocarbon spill scenario, the presence of crude oil could impact the recruitment and replacement of commercial fish stocks, leading to reduced recruitment rates in the short term,

which could affect catching potential. These setbacks influence the economic output of the fishing industry's value chain, including both backward and forward linkages.

The third core economic impact theme focuses on the potential repercussions for the maritime logistics industry in the receiving economy, particularly along the West Coast of South Africa. In the event of a hydrocarbon blowout, the maritime logistics industry may experience a temporary decline in operational efficiency lasting one to two months. This would result from restricted access to affected areas and the necessity to chart alternative routes to destinations along the West Coast of South Africa. Additionally, the extent of the industry's impact from an oil spill event depends on the projected scope of surface contamination. A crude oil hydrocarbon release scenario affects a larger area compared to a condensate hydrocarbon release scenario. This temporary setback affects the economic output of the maritime logistics industry's value chain, encompassing both backward and forward linkages.

The fourth core economic impact theme focuses on the potential repercussions for the maritime tourism industry in the receiving economy, particularly the cruise tourism sector. In the event of a hydrocarbon blowout, the maritime tourism industry may experience a temporary decline in operational efficiency lasting one to two months. This would occur due to restricted access to affected areas and the necessity to chart alternative routes to destinations along the West Coast of South Africa. Additionally, the extent of the industry's impact from an oil spill event depends on the projected scope of surface contamination. A crude oil hydrocarbon release scenario typically results in a greater area being affected compared to a condensate hydrocarbon release scenario. This temporary setback affects the economic output of the maritime tourism industry's value chain, encompassing both backward and forward linkages.

In light of the inherent disruptive nature of oil spillage and the subsequent response operations, a quantitative economic impact assessment was conducted to shed light on the potential economic effects that the condensate and crude oil hydrocarbon well blow-out scenarios could have on various industries in the receiving economy.

The assessment reveals that while a well blowout event could potentially disrupt multiple sectors such as commercial fishing, maritime logistics, and maritime tourism, an oil spill response strategy could stimulate economic activity within the economy. This is due to the multiplier effect that expenditure related to the oil spill response could generate.

Based on the quantitative economic impact assessment of both condensate and crude oil hydrocarbon spill scenarios, the commercial fishing, maritime logistics, and maritime tourism industries may experience a reduction in economic productivity due to the interruption of their normal operational efficiency by the well blowout event. However, the changes in economic activity within the economy resulting from reduced productivity in these sectors could be outweighed by the economic activity stimulated by response efforts.

The economic impact model indicates that the expenditure related to an oil spill response (approximately R342.6 million) that could be spent in the South African economy could generate approximately R1.7 billion in additional business sales and contribute R929.0 million to the gross domestic product over the total oil spill response period – is representative of the multiplier effect created as a result of expenditure in the economy. Moreover, the heightened economic activity could necessitate nearly 1 800 temporary jobs, resulting in over R383.2 million in employee compensation. The response activity could also stimulate more than R196.1 million in additional taxes throughout its value chain during the oil spill response period.

However, industries such as commercial fishing, maritime logistics, and maritime tourism could be disrupted by an oil spill event, resulting in reduced operational efficiency. This, in turn, could impact the economic output produced by these industries.

In the case of the condensate hydrocarbon spill scenario, the commercial fishing and maritime logistics industries are primarily affected. Over the lifespan of the well blowout event, these industries could face disruptions to economic output totalling approximately R16.6 million. Based on the multiplier effect of changes to economic activity, approximately R78.4 million in business sales and R39.2 million in gross domestic product could be affected throughout the economy. Additionally, there might be a temporary decrease in employment demand by 90 jobs, accounting for more than R18.4 million in employee compensation. Consequently, the fiscal value generated by the public sector could temporarily decrease by approximately R9.1 million.

Alternatively, when considering the crude oil hydrocarbon spill scenario, the commercial fishing, maritime logistics and maritime tourism industries are

primarily affected. Over the lifespan of the well blowout event, these industries could face disruptions to economic output totalling approximately R231.8 million. Based on the multiplier effect of changes to economic activity, approximately R1.1 billion in business sales and R559.1 million in gross domestic product could be affected throughout the economy. Additionally, there might be a temporary decrease in employment demand by 1 158 jobs, accounting for more than R227.0 million in employee compensation. Consequently, the fiscal value generated by the public sector could temporarily decrease by approximately R136.6 million.

The quantitative economic impact modelling of the condensate and crude oil hydrocarbon spill scenarios identifies that economic output and activity in the commercial fishing, maritime logistics, and maritime tourism industries could be reduced during a well blowout event and response period. Similarly, changes to economic activity resulting from expenditure on oil spill response strategies could create additional economic activity due to the multiplier effect that additional expenditure has on the economy. However, it is important to note that disruptions and changes to economic activity are temporary and directly tied to the response period of the well blowout event, estimated to last between 1 to 2 months. Residual impacts on the commercial fishing industry could, however, create short-term effects on economic output and productivity due to the impact that crude oil spills could have on recruitment rates of commercial fish. These residual impacts are primarily related to the crude oil hydrocarbon spill event scenario.

Changes in economic productivity and output during an oil spill and response period could affect economic activity at the levels of the receiving, provincial, and national economies. This is primarily due to expenditures throughout the value chain of various industries influenced by an oil spill event or benefiting from expenditures related to oil spill responses. Such economic activity not only impacts employment demand but also has fiscal implications and encourages additional consumption expenditure. It is important to note, however, that the implementation of a robust oil spill response strategy, along with effective coordination with relevant industries, has the potential to mitigate the some of the disruptive effects on fishing locations, shipping lanes and cruise tourism activity.

10 CONCLUSION

10.1 INTRODUCTION

The purpose of the study is to undertake an impact assessment of the receiving economy within which the proposed Block 3B/4B exploration activity will operate in order to determine the likely effect that the proposed exploration activity could have on the receiving environment's overarching economic context. The assessment, therefore, assists with the quantification of the overall economic impact of exploration activities by identifying and measuring impacts that could contribute or subtract from the established economic ecosystem of the project's receiving environment.

