

Environmental Management Plan

De Beers Consolidated Mines Application for a Prospecting Right for Sea Areas I(c) and 6(c)

Version: 1.0

Applicant:



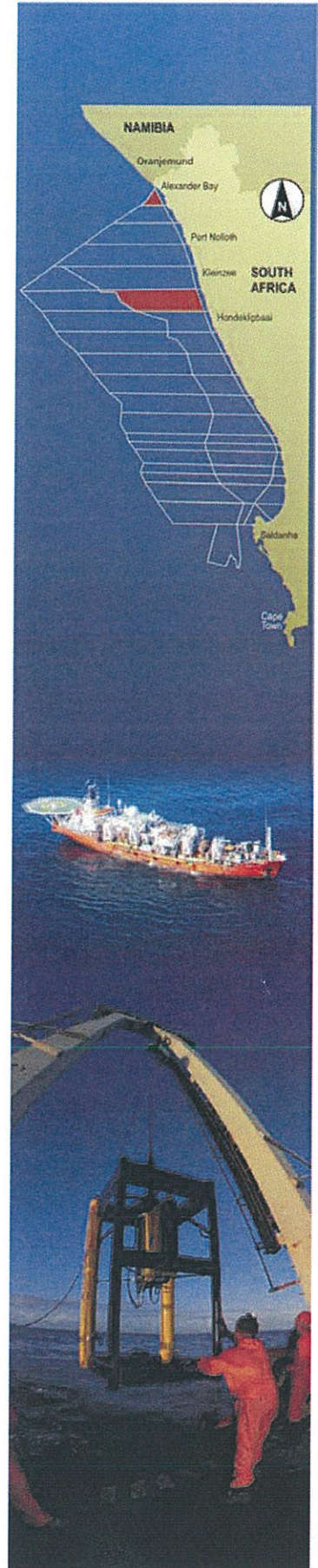
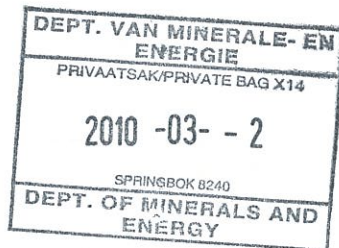
Operator:

DE BEERS



DE BEERS MARINE

February 2010



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APPROVAL FORM

The Environmental Management Plan dated February 2010

for South African Sea Areas 1c & 6c application for the prospecting of heavy minerals general, gold, platinum group metals and sapphire (gemstones)

held by De Beers Consolidated Mines Ltd

operated by De Beers Marine (Pty) Ltd

is hereby approved in terms of section 39 of the Mineral and Petroleum Development Resources Act 28 of 2002.

DEPARTMENT OF MINERALS AND ENERGY Resources

Signed on this 01st day of March 2011

Signature [Signature]

Title Acting Regional Manager

DE BEERS CONSOLIDATED MINES

Signed on this 25th day of February 2010

Signature [Signature] K. M. Cawson

Title S&P MANAGER Debm

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DE BEERS CONSOLIDATED MINES APPLICATION FOR A PROSPECTING RIGHT FOR PORTIONS OF SEA AREAS 1(c) & 6(c) ENVIRONMENTAL MANAGEMENT PLAN

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SECTION I: GENERAL INFORMATION**I.1 PURPOSE**

This Environmental Management Plan has been submitted in support of an application for a prospecting right in terms of Section 39 and Regulation 52 of the Mineral and Petroleum Resources Development Act and Regulations, 2002 (Act No. 28 of 2002) for South African Sea Areas 1(c) and 6(c).

I.2 DETAILS OF THE APPLICANT

Company Applying for right	De Beers Consolidated Mines Ltd
Company Registration number:	1888/000007/06
Postal Address:	De Beers PO Box 616 Kimberley 8300
Contact person:	Mining and Property Titles Administrator
Contact number:	Tel: +27-53-839-4258 fax: +27-53-839-4250

I.3 DETAILS OF THE OFFSHORE OPERATOR

Offshore Operator	De Beers Marine (Pty) Ltd
Postal Address:	PO Box 87 Cape Town 8000
Contact person:	Environmental Manager
Contact details:	Tel: +27-21-658-3194 Fax: +27-21-658-3355 Lesley.Roos@debeersgroup.com

I.4 DETAILS OF THE PERSON RESPONSIBLE FOR PREPARING THE EMP

Name:	Ms LA Roos
Employer:	De Beers Marine (Pty) Ltd
Position held in the company:	Environmental Manager
Qualifications:	B.Sc (Environmental Science & Economics) with B.Sc (Hons) Environmental Science, Trained as an ISO14001 Environmental Auditor
Experience:	Ten years experience running an ISO14001 certified Environmental Management System for De Beers Marine, including coordinating all aspects of the system including, environmental policy, designation of responsibilities, legal compliance, communication and training, impact assessments, management plans, procedures, environmental objectives, corrective actions, environmental auditing and review.

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1.5 LOCATION

The proposed prospecting area is contained within the boundaries of the predefined South African Sea Area concessions of 1(c) and 6(c). A map with boundary co-ordinates of this area is provided – Figure 1. These concession areas extend from a distance of approximately 2.5 to 8 km from the coastline to the 200m depth contour. The prospecting application covers an area of 3 757km².

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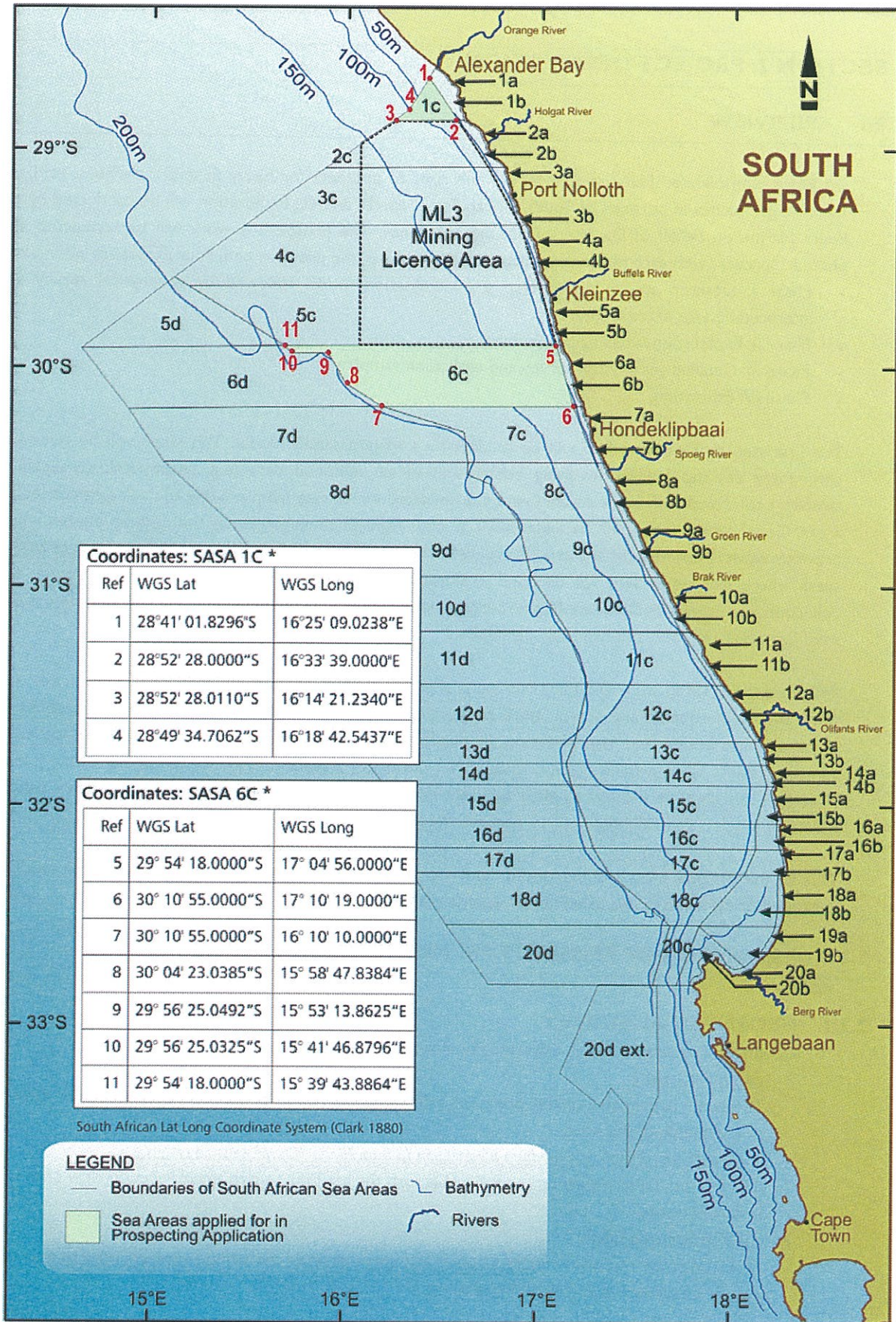


FIGURE I: Sketch plan of Prospecting Right area

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SECTION 2: PROJECT DESCRIPTION

2.1 OVERVIEW

De Beers Consolidated Mines is applying for the right to prospect for heavy minerals, platinum, gold and sapphire gemstones in portions of South African Sea Areas 1c and 6c. Exploration will be conducted by De Beers Marine on behalf of De Beers Consolidated Mines. The prospecting work will be conducted in a phased approach, with each phase dependant on the results of the previous one. Four phases are planned:

- Phase I: Desktop studies to develop a mineralisation model followed by geophysical survey and interpretation for areas of interest
- Phase II: Exploration sampling programme
- Phase III: Detailed geophysical survey and evaluation sampling
- Phase IV: Estimation.

