TRANS ATLANTIC DIAMONDS

FINAL BASIC ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING IN SEA CONCESSION AREA 11C BY TRANS ATLANTIC DIAMONDS (PTY) LTD

February 2022

ANCHOR environmental

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Report prepared for:

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TABLE OF CONTENTS

GLOSSARY

Alien species	Species whose presence in a region is attributable to human actions that enabled them to overcome fundamental biogeographical barriers (i.e., human-mediated extra-range dispersal) (synonyms: Introduced, non-indigenous, non-native, exotic).
Amphipod/a	Crustaceans with no carapace and a laterally compressed body
Anthropogenic	Environmental pollution originating from human activity
Aquaculture	The sea-based or land-based rearing of aquatic animals or the cultivation of aquatic plants for food
Aquifer	Underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well.
Baseline	Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.
Bathymetry	The measurement of depth of water in oceans or seas.
Benthic/benthos	Pertaining to the environment inhabited by organisms living on or in the ocean bottom. The ecological region at the lowest level of a body of water such as an ocean, lake, or stream, including the sediment surface and some sub-surface layers
Biodiversity	The variability among living organisms from all terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.
Biomass	The mass of living biological organisms in a given area or ecosystem.
Biota	Living organisms within a habitat or region
Community	In ecology, a community is a group or association of populations of two or more different species occupying the same geographical area and in a particular time.
Community composition	The number of species in that community and their relative numbers.
Community structure	Taxonomic and quantitative attributes of a community of plants and animals inhabiting a particular habitat, including species richness and relative abundance structurally and functionally.
Cumulative impacts	Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Ecological function	The potential of an ecosystem to deliver a service that is itself dependent on ecological processes and structures.
Ecology	The relations of organisms to one another and to their physical surroundings.
Environment	The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Fauna	General term for all the animals found in a particular location.
Faunal community	A naturally occurring group of native animals that interact in a unique habitat.
Filter-feeders	Animals that feed by straining suspended matter and food particles from water.
Flora	General term for all the plant life found in a particular location.
Functional group	A collection of organisms of specific morphological, physiological, and/or behavioural properties.

Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Indigenous	Species within the limits of their native range (Synonyms: native).
Intertidal	The shore area between the high- and the low-tide levels.
Invasive	Alien species that have self-replacing populations over several generations and that have spread from their point of introduction.
Invertebrate	Animals that do not have a backbone. Invertebrates either have an exoskeleton (e.g., crabs) or no skeleton at all (worms).
Kelp	A member of the order Laminariales, the more massive brown algae.
Macrofauna	An aquatic plant large enough to be seen by the naked eye. Usually larger than 0.5 mm.
Megafauna	Large marine species such as sharks, rays, marine mammals and turtles. These animals are key components of marine ecosystems but, as they are long-lived and have low reproductive rates, their populations are usually the first to be reduced by human pressures.
Mitigation measures	Design or management measures that are intended to minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Native	Species within the limits of their native range (Synonyms: indigenous).
Operational phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Paleo-channel	Old or ancient river channels often infilled with course fluvial deposits which can store and transmit appreciable quantities of water.
Physico-chemical	Dependent on the joint action of both physical and chemical processes.
Phytoplankton	Ocean dwelling microalgae that contain chlorophyll and require sunlight in order to live and grow.
Plankton	Organisms drifting in oceans, seas, and bodies of fresh water. The word zooplankton is derived from the Greek zoon, meaning "animal", and planktos, meaning "wanderer" or "drifter". Typically comprised of phytoplankton and zooplankton, as well as the eggs, larvae and juveniles of larger animals.
Polychaete/a	Also known as the bristle worms. A paraphyletic class of annelid worms, generally marine. Each body segment has a pair of fleshy protrusions called parapodia that bear many bristles, called chaetae, which are made of chitin.
Rocky shore community	A group of interdependent organisms inhabiting the same rocky shore region and interacting with each other.
Scavenger	An animal that eats already dead or decaying animals.
Specialist study	A study into a particular aspect of the environment, undertaken by an expert in that discipline.
Species	A category of biological classification ranking immediately below the genus, grouping related organisms. A species is identified by a two-part name; the name of the genus followed by a Latin or Latinised un-capitalised noun.
Species diversity	The number of different species and relative abundance of each of those species present in an ecosystem.
Species richness	The number of different species represented in an ecological community. It is simply a count of species and does not take into account the abundance of species.

LIST OF ABBREVIATIONS

Anchor/ AEC	Anchor Environmental Consultants (Pty) Ltd.
BAR	Basic Assessment Report
CA	Competent Authority
DFFE	Department of forestry, fisheries and the Environment (Formerly DEFF and DAFF)
DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EBSA	Ecologically or Biologically Significant Marine Areas
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
FLO	Fisheries Liaison Officer
IBA	Important Bird and Biodiversity Area
IEM	Integrated Environmental Management
IUCN	International Union for Conservation of Nature
MARPOL	The International Convention for the Prevention of Pollution from Ships
MBES	Multi Beam Echo Sounder
MMI	Marine Mammal Institute
MMSO	Marine Mammal and Seabird Observer
MPA	Marine Protected Area
MUCH	Maritime and Underwater Cultural Heritage
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act No. 107 of 1998, as amended
OMP	Operational Management Plan
PAM	Passive Acoustic Monitoring
ROV	Remotely Operated Vehicle
SAHRA	South African Heritage Resource Association
SAMLMA	South African Marine Linefish Management Association
SAMSA	South African Maritime Safety Authority
SANBI	South African National Biodiversity Institute
SAPFIA	South African Pelagic Fishing Industry Association
SBP	Sub-bottom profiler
SOPEP	Shipboard Oil Pollution Emergency Plan
TAC	Total allowable catch
TAD	Trans Atlantic Diamonds (Pty) Ltd

ABSTRACT

Project Background

Prospecting is one of the first in many steps of the mining process and can extend over a period of one to five years. It is the search for commodities such as gemstones, minerals, metals, in an area by means of drilling and excavation to determine if mining in that area is economically feasible. Prospecting is also used as an opportunity to collect baseline environmental and biological information, such as the species present in an area, to enable the monitoring of the potential impacts of future mining on the environment. Prospecting does not necessarily guarantee that a mining right will be granted or that an area will be mined.

Mining-related activities are deemed to be a key component of the current national and provincial economies and future mining projects are a means to assist Governments in meeting broader societal needs. With the global population increasing by approximately 83 million people per year, there has been an increased need for goods and services such as food products, houses, transport, healthcare, schools, and the materials needed to manufacture the products needed to supply these needs. Minerals and metals are used, not only in the manufacturing of jewellery, but also in the manufacturing of these products. Examples of uses include, being used as catalytic converters, in modern medicine (x-ray machines, rheumatoid arthritis, pacemakers, dental implants, prosthesis), in information technology (cell phones, laptops, computers), to make glass, fuel, paints and concrete and to make high-strength metal alloys, which are again used to manufacture tools, ships, vehicles, aircrafts, bridges, buildings and electric motors, to name but a few.

South Africa possesses some of the world's richest resources, minerals and several other commodities which has the potential to supply the international markets. Trans Atlantic Diamonds (The Applicant) have therefore applied for the right to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite)), which are considered pivotal in today's modern society and everyday life. They have applied for the right to prospect in offshore Sea Concession area 11C. This area covers 164 023 ha and extends from just south of Hoekbaai to just north of Baai Vals along the West Coast of South Africa (Figure 1).

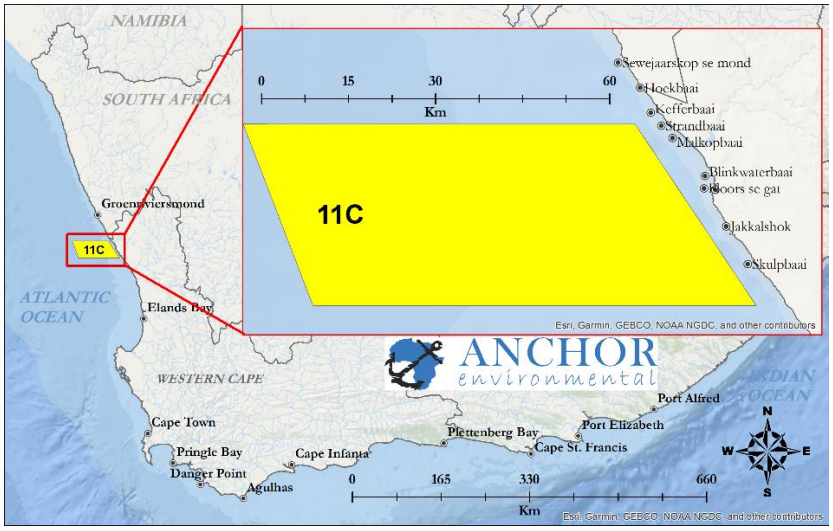


Figure 1 **The location of Concession Area 11C along the West Coast**

The Applicant is required to apply for Environmental Authorisation (EA), in addition to prospecting rights, from the competent authority, i.e., the Department of Mineral Resources and Energy (DMRE), to commence with prospecting activities. This requires that a Basic Assessment of the proposed activity and its potential impacts, along with a Public Participation Process, be conducted. These findings are submitted as a Basic Assessment Report (BAR), along with an Environmental Management Programme (EMPr), to the DMRE and to the public for review and comment. The Applicant has appointed Anchor Environmental Consultants (Pty) Ltd (Anchor) as the independent Environmental Assessment Practitioner to assist with this process.

DESCRIPTION OF THE PROPOSED ACTIVITY

The proposed prospecting programme is anticipated to be completed within five years. Sampling will be conducted in four phases and include a combination of non-invasive (acoustic survey, data acquisition and analysis) and invasive activities (Van Veen grab, core and drill samples). Phase 1 includes a desktop study and acoustic surveys, Phase 2 includes Van Veen grab and core sampling, Phase 3 includes drill sampling and Phase 4 includes a feasibility study and resource estimation.

Acoustic surveys are conducted to collect high-resolution bathymetry data. The information will be reviewed to identify target areas for sampling, any areas that need to be avoided and to inform the appropriate core sampling and drilling method that must be implemented. A Van Veen grab (clamshell bucket) will be used to collect sediment samples for biological, environmental and geotechnical studies. Samples will be used to identify and characterise benthic macrofauna communities (small animals such as worms, mussels, and crustaceans), whilst geotechnical samples will be used to determine the geological units of the seafloor. Sampling will be done at 20–50 sites, disturb a total surface area of 5 square meters (m^2) and a total volume of 1.5 cubic meters (m^3). Core samples will be collected at 100–200 sites. Cores penetrate the seafloor to collect sediment samples used to determine the sea floor geology (types of material present, i.e. sand, gravel and/ or rock and the hardness of the rock) and sediment stratigraphy (how sand and rock are layered). This information is

then used to engineer the drilling tool. Geotechnical sampling is also used to determine whether there are materials that can be mined in the area and whether it will be economically viable. The core samples will disturb a total surface area of 1.57 m^2, and collect a total volume of 4.71 m^3. Lastly, target areas will be sampled by a drill tool.

An initial 150 samples will be collected. Follow-up sampling will require an additional 150 samples. The total number of samples that will be required for drilling is therefore 300 samples which will cover a surface area of 1500 m^2 (based on a drill size of 5 m^2). Should these follow-up samples indicate that there could be a potential resource, only then will resource development commence. A potential resource area of not larger than 500 m x 300 m will then require an additional 60 samples spaced on a 50 m grid. Approximately 20 resource development areas will be required. This equates to 1 200 samples covering a surface area of 6 000 m^2.

The total surface area that will be disturbed during Phases 1, 2, and 3 is estimated at 7 507 m^2 or 0.75 ha. This equates to 0.0005% of the total area of Concession area 11C that will be disturbed. The information acquired will be used for understanding the seafloor topography, resource evaluation and to determine if diamond or other mineral mining within concession area 11C is economically viable. Information will also be used to inform the construction of the mining vessel and to identify areas for mining.

Impacts and risks identified

The potential positive and negative impacts associated with prospecting in Concession Area 11C were grouped and assessed based on the following major receptors: (1) Marine ecology and fisheries, (2) Heritage resources, (3) Socio-economic aspects, (4) Science, (5) Shipping, and (6) Visual integrity. The (7) no-go option and (8) cumulative impacts were also considered.

The assessment identified 18 potential negative impacts ranging from medium significance to insignificant and three potential positive impacts ranging from low significance to insignificant. With the implementation of effective mitigation measures, the negative impacts can all be reduced to low, very low, or insignificant. The negative impacts are associated with the disturbance of fauna (invertebrates, fish, mammals, seabirds and turtles), submerged prehistoric resources, shipping activities and fishing activities. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement. These impacts have the potential to result in the loss of environmental integrity, social values and economic opportunities. It should, however, be noted that most of these impacts were assessed to be insignificant. Marine mammals are expected to be the most significantly affected group by the prospecting activities, due to the impacts that the acoustic surveys could have on their echolocation, behaviour and critical activities such as feeding. The impact of prospecting on submerged Prehistoric Heritage and Palaeontological Resources is expected to be very low and can even yield a positive outcome if sediment samples are retained for assessment of paleoenvironmental and prehistoric lithic material. Due to the location of the concession area relative to the nearest towns and harbours (5 km offshore in addition to 40km and 50 km north of Strandfontein and Doringbaai, respectively), and low fishing effort in this area, prospecting activities are not expected to have a significant impact on fisheries and a negligible impact on the visual integrity of the area. Prospecting activities could also provide benefits in the form of regional socio-economic

opportunities in addition to contributing towards scientific knowledge, specifically in terms of baseline environmental sediment, species and high-resolution bathymetry data. These benefits are, however, considered to be relatively low in the broader context. Below follows a more detailed summary of the potential impacts identified and assessed according to each major receptor:

1) Marine ecology and fisheries

Ten potential negative impacts on the Marine environment and fisheries, ranging from medium to insignificant, were identified. With effective mitigation these can all be reduced to low, very low, or insignificant. These impacts include seismic disturbance to marine fauna; survey vessel collision with marine megafauna; direct impact of seabed excavation and tailings disposal on benthic habitats (soft sediment and reef associated communities); impact of fine sediment plumes on surrounding benthos and water column; waste discharges during vessel operations; and impacts on fisheries and the livelihoods of fishing communities due to exclusion from fishing grounds and disturbance of target fish species. The potential impact of most concern is that of seismic disturbance to marine mammals and was assessed as MEDIUM negative significance prior to mitigation. It is known that migrating humpback, southern right whales, dusky dolphins and the near threatened Heaviside's dolphin are frequently encountered on the west coast of southern Africa. Of the proposed seismic survey activities, the Topas sub-bottom profiler system could present a risk to dusky and Heaviside's dolphins. Effective implementation of mitigation measures should ensure that potential impacts on marine mammals arising from the proposed seismic survey activities in concession 11C would be reduced to LOW significance.

2) Heritage

Prospecting activities are likely to have an impact on any submerged Prehistoric Heritage, Marine Archaeological and Palaeontological Resources present within Concession area 11C. The significance of prospecting-related impacts on such material was assessed to be VERY LOW for Prehistoric Heritage and Palaeontological Resources, while impacts on the Marine Archaeological Resources were assessed to be unlikely and thus scoped out of the assessment. This is due to the fact that there is little or no potential for the presence of historical shipwrecks in the concession area. There is potential for the status of the potential impacts to be changed from negative to positive if core samples are retained for assessment of paleoenvironmental and prehistoric lithic material.

3) Socio-economic

Prospecting activities are anticipated to potentially, negatively impact several fishery sectors in the area. These include impacts to tuna pole and line, traditional line fish, and Small Pelagic Purse Seine fishers. These impacts are related to the 1) temporary disturbance of marine resources; 2) exclusion of fishing vessels from the concession area 11C; and 3) the degradation of water quality. The impacts of the former two were, however, assessed to be insignificant with no mitigation measures being required. That of the latter was assessed to be of very low significance and is expected to be reduced to insignificant after the implementation of appropriate mitigation measures. Despite this very low impact rating, the poor economic performance of the coastal communities should still be taken into consideration due to their high dependence on marine resources to support their household income and livelihoods. Due to the remote and offshore location of the 11 C concession, however, local small scale and subsistence fishing communities are not expected to be negatively impacted. Potential positive impacts from the prospecting activities include the generation of local and regional economic

opportunities, including regional job creation opportunities, although the benefits of these are expected to be insignificant and low, respectively.

4) Contribution to Science

Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. These samples will then be sent to an independent environmental consultancy for analysis to establish a baseline of environmental data. This comprises analysing sediment composition and determining the composition and abundance of benthic species in the sediment. Data collected during the acoustic survey could further be used to identify important physical features such as reefs that may be present in the area. Should artefacts, fossils or any other heritage resources be discovered during the prospecting, these will be donated to scientific institutions and can make an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The information collected during the prospecting survey will therefore contribute towards scientific and environmental knowledge and information.

5) Shipping

The majority of shipping traffic is located on the outer edge of the continental shelf, which is well offshore of the outer edge of Concession Area 11C. The impacts of prospecting activities within concession area 11C on shipping activities are therefore considered to be insignificant.

6) Impact on visual integrity of the area

This concession area is therefore considered relatively isolated and inconspicuous. It is unlikely that the survey vessel will be visible from the farmers' residence or the shoreline. The vessel is also not considered to be more conspicuous than any other vessel (such as fishing vessels) already visiting the area. The entire survey phase is also expected to only take approximately one month (over the next 5 years) to complete. The vessel and activity in Concession Area C is therefore expected to have negligible impacts on the visual integrity of the area.

7) Cumulative impacts

Due to the extent of marine mining and prospecting along the South African west coast, cumulative impacts (whether positive or negative) are experienced across the regional spatial scale and are of longer duration (medium–long term). This results in an increase, by one level, in the overall significance of most impacts assessed when considered cumulatively (i.e., "medium" becomes "high"). For the purpose of assessing the cumulative impacts of prospecting within Concession area 11C, a precautionary approach was taken and an assessment of a "worst case" scenario was done for both negative and positive impacts. Therefore, we assessed the negative impact that was found to be of highest significance, i.e., the MEDIUM Significance impact of seismic surveys on marine mammals and the positive impact that was found to be of lowest significance, i.e., the INSIGNIFICANT socio-economic benefit of prospecting on the local communities of the area. The assessment of the negative cumulative impacts of marine prospecting along the west coast of that was assessed of "Medium" significance would be assessed as being of "High" negative significance when considering it in conjunction with other projects and their impacts. The assessment of the positive cumulative impacts of marine that was assessed as being "INSIGNIFICANT", would be assessed as being of "VERY LOW" positive significance when considering it in conjunction with other projects and their impacts. Mitigation measures as recommended for each individual impact should be implemented. An additional recommended mitigation is that a new Strategic Environmental Impact Assessment be

commissioned and undertaken to assess cumulative impacts of marine prospecting along the South African west coast with a "medium" to "high" level of confidence, and to identify and implement further mitigation measures.

8) *No-go option*

Both positive and negative impacts area related to not continuing with the prospecting activities. These include lost opportunities in terms of collecting baseline environmental data, determining the presence of offshore mining resources and socio-economic benefits. The impacts, are, however, all considered to be of low significance. The positive implications of the no-go option, on the other hand, is that there would be no effects on the biophysical environment in the proposed area. This was also assessed to be of low significance considering the lost opportunity in terms of scientific data and economic opportunities.

Summary table of impacts

Impact	Consequence	Probability	Significance	Status	Confidence
MARINE AND FISHERIES IMPACTS					
Impact 1: Underwater noise disturbance to invertebrates	Very low	Possible	**INSIGNIFICANT**	-ve	Medium
No mitigation					
Impact 2: Underwater noise disturbance to fish	Very low	Possible	**INSIGNIFICANT**	-ve	Medium
No mitigation					
Impact 3: Underwater noise disturbance to marine mammals	Medium	Probable	**MEDIUM**	-ve	High
With mitigation	Medium	Improbable	**LOW**	-ve	High
Impact 4: Underwater noise disturbance to seabirds	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Improbable	**VERY LOW**	-ve	High
Impact 5: Underwater noise disturbance to turtles	Very low	Improbable	**INSIGNIFICANT**	-ve	High
With mitigation	Very low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 6: Marine megafauna collisions with survey vessels	Low	Possible	**VERY LOW**	-ve	High
With mitigation	Very low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 7: Offshore based seabed sampling and tailings disposal	Low	Definite	**LOW**	-ve	High
No mitigation					
Impact 8: Fine sediment plumes	Very low	Definite	**VERY LOW**	-ve	High
No mitigation					
Impact 9: Waste discharges during vessel operations	Very low	Probable	**VERY LOW**	-ve	High

Impact	Consequence	Probability	Significance	Status	Confidence
With best practice mitigation	Very low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 10: Impact on fisheries	Very Low	Possible	**INSIGNIFICANT**	-ve	High
No mitigation (see best practice recommendations)					
HERITAGE RESOURCES IMPACTS					
Impact 11: Impacts on Submerged Prehistoric Heritage Resources – Core Sampling	Low	Possible	**VERY LOW**	-ve	Low
With Mitigation	Low	Possible	**VERY LOW**	+ve	Low
Impact 12: Impacts on Maritime Archaeological Resources: Core Sampling	No impacts expected — scoped out				
Impact 13: Impacts on Paleontological Resources – Core Sampling	Low	Possible	**VERY LOW**	-ve	Low
With Mitigation	Low	Possible	**VERY LOW**	+ve	Low
SOCIO-ECONOMIC IMPACTS					
Impact 14: Tuna pole and line	Very Low	Possible	**INSIGNIFICANT**	-ve	High
No mitigation					
Impact 15: Traditional linefish Sector	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation					
Impact 16: Small pelagic purse seine fisheries	Very Low	Probable	**VERY LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 17: Kelp harvesting	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation					
Impact 18: Local socio-economic performance	Very Low	Possible	**INSIGNIFICANT**	+ve	Medium
No mitigation					
Impact 19: Regional socio-economic performance	Low	Definite	**LOW**	+ve	Medium
No mitigation					
IMPACTS ON SCIENCE					
Impact 20: Impact on Science	Low	Definite	**LOW**	+ve	High
No mitigation					
IMPACTS ON REGIONAL SHIPPING TRAFFIC					
Impact 21: Impacts on other vessels	Very low	Possible	**INSIGNIFICANT**	-ve	Low
No mitigation					
IMPACTS ON THE VISUAL INTEGRITY OF THE AREA					
Impact 21: Visual	Very Low	Possible	**INSIGNIFICANT**	-ve	Medium

Impact	Consequence	Probability	Significance	Status	Confidence
No mitigation					
CUMULATIVE IMPACTS					
1) Cumulative negative impacts "worst case" scenario	High	Probable	**HIGH**	-ve	Low
After mitigation	High	Possible	**MEDIUM**	-ve	Low
2) Cumulative positive impacts "worst case" scenario	Low	Possible	**VERY LOW**	+ve	Low
No mitigation					
NO-GO OPTION					
1) No socio-economic benefits	Medium	Possible	**LOW**	-ve	Medium
No mitigation					
2): No impact on the environment	Low	Probable	**LOW**	+ve	Medium
No mitigation					

Potential mitigation measures

Marine ecology

Essential mitigation measures for impacts to marine megafauna

- Vessel operator must keep watch for marine megafauna in the path of the vessel during vessel operation.
- At least two on-board independent Marine Mammal and Seabird observers (MMSOs) with experience in marine megafauna (including, but not limited to, all marine mammals (cetaceans and seals), sea turtles and seabirds) identification and observation techniques must be employed to carry out daylight observations and ensure compliance with mitigation measures during geophysical surveying. It must be ensured that there are sufficient MMOs on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- Activity must be restricted to specific areas or a time of year, this includes:
    - Avoid planning any surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations;
    - Avoid planning any surveys during mating season (confirm these times with MMSOs); and
    - Confine surveys to seasons when cetaceans are scarce to ensure minimal disturbance (confirm these times with MMSOs).
- MMSOs to conduct pre-survey visual scans of at least 30 minutes for the presence of megafauna around the survey vessel prior to any vessel movement.
- Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered.
- Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20-minute period to act as a warning signal and allow cetaceans to move away from the sound source.

- Passive Acoustic Monitoring (PAM) technology must be incorporated into any survey programme. A designated onboard PAM Observer uses the PAM technology to detect the vocalisations of marine species, particularly during periods of low visibility, such as at night or during adverse weather conditions and thick fog, to prevent collision and impact due to acoustic survey. . It must be ensured that there are sufficient PAM operators on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- Suspend operations if any obvious mortalities or injuries to marine life are observed.
- Make marine mammal incidence data and sound source output data from surveys available on request to the Marine Mammal Institute (MMI), DFFE and DMRE.
- Ensure that MMSOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities
- Record encounters with marine life (seabirds, turtles, seals, fish), their behaviour and response to vessel, including any attraction of predatory seabirds and incidents of feeding behaviour around the survey vessel; data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns).
- Record marine life (cetaceans, seabirds, turtles, seals, fish) incidences and responses to acoustic survey activity, including data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns, feeding behaviour) along with noise levels.
- Wait until all marine megafauna have cleared an area of 500 m radius of the survey vessel (centre of the sound source) before resuming with acoustic survey. If, after a period of 30 minutes, megafauna are still within 500 m of the vessel, the normal “soft start” procedure should be allowed to commence for at least 20-minutes duration. Behaviour during “soft starts” must be monitored;
- Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity.
- Sound containment and improvement of current equipment used must be implemented.
- Reassess the potential marine impacts after completion of the geophysical surveys and biological analysis as these might elucidate areas that would need to be avoided and species of conservation concern;
- Should any ecologically sensitive features such as reefs be identified within the concession area during the initial acoustic survey, these must be avoided and suitably buffered. Appropriate buffers must be determined by a suitably qualified specialist. Once suitable buffers have been mapped it should be illustrated on a map and form part of the EMPr;
- Grab samples collected should be analysed as soon as possible to determine the benthic macrofaunal communities in the area. Results from this survey could be used to inform additional mitigation measures if required. Results will represent baseline data against which any change in macrofaunal communities in the area can be benchmarked after prospecting and mining.

Best Practice Mitigation (Recommended) for impacts related to spills and waste generated by vessels

- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats and reefs;
- Inform & empower all staff about sensitive marine species & suitable disposal of waste;
- Ensure compliance with relevant MARPOL standards;
- Develop a waste management plan using waste hierarchy;
- A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations;

- Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm);
- All process areas should be bunded to ensure drainage water flows into the closed drainage system;
- Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system;
- Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages;
- All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and
- Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.

Fisheries, socio-economic and other shipping

Essential mitigation measures

- Undertake surveys when fishing effort is lowest (preferably out of fishing seasons).
- The survey and sampling vessels must be certified for seaworthiness through an appropriate internationally recognised marine certification programme (e.g. Lloyds Register, Det Norske Veritas). The certification, as well as existing safety standards, requires that safety precautions should be taken to minimise the possibility of an offshore accident. Collision prevention equipment should include radar, multi-frequency radio, foghorns, etc. Safety equipment and training of personnel to ensure the safety and survival of the crew in the event of an accident is a further legal requirement.

Best Practice Mitigation (Recommended)

- Appoint a fisheries liaison officer (FLO) to facilitate communication with affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.
- Prior to survey commencement, the following key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof:
    - Fishing industry / associations (contactable via liason@fishsa.org):
        - SA Marine Linefish Management Association (SAMLMA);
        - South African Pelagic Fishing Industry Association (SAPFIA);
        - South African Tuna Association (SATA);
        - South African Tuna Longline Association (SATLA)
        - Large Pelagic Small Medium & Micro Enterprises Association (LPSMME)
        - Local fishing communities;
    - Other associations and organs of state
        - DFFE;
        - SAMSA;
        - South African Navy Hydrographic office; and
        - Overlapping and neighbouring right holders.

These stakeholders should again be notified at the completion of surveying when the survey vessel(s) is/are off location. The operator must request, in writing, that the South African Navy Hydrographic office release Radio Navigation Warnings and Notices to Mariners throughout the survey periods. The Notice to Mariners should give notice of (1) the co-ordinates of the proposed survey area, (2) an

indication of the proposed timeframes of surveys and day-to-day location of the survey vessel(s), and (3) an indication of the required safety zone(s) and the proposed safe operational limits of the survey vessel. These Notices to Mariners should be distributed timeously to fishing companies and directly onto vessels where possible.

Heritage resources

Essential mitigation measures

- Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities.
- The contractor must be notified that archaeological sites could be exposed during sampling activities, as well as the procedure to follow should archaeological material be encountered during sampling.
- Any core sample sections which contain alluvial material, particularly where organic remains are present, are retained and are subject to paleo-environmental assessment.
- Any fossils found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in an appropriate institution.
- If shipwreck material is encountered during the course of sampling in any of the concession areas, the following mitigation measure should be applied:
    - Cease work in the directly affected area to avoid damage to the wreck until the South African Heritage Resources Agency (SAHRA) has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; and
    - Where possible, take photographs of them, noting the date, time, location and types of artefacts found. Under no circumstances may any artefacts be removed, destroyed or interfered on the site, unless under permit from SAHRA.

Best Practice Mitigation (Recommended)

It is recommended that the onboard Trans Atlantic representative must undergo a short induction on archaeological site and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling.

Cumulative impacts on the environment and community

Mitigation measures as recommended for each individual impact should be implemented. Furthermore, a strategic level Environmental Impact Assessment (EIA) process based on marine spatial planning principles should be conducted to assess and manage potential cumulative impacts in a holistic manner and to identify and implement further mitigation measures.

Recommendation

The EAP recommends that Environmental Authorisation for prospecting rights within sea Concession area 11C be granted to the applicant, on condition that mitigation measures and be implemented and adhered to. This is because the significance of potential negative impacts due to prospecting in this area was assessed to range from low significance to negligible with the implementation of mitigation

measures. The EAP also strongly recommends that the DMRE commissions an updated Strategic Environmental Impact Assessment to better understand and manage cumulative impacts of marine and coastal mining along the South African West Coast.

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL

MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

1 PROSPECTING RIGHT APPLICANT

Name of the Applicant:	**Trans Atlantic Diamonds (Pty) Ltd**
Responsible Person	Anthony Peter
Contact number	021 418 1587
Fax number:	n/a
Physical address:	Office 1603 Portside, 4 Bree Street, Cape Town, Western Cape, 8001
Postal address:	Office 1603 Portside, 4 Bree Street, Cape Town, Western Cape, 8001
Email address:	anthony@transatlanticdiamonds.com
File reference number SAMRAD:	WC30/5/1/1/2/10384PR

2 IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if, among others, the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application for Environmental Authorisation must (a) be prepared in a format that may be determined by the Competent Authority and (b) in terms of section 17 (1) (c) of the same regulation, the competent Authority must check whether the application has taken into account the minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings, as set out below, and ensure that the report is not cluttered with uninterpreted information and that it unambiguously represents the interpretation of the applicant.

2.1 Objective of the Basic Assessment Process

The objective of the basic assessment process is, through a consultative process, to –

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
(b) identify the alternatives considered, including the activity, location, and technology alternatives;
(c) describe the need and desirability of the proposed alternatives,
(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects, to determine:
    (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    (ii) the degree to which these impacts—
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources; and
        (cc) can be managed, avoided or mitigated;
(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
    (i) identify and motivate a preferred site, activity and technology alternative;
    (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
    (iii) identify residual risks that need to be managed and monitored.

PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

3 CONTACT PERSON AND CORRESPONDENCE ADDRESS

3.1 Details of the EAP

Name of The Practitioner	**Dr Kenneth Hutchings**
Contact number:	021 701 3420
Fax number:	021 701 5280
Physical Address	Suite 8, Steenberg House, Silverwood Close, Steenberg Estate, Tokai, 7945
Postal address:	Suite 8, Steenberg House, Silverwood Close, Steenberg Estate, Tokai, 7945
Email address:	ken@anchorenvironmental.co.za

3.1.1 Expertise of the EAP.

Kenneth Hutchings holds a doctoral degree (Ph.D.) in Zoology (fish taxonomy, life history, ecology and management), a Masters (M.Sc.) degree in Zoology (fisheries management), Honours degree in Marine Biology, and a Bachelor of Science degree in Zoology, Environmental and Geographical Science. Dr Hutchings is also a SACNASP registered scientist, Research Associate at the University of Cape Town and Associate Technical Consultant for the Marine Stewardship Council. Qualifications and registrations will be included as appendices to this report. See Appendix 1 for more details. The CVs of the additional contributing consultants are also included as part of Appendix 1.

3.1.2 Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

Dr Hutchings has more than 25 years of research and consulting experience in several disciplinary fields, with his main areas of expertise including Marine and Fisheries Research. He has been the principal consultant on several Specialist studies, Risk and Environmental Assessments and Strategic Environmental Assessments, many of which formed part of EIAs and BAs. These projects ranged from sand mining operations, to shallow water offshore explorations, to desalination plants and upgrades to port. Clients, amongst many others, include NWJ Environmental, Golder Mozambique/Sasol Petroleum Mozambique Exploration Limitada, SE Solutions (Pty) Ltd, South32 Aluminium SA Limited, Transnet National Ports Authority and Tronox Namaqua Sands. For the past five years, Dr Hutchings has been the Environmental Assessment Practitioner (EAP) and supervisory EAP for several EIAs and BAs. Projects include the development of a Greenhouse Farm on the West Coast by Drylands Farms;

the development of an aquaculture farm near Kleinzee in the Northern Cape for Diamond Coast Aquaculture; the development of an abalone ranch in the NC 3 concession area in the Northern Cape by Port Nolloth Sea farms Ranching; and the establishment of a seabased aquaculture development zone (ADZ) in Algoa Bay by the Department of Forestry, Fisheries and the Environment (DFFE) (previously Department of Agriculture, Forestry and Fisheries (DAFF)). The majority of Ken's work forms part of the integrated environmental management field. Ken has been the author and co-author of dozens of peer reviewed papers, reports and management plans, many of which has informed management decisions. Specifically, Ken has played a major role in the research for and production of the annual State of Saldanha Bay and Langebaan Lagoon report, since 2008.

4 INTRODUCTION

4.1 Project Background

Prospecting is one of the first in many steps of the mining process and can extend over a period of one to five years. It is the search for commodities such as gemstones, minerals, metals, in an area by means of drilling and excavation to determine if mining in that area is economically feasible. It is also used to analyse the structure of the earth's crust and the rocks of which it is composed, to assist in the engineering of the mining equipment. Prospecting is also used as an opportunity to collect baseline environmental and biological information, such as the species present in an area, to enable the monitoring of the potential impacts of future mining on the environment. Prospecting does not necessarily guarantee that a mining right will be granted or that an area will be mined. Should results from the prospecting campaign indicate that mining in an area would be economically worthwhile, the client must then apply for a mining right along with Environmental Authorisation (EA) for mining in that area. This would require an additional Environmental Impact Assessment (EIA), specialist studies and public participation process of approximately 6 to twelve months.

The main function of the Department of Mineral Resources and Energy (DMRE) is to regulate mining and matters relating to mineral and petroleum resources under the Mineral and Petroleum Resources Development Act (MPRDA). The DMRE is also the competent authority responsible for granting EAs and for regulating EIAs and Environmental Management Programmes (EMPrs) for new and existing mining activities. The Department of Forestry, Fisheries and the Environment (DFFE), on the other hand, is the main appeal authority, while the Department of Water and Sanitation (DWS) regulates any wastewater generated by mining operations that could potentially affect water resources.

Trans Atlantic Diamonds (Pty) Ltd (The Applicant) is a licensed rough diamond dealer since October 1986. They act as an independent, online rough diamond sales channel which connects both buyers and sellers, while providing a sales solution for producers, small artisanal miners and suppliers. With over thirty years of diamond industry experience, they are well recognised within the trade, and have pioneered tender and auction services across the globe. Should prospecting reveal an economically viable resource and Environmental Authorisation following an application for a mining right be granted, all diamonds mined in the 11C concession area will be offered to the South African Diamond & Precious Metal Regulator (SADPMR) and will be put to tender on the Diamond Exchange and Export Centre, which is part of the SADPMR, with the intention of local beneficiation.

Trans Atlantic Diamonds (Pty) Ltd has applied for the right to prospect diamonds, gemstones, heavy and industrial minerals, as well as ferrous, base and precious metals in sea Concession Area 11C. This is an offshore concession area that extends from just south of Hoekbaai to just north of Baai Vals along the West Coast of South Africa (Figure 5-1).

The prospecting activity triggers a number of Listed Activities in the Environmental Impact Assessment Regulations, 2014 (as amended), promulgated in terms of the National Environmental Management Act (Act No. 107 of 1998). The Applicant is therefore required to apply for Environmental Authorization (EA), in addition to prospecting rights, from the competent authority, i.e., the Department of Mineral Resources and Energy (DMRE), to commence with the activity. To apply for EA, a Basic Assessment of the proposed activity and its potential impacts, along with a Public Participation Process, must be conducted. These findings then need to be submitted as a Basic Assessment Report (BAR), along with

an Environmental Management Programme (EMPr), to the DMRE and to the public for review and comment.

The Applicant has appointed Anchor Environmental Consultants (Pty) Ltd (Anchor) as the independent Environmental Assessment Practitioner to assist with applying for prospecting rights, Environmental Authorisation and conducting a Basic Assessment and Public Participation Process.

4.2 Application process and timeline

Phase 1: Lodge Application

A prospecting rights and environmental authorisation application have been lodged with the DMRE and was accepted on 7 September 2021.

Phase 2: Registration period and initial comment

Invites to register as Interested and Affected Parties (I&APs) were sent out in June and July 2021. Interested and affected parties directly affected by this activity were contacted to provide initial comment on the activity on 4, 5 and 6 October 2021.

Phase 3: Circulate Draft BAR & Official Public Participation Period

A Draft Basic Assessment Report (BAR) was made available on our website and at the Doringbaai e-centre, Doringbaai Library, Strandfontein West Coast Information Centre and Ebenhaeser Library for 30 days during the Public Participation Period - **5 November to 6 December 2021**. Emails regarding this process was sent out on 28 October 2021. I&AP's were provided with the opportunity to comment on the Draft BAR during this time.

Phase 4: Public Participation Meeting

A Public meeting was held on **11 November 2021** in Doringbaai during which members of Anchor (the EAP) and Trans Atlantic Diamonds (the applicant) provided more detail on the proposed prospecting activity and consulted with I&APs who had the opportunity to ask questions and provide comment on the proposal.

Phase 5: Extension of Public Participation Period

Several stakeholders requested that an additional meeting be held closer to the farms adjacent to the concession area as they were not aware of the public participation process and as Doringbaai was too far for them to attend. A request was lodged with the DMRE and an extension for the submission of the BAR granted until 15 February 2022. An additional meeting was held in Kotzesrus on **17 January 2022** and the period for commenting extended until **24 January 2022**.

Phase 6: Submit Final BAR to the DMRE

In this Final BAR, stakeholder comments have been addressed and are included in the stakeholder consultation report which forms part of this document. The final BAR is being submitted to the DMRE for review on **15 February 2022**.

Phase 7: Decision by the DMRE

The DMRE has 107 days to review all the documents and decide whether to grant Environmental Authorisation for prospecting in Concession area 11C.

4.3 Assumptions and limitations

- It is assumed that all relevant project description information has been provided by Trans Atlantic Diamonds and that all information provided is correct.
- There is currently no high-resolution bathymetry data available for Concession area 11C. Information pertaining to the geology, bathymetry and topography of the area is therefore based on a desktop approach and drawn from what is available for the surrounding areas. This information might therefore change pending the results of acoustic surveys to be undertaken as part of the prospecting activities. After completion of the survey, information should be reviewed to determine if the EMPr is still valid.
- Due to the paucity of bathymetry data for this concession area, the exact location of the grab, core and drill samples are yet to be determined, pending the results of the acoustic surveys.
- It is assumed that the project description and activities will not change after the completion of this report.

5 DESCRIPTION OF THE PROPOSED ACTIVITY

5.1 Location and details of the overall Activity.

Farm Name:	**Sea Concession Area 11C**
Application area (Ha)	164 023 ha
Magisterial district:	Vanrhynsdorp
Distance and direction from nearest town	This is an offshore sea concession area situated 43 km northwest of Strandfontein, Western Cape and about 20 km west and offshore of Brand se Baai. The area extends from just south of Hoekbaai (northern most point) to just north of Baai Vals (southernmost point).
21 digit Surveyor General Code for each farm portion	N/A

5.2 Locality map

(show nearest town, scale not smaller than 1:250000).

The application area, Concession 11C, is an area of sea covering 164 023 ha offshore of the Western Cape coast of South Africa (Figure 5-1 – Figure 5-3). It extends from just south of Hoekbaai (northern most point) to just north of Baai Vals (southernmost point). Strandfontein is situated more than 70 km south of the southernmost point of the concession area.