The study explored the legislative and policy framework within which the economic function of exploration is identified and guided. The report also focused on defining and profiling the receiving economy that the proposed exploration activity will likely impact whilst also considering the potential economic functions and/or qualities that the proposed exploration activity could influence, thereby allowing for the identification of economic impacts.

By making use of a quantitative and qualitative economic impact assessment framework, the identified impacts are measured within an economic context in order to establish the extent with which the proposed exploration activity could impact on the receiving economy. The assessment allows for the identification of mitigation measures that focus on either enhancing positive impacts or limiting negative impacts.

The purpose of this chapter is to provide a conclusion of the analyses contained in the report and provide a concise summary of the outcomes related to the economic impact assessment.

10.2 ECONOMIC IMPACT ASSESSMENT SUMMARY

National and provincial development planning identify the need to undertake exploration activities to identify and quantify natural gas and associated petroleum resources and exploitation opportunities. The National Marine Spatial Planning Framework acknowledges the need for a regulatory framework within which exploration can occur, especially within offshore locations where a sizeable concentration of South Africa's hydrocarbon deposits are located. Furthermore, the National Development Plan identifies the potential of hydrocarbon reserves along the West Coast of South Africa as a commercial option within the South African economy and its potential as a long-term growth driver.

Although the production of petroleum resources in South Africa's offshore economic zones is limited, data suggests that exploration activities have been accelerating over the past 10-years. Data shows that approximately 50% of the South African Maritime Exclusive Economic Zone (EEZ) has been allocated to either an exploration right, production right or has some form of exploration or production right pending. The West Coast of South Africa represents a prominent offshore exploration area within which new production locations are being established and which could, in future, be a key location where offshore production activities are located.

Given that exploration of hydrocarbon resources is identified at various planning levels as a key development opportunity for the national economy and given the accelerating interest in offshore exploration in South Africa, the proposed exploration activity within the Block 3B/4B Exploration Right algins with national and provincial development aspirations and trends.

Besides the exploration activity's alignment with national and provincial planning objectives and aspirations, the exploration activity could impact on the receiving environment/economy within which it is located. Analysis of the proposed exploration activity within the context of the receiving economy shows that exploration activities could directly and indirectly impact on the receiving economy. The direct impact could manifest in the form of the multiplier effect of economic output generated by the industry throughout its value chain and consequently encourage additional output, gross value added, livelihood improvements, and employment. Indirect impacts occur as a result of the exploration activity altering key inputs and dependencies of the receiving economy by disrupting the status quo of industries and in effect creating a multiplier effect throughout an industry's value chain.

Further analyses of the exploration activity within the context of the receiving economy identified various economic impacts associated with the exploration activity. These impacts fall under three core themes: direct economic impact from the exploration activity itself, the exploration activity's impact on the commercial

fishing industry, and the exploration activity's impact on the maritime logistics industry.

Considering the preceding impacts within the context of the quantitative impact assessment reveals that during the exploration project's lifespan, the commercial fishing and maritime logistics industries may experience temporary reductions in economic productivity. The reduction of economic productivity is a result of operational disruptions caused by the exploration activity in the form of reduced fishing areas and limited access to traditional shipping routes. The disruptions lead to impacts on the industries' (and their value chains) capacity to produce economic output and as a result sustain employment demand, generate new business opportunities, support household livelihoods and the generation of taxes. However, the positive gains from the exploration activity are expected to outweigh these negative impacts. The economic impact model shows that the economy could experience a net gain during the project's operation, with increased business sales, GDP, and job opportunities created as a result of the sizeable operational expenditure required to undertake the exploration activity.

Table 10.1: Quantified Economic Impact of the Proposed Exploration Activity

Economic Impact Name	Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest	Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Economic Value Added/Subtracted by Each Industry	R799 312 500	-R8 073 606	-R158 110 447	R633 128 447
Additional Business Sales	R4 061 029 119	-R40 170 864	-R743 737 363	R3 277 120 893
Additional Gross Domestic Product	R2 167 557 675	-R20 519 290	-R371 494 208	R1 775 544 176
Additional Taxes	R457 531 182	-R5 598 161	-R85 238 226	R366 694 794
Additional Formal Employment Compensation	R894 220 316	-R8 121 259	-R152 769 752	R733 329 305
Additional Household Income	R2 037 219 144	-R19 511 928	-R342 823 163	R1 674 884 053
Additional Formal Employment	4 196	-51	-692	3 454
Additional SMME Opportunities	50	-1	-10	40
Additional SMME Opportunities (Black Owned)	37	0	-7	29

Source: DEMACON Impact Modelling, 2023

Additionally, the qualitative impact assessment indicates that the proposed exploration activity could have a positive impact on the receiving economy during its operation. While negative effects on the commercial fishing and maritime logistics industries are anticipated, these impacts can be managed through coordinated mitigation strategies.

During the pre-drilling phase, the survey of drilling locations by a survey vessel may disrupt fishing and logistics operations, but coordinating survey activities with these industries can minimise the impact.

The mobilization phase, focused on establishing an onshore logistics base, is expected to generate positive economic benefits such as additional business

transactions throughout the exploration industry's value chain, additional employment, and increased taxes. However, it may also impose additional stresses on bulk infrastructure, leading to an increased maintenance burden.

The qualitative analysis also identifies that the operational phase is expected to have overall positive impacts on the receiving, provincial, and national economy. It could stimulate demand for goods, services, and employment throughout the value chain, leading to business growth and additional tax revenue. Nevertheless, it may negatively affect the commercial fishing and logistics industries, impacting production, employment, GDP, and business growth. Coordinating exploration activities and fishing/logistics operations coupled with strategies for job retention and skills development can mitigate these negative effects.