The first step to be undertaken will be to develop a mineralisation model. This work will be guided by preliminary desktop studies, involving compilation of all published data (e.g. geophysical, geotechnical, sampling) combined with available De Beers Consolidated Mines data from existing and adjacent concession areas. Geophysical surveys will be undertaken in areas highlighted as targets by the desktop studies where previous work is not of sufficient detail to guide further exploration. Survey work may not be necessary in areas where existing surveys for diamond exploration and mining is of sufficient detail. All survey data collection is overseen by De Beers Marine survey and geophysics professional technical staff to optimise data used for target selection and ore body delineation.

Following the desktop study and the assessment of geophysical interpretations, a decision will be made as to the feasibility of sampling and one or more sampling campaigns will be planned and executed to establish the presence, distribution and concentration of target minerals. Geostatistical methods will be applied to sampling results to determine grade distributions from which a mineral resource can be constituted. Initial phases of sampling are unlikely to yield sufficient information to determine a resource and more detailed follow-up work is generally required to improve the confidence of the mineral resource estimate.

Due to the dynamic nature of exploration and evaluation the work programme may have to be modified, extended or curtailed as results and data become available.

2.2 DESCRIPTION OF PROSPECTING METHODS

2.2.1 GEOPHYSICAL SURVEY

Geophysical tools available to DBM for reconnaissance surveys include:

- Swath bathymetry:
The swath bathymetry system produces a digital terrain model of the seafloor over a given distance to either side of the boat.
- Shallow (2 to 10 Khz) and medium penetration (0.5 to 2Khz) "Chirp" seismic systems:
Chirp seismic systems generate profiles beneath the seafloor to give a cross section view of the sediment layers.
- 100Khz side scan sonar:
Side scan sonar systems produce acoustic intensity images of the seafloor and are used to map the different sediment textures of the seafloor.

➤ Magnetometer:

The magnetometer measures local variations in the intensity of the Earth's magnetic field, which are caused by differences in composition of the sediment layers beneath the seafloor and help identify where deposits lie in the seabed.

Survey data will initially be collected using a Focus 400TM capable of collecting both side scan sonar as well as Chirp seismic data. Additional tools such as hull mounted swath bathymetry and towed magnetometers will be deployed to gather additional data.

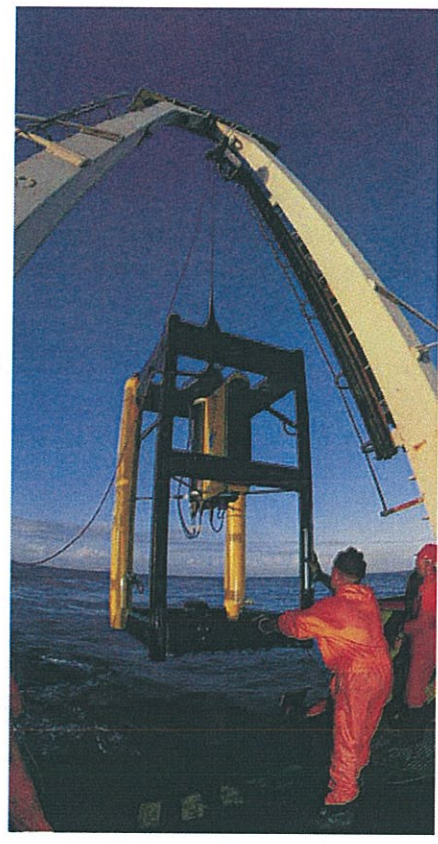
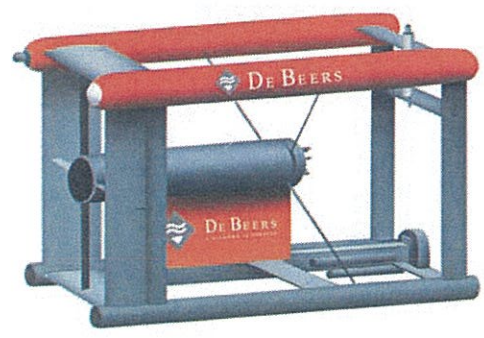


FIGURE 2: Focus Towfish (Dimensions 1.5m x 2.5m x 1.5m)

Detailed geophysical surveys will utilise the same tools with the possible inclusion of AUV (Autonomous Underwater Vehicle) surveys. The AUV is used for survey in areas where survey line spacing is generally less than 50m apart. The AUV is equipped with:

- Very high resolution 3D chirp seismic system
- 500khz side scan sonar system
- High resolution Swath bathymetry system.

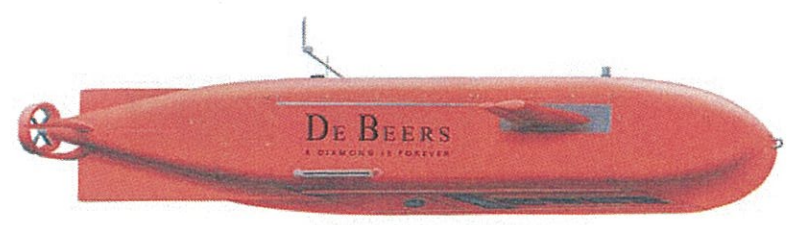


Figure 3: Autonomous Underwater Vehicle (AUV)

2.2.2 SAMPLING

Sampling will use De Beers Marine's proprietary drill technology, mobilised from a vessel of opportunity or from the De Beers Marine-owned vessel the *mv Douglas Bay* (see Figure 4). The technology has been developed by De Beers Marine, after an extensive technology search failed to provide a drilling system capable of adequately sampling marine placer deposits in competent material down to 10 metres.

The system deploys a novel vibratory head, adapting land based technology for marine use, where the vibration energy is transferred into the drill string and causes the string to penetrate the seabed. The system can penetrate through most seabed types, to produce a discrete core for recovery. The sampling system is mounted on a frame, which is lowered to the seabed from a LARS system on the sampling ship. The system has its own independent powerpack and control room.

In addition to the corer, the *mv Douglas Bay* is available to conduct rapid sampling of the seabed using two, standard 0.72m² skirted mega-drills (see Figure 5) in areas where the deposits are shallower. The tools are deployed over the side using a double davit system.



FIGURE 4: De Beers Marine Sampling vessel the *mv Douglas Bay*



FIGURE 5: Standard skirted megadrill (0.72m²) using airlift system principal

The megadrill uses an airlift system to raise gravel to surface via flexible 200mm diameter hoses. The gravels are passed through comminution circuits to break down the clay and shell components. The undersize fraction (<2mm) will be targeted although some samples from the oversize and plant-feed are required.

Samples collected will be logged and some preliminary processing will take place onboard the sampling vessel to reduce the sample to an appropriate size and mass. Most of the sample (non target fractions) will then be returned to the sea floor. The targeted sediment fractions will be sampled to provide discrete samples prior to the processing which will separate the denser material from the lighter material. No chemicals or any other contaminants are added to the sample during processing onboard the sampling vessel or ashore.

Further processing of the collected samples will take place at De Beers Marine's Paarden Eiland sample processing plant. All samples are handled and processed as discrete samples to prevent contamination. The treatment of samples includes weighing, sieving and the use of gravity concentration equipment to produce a heavy-mineral concentrate, which is then panned for a visual assessment of any particles recovered. Other items of equipment used are for the feeding, drying and sizing of material, as well as sumps and pumps for water reticulation around the individual items of equipment.

No assaying of concentrates or tailings is done at the Paarden Eiland facility. Concentrates and a portion of tailings will be sent for final analysis at a designated laboratory (e.g. SGS Lakefield). Results from the sample treatment and the assaying process will provide inputs into the Geological model.

2.2.3 ONSHORE SUPPORT

All sampling and survey operations will be managed from the De Beers Marine (Pty) Ltd offices, DBM Gardens, Golf Park 2, Raapenberg Rd, Pinelands, Cape Town. Products sent ashore will consist of targeted sediment fractions from sampling that will be processed within a secure environment at the De Beers Paarden Eiland facility. Data processing and interpretation will be conducted at the De Beers Marine offices in Cape Town. Crew transport, where required will be managed as part of De Beers Marine's operational logistics program using fixed wing transfers from Cape Town to Oranjemund/Alexander Bay and helicopter transfers from shore to sea.

2.2.4 PROPOSED TIMEFRAMES

Activity	Timeframe
Desktop studies & targeting	2 nd Quarter 2010
Geophysical survey & interpretation	3 rd Quarter 2010
Risk Assessment	4 th Quarter 2010
Sampling	1 st Quarter 2011
Concentrate recovery	1 st & 2 nd Quarter 2011
Evaluation of results	3 rd & 4 th Quarter 2011
Detailed geophysical survey	To be determined (2012)

Note: Timeframes are indicative and will depend on the timing of the granting of a prospecting right.