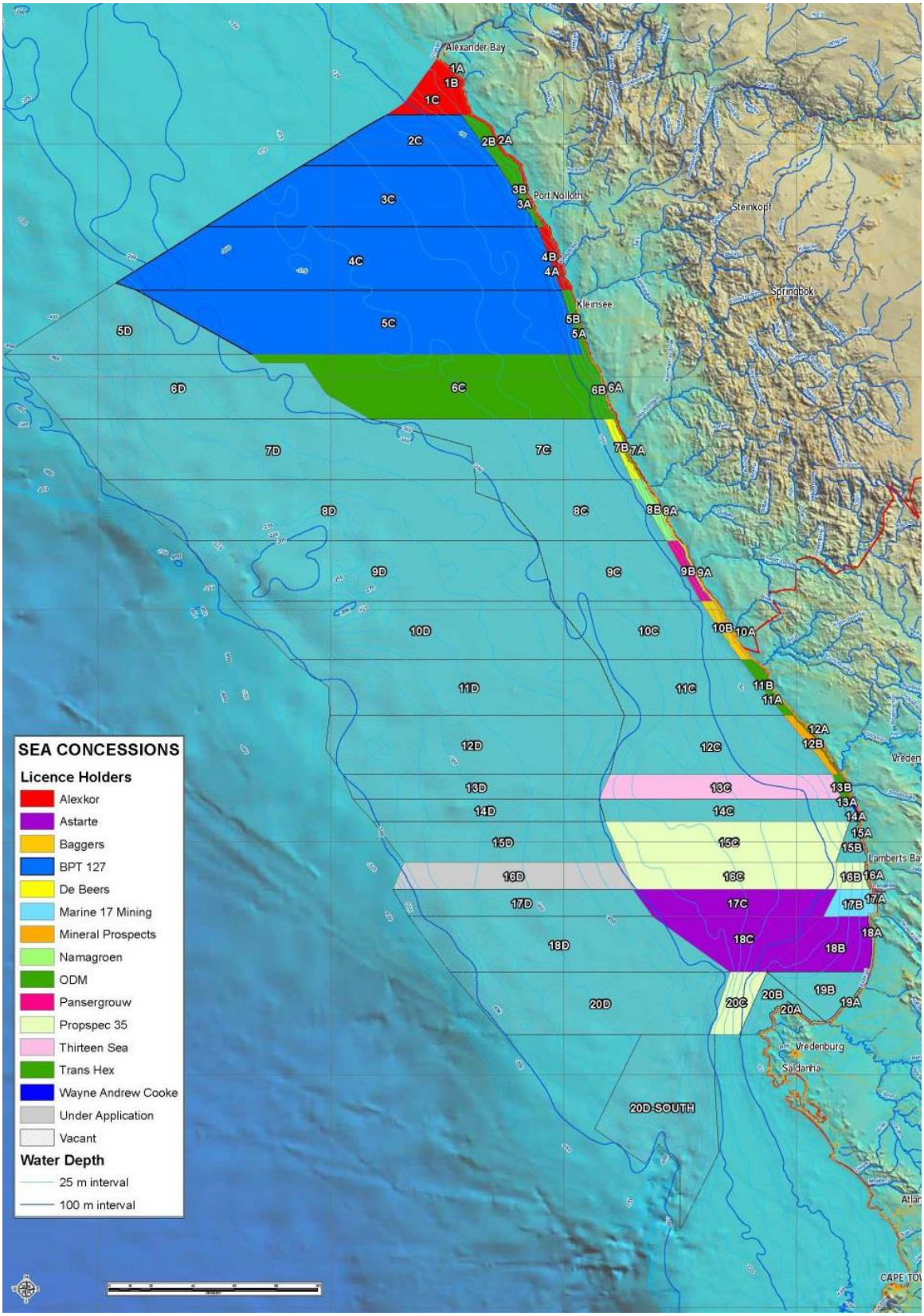


Figure 5-1 **The offshore diamond mining lease areas in South African waters. The coastal shelf waters have been divided into 20 contiguous, parallel strips which have been further subdivided into the onshore and offshore concession areas (A, B, C, D).**

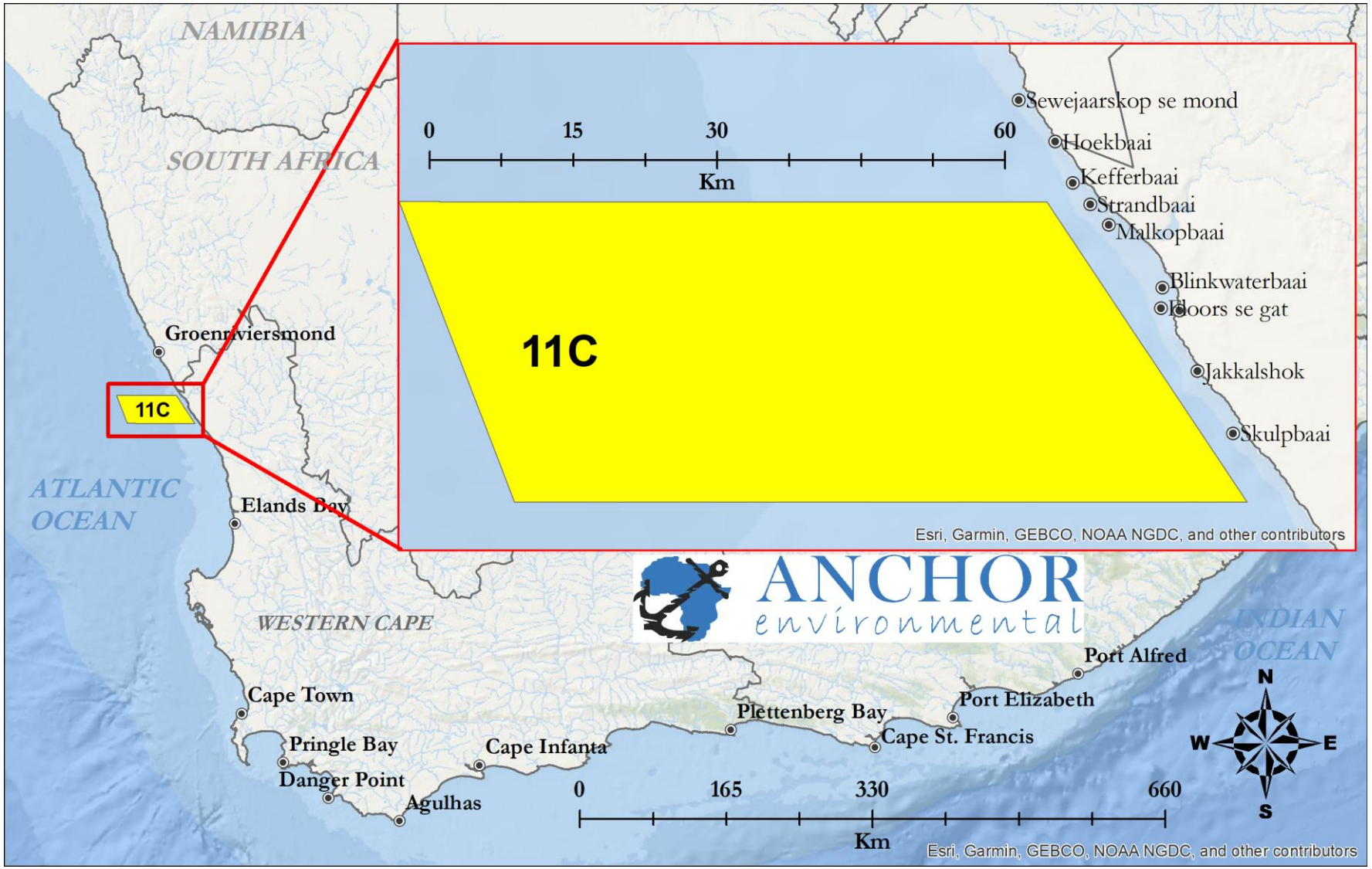
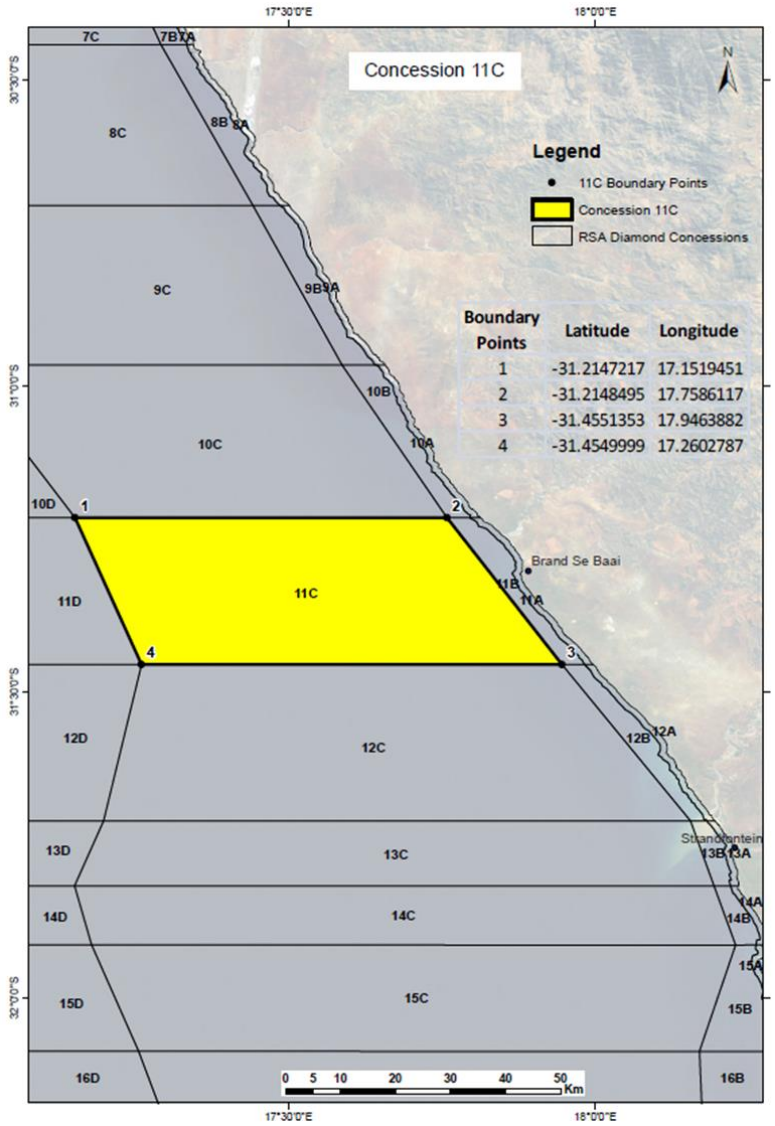


Figure 5-2 **Location of the concession area 11C off the Western Cape Coast. The concession starts 5 km offshore of the High-Water Mark and extends to the 200 m isobath which is 60-70 km offshore.**



PLAN AS REFERRED TO IN REGULATION 2.2 IN FORCE IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (28 OF 2002).
IN SUPPORT OF AN APPLICATION FOR A PROSPECTING RIGHT IN SOUTH AFRICAN SEA CONCESSION 11C

WESTERN CAPE PROVINCE
DESCRIPTION OF SEA AREA UNDER APPLICATION FOR PROSPECTING RIGHT

THE SOUTH AFRICAN SEA AREA 11 (C)
REPRESENTS THE AREA OF SEA IN EXTENT
164 023 HECTARES

Plan Approved:

_____
Regional Manager
WESTERN CAPE PROVINCE
Department of Minerals and Energy

Date: _____

Name of Applicant:
Trans Atlantic Diamonds (Pty) Ltd

_____
Signature of Applicant

Name (Print): Anthony Peter
Date: 3 September 2021

Figure 5-3 **Site Plan of concession area 11C as referred to in Regulation 2(2) in terms of the Mineral and Petroleum Resources Development Act (28 of 2002).**

5.3 Description of the scope of the proposed overall activity.

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

Trans Atlantic Diamonds (Pty) Ltd is proposing to prospect within Sea Concession area 11C using both non-invasive and invasive sampling activities, none of which require infrastructure. As the activity is located offshore and comprises prospecting only, no land-based infrastructure will be required. Prospecting will be conducted using a dedicated survey vessel such as the IMD SA survey vessel DP Star (Figure 5-4) or the Explorer (Figure 5-5).

Figure 5-4 **The DP STAR, an example of a vessel that could potentially be used for prospecting and exploration.**

Figure 5-5 **The EXPLORER, an example of a vessel that could potentially be used vessel for prospecting and exploration.**

5.4 Listed and specified activities

NAME OF ACTIVITY (E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE 1, 2 and 3 (*GNR 544, GNR 545 or GNR 546)***
The activities for the proposed project will involve prospecting for diamonds, gemstones, minerals and various metals that may exist within the application area.	164 023 ha	X	GNR 544, as amended by GN327, Activity 20. This activity states that "*any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource*" requires environmental authorisation.
Geophysical survey and seafloor. mapping	164 023 ha		No listed activity triggered
A Van Veen grab will be employed to collect between 20 and 50 samples for baseline biological assessment. Each grab has a total volume of 0.03 m^3 and is anticipated to disturb an area covering approximately 0.1 m^2. The total volume of sediment that will be collected is estimated at 1.5 m^3, while the total surface area that will be disturbed is estimated to be 5 m^2.	Approximately 5 m^2 over the area of 164 023 ha	X	GNR 544, as amended by GN327, Activity 20.

One of the prospecting activities will be drilling by means of one of three methods: vibracore, sonic core or gravity core. Between 100 and 200 samples will be collected across the entire concession area. Each core has a diameter of 10 cm, length of 3 m and, depending on the type of core, can penetrate to depths of 3-5 m. Each core collects approximately 0.024 m^3 of sediment and will disturb a total surface area of 0.00785 m^2. The total volume of samples that will be collected by 200 cores is estimated at 4.8 m^3, while the total surface area that will be disturbed is estimated to be 1.57 m^2.	A total surface area of approximately 1.57 m2 is estimated to be disturbed across the entire concession area of 164 023 ha	X	GNR 544, as amended by GN327, Activity 20.
Prospective target areas will be surveyed using a uniquely designed drill tool that can dredge gravel from the seabed. Pending the final tool design, the drill bit footprint will be between 3 and 5 m^2. The expected average hole depth will be 3 m, although the drill is designed to drill up to 12 m into the seabed if required. Sample volumes are anticipated to be in the range of 9 to 15 m^3 per sample. An estimated total of 300 samples spaced at roughly 300 m apart from north to south will be required. It is expected that phase 3 (resource development phase) may require a greater density of samples (arranged in a 25 m to 50 m sampling grid).	A total surface area of approximately 1500m^2 (or 0.15 ha) is estimated to be disturbed across the entire concession area of 164 023 ha.	X	GNR 544, as amended by GN327, Activity 19a which states that "*The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (iii) the sea…*". Activity 20 as indicated above.
Desktop study and literature review	164 023 ha		No listed activity triggered
Data acquisition and synthesis	164 023 ha		No listed activity triggered
Geological modelling	164 023 ha		No listed activity triggered
Feasibility study and resource estimation	164 023 ha		No listed activity triggered

5.5 Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity)

5.5.1 Minerals to be prospected for

Most of the diamond production in South Africa is attributed to large-scale, land-based mining operations. Marine and coastal diamond mining operations are rapidly increasing, however, the mining of various other valuable materials in the Benguela region (off the west coast of southern Africa) is also rapidly increasing in economic importance. Years of erosion and natural forces (wind, rain, water currents) have washed gemstones and other valuable minerals from their primary deposits in kimberlite pipes to beaches (including submerged paleo beach terraces) where they were deposited.

Trans Atlantic Diamonds (Pty) Ltd is proposing to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite)) within Sea Concession area 11C (Table 1).

Note that the natural maximum values of raw mineral radiation is not expected to exceed the safety guidelines and that all regulations and standards as set out by the South African Maritime Safety Authority (SAMSA), International Maritime Organization (IMO), The International Maritime Dangerous Goods (IMDG) Code and International Atomic Energy Agency Safety Standards (IMDG) will be complied with when prospecting, extracting, working with, storing and transporting any minerals. As an example, natural maximum values of raw Monazite radiation around workers in a factory was measured at 0.62 mSv y, which is lower than the reference level range for abnormally high levels of 1-20 mSv y for natural background radiation (as published in the International Commission of Radiological Protection (Iwaoka et al. 2017).

Table 1 Details relating to the proposed prospecting, including minerals to be prospected and location details.

ITEM	DETAIL

Type of mineral(s)	• Precious metals (gold, silver and platinum)
	• Gemstones (alluvial diamonds, sapphires and garnets),
	• Ferrous and base metals:
	  ○ rare earths (monasite mineral)
	  ○ black sand minerals (titanium minerals e.g., ilmenite and rutile)
	  ○ zirconium ore (zircon)
	  ○ iron ore (magnetite)

Locality	This is an offshore sea concession area situated 43 km northwest of Strandfontein, Western Cape and about 5-70 km west and offshore of Brand se Baai. The area extends from just south of Hoekbaai (northern most point) to just north of Baai Vals (southernmost point).
Extent of the area required for prospecting	164 023 ha
Geological formation	Mineralised Quaternary sediments overlying Pre-Cambrian and Cretaceous bedrock

5.5.2 The need for and use of these minerals

The global population increases by approximately 83 million people every year. This has led to an increased need for goods and services such as food products, houses, transport, healthcare, schools, etc., and has, in turn, driven technological progress and advances, industrialisation, globalisation and consumerism.

Industrialisation is the shift from a predominantly agricultural economy and society to one dominated by mass-production and technologically advanced goods and services. This has increased our incomes, standards and quality of living and need for recreation and leisure. Globalization is the increased interdependence of the world's economies and cultures, and the trade in technology, goods, services and information to meet the growing needs of the growing population. This has further led to a culture

of consumerism, where there is an increasing encouragement and desire for the acquisition and consumption of goods and service. Unfortunately, the growing world and South African population and associated growing needs, requires an increase in products to meet these needs. Examples include transportation, fuel, cell phones, laptops, farming equipment, houses, fishing vessels, factories for production of goods, etc. Materials used in the production of these products are mostly sourced from the environment.

South Africa possesses some of the world's richest resources, minerals and several other commodities, which has the potential to supply the international markets (Minerals and Mining Policy for South Africa, 1998). Trans Atlantic Diamonds are therefore proposing to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite), which are considered pivotal in today's modern society and everyday life.

Gold, platinum, silver, diamonds and other gemstones, and other precious metals are not only used in the manufacturing of jewellery, but also in a plethora of other areas. Platinum, gold and silver are most commonly used as catalytic converters, in modern medicine (treatment of cancer, rheumatoid arthritis and other diseases, pacemakers, dental implants, prosthesis), in information technology (cell phones, laptops, computers), to make glass and in fuel, to name but a few of the uses. Diamonds are an important commodity in the global economy that has grown from approximately 1 million carats in the late 1800's to 176.7 million carats in 2005 (Janse 2007) and is now considered a billion-dollar industry. Apart from being used in the jewellery industry, diamonds are also used in several other industries. They are, for example, used in the automotive industry and are components of high-tech vehicles. Being the hardest known material on earth, diamonds are used in polishing, cutting and drilling tools. These gems are also used in surgical tools and instruments (x-ray machines, dentist drills, 3-D non-invasive bioimaging machines), modern medicine (drug delivery system to disease-infected organs, cancer treatment, tissue engineering) and information technology. Garnets are used in construction as skid-resistant road aggregates, in paints and as fillers in concrete used in harsh environments. Rare Earth Elements (REEs) are used as components in information technology, wind turbines and defence technologies. Ilmenite and rutile are the primary sources of titanium and titanium oxide. The latter minerals are used in the manufacturing of lightweight, high-strength metal alloys, which are again used to manufacture a wide variety of parts and tools including information technology, aircraft parts, sporting equipment and artificial joints. Zircon is used in high accuracy optics, in ceramics and in construction material as it can withstand high temperatures. Iron ore is probably the most used metal in everyday life. It is used in the construction of machinery, tools, ships, vehicles, aircrafts, bridges, buildings, and electric motors.

The National Development Plan 2030 (NDP) and Operation Phakisa aims to boost the growth of the economy and alleviate poverty and inequality amongst South Africans through faster and inclusive growth development. A manner of achieving this is to focus on South Africa's natural resources and creating opportunities that will advance the NDP strategy. Mining is identified in the NDP as an industry that has large potential for growth and employment opportunities and for it to continue to contribute largely to the South African economy, new mineral resources need to be identified through prospecting. Both of these frameworks promote the sustainable use of the country's natural resources as well as the conservation, preservation and restoration of the environment.

In terms of the above, it is evident that mining-related activities are deemed to be a key component of the current national and provincial economies and future mining projects are a means to assist Governments in meeting broader societal needs. It is important to remember that potential future mining is still years down the line and that the current application process is focused on prospecting which is a key initial step in the mining process and necessary for resource estimation and planning.

Unfortunately, the impacts of globalisation, industrialisation and consumerism are complex. Though it is key in economic growth and innovation and in meeting the everyday needs of people, thereby benefiting society as a whole, it also has numerous wide-ranging negative social (mental health and moral) and environmental impacts. One of the roles of Environmental Assessment Practitioners is to assess, mitigate and manage the impacts of globalisation and industrialisation as best possible.

5.5.3 Description of the proposed activities

The proposed prospecting programme will take place during spring and/or summer and when weather conditions are suitable and seas are calm. It is anticipated to be completed within five (5) years. Sampling will be conducted in four phases and include a combination of non-invasive and invasive activities to detect the presence of paleo-beach deposits, which are known from other concessions to contain diamondiferous gravels. Prospecting operations are expected to occur sporadically over the entire extent of the concession area. The non-invasive activities will include geophysical exploration (acoustic survey), data acquisition and analysis, while the invasive activities will include physical sampling (collection of core, drill and grab samples) (Figure 5-6).

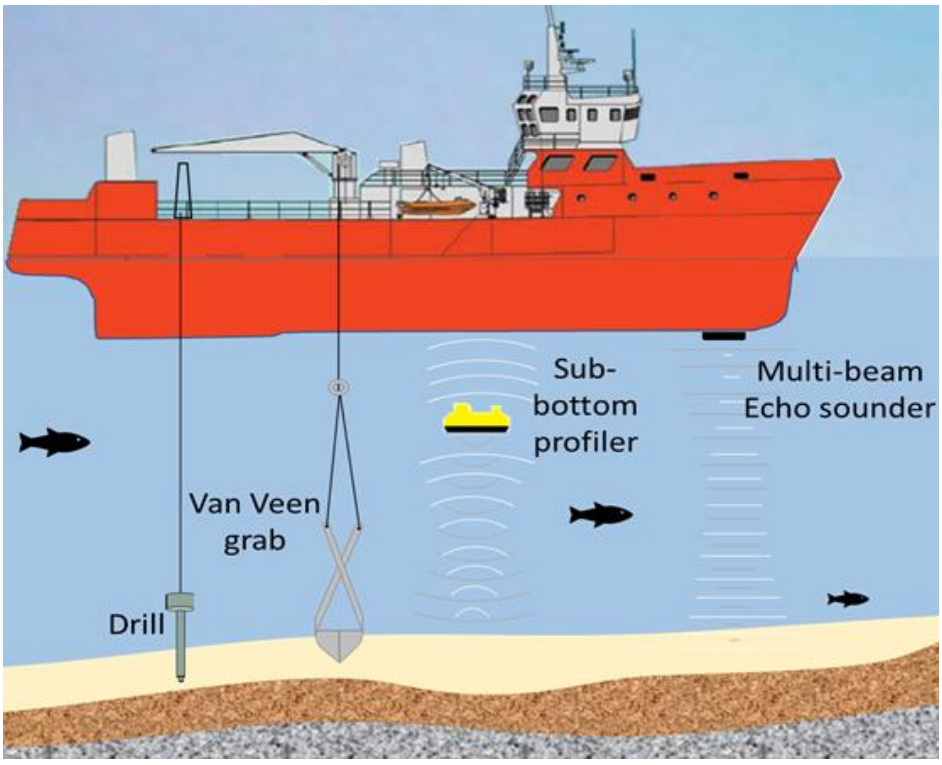


Figure 5-6 Illustration of some of the various sampling methods that will be used.

Non-invasive sampling activities will include the following:

- Desktop study;
- Geophysical survey and seafloor mapping;
- Data acquisition and synthesis;
- Geological modelling; and
- Feasibility study.

Invasive sampling activities will include:

- Core sampling using either a Vibracore, Gravity core or Sonic core;
- Drilling with a specialised drilling tool; and
- Van Veen grab sampling.

The four sampling phases will include:

- **Phase 1:**
  a) Desktop Study
  b) Geophysical Exploration
- **Phase 2:**
  a) Van Veen grab sampling
  b) Core sampling
- **Phase 3:**
  a) Drill sampling
- **Phase 4:**
  a) Feasibility study and resource estimation

5.5.4 Non-invasive sampling:

Phase 1

a) Desktop Study:

A comprehensive literature review will be undertaken to investigate the depositional environments, sediment stratigraphy and geological units of the area. Data will be obtained from a variety of sources including previous explorations in neighbouring concession areas, published papers, data from field surveys, databases, etc. This review will allow the applicant to identify target sites that are likely to contain diamonds or other valuable minerals within the concession area. It will also enable the applicant to identify potential challenges and the best means to address these challenges with a view to minimising environmental impacts and costs. This will allow for a more efficient and effective prospecting sampling programme.

b) Geophysical Exploration

Geophysical surveying will be undertaken to collect high-resolution acoustic and multibeam echosounder data along lines 50 m to 200 m apart, throughout the concession area. Surveys will be

conducted using a dedicated survey vessel such as the IMD SA survey vessel DP Star (Figure 5-4) or the Explorer (Figure 5-5). The vessel will have a hull-mounted multibeam echo sounder (MBES) and a Topas sub-bottom profiler system that are designed to collect high-resolution acoustic data (Figure 5-7). As these devices are hull mounted, no physical or environmentally destructive impacts are anticipated for this sampling method. Potential noise or sound impacts on biota will, however, be considered. The acoustic equipment will be similar to that typically used in diamond prospecting i.e. hull-based transducers that generate sounds waves at frequencies of 70-455 kHz. The information collected during the acoustic survey will be reviewed by both the geologist and the Environmental Control Officer/ Scientific Officer to identify target areas for sampling, any areas that need to be avoided and to inform the appropriate core sampling and drilling method that must be implemented. The preferred alternative within the site is thus subject to change pending results from the geophysical survey.

Figure 5-7 An example of a sub-bottom profiler. Source: Seatronics.

The IMD SA survey vessel DP Star is regularly used for similar survey work along the west coast of southern Africa. This type of survey typically does not require the vessel to tow any cables, however, it will be "restricted in its ability to manoeuvre" during the survey due to the operational nature of this work. Geophysical surveying will be undertaken along survey lines spaced 1000 m to 100 m apart throughout the concession area. The survey speed of the DP Star is typically 120 km/day in an offshore area such as the C-concession area. This would equate to approximately five day's work. It has been proposed that survey work will be conducted over a one-week window period during suitable calm sea and weather conditions (probably late summer-autumn 2022). The bathymetry of 11C will be modelled using processed seismic survey data before sampling can take place – it is estimated that this would take approximately one month.

The use of this geophysical survey equipment allows the operator to produce a digital terrain model of the seafloor. The MBES provides depth sounding information on either side of the vessel's track across a swath width of approximately two times the water depth, while the Topas sub-bottom profiler generates profiles up to 60 m beneath the seafloor, thereby giving a cross section view of the sediment layers. The source sound level of the MBES is variable but will be a maximum of 221 dB re 1µPa @ 1m, with a frequency range of between 200 and 400 kHz. The Topas sub-bottom profiler uses shallow (35 to 45 kHz) and medium penetration (1 to 10 kHz) "Chirp" acoustic pulses. This equipment has a variable power output and can therefore have the power ramped up in accordance with survey requirements and be contained within acceptable environmental noise

levels. As such, it is also capable of "soft starts". The use of a magnetometer to detect magnetic signatures will also be required.

5.5.5 Invasive Sampling activities:

Sampling will be undertaken in targeted areas as through the analysis of the acoustic survey data. Three potential methods of collecting geophysical samples from the seabed are being considered.

Phase 2:

a) Van Veen grab sampling

This is a popular method used to collect sediment samples for biological, environmental and geotechnical studies. It usually comprises a clamshell bucket made of stainless steel that collects sediment from the seafloor. A Van Veen grab with a sampling capacity of approximately 50 kg will be used to collect baseline environmental data on sediment and benthic macrofauna. These samples will be collected at 20–50 sites at a sampling rate of approximately 30 samples per day (maximum) and equate to two working days (Figure 5-8). The grab can penetrate to depths of 20 to 50 cm and collects surficial sediment samples that will be subjected to subsampling. Those for biological analyses will be stored in formalin or ethanol whereafter they will be sent for biological analysis, while the geotechnical subsamples will be frozen and sent to a laboratory to test for shear strength, grain size composition, etc. Biological samples will be analysed to identify and characterise benthic macrofauna communities (small animals such as worms, mussels, and crustaceans), whilst geotechnical samples will be used to determine the geological units of the seafloor. The grab samples will disturb a total surface area of 5 square meters (m^2) while the total volume of samples that will be collected will be 1.5 cubic meters (m^3). Results from this survey will represent baseline data against which any change in macrofaunal communities in the area can be benchmarked after prospecting and mining (should the project proceed to production).

Figure 5-8 A Van Veen grab works like a claw to grab sediment containing macrofauna from the seafloor.

b) Coring

Geotechnical samples will be collected at 100-200 sites using either vibracoring, gravity coring or sonic coring (Figure 5-9). A core is used to penetrate the seafloor to collect sediment samples. These samples are analysed to determine the sea floor geology (types of material present, i.e. sand, gravel and/ or rock and the hardness of the rock), topography (trenches or elevations) and sediment stratigraphy (how sand and rock are layered). This information is then used to engineer the drilling tool (for phase three of the prospecting activities – see below) and the future mining vessel. Geotechnical sampling is also used for resource evaluation, i.e. determining whether there are materials that can be mined in the area and whether it will be economically viable. The type of coring will depend on the geological formations of the seafloor. The sonic core is an advanced form of drilling that employs high-frequency, resonant energy generated inside the Sonic head to advance a core barrel or casing into subsurface formations, i.e. can penetrate some subsurface rock, whilst gravity and vibracoring can only sample unconsolidated material. The diameter of core samples will be approximately 10 cm, the corers will penetrate to depths of 3–8 m. Material collected by the cores will be brought to the surface for analysis. The volume per core is estimated at 0.024 m3. Core samples do not require onboard processing (i.e. no sediment spill in the ocean) as all material collected will remain intact within core tubes which will be analysed on land. The core samples will be collected from a purpose-built survey vessel with equipment sourced from IMD SA and/or Underwater Mining Solutions. The sampling of 200 cores will take approximately ten workdays. Sampling work will be restricted between the western boundary of the concession and not shallower than 20 m water depth. The exact sampling sites will be informed by the information acquired during the geophysical surveying and the recommendations from the environmental impact assessment (marine ecology specialist study). The core samples will disturb a total surface area of 1.57 m^2, while the total volume of samples that will be collected by the cores will be 4.71 m^3.

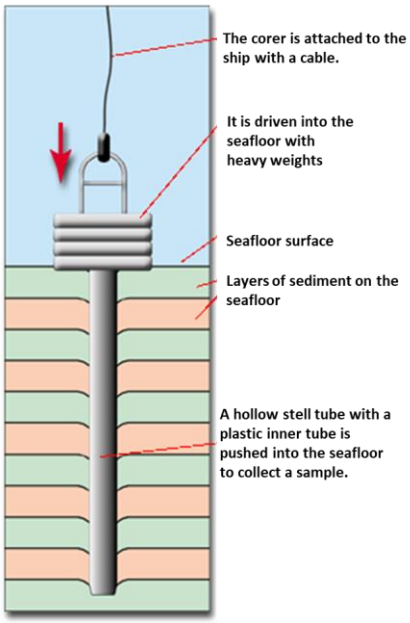


Figure 5-9 Example of a corer. Source: British Ocean Sediment Core Research Facility.

Phase 3

a) Drilling

In addition to the above, prospective targets will be analysed by a uniquely designed drill tool that can dredge gravel from the seabed (Figure 5-10). Material will be processed onboard by a processing plant and tailings will be discarded overboard, thereby causing sediment plumes. Sediment plume formation and persistence in the water column is largely dependent of the sediment particle size and prevailing oceanographic conditions. Discard material that consists mostly of sand has a minimal suspension time, whilst muddy sediments form longer lasting plumes. Pending the final tool design, the drill bit footprint is estimated to be between 3 and 5 m^2 diameter. The expected average hole depth will be 3 m, although the drill is designed to drill up to 12 m into the seabed if required. Sample volumes are anticipated to be in the range of 9 to 15 m^3 per sample. This does not constitute bulk sampling in terms of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (pers comms DMRE), however, as the material is for prospecting purposes only, not commercial gain, nor are large sections of the seafloor being dredged out.

At an initial sample density of 0.06 samples/ha, 150 samples will be collected. Follow-up sampling will require an additional 150 samples. The total number of samples that will be required for drilling is therefore 300 samples which will cover a surface area of 1500 m^2 (based on a drill size of 5 m^2). These samples will be spaced at roughly 300 m apart from north to south. A sampling rate of 30 samples per day would equate to a period of approximately ten days (this does not consider weather delays).

Should these follow-up samples indicate that there could be a potential resource, only then will resource development commence. A potential resource area of not larger than 500 m x 300 m will then require an additional 60 samples spaced on a 50 m grid. Approximately 20 resource development areas will be required. This equates to 1 200 samples covering a surface area of 6 000 m^2 (based on a drill size of 5 m^2). A sampling rate of 30 samples per day would equate to a period of approximately 40 days.

The total surface area that will be disturbed during Phases 1, 2, and 3 is estimated at 7 507 m^2 or 0.75 ha. This equates to 0.0005% of the total area of Concession area 11C that will be disturbed. The information acquired will be used for understanding the seafloor topography, resource evaluation and to determine if diamond or other mineral mining within concession area 11C is economically viable. Information will also be used to inform the construction of the mining vessel and to identify areas for mining.

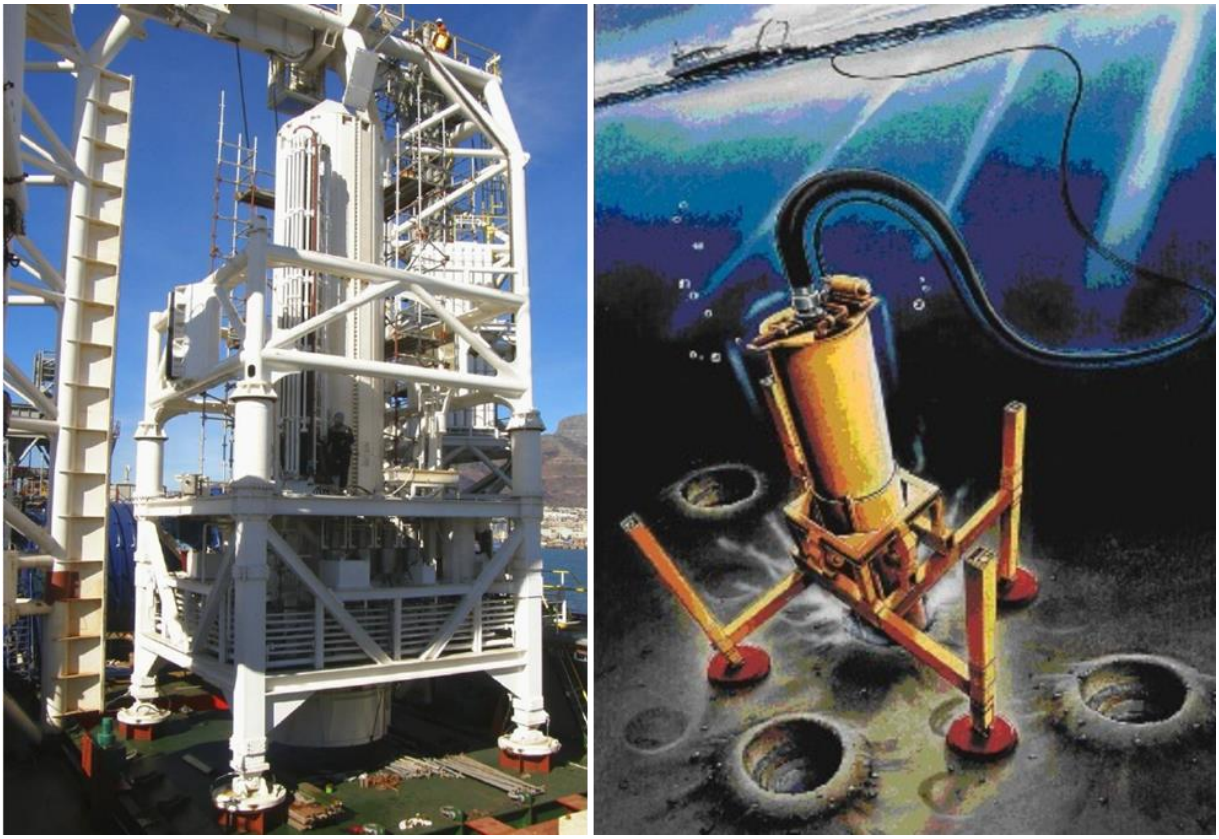


Figure 5-10 A sampling drill tool onboard The Explorer with a drill bit footprint 5m² (left) and an artists impression of a smaller sampling drill tool with a drill bit footprint of 3m².

Phase 4:

a) Feasibility study and resource estimation

Should Phases 1, 2 and 3 yield positive results and the targeted features be identified, a feasibility study will be conducted to assess the likely magnitude of the resource and the economic viability of mining in the proposed prospecting area. This will be a desktop study and will consider the data collected as part of the prospecting activities. The outcome of this will be a Feasibility Study Report. The report will include data on the seafloor topography, sediment stratigraphy and geological units; distribution of potentially mineralised deposits; an evaluation of the drill samples; resource evaluation of areas that are mineralised; an estimate of the extent and size of the resource present; results and recommendations for future mining operations, and recommendations on mining vessel design and construction.