Table 10.2: Overview of the Final Impact Significance Rating of Each Impact Measured

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Stimulation of economic activity (additional business sales) throughout the exploration industry's value chain for the duration of the survey operations	Pre-Drilling Surveys	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on commercial fishing operators targeting large pelagic longline fish species because of reduced fishing grounds and potential lowered catch potential	Pre-Drilling Surveys	-1	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Survey Vessel at Drill Sites Excludes Sea-Based Industries Operating in the Exploration Area's Area of Interest from performing Normal Operations	Impact on maritime logistics operations because of disrupted shipping routes to major ports along the South African coast. Alternate routes could impact on the economic efficiency of maritime logistics	Pre-Drilling Surveys	-1	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The establishment of the onshore logistics base could create temporary employment opportunities for skilled labour	Mobilisation Phase	11	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Employment opportunities created by the logistics base could provide compensation to employees that could contribute toward household livelihoods and their access to services and amenities	Mobilisation Phase	8	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The economic activity stimulated by the sourcing of inputs for exploration activities could increase the fiscus of government through fiscal benefits in the form of taxation (personal, business, production, product, imports, etc)	Mobilisation Phase	12	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The sourcing of materials, equipment and associated services could generate additional business sales throughout the exploration industry's value chain – businesses providing inputs to the exploration industry could benefit from an increase in sales and economic output	Mobilisation Phase	12	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	Additional employment opportunities could be created throughout the exploration industry's value chain due to increased demand generated for goods and services	Mobilisation Phase	6	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Mobilisation Phase	9	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Establishment of an Onshore Logistics Base at the Preferred or Alternative Port	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Mobilisation Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The operational phase of the exploration activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the operational period of exploration could lead to additional business sales throughout the exploration industry's value chain (increased economic output, production and gross value added)	Operational Phase	15	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	New employment opportunities throughout the exploration industry's value chain could be stimulated as a result of the increased demand generated by the proposed exploration activity	Operational Phase	10	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The logistics base of the exploration activity sustains skilled employment opportunities for the duration of exploration activities	Operational Phase	10	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The employment opportunities created directly (i.e., through the projects logistics base) or indirectly (i.e., throughout the exploration industry's value chain) by the proposed exploration activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	14	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The exploration activity through its expenditure during its operation phase stimulates economic activity throughout its value chain and as a result increases the fiscal value (i.e., taxes) collected by government	Operational Phase	14	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The exploration activity further contributes toward a basic sector of the economy and therefore assists with maintaining the economic functionality of the receiving economy by providing a basis from which SMME development could occur	Operational Phase	8	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The demand for bulk services contributes to the fiscus of the local authority or providing agent	Operational Phase	9	**Medium positive impact** (i.e., where the impact could influence the decision to undertake the project)
Economic Impact of the Proposed Exploration Activity	The increased demand on bulk infrastructure requires additional investment to accommodate additional demand. Additional demand is accompanied by an increased maintenance burden	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	The proposed exploration activity could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	Due to the temporary decreased of economic productivity in the receiving economy's large pelagic longline fishing industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of Exploration Activity on the Commercial Fishing Industry	The temporary decrease of economic productivity in the receiving economy's large pelagic longline fishing industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	The proposed exploration activities' area of interest overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decrease of economic productivity in the receiving economy's transport and storage industry, the demand for employment throughout the industry's value chain could be lowered, affecting the availability of employment opportunities	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry and the subsequent lowering of demand for employment in the industry, the compensation of employees and income of households dependent on the industry could be lowered, impacting on the capability of households to sustain livelihoods	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Exploration Activity on the Maritime Logistics Industry	Due to the temporary decreased of economic productivity in the receiving economy's transport and storage industry, the fiscal value that government receives (e.g., taxation of productions, production, businesses and employees) as a result of economic activity throughout the industry's value chain could be diminished	Operational Phase	-6	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Impact of the Exploration Activity on the Maritime Logistics Industry	The temporary decrease of economic productivity in the receiving economy's transport and storage industry could temporarily diminish the demand for new business (SMME) development due to limited scope with which business sales can be stimulated	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Based on the analyses conducted in this report, outcomes suggest that the proposed exploration activity has the potential to create net benefits for the receiving economy during its operational period. The positive impacts identified in the economic impact assessments indicate that the exploration activity could generate additional economic value, stimulate various sectors, and contribute to overall economic growth. It is, however, important to note that the exploration activity offers short-term economic benefits (i.e., operational period of between 20 and 24 months) and therefore would only create additional value for a defined period of time.

Furthermore, exploration activities can also have negative effects on the receiving economy and specific industries within it. These potential negative impacts include disruptions to commercial fishing and maritime logistics operations, which can lead to temporary reductions in economic output, employment, and growth in these industries.

To mitigate these negative effects and maximise the positive outcomes, effective and coordinated planning is crucial. This entails collaborating with all interested and affected parties, including local communities, businesses, and relevant government agencies. By involving stakeholders from the outset, it is possible to assess potential challenges and identify strategies to minimise adverse impacts.

Coordinated planning can ensure that exploration activities are carefully scheduled and coordinated with fishing and logistics operations to minimise disruptions. It is also important to acknowledge that because the exploration activity's operational period is defined, the disruptive effects of the exploration activity is temporary and not sustained.

Apart from the potential impacts that could arise during the exploration activity, it is necessary to consider any effects that could result from unplanned events. Unplanned events in this instance refers to unlikely events or occurrences that could generate economic and associated impacts on the receiving economy and its value chains as a result of the exploration activity.

For the purposes of this study, the analysis of unplanned events focusses on the economic impacts that may arise from a subsea blow-out of an exploration well being drilled in the area of interest of the exploration activity (otherwise referred to as a 'blow-out'). Two oil spill scenarios have been identified from the updated Oil Spill Drift Modelling Report (2024). The first scenario refers to a subsea blow-out of a condensate hydrocarbon whilst the second scenario considers a subsea blow-out of crude oil. Because of the capacity of such scenarios to create far reaching environmental, social and economic impacts, the potential of such scenarios must be considered.