SECTION 3: DESCRIPTION OF ENVIRONMENT

Description of the environment likely to be affected by proposed prospecting/mining operations as required by Regulation 52(2)(a) of the MPRDA.

3.1 NATURAL ENVIRONMENT

Much of the information presented below is taken from the SASA ML3 Environmental Management Programme Report (Roos, 2005), unless otherwise stated.

3.1.1 GEOLOGY AND SEDIMENT

A regional geological model has been constructed using regional geophysics, vibrocores, large-diameter sampling for diamonds, microfossil dating, as well as mining information from DBCM's Namaqualand Mines operation located on land.

The fragmentation of West-Gondwanaland 125 million years ago led to down-faulting of basement rocks and graben forming parallel to the present coastline. The Orange and associated rivers discharged their sediments onto the basement, filling the basin with a succession of Cretaceous and Tertiary sediments. The shelf edge maintained a constant northwest trend and the variation in width of the shelf can be attributed to changes in the strike of the coastline. Basement outcrops are limited to the inner shelf up to a depth of approximately 100m. In the middle and outer shelf, the Cretaceous and Tertiary strata are generally overlain by a thin veneer of sediment. Significant sediment thicknesses do, however, occur at the base of depocentres where up to 60m of sediment has been observed. Extensive regions of the middle and outer shelf are covered by an overburden Holocene clayey to sandy mud of between 0.1m and greater than 12m in thickness. Present day sedimentation is limited to input from the Orange River. This sediment is generally transported northward. Most of the sediment in the area is therefore considered to be relict deposits by now ephemeral rivers active during wetter climates in the past. However, the Orange River, when in flood, still contributes largely to the mudbelt as suspended sediment is carried southward by poleward flow.

The degree of mineralization is controlled by many parameters that include amongst others: proximity to local drainage systems linked to secondary source areas, marine process along above mentioned palaeo-shorelines, gravel development and seabed surface roughness linked to cemented footwall horizons and cemented fault zones.

3.1.2 METEOROLOGY

The meteorological conditions along the coast between Hondeklipbaai and Lüderitz are controlled by the ever-present South Atlantic anticyclone, the northward-flowing Benguela Current (with associated upwelling) and the divergence of the south-east trade winds along the coast. The predominant winds are from the south and south east quadrant and generally are stronger in spring and summer than in autumn and winter when north westerly and westerly winds predominate. The semi-permanent temperature inversion caused by the warm, dry air mass overlapping the cool air mass above the ocean is ideal for the formation of fog and low stratus cloud.

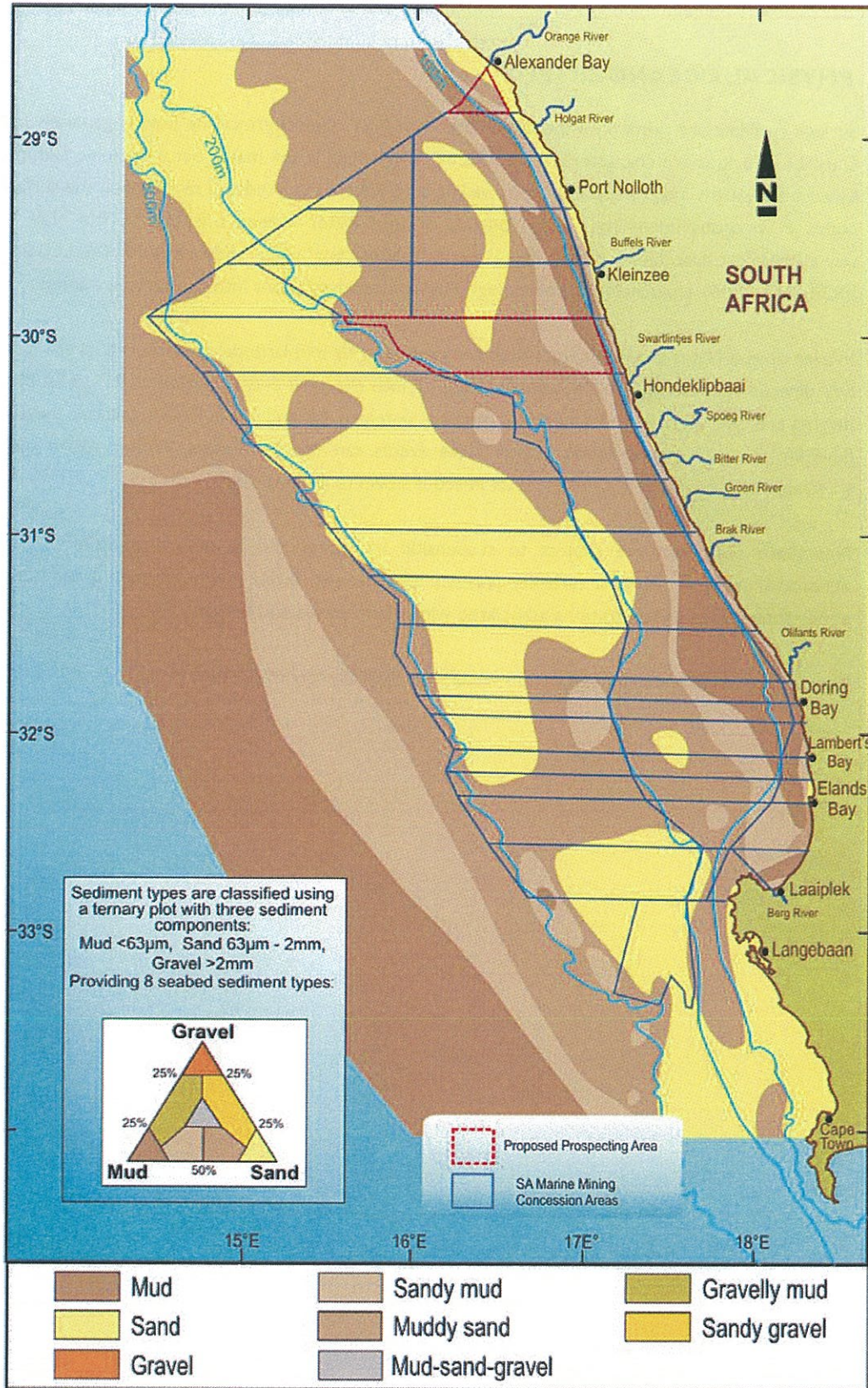


FIGURE 6 Map of the distribution of seabed surface sediment types off the South African west coast (adapted from Lane & Carter 1999), in relationship to the prospecting application area.

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3.1.3 PHYSICAL OCEANOGRAPHY

Surface currents are primarily wind driven and flow NW. Sub-thermocline flow is generally poleward. Current velocities are characteristically <30cm/s. Upwelling is the major oceanographic feature, driven by equator-ward winds (S-SE). During upwelling cold water is uplifted and may breach the surface at the coast. In vigorous upwelling events tongues of cold water extend offshore to the NW with the upwelling effect detectable at the surface up to 30-50 nautical miles offshore (VAN BALLEGOOYEN & MORANT, 2006). Upwelling transports high nutrient concentrations into the surface waters.

Waves on the Namaqua continental shelf are generated by mid-latitude cyclones; >65% are from the S-SW direction sector, 90% are <3.8m and 90% fall into the peak energy period of 9.7-13.5s. Mean wave heights are typically 2.6m with tidal variations of between 1.2 and 1.6m. Peak significant wave height is 8.5-9.0m (% occurrence <0,5%). Large wave events can last 4 - 5 days. Winter storm surges with wavelengths in excess of 150m will result in scour down to at least 60m.

Nearshore sediments are subject to suspension by waves and longshore transport. This effect penetrates to 90m. Natural turbidity (suspended sediment) levels range between 3 and 12mg/l with significantly higher concentrations associated with storm waves and floods.

Oxygen concentrations in near bottom waters are typically low (< 2.0 ml/l).