5.6 Policy and Legislative Context

Table 2 The most important legislation applicable to prospecting in Concession area 11C.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Mineral and Petroleum Resources Development Act, 2002. In terms of this Act, a Prospecting Right must be obtained before any prospecting activities may commence	Throughout the entire prospecting process	The applicant must submit a prospecting right application in terms of Section 16 (1) of this Act, along with an application for Environmental Authorisation (EA) to the Regional Manager. The prospecting right application must be accepted within 14 days, provided that no other entity or person holds a Prospecting Right, Mining Right, Mining Permit or Retention Permit for the same land and mineral. Once the application is accepted, a Basic Assessment Process, including stakeholder consultation and reporting, must be conducted as per Chapter 5 of the National Environmental Management Act, 1998 (NEMA).
National Environmental Management Act, 1998. NEMA sets out a number of governing environmental principles that should be taken into account and applied by all organs of state when making decisions that significantly affect the environment. It provides the minimum requirements for the procedures for investigating, assessing and communicating the potential impacts of activities on the environment and society and for the granting of Environmental Authorisation for any activity. It requires that any activity should not only be environmentally sustainable, but economically and socially as well. The cultural, social, economical, psychological, developmental and physical needs of people should be considered along with the environment.	Throughout the entire prospecting process	A Basic Assessment Process will be conducted and the appropriate environmental authorisation obtained before commencing with any activities. Measures will be taken to ensure that the activity preserves and promotes the environmental and socioeconomic integrity of the area. Interested and Affected Parties (I&APs) will be consulted and informed about the proposed activities and their potential impacts (both positive and negative). Comments received from I&APs will be communicated to the authorities for consideration as part of the Basic Assessment Report.
Environmental Impact Assessment (EIA) Regulations, 2014 (as amended). The EIA regulations, 2014 (as amended) promulgated in term of Chapter 5 of NEMA controls certain listed activities. These activities are published as Listing Notice (LN) 1 in Government Notice (GN) No. R983 (as amended) as LN 2 in GN No.R 984 (as amended) and as LN 3 in GN No. R985 (as amended). These activities are prohibited until Environmental Authorisation (EA) has been granted by the competent authority. Activities triggered under LN 1 and 3 requires that a Basic Assessment be	Throughout the entire prospecting process	The proposed project triggers Listing Notice (LN) 1. A Basic Assessment Process will be undertaken and a Basic Assessment Report and stakeholder consultation report submitted as part of the application for EA. No activity will commence before EA has been granted by the Competent Authority.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
conducted, while activities triggered under LN 2 requires that a Scoping and Environmental Impact Assessment Report be conducted. See the Department of Environmental Affairs and Development Planning. 2011. EIA guideline and Information document series: Information document on biodiversity offsets		
National Environmental Management: Air quality Act, 2004. The offshore area of activity and the South African Exclusive Economic Zone (EEZ) does not fall within any municipal or provincial jurisdiction. There is thus a no formal means by which an application can be made for incineration from vessels in the offshore area. This activity is, however, permitted in terms of the International Convention for the prevention of pollution from ships, 1973/1978 (MARPOL) to which South Africa is a signatory.	Throughout the entire prospecting process	South Africa is a signatory of the International Convention for the prevention of pollution from ships, 1973/1978 (MARPOL). As such, all vessels have the responsibility to ensure that they prevent, minimise and mitigate potential pollution by vessels. To manage the potential impact of air pollution by vessels, all contractors and employees will be subjected to an environmental awareness campaign.
National Environmental Management: Waste Act, 2008.	Throughout the entire prospecting process	The client must ensure that this act is adhered to throughout the entire process.
Convention for the prevention of pollution from ships, 1973/1978 (MARPOL).	Throughout the entire prospecting process	Convention for the prevention of pollution from ships, 1973/1978 (MARPOL). As such, all vessels have the responsibility to ensure that they prevent, minimise and mitigate potential pollution by vessels. While a waste management license is not required for offshore waste management activities, such as those related to sewage, the generation of potential waste will be minimised through ensuring employees are subjected to the appropriate environmental awareness campaigns before commencement. All waste generated will be disposed of in a responsible and legal manner.
National Heritage Resources Act, 25 of 1999.	During coring, drilling and grab sampling	A heritage impact assessment has been conducted to ensure that there are no substantial impacts on heritage sites. No prospecting activities shall take place within 50 m of any identified heritage resources such as shipwrecks.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Companies Act 71 of 2008 The aim of this act is to: • provide for the incorporation, registration, organisation and efficient management of companies, the capitalisation of profit companies, and the registration of offices of foreign companies carrying on business within the Republic; • record-keeping and reporting by companies;	Throughout the entire prospecting process	The client must ensure that this act is adhered to throughout the entire process.
Restitution of Land Rights Act 22 of 1994 The Act provides for the restitution of rights to land to persons or communities dispossessed of their rights after 19 June 1913 as a result of historical racially discriminatory laws and practices	N/A	As this is an offshore application, this act is not applicable to this application.
Climate Change – Carbon Tax Act 15 of 2019 A taxpayer is liable to pay a carbon tax where it conducts any activities set out in Schedule 2 of the Carbon Tax Act and emits GHG emissions above the listed thresholds. Tax liability may be reduced through using the various allowances available and in some instances, the tax is only payable where the allowances are exceeded.	Throughout the entire prospecting process	The client has the responsibility to ensure that they pay carbon tax should they emit emissions above the listed thresholds or ensure that they reduce their emissions.
Climate Change – National Climate Change Response White Paper This paper provides guidance across all levels of government, sectors, and stakeholders in terms of climate change adaptation efforts in South Africa in the short to medium-term. Financial institutions must integrate environmental considerations into their decision-making frameworks and contribute to climate change mitigation and resilience. The paper acknowledges that financial institutions can play an important role in mobilizing finance to mitigate the impacts of climate change in South Africa and supporting a just transition to a low carbon economy.	Throughout the entire prospecting process	The client has the responsibility to ensure that they integrate environmental considerations and mitigation measures to reduce the impacts of climate change as a result of any operations they conduct into their decision-making frameworks and business plans.
National Water Act 36 of 1998 South Africa's waters are governed by the Water Services Act of 1997 and the National Water Act (NWA) of 1998. The NWA requires that certain	N/A	As this is an offshore prospecting activity that will not require any water uses, this act is not applicable to this activity.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
water users obtain a license with the Department of Water Affairs and follow specific requirements. Activities that typically require water use licenses are abstraction of water from dams or boreholes for irrigation, forestry operations, discharging waste water into water courses and altering the physical structures of rivers and streams.		
The Occupational Health and Safety Act No. 85 of 1993 The Act governs health and safety at all workplaces. It is focused on the health and safety of persons at work and places the responsibility on employers "to do everything reasonably practical" to protect the welfare of their employees The Act requires that every company with more than 20 employees has to have a health and safety committee, which should be tasked with identifying potential hazards, examining the causes of any workplace incidents, investigating employee complaints and consulting with health and safety inspectors. The Act also directs employers to provide and establish precautionary measures and systems to prevent workplace injuries.	Throughout the entire prospecting process	The client has to ensure that they adhere to the conditions set out in this act throughout the entire process. They also have to appoint a Health and Safety Officer to supervise the health and safety performance of the company, as well as to represent the employer and management at Health and Safety Committee meetings.
National Environmental Management: Protected Areas Act *"To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes"*	During coring, drilling and grab sampling	Results from the Screening Report and specialist marine impact assessments should be taken into consideration to avoid prospecting in a protected area or area of conservation concern.
Maritime Zones Act (No 15 of 1994) The Act defines the maritime zones of South Africa which include the contiguous zone, territorial waters, the maritime cultural zone, the exclusive economic zone and the continental shelf. South Africa has the right to exercise and implement all laws within the contiguous zone.	Throughout the entire prospecting process	Concession Area 11C lies within the territorial waters. Any offshore are subject to National law and should be adhered to.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Constitution of South Africa This is the supreme law that provides the legal framework for the existence of the Republic of South Africa.	Throughout the entire prospecting process	The conducting of prospecting activities in the area shall be done in such a manner that avoids significant environmental impacts. In instances where this cannot be avoided, impacts must be minimised or mitigated in order to protect the environmental rights of South Africans.
National Environmental Management: Biodiversity Act 10 of 2004. This act provides legal protection and management of South Africa's biodiversity within the context of the National Environmental Management Act and the sustainable use of biological resources.	Throughout the entire prospecting process	Strict compliance with the EMPr should be adhered to and mitigation measures implemented to reduce disturbance of biodiversity and aid in recovery.
Relevant specific environmental management Act (SEMA(s)) and their regulations. This refers to and includes subordinate regulations made in terms of section 1 of NEMA and specifically refers to the Protected Areas, Biodiversity, Air Quality, Integrated Coastal Management and Waste Acts.	Throughout the entire prospecting process	Applicable SEMA acts should be taken into account during the planning and design phase so that appropriate protocols are developed and maintained during the operational phase such as for waste management and protection of biodiversity areas.
CapeNature Western Cape Biodiversity Spatial Plan (WCBSP, 2017) A spatial assessment and biodiversity plan that is delineated on a Geographic Information System map that includes Critical Biodiversity, Ecological Support Areas to inform sustainable development in the Western Cape.	Planning and Design Phase	This spatial plan should be taken into account during the plan and design phase to inform areas for prospecting and activities should be adjusted accordingly.
•The Western Cape Provincial Spatial Development Framework (2014) (Department of Environmental Affairs & Development Planning)8 This includes land development policies, strategies, objectives as well as growth and development strategies for the province, all of which are spatially represented.	Throughout the entire prospecting process	This legislative framework should be taken into account to promote growth and development of local communities and should be considered during the planning and design phase.
The Mining and Biodiversity Guideline (2013) Outlines six principles that should be applied during any stage of the mining for decision-making. The document uses biodiversity information for decision-making throughout the mining cycle	Throughout the entire prospecting process	This should be employed to provide a practical guideline when making decisions regarding impacts to biodiversity with respect to the prospecting activities.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
The Western Cape Land Use Planning Guidelines: Rural Areas (2019) Aims at Safeguarding priority biodiversity areas and their functionality and ecological infrastructure and ensuring sustainable development in rural locations throughout the Western Cape	Throughout the entire prospecting process	This guideline will inform the planning and design of the prospecting survey and can be used to develop protocols for implementation in the operation phase.
Western Cape Guideline on Biodiversity Offsets DEA&DP 2015. Western Cape Guideline on Biodiversity Offsets. Prepared by Susie Brownlie and Mark Botha for DEA&DP, Cape Town12	Throughout the entire prospecting process	This guideline should be used during the planning and design phase such that residual impacts of the prospecting activity on biodiversity should be reduced.
National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM: ICMA) ICMA governs the sustainable use of goods and services that are generated by coastal and marine ecosystems.	Throughout the entire prospecting process	The required discharge and dumping permits need to be obtained in terms of NEM: ICMA with reference to the discharge of sediment into the marine environment Implement the Provincial Coastal Management Programme (PCMP). Its purpose is to provide an integrated, coordinated and uniform approach to coastal management in accordance with the and the.
Marine Spatial Planning Act of 2019 Makes provision for marine spatial planning system in South Africa so that the environment can be accessed by all users of the ocean, to facilitate responsible use of the ocean and conservation for future generations.	Planning and Design Phase	When planning the prospecting survey, areas of biological significance need to be taken into account and avoided.
National Estuarine Management Protocol (promulgated in GN No. 533 of 18 June 2021). This protocol was developed to determine a vision and objectives for integrated and effective management of South African estuaries.	Throughout the entire prospecting process	Relevant guidelines, Estuarine Management Plans and Mouth Management Plans need to be considered should activities impact the Olifants River Estuary
International Regulations for Preventing Collisions at Sea (Colregs 1972) These regulations refer to navigational rules that need to be adhered to by maritime vessels to minimise the likelihood of collisions.	Operation Phase	To prevent collision with other maritime vessels during survey operations, the operation vessel should adhered to this regulation, implement a safety zone and effectively signal this to other vessels.

5.7 Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

The global population increases by approximately 83 million people every year. This has led to an increased need for goods and services such as food products, houses, transport, healthcare, schools, etc., and has, in turn, driven technological progress and advances, industrialisation, globalisation and consumerism.

Industrialisation is the shift from a predominantly agricultural economy and society to one dominated by mass-production and technologically advanced goods and services. This has increased our incomes, standards and quality of living and need for recreation and leisure. Globalization is the increased interdependence of the world's economies and cultures, and the trade in technology, goods, services and information to meet the growing needs of the growing population. This has further led to a culture of consumerism, where there is an increasing encouragement and desire for the acquisition and consumption of goods and service. Unfortunately, the growing world and South African population and associated growing needs, requires an increase in products to meet these needs. Examples include transportation, fuel, cellphones, laptops, farming equipment, houses, fishing vessels, factories for production of goods, etc. Materials used in the production of these products are mostly sourced from the environment.

South Africa possesses some of the world's richest resources, minerals and several other commodities which has the potential to supply the international markets with more than it can consume (Minerals and Mining Policy for South Africa, 1998). According to the Minerals and Mining Policy for South Africa, 1998, the national mining industry is said to be one of the few "world-class industries" in the country with the potential to create broad scale employment opportunities and wealth. Trans Atlantic Diamonds are therefore proposing to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite)), which are considered pivotal in today's modern society and everyday life.

Gold, platinum, silver, diamonds and other gemstones, and other precious metals are not only used in the manufacturing of jewellery, but also in a plethora of other areas. Platinum, gold and silver are most commonly used as catalytic converters (for silicone production for example), in modern medicine (treatment of cancer, rheumatoid arthritis and other diseases, pacemakers, dental implants, prosthesis), in information technology (cell phones, laptops, computers), to make glass and in fuel, to name but a few of the uses.

Garnets are used in construction as skid-resistant road aggregates, in paints and as fillers in concrete used in harsh environments. Rare Earth Elements (REEs) are used as components in information technology, wind turbines and defence technologies. Ilmenite and rutile are the primary sources of titanium and titanium oxide. The latter minerals are used in the manufacturing of lightweight, high-strength metal alloys, which are again used to manufacture a wide variety of parts and tools including information technology, aircraft parts, sporting equipment and artificial joints. Zircon is used in high accuracy optics, in ceramics and in construction material as it can withstand high

temperatures. Iron ore is probably the most used metal in everyday life. It is used in the construction of machinery, tools, ships, vehicles, aircrafts, bridges, buildings, and electric motors.

Diamonds are an important commodity in the global economy that has grown from approximately 1 million carats in the late 1800's to 176.7 million carats in 2005 (Janse 2007), and is now considered a billion dollar industry. Apart from being used in the jewellery industry, diamonds are also used in several other industries. They are, for example, used in the automotive industry to make vehicles and also form part of high-tech vehicles. Being the hardest known material on earth, diamonds are used in polishing, cutting and drilling tools. These gems are also used in surgical tools and instruments (x-ray machines, dentist drills, 3-D non-invasive bioimaging machines), modern medicine (drug delivery system to disease-infected organs, cancer treatment, tissue engineering) and information technology.

While the majority of diamond production in South Africa is attributed to large-scale land-based mining operations, marine and coastal diamond mining operations are rapidly increasing. In 2005, six of the 14 Southern African Development Community (SADC) member states (Angola, Botswana, Democratic Republic of Congo, Namibia, South Africa and Tanzania) together produced 87.8 million carats of diamonds (US$7.5 billion) which is equivalent to 53% of world production (DME, 2006; Penney et al. 2007). Diamond mining production in South Africa alone, however, has decreased slightly from around 15 million carats in 2007 to around 9.9 million carats to in 2017 (DMR 2017). Although the overall South African Mining Industry production decreased by 4.0% in 2016, which was regarded as the largest annual fall since the global recession of 2009, diamond production still grew in that year (1%), and was recognized as the most successful mineral for the year in 2016. Furthermore, the latter commodity escalated further reaching 17% production growth in 2017 (STATS SA 2018).

While the most important source of diamonds is kimberlite pipes, the second major source is alluvial diamonds, which are formed through the erosion of the kimberlite pipes, resulting in the release of diamonds into rivers and ultimately, the sea. Today, these deposits extend from the coast down to 150 m depth (approximately 50–60 km offshore) where they are found in gullies and potholes which have been covered with sediment over time. It is this marine diamondiferous gravel that is of interest to the modern marine diamond mining industry (Penney et al. 2007). Diamond mining in the Benguela region (off the west coasts of southern Africa) has been shown to be economically important (DME, 2006; Penney et al. 2007) and therefore the proposed prospecting activities are ideally placed in concession area 11C offshore of the Western Cape Coast of South Africa.

Mineral prospecting also aligns itself with two national policies: The National Development Plan 2030 (NDP) and Operation Phakisa. The main objective of the NDP is to alleviate poverty and inequality amongst South Africans through faster and inclusive growth development. A manner of achieving this is to focus on South Africa's already unprecedented amounts of natural resources and creating opportunities that will advance the NDP strategy. Mining is identified in the NDP as an industry that has large potential for growth and employment opportunities and for it to continue to contribute largely to the South African economy, new mineral resources need to be identified through prospecting.

Operation Phakisa was established to facilitate and boost the growth of the economy to help achieve the objectives of the NDP, and to operate across industries. Mining Phakisa is a programme established under this operation whose objective is to warrant the economic sustainability of the

South African mining industry and to promote the growth and contribution thereof at a national level. Both of these frameworks promote the sustainable use of the country's natural resources as well as the conservation, preservation and restoration of the environment.

The Northern Cape Provincial Spatial Development Framework 2012 (PSDF) and Western Cape PSDF 2014 also notes that "the greatest value from marine and coastal resources is generated through the mining and fishing sectors" and that the Northern and Western Cape has an abundance of diamond deposits. This has led to the development of a large diamond mining sector, which has become the dominant activity of the coastal zone.

In terms of the above, it is evident that mining-related activities are deemed to be a key component of the current national and provincial economies and future mining projects are a means to assist Governments in meeting broader societal needs. It is important to remember that potential future mining is still years down the line and that the current application process is focused on prospecting which is a key initial step in the mining process and necessary for scientific knowledge, environmental baseline data, resource estimation and planning.

5.8 Alternatives considered

5.8.1 Motivation for the overall preferred site, activities and technology alternative.

Kimberlite pipes are believed to have formed by high-pressure and deep-rooted volcanic eruptions. They are igneous intrusions or "pipes" projecting through the Earth's crust and a major source of diamonds and other minerals such as rutile, zircon, garnets, ilmenite and magnetite (Gurney et al. 1991; Penney et al. 2007). These pipes transport the diamonds and minerals from the upper mantle to the surface of the Earth. These deposits were then further transported by means of erosion, wind, rain and rivers and deposited primarily in the sea in gravel terraces along riverbanks and on the coast. The Orange and Olifants rivers are believed to be the major westward transport mechanisms responsible for the deposition of diamondiferous sediments along west coast of South Africa and southern Namibia (Gurney et al.1991; Penney et al. 2007). With the influence of currents, swell and tidal action, diamonds gradually accumulated on gravel beaches along the coast (Penney et al. 2007). Today, these deposits extend from the coast down to 150 m depth (approximately 50–60 km offshore) where they are found in gullies and potholes which have been covered with sediment over time. It is this marine diamondiferous gravel which is of interest to the modern marine diamond mining industry (Penney et al. 2007).

With the Benguela region being rich in diamond, mineral and other deposits, the former Department of Minerals and Energy (now the Department of Mineral Resources and Energy — DMRE) established designated mineral sea concession areas in 1994, extending from Saldanha Bay to the Orange River mouth on the west coast of South Africa. Prospecting and mining activities are only permitted by individuals that are in possession of a mining or prospecting right, and only within specially designated areas that allow the industry, the trade of commodities, the associated activities and potential impacts, environmental management and the responsible extraction of minerals, to be monitored. Companies can apply for prospecting and/ or mining rights within concession areas for which rights are available. As this is a competitive industry, few concession

areas are available at any given time. Although several alternative concession areas were considered by the applicant, the prospecting and mining rights for many of these were already held by other companies.

As the intention of the proposed prospecting activity is to search for diamondiferous, gemstone, mineral and metal deposits, and to ensure the economic feasibility of mining within a certain concession area, an area known to contain these resources needs to be selected. As such, few location alternatives exist. Diamonds and other commodities have been discovered in neighbouring "C" concession areas and some are actively mined. In addition, the preferred site is thought to contain palaeo-beach deposits which are known from prospecting and mining in other concession areas, to contain diamondiferous gravels.

The preferred activities, i.e. geophysical surveys and drilling, are the primary methods used for mineral prospecting, and will facilitate the discovery and estimation of mineral resources within the concession area. These activities will include invasive and non-invasive methods such as geophysical surveys, drilling and baseline biological sampling outlined in section 5.5 above. These methods have been developed through many years of research and development by the mining industry and are the preferred methods for resource estimation and cannot easily be replaced by any other methods.

5.8.2 Full description of the process followed to reach the proposed preferred alternatives within the site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

The National Web based Environmental Screening Tool was used to identify any terrestrial areas of conservation that would need to be avoided (see Appendix 2). The SANBI BGIS database was consulted to review the Ecosystem Threat Status and to identify Marine protected Areas and Ecologically and Biologically Significant Areas in the area. GIS layers were extracted and overlaid on a map of Concession 11C in ArcGIS. This enabled the identification of areas of conservation concern that needs to be avoided (Figure 5-11).

In addition to the areas of conservation concern that will be avoided, geophysical surveying will be undertaken along survey lines spaced 1000 m to 100 m apart throughout the concession area. This will be conducted over a period of suitable, calm sea and weather conditions (the survey speed of the DP Star is typically 120 km/day in an offshore). Furthermore, no invasive sampling will be undertaken on reef areas as these are known to be hotspots for marine biodiversity. As no geophysical sampling has been conducted in this area to date, the exact position of reefs and other areas that need to be avoided have not yet been identified. These areas will be identified only after the non-invasive seismic surveys have been completed. Consultation with stakeholders during the Public Participation Process will further elucidate areas that need to be avoided. The preferred alternative within the site is thus subject to change pending results from the geophysical survey and consultation with stakeholders. No infrastructure will be placed on shore or in the sea.

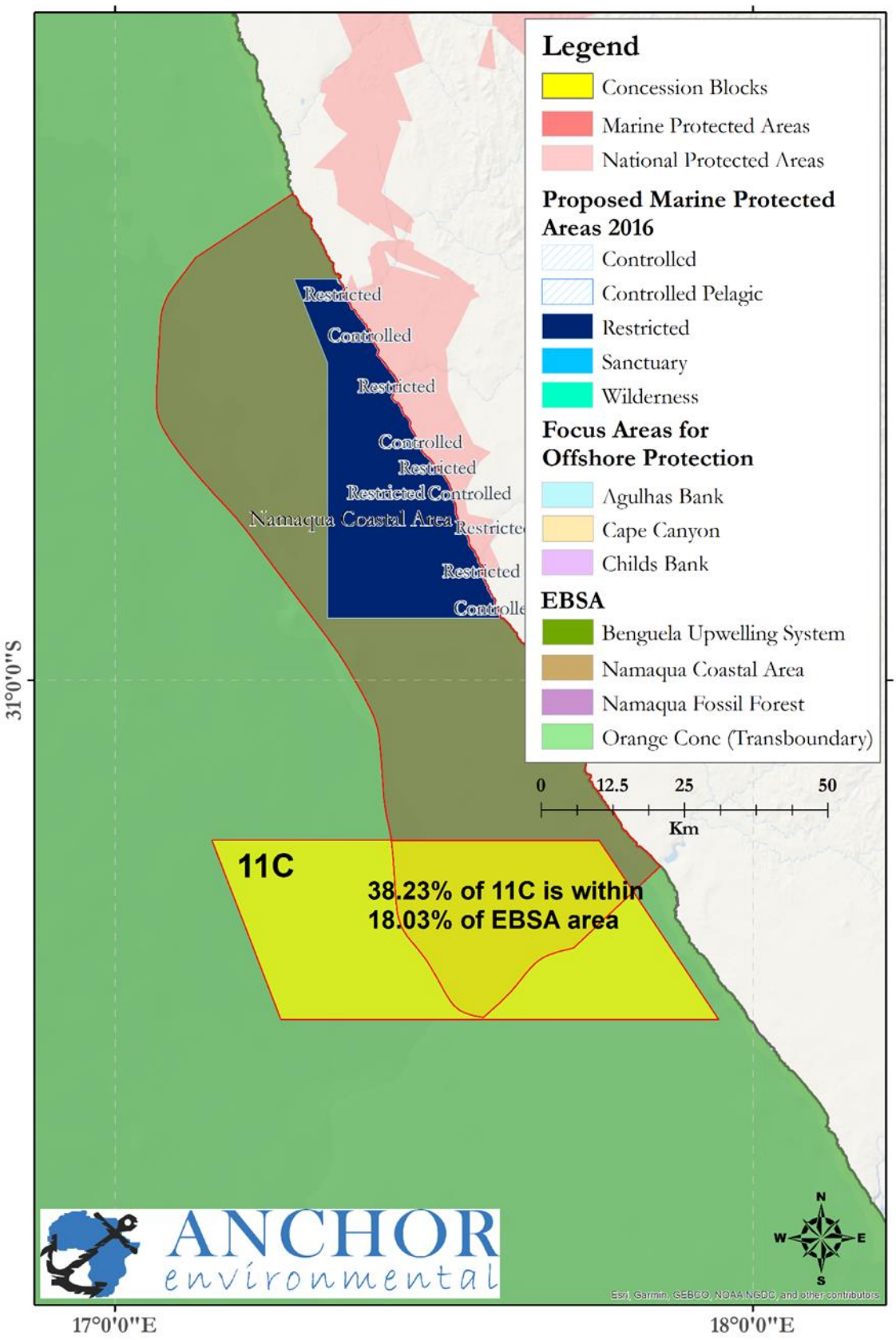


Figure 5-11 **Marine protected Areas (dark blue) and the proposed Namaqua Coastal Area EBSA and location of concession area 11C. Source: https://bgis.sanbi.org/**

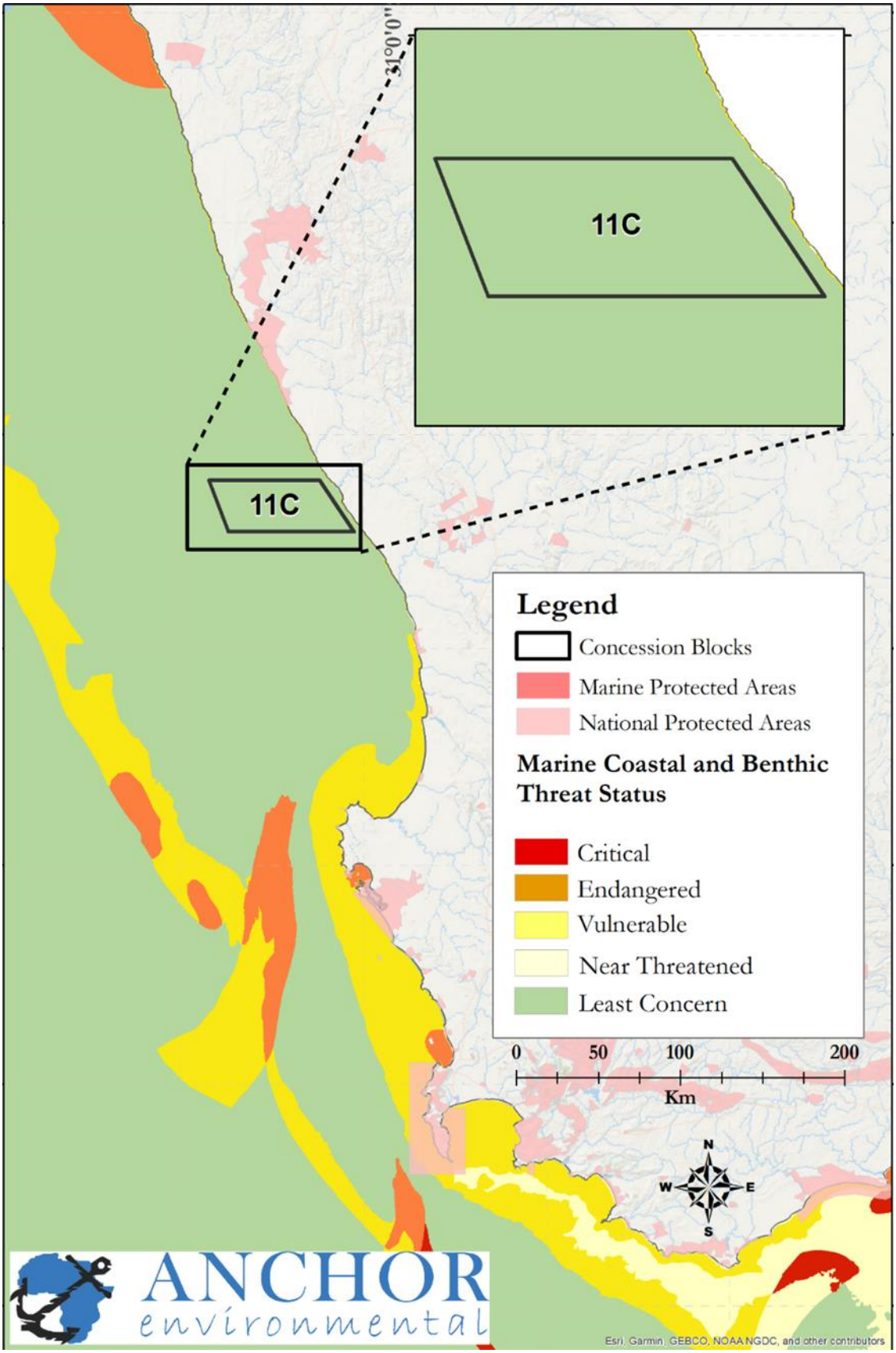


Figure 5-12 SANBI Ecosystem Threat Status and location of concession area 11C. Source: https://bgis.sanbi.org/

5.8.3 Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which, or location where, it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

a) the property on which or location where it is proposed to undertake the activity

Prospecting and mining activities are only permitted within the specially designated concession areas along the west coast. In addition to this, only a limited number of these concession areas are available. As such, a limited number of alternative sites for prospecting and mining activities area available.

Results from prospecting and mining operations conducted within the neighbouring concession areas have indicated that the area is rich in mineral deposits. The study area is therefore expected to have similar resources. As the intention of the proposed prospecting activity is to determine the presence of diamondiferous, gemstone, mineral and metal deposits, and to ensure that they are present in quantities that will be economically viable to mine, it is important that a site known to be rich in resources, is selected. As such, few alternatives in terms of location exist. The preferred site has been identified as an area where palaeo-beach deposits are known to occur and these are known from other concession areas to contain diamondiferous gravels.

It is important to note that the exact location of the core and drill sites will only be confirmed after the completion of the acoustic surveys. Buffers will be applied around reef areas and areas of conservation concern. The final site layout plan is thus subject to change.

b) the type of activity to be undertaken

Alternatives which exist in terms of the activities include prospecting by means of bulk sampling or prospecting without bulk sampling. Bulk sampling entails use of dredge equipment to sample large volumes over large areas of the sea floor. The impact of bulk sampling is expected to be higher than that without bulk sampling. For this reason, prospecting without bulk sampling has been selected as the preferred alternative. This will include core and drill samples with a footprint of less than 5 m^2 per sample.

c) the design or layout of the activity

Areas of conservation concern in addition to reef areas will be avoided. (Figure 5-11 & Figure 5-12). As no geophysical sampling have been conducted in this area to date, the exact position of reefs and other areas that need to be avoided have not yet been identified. Consultation with stakeholder during the Public Participation Process will further elucidate areas that need to be avoided. The preferred alternative within the site is subject to change pending results from the geophysical survey and consultation with stakeholders.

d) the technology to be used in the activity

The preferred activities, i.e. geophysical surveys and drilling are the primary methods used for mineral prospecting and will facilitate the discovery and estimation of natural mineral resources with the sea concession area. These activities will include invasive and non-invasive methods such as geophysical surveys, drilling and baseline biological sampling outlined in section 5.5 above. These methods are thus the preferred activities and cannot be replaced by other methods.

However, several types of core and drill tools exist. Equipment with a small physical footprint has been selected. The Van Veen grab sampling, core sampling and drill sampling will disturb a total surface area of approximately 5 m^2, 1.57 m^2 and 1 500 m^2, respectively. This amounts to a total of 0,151 ha which is 0.012% of the total area of the concession area.

e) the operational aspects of the activity

There is some flexibility in terms of when, where and how the sampling and surveying will be carried out. This will be informed by the specialist studies, consultation with interested and affected parties (I&APs) and the acoustic surveys. For example, every effort will be made to avoid sampling and prospecting in marine protected areas or important conservation areas and also areas that are important for fisheries, particularly small-scale commercial fisheries. Results of the BA and associated specialist studies will also be used to guide selection of the most appropriate survey and sampling equipment. This is detailed in the project EMPr.

The preferred timing for this project is to undertake geophysical and sampling surveys over a period of five years. There is some flexibility in terms of which months of the year the sampling and surveying will be undertaken and this will be informed by the specialist studies and consultation with interested and affected parties (I&APs). For example, every effort will be made to avoid sampling and prospecting during seasonal migrations of marine mammals, fish and birds and at times when fishing fleets are operating in the concession area. This is detailed in the project EMPr. No infrastructure and no services in terms electricity, water supply, or sewerage facilities are required.

f) the option of not implementing the activity (No-go option)

According to EIA regulations and guidelines (as amended), a no-go option should also be included. As such, the absence or non-occurrence of prospecting in the concession area is considered to have both positive and negative implications. The advantage of the no-go option will mean that there are no impacts on the bio- and geophysical environment in the proposed prospecting area while the disadvantages of not prospecting will lead to a loss of opportunity to extract an economically viable natural resource, prevention of socioeconomic benefits and loss of economic and growth development opportunities. Given the high existing levels of unemployment and poverty within South Africa, this is considered significant.

6 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

6.1 Description of the Affected Baseline environment

6.1.1 Regional oceanography

The Benguela is one of the world's most productive systems, supporting rich fishing grounds and attracting large colonies of sea birds and seals (Branch 1981). Wind is the primary driver of productivity in the system. The prevailing south-easterly winds displace surface water offshore during the summer, and cause cold, nutrient rich water to rise from deeper water masses to replace this surface water. These upwelling events are the trigger for minimum temperatures and maximum nutrient levels (Branch and Griffiths 1988). The oceanic primary producers, phytoplankton, bloom when upwelled inorganic nutrients become available for photosynthesis in the presence of sunlight. These are consumed by zooplankton, which are in turn consumed by small pelagic fish species such as anchovy and sardine. The Benguela is one of the world's most productive systems, supporting rich fishing grounds and attracting large colonies of sea birds and seals (Branch 1981).

The West Coast is subject to semi-diurnal tides, with each successive high (and low) tide separated by 12 hours. Spring tides occur once a fortnight during full and new moons. Tidal activity greatly influences the biological cycles (feeding, breeding and movement) of intertidal marine organisms, and has an influence on when people visit the coastline to partake in various activities such as bathing and the harvesting of marine resources.

The west coast of South Africa typically experiences high wave energy and is dominated by south-westerly swells (Branch and Griffiths 1988). Southerly and south-westerly waves frequently exceed 2 m (Figure 6-1 & Figure 6-2). The average water temperature during the summer months is cool due to upwelling (approximately 11°C) and slightly warmer during downwelling events, which are caused by westerly winds or occasional Benguela Niños when unseasonal westerly winds result in a breakdown of the upwelling front with movement of warm oceanic water towards the coast (Laird and Clark 2018).

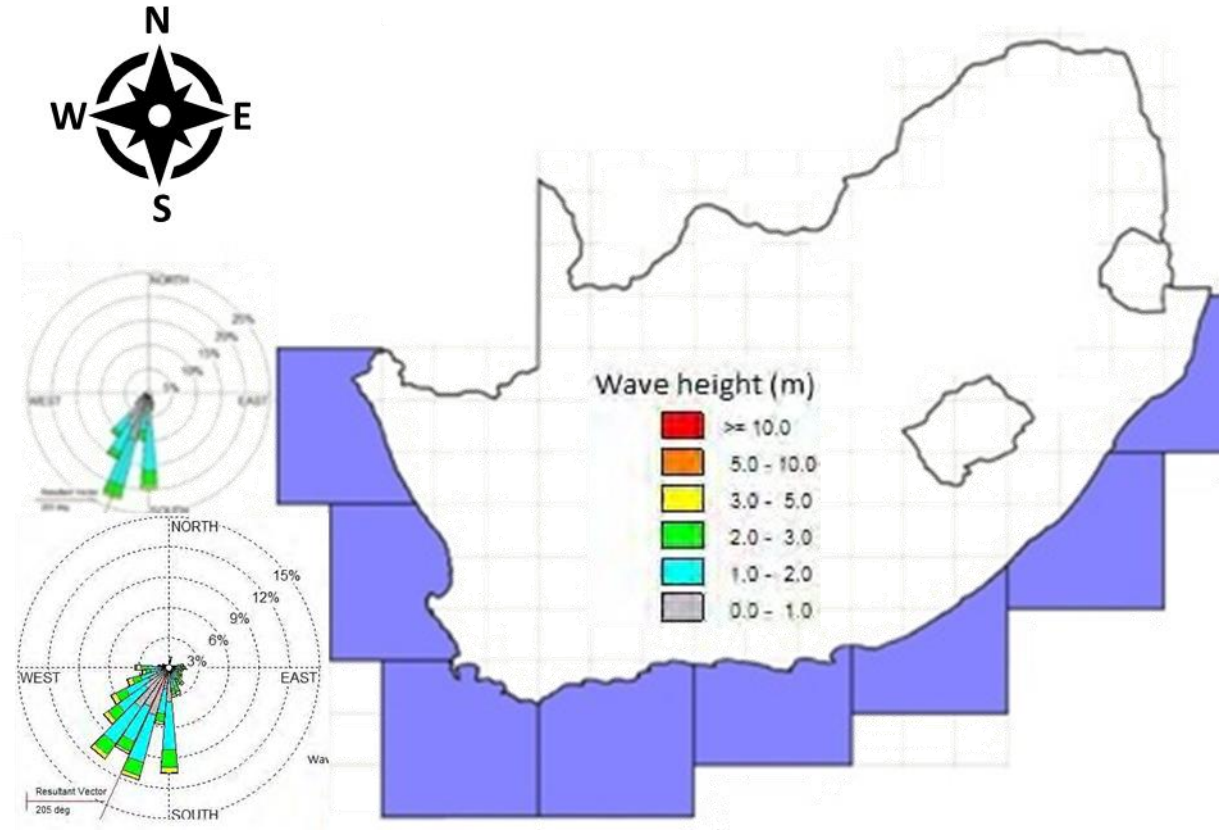


Figure 6-1 **Wave roses showing the frequency of significant wave heights and direction on the West Coast (Source: SADCO Voluntary Observing Ships data).**

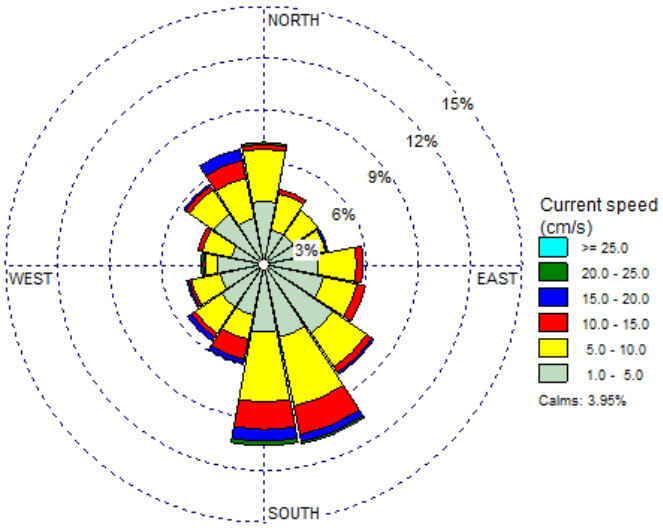


Figure 6-2 **Current rose showing current direction and strength data at -12 m water depth inshore of concession area 11C. (Source: Laird and Clark 2018).**

6.2 Biogeography

Concession Area 11C is positioned in the southern section of the Benguela Current System (BCS), which extends along the west coast of southern Africa between Cape Agulhas and Angola. The area

falls within the Namaqua inner shelf ecozone, which is nested within the Southern Benguela Ecoregion as defined by Sink *et al*. (2012) (Figure 6-3).

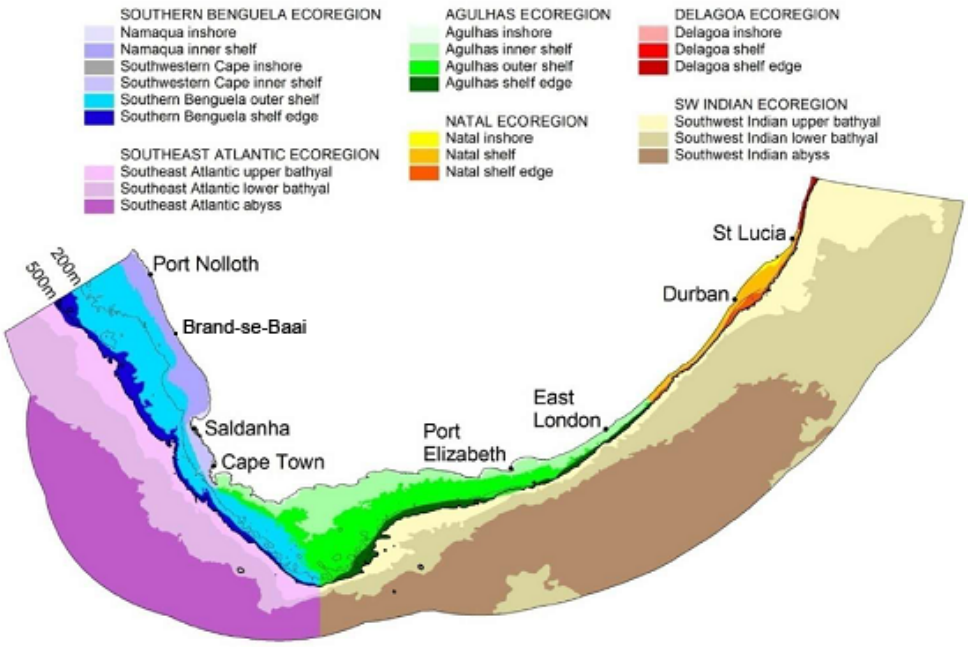


Figure 6-3 Six marine ecoregions with 22 ecozones incorporating biogeographic and depth divisions in the South African marine environment as defined by Sink *et al*. (2012).

6.3 Ecology

Wind-driven coastal upwelling is the predominant physical driver that shapes the high levels of biological productivity in the southern Benguela, providing nutrients for primary producers, and food for diverse fauna, such as pelagic (pilchards, anchovy) and demersal (hakes, kingklip) fish stocks, near-shore fisheries (linefish, rock lobster), mammals (seals and whales) and seabirds (penguins, gannets, cormorants etc.). There are three broad marine habitats within the11C Concession Area. These include sandy benthic habitat, offshore rocky reefs, and the water column or pelagic habitat.

6.3.1 Subtidal sandy benthic habitat

Benthic epifauna are animals that inhabit the surfaces of subtidal sand, while infauna are those that burrow or dig into the soft sediments (Castro and Huber 1997). The distribution of infauna and the depth at which organisms can live in the substrate is largely dependent on sediment particle size. More porous, larger grained substrates allow for greater water circulation through the sediment, thereby replenishing the oxygen that is used up during the decomposition processes.

Much of the benthic infauna on the western coast are deposit feeders (e.g. worms), feeding and extracting nutrients from sediment, organic matter and detritus (Castro and Huber 1997). Suspension feeders feed on detritus and plankton suspended in the water column (e.g. some crab species), while filter feeders actively pump and filter water to extract suspended particles (e.g. bivalves). Most

bottom-dwelling fish inhabiting soft bottom habitats are predators (e.g. rays and skates, flat fish such as sole). Predators such as crabs, hermit crabs, lobsters and octopuses, which inhabit rocky areas, may move to sandy benthos to feed (Castro and Huber 1997). Similarly, reef-associated fish also rely on sandy substrate for food.

Macrofauna living within benthic substrata play an important role in the reworking of sediments. These organisms assist in promoting the exchange of oxygen and nutrients within the substrate by enhancing sediment porosity. Macrofaunal communities also provide an important food source for fish and other invertebrate species.

Benthic macrofauna are the biotic component most frequently monitored to detect changes in the health of a marine environment as they are short-lived, and their community composition responds rapidly to environmental change (Warwick 1993). They also tend to be directly affected by pollution, are easy to sample quantitatively, and are scientifically well-studied compared to other sediment-dwelling components. Anthropogenic physical disturbance will negatively affect benthic macrofauna and is likely to result in the proliferation of opportunistic pioneer species following a disturbance event. Harmer *et al.* (2013) showed that polychaetes are generally most abundant, followed by amphipods and gastropods. The soft sediment infauna of the Namaqua inner shelf ecozone of the west coast of South Africa is moderately well studied. Benthic sampling undertaken by Anchor Environmental Consultants in concessions 1B, 1C and 2C (similar depth range and biogeographical zone as 11C) yielded a benthic macrofaunal community consisting of 45 species with an average biomass of 85.9 g/m^2 (1B), 31.8 g/m^2 (1C) and 38.9 g/m^2 (2C) respectively (Mostert *et al.*, 2016 and Biccard *et al.*, 2020a). This is much lower than the diversity and biomass of macrofaunal communities found in the shallower, sheltered and retentive bays along the west coast (diversity: >150 species; biomass: St. Helena Bay = 846.53 g/m^2, Saldanha = 970.78 g/m^2) (Biccard *et al.* 2020c; Clark *et al.* 2020). Available evidence suggests that the macrofaunal communities of Concession 11C are more similar to those found in the offshore, open coast areas such as 1C and 2C than the sheltered, productive west coast bays, but this will be confirmed during the proposed baseline sampling.

6.3.2 Offshore rocky reefs

The offshore environment is divided into six areas: the inner and outer shelf, the shelf edge, the upper and lower bathyal zones, and the abyssal zone. According to the National Biodiversity Assessment, offshore benthic habitat types include six broad ecosystem groups: rocky shelf, rocky shelf edge, seamounts and unconsolidated shelf, unconsolidated shelf edge and deep-sea sediments (Sink *et al.* 2012). Concession 11C lies within what is mostly classified as sandy inner shelf habitat interspersed with rocky outcrops (Figure 6-4). The sandy inner shelf habitat type has the greatest extent within our EEZ, with muddy, gravel and mixed sediment habitat types constituting smaller areas (Sink *et al.* 2012). These offshore rocky reefs are colonised by a range of epifauna including bryozoans, encrusting and upright sponges, solitary and colonial ascidians, sea anemones and cold-water coral colonies — the latter being slow-growing and taking many years to become established (Biccard *et al.*, 2020b). Studies undertaking assessments of prospecting and mining-related impacts on these habitats in this region are relatively new and the time taken for disturbed epifaunal communities inhabiting offshore rocky reefs to recover has not yet been determined (Biccard *et al.*, 2020b).