The economic impact of a well blow-out event on the economy can influence the equilibrium of an economy based on changes to economic activity within the sectors or industries affected by an oil spill event. In the context of this report, economic activity in the receiving economy is influenced by expenditure on spill response strategies whilst industries such as commercial fishing, maritime logistics and maritime tourism could experience reduced operational efficiency which could impact on the economic output produced by these industries and their value chains.

The economic impact model demonstrates the ripple effect of oil spill response expenditure (multiplier effect) within the South African economy. An estimated South African expenditure of approximately R342.6 million, could generate approximately R1.7 billion in additional business sales and contribute approximately R929.0 million to the gross domestic product over the total response period. Heightened economic activity may create demand for 1,800 temporary jobs, resulting in over R383.2 million in employee compensation and potentially stimulating more than R196.1 million in additional taxes throughout the response period.

However, the potential disruptions caused by oil spill events, particularly for industries like commercial fishing, maritime logistics, and maritime tourism, could hinder operational efficiency and affect economic output. In the case of a

condensate hydrocarbon spill, disruptions to affected industries totalling approximately R16.6 million could occur, while in the context of a crude oil hydrocarbon spill scenario, greater disruptions totalling approximately R231.8 million in economic output could occur across the affected industries. Based on the multiplier effect of changes to economic activity and given the context of the condensate and crude oil spill scenarios, between R78.4 million and R1.1 billion in additional business sales and between R39.2 and R559.1 million additional gross domestic product could be disrupted in affected industries (commercial fishing, maritime logistics and maritime tourism) throughout the economy per scenario tested.

The quantitative economic impact modelling of condensate and crude oil hydrocarbon spill scenarios reveals potential reductions in economic output and activity across commercial fishing, maritime logistics, and maritime tourism industries during a well blowout and response phase. Conversely, expenditures on oil spill response strategies can stimulate additional economic activity through the multiplier effect. Yet, disruptions and changes are temporary, tied directly to the response period lasting 1 to 2 months. Residual impacts, notably in the commercial fishing industry, may persist due to crude oil spills' effects on fish recruitment rates, particularly evident in crude oil hydrocarbon spill scenarios.

These shifts in economic productivity and output extend to various levels—receiving, provincial, and national economies—driven by expenditures across industry value chains affected by or benefiting from oil spill responses. This economic activity not only affects employment demand but also entails fiscal implications and encourages additional consumption expenditure. However, the implementation of a robust oil spill response strategy, coupled with effective coordination with relevant industries, holds promise in mitigating disruptive effects on fishing locations, shipping lanes, and cruise tourism activity.

Table 10.3: Quantitative Impact Assessment of a Condensate Well Blow-Out Scenario

Economic Impact Name	Economic Impacts Created as a Result of the Capping Only Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Total Quantified Economic Impact
Economic Value Added/Subtracted by Each Industry	R342 562 500	-R807 361	-R15 811 045	R325 944 095
Additional Business Sales	R1 740 441 051	-R4 017 086	-R74 373 736	R1 662 050 228
Additional Gross Domestic Product	R928 953 289	-R2 051 929	-R37 149 421	R889 751 939
Additional Taxes	R196 084 792	-R559 816	-R8 523 823	R187 001 153
Additional Formal Employment Compensation	R383 237 278	-R812 126	-R15 276 975	R367 148 177
Additional Household Income	R2 037 219 144	-R19 511 928	-R342 823 163	R1 674 884 053
Additional Formal Employment	1 798	-5	-69	1 724
Additional SMME Opportunities	22	0	-1	20
Additional SMME Opportunities (Black Owned)	16	0	-1	15

Source: DEMACON Modelling, 2023

Table 10.4: Quantitative Impact Assessment of the Well Blow-Out Scenario

Economic Impact Name	Economic Impacts Created as a Result of a Full Response to a Well Blow-Out Scenario	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Oil Spill Area	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations	Oil Spilled during a Potential Well Blow-Out Event could Temporarily Disrupt Maritime Tourism Operations	Total Quantified Economic Impact
Economic Value Added/Subtracted by Each Industry	R342 562 500	-R75 567 254	-R36 487 026	-R119 742 857	R110 765 363
Additional Business Sales	R1 740 441 051	-R375 990 840	-R171 631 699	-R563 259 661	R629 558 851
Additional Gross Domestic Product	R928 953 289	-R192 056 244	-R85 729 433	-R281 346 228	R369 821 384
Additional Taxes	R196 084 792	-R52 397 609	-R19 670 360	-R64 554 044	R59 462 779
Additional Formal Employment Compensation	R383 237 278	-R76 013 277	-R35 254 558	-R115 698 152	R156 271 291
Additional Household Income	R873 093 919	-R182 627 539	-R79 113 038	-R259 632 591	R351 720 751
Additional Formal Employment	1 798	-475	-160	-524	640
Additional SMME Opportunities	22	-5	-2	-8	7
Additional SMME Opportunities (Black Owned)	16	-3	-2	-5	5

Source: DEMACON Modelling, 2024

Supplementing the quantitative analysis, the qualitative impact assessment of each oil spill scenario highlights the contrast between the economic effects of expenditure during an oil spill response and the disruptions to economic activity and output caused by industries affected by such an event.

The qualitative analysis reveals that expenditure during an oil spill response could trigger multiplier effects throughout the economy, particularly by increasing demand for goods and services essential for addressing oil spill incidents. This heightened demand is intertwined with impacts on the value chain supporting oil spill responses, potentially leading to temporary increases in employment and subsequent compensation within the economy.