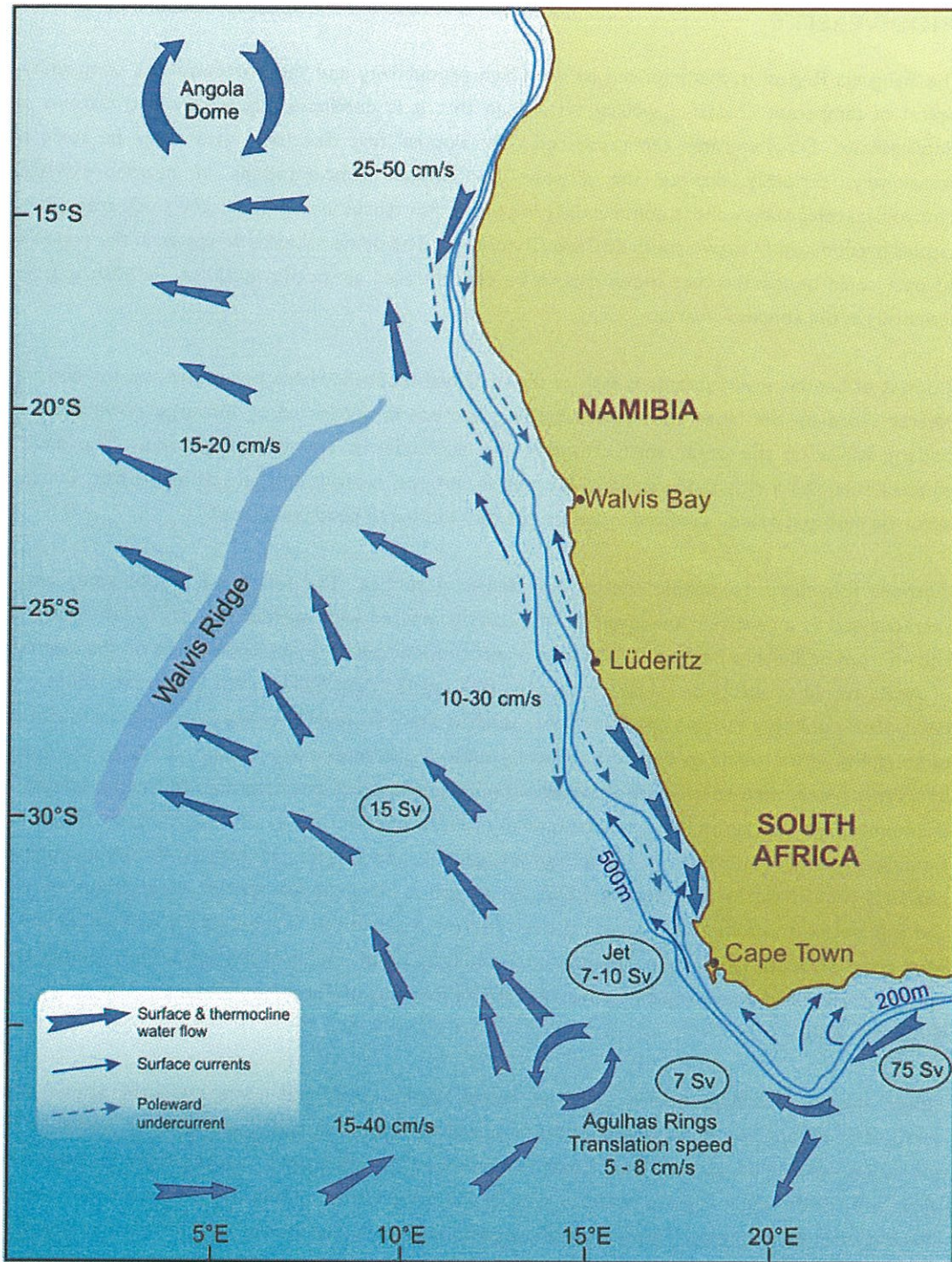


FIGURE 7: Circulation and volume flows in the Benguela Current (from Shannon & Nelson 1996)

3.1.4 BIODIVERSITY

The Benguela Region is characterised by very high productivity and the phytoplankton community is typical of temperate coastal upwelling systems in that it is dominated by large celled diatoms and dinoflagellates. Dinoflagellates can cause red tide 'blooms' that discolour water, may be toxic and occasionally, seriously deplete the already low oxygen concentrations in nearshore waters. Ichthyoplanktonic stages of the commercially important fish stocks are limited in the study area. Pelagic species predominantly spawn south of Cape Columbine. The demersal hake do spawn in the region but no data could be located that shows this to be concentrated at specific localities. Jellyfish aggregate seasonally in the concession areas.

Biomass of benthic invertebrates is high in the mid-shelf mudbelt where polychaete worms dominate. Nearer shore on the inner continental shelf the benthos is dominated by molluscs, polychaetes and cnidaria whilst on the outer shelf crustacea and echinoderms are most important. The midshelf mudbelt supports a rich food resource for mantis shrimps, cephalopods and demersal fish. Cuttlefish occur on mud and muddy sand sediments on the mid and outer continental shelf.

Offshore fish comprise pelagic species and demersal species. The fish fauna of the study area is characterised by a relatively low diversity of species compared with warmer oceans: 76 fish species are known from or likely to be found in the area under consideration – an equivalent area on the east coast of Africa would probably be inhabited by over 800 species (Van Ballegooyen & Morant, 2006). The ichthyofauna of highly variable upwelling zones, such as the Benguela Upwelling System of the west coast of southern Africa, tends to have the following suite of characters: low species diversity, low species interdependence, rare species are uncommon, migratory species are common, sedentary species are uncommon, low speciation rates, low extinction rates, low species saturation, wide trophic niches, high fecundity, typically generalist life styles, high adaptability, and subject primarily to density-independent mortality (van Ballegooyen & Morant, 2006). An exception being the fish species, *Austroglossus microlepis* and *Sufflogobius bibarbatus*, which have relatively narrow distributions, being endemic to Namibia and the west coast of South Africa (van Ballegooyen & Morant, 2006). None of the species are known to be rare or endangered (none appear in the 1994 IUCN Red List of Threatened Animals (Van Ballegooyen & Morant, 2006).

Pelagic species, including anchovy, pilchard, round herring, chub and horse mackerel, spawn mainly south of St Helena Bay downstream of major upwelling centres in spring and summer, and their eggs and larvae are carried up the West Coast in northward flowing waters. Large pelagic species include tunas and billfish which migrate between surface and deep waters (>300m) and have a highly seasonal distribution in the Benguela. Demersal species comprise deepwater species (>380m) such as deepwater hake, monkfish, and kingklip and more shallow water species dominated by Cape hake and including jacobever, white squid and catshark. The distribution of the latter shelf community varies seasonally. The vulnerability of a fish species to anthropogenic disturbance (fishing, mining, pollution or other impacts) is subject to three main factors: fish abundance, fish distribution and the particular life-history characteristics of the fish species affected.

Forty-nine pelagic seabird species have been recorded in the region; fourteen are resident, ten originate from the Northern Hemisphere and twenty-five from the southern ocean. The area supports 35% of the total Benguela system population. Highest bird densities occur offshore of the shelf-break in winter.

Twenty-three species of whales and dolphins have been recorded in the study area. Heaviside's dolphin and Brydes whales appear to be spatially restricted to the continental shelf and Southern Right whales commonly occur in inshore waters.

Four seal species occur in the region of which the most abundant is the Cape fur seal. This species forages throughout the area and has established colonies on the coast.

3.1.5 PROTECTED AREAS / AREAS OF CONSERVATION INTEREST

The licence area does not overlap with any marine protected areas. However, two areas of conservation interest are relevant in the context of SASA ML3 operations:

➤ Orange river Mouth RAMSAR site

The Orange River Mouth area is ranked as the sixth-most important coastal wetland in southern Africa in terms of the number of birds it supports and is used by waterbirds either for breeding purposes or as a stopover on migratory routes. Many birds depend on the area for food, as well as for shelter from the strong coastal winds. These factors have led to the mouth being declared a Wetland of International Importance under the Ramsar Convention. The sensitivity of the area needs to be considered when managing airborne logistics operations either from Alexander Bay or Oranjemund airports (see Figure 8).

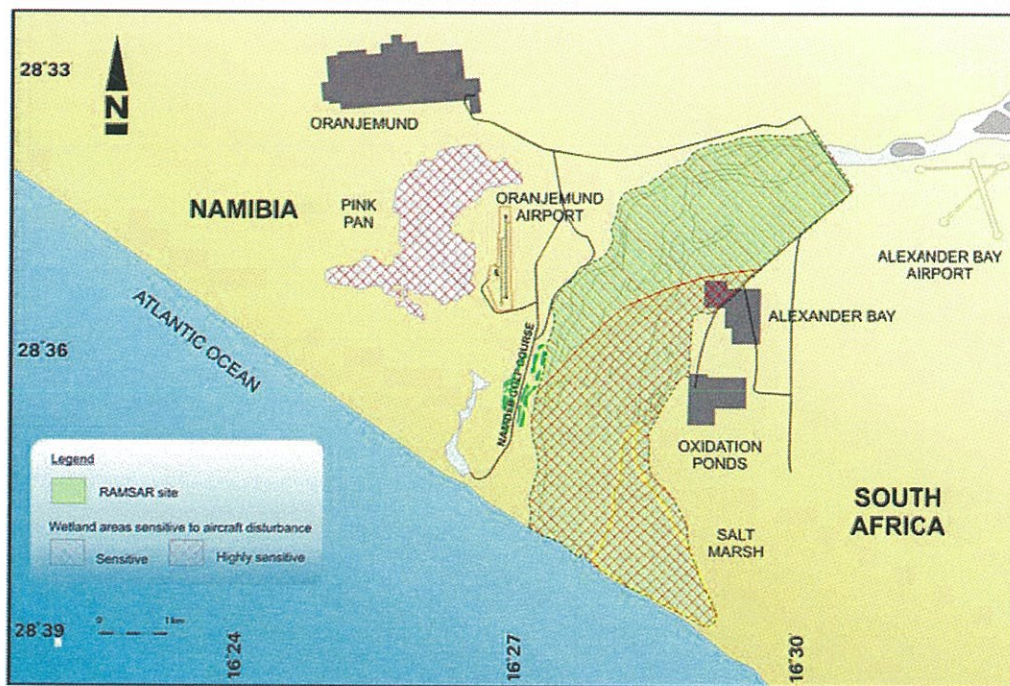


FIGURE 8: Map of the Orange River Mouth and surrounds indicating the extent of the RAMSAR site, as well as the areas sensitive to aircraft disturbance.