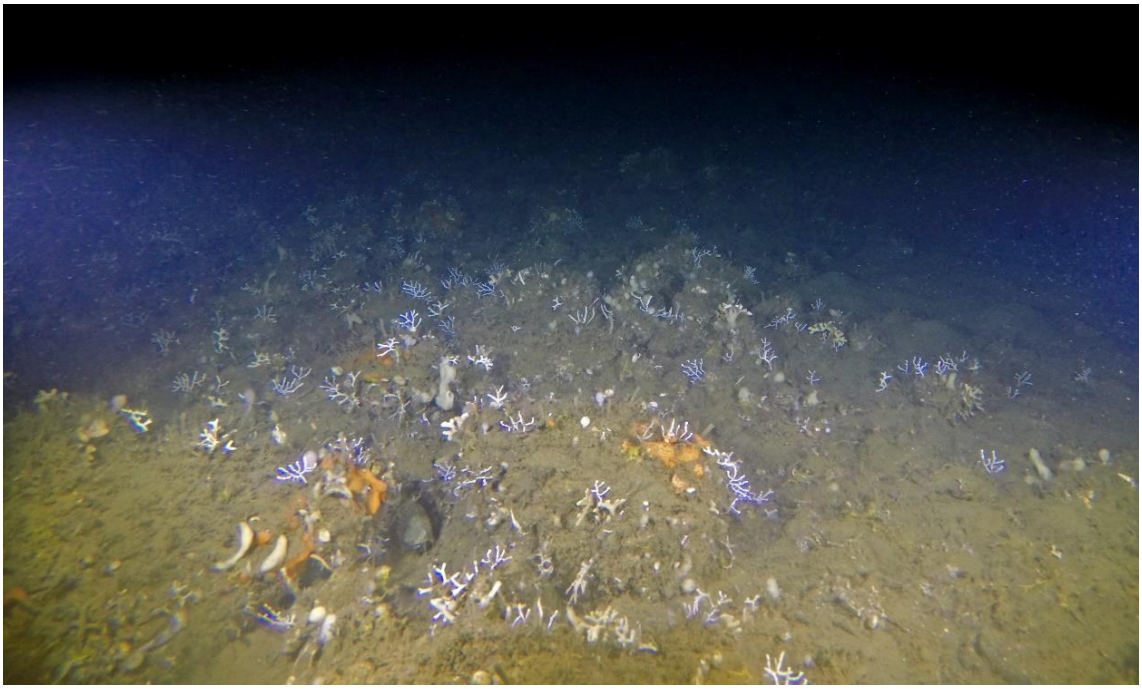


Figure 6-4 **A typical hard-bottom inner shelf benthic habitat off the west coast of South Africa consisting of both epifauna and infauna. Source: Anchor Environmental.**

These offshore reefs within Concession area 11C should be visually assessed (by means of drop camera deployments or remotely operated underwater vehicle) during the baseline environmental survey with regular repeat surveys following mining operations in the area — offshore reefs may not be directly impacted (mined) but are at risk of being indirectly impacted by tailings disposal.

6.3.3 Pelagic habitat

This habitat type constitutes the largest of all habitats and is loosely defined as the water column of the open ocean. Main physical drivers include temperature, turbidity, dissolved oxygen, nutrient levels and light. In contrast to demersal and benthic biota that are associated with the seabed, pelagic species live and feed in the open water column. Pelagic communities are divided into plankton and fish, and their main predators, seabirds, marine mammals (seals, dolphins and whales) and turtles.

6.3.3.1 Planktonic communities

The ecology of the open water pelagic habitat within Concession 11C is typical of the Benguela upwelling region and the Namaqua inshore ecozone. Pulsed inputs of nutrients (nitrates, phosphates and silicates) due to wind driven upwelling result in high primary productivity with phytoplankton communities dominated by dinoflagellates and diatoms. Phytoplankton are consumed by a variety of zooplankton that typically consist of crustacean copepods, euphausiids, mysids and a myriad of eggs and larvae from almost all marine phyla. For example, ichthyoplankton in the southern Benguela are composed mainly of small pelagic anchovy and sardine fish eggs and larvae, with some hakes and mackerel (Shannon and Pillar 1986). Zooplankton are in turn the food source for large numbers of small pelagic fish, particularly sardine *Sardinops sagax*, anchovy *Engraulis encrasicolus,* red eye round herring *Etrumeus whiteheadi* and maasbanker, *Trachurus capensis*. These small pelagic fish exert a

controlling influence on the abundance of both their zooplankton prey and their predators that include commercially important fish species such as snoek *Thyristes atun*, yellowtail *Seriola lalandi* and hake *Merluccius* sp. (Cury *et al.* 2000; Shannon *et al.* 2020).

6.3.3.2 Seabirds

Fourteen species of seabirds breed in southern Africa; Cape Gannet, African Penguin, four species of Cormorant, White Pelican, three Gull and four Tern species (Table 3). Species listed as endangered on the IUCN red data list include the African penguin, Cape cormorant and the bank cormorant. Breeding areas are distributed around the coast with islands being particularly important. The number of successfully breeding birds at each breeding site varies with the abundance of food. Most of these breeding seabird species forage for small pelagic fish at sea with most birds being found relatively close inshore (within 30 km of the coast). Of the diving birds that occur along the coast, only *Morus capensis*, the Cape gannet, regularly feeds from the inshore environment as far as 100 km offshore and African penguins have also been recorded as far as 60 km offshore. Most of the species listed here are likely to be encountered in concession 11C. Note that inshore species such as the African Black Oyster Catcher (Swart Tobie) *Haematopus moquini*, that are not likely to be encountered as far offshore as Concession area 11C, are not listed in the table below.

Table 3 Breeding seabirds present on the west coast of South Africa (adapted from Pulfrich 2021).

Common name	Species name	Global IUCN Status
African Penguin	*Spheniscus demersus*	Endangered
Great Cormorant	*Phalacrocorax carbo*	Least Concern
Cape Cormorant	*Phalacrocorax capensis*	Endangered
Bank Cormorant	*Phalacrocorax neglectus*	Endangered
Crowned Cormorant	*Phalacrocorax coronatus*	Near Threatened
White Pelican	*Pelecanus onocrotalus*	Least Concern
Cape Gannet	*Morus capensis*	Vulnerable
Kelp Gull	*Larus dominicanus*	Least Concern
Greyheaded Gull	*Larus cirrocephalus*	Least Concern
Hartlaub's Gull	*Larus hartlaubii*	Least Concern
Caspian Tern	*Hydroprogne caspia*	Least Concern
Swift Tern	*Sterna bergii*	Least Concern
Roseate Tern	*Sterna dougallii*	Least Concern
Damara Tern	*Sterna balaenarum*	Near Threatened

Pelagic seabirds such as albatross, petrels and shearwaters are prevalent in offshore areas such as 11C. Species listed as endangered include the black-browed albatross and yellow-nosed albatross.

Table 4 Pelagic seabirds common to the southern Benguela region (Crawford *et al.*, 1991).

Common Name	Species name	Global IUCN
Shy albatross	*Thalassarche cauta*	Near Threatened
Black browed albatross	*Thalassarche melanophrys*	Endangered
Yellow nosed albatross	*Thalassarche chlororhynchos*	Endangered
Giant petrel sp.	*Macronectes halli/giganteus*	Near Threatened
Pintado petrel	*Daption capense*	Least concern
Greatwinged petrel	*Pterodroma macroptera*	Least concern
Soft plumaged petrel	*Pterodroma mollis*	Least concern
Prion spp.	*Pachyptila spp.*	Least concern
White chinned petrel	*Procellaria aequinoctialis*	Vulnerable
Cory's shearwater	*Calonectris diomedea*	Least concern
Great shearwater	*Puffinus gravis*	Least concern
Sooty shearwater	*Puffinus griseus*	Near Threatened
European Storm petrel	*Hydrobates pelagicus*	Least concern
Leach's storm petrel	*Oceanodroma leucorhoa*	Least concern
Wilson's storm petrel	*Oceanites oceanicus*	Least concern
Blackbellied storm petrel	*Fregetta tropica*	Least concern
Skua spp.	*Catharacta/Stercorarius spp.*	Least concern
Sabine's gull	*Larus sabini*	Least concern

6.3.3.3 Marine mammals

The marine mammal fauna occurring off the southern African coast includes several species of baleen whales, toothed whales, beaked whales, dolphins and one resident seal species. Based on the available literature thirty-six marine mammals that may occur in the proposed survey area have been identified (Table 5); each of these have been placed into marine mammal hearing groups as per Southall *et al.* (2019).

Of the species listed, the blue whale is considered 'Critically endangered', fin and sei whales are 'Endangered' and two (humpback and sperm whale) are considered vulnerable (IUCN Red Data list Categories). Current information on the distribution, population sizes and trends of most cetacean species occurring on the west coast of southern Africa is lacking (Pulfrich 2021). The most abundant baleen whales in the Benguela are humpback whales and southern right whales. Increasing numbers of summer records of both species from the southern half of Namibia suggest that animals may also be feeding in the Lüderitz upwelling cell (NDP unpublished. data) and will therefore occur in or pass through the area of interest (Pulfrich 2021).

Table 5 **Marine mammals thought to occur within the proposed survey area. Each species listed has been placed into a marine mammal hearing group as defined by Southall *et al.* 2019. The relative abundance and likelihood of occurrence within the proposed survey area during the survey period in late summer is indicated for each species. Conservation status from the IUCN (2021) red data list is indicated.**

Marine Mammal hearing group (Southall *et al.* 2019)	Species	Shelf/Offshore	Likely encounter frequency in 11C and seasonality in parentheses	IUCN Conservation status
Low frequency cetaceans (Baleen whales) Generalised hearing range: 7 Hz to 35 kHz	*Balaenoptera bonaerensis* (Antarctic minke whale)	Shelf and offshore	Monthly (winter)	Least concern
	B. acutorostrata (Dwarf minke whale)	Shelf and offshore	Occasional (year-round)	Least concern
	B. physalus (Fin whale)	Shelf and offshore	Occasional (rarely in summer)	Endangered
	B. musculus (Blue whale)	offshore	Unlikely (seasonality unknown)	Critically Endangered
	B. borealis (Sei whale)	Shelf and offshore	Occasional (winter)	Endangered
	B. brydei (offshore Bryde's whale)	Shelf and offshore	Occasional (summer)	Not assessed
	B. brydei (subspp) (inshore Bryde's whale)	Shelf and offshore	Occasional (year-round)	Vulnerable
	Eubalaena australis (Southern right whale)	Shelf	Daily (year-round, higher in early spring and	Least concern
	Megaptera novaeangliae (Humpback whale)	Shelf and offshore	Daily (year-round, higher in summer)	Vulnerable
High frequency cetaceans (Dolphins, toothed whales, beaked whales) Generalised hearing range: 150 Hz to 160 kHz	*Lagenorhynchus obscurus* (Dusky dolphin)	Shelf (0-800 m)	Daily (year-round)	Data deficient
	Cephalorhynchus heavisidii (Heaviside's dolphin)	Shelf (0-200 m)	Daily (year-round)	Near threatened
	Tursiops truncates (Common bottlenose dolphin)	Shelf and offshore	Monthly (year-round)	Least concern
	Delphinus delphis (Common short beaked dolphin)	Shelf and offshore	Monthly (year-round)	Least concern
	Lissodelphis peronii (Southern right whale dolphin)	Shelf and offshore	Occasional (year-round)	Least concern
	Stenella coeruleoalba (striped dolphin)	Offshore	Unlikely (unknown)	Least concern
	S. attenuate (Pantropical spotted dolphin)	Shelf edge and offshore	Unlikely (year-round)	Least concern
	Globicephala melas (Long-finned pilot whale)	Shelf edge and offshore	Monthly (year-round)	Least concern
	G. macrorhynchus (Short-finned pilot whale)	Unknown	Unlikely (unknown)	Least concern
	Steno bredanensis (Rough-toothed dolphin)	Unknown	Unlikely (unknown)	Least concern
	Orcinus orca (Killer whale)	Shelf and offshore	Occasional (year-round)	Data deficient
	Pseudorca crassidens (False killer whale)	Shelf and offshore	Monthly (year-round)	Least concern

Marine Mammal hearing group (Southall *et al.* 2019)	Species	Shelf/Offshore	Likely encounter frequency in 11C and seasonality in parentheses	IUCN Conservation status
	Feresa attenuate (Pygmy killer whale)	Offshore	Occasional (unknown)	Least concern
	Grampus griseus (Risso's dolphin)	Shelf edge and offshore	Occasional (unknown)	Least concern
	Kogia breviceps (Pygmy sperm whale)	Shelf edge and offshore	Occasional (year-round)	Data deficient
	K. sima (Dwarf sperm whale)	Shelf edge	Unlikely (unknown)	Data deficient
	Physeter macrocephalus (Sperm whale)	Shelf edge and offshore	Occasional (year-round)	Vulnerable
	Ziphius cavirostris (Cuvier's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	Beradius arnouxii (Arnoux's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	Hyperoodon planifrons (Southern bottlenose beaked whale)	Offshore	Occasional (year-round)	Least concern
	Mesoplodon layardii (Layard's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	M. mirus (True's beaked whale)	Offshore	Unlikely (year-round)	Data deficient
	M. grayi (Gray's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	M. densirostris (Blainville's beaked whale)	Offshore	Unlikely (year-round)	Data deficient
Phocid carnivores in water (PCW)	*Mirounga leonine* (Southern elephant seal)	Shelf and offshore	Unlikely (unknown)	Least concern
	Hydrurga leptonyx (Leopard seal)	Shelf and offshore	Unlikely (unknown)	Least concern
Other marine carnivores in water (OCW)	*Arctocephalus pusillus* (Cape fur seal)	Shelf	Daily (year-round)	Least concern

6.4 Socio-economic and cultural character

The proposed prospecting activity would take place in the offshore marine environment at least 5km offshore by a survey vessel operating out of the Port of Cape Town or possibly Saldanha. As a result, the local terrestrial socio-economic and cultural environment would not be affected and residents would probably not even be aware of any prospecting activities underway. It is described here for regional context and the socio-economic characteristics of maritime users who may be affected by the proposed prospecting is described in section 6.8. The cultural and socio-economic environment is largely dependent upon the regional, local and immediate communities present in the area. The proposed prospecting/survey activity falls within the regional West Coast District Municipality (WCDM) and local Matzikama Municipality. The nearest coastal towns are Papendorp and Strandfontein, while the nearest inland towns are Ebenhaeser, Lutzville and Koekenaap. The

Namakwa District Municipality (NDM) is located in the southwestern portion of the Northern Cape which is situated directly north of this concession area.

The West Coast has a very rich cultural, heritage and history, with many of the towns being over a century old. The West Coast and local towns are also very popular tourist destinations, being renowned for their beaches, wildlife, hiking trails, whale watching locations, 4x4 routes and variety of holiday accommodations. As very little to no socio-economic or demographic information is available for the small towns located in this region, information is only provided for the District and Local Municipalities adjacent to the concession area. The level of education in these towns are relatively low. Since education improves access to employment opportunities, the low levels of education result in an underdeveloped skilled labour workforce and low household income levels. These towns have a high dependency ratio which is commonly observed in developing countries and have been found to show significant relationship with economic growth, poverty, and employment (Vijayakumar 2013). This reiterates the need for a skilled labour force as this is vital to a country's economy, growth and development.

6.5 Regional Study Area

West Coast District Municipality (Western Cape)

The West Coast District Municipality extends over an area of 31 099 km^2 and includes five local municipalities (Matzikama, Cederberg, Bergrivier, Saldanha Bay, and Swartland). It supports a total population of 464 056 inhabitants in 122 074 households (WCDM 2021). The population is 50.3% female and 49.7% male, with three predominant population groups: Coloured (66.58%), Black African (16.36%), and White (15.71%) communities. Most of the populations' first language is Afrikaans (83.67%), followed by IsiXhosa (8.58%), English (3.98%) and other indigenous languages (IsiNdebele, Sesotho, and Setswana). The WCDM population dependency ratio is quite high (45.9%) with 68% in the working age group (15–64), followed by the young (25%, 0–14) and the elderly group (7%, 65+), which puts significant strain on the workforce, social systems and the delivery of basic services. Level of education is relatively low (79.1%) compared to the Western Cape (87.2%) and South Africa as a whole (80.9%). In 2019, the WCDM experienced a loss of 389 jobs, which is expected to have a significant impact on the economy should this trend continue. In 2018, the agriculture, forestry and fishing sector were the primary source of employment, creating 70 060 jobs and contributing towards 38.1% of the total employment.

Namakwa District Municipality (Northern Cape)

The Namakwa District Municipality (NDM) is located in the southwestern portion of the Northern Cape. According to the 2011 Census (Statistics South Africa 2011). This municipality has a population size of 115 842, which is the smallest population in the Northern Cape. Although this is larger than the population recorded during the 2001 census, it has decreased by at least 8.6% since the 2007 census, indicating a slower population growth than anticipated. The economic growth of this municipality (2.03% per annum) was recorded to be less than 50% of the national growth rate of 5% (as recorded between 1996 to 2007) and relies heavily on the mining sector, which contributes

approximately 52% to the GGP (Gross Geographic Product) (CNdV 2012; Figure 6-5). Mining and agriculture employ the largest number of people, followed by Trade, catering and accommodation.

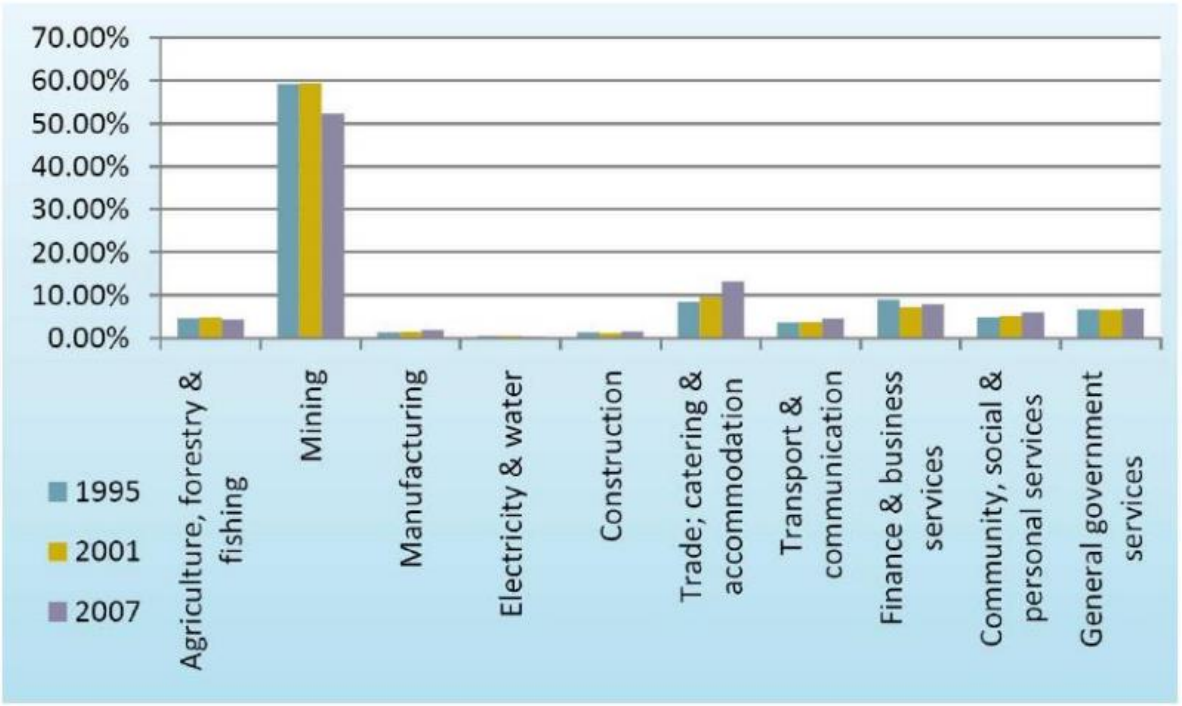


Figure 6-5 Contribution to the Gross Geographic Product in the Namakwa District Municipality by sector. Source Namakwa District Municipality SDF (CNdV 2012).

Approximately 7.4% of the population has a tertiary education while 18.8% of the population's highest level of education is matric. Only 6.6% of the population has no education. In 2011, the unemployment rate was recorded to be 20.1%, which is less than that recorded during the 2001 survey (StatsSA 2011). The highest unemployment rate in 2011 was recorded for the Kamiesberg Local Municipality (30.8%). Unfortunately, the municipality is still unable to provide enough employment opportunities to the high number of job seekers (CNdV 2012). For this reason, individuals with some education or qualification, leave the Municipality to seek employment elsewhere (NDM 2012).

According to the NDM's Integrated Development Plan, economic and employment opportunity development is a crucial developmental issue in the District (NDM 2012). This area is known for its unique flora, nature reserves and unspoilt environment, making it ideal for outdoor activities, scientific research and conservation efforts. The sea environment is also known for its rich diamond and other mineral deposits, while vast areas of vacant land far from civilisation, are available for development projects such as energy developments. Mining, scientific development and research (biodiversity, geology and astronomy), energy production, conservation and tourism, have therefore all been identified as avenues that can be expanded upon so as to benefit the local economy (CNdV 2012).

6.6 Local Study Area

Matzikama municipality (Western Cape)

The Matzikama municipality consist of 18 towns, with three coastal settlements (Doringbaai, Papendorp and Strandfontein) and several small inland towns (Ebenhaeser, Lutzville and Koekenaap) which serves as agriculture service centres (MM 2019; WCGPT 2018). The area is defined by an arid environment with a natural irrigation system sustained by the Olifants River. This irrigation system comprises 237 km of canals and is essential to the surrounding towns as it supplies them with water for domestic, industrial and agricultural use (DWS 2019). The river and in particular the estuary is an important fishing ground for many subsistence fisherman. Vredendal is the largest town and supports the majority of economic activities (WCGPT 2018). The agriculture sector (viniculture) followed by the forestry and fishing sector are the largest contributors towards the municipal GDP and employment in 2018 (Mayson et al. 2020; MM 2019). It is estimated that the Matzikama municipality experienced a large decline in its annual GDP growth rate in 2019 due to the COVID-19 pandemic (IDP 2021/22). Should this pandemic continue, it is expected to lead to a further decline in municipal revenue, employment and the local economy (IDP 2021/22).

Kamiesberg Local Municipality (Northern Cape)

The Kamiesberg Local Municipality (KLM) is the smaller of one of six municipalities in the NDM. It is 14 210km2 in size with approximately 16 small towns and a total population of 10 187 residents. This is a 5.27 % decrease since 2001 (StatsSA 2011) (see Figure 4-8) which is mainly attributed to people leaving the area to seek employment opportunities. Each town supports very few residents, with most being communal farmers of sheep and goats, while others work on the surrounding commercial farms. These towns have cultural and historical significance as many of them formed part of the main route used by the travellers and explorers. A part of the route also formed part of an old well-known game trails of rhinos, elephants and other animals.

Approximately 63% of the population is of working age (15 and 64 years), although there is a lower proportion of individuals between ages 15 to 34 years as a result of the younger people leaving the area due to a lack of employment opportunities. The greatest proportion of residents is between the ages of 35 and 64 years old. Approximately a quarter is between the ages of 0 to 14 years, while the elderly (65+) represents 10% of the population. The number of unemployed and disadvantaged individuals are high as approximately only 2205 (34%) people of working age are employed, while the remaining are either unemployed (981) being, discouraged work-seekers (723) or classified as economically inactive (2535). The population is classified as 85.6% coloured, 8.1 % white, 5.3% black African (5.3%), 0.5% Indian/ Asian (0.5%) and 0.5% other people.

The key economic sectors contributing to the GGP in the KLM is mining (21.5%), followed by wholesale and retail (including tourism and accommodation; 14.3%) and agriculture (10%). As the tourism industry and construction sectors are seasonal, they are prone to economic changes. For this reason, a diversified economy of various sectors is important to ensure economic stability (KLM IDP 2013; KLM 2020).

6.7 Heritage aspects

The underwater cultural heritage of South Africa is rich in historical shipwrecks, shell middens and tidal fish traps reflecting a long history of human exploitation of marine resources. Evidence related to pre-colonial submerged archaeological sites is scarce, although based on the terrestrial archaeology of the West Coast and similar offshore sites offshore globally, there is potential for pre-colonial submerged archaeological sites around the West Coast. South Africa's maritime heritage remains mostly unexplored, although it is known to have a diverse underwater cultural heritage with at least 2,500 shipwrecks reported since the 1500s.

Maritime History of the South African Coast:

The West Coast's maritime history dates back to Dutch settlers that exploited the West Coast's rich marine resources. Sealing and fishing were common practice and led to the development of fishing villages at Saldanha Bay, Lamberts Bay and Elands Bay. The former and latter also became important for the export of other produce (Ingpen 1979). Early during the nineteenth century, many of the West Coast islands were exploited for their rich guano resources, while Namaqualand and the Richtersveld were exploited for their rich copper deposits. This led to the extensive use of Alexander Bay, Robbe Bay (now Port Nolloth) and Hondeklip Bay, and the development of coastal shipping services at these Bays (The Nautical Magazine and Naval Chronicle 1855: 297-303; Ingpen 1979).

With the exception of Saldanha Bay, the West Coast lacks good harbours due to dangerous currents, coastal fogs and a rocky shoreline. The West Coast has therefore claimed many vessels over the years. At least 2 500 ships have been wrecked, abandoned or sunk since the 1500s in South African waters. More than 1 900 of these are more than 60 years old and are protected by the National Heritage Resources Act (NHRA) as archaeological resources. It is believed that there are far more shipwrecks present in South African waters especially wrecks that pre-date the European exploration and trade. These sites support important information in terms of the cultural, political, economic and social standing associated with the historic world.

Maritime Heritage of the West Coast and Concession Area 11C

At least 89 shipwrecks have been reported between the Orange and Berg Rivers (As per the SAHRA Maritime and Underwater Cultural Heritage database), but two are known to have occurred adjacent to Concession Area 11C, i.e. the *Zulu Coast I* and *Meteren* (Table 6 and Figure 6-6).

Table 6 Shipwrecks in the vicinity of Concession Area 11C.

Ship Name	Approximate Position	Place	Event Type	Vessel Category	Nationality	Year	Notes
Zulu Coast I	-31.1821S 17.7720E	Groen River mouth (near)	Wrecked	Motor coaster	South African	1953	Wrecked in fog about 60 km south of Hondeklip Bay
Meteren	-31.7745 18.2216	Mietjie Frans se Baai	Wrecked	Wooden hoeker	Dutch	1723	Wrecked after anchor dragged in heavy swell

Both the *Zulu Coast I* and *Meteren* shipwrecks are more than 60 years old having wrecked in 1953 and 1719, respectively. They are both considered heritage resources and are protected by the National Heritage Resources Act (NHRA). However, both shipwrecks do not occur within the proposed prospecting area, sea concession 11C.

While unlikely, it is possible that remnants of unknown and unrecorded shipwrecks could still be present within the concession area. Historical records are full of examples of shipwrecks that were lost at sea and could therefore lie anywhere between their points of departure and arrival. For example, the *Bom Jesus* was unexpectedly discovered during terrestrial diamond mining activities in Oranjemund, Namibia.

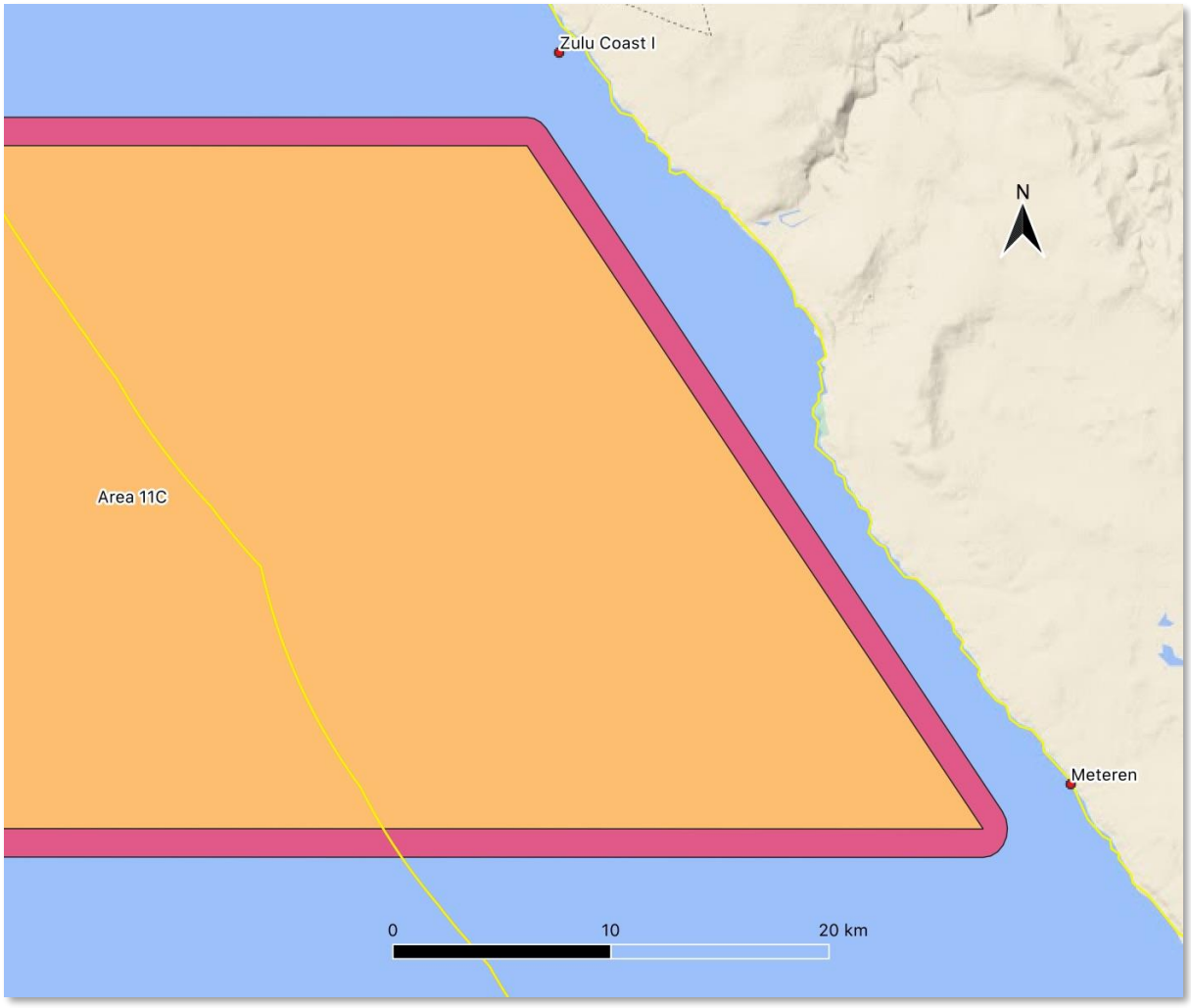


Figure 6-6 **Known historical wrecks located just outside of the Study Area around Concession Area 11C (Source: Google Earth).**

Submerged Prehistory:

Historically, large parts (as much as 80,000 km^2 in extent) of the continental shelf were exposed as dry land. The figure below (Figure 6-7) illustrates the possible extent of continental shelf exposure during the second to last glaciation (MIS 6).

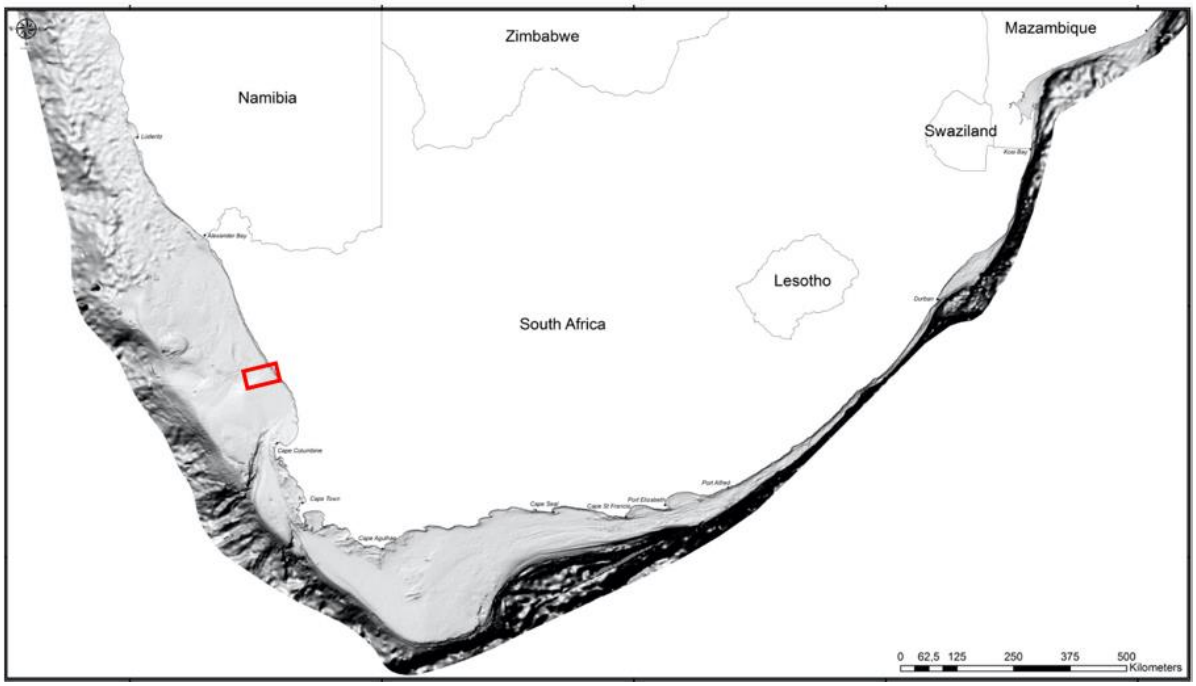


Figure 6-7 **Shaded relief map showing the entire extent of the South African continental shelf. The approximate location of Concession Area 11C is marked by the red box (After De Wet 2012:106).**

This exposed continental shelf was populated by terrestrial fauna, flora and our human ancestors. As such, much of the archaeological record of the later Earlier, Middle and early Late Stone Age is now submerged in water (Van Andel, 1989:133-134). No studies of the submerged prehistory of the West Coast have been conducted to date, although the archaeological evidence for a hominin presence along the coast is abundant, especially from the early, middle and later stone ages. These include shell middens, fossilised human footprints and hand tools. Any areas of South Africa's current seabed shallower than -120 m thus has the potential to have been used by our ancestors and to preserve the archaeological evidence of that use.

Since Concession 11C extends from about 92 – 228 m depth, only a part of the area could potentially hold such prehistoric evidence. Indications of this include Diepkloof rock shelter inland of Elands Bay and south-east of the concession area, which contains evidence of almost 85 000 years of continuous human occupation; Hoedjiespunt in Saldanha Bay where hominid teeth, cranium fragments, postcranial bones which could date back to between 130 000 and 180 000 years; fossilized human footprints nearby Churchaven on the Langebaan lagoon which date back to ~117 000 years ago when sea levels would have started to drop; and coastal shell middens which indicate the earliest evidence in the world for coastal exploitation. Numerous channels, including those extending offshore to the west of Kleinzee and the submerged fluvial channels extending seawards from Langklip Bay and between Hondeklip Bay and the Swartlintjies River, and their associated sediment bodies, have the potential for ancient, submerged archaeological material (archaeological artefacts) and palaeo-environmental evidence (pollens, foraminifera and diatoms, for example). These are illustrative of the likely situation with other major rivers, such as the Olifants River, along the West Coast and which also have submerged palaeo-channels extending offshore. These channels are an important target for diamond mining as they are the source of, and likely still contain diamondiferous gravel.

Seabed Geology and Palaeontology

This concession area is on the continental shelf. Here the Pre-Cretaceous bedrock drops relatively steeply down towards the sea. The inner-shelf bedrock is expected to comprise primarily of highly deformed, metasedimentary schists, quartzites and limestones of the Gifberg Group. The sediment distribution is sparse and mostly affected by the topography of the bedrock, with mini-basins of sediments interspersed by bedrock high outcrops. The southern portion is expected to comprise minor outliers of basal Table Mountain Group conglomerates, shales and sandstones. In the north, older crustal basement gneisses are present. The oldest preserved deposits are found beneath the latest Quaternary basal gravels, in deeper, local bedrock depressions and palaeochannels in the Precambrian bedrock.

Millions of years of upwelling, sea level oscillations, ice ages, erosion and interglacial deepening led to the production of a wide range of multiphase phosphorite nodules, phosphatic shell casts of various ages and preservation of bones and teeth of sharks and other fishes, the skulls of extinct whale species and the occasional remains of land animals. The specimens and fossils are regularly discovered during trawling, scientific sampling and dredging, prospecting and mining. These specimens are often donated to scientific institutions and provide an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The marine shell fossils are predominantly species typical of that expected on the West Coast Shelf, although extralimital species are also common. Indeed, extra-limitals have been found during diamond sampling/mining off northern Namaqualand and can be expected to be more abundant further south such as in Concession Area 11C.

6.8 Description of the current user groups of the sea area

The main users of the sea space in Concession 11C are the commercial shipping and fishing industries, and low levels of recreational boating activity. Most merchant shipping crosses offshore of the concession area. Inshore of Concession 11C, diamond mining is undertaken by divers operating suction hoses from small vessels or from the shore. The demersal trawl, demersal hake longline and large pelagic longline commercial fishing sectors that are active along the west coast, all operate well offshore of the 11C Concession Area, whilst the West Coast Rock Lobster fishery operates inshore, in water shallower than the concession area. . Potential spatial overlap with the small pelagic, traditional linefish and tuna pole fisheries was, however, identified.

6.8.1 Small Pelagic Purse Seine

The South African small pelagic fishery targets sardines *Sardinops sagax,* anchovy *Engraulis encrasicolus* and, to a lesser extent, red eye *Eutremeus whiteheadi*. This fishery has the largest catch volume for any of the South African fishery sectors and has the second largest annual catch value, estimated at around R2.164 billion in 2017, which is approximately one fifth of the combined value of South African Fisheries (Japp & Wilkinson 2021). At this time, the industry supported around 4 500 full time staff, 2 500 seasonal staff and more than 700 fishers. The support industries contribute an estimated further 2 400 jobs.

The small pelagic purse-seine fishery operates between the Orange River and East London mostly in nearshore waters (within 10 km of the coast). The 11C Concession Area does overlap with identified

priority fishing areas for anchovy and with the sardine directed fishing ground (Figure 6-8) (Norman *et al.* 2018). However, concession 11C lies at the northern extreme of the small pelagic fishing grounds and the total average small pelagic catch reported for these blocks over the period 2006-2011was only ~150 tonnes out of an average national total of around 300 000 tonnes i.e. less than 0.01 % (Figure 6-9). Potential negative impacts of prospecting activities within 11C on the small pelagic fishing sector are unlikely to be significantly negative as fishers will only be affected by small temporary closures/exclusion zones around survey vessels and geotechnical survey sites.

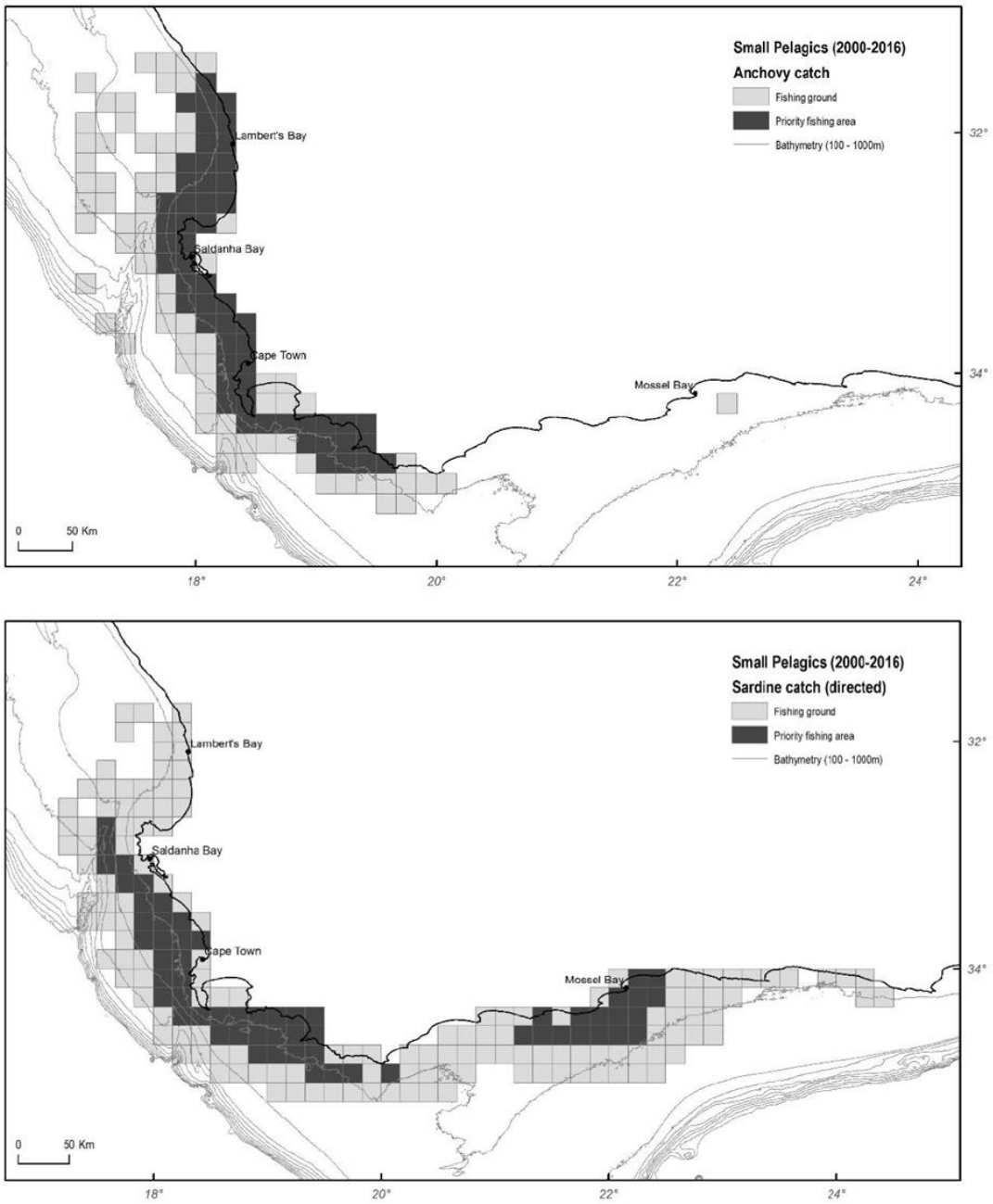


Figure 6-8 Spatial distribution of anchovy (top) and sardine (bottom) purse seine catch (2000-2016) with identified priority fishing areas (Source: Norman *et al.* 2018).