Conversely, a well blowout event could disrupt industries such as commercial fishing, maritime logistics, and maritime tourism (including cruise tourism), resulting in decreased economic output and activity. These disruptions could ripple through the value chains supporting these sectors. In the case of a condensate hydrocarbon spill scenario, the impact is generally confined to a smaller area compared to a crude oil hydrocarbon spill event. However, the severity, duration, and reversibility of impacts are amplified in the context of a crude oil hydrocarbon spill.

Nevertheless, it's crucial to emphasize that implementing a robust oil spill response strategy, coupled with effective coordination with relevant industries, has the potential to mitigate some of the disruptive effects on fishing locations, shipping lanes, and cruise tourism activities. Additionally, mitigation measures identified within environmental, marine ecology, fishing industry, and social specializations could further aid in mitigating potential disruptive effects of oil spills on economic output and activity.

Table 10.5: Overview of the Final Impact Significance Rating of Each Impact Measured for the Condensate Well Blow-Out Scenario

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The capping only Oil Spill Response Strategy for a well blow-out scenario could generate demand for goods and services necessary to sustain operational activities. The demand created during the response period could lead to additional business sales throughout the response activity's value chain (increased economic output, production and gross value added)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event	Operational Phase	-2	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently reduce the economic output (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that exploration activities will not be a long-term sustained operation	Operational Phase	-2	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Source: DEMACON, 2023

Table 10.6: Overview of the Final Impact Significance Rating of Each Impact Measured for the Crude Oil Well Blow-Out Scenario

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The oil spill response activity could generate demand for goods and services necessary to sustain operational activities. This sustained demand over the response period of exploration could lead to additional business sales throughout the response industry's value chain (increased economic output, production and gross value added)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	New employment opportunities throughout the response activity's value chain could be stimulated as a result of the increased demand generated by the response activity	Operational Phase	2	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Economic Impact of the Oil Spill Response Strategy for a Well Blow-Out Scenario	The employment opportunities created directly or indirectly by the response activity provides compensation to employees which in turn assists with maintaining household livelihoods (i.e., access to services and amenities)	Operational Phase	3	**Low positive impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	A well blow-out event could lead to reduced fishing grounds and catch potential for the large pelagic longline, tuna pole-line, demersal trawl and demersal longline fishing industry, which, in turn, may result in decreased economic productivity for the receiving economy's fishing industry. As a consequence, the demand for inputs to the fishing industry and the outputs from the industry may be impacted (limiting business sales, economic output and gross value added). The impact is viewed as a temporary impact given that the well blow-out event might not be a long-term sustained event	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Commercial Fishing Industry	The occurrence of a well blow-out event and the resultant presence of crude oil could impact the recruitment and replacement of commercial fish stocks. An overlap exists between passively drifting spawn products (eggs and larvae) and areas with a low to moderate probability of oil spills (20% to 40%). This overlap could potentially lead to reduced recruitment rates and/or loss of stock of commercial fish species. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential		-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of the Well Blow-Out Event on the Maritime Logistics Industry	The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used shipping routes. This overlap may result in disruptions to shipping operations, as vessels may need to use alternative routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated, biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event	Operational Phase	-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)
Impact of a Well Blow-Out Event on the Maritime Tourism Industry	· The potential area that is affected by a crude oil well blow-out event overlaps with established and commonly used cruise tourism routes. This overlap may result in disruptions to cruise line operations, as vessels may need to use alternative routes, or temporarily postpone trips along popular routes. Such deviations can diminish operational efficiency and subsequently affect economic activity (limiting business sales, economic output and gross value added) within the receiving economy's tourism and transport and storage industry. The impact is viewed as a temporary impact given that the majority of surface oil has evaporated,		-3	**Low negative impact** (i.e., where this impact would not have a direct influence on the decision to undertake the project)

Theme	Impact	Phase	Final Impact Significance	Impact Significance Rating Description
	biodegraded and dispersed after 60 days thereby reducing the area affected by an oil spill event			

10.3 Assumptions and Limitations

The following provides an overview of the key assumptions and limitations that apply to the economic impact assessment report.

10.3.1 Exploration Activity Assumptions and Limitations

The following section provides an overview of the underlying assumptions that define each impact contained in the report. These assumptions serve as the basis for measuring the effect of each impact on the economy, whether it results in a gain or a loss.

Economic Impacts Created as a Result of the Normal Operation of the Exploration Activity

- The impact identifies that the proposed exploration activity could drill 5 wells in the designated areas of interest of the project over a 20-month period (starting date undefined)[38]
- No cost data has yet been provided and therefore an estimated cost has been calculated
  - The total cost to undertake and complete exploration drilling each exploration well location is estimated at approximately US$35 000 000[39]
  - An exchange rate of R18.27 (Average between November 2022 and November 2023) per US$ has been used to convert UD$ to South African Rand[40]
- The total cost per well is therefore estimated at approximately R639.5 million. 5 wells are planned and an estimated 25% of all capital expenditure will occur in South Africa (total capital expenditure of 799.3 million).
- The calculation of the impact is based on market conditions at the time of the report. Market conditions and pricing assumptions may change over time.

Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Project's Area of Interest

- The impact identifies that an overlap exists between the proposed exploration activity's area of interest and the normal operational areas of the large pelagic longline fishing industry. Because of exploration activities coupled with safety exclusion zones, it is expected that normal fishing operations of the industry could be disrupted in the project's area of interest due to limited access. The disruption is expected to be temporary and to last for the duration of exploration (4-months)
- Spatial data shows that on average approximately 127 tons of large pelagic fish species are caught in the area of interest of the exploration activity per year (approximately 220 tons over the project's operational period) [41]
- The value of the large pelagic longline fishing industry was determined to be approximately R38 143 per ton of fish caught (approximately 3 510 tons of fish caught at a value of R133 882 000)[42]
- The total value of the disrupted fishing industry amounts to R8 073 606
- The calculation of the impact is based on market conditions at the time of the report. Market conditions and pricing assumptions may change over time.