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➤ Proposed Namaqualand Marine Protected Area

The Department of Environmental Affairs and Tourism invited comment on a "Notice of intention to declare the Namaqualand Marine Protected Area under section 43 of the Marine Living Resources Act, 1998" which was published in Government Gazette No 26050 dated 17 February 2004 (see Figure 9). Several concerns were raised by Interested and Affected Parties regarding the location of the proposed protected area and the area has not been promulgated. The proposed Marine Protected Area does not overlap with sea areas 1c and 6c.

The World Wildlife Fund for Nature (WWF) and the South African National Biodiversity Institute (SANBI) have since established an Offshore Marine Protected Areas (OMPA) Project. This project aims to facilitate the development of a representative Offshore MPA network that has broad support from the various offshore marine use sectors and is based on the best available scientific information, for the persistent conservation of South Africa's offshore biodiversity and the wise use of offshore marine resources. De Beers Marine is participating in the OMPA Project.

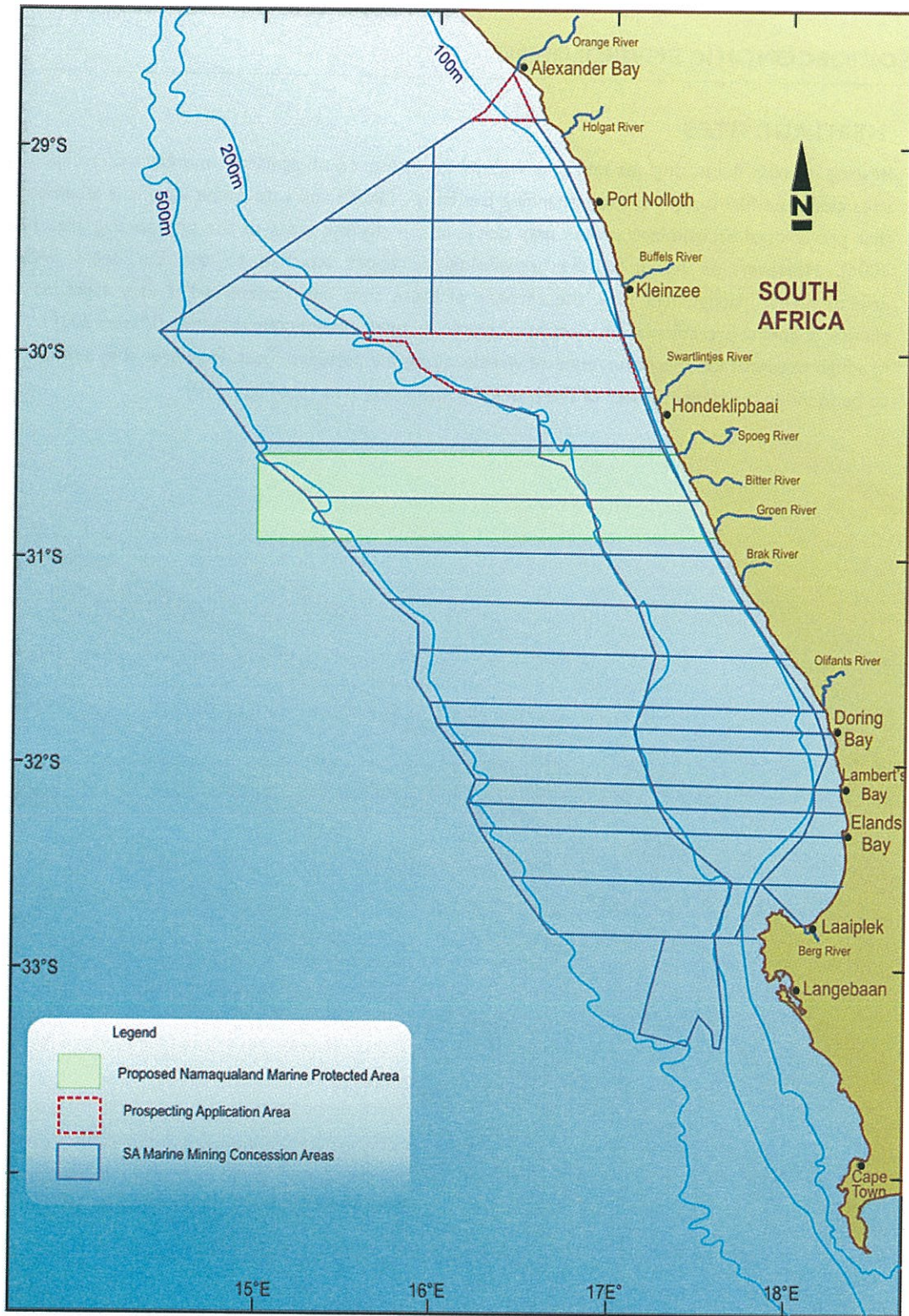


FIGURE 9: Map showing location of proposed Namaqualand Marine Protected Area in relation to the prospecting application area.

3.2 SOCIOECONOMIC ENVIRONMENT

3.2.1 HERITAGE SITES

Bearing in mind fluctuating sea levels as well as the presence of significant numbers of archaeological sites along the Namaqualand coast spanning the Early-, Middle and Late Stone Age, it is assumed likely that pre-colonial archaeological sites may occur in the shallow areas of the prospecting area (Visser, 2006). However, as noted in the archaeological report attached to the De Beers SASA 7b Environmental Management Plan, the chances of these sites being preserved is very slight, as is the chance of finding pre-colonial archaeological material during prospecting activities (Visser, 2006). There is a high potential for the occurrence of wrecks along the adjacent coast. However they are less likely to be found in the deeper water of the planned prospecting area (see Figure 10).

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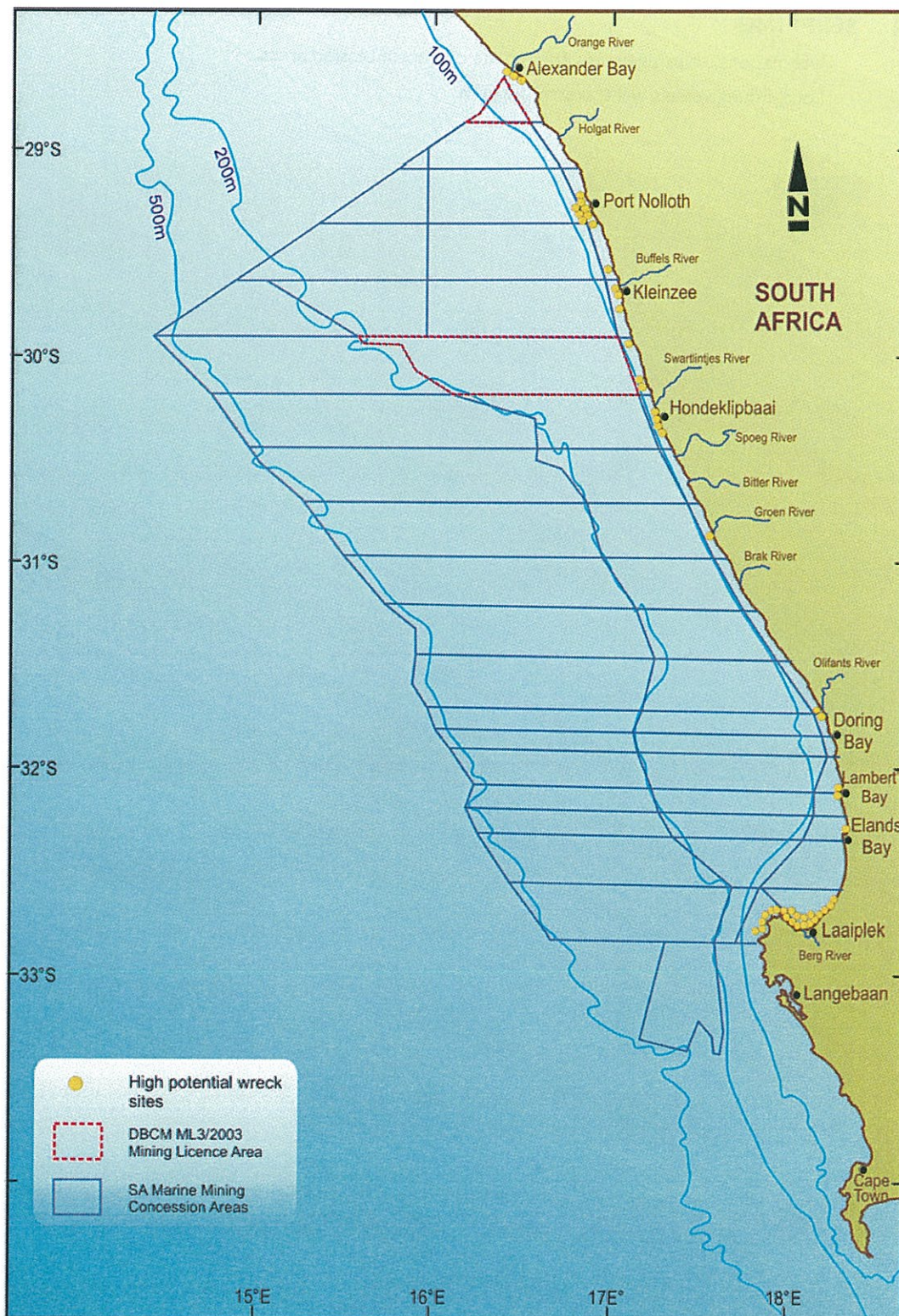


FIGURE 10: Known and presumed positions of shipwrecks along the South African west coast, in relation to the marine diamond concession areas (from Lane & Carter 1999).