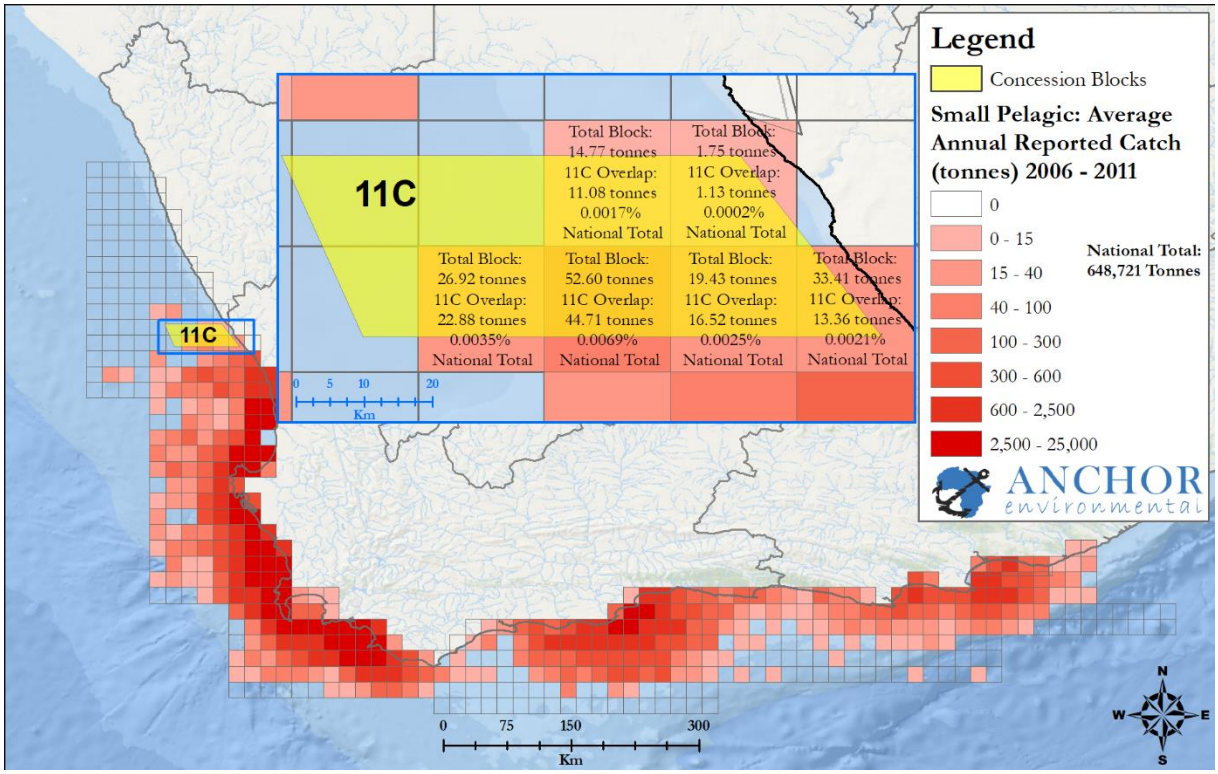


Figure 6-9 **Average annual reported small pelagic catch 2006-2011 (tonnes) and the calculated proportion of the average national total catch made within Concession Area 11C (Data source: DFFE).**

6.8.2 Tuna pole and line

The South African tuna pole and line (TPL) sector targets longfin tuna (*T. alalunga*), yellowfin tuna (*T. albacares*, bigeye tuna (*T. obesus*) and skipjack tuna (*Katsuwonus pelamis*) seasonally between November and May. Due to the seasonality of the TPL fishery, fishers also have access to snoek *Thyrsites atun* and yellowtail *Seriola lalandi* that are also important targets of the traditional linefishery. The tuna pole fleet consists of approximately 100 vessels ranging from small outboard powered skiboats (7-9 m Length) to inboard diesel-powered deck boats (6-25m length). The reported longfin tuna catch in 2018 was 2 471 tonnes, with a wholesale value of R124 Million, or 1.2% of the total South African commercial fisheries value (Japp & Wilkinson 2021).

The commercial tuna pole fishing grounds lie between Cape Agulhas and the Orange River, but the fleet operates predominantly out of Cape Town and Hout Bay harbours and most fishing effort takes place within 100 nautical miles of these ports (particularly in the Cape Canyon area). Some effort does take place further up the west coast, although this is mostly offshore of, or to the south of concession area 11C (Figure 6-10). Over the period 2017-2019 there was no reported TPL fishing effort in the area west of Brand se Baai and inshore of the 200m isobath, i.e. none within concession 11C (Japp and Wilkinson 2020). Impacts on the TPL fleet due to the proposed prospecting activities within 11c are therefore expected to be insignificant.

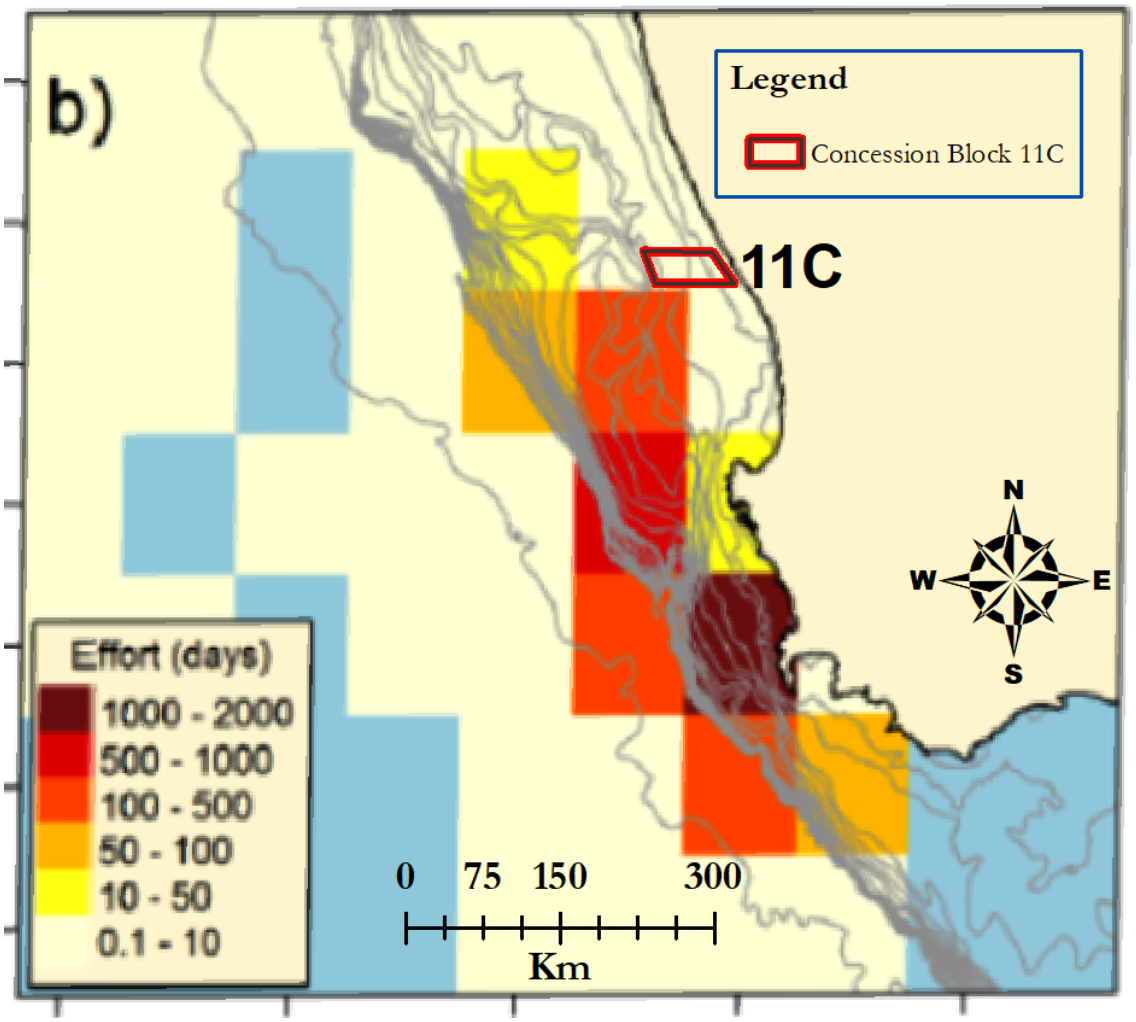


Figure 6-10 **Mean annual tuna pole and line fishing effort (boat days) in relation to concession 11C (Source: Norman et al 2018).**

6.8.3 Traditional Line fish

Commercial, recreational and subsistence line fishers target up to 200 different fish species, both from boats and the shore. Line fishers operate in shallow water (generally <100 m depth) and would potentially be negatively impacted by coastal and nearshore seismic exploration and prospecting operations (particularly recreational, small scale and subsistence shore fishing). Concession area 11 C is however relatively far offshore in water that is mostly deeper than 100m, and far from suitable launch sites. A spatial analysis of the reported commercial linefish catch data does not show any activity in reporting blocks that overlap with Concession Area 11C (Figure 6-11) and exploration activities in this concession are expected to have negligible impacts on the traditional linefish sector.

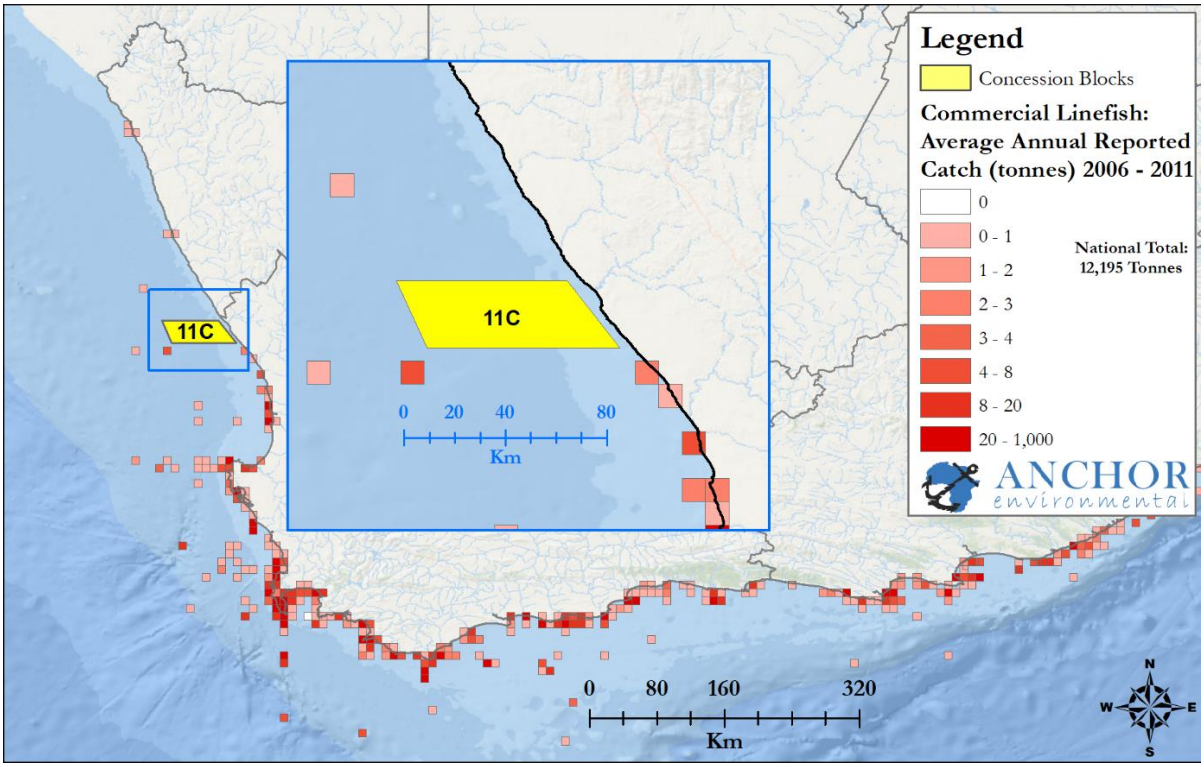


Figure 6-11 **Reported annual commercial line fishing catch the calculated proportion of the average national total catch made within Concession Area 11C (Data source: DFFE).**

6.8.4 Sea kelp farming

Kelp harvesting and processing is relatively large industry along the West Coast of South Africa (Figure 6-12). It provides numerous employment opportunities to people from the area, including third party companies such as the transport industry. A large percentage of the kelp is exported, further contributing towards South Africa's economy. *Ecklonia maxima* is the primary species of kelp that is harvested, although *Laminaria pallida* contributes to a portion of the harvests. Kelp is harvested for three main industries. Boat-based harvesting of fresh kelp is currently the largest, yielding 4 000 to 5 000 t of kelp per year for use as abalone feed in land-based farms. Kelp harvested by divers for the agriculture industry to use as liquid plant growth enhancer, is the second largest industry (3 000 t per year). The harvesting, drying and export of washed-up kelp, for the purpose of extracting of alginate, is a relatively small industry (Rothman et al. 2020).

As kelp grows in shallow water down to about 20 m depth, prospecting activities in Concession area 11C will not interfere with or impact upon kelp harvesting as this concession area starts at 70 m depth and is located at least 4 km west (out to sea) of where kelp harvesting occurs.

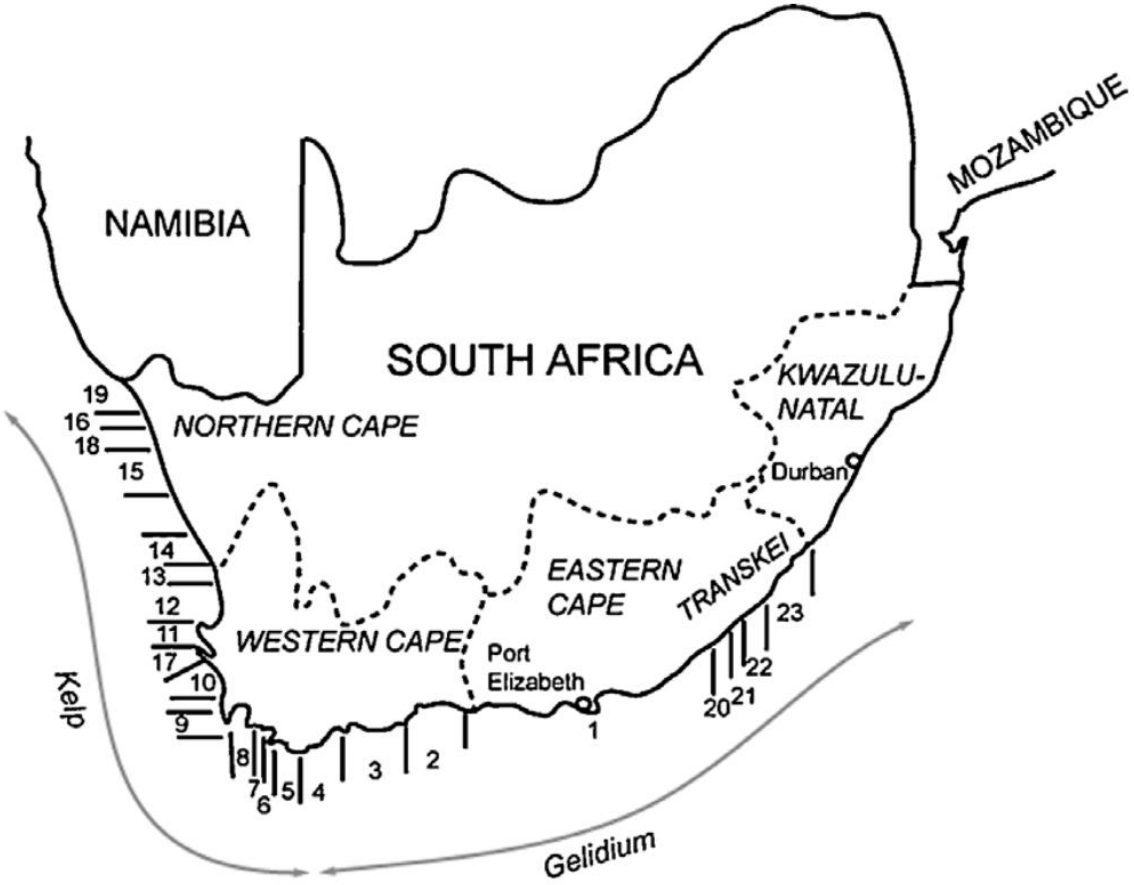


Figure 6-12 **Kelp and seaweed concession areas (separated by lines) along the South African coast. Kelp harvesting occurs in areas 5–9, 11–16 and 18–19 (sourced from Troell *et al*. 2006).**

6.8.5 Shipping

The majority of shipping traffic is located on the outer edge of the continental shelf, which is offshore of the outer edge of Concession Area 11C (Figure 6-13). The inshore traffic of the continental shelf along the West Coast is largely comprised of fishing and mining vessels, especially between Kleinzee and Oranjemund. Thus, there is unlikely to be much interaction between the vessel (s) involved with prospecting in the concession area and other vessels.

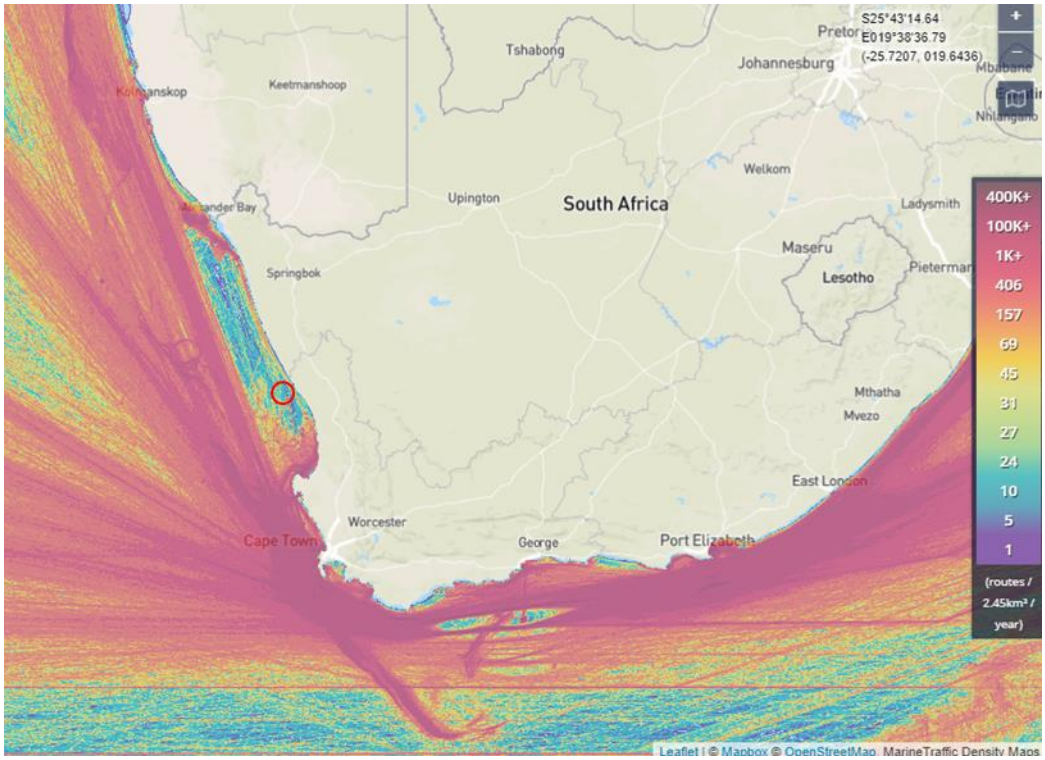


Figure 6-13 Commercial shipping traffic in relation to Concession Area 11C. Source: https://www.marinetraffic.com/en/ais/home/centerx:16.4/centery:-32.5/zoom:7. Accessed 16 July 2021. The red dot indicates the approximate location of the 11C concession area.

6.9 Description of specific environmental features and infrastructure on the site.

6.9.1 Sensitivity and significance of the system: Ecosystem threat status

The 2018 National Biodiversity Assessment (NBA) assesses the threat status and sensitivity of different habitat types based on biodiversity (richness, uniqueness, spatial extent of the habitat type) and exposure levels to natural disturbance or environmental perturbations. Ecosystem types are categorised as "Critically Endangered", "Endangered", "Vulnerable", "Near Threatened" or "Least Concern", based on the proportion of the original extent of each ecosystem type that remains in good ecological condition relative to a series of biodiversity thresholds (Harris *et al.* 2018). Critically Endangered, Endangered and Vulnerable ecosystems are collectively referred to as threatened ecosystems (SANBI 2016). Critically Endangered, Endangered and Vulnerable ecosystems are collectively referred to as threatened ecosystems (SANBI 2016). According to the latest available data from the 2018 NBA, the entire area covered by Concession Area 11C is classified as "Least Concern" (Figure 6-14).

In terms of the SANBI Ecosystem Threat Status layer, the 11C concession block is not identified as part of a National Marine Protected Area (MPA). However, 38% of the area of concession 11 overlaps with the proposed Namaqua Coastal Area Ecological and Biologically Significant Area (Figure 5-11). EBSAs are defined by the Convention on Biological Diversity (CBD) as "geographically or oceanographically discrete areas that provide important services to one or more species/populations of an ecosystem or

to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or otherwise meet the [EBSA] criteria".

The proposed Namaqua Coastal Area EBSA is located from the estuary of the Spoeg River to the estuary of the Sout River in the Namaqua bioregion of South Africa (Sink *et al.*, 2012), and from the dune base to approximately 33-36 km offshore. It consists of Namaqua coastal, inner, mid and outer shelf ecosystem types (Sink *et al.*, 2019). The associated pelagic environment is characterized by upwelling, giving rise to very cold waters with very high productivity/chlorophyll levels (Lagabrielle 2009, Roberson *et al.*, 2017). Altogether, the area includes three estuaries (van Niekerk and Turpie, 2012). A large proportion of the area is characterized by habitat that is in relatively good (natural/pristine) condition due to much lower levels of anthropogenic pressures relative to other coastal areas in the Northern Cape Province. There is a small part of the EBSA (midway along the shore) that was recently declared as a marine protected area that came into effect in 2019. The terrestrial habitat adjacent to the part of the EBSA that stretches between the Groen and Spoeg estuaries is within the Namaqua National Park and is, therefore, also protected.

Reefs may not be directly impacted (mined) but are at risk of being indirectly impacted by tailings disposal. Offshore reef habitat does not recover easily from such disturbance (Biccard *et al*. 2020) and if left unchecked, future operations could have lasting deleterious impacts on this habitat and those who depend on its ecological functioning (e.g. fishermen). It is therefore important that tailings not be discarded in or near reef area.

6.10 Environmental and current land use maps

See Section 6.8 as well as Figure 5-11, Figure 5-12 and Figure 6-8 – Figure 6-15.

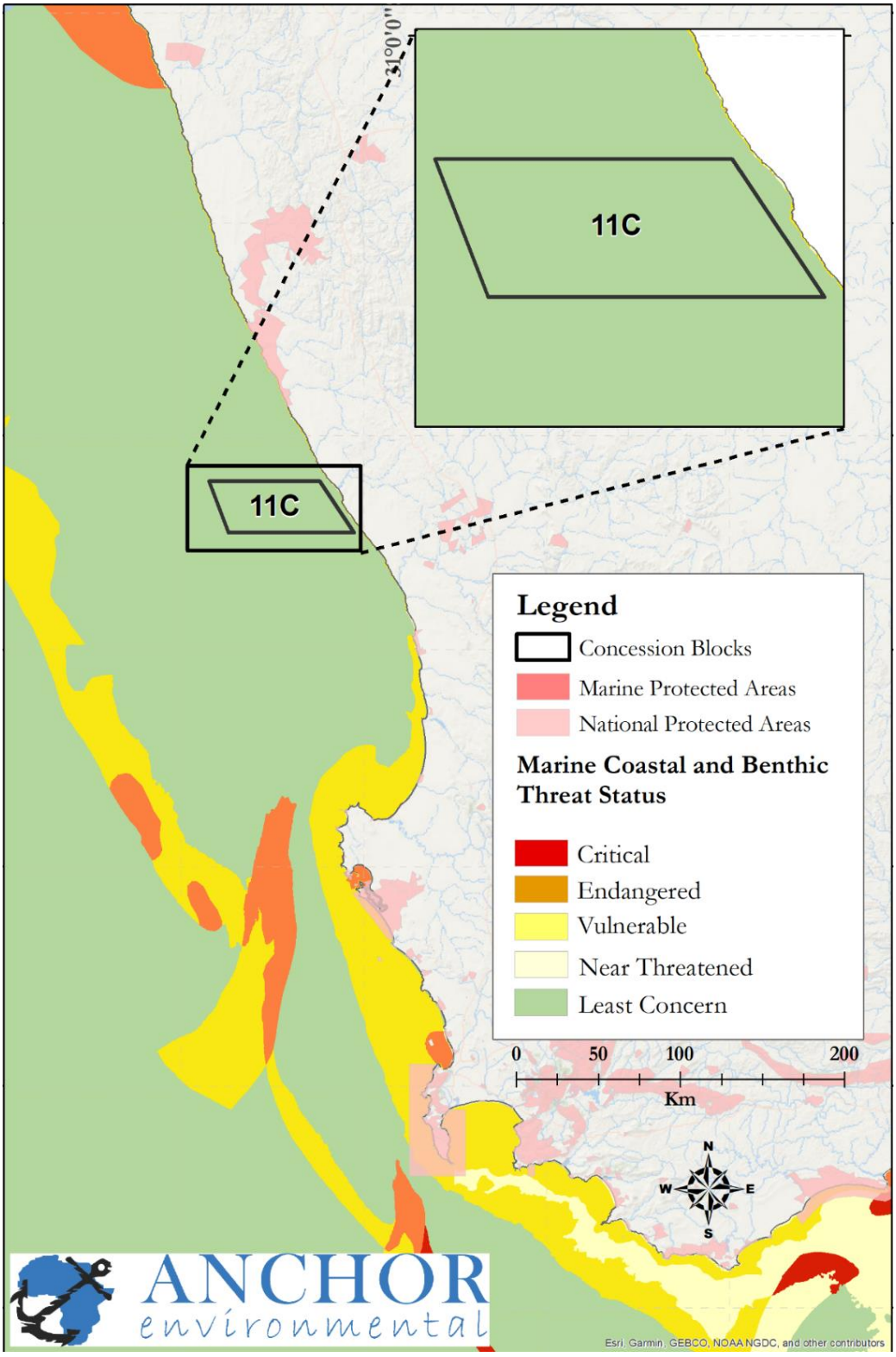


Figure 6-14 SANBI Ecosystem Threat Status and location of concession area 11C. Source: https://bgis.sanbi.org/.

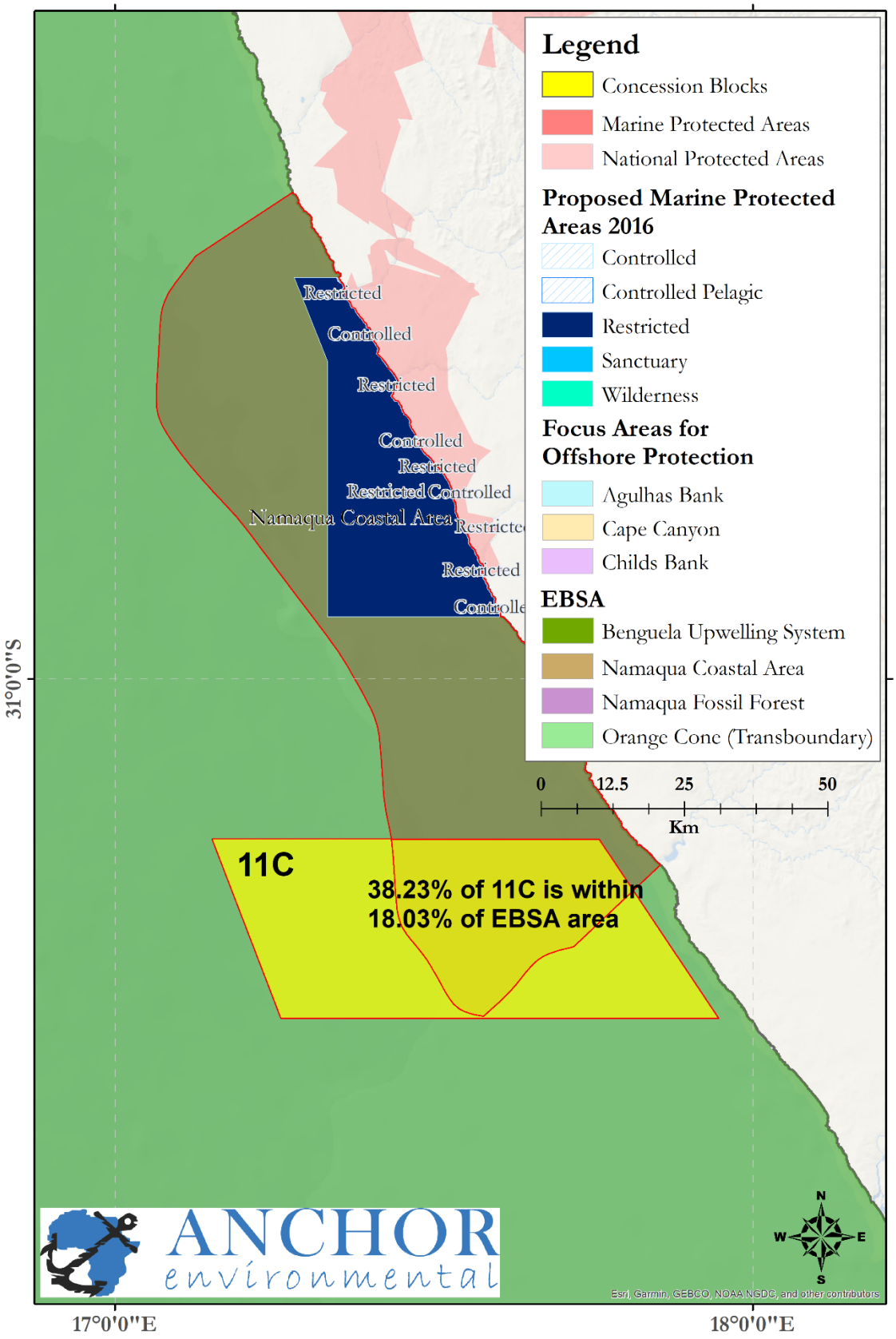


Figure 6-15 **Marine protected Areas (dark blue) and the proposed Namaqua Coastal Area EBSA and location of concession area 11C. Source: https://bgis.sanbi.org/.**

7 IMPACT ASSESSMENT

7.1 Impacts and risks identified

A list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated

The National Environmental Screening Tool was used in accordance with NEMA and the EIA Regulations to assess the environmental sensitivity of the concession area (Appendix 2). The tool generates a report summarising the most important Environmental Themes that needs to be considered for assessment (e.g. marine ecology, socio-economic, visual, etc.) and their Environmental Sensitivity (very high, high, medium or low) relating to the developmental footprint. The screening tool identified that the following list of Environmental Themes need to be assessed to determine the proposed activity's degree of impact on each:

1) Archaeological and Cultural Heritage Impact Assessment;
2) Palaeontology Impact Assessment;
3) Landscape/Visual Impact Assessment
4) Terrestrial Biodiversity Impact Assessment
5) Aquatic Biodiversity Impact Assessment
6) Marine Impact Assessment
7) Hydrology Assessment
8) Socio-Economic Assessment
9) Plant Species Assessment
10) Animal Species Assessment

Based on the Environmental Assessment Practitioner's (EAP) assessment, it was determined that specialist impact assessments would be required for the following themes: (1) Marine ecology and fisheries, (2) Archaeological, Cultural Heritage and Palaeontological resources (all assessed in one report) and (3) Socio-economic resources. Results from these assessments are provided in the respective specialist study that were commissioned (Appendix 3–5). Specialists' CV are also attached as appendices (Appendix 6).

Visual impacts, although important, are considered to be less significant than the impacts subjected to a full specialist assessment. For this reason, Visual Impacts may be reviewed by the EAP in the form of a Compliance Statement, rather than being subjected to a comprehensive specialist impact assessment. Since the proposed activity will occur in the ocean offshore and not on land, certain themes were considered unlikely to be impacted by the prospecting activities and were therefore not assessed and scoped out. These include Terrestrial Biodiversity, Aquatic Biodiversity (terrestrial freshwater), Hydrology, Terrestrial Plant Species and Terrestrial Animal Species. Note that the impacts on marine animals and plants were all assessed as part of the Marine Specialist Impact Assessment.

The potential impacts associated with prospecting in Concession Area 11C were grouped and assessed based on the following major receptors: (1) Marine ecology and fisheries, (2) Science, (3) Heritage resources, (4) Shipping, (5) Socio-economic aspects and (6) Visual. The no-go option and cumulative impacts were also considered. Assessment tables for each of the identified impacts for these six

receptors are presented below along with a summary of the key findings. Potential impacts were assessed in terms of their nature, extent, duration, intensity, probability of occurrence, potential for mitigation, cumulative effects and overall significance. Section 7.2 provides a description of the impact assessment methodology used in this study.

7.2 Specialist studies

7.2.1 Potential impacts on marine ecology and fisheries

Potential impacts to the marine environment as a result of exploration and prospecting were identified based on available literature, previous EIA and monitoring reports, and the specialist's own knowledge. It is assumed that a vessel with dynamic positioning will be used for all survey and sampling activities and potential impacts of anchoring on the seabed are therefore not assessed. Identified potential impacts include:

- Underwater noise disturbance to marine fauna;
- Marine megafauna collisions with survey vessels;
- Direct impact of seabed excavation and tailings disposal during drill sampling on benthic habitats e.g. soft sediments and/or reefs and associated infaunal and epifaunal communities;
- Impact on surrounding benthos and water column via fine sediment plume;
- Waste discharges during vessel operations;
- Impacts on fisheries (and livelihoods of those who depend on these fisheries) due to exclusion zones around survey vessels and direct potential impacts on target species and supporting ecosystems;

7.2.1.1 Underwater noise disturbance to marine fauna

Sounds generated by vessels in addition to the noise from acoustic surveys have been related to negative impacts on marine animals (Koper and Plön 2012). These negative impacts include direct effects, such as physical injury (i.e. auditory and non-auditory), stress, perceptual interference, behavioural changes, and chronic responses, and indirect effects on predator species as a consequence of a change in prey distribution or abundance due to direct effects of sound on the prey (NRC 2003; Koper and Plön 2012). The impacts associated with acoustic surveys are not yet fully understood and further research is currently underway.

During prospecting, sounds and vibrations emanating from sampling tools only last a few days but can be intense. Exposure to intense sounds for even short periods of time can lead to permanent hearing damage. However, the potential effects of diamond prospecting and mining in southern Namibia on marine mammals have been reported to be minimal Findlay (1996). The proposed sampling via coring and drilling is also not expected to create significant underwater noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. It should further be noted that natural sound sources are also emitted frequently from the ocean and other animals and may even overshadow anthropogenic noise (Penney *et al*. 2007; Pulfrich 2017; Au 1993; Richardson *et al*. 1995).

Adverse impacts of underwater sound can be broadly summarised into three categories:

- Physical traumatic injury and fatality;

- Auditory injury (either permanent threshold shift (PTS) or temporary threshold shift (TTS) and;
- Disturbance.

These impacts are different for different groups of organisms (invertebrates, fish, marine mammals and sea birds). The current state of knowledge in respect of each of these groups is summarised below.

a) Invertebrates

Although invertebrates mostly do not possess hearing organs, many do have tactile organs that are sensitive to sound pressure (Mason 2017). While there is very little published information available about the effects of seismic noise on marine invertebrates, it has been postulated that benthic invertebrates can only hear seismic survey sounds at very close range. This implies that only surveys conducted in very shallow water will have any detrimental effects on benthic invertebrates. Studies investigating the impacts of airguns (which is more powerful than the acoustic equipment suggested in this study) on zooplankton, found that there were no discernible negative effects on the zooplankton communities (Fields et al. 2019 and Richardson et al. 2017). The impacts of the acoustic survey (as proposed in this prospecting study) on zooplankton is therefore anticipated to be negligible. The overall impact of seismic disturbance to marine invertebrates in concession 11C is assessed to be INSIGNIFICANT. No mitigation is considered necessary (Table 7).

Table 7 Seismic disturbance to invertebrates

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very low 3	Possible	**INSIGNIFICANT**	-ve	Medium
Best Practice: • No essential or potential mitigation measures identified								

b) Fish

Powerful external forces such as sounds may disturb fish and possibly affect their recruitment. The Multibeam Echo Sounder (MBES) (high-frequency range) and the Topas chirp SBP (mid-frequency range) are mostly inaudible to fish. Some species such as those with swim bladders, may suffer serious injury at close range to the sound source, although fish are expected avoid noise levels that can cause injury (Mason 2017). Possible injury or mortality in pelagic species could occur on initiation of a sound source at full power in the immediate vicinity of fish, or where reproductive or feeding behaviour may override a flight response to seismic survey sounds. Popper and Schilt (2008) conclude that as most fish exposed to seismic sounds will in all likelihood be some distance from the source, where the sound level has attenuated considerably; only a very small number of animals in a large population will ever be directly killed or damaged by sounds from seismic sources. The limited extent and short duration of the planned surveys, however, mean that the overall impact of the use of the acoustic survey equipment on fish is assessed to be INSIGNIFICANT and no mitigation is considered necessary

Table 8 Seismic disturbance to fish

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
Best Practice: • No essential or potential mitigation measures identified								

c) Marine mammals

All marine mammals are susceptible to acoustic trauma from geophysical survey activity although there is little information on the levels of noise that would result in physiological injury and no permanent threshold shifts (PTS) have been recorded (Mason 2017). Information suggests that the animal would need to be in close proximity to the acoustic equipment to suffer severe physiological injury (Koper and Plön 2012). Such injuries are either temporary (temporary threshold shift – TTS) or permanent (permanent threshold shift – PTS). Injuries are likely to result in a reduction in foraging efficiency, reproductive potential, social cohesion and ability to detect predators (Weilgart 2007). As marine mammals are highly mobile, they are expected to avoid the source of the sound. Of the proposed acoustic survey activities, the Topas sub-bottom profiler system is thought to present the greatest risk to marine mammals (particularly) dolphins that are known to occur in the area (mainly dusky and Heaviside's dolphins).

Many marine mammals such as humpback whales, dusky dolphins and the near threatened Heaviside's dolphins are frequently encountered in the vicinity of the concession area throughout the year. The timing of seismic survey activity in concession 11C should be confined to seasons when cetaceans are scarce to ensure minimal disturbance (Gründlingh *et al.* 2006). A breeding colony of Cape fur seals (*Arctocephalus pusillis pusillis*) exists on Elephant Rock, inshore of concession 11C, approximately 10 km north of the Olifants River Mouth. Seals are highly mobile animals with a general foraging area covering the continental shelf up to 120 m (approximately 220 km) offshore. It is likely that seals will be encountered during seismic exploration and sampling/prospecting activities in Concession 11C. In general, seals display considerable tolerance to underwater noise (Richardson *et al.* 1995). This has been confirmed by a study in Arctic Canada in which ringed seals showed only limited avoidance of seismic operations (Lee *et al.* 2005). In another study, ringed seals were shown to habituate to industrial noise (Blackwell *et al.* 2004). It is likely that seals would only suffer significant injury if they were diving directly below the vessel in close proximity to the seismic source. The likelihood of this occurring is considered very low.

It is recommended that an MMSO be on duty during the proposed seismic survey activities and as a precaution, the mitigation measures listed below are followed. A passive acoustic monitoring (PAM) system should also be used during survey activity to detect cetaceans that could be at risk. Seals are not expected to be severely impacted and are only likely to suffer significant injury if they are diving directly below the vessel

Based on the above, impacts to marine mammals was assessed to be of MEDIUM risk and with the implementation of mitigation (see below) this is reduced to LOW risk (Table 9).