[38] Data provided by EIMS, 2023
[39] Data provided by EIMS, 2023
[40] South African Reserve Bank Exchange Rate Data, 2023 (https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates)
[41] Data Sourced from DFFE and CapMarine
[42] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

Normal Operations of the Exploration Activity could Temporarily Disrupt Commercial Maritime Logistics Operations

- The impact identifies that the exploration activity's area of interest overlaps with common and regularly used marine logistics passageways. Because of this overlap, cargo, tankers and other related shipping would need to make use of alternate routes to access the Port of Cape Town and Port of Saldanha Bay. It is estimated that approximately 125 ships traverse the area of interest per month[43]
- the operational efficiency lost by the shipping industry was based on the average hourly operational cost of a typical cargo ship and the total distance lost as a result of no access to the area of interest
    - The average annual operational cost of a typical cargo ship is approximately US$9 000 000 per annum (R164 430 000), which translates to approximately R18 771 per hour[44]
    - The total distance that a ship could lose when not being able to traverse the area of interest approximately 156 km[45]. As of the completion of this report, the specific locations for the planned exploration wells have not yet been confirmed. While a 500-meter exclusion zone is typically established around drilling rigs to control vessel movement near drilling sites, the precise locations of the drilling operations within the area of interest remain unconfirmed. Consequently, the exclusion zones associated with drilling locations have not yet been confirmed. Therefore, the assumption identifies that the entirety of the area of interest is used as an area through which commercial shipping operations cannot travel during exploration activities
    - An average cargo ship travels at approximately 46.3 km per hour[46]
    - In total, a cargo ship loses approximately 3.4 hours of travel time due to not being able to traverse the project's area of interest.
    - The impact is expected to be temporary, lasting for the duration of the exploration activity (20-months)
    - Total hours lost because of the proposed exploration activity amounts to 8 423
- The total value of the disrupted logistics industry amounts to R158 110 447
- The calculation of the impact is based on market conditions at the time of the report. Market conditions and pricing assumptions may change over time.

10.3.2 Condensate Hydrocarbon Well Blow-Out Scenario Assumptions and Limitations

Given the preceding economic impacts, the following section provides an overview of the underlying assumptions that define each impact. These assumptions serve as the basis for measuring the effect of each impact on the economy, whether it results in a gain or a loss.

Economic Impacts Created as a Result of a Capping Only Oil Spill Response Strategy

- The impact identifies that the Technical Report identifies that a capping only oil spill response strategy is the best suite response to a well blow-out event in the area of interest of the proposed exploration activity
- Cost estimates for the response strategy was received from EIMS
    - The total cost to undertake a capping only response to a well blow-out scenario is 75 million US$[47] of which 25% could be spent in South Africa
    - An exchange rate of R18.27 (Average between November 2022 and November 2023) per US$ has been used to convert US$ to South African Rand[48]

[43] National Oceans and Coastal Information System, 2023

[44] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter5/maritime-transportation/containerships-operating-costs-panamax-post-panamax/#:~:text=A%20standard%20Panamax%20containership%20has,of%20about%20%242%2C314%20per%20TEU.)

[45] Based on DEMACON geographic information system measurements

[46] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter4/transportation-and-energy/fuel-consumption-containerships/)

[47] EIMS Data Response, 2023

[48] South African Reserve Bank Exchange Rate Data, 2023 (https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates)

- The total response strategy cost for one blow-out event is therefore estimated at approximately R342.6 million.
- The calculation of the impact is based on market conditions at the time of the report. Market conditions and pricing assumptions may change over time.

Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Area

- The impact identifies that a well-blowout event could disrupt commercial fishing operations because a well blow-out event is likely to occur within the project's area of interest and the normal operational areas of the large pelagic longline fishing industry. It is anticipated that normal fishing operations of the industry could be disrupted. The disruption is expected to be temporary and to last for 1 to 2 months
- Fishing industry data shows that on average approximately 127 tons of large pelagic fish species are caught in the area of interest of the exploration activity per year (approximately 21 tons over the well blow-out impact period) [49]
- The value of the large pelagic longline fishing industry was determined to be approximately R38 143 per ton of fish caught (approximately 3 510 tons of fish caught at a value of R133 882 000)[50]
- The total value of the disrupted fishing industry amounts to R807 361
- The calculation of the impact is based on market conditions at the time of the report. Market conditions and pricing assumptions may change over time.

Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations

- The impact identifies that a well blow-out event is likely to occur within the project's area of interest which overlaps with common and regularly used marine logistics passageways. Because of this overlap, cargo, tankers and other related shipping would need to make use of alternate routes to access the Port of Cape Town and Port of Saldanha Bay. It is estimated that approximately 125 ships traverse the area of interest per month[51]
- the operational efficiency lost by the shipping industry was based on the average hourly operational cost of a typical cargo ship and the total distance lost as a result of no access to the area of interest
    - The average annual operational cost of a typical cargo ship is approximately US$9 000 000 per annum (R164 430 000), which translates to approximately R18 771 per hour[52]
    - The total distance that a ship could lose when not being able to traverse the area of interest approximately 156 km[53]. The assumption is based on the information contained in the Oil Spill Drift Modelling Technical Report (2023). Given the results of the Technical Report, the entirety of the area of interest is used as an area through which commercial shipping operations cannot travel during a well blow-out event
    - An average cargo ship travels at approximately 46.3 km per hour[54]
    - In total, a cargo ship loses approximately 3.4 hours of travel time due to not being able to traverse affected areas.
    - The impact is expected to be temporary, lasting for the duration of the well blow-out event duration of 1 to 2 months
    - Total hours lost because of the well blow-out event amounts to 8 423
- The total value of the disrupted logistics industry amounts to R15 811 045

[49] Data Sourced from DFFE and CapMarine

[50] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

[51] National Oceans and Coastal Information System, 2023

[52] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter5/maritime-transportation/containerships-operating-costs-panamax-post-panamax/#:~:text=A%20standard%20Panamax%20containership%20has,of%20about%20%242%2C314%20per%20TEU.)