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3.2.2 SHIPPING

- International shipping routes fall outside of the concession areas.
- Local fishing vessels will traverse the area.

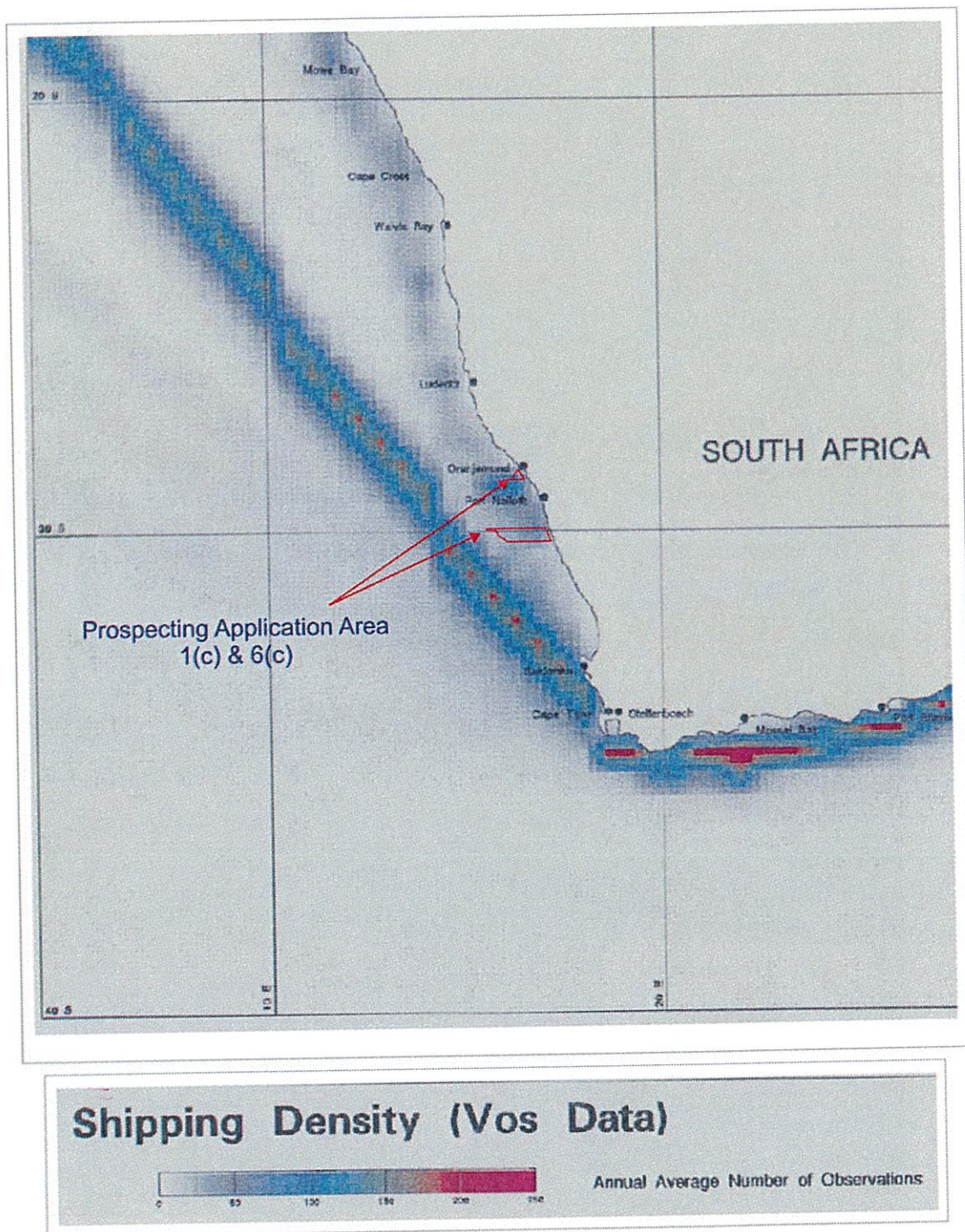


FIGURE 11: Primary and secondary shipping routes off the west coast of southern Africa (from Lane & Carter 1999, derived from data from the South African Data Centre for Oceanography).

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3.2.3 COMMERCIAL FISHING GROUNDS

The Benguela system supports a major continental shelf fishery. Primary target species are the demersal hake, pelagic / epipelagic anchovy, and midwater horse mackerel and round herring. Kingklip, monkfish, angelfish, and snoek are the main components of the demersal by-catch, comprising up to 30% of the catch.

Demersal trawling and longlining (mainly for deepwater hake) is conducted primarily in waters deeper than 300m (i.e. (d) concessions) and most catches are concentrated on the shelf break south of Doringbaai with catches increasing towards Cape Columbine (see Figure 12). The Deep Sea Trawling Industry Association has noted that because the proposed prospecting work will be focussed shoreward of the 200 metre isobath that it is not expected to have any significant impact on trawling operations.

Purse seine fishing for pelagic species, mainly anchovy, is concentrated mainly in inshore waters (mid to inner continental shelf) between Cape Columbine and the Olifants River with the main fishing area being in St Helena Bay (see Figure 12). The small pelagic fishery is reported by Marine and Coastal Management to be the largest fishery in terms of volume and second most important by value (MCM: DEAT, 2005). The prospecting application area overlaps with the pelagic fishery, however the concentration of effort is low.

Zone A of the West Coast rock lobster is situated north of the Olifants River and south of the Orange River however fishing is concentrated in depths shallower than 15m water depth (pers. Coms. Dr Andy Cockcroft, Marine and Coastal Management, Department of Environmental Affairs and Tourism). Engagement with the West Coast Rock Lobster Sea Management Association has confirmed that activities deeper than 100m water depth will not have a significant impact on the inshore rock lobster resource.

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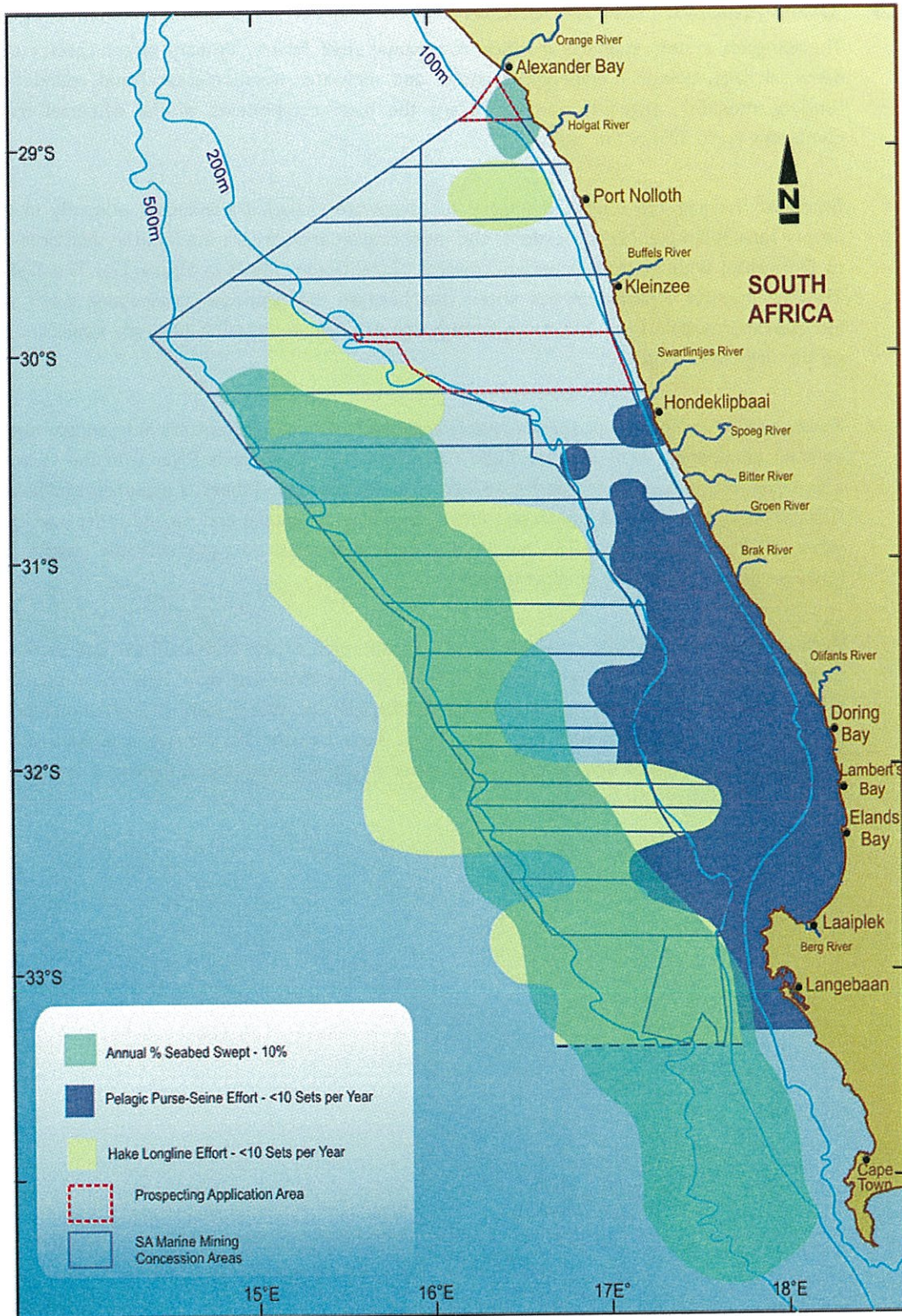


FIGURE 12: Distribution of pelagic purse-seine and hake longline effort and demersal trawling area in relation to the prospecting application area (Adapted from Penney 2005).