Table 9 Underwater noise disturbance to marine mammals

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	High 3	Short-term 1	Medium 6	Probable	**MEDIUM**	-ve	High
Essential mitigation measures: • A designated onboard Marine Mammal and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying. • MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of cetaceans around the survey vessel prior to the initiation of any acoustic impulses • "Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20 minute period to act as a warning signal and allow cetaceans to move away from the sound source. • Terminate the survey if any marine mammals show affected behaviour within 500 m of the survey vessel or equipment until the mammal has vacated the area. • Avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations. • Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility.								
With mitigation	Regional 2	High 3	Short term 1	Medium 6	Improbable	**LOW**	-ve	High

d) Seabirds

Impacts of sound pulses to marine birds (diving or resting on water surface) include physiological injury, behavioural avoidance of acoustic survey areas and indirect impacts due to effects on prey. The African penguin (*Spheniscus demersus*) and other diving birds, although susceptible to this impact, are likely to avoid the approaching sound source (Mason 2017). Cape gannet, Cape cormorant and various terns and gull species, pelagic seabirds such as albatross, petrels and shearwaters, are most likely to be encountered and affected by the acoustic surveys within area 11C. Note that inshore shore bird species such as the African Black Oyster Catcher (Swart Tobie) *Haematopus moquini*, that are very unlikely to be encountered as far offshore as Concession area 11C, are not included as part of the impact assessment. The overall impact is assessed to be of LOW risk and with the implementation of mitigation (see below) is reduced to VERY LOW (Table 10).

Table 10 Underwater noise disturbance to seabirds

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	High 3	Short-term 1	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures: • A designated onboard Marine Mammal and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying • MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of feeding seabirds in the survey area.								

- If spotted ,wait until all marine life (seabirds, seals, cetaceans and turtles) have cleared an area of 500 m radius of the centre of the sound source before resuming with survey (initiate soft start procedure when resuming survey).
- Terminate the survey if any seabirds show affected behaviour within 500 m of the survey vessel or equipment, until they have vacated the area.
- Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to acoustic survey activity.
- Suspend operations if any obvious mortalities or injuries to marine life are observed.

With mitigation	Local 1	High 3	Short term 1	Low 5	Improbable	**VERY LOW**	-ve	High

e) Turtles

Turtles may be affected by seismic noise as they only detect seismic survey equipment at close range (<10 m) and are not sufficiently mobile to move away the sound source. Initiation of a sound source at full power in the immediate vicinity of a swimming or basking turtle could result in physical injury. This also means that turtles may be vulnerable to boat strikes and entanglement with seismic towed equipment. Turtles are restricted to offshore pelagic waters off the west coast of South Africa and are likely to be encountered in Concession 11C. However, most incidents involve foraging turtles or turtles diving in an escape response becoming trapped by towed survey equipment which is not in the scope of works for the proposed seismic survey in Concession 11C. The overall impact is therefore assessed to be INSIGNIFICANT with no mitigation required (Table 11). Despite the low probability of impacts on turtles during the short survey duration, their inability to timeously avoid an approaching survey vessel warrants a precautionary approach and required mitigation includes delayed start-ups and a 500m buffer.

Table 11 Underwater noise disturbance to turtles

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High

Essential mitigation measures:

- A designated onboard Marine Mammal, Turtle and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying
- MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of feeding seabirds in the survey area
- If spotted wait until all marine life (seabirds, seals, cetaceans and turtles) have cleared an area of 500 m radius of the centre of the seismic source before resuming with seismic survey (initiate soft start procedure when resuming seismic survey).
- Terminate the survey, if any turtles show affected behaviour within 500 m of the survey vessel or equipment, until they have vacated the area.
- Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to seismic survey activity.
- Suspend operations if any obvious mortalities or injuries to marine life are observed

7.2.1.2 Marine megafauna collisions with survey vessels

There is a low risk of survey vessel collisions with marine megafauna such as whales and turtles that are susceptible to "ship strikes". Any increase in vessel traffic in habitat used by these animals can increase the risk of collision. The potential for collision is directly proportional to the vessel speed and the abundance and behaviour of cetaceans in the area. The 11C concession area is part of the natural range of several species of marine mammals including large whales such as humpback and southern right whales, but it is not considered an important aggregation site or migration route. The number of marine fauna expected to be encountered during the limited time that the survey vessel is active is therefore expected to be very low and the intensity of the impact is considered high for the individual affected animal and medium for the population as a whole. Seabird collision with the vessel is not anticipated as the vessel will not be creating fish offal or create light more intense than that on any other operational vessel, that would attract seabirds. The potential impact of marine megafauna collision with the survey vessel or entanglement in sampling equipment is therefore assessed to be of VERY LOW significance and with the implementation of mitigation measures is reduced to INSIGNIFICANT (Table 12).

Table 12 Marine megafauna collisions with survey vessels

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Medium 2	Short-term 1	Low 5	Possible	**VERY LOW**	-ve	High
Essential mitigation measures: • A designated onboard Marine Mammal Observer (MMO) and vessel operator to keep watch for marine megafauna in the path of the vessel during geophysical surveying. • Avoid geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations. • Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity.								
With mitigation	Regional 2	Low 1	Short term 1	Very Low 4	Improbable	**INSIGNIFICANT**	-ve	High

7.2.1.3 Seabed sampling and tailings disposal

The impacts from grab and core sampling are expected to be virtually negligible although the impacts from drill sampling are expected to be more extensive and include habitat loss and smothering of the benthos at sites associated with tailings discard. Recolonisation is, however, possible. Considering the available area of similar habitat on the West Coast, the reduction in benthic biodiversity can be considered negligible. Full recovery is expected to take place within the short to medium term (i.e. 5 – 10 years). It is generally accepted that offshore disturbed areas take longer to recover than those in shallow water further inshore. No direct mitigation is considered necessary, although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented (Penney *et al.* 2007; Pulfrich 2017). The overall consequence of this impact is considered to be low and is of LOW significance (Table 13). No mitigation measures are required.

Table 13 Benthic Impact of Seabed sampling and tailings disposal

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Medium-term 2	Low 5	Definite	**LOW**	-ve	High
Best Practice: • Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats • No essential or potential mitigation measures identified								

7.2.1.4 Fine sediment plumes

During the sampling process, sedimentary material that has been brought to the surface will be processed onboard and unwanted material (tailings) will be discarded overboard, thereby causing sediment plumes. These plumes can affect light penetration through the water column and can adversely affect phytoplankton productivity (O'Toole 1997; Pulfrich 2017). Suspended sediments may also affect the biological responses of consumers (hatching success, larval survival and foraging behaviour) (Clarke and Wilber 2000). Marine communities in the Benguela region are, however, well adapted to such events as they are frequently exposed to naturally elevated suspended-sediment levels (Penney *et al* 2007). Where deep-water sampling/prospecting is practiced, increased turbidity in the pelagic offshore environment as result of tailings plumes is not expected to have any significant effects on the marine biota (Penney *et al.* 2007; Pulfrich 2017). Sampling activities in 11C will not be contiguous. This will result in a delay in time while the seabed tool is transferred to the new sampling site before additional sediment is released overboard with the next sample.

Furthermore, the limited spatial scale, temporary nature of operations and low volume of any sediment plumes generated during sampling are not anticipated to have noticeable impacts on the environment and marine biota, including small pelagic fish recruitment. Impacts are therefore expected to be insignificant and without any measurable cumulative impact (Table 14). No direct mitigation is feasible as tailings disposal is an integral part of this mining method. However, tailings disposal must be done in a designated area with no reefs or sensitive habitat.

Table 14 Potential Impact of tailings discharge and fine sediment plumes on the pelagic habitat.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very low 3	Definite	**VERY LOW**	-ve	High
Best Practice: • No essential or potential mitigation measures identified								

7.2.1.5 Waste discharges during vessel operations

Water quality in the vicinity of exploration, sampling and associated support vessels may be impaired by various forms of waste discharged into the marine environment including hydrocarbons, sewage, litter, food, detergents and cooling water. During vessel operations, normal discharges to the sea can come from a variety of sources but these are all regulated by onboard waste management plans which must be MARPOL compliant. MARPOL is the International Convention for the Prevention of Pollution from Ships and is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The duration and severity of the impact would depend on the bio-degradation potential of the type of waste and its toxicity. Solid wastes (e.g. plastics, scrap metals) may take decades or centuries to degrade while hydrocarbons are toxic.

Based on the relatively small volumes of waste that can be expected, the potential impact of operational discharges from exploration and sampling/prospecting on the marine environment are of very low consequence, and the extent is likely to be limited to the immediate area around the vessel(s). Overall, the potential impact of operational discharges on the marine environment is considered to be of VERY LOW significance. With the implementation of the stipulated mitigation measures this is reduced to INSIGNIFICANT (Table 15).

Table 15 Waste discharge during vessel operation

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Medium-term 2	Very low 4	Probable	**VERY LOW**	-ve	High
Best Practice: • Inform & empower all staff about sensitive marine species & suitable disposal of waste; • Ensure compliance with relevant MARPOL standards; • Develop a waste management plan; • A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations; • Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm); • All process areas should be bunded to ensure drainage water flows into the closed drainage system; • Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system; • Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages; • All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and • Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.								
With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High

7.2.2 Impacts on fisheries

Exclusion of fishing vessels from fishing areas, possible altered behaviour of fish due to seismic activities and interference with shipping could have (indirect) socio-economic implications for the affected industries. Fisheries might be affected as a result of target species avoiding seismic survey areas for several days after the survey has terminated or the vessel has moved on (Mason 2017).

Fisheries sectors operating within Concession 11C that could be impacted include small pelagic purse seine, tuna pole and line and traditional linefish. The catches from these sectors made within the concession area 11C are all of limited significance as a proportion of the national total catch of each of these fisheries. Furthermore, the remote offshore location of the 11C concession area (50 km north of the nearest coastal fishing community at Doringbaai and with a landward boundary 5 km offshore) means that impacts on local small-scale fisherman due to prospecting in this concession area will not occur. Prospecting activities will further not interfere with or impact upon kelp harvesting as kelp grows in shallow water down to about 20 m depth, while the concession area starts at 70m depth and is located approximately 5km west (out to sea) of where kelp harvesting occurs.

Overall, the impact is assessed to be INSIGNIFICANT and recommended Best Practice would be to inform key stakeholders from the potentially affected Small Pelagic, Tuna Pole and Line and Traditional Linefish sectors (Table 16).

Table 16 Impact on fisheries

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 2	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

Best Practice:

- Undertake surveys when fishing effort is lowest (preferably out of fishing seasons).
- Appoint a fisheries liaison officer (FLO) to facilitate communication with potentially affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.
- Prior to survey commencement, the following key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof:
- Fishing industry / associations (contactable via liaison@fishsa.org):
    - SA Marine Linefish Management Association (SAMLMA);
    - South African Pelagic Fishing Industry Association (SAPFIA);
    - South African Tuna Association (SATA);
    - South African Tuna Longline Association (SATLA);
    - Large Pelagic Small Medium & Micro Enterprises Association (LPSMME); and
    - Local fishing communities.
- Other associations and organs of state
    - DFFE;
    - SAMSA;
    - South African Navy Hydrographic office; and
    - Overlapping and neighbouring right holders.

7.2.3 Potential impacts on heritage resources

The potential exists that sampling activities could disturb cultural heritage material on the seabed, particularly historical shipwrecks and other palaeontological or rare geological objects. The potential impacts on cultural heritage material that are associated with the coring and drilling prospecting activities were assessed in three resource classes: submerged pre-history, palaeontology and shipwrecks/ maritime heritage.

7.2.3.1 Submerged pre-history

The physical intrusion of collecting core samples from the seabed is considered small and in the instance of concession Area 11C, the impact will be localised. Where impacts are likely to occur, they will be irreversible/permanent because heritage resources are considered non-renewable as they cannot be replaced nor recover after being disturbed, damaged or destroyed. The intensity of impact will be low, given the very limited physical intrusion into or disturbance of the seabed of the coring and the probability of occurrence is POSSIBLE. The significance of the impact is assessed to be VERY LOW but where impacts do occur their effects will be NEGATIVE. The lack of concrete information about the presence of submerged prehistoric resources in the concession area means that the level of confidence in this assessment of impacts is LOW. Access to such samples for palaeo-environmental and archaeological assessment may offset the potential impacts of core sampling and would result in the changing of the impact status from negative to POSITIVE because of a potential benefit to archaeological research and knowledge that could accrue from access to such information.

Table 17 Assessment of impacts of core sampling on submerged prehistoric resources

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	-ve	Low
Essential mitigation measures: • Core sample sections which contain alluvial material, particularly where organic remains are present, are retained and subject to paleoenvironmental assessment. This could offset any potential impacts. • the possibility is considered of retaining samples of the coarser fraction (i.e. gravel and stone (20 mm +) of sorted seabed sediment for assessment by an archaeologist for the presence of prehistoric lithic material.								
With mitigation	1	1	3	5	Possible	**VERY LOW**	+ve	Low

7.2.3.2 Palaeontology

Impacts of the proposed coring activities will be localised and where they do occur, they will be irreversible/ permanent as heritage resources are non-renewable. The intensity of impact will be LOW, given the very limited physical intrusion into or disturbance of the seabed of the coring and the probability of occurrence is POSSIBLE. The significance of the impact is assessed to be VERY LOW but where impacts do occur their effects will be NEGATIVE. The lack of concrete information about the possible presence or distribution of palaeontological resources in the concession area means that the level of confidence in this assessment of impacts is LOW. Such work would offset the potential impacts of the prospecting activities and would result in the changing of the impact status from negative to

POSITIVE because of a potential benefit to palaeontological research and knowledge that could accrue from such information.

Table 18 Assessment of impacts of core sampling on palaeontological resources.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Negligible (Low) 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	-ve	Low
Essential mitigation measures: • Any fossils such as petrified bone and teeth and shell casts, usually phosphatic, found during the processing of the cores must have the details of context recorded and must be kept for identification by an appropriate specialist and if significant, to be deposited in a curatorial institution such as the IZIKO SA Museum. • The possible detailed study and dating of a set of cores, possibly as a B.Sc. Honours or M.Sc. project should be considered.								
With mitigation	1	1	3	5	Possible	**VERY LOW**	+ve	Low

7.2.3.3 Maritime heritage

The only known or suspected heritage resources that may occur in Concession Area 11C are shipwrecks. The likelihood of disturbing a shipwreck is expected to be very small considering the vast size of the South African offshore area. While there is a possibility for unknown and unrecorded wrecks to be present in the concession area, this is unlikely. In the area under consideration, there are at least two vessels, i.e., *Zulu Coast I* and *Meteren*, that have been wrecked in the vicinity of the concession area, although neither of these are directly within Concession area 11C. Additionally, the possibility that currently unknown historical wrecks or maritime debris are present on the seabed in the concession area is so low that it can probably be discounted. The precise location of all these wrecks is unknown due to them being documented only through survivor accounts, archival descriptions and eyewitness reports recorded in archives and databases. In the event that these shipwreck sites are disturbed during sampling activities, the impact would be at the national level, permanent and of high intensity. The significance of impact is consequently High, without mitigation. With the implementation of mitigation, shipwreck sites can be largely avoided and if sampling is terminated in the unlikely event of encountering a shipwreck, the impact is regarded as INSIGNIFICANT. There is thus UNLIKELY to be any impact arising from prospecting activities on maritime heritage resources and they are SCOPED OUT of this impact assessment.

7.2.4 Potential socio economic impacts

A total of three negative socioeconomic impacts were identified as potentially being associated with the proposed survey/prospecting activities. These included Temporary disturbance of the 1) Tuna pole and line fisheries sector; 2) Traditional Linefish Sector; and 3) Small Pelagic Purse Seine Fisheries sector. Impacts will result mainly from temporary 1) disturbance to marine resources; 2) exclusion of fishing vessels from the concession area 11C; and 3) degradation of water quality in the area. These impacts could potentially impact the livelihoods and household income of three marine fisheries sectors (tuna pole and line, traditional line fish, and Small Pelagic Purse Seine fishers). The significance

of impacts to these fisheries are considered in detail below along with potential positive impacts on the local and regional economies.

Potential negative impacts on the three fishing sectors were assessed to be 'INSIGNIFICANT' after mitigation (where required). Positive impacts might include local and regional socioeconomic benefits.

7.2.4.1 Tuna pole and line

The South African tuna pole and line sector (TPL) targets longfin tuna *Thunnus alalunga*, yellowfin tuna *T. albacares*, bigeye tuna *T. obesus* and skipjack tuna *Katsuwonus pelamis* seasonally between November and May. Due to the seasonality of the TPL fishery, fishers also have access to snoek (*Thyrsites atun*) and yellowtail (*Seriola lalandi*) that are also important targets of the traditional linefishery. The tuna pole fleet consists of approximately 100 vessels ranging from small outboard powered skiboats (7-9 m length) to inboard diesel-powered deck boats (6-25 m length). The reported longfin tuna catch in 2018 was 2471 tonnes, with a wholesale value of R 124 Million, or 1.2% of the total South African commercial fisheries value (Japp & Wilkinson 2021). The commercial tuna pole fishing grounds lie between Cape Agulhas and the Orange River, but the fleet operates predominantly out of Cape Town and Hout Bay harbours and most fishing effort takes place within 100 nautical miles of these ports (particularly in the Cape Canyon area). Some effort does take place further up the west coast, although this is mostly offshore or to the south of concession area 11C. Over the period 2017-2019 there was no reported TPL fishing effort in the area west of Brand se Baai and inshore of the 200 m isobath, i.e. none within concession 11C (Japp & Wilkinson 2020). Impacts on the TPL fleet due to the proposed prospecting activities within 11C are therefore expected to be insignificant (Table 19).

Table 19 Impact rating of the prospecting activity on the Tuna Pole and Line fishery.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 4	Possible	**INSIGNIFICANT**	-ve	High
No mitigation required. :								

7.2.4.2 Traditional Linefish Sector

Line fisheries in South Africa include subsistence, recreational and commercial participants. Most (85%) subsistence fishers employ traditional line fishing methods, which is generally considered labour intensive and associated to low revenue output (Brick & Hasson 2018). Line fishers operate in shallow water (generally <100 m depth) and would potentially be negatively impacted by coastal and nearshore seismic exploration, prospecting and mining operations (particularly recreational, small scale and subsistence shore fishing). Recreational and subsistence line fisheries are open access, whereas the commercial traditional line fishery has limited fishing rights based access and a Total Applied Effort (TAE) is set (DAFF 2013). All sectors use simple handheld lines or rod with no more than 10 baited hooks per line. The traditional line fishing sector targets multiple species (up to 200 species) of which 95 species are commercially and recreationally significant (DAFF 2013). The line fisheries

along the west coast (Line fish management Zone A — Orange River to Cape Infanta) mostly target the nomadic coastal migrant species, snoek (*Thyrsites atun*) and yellowtail (*Seriola lalandi*), as well as the reef dwelling Hottentot sea bream (*Pachymetopn blochii*). Snoek typically contributes the highest catch weight in the commercial line fisheries (total landings of up to 5 800 tonnes) (Kerwath *et al.*, 2017). The management framework includes a comprehensive suite of line fish regulations including minimum size limits, daily bag limits, closed seasons, closed areas, commercial fishing bans for certain species and the capping of the commercial effort with zonal based Total Allowable Effort (TAE) (Kerwath *et al.*, 2017).

Concession area 11C is, however, relatively far offshore in water deeper than 100 m, and far from suitable launch sites. A spatial analysis of the reported commercial linefish catch data does not show any activity in reporting blocks that overlap with Concession Area 11C and exploration activities in this concession area are expected to have negligible impacts on the traditional linefish sector. The proposed prospecting in concession area 11C is therefore expected to have a negligible socio-economic impact on the direct and indirect dependants from the traditional linefishing sector (Table 20).

Table 20 Impact rating of the prospecting activity on the Traditional Linefish Sector.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation required								

7.2.4.3 Small Pelagic Purse Seine Fisheries

The small pelagic fishery is described in the has the largest catch volume for any of the South African fishery sectors and has the second largest annual catch value, estimated at around R2.164 billion in 2017, which is approximately one fifth of the combined value of South African Fisheries (Japp & Wilkinson 2021). The industry supports around 4 500 full time staff, 2 500 seasonal staff and more than 700 fishers. The support industries contribute an estimated further 2 400 jobs. The management of the small pelagic fishery is described in the marine specialist report (Hutchings et al 2021). Stock status of anchovy and round herring are currently considered optimal, whilst sardine stocks are considered depleted (DEFF 2020).

The small pelagic purse-seine fishery operates between the Orange River and East London mostly in nearshore waters (within 10 km of the coast). The 11C Concession Area does overlap with identified fishing areas for anchovy and with the sardine directed fishing ground (Norman *et al.* 2018). A quantitative spatial analysis using commercial catch return data (all small pelagic species combined) for the period 2006-2011, however, suggests that Concession Area 11C itself, does not constitute an area where a substantial proportion of the average annual purse seine catch is made. Despite overlapping with six small pelagic reporting grid blocks, concession 11C lies at the northern extreme of the small pelagic fishing grounds and the total catch reported for these blocks was only ~150 tonnes (out of a national total of around 300 000 tonnes).

The fishery is unlikely to be significantly negatively affected by small temporary closures/exclusion zones around survey vessels and geotechnical survey sites and potential negative impacts on the livelihoods and household income of participants in this fishery are considered unlikely. The socioeconomic impact is assessed as 'very low', and 'insignificant' after recommended mitigation measures (Table 21).

Table 21 Impact rating of the prospecting activity on the Small Pelagic Purse Seine Fisheries.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
Essential mitigation measures: • Undertake surveys when fishing effort is lower (preferably out of fishing seasons). • Appoint a fisheries liaison officer (FLO) to facilitate communication with the Small Pelagic Fishing Industry Association. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering purse seine fishing vessels in the survey area.								
With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

7.2.4.4 Sea kelp farming

The harvesting and processing of kelp (mainly the species *Ecklonia maxima* and to some degree *Laminaria pallida*) along the West Coast of South Africa is a large industry that provides numerous employment opportunities to the local community (Figure 6-12). The three main kelp harvesting industries include boat-based harvesting of fresh kelp to be used as feed on abalone farms; harvesting by divers to use as liquid plant growth enhancer in the agriculture industry and the harvesting and drying of washed-up kelp for exporting and extracting of alginate. As kelp grows in shallow water down to about 20 m depth, prospecting activities in Concession area 11C will not interfere with or impact upon kelp harvesting as this concession area starts at 70m depth and is located at least 4km west (out to sea) of where kelp harvesting occurs. The proposed prospecting in concession area 11C is therefore expected to have a negligible socio-economic impact on the direct and indirect dependants from the kelp harvesting industry.

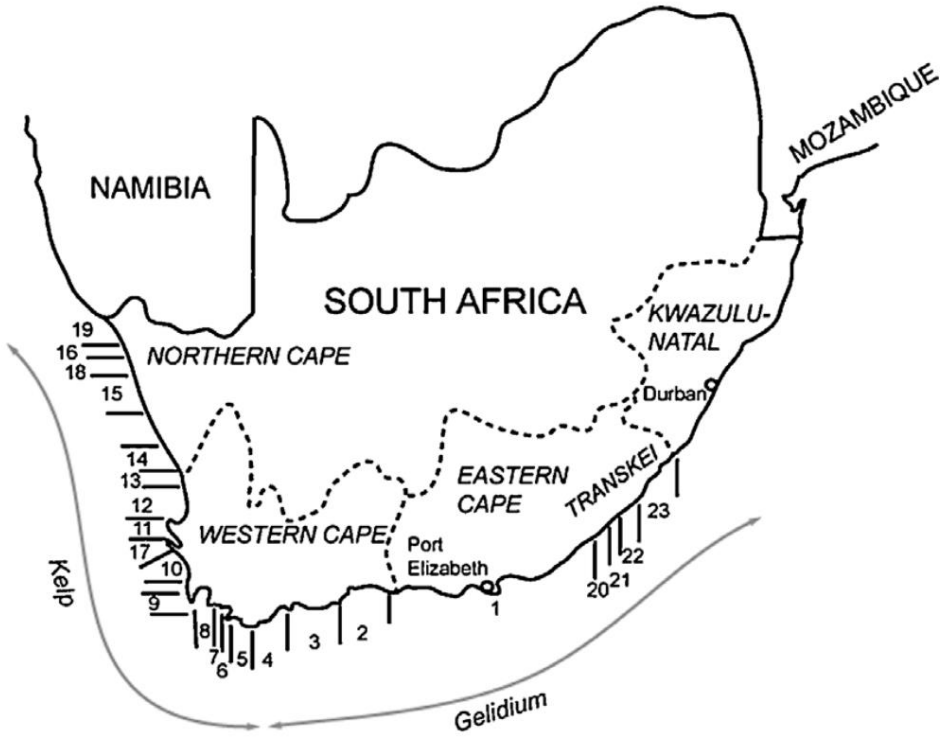


Figure 7-1 **Kelp and seaweed concession areas (separated by lines) along the South African coast. Kelp harvesting occurs in areas 5–9, 11–16 and 18–19 (sourced from Troell *et al*. 2006).**

Table 22: Impact on the kelp harvesting industry.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation required								

7.2.4.5 Potential positive impacts

Mining is economically important as it can create broad scale employment opportunities and boost the local and regional economies. Previous offshore diamond mining operations in Doringbaai did not, however, employ many local community members (SU 2013), which has led to poor community support for these projects. Trans Atlantic Diamond will incorporate codes of good practice on Broad Based Black Economic Empowerment issued under the section 9 of the Broad Based Black Economic Empowerment Act, Act 53 of 2003, as amended by Act 46 of 2013. The following resource support aims will be incorporated by the Applicant:

- At least 25% of cost of sales excluding labour cost and depreciation will be procured from local producers or local suppliers in SA.
- Job creation – 50% of jobs created will be reserved for persons of colour. Employment opportunities that will be created through this project include:
  - Employment of local security companies.
  - Employment allocated to port duties

  - If feasible, employment of local small-scale fisher vessels as support vessels during survey operations.
  - Employment of local or national Geologists, a vessel manager, captain, crew members, scientists, Marine Mammal and Seabird Observers (MMSOs), etc.
- At least 25% transformation of raw material or beneficiation which includes local manufacturing, production and/or assembly, and/or packaging, or at least 85% of labour cost will be paid to South African employees by service industry organizations
    - mining equipment, where and if possible, will be sourced within South Africa or neighbouring communities.
    - Support for operational activities will be sourced from local services for e.g., refuelling, general supplies, and possible equipment repair)
- Skills transfer – Training opportunities
    - Environmental officers
    - Health and Safety Officers
    - MMSOs and Passive Acoustic Monitoring (PAM) operators
    - general crew/ deck member
    - Commercial divers to help with surveys

Additional compensation and resource support measurements were identified by communities to reduce the severity of the impacts on the socio-economic performance (SU 2013; Nthane *et al*., 2015). These will be implemented by Trans Atlantic Diamonds and include:

- Skills Development though training programs and formal education opportunities such as financial management skills.
- Support of local initiatives, investments, and entrepreneurship.
- Support the development of a local fisheries and businesses and assist in the export of fish locally and internationally. In addition, assist partnership between local fisheries and retail markets.
- Assist local communities in navigating new Small-Scale Fisheries Policy structures.
- Assist in the development of a streamlined communication platform between local community, community representatives, stakeholders, and government officials.

Many of the benefits and positive impacts discussed above will, however, only be achieved during mining. The benefits associated with prospecting activities are considered to be much less as prospecting is a research phase with no economic gain.

Local socio-economic benefits

The potential local socio-economic benefits of prospecting were assessed to by INSIGNIFICANT, as it is not likely that employment opportunities will be available for the local community during this phase. This is because the prospecting vessel will operate out of Cape Town of Saldanha ports and prospecting activities require individuals skilled and trained in specific areas of expertise (Table 23).

Table 23 Local socio-economic benefits of prospecting activities.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Possible	**INSIGNIFICANT**	+ve	Medium
No mitigation measures deemed necessary								

Regional socio-economic benefits

As the employees will be sourced within South Africa, prospecting is expected to provide regional benefits. Employees that will be required by this project include a Geologist, a vessel manager, captain, crew members, scientists, Environmental officer, Health and Safety Officer, Marine Mammal and Seabird Observers (MMOs) and a Passive Acoustic Monitoring (PAM) operator. In addition, the equipment and technology used in mining/ prospecting vessels are usually sourced and installed in South Africa, further supporting local vendors and artisans. Local vendors and businesses that will also be supported include fueling stations, general supply stores, equipment repair companies, scientific laboratories for analysing sediment samples, environmental consultancies for analysing benthic biological samples, etc. Positive regional socio-economic impacts were therefore assessed to be of Low positive significance.

Table 24 Impact rating of the prospecting activity on the on the regional socio-economic performance.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Low 1	Medium-term 2	Low 5	Definite	**LOW**	+ve	Medium
No mitigation measures deemed necessary								

7.3 Less Significant Impacts

7.3.1 Impacts on Science

Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. These samples will then be sent to an independent environmental consultancy for analysis to establish a baseline of environmental data. This comprises analysing sediment composition and determining the composition and abundance of benthic species in the sediment. Data collected during the acoustic survey can be used to map important features such as reefs that may be present in the area. Should artefacts, fossils or any other heritage resources be discovered during the prospecting, these will be donated to scientific institutions and can make an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The contribution of information to science collected during prospecting will be positive, but was assessed to be of LOW significance.

Table 25 Potential Impact of prospecting on science.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term 3	Low 5	Definite	**LOW**	+ve	High
Essential mitigation measures: • No essential or potential mitigation measures identified								

7.3.2 Potential interference with commercial shipping traffic

The majority of shipping traffic is located on the outer edge of the continental shelf, which is well offshore of the outer edge of Concession Area 11C (Figure 7-2). The inshore traffic of the continental shelf along the West Coast is largely comprised of fishing and mining vessels, especially between Kleinzee and Oranjemund. Thus, there is unlikely to be much interaction between vessels involved with prospecting in Area 11C and other vessel. The impact on shipping traffic is considered to be localised, of low intensity in the short-term. The significance of this impact is therefore assessed to be INSIGNIFICANT with and without mitigation (Table 26).

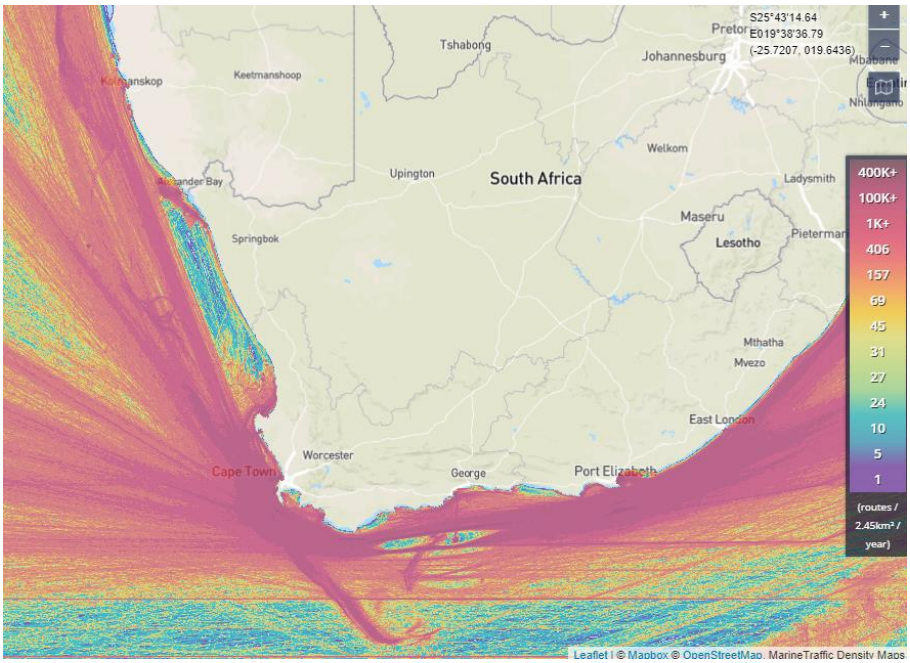


Figure 7-2. Commercial shipping traffic in relation to Concession Area 11C. The concession area is indicated by the red dot on the map. Source: https://www.marinetraffic.com/en/ais/home/centerx:16.4/centery:-32.5/zoom:7. Accessed 16 July 2021.

Table 26. Assessment of impacts pertaining to interaction with other vessels

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Negligible 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
No mitigation deemed necessary								

7.3.3 Visual Impacts

The towns closest to Concession area 11C, i.e., Lepelsfontein and Kotzesrus, is situated approximately 20km north east and inland of the concession area. The topography and landscape in this region are variable and characterised by numerous valleys and lines of granite hills. As a result, the shoreline and the concession area are not visible from these towns.

When considering the visual impacts of the proposed activities on farmers and communities residing on the land adjacent to the concession area, cognisance must be given to the fact that the area is sparsely populated and that the concession area is starts approximately 5km offshore. This concession area is therefore considered relatively isolated and inconspicuous. It is unlikely that the survey vessel will be visible from the farmers' residence or the shoreline. The vessel is also not considered to be more conspicuous than any other vessel (such as fishing vessels) already visiting the area. The entire survey phase is also expected to only take approximately one month (over the next 5 years) to complete. It is therefore the EAPs reasoned opinion that the vessel and activity in Concession Area are expected to have negligible impacts on the visual integrity of the area (Table 20).

Table 27 Impacts on the visual integrity of the area.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
No mitigation measures deemed necessary								

7.4 Cumulative Impacts

Coastal and marine mining is a well-established along South Africa's west coast between St Helena Bay and the Orange River mouth (Figure 7-3). There are prospecting and mining permits allocated for most of the nearshore, land based and surf zone coastal concessions between the Olifants and Orange River mouths (Figure 7-3). These mines are largely extracting diamondiferous gravels. Between the Olifants estuary mouth and Brand se Baai mineral sands are extracted by Tormin and Tronox mines in intertidal and land based coastal operations respectively. There are also offshore oil and gas production and prospecting licenses with additional exploration applications currently underway (Figure 7-3). The prospecting and exploration methods for oil and gas exploration (seismic surveys and core/drill sampling) are similar (although normally of greater intensity as the oil and gas reserves are typically deeper and located in pockets of sedimentary rock below the sea floor) to those used for offshore diamond and other mineral exploration. There has been a recent increase in applications for prospecting and exploration rights along the west coast and increased prospecting/survey activity in the short term and marine mining in the long-term is anticipated.

This means that cumulative impacts of marine prospecting and mining must be considered at a broader spatial scale in a strategic manner for each potential impact identified. Obtaining detailed information on the scale, extent, methodology (and hence intensity) of various current and pending applications is, however, not possible within the prescribed timeframes of a Basic Assessment Process for a single application (such as this one). This requires a revised strategic level Environmental Impact

Assessment to assess cumulative impacts with a medium to high level of confidence. The last strategic level EIA that assessed marine and coastal diamond mining Impacts in the region was a Benguela Current Large Marine Ecosystem Programme (BCLME) study undertaken over the period 2004–2007 (Penney et al 2007).

It is, however, logical and reasonable, to anticipate that many of the potential impacts assessed for this project would continue together with other projects that are ongoing or scheduled to come on-line. The result is that the spatial Extent would change from "local" to "regional", whilst the duration would change from "short-term" (<2 years) to at least "medium term" (2–15 years) or even "long-term" (>15 years, mostly reversible in the case of prospecting, but not always for mining). The intensity of impacts is anticipated to remain as they are assessed here for operations of this nature, but may be higher for other sea-based mineral and energy projects in different areas with different objectives. Each of the impacts identified in Section 7.2.1 to Section 7.3.3, can thus be assessed in this manner to determine their cumulative impacts.

For the purpose of assessing the cumulative impacts of prospecting within Concession area 11C, a precautionary approach was taken. This requires an assessment of a "worst case" scenario. In other words, instead of assessing the cumulative impacts of each impact identified in Section 7.2.1 to Section 7.3.3, we assessed the negative impact that was found to be of highest significance, i.e., the Medium Significance impact of seismic surveys on marine mammals. Then we can assume that the cumulative impacts of all other impacts will either be of the same, or lower significance.

We therefore provide an assessment of the negative cumulative impacts of marine prospecting along the west coast that demonstrates how an impact that was assessed as being of "Medium" significance would be assessed as being of "High" negative significance when considering it in conjunction with other projects and their impacts (Table 28).

Effective implementation of international best practice mitigation measures (in this example of potential seismic survey impacts on cetaceans that would include seasonal timing of the surveys, compulsory MMSOs, soft starts, PAM monitoring etc.) by all active operations would reduce the "probability" of the impact and result in a "MEDIUM" significance cumulative impact. This assessment will also have a "low confidence" due to the lack of information on other activities in the region.

Table 28 **Assessment of cumulative Impacts of a "MEDIUM" Significance negative impact (e.g. Underwater noise disturbance to marine mammals) by numerous, simultaneous or sequential marine prospecting operations along the South African west coast.**

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Medium 2	Long-term 3	High 7	Probable	**HIGH**	-ve	Low

Proposed mitigation measures:

- Mitigation measures as recommended for each individual impact. In this example:
  - A designated onboard Marine Mammal and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying.
  - MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of cetaceans around the survey vessel prior to the initiation of any acoustic impulses
  - "Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible,

	the equipment should be turned on and off over a 20 minute period to act as a warning signal and allow cetaceans to move away from the sound source. • Terminate the survey if any marine mammals show affected behaviour within 500 m of the survey vessel or equipment until the mammal has vacated the area. • Avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations. • Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility.							
With mitigation	2	2	3	7	Possible	**MEDIUM**	-ve	Low

The same assessment should be applied to the positive impacts that have been identified. We again take a modest approach and assess the lowest positive impact, i.e., the INSIGNIFICANT" socio-economic benefits of prospecting on the local communities of the area. We can then assume that the cumulative impacts of all other positive impacts will either be of the same, or higher significance. We therefore provide an assessment of the positive cumulative impacts of marine prospecting along the west coast that demonstrates how an impact that was assessed as being "INSIGNIFICANT", would be assessed as being of "VERY LOW" positive significance when considering it in conjunction with other projects and their impacts (Table 29). Note that the assessment was based on a short-term duration so as to not overestimate the positive impacts.

Table 29 **Assessment of cumulative Impacts of an "INSIGNIFICANT" positive impact (e.g. Local socio-economic benefits) by numerous, simultaneous or sequential marine prospecting operations along the South African west coast.**

	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Regional 2	Medium 2	Short-term 1	Low 5	Possible	**VERY LOW**	+ve	Low
No mitigation measures deemed necessary								

It is recommended that a strategic level Environmental Impact Assessment (EIA) process based on marine spatial planning principles be undertaken to assess and manage potential cumulative impacts in a holistic manner and to identify and implement regional level mitigation measures. The decision-making authority (DMRE) must take cognisance of this recommendation to do a strategic level EIA in order for Specialists and Environmental Assessment Practitioners to accurately assess cumulative impacts.

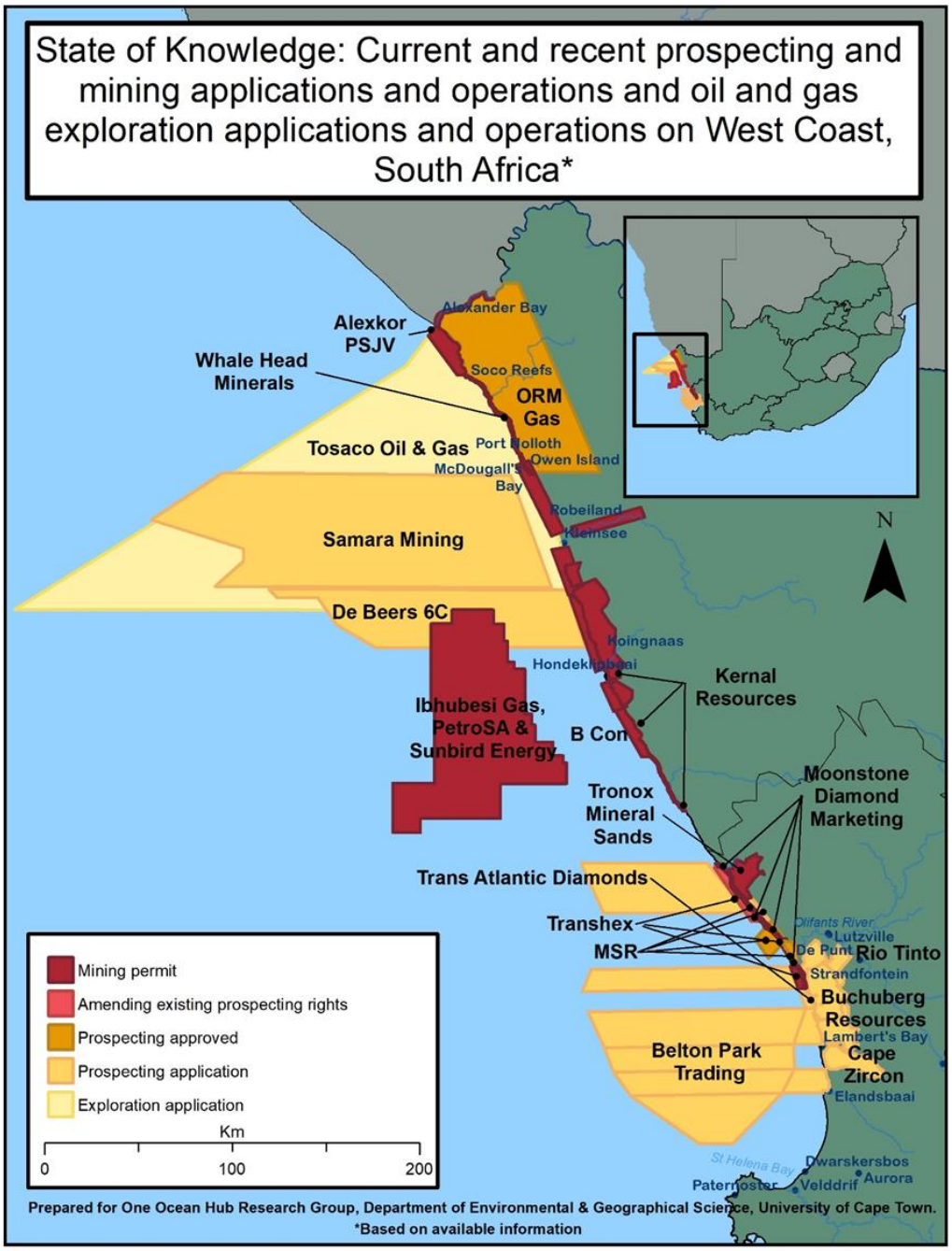


Figure 7-3. **Extent of prospecting and mining applications and operations along South Africa's West Coast (Source: Compiled by R. Button for the One Ocean Hub Research Group, Department of Environmental & Geographical Science, University of Cape Town).**

7.5 The "No-go" alternative

The implications of not going ahead with the proposed prospecting activities are as follows:

- Loss of opportunity to establish whether or not a viable offshore diamond resource exists in Concession Area 11C off the West Coast of South Africa;

- Prevention of any socio-economic benefits associated with the continuation of prospecting activities;
- Lost economic opportunities; and
- Lost environmental baseline data.