[53] Based on DEMACON geographic information system measurements

[54] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter4/transportation-and-energy/fuel-consumption-containerships/)

- The calculation of the impact is based on market conditions at the time of the report. Market conditions and pricing assumptions may change over time.

10.3.3 Crude Oil Hydrocarbon Well Blow-Out Scenario Assumptions and Limitations

Given the preceding economic impacts, the following section provides an overview of the underlying assumptions that define each impact. These assumptions serve as the basis for measuring the effect of each impact on the economy, whether it results in a gain or a loss.

Economic Impacts Created as a Result of a Full Oil Spill Response Strategy

- The impact identifies that the information presented in the updated Technical Report indicates that additional containment responses may be necessary to complement a capping-only approach in order to mitigate the long-term and low probability risk of oil reaching the South African shoreline
- Cost estimates for the response strategy was received from EIMS
    - The total cost to undertake a full response to a well blow-out scenario is 75 million US$[55] of which 25% could be spent in South Africa
    - An exchange rate of R18.27 (Average between November 2022 and November 2023) per US$ has been used to convert US$ to South African Rand[56]
- The total response strategy cost for one blow-out event is therefore estimated at approximately R342.6 million.

Well Blow-Out Event could Temporarily Disrupt Commercial Fishing Operations that Overlap with the Affected Area

- The impact identifies that a probability exists that several commercial fishing industries could be affected by a crude oil spill event. In essence, the likelihood that the fishing industry is impacted varies depending on the projected scope of surface contamination relative to the proximity of fishing grounds
- The impact identifies that a well-blowout event could disrupt commercial fishing operations because a crude well blow-out event is likely to occur within the project's area of interest and the normal operational areas of the large pelagic longline fishing industry.
- It is anticipated that normal fishing operations of all industries identified as overlapping with high surface oil probability areas (probabilities greater than 10%) could be disrupted. The disruption is expected to be temporary and to last for 1 to 2 months
- The following aspects have been considered as part of the assumptions that underpin various commercial fishing industries identified as overlapping with areas that have a high potential for surface oil presence during an oil spill event impact period[57]:
    - Data shows that that approximately 915 tons of Demersal Longline fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 152 tons)
    - Data shows that approximately 1 129 tons of Large Pelagic Longline fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 188 tons)
    - Data shows that approximately 96 tons of Demersal Trawl fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 188 tons)
    - Data shows that approximately 573 tons of Tuna Poleline fish species are caught annually in areas where fishing activity and a high surface oil presence probability exists (approximately 96 tons)
- The value of each industry is determined by:
    - The Demersal Longline industry was determined to approximately R32 856 per ton of fish caught (approximately 55 580 tons of fish caught at a value of R1 826 156 000)[58]
    - The Large Pelagic Longline and Tuna Poleline industries were determined to approximately R38 143 per ton of fish caught

[55] EIMS Data Response, 2023

[56] South African Reserve Bank Exchange Rate Data, 2023 (https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates)

[57] Data Sourced from DFFE and CapMarine

[58] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)

(approximately 3 510 tons of fish caught at a value of R133 882 000)[59]
    - The Demersal Trawl industry was determined to approximately R18 843 per ton of fish caught (approximately 307 045 tons of fish caught at a value of R5 785 808 000)[60]
- The Marine Ecology Assessment Report (2024) as well as the Fisheries Baseline and Impact Assessment Report (2024) identify that a crude oil blow out event could have an impact on the marine ecology of the area affected by an oil spill event. Factors such as an impact on reproduction and recruitment could impact on the productivity of commercial fishing sectors due to reduced catching potential. To account for this event, a reduced productivity factor of 10% over a 4-to-5-year period (excluding direct oil spill events of 1 to 2 months) has been applied.
- The total value of the disrupted fishing industry amounts to R73 987 224 over a 4 to 5 year period

Well Blow-Out Event could Temporarily Disrupt Commercial Maritime Logistics Operations

- The impact identifies that a well blow-out event is likely to occur within the project's area of interest which overlaps with common and regularly used marine logistics passageways. Because of this overlap, cargo, tankers and other related shipping would need to make use of alternate routes to access the Port of Cape Town and Port of Saldanha Bay. It is estimated that approximately 125 ships traverse the area of interest per month[61]
- the operational efficiency lost by the shipping industry was based on the average hourly operational cost of a typical cargo ship and the total distance lost as a result of no access to the area of interest
    - The average annual operational cost of a typical cargo ship is approximately US$9 000 000 per annum (R164 430 000), which translates to approximately R18 771 per hour[62]
    - The total distance that a ship could lose when not being able to traverse the area of interest approximately 360 km[63]. The assumption is based on the information contained in the updated Oil Spill Drift Modelling Technical Report (2023). Given the results of the Technical Report, the entirety of the area of interest is used as an area through which commercial shipping operations cannot travel during a well blow-out event
    - An average cargo ship travels at approximately 46.3 km per hour[64]
    - In total, a cargo ship loses approximately 7.8 hours of travel time due to not being able to traverse affected areas.
    - The impact is expected to be temporary, lasting for the duration of the well blow-out event duration of 1 to 2 months
    - Total hours lost because of the well blow-out event amounts to 1 944
- The total value of the disrupted logistics industry amounts to R36 487 026

Well Blow-Out Event could Temporarily Disrupt Maritime Tourist Industry Operations

- The impact identifies that a well blow-out event could occur within the project's area of interest and the resulting probability of the presence of surface oil could overlap with common and regularly used cruise tourism passageways. Because of this overlap, the operational potential of cruise liners that travel between the Port of Cape Town and Port of Walvis Bay could be affected.