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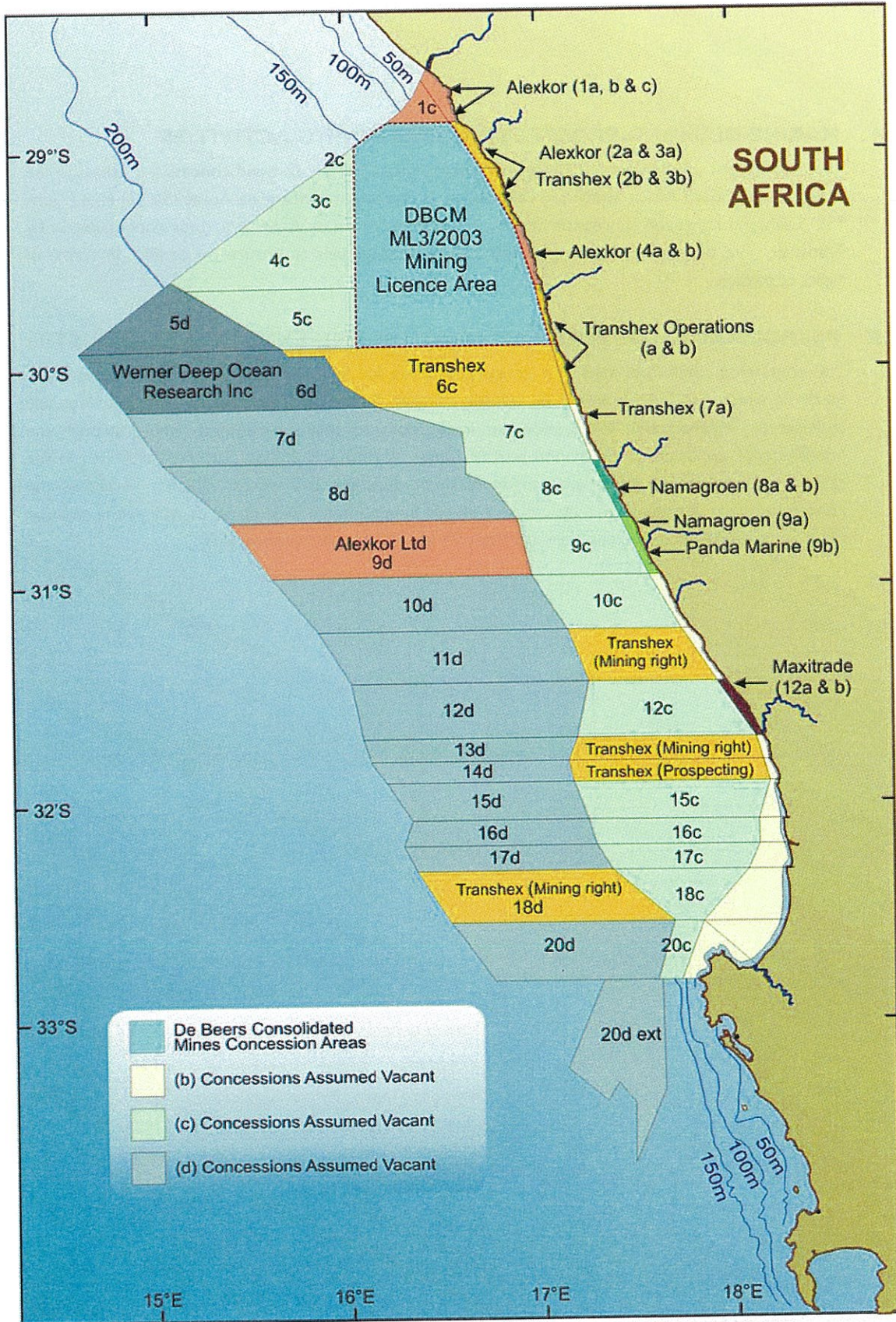
3.2.4 MARINE DIAMOND PROSPECTING AND MINING ACTIVITIES

The Department of Minerals and Energy have demarcated marine diamond concessions areas on the west coast of South Africa, which are referred to as the South African Sea Areas (SASA) (see Figure 13). Diamond rights for concession area 1c are currently held by Alexkor and for concession 6c by Transhex. The overlap of these rights will require engagement to ensure no conflict in terms of rights of passage.

3.2.5 PETROLEUM RESOURCES EXPLORATION AND EXTRACTION INDUSTRY

The continental shelf is divided into concession areas for hydrocarbon (oil and gas) exploration, much of which has been covered by seismic surveys. Further survey and sampling activities are anticipated. Hydrocarbon exploration has implications for marine diamond mining through the imposition of exclusion zones around seismic survey vessels and drilling platforms, although in the case of seismic surveys these are mostly of short duration (3-5 weeks). Figure 14 shows the concession areas for the oil and gas industry off the South African west coast, as well as the position of known wellheads. Key stakeholders are PetroSA and Forest International (SA).

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Compiled by De Beers Marine using best available information.

FIGURE 13: West coast marine diamond concession areas

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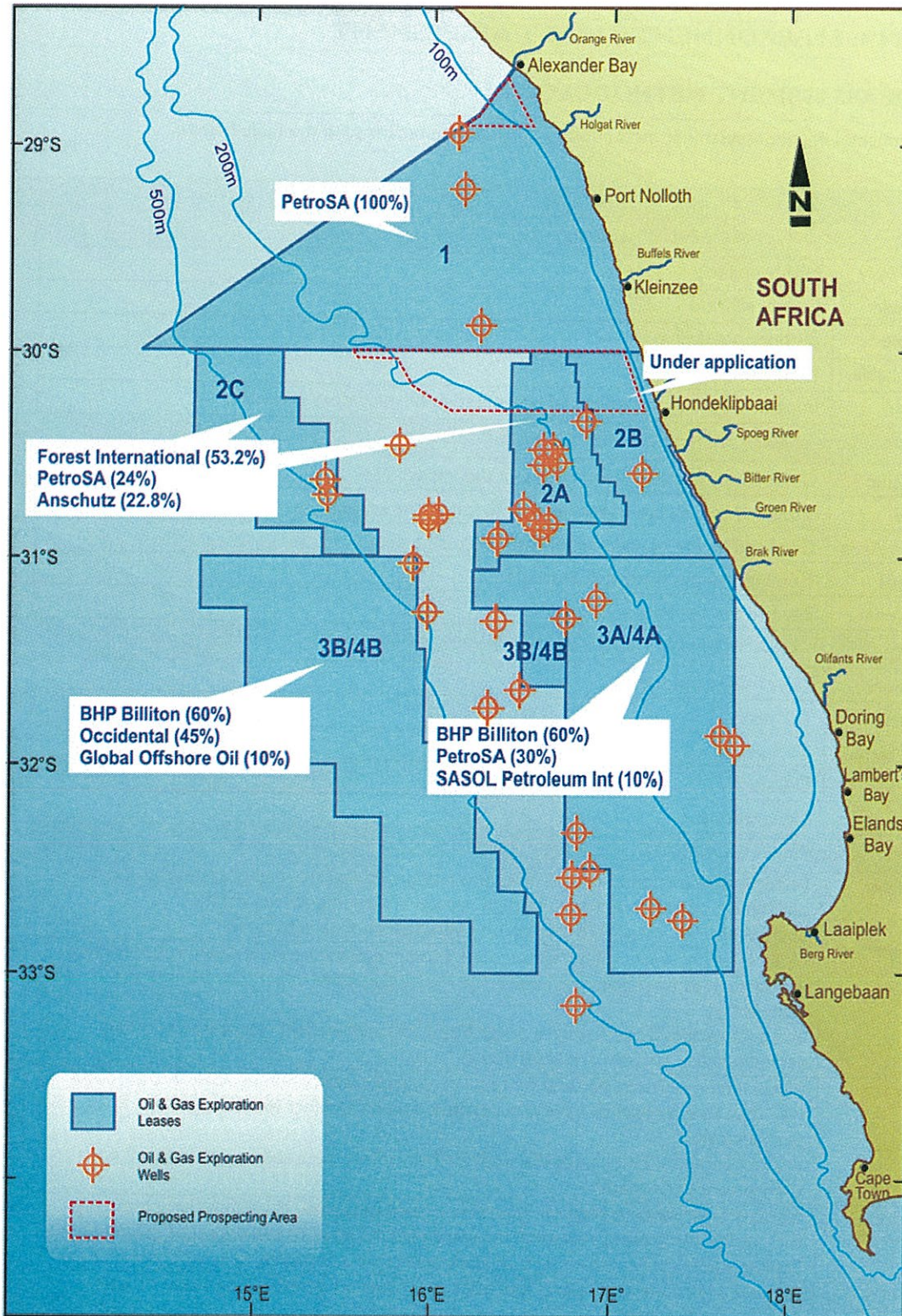


FIGURE 14 Oil & gas concession blocks in relation to the west coast marine diamond concession areas, (derived from map on the Petroleum Agency of South Africa website, February 2010), as well as location of know well-heads (from Lane & Carter 1999, derived from data from SOEKOR PLU).