The potential negative impact related to the lost opportunity to further delineate the offshore diamond resource on the west coast and maximise the use of South Africa's own resources is considered to be of LOW significance. The positive implications on the no-go option are that there would be no impacts on the biophysical environment in the area proposed for the prospecting activities. These were also assessed to be of LOW positive significance.

Table 30. Assessment of the "No-go" alternative in terms of the negative impacts

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Medium 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Medium
No mitigation measures deemed necessary								

Table 31. Assessment of the "No-go" alternative in terms of the positive impacts

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term 3	Low 5	Probable	**LOW**	+ve	Medium
No mitigation measures deemed necessary								

7.6 Summary table of impacts

Table 32 **Potential impacts associated with prospecting in Concession area 11C, as identified during the Basic Assessment Process. These include impacts on Marine and Fisheries resources, Heritage resources, shipping activities, science, socio-economic aspects, visual integrity, cumulative impacts and impacts related to the no-go option.**

Impact	Consequence	Probability	Significance	Status	Confidence
MARINE AND FISHERIES IMPACTS					
Impact 1: Underwater noise disturbance to invertebrates	Very low	Possible	**INSIGNIFICANT**	-ve	Medium
No mitigation					
Impact 2: Underwater noise disturbance to fish	Very low	Possible	**INSIGNIFICANT**	-ve	Medium
No mitigation					
Impact 3: Underwater noise disturbance to marine mammals	Medium	Probable	**MEDIUM**	-ve	High
With mitigation	Medium	Improbable	**LOW**	-ve	High

Impact	Consequence	Probability	Significance	Status	Confidence
Impact 4: Underwater noise disturbance to seabirds	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Improbable	**VERY LOW**	-ve	High
Impact 5: Underwater noise disturbance to turtles	Very low	Improbable	**INSIGNIFICANT**	-ve	High
With mitigation	Very low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 6: Marine megafauna collisions with survey vessels	Low	Possible	**VERY LOW**	-ve	High
With mitigation	Very low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 7: Offshore based seabed sampling and tailings disposal	Low	Definite	**LOW**	-ve	High
No mitigation					
Impact 8: Fine sediment plumes	Very low	Definite	**VERY LOW**	-ve	High
No mitigation					
Impact 9: Waste discharges during vessel operations	Very low	Probable	**VERY LOW**	-ve	High
With best practice mitigation	Very low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 10: Impact on fisheries	Very Low	Possible	**INSIGNIFICANT**	-ve	High
No mitigation (see best practice recommendations)					
HERITAGE RESOURCES IMPACTS					
Impact 11: Impacts on Submerged Prehistoric Heritage Resources – Core Sampling	Low	Possible	**VERY LOW**	-ve	Low
With Mitigation	Low	Possible	**VERY LOW**	+ve	Low
Impact 12: Impacts on Maritime Archaeological Resources: Core Sampling	No impacts expected — scoped out				
Impact 13: Impacts on Paleontological Resources – Core Sampling	Low	Possible	**VERY LOW**	-ve	Low
With Mitigation	Low	Possible	**VERY LOW**	+ve	Low
SOCIO-ECONOMIC IMPACTS					
Impact 14: Tuna pole and line	Very Low	Possible	**INSIGNIFICANT**	-ve	High
No mitigation					
Impact 15: Traditional linefish Sector	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation					
Impact 16: Small pelagic purse seine fisheries	Very Low	Probable	**VERY LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 17: Kelp harvesting	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation					

Impact	Consequence	Probability	Significance	Status	Confidence
Impact 18: Local socio-economic performance	Very Low	Possible	**INSIGNIFICANT**	+ve	Medium
No mitigation					
Impact 19: Regional socio-economic performance	Low	Definite	**LOW**	+ve	Medium
No mitigation					
IMPACTS ON SCIENCE					
Impact 20: Impact on Science	Low	Definite	**LOW**	+ve	High
No mitigation					
IMPACTS ON REGIONAL SHIPPING TRAFFIC					
Impact 21: Impacts on other vessels	Very low	Possible	**INSIGNIFICANT**	-ve	Low
No mitigation					
IMPACTS ON THE VISUAL INTEGRITY OF THE AREA					
Impact 21: Visual	Very Low	Possible	**INSIGNIFICANT**	-ve	Medium
No mitigation					
CUMULATIVE IMPACTS					
1) Cumulative negative impacts "worst case" scenario	High	Probable	**HIGH**	-ve	Low
After mitigation	High	Possible	**MEDIUM**	-ve	Low
2) Cumulative positive impacts "worst case" scenario	Low	Possible	**VERY LOW**	+ve	Low
No mitigation					
NO-GO OPTION					
1) No socio-economic benefits	Medium	Possible	**LOW**	-ve	Medium
No mitigation					
2): No impact on the environment	Low	Probable	**LOW**	+ve	Medium
No mitigation					

7.7 Methodology used in determining, assessing and ranking impacts

Provide a full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity). (Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

The National Environmental Screening Tool was used to assess terrestrial habitat adjacent to Concession Area 11C. The purpose of a screening process is to identify any environmental site

sensitivities within the area. Specialists were appointed to assess these site sensitivities and any potential impacts associated with prospecting in this area. Information from these studies and the screening tool, together with the expertise from the EAP and consultation with stakeholders were used to identify and assess the potential impacts of prospecting in this area.

The method used to assess the impacts of the proposed prospecting activity is guided by the requirements of the NEMA, 1998 (Act No. 107 of 1998) and EIA Regulations, 2014 (as amended). The broad approach to the assessment criteria is to ensure that it is comprehensive in its approach to determine the overall significance as accurately as possible. Therefore, the following criteria will be taken into consideration:

The significance of all potential impacts that would result from the proposed project is determined in order to assist decision-makers. The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact was thus rated according to the methodology set out below:

Step 1 – Determine the **consequence** rating for the impact by determining the score for each of the three criteria (A-C) listed below and then **adding** them. The rationale for assigning a specific rating, and comments on the degree to which the impact may cause irreplaceable loss of resources and be irreversible, must be included in the narrative accompanying the impact rating:

Rating	Definition of Rating	Score
A. *Extent – the area over which the impact will be experienced*		
Local	Confined to project or study area or part thereof (e.g. limits of the concession area)	1
Regional	The region (e.g. the whole of Namaqualand coast)	2
(Inter) national	Significantly beyond Saldanha Bay and adjacent land areas	3
B. *Intensity – the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. *Duration – the time frame for which the impact will be experienced and its reversibility*		
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years (state whether impact is irreversible)	3

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

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

Example 1:

Extent	Intensity	Duration	Consequence
Regional 2	Medium 2	Long-term 3	High 7

Step 2 – Assess the **probability** of the impact occurring according to the following definitions:

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

Example 2:

Extent	Intensity	Duration	Consequence	Probability
Regional 2	Medium 2	Long-term 3	High 7	Probable

Step 3 – Determine the overall **significance** of the impact as a combination of the **consequence** and **probability** ratings, as set out below:

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

Example 3:

Extent	Intensity	Duration	Consequence	Probability	Significance
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH

Step 4 – Note the **status** of the impact (i.e. will the effect of the impact be negative or positive?)

Example 4:

Extent	Intensity	Duration	Consequence	Probability	Significance	Status
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	– ve

Step 5 – State the level of **confidence** in the assessment of the impact (high, medium or low).

Impacts are also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below. Depending on the data available, a higher level of confidence may be attached to the assessment of some impacts than others. For example, if the assessment is based on extrapolated data, this may reduce the confidence level to low, noting that further ground-truthing is required to improve this.

Confidence rating	
Status of impact	+ ve (beneficial) or – ve (cost)
Confidence of assessment	Low, Medium or High

Example 5:

Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	– ve	High

The significance rating of impacts is considered by decision-makers, as shown below. Note, this method does not apply to minor impacts which can be logically grouped into a single assessment.

- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity.
- **HIGH**: the potential impact **will** affect a decision regarding the proposed activity.
- **VERY HIGH**: The proposed activity should only be approved under special circumstances.

Step 6 – Identify and describe practical **mitigation** and **optimisation** measures that can be implemented effectively to reduce or enhance the significance of the impact. Mitigation and optimisation measures must be described as either:

- **Essential**: must be implemented and are non-negotiable; and
- **Best Practice**: must be shown to have been considered and sound reasons provided by the proponent if not implemented.

Essential mitigation and optimisation measures must be inserted into the completed impact assessment table. The impact should be re-assessed with mitigation, by following Steps 1-5 again to demonstrate how the extent, intensity, duration and/or probability change after implementation of the proposed mitigation measures.

Example 6: A completed impact assessment table

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional **2**	Medium **2**	Long-term **3**	**High 7**	Probable	**HIGH**	**– ve**	High
Essential mitigation measures: xxxxx xxxxx								
With mitigation	Local 1	Low 1	Long-term 3	**Low 5**	Improbable	**VERY LOW**	**– ve**	High

Step 7 – Prepare a summary table of all impact significance ratings as follows:

Impact	***Consequence***	***Probability***	**Significance**	***Status***	***Confidence***
Impact 1: XXXX	Medium	Improbable	LOW	–ve	High
With Mitigation	Low	Improbable	VERY LOW		High
Impact 2: XXXX	Very Low	Definite	VERY LOW	–ve	Medium
With Mitigation:	*Not applicable*				

Indicate whether the proposed development alternatives are environmentally suitable or unsuitable in terms of the respective impacts assessed by the relevant specialist and the environmentally preferred alternative.

7.8 The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Refer to section 7.1 above for a comprehensive discussion relating to the positive and negative impacts of prospecting in Concession area 11C. Below follows a summary of these impacts.

Prospecting and mining activities are only permitted by individuals that are in possession of a mining or prospecting right, and only within specially designated areas that allow the industry, the trade of commodities, the associated activities and potential impacts, environmental management and the responsible extraction of minerals, to be monitored. Companies can apply for prospecting and/ or mining rights within concession areas for which rights are available. As this is a competitive industry, few concession areas are available at any given time. Although several alternative concession areas were considered by the applicant, the prospecting and mining rights for many of these were already held by other companies. No alternatives sites were therefore considered in this Basic Assessment Process. As the intention of the proposed prospecting activity is to search for diamondiferous, gemstone, mineral and metal deposits, and to ensure the economic feasibility of mining within a certain concession area, an area known to contain these resources needs to be selected. This concession area is targeted as it is known to contain kimberlite pipes which is a source of diamonds and other mineral deposits.

The preferred activities, i.e. geophysical surveys and drilling are the primary methods used for mineral prospecting, and will facilitate the discovery and estimation of mineral resources within the concession area. These activities will include invasive and non-invasive methods such as geophysical surveys, drilling and baseline biological sampling. These methods have been developed through many years of research and development by the mining industry and are the preferred methods for resource estimation and cannot easily be replaced by any other methods.

The assessment of the impacts of prospecting on the marine ecological environment, fisheries, socio-economic status, heritage, shipping and visual integrity of the area, identified 18 potential negative impacts ranging from medium to insignificant and three potential positive impacts ranging from low to insignificant. With the implementation of effective mitigation measures, the negative impacts can all be reduced to low, very low, or insignificant.

The negative impacts are associated with the disturbance of fauna (invertebrates, fish, mammals, seabirds and turtles), submerged prehistoric resources, shipping activities, fishing activities and abalone aquaculture. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement. These impacts have the potential to result in the loss of environmental integrity, social values and economic opportunities. It should, however, be noted that most of these impacts were assessed to be insignificant. Marine mammals are expected to be the most significantly affected group by the prospecting activities, due to the impacts that the acoustic surveys could have on their echolocation and hence behaviour and critical activities such as feeding. The impact of prospecting on submerged Prehistoric Heritage and Palaeontological Resources is expected to be very low and can even yield a positive outcome if sediment samples are retained for

assessment of paleoenvironmental and prehistoric lithic material. Due to the location of the concession area relative to the nearest towns and harbours (5 km offshore in addition to 40km and 50 km north of Strandfontein and Doringbaai, respectively), and low fishing effort in this area, prospecting activities are not expected to have a significant impact on fisheries and a negligible impact on the visual integrity of the area.

Prospecting activities could also provide benefits in the form of local and regional socio-economic opportunities in addition to contributing towards scientific knowledge, specifically in terms of baseline environmental sediment, species and high-resolution bathymetry data. These benefits are, however, considered to be relatively low in the broader context.

The assessment of impacts in this concession area further revealed that the significance of the impacts is lower when compared to that of impacts identified in other nearshore concession areas. This could be attributed to the concession area's distance from and location relative to the coastline, fishing areas, aquaculture farms, harbours, shipping routes and towns. In light of the above, Concession area C is considered to be situated in a suitable location where prospecting will have relatively low negative impacts and provide potential benefits.

7.9 The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

7.9.1 Marine ecology

Essential mitigation measures for impacts to marine megafauna

- Vessel operator must keep watch for marine megafauna in the path of the vessel during vessel operation.
- At least two on-board independent Marine Mammal and Seabird observers (MMSOs) with experience in marine megafauna (including, but not limited to, all marine mammals (cetaceans and seals), sea turtles and seabirds) identification and observation techniques must be employed to carry out daylight observations and ensure compliance with mitigation measures during geophysical surveying. It must be ensured that there are sufficient MMOs on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- Activity must be restricted to specific areas or a time of year, this includes:
    - Avoid planning any surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations;
    - Avoid planning any surveys during mating season (confirm these times with MMSOs); and

  - Confine surveys to seasons when cetaceans are scarce to ensure minimal disturbance (confirm these times with MMSOs).
- MMSOs to conduct pre-survey visual scans of at least 30 minutes for the presence of megafauna around the survey vessel prior to any vessel movement.
- Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered.
- Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20-minute period to act as a warning signal and allow cetaceans to move away from the sound source.
- Passive Acoustic Monitoring (PAM) technology must be incorporated into any survey programme. A designated onboard PAM Observer uses the PAM technology to detect the vocalisations of marine species, particularly during periods of low visibility, such as at night or during adverse weather conditions and thick fog, to prevent collision and impact due to acoustic survey. . It must be ensured that there are sufficient PAM operators on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- Suspend operations if any obvious mortalities or injuries to marine life are observed.
- Make marine mammal incidence data and sound source output data from surveys available on request to the Marine Mammal Institute (MMI), DFFE and DMRE.
- Ensure that MMSOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities
- Record encounters with marine life (seabirds, turtles, seals, fish), their behaviour and response to vessel, including any attraction of predatory seabirds and incidents of feeding behaviour around the survey vessel; data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns).
- Record marine life (cetaceans, seabirds, turtles, seals, fish) incidences and responses to acoustic survey activity, including data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns, feeding behaviour) along with noise levels.
- Wait until all marine megafauna have cleared an area of 500 m radius of the survey vessel (centre of the sound source) before resuming with acoustic survey. If, after a period of 30 minutes, megafauna are still within 500 m of the vessel, the normal "soft start" procedure should be allowed to commence for at least 20-minutes duration. Behaviour during "soft starts" must be monitored;
- Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity.
- Sound containment and improvement of current equipment used must be implemented.
- Reassess the potential marine impacts after completion of the geophysical surveys and biological analysis as these might elucidate areas that would need to be avoided and species of conservation concern;
- Should any ecologically sensitive features such as reefs be identified within the concession area during the initial acoustic survey, these must be avoided and suitably buffered.

Appropriate buffers must be determined by a suitably qualified specialist. Once suitable buffers have been mapped it should be illustrated on a map and form part of the EMPr;

- Grab samples collected should be analysed as soon as possible to determine the benthic macrofaunal communities in the area. Results from this survey could be used to inform additional mitigation measures if required. Results will represent baseline data against which any change in macrofaunal communities in the area can be benchmarked after prospecting and mining.

Best Practice Mitigation (Recommended) for impacts related to spills and waste generated by vessels

- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats.
- Inform & empower all staff about sensitive marine species & suitable disposal of waste;
- Ensure compliance with relevant MARPOL standards;
- Develop a waste management plan using waste hierarchy;
- A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations;
- Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm);
- All process areas should be bunded to ensure drainage water flows into the closed drainage system;
- Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system;
- Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages;
- All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and
- Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.

7.9.2 Fisheries, socio-economic and other shipping

Essential mitigation measures

- Undertake surveys when fishing effort is lowest (preferably out of fishing seasons).
- The survey and sampling vessels must be certified for seaworthiness through an appropriate internationally recognised marine certification programme (e.g. Lloyds Register, Det Norske Veritas). The certification, as well as existing safety standards, requires that safety precautions should be taken to minimise the possibility of an offshore accident. Collision prevention equipment should include radar, multi-frequency radio, foghorns, etc. Safety equipment and training of personnel to ensure the safety and survival of the crew in the event of an accident is a further legal requirement.

Best Practice Mitigation (Recommended)

- Appoint a fisheries liaison officer (FLO) to facilitate communication with affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.
- Prior to survey commencement, the following key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof:
    - Fishing industry / associations (contactable via liason@fishsa.org):
        - SA Marine Linefish Management Association (SAMLMA);
        - South African Pelagic Fishing Industry Association (SAPFIA);
        - South African Tuna Association (SATA);
        - South African Tuna Longline Association (SATLA)
        - Large Pelagic Small Medium & Micro Enterprises Association (LPSMME)
        - Local fishing communities;
    - Other associations and organs of state
        - DFFE;
        - SAMSA;
        - South African Navy Hydrographic office; and
        - Overlapping and neighbouring right holders.

These stakeholders should again be notified at the completion of surveying when the survey vessel(s) is/are off location. The operator must request, in writing, that the South African Navy Hydrographic office release Radio Navigation Warnings and Notices to Mariners throughout the survey periods. The Notice to Mariners should give notice of (1) the co-ordinates of the proposed survey area, (2) an indication of the proposed timeframes of surveys and day-to-day location of the survey vessel(s), and (3) an indication of the required safety zone(s) and the proposed safe operational limits of the survey vessel. These Notices to Mariners should be distributed timeously to fishing companies and directly onto vessels where possible.

7.9.3 Heritage resources

Essential mitigation measures

- Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities.
- The contractor must be notified that archaeological sites could be exposed during sampling activities, as well as the procedure to follow should archaeological material be encountered during sampling.
- Any core sample sections which contain alluvial material, particularly where organic remains are present, are retained and are subject to paleo-environmental assessment.
- Any fossils found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in an appropriate institution.
- If shipwreck material is encountered during the course of sampling in any of the concession areas, the following mitigation measure should be applied:

- Cease work in the directly affected area to avoid damage to the wreck until the South African Heritage Resources Agency (SAHRA) has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; and
- Where possible, take photographs of them, noting the date, time, location and types of artefacts found. Under no circumstances may any artefacts be removed, destroyed or interfered on the site, unless under permit from SAHRA.

Best Practice Mitigation (Recommended)

It is recommended that the onboard Trans Atlantic representative must undergo a short induction on archaeological site and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling.

7.9.4 Cumulative impacts on the environment and community

Essential mitigation measures

Mitigation measures as recommended for each individual impact should be implemented. Furthermore, a strategic level Environmental Impact Assessment (EIA) process based on marine spatial planning principles should be conducted to assess and manage potential cumulative impacts in a holistic manner and to identify and implement further mitigation measures.

7.10 Motivation where no alternative sites were considered.

Trans Atlantic Diamonds (Pty) Ltd has applied for a right to prospect for diamonds in Sea Area Concession 11C in terms of the Mineral and Petroleum Resources Development Act, 2002, subject to environmental Authorisation. The concession holder does not have the right to prospect in any other areas. No alternatives sites were therefore considered in this Basic Assessment Process. In addition, the concession area is targeted as it is known to contain kimberlite pipes which is a source of diamonds and other mineral deposits. Please also refer to section 5.8.

7.11 Statement motivating the alternative development location within the overall site.

Areas of conservation concern will be avoided to preserve the integrity of these environments. Furthermore, reef areas will also be avoided as these are known to be hotspots for marine biodiversity. As no geophysical sampling has been conducted in this area to date, the exact position of reefs and other areas that need to be avoided have not yet been identified. The information collected during the acoustic survey will be reviewed by both the geologist and the Environmental Control Officer/ Scientific Officer to identify any areas that need to be avoided during sampling. The preferred alternative within the site is thus subject to change pending results from the geophysical survey.

7.12 Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties

Table 33 Summary of all identified impacts of prospecting in Concession Area 11C

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route)	(Including the potential impacts for cumulative impacts) (dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution)		(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)		(modify, remedy, control, or stop) through (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.) E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation.	
Planning Phase	N/A	N/A	Planning Phase – Phase 1	N/A	N/A	N/A
Stakeholder consultation	N/A	Consultation with communities	Planning Phase – Phase 1	N/A	N/A	N/A
Geophysical acoustic survey and seafloor mapping	Noise disturbance	Benthic invertebrates	Operational Phase – Phase 1	Insignificant	N/A	N/A
Geophysical acoustic survey and seafloor mapping	Noise disturbance	Fish	Operational Phase – Phase 1	Insignificant	N/A	Insignificant
Geophysical acoustic survey and seafloor mapping	Noise disturbance	Marine mammals	Operational Phase – Phase 1	Medium	• Control through noise control; • Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment; • Control through management such as through use of an independent Marine Mammal Observer;.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					Remedy through suspending activities.	
Geophysical acoustic survey and seafloor mapping	Noise disturbance	Seabirds	Operational Phase – Phase 1	Low	Same as above	Very Low
Geophysical acoustic survey and seafloor mapping	Noise disturbance	Turtles	Operational Phase – Phase 1	Insignificant	N/A	N/A
All activities including acoustic surveys, core, grab and drill sampling	Injury or death due to collision with survey vessels	Megafauna such as whales	Operational Phase – Phase 1, 2 and 3	Very Low	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment; • Control through management such as through use of an independent Marine Mammal Observer;. • Remedy through suspending activities. • Control through modifying activities such as vessel speed	Insignificant
Seabed sampling and tailings disposal	Disturbance and sediment plumes	Benthic macrofauna	Operational Phase – Phase 3	Low	• No essential or potential mitigation measures identified • Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats	N/A
Vessel and equipment operation during all activities including acoustic surveys, core, grab and drill sampling	Discharge of fine sediment plumes	Phytoplankton and consumers such as fish and invertebrates	Operational Phase – Phase 1, 2 and 3	Very Low	N/A	N/A
Vessel and equipment operation during all activities including	Waste discharges and pollution – deteriorating water quality	The marine environment and ecosystem functions	Operational Phase – Phase 1, 2 and 3	Very Low	• Management through informing staff; • Management through compliance with relevant standards and protocols;	Insignificant

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
acoustic surveys, core, grab and drill sampling					• Control and modify activities; • Stop impacts through avoidance and terminating activities; • Remedy through design measures; • Control through management such as through use of an independent Marine Mammal Observer;. • Remedy through suspending activities.	
Vessel and equipment operation during all activities including acoustic surveys, core, grab and drill sampling	Noise and physical disturbance	Fishing operations, South African fishing sectors dependent upon these resources and species targeted during fishing	Operational Phase – Phase 1, 2 and 3	Insignificant	• Control and modify activities through avoidance in terms of time and space such as undertake surveys when fishing effort is lowest; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment; • Control through management such as appointing fisheries liaison officer to facilitate communication with affected fishing sectors. • Remedy through suspending activities.	N/A
Core, drill and grab sampling	Disturbance, destruction and loss of Prehistoric Heritage Resources	Prehistoric Heritage Resources	Operational Phase – Phase 2 and 3	Very Low	• Avoidance of certain sites • Remedy through collection and preservation of samples	Very Low positive
Core, drill and grab sampling	Disturbance, destruction and loss of Maritime archaeological resources	Maritime archaeological resources, particularly historical shipwrecks	N/A	N/A	See above	N/A
Core, drill and grab sampling	Disturbance, destruction and loss of palaeontological resources	Fossils	Operational Phase – Phase 2 and 3	Very Low	See above	Very Low positive

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Vessel and equipment operation during all activities including acoustic surveys, core, grab and drill sampling	Reduction in fishing success and decline in socio-economic conditions	South African fishing sectors dependent upon these resources and local economy	Operational Phase – Phase 1, 2 and 3	Very Low	• Control and modify activities through avoidance in terms of time and space such as undertake surveys when fishing effort is lowest; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment; • Control through management such as appointing fisheries liaison officer to facilitate communication with fishing communities. • Remedy through suspending activities.	Insignificant
Prospecting activities	Increase in local economic opportunities and socio-economic values	Local communities	Operational Phase – Phase 1, 2 and 3	Insignificant positive	N/A	N/A
Prospecting activities	Increase in regional economic opportunities and socio-economic values	WCDM and South African economy	Operational Phase – Phase 1, 2 and 3	Low positive	N/A	N/A
Acoustic survey and grab samples	Positive contribution to scientific knowledge and baseline environmental data in the area	Scientific knowledge	Operational Phase — Phase 1 and 2	Low positive	N/A	N/A
Vessel operation and physical presence	Disturbance	Vessels and shipping	Operational Phase – Phase 1, 2 and 3	Insignificant	N/A	N/A
Physical presence of vessel	Decrease in visual integrity of the area	Sense of place and communities in the area	Operational Phase – Phase 1, 2 and 3	Insignificant	N/A	N/A
Prospecting activities	Negative Cumulative impacts	All individual impacts considered above	Operational Phase – Phase 1, 2 and 3	Very Low to High	• Mitigation measures as recommended for each individual impact. • A strategic level Environmental Impact Assessment (EIA) process based on marine spatial planning principles should be conducted to assess	Insignificant to Medium

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					and manage potential cumulative impacts in a holistic manner and to identify and implement further mitigation measures.	
Prospecting activities	Positive Cumulative impacts	All impacts considered above	Operational Phase – Phase 1, 2 and 3	Very Low to Medium positive	N/A	N/A

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix**

The four sampling phases will include:

- **Phase 1:**
  c) Desktop Study
  d) Geophysical Exploration
- **Phase 2:**
  c) Van Veen grab sampling
  d) Core sampling
- **Phase 3:**
  b) Drill sampling and resource estimation
- **Phase 4:**
  b) Feasibility study

i) Summary of specialist reports.

Table 34 Summary of all specialist reports completed and used informed the impact assessment and final site layout process.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Marine and Fisheries Specialist Study	• It is recommended that an MMSO be on duty during acoustic survey activities and that the listed mitigation measures (halting the survey when cetaceans if cetacean approach within close proximity to the survey vessel and using soft start procedures, etc.) are followed. • For larger migratory cetaceans, acoustic surveying should be confined to seasons when they are scarce to ensure minimal disturbance. • Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility (night-time or mist). • It is recommended that important fishing grounds be identified in consultation with stakeholders so that effective and mutually acceptable mitigation measures can be implemented during acoustic survey, prospecting and future mining phase activities. • Reefs are considered sensitive habitat and it is recommended that they be visually assessed (by means of drop camera deployments or diver surveys) during the baseline environmental survey with regular repeat surveys in the event of future mining operations in the area • Ensure compliance with relevant MARPOL standards to prevent or mitigate pollution.	X	Section 7.2.1; 7.2.2; 7.9.1; 7.9.2; 7.14; 11
Underwater Heritage Specialist Study	• Any core samples which contain alluvial material, particularly where organic remains are present, must be retained for paleoenvironmental assessment; and • Any samples of the coarser fraction (i.e. gravel and stone bigger than c. 20 mm) of sorted core sediment should be retained for assessment by an archaeologist for the presence of prehistoric lithic material.	X	Section7.2.3, 7.9.3; 7.14; 11
Socio-economic study	• Stakeholders should be consulted throughout the project life to ensure that their livelihoods and socio-economic conditions are not negatively affected. • The applicant must adhere to the conditions of their Preferential Procurement and Development policy	X	Section 7.2.4; 7.9.2; 7.14; 11

Specialist Reports are included as appendices to this BAR.

7.13 Environmental impact statement

7.13.1 Summary of the key findings of the environmental impact assessment, including the positive and negative impacts and risks of the proposed activity and identified alternatives

The potential positive and negative impacts associated with prospecting in Concession Area 11C were grouped and assessed based on the following major receptors: (1) Marine ecology and fisheries, (2) Heritage resources, (3) Socio-economic aspects, (4) Science, (5) Shipping, and (6) Visual integrity. The (7) no-go option and (8) cumulative impacts were also considered.

The assessment identified 18 potential negative impacts ranging from medium significance to insignificant and three potential positive impacts ranging from low significance to insignificant. With the implementation of effective mitigation measures, the negative impacts can all be reduced to low, very low, or insignificant. The negative impacts are associated with the disturbance of fauna (invertebrates, fish, mammals, seabirds and turtles), submerged prehistoric resources, shipping activities and fishing activities. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement. These impacts have the potential to result in the loss of environmental integrity, social values and economic opportunities. It should, however, be noted that most of these impacts were assessed to be insignificant. Marine mammals are expected to be the most significantly affected group by the prospecting activities, due to the impacts that the acoustic surveys could have on their echolocation, behaviour and critical activities such as feeding. The impact of prospecting on submerged Prehistoric Heritage and Palaeontological Resources is expected to be very low and can even yield a positive outcome if sediment samples are retained for assessment of paleoenvironmental and prehistoric lithic material. Due to the location of the concession area relative to the nearest towns and harbours (5 km offshore in addition to 40km and 50 km north of Strandfontein and Doringbaai, respectively), and low fishing effort in this area, prospecting activities are not expected to have a significant impact on fisheries and a negligible impact on the visual integrity of the area. Prospecting activities could also provide benefits in the form of regional socio-economic opportunities in addition to contributing towards scientific knowledge, specifically in terms of baseline environmental sediment, species and high-resolution bathymetry data. These benefits are, however, considered to be relatively low in the broader context.

Below follows a more detailed summary of the potential impacts identified and assessed according to each major receptor:

1) Marine ecology and fisheries

Ten potential negative impacts on the Marine environment and fisheries, ranging from medium to insignificant, were identified. With effective mitigation these can all be reduced to low, very low, or insignificant. These impacts include seismic disturbance to marine fauna; survey vessel collision with marine megafauna; direct impact of seabed excavation and tailings disposal on benthic habitats (soft sediment and reef associated communities); impact of fine sediment plumes on surrounding benthos and water column; waste discharges during vessel operations; and impacts on fisheries and the livelihoods of fishing communities due to exclusion from fishing grounds and disturbance of target fish species. The potential impact of most concern is that of seismic disturbance to marine mammals and was assessed as MEDIUM negative significance prior to mitigation. It is known that migrating

humpback, southern right whales, dusky dolphins and the near threatened Heaviside's dolphin are frequently encountered on the west coast of southern Africa. Of the proposed seismic survey activities, the Topas sub-bottom profiler system could present a risk to dusky and Heaviside's dolphins. Effective implementation of mitigation measures should ensure that potential impacts on marine mammals arising from the proposed seismic survey activities in concession 11C would be reduced to LOW significance.

The proposed sampling via coring and drilling is not expected to create significant underwater noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. Seabird collision with the vessel is not anticipated as the vessel will not be creating fish offal to attract sea birds and is not expected to create light that will be brighter or more intense than that on any other operational vessel. Potential impacts of acoustic surveys on zooplankton was scoped out of the assessment as previous studies did not find any discernible effects on zooplankton.

The limited spatial scale, temporary nature of operations (only approximately 1 month over 5 years) and low volume of any sediment plumes generated during sampling are not anticipated to have noticeable impacts on small pelagic fish recruitment. It is worth noting that much of the west coast constitutes a recruitment area for anchovies and only a tiny proportion may be impacted by the generation of turbidity plumes for a very short duration.

2) Heritage

Prospecting activities are likely to have an impact on any submerged Prehistoric Heritage, Marine Archaeological and Palaeontological Resources present within Concession area 11C. The significance of prospecting-related impacts on such material was assessed to be VERY LOW for Prehistoric Heritage and Palaeontological Resources, while impacts on the Marine Archaeological Resources were assessed to be unlikely and thus scoped out of the assessment. This is due to the fact that there is little or no potential for the presence of historical shipwrecks in the concession area. There is potential for the status of the potential impacts to be changed from negative to positive if core samples are retained for assessment of paleoenvironmental and prehistoric lithic material.

3) Socio-economic

Prospecting activities are anticipated to potentially, negatively impact several fishery sectors that operate in the area. These include potential impacts to tuna pole and line, traditional line fish, and Small Pelagic Purse Seine commercial fishing sectors. These impacts are related to the 1) temporary disturbance of marine resources; 2) exclusion of fishing vessels from the concession area 11C; and 3) the degradation of water quality. The impacts of the former two were, however, assessed to be insignificant with no mitigation measures being required. That of the latter was assessed to be of very low significance and is expected to be reduced to insignificant after the implementation of appropriate mitigation measures. Despite this very low impact rating, the poor economic performance of the coastal communities should still be taken into consideration due to their high dependence on marine resources to support their household income and livelihoods. Due to the remote and offshore location of the 11 C concession, however, local small scale and subsistence fishing communities are not

expected to be negatively impacted. Potential positive impacts from the prospecting activities include the generation of local and regional economic opportunities, although the benefits of these are expected to be insignificant and low, respectively.

4) Contribution to Science

Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. These samples will then be sent to an independent environmental consultancy for analysis to establish a baseline of environmental data. This comprises analysing sediment composition and determining the composition and abundance of benthic species in the sediment. Data collected during the acoustic survey could further be used to identify important physical features such as reefs that may be present in the area. Should artefacts, fossils or any other heritage resources be discovered during the prospecting, these will be donated to scientific institutions and can make an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The information collected during the prospecting survey will therefore contribute towards scientific and environmental knowledge and information.

5) Shipping

The majority of shipping traffic is located on the outer edge of the continental shelf, which is well offshore of the outer edge of Concession Area 11C. The impacts of prospecting activities within concession area 11C on shipping activities are therefore considered to be insignificant.

6) Impact on visual integrity of the area

This concession area is considered relatively isolated and temporary survey activities are anticipated to be inconspicuous. It is unlikely that the survey vessel will be visible from the farmers' residences or the shoreline. The vessel is also not considered to be more conspicuous than any other vessel (such as fishing vessels) already visiting the area. The entire survey phase is also expected to only take approximately one month (over the next 5 years) to complete. The vessel and activity in Concession Area C is therefore expected to have negligible impacts on the visual integrity of the area.

7) Cumulative impacts

Due to the extent of marine mining and prospecting along the South African west coast, cumulative impacts (whether positive or negative) are experienced across the regional spatial scale and are of longer duration (medium–long term). This results in an increase, by one level, in the overall significance of most impacts assessed when considered cumulatively (i.e., "medium" becomes "high"). For the purpose of assessing the cumulative impacts of prospecting within Concession area 11C, a precautionary approach was taken and an assessment of a "worst case" scenario was done for both negative and positive impacts. Therefore, we assessed the negative impact that was found to be of highest significance, i.e., the MEDIUM Significance impact of seismic surveys on marine mammals and the positive impact that was found to be of lowest significance, i.e., the INSIGNIFICANT socio-economic benefit of prospecting on the local communities of the area. The assessment of the negative cumulative impacts of marine prospecting along the west coast that were assessed as "Medium" significance would be assessed as being of "High" negative significance when considering the impact

in conjunction with other projects and their impacts. The assessment of the positive cumulative impacts of marine that was assessed as being "INSIGNIFICANT", would be assessed as being of "VERY LOW" positive significance when considering it in conjunction with other projects and their impacts. Mitigation measures as recommended for each individual impact should be implemented. An additional recommended mitigation is that an updated Strategic Environmental Impact Assessment be commissioned and undertaken to assess cumulative impacts of marine prospecting along the South African west coast with a "medium" to "high" level of confidence, and to identify and implement regional mitigation measures.

8) *No-go option*

Both positive and negative impacts area related to not continuing with the prospecting activities. These include lost opportunities in terms of collecting baseline environmental data, determining the presence of offshore mining resources and socio-economic benefits. The impacts, are, however, all considered to be of low significance. The positive implications of the no-go option, on the other hand, is that there would be no effects on the biophysical environment in the proposed area. This was also assessed to be of low significance considering the lost opportunity in terms of scientific data and economic opportunities.

7.13.2 Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers .Attach as **Appendix**

Refer to Section 5.2 as well as Figure 5-2, Figure 5-3, Figure 5-11, Figure 5-12 and Figure 13 above. The final site map and buffers will be completed pending consultation with I&APs during the Public Participation Process and results from the acoustic surveys. The current site map has been attached as Appendix 7.

7.14 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.

The nature, intensity and extent of any potential impacts that have been identified, including those issues identified by I&APs during the consultation process, have been carefully assessed and incorporated into the BAR and specifically into the EMPr. This information was used to inform management actions (an impact management plan) that will form part of the EMPr. The objectives of the impact management plan are to anticipate and avoid risks and impacts. Each prospecting activity has been considered, together with its potential impacts on the environment, fisheries, socio-economic, heritage and other resources. Through the development of the EMPr, measures have been developed to avoid environmental, social and other risks and impacts, and to provide mitigation where

possible. These mitigation measures will all be included in an impact management plan to be retained by the Environmental Control Officer (or such designated authority) who can oversee and report on the impact monitoring and mitigation measures.

The objectives of this impact management framework or the EMPr will be to:

- Provide sufficient information to strategically plan the prospecting activities so as to mitigate social, economic, heritage, environmental and other impacts.
- Provide a management plan that is effective and practical for implementation.
- Anticipate the risks and impacts of the prospecting activities through environmental monitoring and inspections.
- Create an adaptive framework for management of impacts such that unplanned events or incidents can be effectively controlled or minimised.
- The impact management plan and associated mitigation measures will be developed in adherence to international (such as UNCLOS), national and regional legal standards such as those implemented by designated authorities which include the DMRE, NEMA, and EIA regulations and guidelines.
- Through the development of the EMPr, measures will be developed to avoid environmental, social and other risks and impacts, and to provide mitigation where possible. This will then be included in the EMPr to be retained by the Environmental Control Officer (or such designated authority) who can oversee and report on the impact monitoring and mitigation measures.

To ensure the implementation of the impact management plan, the outcomes will be measured through compliance monitoring, evaluations, routine inspections and independent audits which will also be defined in the EMPr.

7.14.1 Environmental sensitivities and awareness:

- Contractor personnel and staff should undergo environmental awareness training which would include being briefed about the sensitivities pertaining to the environmental and sensitive species, archaeological, heritage, and palaeontological resources, the consequences of any damage/removal of such resources.
- A fisheries liaison officer (FLO) should be appointed to facilitate communication with affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.

7.14.2 Marine ecological resources:

- A dedicated onboard Marine Mammal and Seabird Observer (MMSO) should be employed to ensure compliance with mitigation measures during geophysical surveying.
- The vessel must be fitted with Passive Acoustic Monitoring (PAM) technology to be operated by a PAM operator, especially when surveying at night or during adverse weather conditions and thick fog and at all times over the period 1 June – 30 November;
- Restrict prospecting to water depths below 50 m and designate this region as a restricted zone.

- Grab samples collected should be analysed as soon as possible to determine the benthic macrofaunal communities in the area. Results of this monitoring should be used to inform additional mitigation measures if required. This will also establish a baseline for comparison of any future surveys and sampling.
- Reassess the potential marine impacts and mitigation measures after completion of the acoustic surveys and biological analysis as these might elucidate areas that would need to be avoided and species of conservation concern.

7.14.3 Heritage resources

- It is recommended that the onboard Trans Atlantic representative must undergo a short induction on archaeological site and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling.
- The contractor must be notified that archaeological sites could be exposed during sampling activities, as well as the procedure to follow should archaeological material be encountered during sampling.
- Any core sample sections which contain alluvial material, particularly where organic remains are present, are retained and are subject to paleo-environmental assessment.
- Any fossils found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in an appropriate institution.
- If shipwreck material is encountered during the course of sampling in any of the concession areas, the following mitigation measure should be applied:
    - Cease work in the directly affected area to avoid damage to the wreck until the South African Heritage Resources Agency (SAHRA) has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; and
    - Where possible, take photographs of them, noting the date, time, location and types of artefacts found. Under no circumstances may any artefacts be removed, destroyed or interfered with on the site, unless under permit from SAHRA.

7.14.4 Shipping

- Prior to the commencement of activities, the vessel operator must notify relevant bodies including: DMR, DEA, SAMSA, the SAN Hydrographic Office, relevant Port Captains and DAFF: MRM, providing the navigational coordinates of the survey and/or sampling areas.
- The survey and sampling vessels must be certified for seaworthiness through an appropriate internationally recognised marine certification programme (e.g. Lloyds Register, Det Norske Veritas). The certification, as well as existing safety standards, requires that safety precautions should be taken to minimise the possibility of an offshore accident. Collision prevention equipment should include radar, multi-frequency radio, foghorns, etc. Safety equipment and training of personnel to ensure the safety and survival of the crew in the event of an accident is a further legal requirement.
- A Notice to Mariners should provide the co-ordinates of the survey and/or sampling areas.

7.14.5 Socio-economic:

- Avoid designated fishing spots and undertake surveys preferably out of fishing seasons or when fishing effort is lower.
- Landowners and land occupiers should be consulted at least 1 month after the start of the survey.
- Appoint a fisheries liaison officer (FLO) to facilitate communication with potentially affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.