[59] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)
[60] Statistics South Africa Ocean Fisheries and Related Services Report (https://www.statssa.gov.za/publications/Report-13-00-00/Report-13-00-002020.pdf)
[61] National Oceans and Coastal Information System, 2023
[62] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter5/maritime-transportation/containerships-operating-costs-panamax-post-panamax/#:~:text=A%20standard%20Panamax%20containership%20has,of%20about%20%242%2C314%20per%20TEU.)
[63] Based on DEMACON geographic information system measurements
[64] Based on information from the Geography of Transport Systems (https://transportgeography.org/contents/chapter4/transportation-and-energy/fuel-consumption-containerships/)

- It is estimated that approximately 35 ships traverse the route between the Port of Cape Town and the Port of Walvis Bay annually[65]. On average approximately 2 to 3 ships arrive or depart from the Port of Cape Town towards Namibia per month – these ships could be affected by an oil spill event.
- On average approximately 1 113 tourists arrive in the Port of Cape Town per ship. Given that 2 to 3 ships travel between the Port of Cape Town and Port of Walvis Bay per month, between 2 000 and 3 500 tourists per month could be affected by an oil spill event along the West Coast of South Africa. These tourists spend between R9 000 and R10 000 per visit to the Port of Cape Town – spend in South Africa.
- Approximately 600 crew members travel with each ship, representing additional expenditure potential within the Western Cape. It is estimated that crew members of ships spend approximately R145 per visit to the Port of Cape Town.
- Additional charges that cruise ships must pay in terms of administrative and docking fees, passenger related costs (e.g., food and beverages, fresh water, sludge, etc.) amount to R9 257 143 per ship per visit
- The operational efficiency lost by the cruise tourism industry is based on the average number of cruise vessels that could be affected as a result of limited to no access to oil spill affected areas along the West Coast of South Africa over a 2-month period. The impact considers the estimated capital expenditure that these cruise liners could generate in tourism revenue within the Western Cape
    - The average annual expenditure generated by the cruise industry in the Western Cape amounts to R1.4 billion (includes expenditure by international passengers, domestic passengers, cruise ship crew and cruise ship expenditure on administrative and passenger needs). Given that approximately 70 cruise ships dock at the Port of Cape Town per year, the average expenditure per cruise vessel arriving at the Port of Cape Town is approximately R19 957 143[66]
    - It is estimated that approximately 50% of all vessels arriving or departing from the Port of Cape Town travel northward from the Port of Cape Town along the West Coast of South Africa to the Port of Walvis Bay or other West African ports. The data suggests that approximately 35 vessels per year, or 3 vessels per month, depart or arrive at the Port of Cape Town from along the West Coast of Africa
    - The potential that the cruise industry's operations could be disrupted during an oil spill event [67] is based on the information contained in the updated Oil Spill Drift Modelling Technical Report (2024). Given the results of the updated Technical Report, typical routes indicate that cruise ships travelling northward from the Port of Cape Town stay between 80 and 90 kilometers from the South African coast, placing the general route of cruise ships within the 25% to 40% probability zone of surface oil
    - The disruption to cruise ship industry operations is anticipated to last 1- to 2-months. The updated Technical Report notes that the majority of the oil spilt during an oil spill event will have evaporated, biodegraded and dispersed after 60 days and that the remaining oil on the surface of water is located 700 to 1 000 kilometers northwest of the worst case scenario release point (Release Point D)
- The total value of the disrupted cruise tourism industry amounts to R119 742 857

[65] Western Cape Cruise Liner Industry Economic Contribution 2022-23 Season, Wesgro, 2023
[66] Western Cape Cruise Liner Industry Economic Contribution 2022-23 Season, Wesgro, 2023
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APPENDIX A: SPECIALIST DECLARATION

EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES		SPECIALIST DECLARATION	
EIMS Ref	1570	Project Name	PROPOSED AFRICA OIL SOUTH AFRICA CORP BLOCK 3B/4B EXPLORATION RIGHT

Project Details

Project Name	Proposed Africa Oil South Africa Corp Block 3b/4b Exploration Right
Applicant	Africa Oil SA Corp, Ricocure (Pty) Ltd and Azinam Limited (a wholly owned subsidiary of Eco Atlantic) (the Joint Venture (JV) Partners)
Competent Authority	Department of Mineral Resources

Specialist Details

Specialist Company	DEMACON Market Studies			
Specialist Name	Jean-Pierre du Plessis			
Contact details	Tel	012 460 7009	Cell	076 525 7767
	E-mail	jp@demacon.co.za		
	Postal Address	PO Box 95530, Waterkloof, 0145		
	Physical Address	30 26th Street, Menlo Park, Pretoria		

General Declaration

By signing this form, I hereby declare that:

- I act as an independent specialist in this application.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting undertaking the specialist work as required, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations, and all other applicable legislation.
- I have not, and will not engage in, conflicting interest in the undertaking of the activity.
- I understand to disclose to the applicant and competent authority all material information in my possession that reasonably has or may have the potential of influencing- any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority.
- I have taken into account, to the extent possible, the matters referred to in Regulation 18 when preparing the report, plan or document.
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.
- All the particulars furnished by me this form are true and correct.

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EIMS Ref	1570	Project Name	PROPOSED AFRICA OIL SOUTH AFRICA CORP BLOCK 3B/4B EXPLORATION RIGHT

- I will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations.
- I am aware of what constitutes an offence in terms of Regulation 48 and that a person convicted of an offence in terms of Regulation 48(1) is liable to the penalties as contemplated in Section 49B of the Act.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remunerative for work performed in terms of the Regulations.

Undertaking Under Oath/Affirmation

By signing this form, I swear under oath/affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signatures

Specialist					
Name	Jean-Pierre du Plessis	Signature		Date	02/04/2024
Commissioner of Oaths					
Name	Maiouna M.C	Signature		Date	2024-04-03

Commissioner of Oaths Official Stamp

SOUTH AFRICAN POLICE SERVICE
GARSFONTEIN
2024 -04- 03
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