7.14.6 Disturbance management:

- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats
- Avoid prospecting activity surrounding the seawater intake points
- Ensure compliance with relevant MARPOL standards;
- Develop a waste management plan using waste hierarchy.

7.14.7 Waste management and water pollution:

- Contractor personnel and staff should undergo waste management and spill management training.
- A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations.
- Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm).
- All process areas should be bunded to ensure drainage water flows into the closed drainage system.
- Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system.
- Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages.
- All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected.
- A water quality monitoring system should be developed and implemented

7.15 Aspects for inclusion as conditions of Authorisation.

(Any aspects which must be made conditions of the Environmental Authorisation)

It is the opinion of the EAP that the following conditions should form part of the authorisation:

- The information collected during the acoustic survey must be reviewed by both the geologist and the Environmental Control Officer and results reviewed by an independent specialist, to identify any areas that need to be avoided before commencement of sampling.
- Baseline grab samples should be collected before core samples to determine the nature of benthic communities before disturbance.
- Grab samples should be analysed as soon as possible after collection to determine the benthic macrofaunal communities in the area. These results should be used to inform additional mitigation measures should unacceptable negative impacts be anticipated. This monitoring will also establish a baseline for comparison of any future surveys and sampling.
- Potential marine impacts should be reassessed after completion of the acoustic surveys and biological analysis, as these might elucidate areas that would need to be avoided and species of conservation concern.
- Affected stakeholders should be consulted at least 1 month before the start of the survey.
- A map detailing sampling locations should be provided to the affected stakeholder as well as the DMRE prior to commencement of prospecting activity.
- All environmental legislation must be complied with. Specific aspects to be adhered to from environmental legislation include National Environmental Management Act, Act 107 of 1998 (NEMA), Minerals and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA).
- All mitigation measures outlined in the BAR and any that might come to light before, during or after any prospecting phase, including information obtained following acoustic and benthic grab sampling, or due to new regulations or scientific information becoming available, must be implemented by the applicant and adhered to.

8 GENERAL INFO PERTAINING TO THE BAR, PROSPECTING ACTIVITIES AND ENVIRONMENTAL AUTHORISATION

8.1 Description of assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

- It is assumed that all relevant project description information has been provided by Trans Atlantic Diamonds and that all information provided is correct.
- There is currently no high-resolution bathymetry data available for Concession area 11C. Information pertaining to the geology, bathymetry and topography of the area is therefore based on a desktop approach and drawn from what is available for the surrounding areas. This information might therefore change pending the results of the acoustic surveys. After completion of the survey, information should be reviewed to determine if the EMPr is still valid.
- Due to the paucity of bathymetry data for this concession area, the exact location of the grab, core and drill samples are yet to be determined, pending the results of the acoustic surveys.
- It is assumed that the project description and activities will not change after the completion of this report.

8.2 Reasoned opinion as to whether the proposed activity should or should not be authorised

8.2.1 Reasons why the activity should be authorized or not.

The EAP recommends that Environmental Authorisation for prospecting rights within sea Concession area 11C be granted to the applicant, on condition that mitigation measures be implemented and adhered to. This is because the significance of potential negative impacts due to prospecting in this area was assessed to be of low significance to negligible with the implementation of mitigation measures. The EAP also strongly recommends that the DMRE commissions an updated Strategic Environmental Impact Assessment to better understand and manage cumulative impacts of marine and coastal mining along the South African West Coast.

8.2.2 Conditions that must be included in the authorisation

See section 7.15 above

8.3 Period for which the Environmental Authorisation is required.

The proposed activity is set to take place seasonally during a two-month time period and reasonable sea conditions over a three to five-year prospecting period. This will largely be influenced by the data and findings collected during initial phase of the proposed prospecting activities. The authorisation is

thus required for five years plus a potential to extend the right by an additional three years, although this extension is unlikely to be necessary

8.4 Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.

An undertaking is provided at the end of this report. See section 12.

9 FINANCIAL PROVISION

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

Approximately R16,787,220 is available to complete surveying, sampling and feasibility study. An additional R300,000.00 for rehabilitation monitoring after the prospecting, R1,460 400 to implement the EMPr and R1 460 400 for emergencies and remediation.

Guarantees from banks and investors have been issued to the DMRE as part of the Prospecting Work Programme that formed part of the Application. This confirms the availability of sufficient funds to undertake the prospecting activities, the decommissioning and closure of the operations; and the potential undertaking of the remediation of any negative environmental impacts which may become known. The applicant is also committed to ensure the prevention of pollution and environmental degradation as referred to in section 24(b)(ii) of the Constitution.

9.1 Explain how the aforesaid amount was derived.

This amount was derived based on market research, quotations and information from other similar surveys.

Table 35 A cost estimate of the expenditure to be incurred for each phase of the proposed prospecting operation.

PHASE	ACTIVITY	Cost USD ($)	Cost ZAR (R)
GEOPHYSICAL OPERATIONS – DP Star			
PHASE 1 -	Acoustic survey: Survey data acquisition Phase 1	90,000	
	Data interpretation by geological team	7,200	
	Sub-total	**97,200**	**1,479,345.12**
PHASE 2	Survey data acquisition Phase 2	135,000	
	Data interpretation by geological team	10,800	
	Sub-total	**145,800**	**2,219,017.68**
	Survey deliverables (footwall DEM, SedT, contours, maps)	6,000	91,317.60
DRILL SAMPLING OPERATIONS – The Explorer			
PHASE 3	Sampling Planning	6,000	
	Sampling Execution	835,000	
	Sub-total	**841,000**	**12,799,683.60**
MINING FEASIBILITY STUDY REPORT			
PHASE 4	Cost of competent person (Geologist)	13,000	197,854.80
TOTAL COST		**1,103,000.00**	**16,787,218.80**

Table 36 **Potential costs related to the implementation of the EMPR, rehabilitation monitoring and in the event of an emergency.**

REMEDIATION FINANCIAL PLAN		
ACTIVITY	**TASK**	**TOTAL COST**
ANNUAL REHABILITATION SURVEY TOTAL		**R300,000.00**
Microbiological monitoring	Analysis and write-up	R40,000.00
Water quality monitoring	Collection of samples analysis	R40,000.00
	Analysis and write-up	
Sediment quality monitoring	Sample collection	R60,000.00
	Laboratory analysis	
	Write-up	
Annual biophysical monitoring	Benthic macrofauna & Fish	R100,000.00
	Sample collection	
	Laboratory analysis	
	Write-up	
Impact assessment	Analysis	R60,000.00

COSTS TO MEET EMPR REQUIREMENTS		
ACTIVITY	**TASK**	**TOTAL COST**
TOTAL COSTS		**R1 460 400**
Vessel safety	Prospecting vessel maintain adequate Protection and Indemnity (P&I) Insurance Cover to allow for clean-ups in the event of a hydrocarbon spill and other eventualities;	R500 000
Training	Environmental awareness training & induction for archaeological heritage	R50 000
Pollution control and waste management	Appointing contractor	R120 000
Auditing and compliance	Appoint independent ECO auditor	R220 000
	Appoint internal auditor	
	Internal audits at the end of each survey/sampling campaign	
Stakeholder consultation	Appointing a FLO to consult with stakeholders and communities	R50 000
Baseline surveys	Analysis of baseline sediment samples and reporting	R140 000
Protection of marine megafauna	Appointment of MMSOs' and PAM operators. PAM equipment hiring	R380 400

EMERGENCY RESPONSES		
TOTAL COSTS		**R1 246 000.00**

Preparation for any emergency that could result in an environmental impact (oil spill/vessel collision)	Emergency services required (eg. Dedicated oil clean-up vessel)	R500 000
	Implementation of Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL	
	Implementation of Emergency Response Plan (including MEDIVAC plan)	
	Implementation of Waste Management Plan as required by MARPOL (see contents in Section 4.3.7).	
	NSRI Rescue	
	Use of helicopters for emergency services	
Equipment loss	Retrieval of equipment	R50 000
Premature prospecting closure	Apply for closure to the DMRE: A final layout plan; A Closure Plan (if required); An Environmental Risk Report; A application form to transfer environmental responsibilities and liabilities	R100 000
Physical harm to Marine mammals	Emergency services required	R96 000
Impact of sampling operations	Natural rehabilation of seabed	R0
Emergency Impact survey	Sample collection	R300 000
	Analysis and Write-up	
	Compilation of report	
Reimbursement for damages		R200 000

CONTINGENCIES		**R100 000**
TOTAL COSTS		**R1 246 000.00**

9.2 Confirm that this amount can be provided for from operating expenditure.

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

Funding will be provided though Trans Atlantic Diamonds (Pty) Ltd. The company is affiliated with more than one Financial Institution. They are financially in good standing and have more than the budgeted amount available to conduct the prospecting activities. Should further information be required, these will be provided upon request. Supporting documents and Proof of Funds have been uploaded as part of the Work Programme on the SAMRAD system.

10 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

10.1 Compliance with the provisions of

(sections 24(4)(a) & (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act, the EIA report must include the):

10.1.1 Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix** .

Please refer to section 7 regarding the assessment of the socio-economic conditions of the communities. A socio-economic statement has also been attached as Appendix 5.

10.1.2 Impact on any national estate referred to in section 3(2) of the National

Heritage Resources Act. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The Heritage Impact Assessment Report has been attached as Appendix 4. The applicable mitigation measures have been included in the relevant sections.

Prospecting activities could potentially have an impact on submerged Prehistoric Heritage, Marine Archaeological and Palaeontological Resources present within Concession area 11C. The significance of prospecting-related impacts on such material was assessed to be very low for Prehistoric Heritage and Palaeontological Resources, while that on the Marine Archaeological Resources were assessed to be unlikely and thus scoped out of the assessment. This is due to the fact that there is little or no potential for the presence of historical shipwrecks in the concession area. There is potential for the status of the potential impacts to be changed from negative to positive if core samples are retained for assessment of paleoenvironmental and prehistoric lithic material.

Impacts of seabed coring – Prehistoric Resources

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Possible	VERY LOW	-ve	Low
Essential Mitigation Measures: • Core sample sections which contain alluvial material, particularly where organic remains are present, are retained and subject for paleoenvironmental assessment. This could offset any potential impacts.								
With mitigation	1	1	3	5	Possible	VERY LOW	+ve	Low

Impacts of seabed coring – Palaeontology

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Negligible (Low) 1	Long-term (Irreversible) 3	Low 5	Possible	VERY LOW	-ve	Low
Essential Mitigation Measures: • Any fossils found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in a an appropriate institution; • The possible detailed study and dating of a set of cores, possibly as a B.Sc. Honours or M.Sc. project should be considered.								
With mitigation	1	1	3	5	Possible	VERY LOW	+ve	Low

No Impacts on Maritime Archaeology Resources are anticipated, and this assessment was thus scoped out of the assessment.

10.2 Other matters required in terms of sections 24(4)(a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4)**.

A motivation has been attached as Appendix 8.

ENVIRONMENTAL MANAGEMENT PROGRAMME

Please note that the Environmental Management Programme (EMPr) for this project was prepared as a separate standalone document and was made available to stakeholders with the Final BAR and Appendices. The information presented below is a summary of this EMPr and should not be considered the Official document for implementation. Please refer to the Document: "Basic Assessment Process for the proposed prospecting in Sea Concession Area 11CA by Trans Atlantic Diamonds (Pty) Ltd. Part B: Environmental Management Programme" for the Official EMPr.

11 SUMMARY ENVIRONMENTAL MANAGEMENT PROGRAMME

11.1 Details of the EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required)

It is confirmed that the details of the EAP is included in Part A. The EAPs CV has also been attached as Appendix 1.

11.2 Description of the Aspects of the Activity.

(Confirm that the requirement to describe the aspects of the activity that are covered by the environmental management programme is already included in PART A, section (1)(h) herein as required)

It is confirmed that the aspects of the activity are included in Part A of this report.

11.3 Composite Map

(Provide a map (Attached as an Appendix 7) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

Refer to Section 5.2 as well as Figure 5-2, Figure 5-3, Figure 5-11, Figure 5-12 and Figure 13 above. The final site map and buffers will be completed pending results from the acoustic surveys.

11.4 Description of Impact management objectives including management statements

11.4.1 Determination of closure objectives.

(ensure that the closure objectives are informed by the type of environment described)

- The survey vessel will leave the area.
- The stakeholders will be informed of the closure of the project.

- Any waste on the ship will be disposed of in a responsible manner.
- A feasibility study will be conducted to determine the feasibility of mining in Concession 11C.
- The impacts from grab and core sampling are expected to be virtually negligible although the impacts from drill sampling are expected to be more extensive. Recolonisation by benthic biota is, however, possible. Considering the available area of similar habitat on the West Coast, the reduction in benthic biodiversity can be considered negligible. Full recovery is expected to take place within the short to medium term (i.e. 5 – 10 years). No direct mitigation is considered necessary, although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented. Important drivers of habitat recovery are related to the exposure to dynamic physical processes such as currents and sediment refill.
- On completion of the prospecting activities, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE.

11.4.2 Volumes and rate of water use required for the operation.

No water use is required as this is an offshore application

11.4.3 Has a water use licence has been applied for?

No. As this is an offshore application, no water will be required and a such a water use licence is not required.

11.4.4 Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

Table 37 Summary of the activities, impacts, mitigation measures and how these will comply with environmental management standards.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route)	(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	(Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc)		(modify, remedy, control, or stop) through (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc). E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation.		
Planning and design Phase	Planning Phase – Phase 1	N/A	164 023 ha	N/A	N/A	Prior to commencement of operation
Desktop study and literature review	Planning Phase – Phase 1	N/A	164 023 ha	N/A	N/A	Prior to commencement of operation
Stakeholder consultation	Planning, Operational and Closure Phase – Phase 1	N/A	N/A	N/A	N/A	Prior to commencement of operation and throughout the entire process
Geophysical acoustic survey	Operational Phase – Phase 1	Noise disturbance impacting marine fauna	164 023 ha	• Activity must be restricted to specific areas or a time of year • Sound containment and improvement of current equipment used must be implemented • Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered • Implement “soft-starts” of at least 20 minutes duration. • Employ on board independent observer(s) / MMSO(s) with experience in seabird, turtle and marine mammal identification and observation techniques to carry out daylight observations.	N/A	Approximately five days. . Should be completed within four months after the start of the programme.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
				• Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility. Utilise PAM technology when surveying at night or during adverse weather conditions and thick fog (commonly encountered on the west coast of South Africa). • Record marine mammal incidences and responses to acoustic survey activity, including data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns) along with noise levels. • Terminate acoustic survey if mass mortalities of fish are observed. • If spotted wait until all marine megafauna (seabirds, seals, cetaceans and turtles) have cleared an area of 500 m radius of the centre of the sound source before resuming with acoustic survey (initiate soft start procedure when resuming acoustic survey). • Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to acoustic survey activity. • Suspend operations if any obvious mortalities or injuries to marine life are observed. • Wait until all small cetaceans (<3 m in overall length) have cleared an area of 500 m radius of the survey vessel before resuming with acoustic survey. If, after a period of 30 minutes, small cetaceans are still within 500 m of the vessel, the normal “soft start” procedure should be allowed to commence for at least 20-minutes duration. Small cetacean behaviour during “soft starts” shall be monitored.		

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
				• Record seabird incidences and behaviour, including any attraction of predatory seabirds and incidents of feeding behaviour around the survey vessel. • Ensure that MMOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities. • Make marine mammal incidence data and sound source output data from surveys available on request to the Marine Mammal Institute (MMI), DAFF and DMR.		
Geological modelling	Operational Phase – Phase 1	N/A	164 023 ha	N/A	N/A	Directly after the acoustic survey.
Vessel operation	Operational Phase – Phase 1, 2 and 3	Injury or death of Megafauna such as whales due to collision with survey vessels	164 023 ha	• A designated onboard Marine Mammal Observer (MMO) and vessel operator to keep watch for marine megafauna in the path of the vessel during geophysical surveying. • Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility. • Avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations • Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity	Standard vessel operation procedures	Throughout sampling activities
Grab sampling	Operational Phase – Phase 1	Disturbance, destruction and loss of Prehistoric, Maritime	Each grab has a total volume of 0.03 m^3 and is anticipated to	• An onboard Trans Atlantic Diamonds representative must undergo a short induction on heritage and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling.	Heritage Act; NEMA; EIA Regulations	• Approximately 2 to five days.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
		and Heritage Resources	disturb an area covering approximately 0.1 m^2. The total volume of sediment that will be collected by the 50 grab samples is estimated at 1.5 m^3, while the total surface area that will be disturbed is estimated to be 5 m^2 over the area of 164 023 ha	• Any core samples are retained and subjected to assessment. • If artefacts are found during the course of sampling in any of the concession areas, the following mitigation measure should be applied: • Cease work in the directly affected area to avoid damage until SAHRA has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; • Take photographs, noting the date, time, location and types of artefacts found. • Do not remove, disturb or, destroy the artefacts or site • Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities		
Core sampling	Operational Phase – Phase 2	Disturbance, destruction and loss of Prehistoric, Maritime and Heritage Resources	Each core collects approximately 0.024 m^3 of sediment and will disturb a total surface area of 0.00785 m^2. The total volume of samples that will be collected by 200 cores is	Same as above	Heritage Act; NEMA; EIA Regulations	Approximately 10 to 20 days and within six months after the acoustic surveys and grab sampling have been completed.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
			estimated at 4.8 m^3, while the total surface area that will be disturbed is estimated to be 1.57 m^2 over the area of 164 023 ha.			
Drill sampling	Operational Phase – Phase 3	Disturbance, destruction and loss of Prehistoric, Maritime and Heritage Resources	Sample volumes are anticipated to be in the range of 9 to 15 m^3 per sample. An estimated total of 300 samples spaced at roughly 300 m apart from north to south will be required. A total surface area of approximately 1500m^2 (or 0.15 ha) is estimated to be disturbed across the entire concession area of 164 023 ha.	Same as above	Heritage Act; NEMA; EIA Regulations	Approximately 50 days and within six months after the core sampling have been completed.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
Grab sampling	Operational Phase – Phase 1	Disturbance of marine fauna due to physical activities and sediment plumes	Each grab has a total volume of 0.03 m^3 and is anticipated to disturb an area covering approximately 0.1 m^2. The total volume of sediment that will be collected by the 50 grab samples is estimated at 1.5 m^3, while the total surface area that will be disturbed is estimated to be 5 m^2 over the area of 164 023 ha	• Avoid reef and sensitive habitats	NEMA; EIA Regulations	Approximately 5 days.
Core sampling	Operational Phase – Phase 2	Disturbance of marine fauna due to physical activities and sediment plumes	Each core collects approximately 0.024 m^3 of sediment and will disturb a total surface area of 0.00785 m^2. The total	• Avoid reef and sensitive habitats	NEMA; EIA Regulations	Approximately 10 – 20 days and within six months after the acoustic surveys and grab sampling have been completed.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
			volume of samples that will be collected by 200 cores is estimated at 4.8 m^3, while the total surface area that will be disturbed is estimated to be 1.57 m^2 over the area of 164 023 ha.			
Drill sampling	Operational Phase – Phase 3	Disturbance of marine fauna due to physical activities and sediment plumes	Sample volumes are anticipated to be in the range of 9 to 15 m^3 per sample. An estimated total of 300 samples spaced at roughly 300 m apart from north to south will be required. A total surface area of approximately 1500m^2 (or 0.15 ha) is estimated to be disturbed	• Avoid reef and sensitive habitats	NEMA; EIA Regulations	Approximately 50 days and within six months after the core sampling have been completed.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
			across the entire concession area of 164 023 ha.			
Tailings disposal	Operational Phase – Phase 3	Disturbance of benthic macrofauna and due to physical activity and sediment plumes	A designated area should be assigned to dispose of tailings to ensure that sensitive habitats area avoided	• No essential or potential mitigation measures identified **Best Practice:** • Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats.	N/A	• During the drill sampling activities
Waste discharges	Operational Phase – Phase 1, 2 and 3	Waste discharges and pollution, deteriorating water quality and disturbance	Waste should not be disposed of in the sea.	• Inform & empower all staff about sensitive marine species & suitable disposal of waste; • Ensure compliance with relevant MARPOL standards; • Develop a waste management plan using waste hierarchy; • A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations; • Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm); • All process areas should be bunded to ensure drainage water flows into the closed drainage system; • Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system; • Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages;	Adherence to South African Water Quality Guidelines and MARPOL	• While the vessel is operating in the concession area.

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
				• All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and • Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks		
Vessel operation and physical presence	Operational Phase – Phase 1, 2 and 3	Disturbance to vessels and shipping	164 023 ha	Key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof: • A Marine Linefish Management Association (SAMLMA); • South African Pelagic Fishing Industry Association (SAPFIA); • South African Tuna Association (SATA); • South African Tuna Longline Association (SATLA) • Large Pelagic Small Medium & Micro Enterprises Association (LPSMME) • Local fishing communities; • DFFE; • SAMSA; • South African Navy Hydrographic office; and • Overlapping and neighbouring right holders	N/A	Throughout sampling activities
Vessel and equipment operation during all activities	Operational Phase – Phase 1, 2 and 3	Reduction in fishing success and decline in socio-economic conditions community fishing sectors dependent upon these resources.	164 023 ha	• Avoid designated fishing grounds and undertake surveys preferably out of fishing seasons or when fishing effort is lower • Continuous consultation with stakeholders • Appoint a fisheries liaison officer (FLO) to facilitate communication with potentially affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area • Best practice:	N/A	Throughout sampling activities

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
				• Key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof: • SA Marine Linefish Management Association (SAMLMA); • South African Pelagic Fishing Industry Association (SAPFIA); • South African Tuna Association (SATA); • South African Tuna Longline Association (SATLA) • Large Pelagic Small Medium & Micro Enterprises Association (LPSMME) • Local fishing communities; • DFFE; • SAMSA; • South African Navy Hydrographic office; and • Overlapping and neighbouring right holders		
Physical presence of the vessel	Operational Phase – Phase 1, 2 and 3	Visual impact potentially decreasing sense of place	N/A	• No essential or potential mitigation measures deemed necessary	N/A	Throughout sampling activities
Data acquisition and synthesis	N/A	N/A	164 023 ha	N/A	N/A	Approximately three months
Feasibility study and resource estimation	N/A	N/A	164 023 ha	N/A	N/A	Approximately six months
Decommissioning and Closure	Decommissioning Phase	N/A	N/A	N/A	NEMA and the EIA regulations. On completion of	Where the throughput of the activity has reduced by 90% or more over a period of 5 years

NAME OF ACTIVITY	PHASE IN WHICH IMPACT IS ANTICIPATED	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION MEASURE	COMPLIANCE	TIME
					the prospecting activities, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE.	
Rehabilitation	N/A	N/A	N/A	Recolonisation of the habitat is possible and recovery is expected to take place within the short to medium term (i.e. 5 – 10 years). No direct mitigation is considered necessary, although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented	N/A	N/A

11.5 Impact Management Outcomes

Table 38 A description of impact management outcomes.

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air Pollution, etc)		In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, postclosure	(modify, remedy, control, or stop) through (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) •Modify through alternative method. •Control through noise control •Control through management and monitoring •Remedy through rehabilitation..	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Planning and design Phase	N/A	N/A	Planning Phase – Phase 1	N/A	Avoiding impacts
Desktop study and literature review	N/A		Planning Phase – Phase 1	N/A	Avoiding impacts
Stakeholder consultation	N/A	Local communities	Planning, Operational and Closure Phase	• Management	Avoiding and mitigating impacts. NEMA; EIA Regulations
Geophysical acoustic survey	Noise disturbance impacting marine fauna	Fish, Marine mammals, Marine mammals, Turtles	Operational Phase – Phase 1	• Control through noise control; • Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities;	Limit noise levels Limit impacts, injury or death to animals; SANS 10103

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				• Remedy through design measures and noise control of survey equipment; • Control through management such as through use of an independent Marine Mammal Observer; • Remedy through suspending activities.	
Geological modelling	N/A	N/A	Operational Phase – Phase 1	N/A	To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites
Vessel operation	Injury or death of Megafauna such as whales due to collision with survey vessels	Megafauna such as whales	Operational Phase – Phase 1, 2 and 3	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Control through management such as through use of an independent Marine Mammal Observer;. • Control through modifying activities such as vessel speed	Avoiding impacts such as injury or death to animals and damage to vessels

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Grab sampling	Disturbance of marine fauna due to physical activities and sediment plumes	Benthic macrofauna	Operational Phase – Phase 1	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Remedy through suspending activities.	Limit impacts and disturbance;
Core sampling	Disturbance of marine fauna due to physical activities and sediment plumes	Benthic macrofauna	Operational Phase – Phase 2	See above	Limit impacts and disturbance
Drill sampling	Disturbance of marine fauna due to physical activities and sediment plumes	Benthic macrofauna	Operational Phase – Phase 3	See above	Limit impacts and disturbance; Listing Notice 1
Grab, core and drill sampling	Destruction and loss of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks	Prehistoric Heritage, palaeontological (fossils) and Maritime archaeological resources, particularly historical shipwrecks	Operational Phase – Phase 2 and 3	• Avoidance of certain sites Remedy through collection and preservation of samples	Limit impacts and destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources; Heritage Act
Tailings disposal	Disturbance of benthic macrofauna and due to physical activity and sediment plumes	Phytoplankton and consumers such as fish and invertebrates	Operational Phase – Phase 3	No essential or potential mitigation measures identified **Best Practice:** Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats	To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Waste discharges	Waste discharges and pollution, deteriorating water quality and disturbance	The marine environment and ecosystem functions	Operational Phase – Phase 1, 2 and 3	• Management through informing staff; • Management through compliance with relevant waste standards and protocols; • Control and modify activities; • Stop impacts through avoidance and terminating activities; • Remedy through design measures;.	Limit impacts; limit waste through management; NEM:WA. Adherence to South African Water Quality Guidelines and MARPOL
Vessel operation and physical presence	Disturbance to vessels, shipping activities and fishing activities	Vessels and shipping	Operational Phase – Phase 1, 2 and 3	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment; • Control through management • Remedy through suspending activities.	Limit disturbance
Physical presence of vessel	Visual impact	Visual integrity and sense of place	Operational Phase – Phase 1, 2 and 3	NA	N/A

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Vessel and equipment operation during all activities	Reduction in fishing success and decline in socio-economic conditions of Local fishing communities dependent upon these resources and local economy	Species targeted during fishing, fishing operations and local fishing communities dependent upon these resources	Operational Phase – Phase 1, 2 and 3	See above	NEMA; EIA Regulations; Limit disturbance and impact on local communities
Grab, core and drill sampling	Destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks	Prehistoric Heritage, palaeontological (fossils) and Maritime archaeological resources, particularly historical shipwrecks	Operational Phase – Phase 1, 2 and 3	• Avoidance of certain sites • Remedy through collection and preservation of samples	Limit destruction of resources. Preservation of resources
Data acquisition and synthesis	N/A	N/A	Operational Phase – Phase 4	N/A	N/A
Feasibility study and resource estimation	N/A	N/A	Operational Phase – Phase 4	N/A	N/A
Decommissioning and Closure	N/A	N/A	Decommissioning Phase	N/A	Closure certificate; NEMA
Rehabilitation	N/A	N/A	Decommissioning Phase	N/A.	N/A

11.6 Impact Management Actions

Table 39 A description of impact management actions, identifying the manner in which the impact management objectives and outcomes will be achieved.

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) •Modify through alternative method. •Control through noise control •Control through management and monitoring •Remedy through rehabilitation.	Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Planning and design Phase	N/A	N/A	Prior to commencement	Avoiding impacts
Desktop study and literature review	N/A	N/A	Prior to commencement	Avoiding impacts
Stakeholder consultation	N/A	Management	Prior to commencement of operation and throughout the entire process	Avoiding and mitigating impacts. NEMA; EIA Regulations
Geophysical acoustic survey	Noise disturbance impacting marine fauna	• Control through noise control; • Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment;	Throughout the acoustic survey operation	Limit noise levels Limit impacts, injury or death to animals; SANS 10103

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		• Control through management such as through use of an independent Marine Mammal Observer;. Remedy through suspending activities.		
Geological modelling	N/A	N/A	After the modelling, sites for drilling and sites for avoidance should be selected	To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites
Vessel operation	Injury or death of Megafauna such as whales due to collision with survey vessels	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Control through management such as through use of an independent Marine Mammal Observer;. Control through modifying activities such as vessel speed	Throughout the entire prospecting survey during which the vessel is being operated	Avoiding impacts such as injury or death to animals and damage to vessels
Grab sampling	Disturbance of marine fauna due to physical activities and sediment plumes	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; Remedy through suspending activities.	During grab sampling	Limit impacts and disturbance;
Core sampling	Disturbance of marine fauna due to physical activities and sediment plumes	See above	During core sampling	Limit impacts and disturbance

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Drill sampling	Disturbance of marine fauna due to physical activities and sediment plumes	See above	During drill sampling	Limit impacts and disturbance; Listing Notice 1
Grab, core and drill sampling	Destruction and loss of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks	• Avoidance of certain sites Remedy through collection and preservation of samples	Before sampling commences and during	Limit impacts and destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources; Preservation of resources Heritage Act
Tailings disposal	Disturbance of benthic macrofauna and due to physical activity and sediment plumes	No essential or potential mitigation measures identified **Best Practice:** Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats	During the planning phase	To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites
Waste discharges	Waste discharges and pollution, deteriorating water quality and disturbance	• Management through informing staff; • Management through compliance with relevant waste standards and protocols; • Control and modify activities; • Stop impacts through avoidance and terminating activities; Remedy through design measures;.	Throughout the entire prospecting operation	Limit impacts; limit waste through management; NEM:WA

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Vessel operation and physical presence	Disturbance to vessels, shipping activities and fishing activities	• Control and modify activities through avoidance in terms of time and space; • Stop impacts through avoidance and terminating activities; • Remedy through design measures and noise control of survey equipment; • Control through management Remedy through suspending activities.	Throughout the entire prospecting survey during which the vessel is being operated	Limit disturbance
Physical vessel presence	Impact on visual integrity and sense of place	N/A	N/A	N/A
Vessel and equipment operation during all activities	Reduction in fishing success and decline in socio-economic conditions of Local fishing communities dependent upon these resources and local economy	See above	Planning phase and operational phase	NEMA; EIA Regulations; Limit disturbance and impact on local communities
Data acquisition and synthesis	N/A	N/A	N/A	N/A
Feasibility study and resource estimation	N/A	N/A	N/A	N/A
Decommissioning and Closure	N/A	N/A	Upon the cessation of prospecting	Closure certificate; NEMA
Rehabilitation	N/A	N/A.	N/A	N/A

11.7 Financial Provision

11.7.1 Determination of the amount of Financial Provision.

a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The impacts from grab and core sampling are expected to be virtually negligible although the impacts from drill sampling are expected to be more extensive. Recolonisation by benthic biota is, however, possible. Considering the available area of similar habitat on the West Coast, the reduction in benthic biodiversity can be considered negligible. Full recovery is expected to take place within the short to medium term (i.e. 5–10 years). No direct mitigation is considered necessary, although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented Important drivers of habitat recovery are related to the exposure to dynamic physical processes such as currents and sediment refill.

On completion of the prospecting activities, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE.

Trans Atlantic Diamonds (Pty) Ltd is affiliated with more than one Financial Institution and is financially in good standing. Guarantees from banks and investors have been issued to the DMRE as part of the Prospecting Work Programme that formed part of the Application. This confirms the availability of sufficient funds to undertake the prospecting activities, the decommissioning and closure of the operations; and the potential undertaking of the remediation of any negative environmental impacts which may become known. The applicant is also committed to ensure the prevention of pollution and environmental degradation as referred to in section 24(b)(ii) of the Constitution.

b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

This has been discussed with I&APs during the Public Participation Period.

c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

No direct mitigation or rehabilitation is considered necessary although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented. Approximately R300,000.00 has been set aside for rehabilitation monitoring after the prospecting, R1,460 400 to implement the EMPr and R1 460 400 for emergencies and remediation. See Table 36 for a list of potential activities that could form part of rehabilitation/ remediation.

d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

It is generally accepted that no rehabilitation is deemed necessary within the marine environment as habitat recovery occurs naturally due to the dynamic physical processes such as currents and sediment refill.

e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

No rehabilitation is expected, but should the remediation of any negative environmental impacts or damages become necessary, there is sufficient funds available for this.

f) Confirm that the financial provision will be provided as determined.

Trans Atlantic Diamonds (Pty) Ltd is affiliated with more than one Financial Institution and is financially in good standing. Guarantees from banks and investors have been issued to the DMRE as part of the Prospecting Work Programme that formed part of the Application. This confirms the availability of sufficient funds to undertake the prospecting activities, the decommissioning and closure of the operations; and the potential undertaking of the remediation of any negative environmental impacts which may become known. The applicant is also committed to ensure the prevention of pollution and environmental degradation as referred to in section 24(b)(ii) of the Constitution.

11.8 Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

g) Monitoring of Impact Management Actions
h) Monitoring and reporting frequency
i) Responsible persons
j) Time period for implementing impact management actions
k) Mechanism for monitoring compliance

Table 40 Mechanisms for monitoring compliance with and performance assessment against the EMPr.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All prospecting activities	See below	Ensure that the Prospecting Work Programme, mitigation measures and conditions as set out in the EMPr, are being adhered to.	See below	Submit an annual prospecting progress report to DMRE. Undertake and submit an environmental performance audit every two years to DMRE.
Geophysical acoustic survey	Noise	Ensure that the Prospecting Work Programme, mitigation measures and conditions as set out in the EMPr, are being adhered to.	Geologist. Marine Mammal Observer (MMO); Environmental Control Officer; On-board Scientific Officer	Impact management actions should be implemented at all times during the activities or as per the EMPr. An environmental performance audit report should be submitted to the DMRE annually. Auditing should be done by an internal auditor (Scientific officer) on a monthly basis and by an independent external Environmental Control Officer (ECO) annually.
Vessel operation	Collision causing injury or death of Megafauna	See above	MMO, On-board Scientific Office, Captain	See above

Grab sampling, core and drill sampling	Disturbance of marine fauna	See above	MMO, Geologist; Scientific Office	See above
Grab sampling, core and drill sampling	Sediment plumes	See above	Geologist; Scientific Office	See above
Grab, core and drill sampling	Destruction and loss of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks	See above	Geologist and trained Trans Atlantic Diamonds heritage representative	See above
Tailings disposal	Disturbance and destruction	See above	Geologist, Scientific Office	See above
Waste discharges	Waste discharges and pollution, deteriorating water quality	See above & Implementation of effective waste management	Scientific Office	See above
Vessel operation and physical presence	Disturbance to vessels	See above	Captain	See above
Vessel and equipment operation during all activities	Reduction in fishing success and decline in socio-economic conditions	See above & Ensure stakeholders and regularly consulted and implement a stakeholder complaints register.	Fishing Liaison Officer, Scientific Officer	See above

l) Indicate the frequency of the submission of the performance assessment/ environmental audit report.

An environmental performance audit report should be submitted to the DMRE annually. Auditing should be done by an internal auditor (Scientific officer) on a monthly basis and by an independent external Environmental Control Officer (ECO) annually.

m) Environmental Awareness Plan

1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Trans Atlantic Diamonds will have an induction process which will include, but is not limited to:

- Job specific training to ensure that staff can perform tasks;
- Health and safety training;
- Environmental awareness training for contractors and employees which will cover the risks and mitigation measures as set out in the EMPr;

2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

This will be covered during the Environmental awareness training and will also be included in the EMPr.

n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

Financial provision will be reviewed annually.

12 UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports;	✔
b) the inclusion of comments and inputs from stakeholders and I&APs;	✔
c) the inclusion of inputs and recommendations from the specialist reports where relevant; and	✔
d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein.	✔

Signature of the environmental assessment practitioner:

Anchor Environmental Consultants Pty Ltd

Name of company:

14 February 2022

Date:

-END-

13 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

13.1 Public Participation Process

The public participation process was an integrated process that engaged Interested and Affected Parties (I&APs) for the duration of the project. The following steps were undertaken as part of the public participation process:

13.1.1 Identification of Stakeholders

Potential I&APs for the towns of Doringbaai, Lutzville, Papendorp, Koekenaap, Ebenhaeser, Standfontein and Lambertsbaai were identified through the use of existing I&AP databases and by contacting various government departments, community representatives, fisheries trusts, etc. The DFFE also suggested that we liaise with the communities through the community representatives in these towns. The representatives were provided with the project details and information and asked to distribute it amongst the community members.
See Appendix 9 for an example of one of the many email requests that were sent out.

The following I&APs were considered:

(i) Host Communities
(ii) Landowners (Traditional and Title Deed owners)
(iii) Traditional Authority
(iv) Land Claimants
(v) Lawful land occupier
(vi) The Department of Land Affairs,
(vii) Any other person (including on adjacent and non-adjacent properties) whose socioeconomic conditions may be directly affected by the proposed prospecting or mining operation
(viii) The Local Municipality,
(ix) The relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

No traditional authorities were identified or are known to be present in this area. However, the West Coast District Municipality and the Matzikama Municipality have been identified as the ruling authority for the area. As this is an offshore sea concession area, no landowners and no lawful occupiers of the land exist. Several community representatives have, however, been identified for the neighbouring communities where fishing communities are prevalent. These include the communities of Lutzville, Papendorp, Koekenaap, Ebenhaeser, Standfontein and Doringbaai. Many of the residents in these communities are subsistence fishers reliant upon fishing for food and income but, these small scale fishers operate close to the shore and are not anticipated to be negatively impacted by prospecting activities in the remote, offshore 11C concession. .

13.1.2 Registration period

Emails were sent out and individuals contacted by phone to invite I&APs to register for the proposed project in order to receive further communication with regards to the project and to provide comment See Appendix 10 for an example of the email that was sent out to I&APs.

13.1.3 Comprehensive stakeholder database

An extensive database of I&APs was compiled based on responses received (see Appendix 11 for the complete stakeholder database). Please note that the names and contact details of the I&APs have been omitted to protect their personal information (as per the Protection of Personal Information Act or POPIA). See Appendix 12 for Anchor Environmental Consultant's Statement regarding compliance with the POPI Act.

13.1.4 Initial 30-day stakeholder consultation period

The application for prospecting rights were accepted by the DMRE on 7 September 2021. Thereafter, individual stakeholders, community representatives, adjacent and non-adjacent communities and relevant government departments were contacted by means of phone and email within a 30-day Stakeholder consultation period to inform them that the Prospecting Rights Application has been accepted. A Draft Background Information Document (BID) and questionnaire was circulated and I&APs invited to provide initial comment on the acceptance of the rights application (Appendix 13). Community representatives were also consulted via phone. A stakeholder consultation report with the initial comments from I&APs were compiled and submitted on the SAMRAD online system.

13.1.5 Official Public Participation Process

Potential I&APs were notified of the start of the Public Participation Period, Public Participation Meeting and circulation of the Draft BAR by means of:

- Email notices that were sent out on 28 October 2021.
- Site and other notices that were placed at Doringbaai, Lutzville, Strandfontein, Papendorp, Koekenaap and Ebenhaeser at several shops, libraries and/ or information centres.
- Placement of newspaper advertisements in a regional (Die Burger) and a local (Ons Kontrei) newspapers that were published on 29 October 2021. According to News 24, this newspaper is very popular amongst the residents with thousands of copies being sold in these towns weekly.
- The EAP also visited the towns on 29 October 2021 to post notifications at the libraries, shops, information centres and other public places and hand out hard copies of the BID and questionnaires. These notices and documents were made available in both Afrikaans and English.
- In addition to this, the EAP also approached various community members during this time to verbally provide details about the project, the meeting and how they could participate,

especially in the towns north of Doringbaai. We also asked them to let us know if we should consider having a meeting in their town. Their response was that the concession area is relatively far from them and that they will not be affected. They said that most of their fishing occurs in the waters just west of the towns or in the Olifants River Estuary.

See Appendix 14 for these notices and proof that these notices were sent and placed at various locations. The Background Information Document and questionnaire (Appendix 16), specialist studies (Appendix 3, 4 and 5) and draft BAR were made available electronically on our website at https://anchorenvironmental.co.za/ and as hardcopies at the Doringbaai e-centre, Doringbaai Library, Strandfontein West Coast Information Centre and Ebenhaeser Library during the Public Participation Period.

Interested and Affected Parties were invited to register, review the BAR and provide comments on the application for prospecting rights and environmental authorisation during the Public Participation Period which extended from Friday 5 November 2021 to Monday 6 December 2021. They were also invited to the Public Participation Meeting which was scheduled for **11 November 2021** in Doringbaai.

13.1.6 Public Participation Meeting

A Public Participation Meeting was held on **11 November 2021** in Doringbaai. During this meeting members of Anchor (the EAP) and Trans Atlantic Diamonds (the applicant) provided more detail on the proposed prospecting activity and consulted with I&APs who then had the opportunity to ask questions and provide comment on the proposal. See Appendix 14 for more details on the public meeting, including the presentation and meeting minutes.

13.1.7 Extension of Public Participation Period

Anchor Environmental Consultants received several requests from farmers adjacent to and north of the concession area to extend the commenting period and to host an additional meeting closer to their farms as they were not aware of the public participation process or the meeting at Doringbaai. They further said that they would not have been able to attend the meeting in Doringbaai, as it was too far for them. A request for extension was lodged with the DMRE and an extension for the submission of the BAR granted for 15 February 2022. An additional meeting was held in Kotzesrus in the Northern Cape, as per the request of the farmers, on 17 January 2022 and the period for commenting extended until 24 January 2022. See Appendix 15 for more details on the second Public Participation Process, including the presentation and meeting minutes.

13.2 Summary of issues raised by I&APs

Copies of the emails received from I&APs during the Public Participation Period have been included as Appendix 17. All comments and input received have been transcribed into the "comments and responses" table and included as Appendix 18 of this Final BAR. Responses sent to the I&APs by the EAP are included in Appendix 19.

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