SECTION 4: ENVIRONMENT IMPACT ASSESSMENT

4.1 RISK ASSESSMENT METHODOLOGY

The environmental impact assessment methodology applied is summarised in the table below:

Rating	Definition of Rating	Score
A. Probability– the probability of the impact occurring		
Highly unlikely	Highly unlikely	1
Improbable	Low likelihood	2
Probable	Distinct possibility	3
Highly Probable	Most likely	4
Definite	Impact will occur regardless of preventative or mitigatory measures	5
B. Extent– the area over which the impact will be experienced		
Site specific	Confined to within < 1 km radius of the impact site	1
Local	Confined to a radius of between 2-20 km of the impact site	2
Concession Area	Confined to the boundaries of the concession area	3
Regional	Confined to the Namaqua Bioregion	4
International	Beyond the borders of South Africa	5
C. Duration– the time frame for which the impact will be experienced		
Very short	Days / weeks/months	1
Short-term	1-5 years	2
Medium-term	6-15 years	3
Long-term	Decades	4
Permanent	Generations	5
D. Intensity– the magnitude of the impact		
Negligible	Natural environment: Natural functions and processes are negligibly altered due to adaptation by the receptor(s) to high natural environmental variability Socioeconomic: Negligible disruption of socioeconomic activity/ies	1
Mild	Natural environment: Natural functions and processes continue albeit in a modified way that does not appear to have a significant disruptive effect (i.e. changes are temporary) Socioeconomic: Does not have a significant disruptive effect on socioeconomic activity/ies (i.e. changes are temporary)	2
Moderate	Natural environment: Natural functions and processes continue albeit in a modified way that does appear to have a noticeable disruptive effect (i.e. changes are permanent) Socioeconomics: Noticeable disruptive effect on socioeconomic activity/ies (i.e. changes are permanent)	3
Severe	Natural environment: Natural functions or processes are altered to the extent that they temporarily cease resulting in severe deterioration of the impacted environment Socioeconomics: Severe impact on socioeconomic activity/ies	4
Very Severe	Natural environment: Natural functions or processes permanently cease or are completely disrupted Socioeconomics: very severe impact on socioeconomic activity/ies	5

A Risk Rating for each identified impact is subsequently determined by combining the scores as follows:

Combined Score (A+B+C+D)	4 - 9	10 - 13	14 - 20
Risk Rating	Low	Medium	High

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4.2 IMPACT ON NATURAL ENVIRONMENT

Information regarding the impact of the proposed operation on the natural environment in terms of Regulation 52(2)(b) of the MPRDA.

4.2.1 NOISE DISTURBANCE

<i>Impact Description</i>	Vibration or noise disturbance of marine mammals (including the endemic Heaviside's Dolphin), particularly during times of whale migration or aggregation caused by the acoustic pulses from seismic transducers in the survey towfish
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	1: Very short; limited to the duration of the survey
<i>Intensity</i>	2: Mild
<i>Significance</i>	7: Low Specialist studies have been conducted and have demonstrated that due to the nature of the sounds produced by the survey equipment currently in use the impact intensity is low (FINDLAY, 2005).

4.2.2 SAMPLING EXCAVATION / FOOTPRINT

<i>Impact Description</i>	Site specific alteration of sediment structure / benthic habitat and resultant effects on benthic community structure due to the excavation and re-deposition of sampled sediments.
<i>Status</i>	Negative
<i>Probability</i>	5: Definite
<i>Extent</i>	1: Site (<1 km radius)
<i>Duration</i>	2: Short term
<i>Intensity</i>	2: Mild
<i>Significance</i>	10: Medium Natural rehabilitation of the seabed following mining operations, through a process of involving influx of sediments and recruitment of invertebrates, has been demonstrated (PENNEY & PULFRICH, 2004). Relative to mining, sampling causes disturbance at a significantly smaller scale and in scattered pockets, resulting in accelerated recovery of sediment and subsequent benthic communities.

4.2.3 BENTHIC (SEABED) COMMUNITY IMPACTS

<i>Impact Description</i>	Alteration of benthic community composition and reduction in benthic biodiversity due to the direct mortality of benthic organisms and change to sediment structure during the sampling / mining excavation process
<i>Status</i>	Negative
<i>Probability</i>	5: Definite
<i>Extent</i>	1: Site (<1 km radius)
<i>Duration</i>	2: Short term
<i>Intensity</i>	2: Mild
<i>Significance</i>	I0: Medium Natural rehabilitation of the seabed following mining operations, through a process of involving influx of sediments and recruitment of invertebrates, has been demonstrated (PENNEY & PULFRICH, 2004). Relative to mining, sampling causes disturbance at a significantly smaller scale and in scattered pockets, resulting in accelerated recovery of sediment and subsequent benthic communities.

4.2.4 IMPACTS ON MOBILE SPECIES (FISH, INVERTEBRATES)

<i>Impact Description</i>	Sub-lethal or lethal impacts on mobile species including fish (hake, kingklip) and invertebrate species (rock lobster, mantis shrimps, crabs etc) that are unable to evade the suction nozzle
<i>Status</i>	Negative
<i>Probability</i>	5: Definite
<i>Extent</i>	1: Site (<1 km radius)
<i>Duration</i>	2: Short term
<i>Intensity</i>	2: Mild
<i>Significance</i>	I0: Medium

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4.2.5 DISCARDING OF OVER & UNDERSIZED MATERIAL

<i>Impact Description</i>	Smothering of benthos resulting in significant alteration of benthic community composition and/or potential reduction in benthic biodiversity due to the re-deposition of sediments
<i>Probability</i>	3: Probable
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	3: Moderate
<i>Significance</i>	<p>10: Medium</p> <p>Relatively small quantities of over- and under-sized tailings during a sampling, of short duration and in an environment which is subject to significant input of sediment into the water column from wind and sediment input from the Orange River.</p> <p>Specialist study completed for mining tailings in the same operational area demonstrates that during mining it is likely that adopted lower thresholds of 20mg/l TSS will be marginally exceeded but that TSS will be well within maximum threshold of 80mg/l (CARTER, 2008). Due to the intermittent nature and lower discharge rate of the sampling discharges it is unlikely that the lower threshold will be reached within the 500m boundary.</p>

<i>Impact Description</i>	<ul style="list-style-type: none"> • Significant impacts on water column invertebrates, ichthyoplankton stages, juvenile and/or adult fish • Reduction visibility resulting in decline in hunting effectiveness of visual predators such as marine mammals and seabirds • Reduction in the productivity of phytoplankton
<i>Probability</i>	3: Probable
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	2: Mild
<i>Significance</i>	<p>9: Low</p> <p>Relatively small quantities of over- and under-sized tailings during a sampling, of short duration and in an environment which is subject to significant input of sediment into the water column from wind and sediment input from the Orange River.</p> <p>Specialist study completed for mining tailings in the same operational area demonstrates that during mining it is likely that adopted lower thresholds of 20mg/l TSS will be marginally exceeded but that TSS will be well within maximum threshold of 80mg/l (CARTER, 2008). Due to the intermittent nature and lower discharge rate of the sampling discharges it is unlikely that the lower threshold will be reached within the 500m boundary.</p>

<i>Impact Description</i>	<ul style="list-style-type: none"> • Release of naturally occurring heavy metals and other contaminants from seabed sediments resulting in significant impacts on marine organisms • Release of naturally occurring hydrogen sulphide from mined sediments resulting in sub-lethal or lethal impacts on marine organisms
<i>Probability</i>	2: Improbable
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	3: Moderate
<i>Significance</i>	9: Low

4.2.6 USE OF FERROSILICON IN TREATMENT PROCESS

Impact Description	Risk of exceeding established water quality guidelines by other heavy metal constituents of the ferrosilicon (FeSi) used in the treatment process (recovery of FeSi used in the treatment process is not complete and a proportion is lost overboard with discarded sediment)
Status	Negative
Probability	2: Improbable (low likelihood)
Extent	2: Local (confined to a radius of between 2-20 km of the impact site)
Duration	4: Decades
Intensity	1: Negligible
Significance	7: Low

4.2.7 USE OF HYDRAULIC SAMPLING EQUIPMENT

Impact Description	Significant impact on marine organisms caused by a hydraulic fluid spill (rupture of pipes /failure of hydraulic sampling equipment) which cannot be contained on the vessel
Status	Negative
Probability	2: Improbable (low likelihood)
Extent	2: Local (confined to a radius of between 2-20 km of the impact site)
Duration	2: Short term
Intensity	2: Mild
Significance	8: Low

4.2.8 EXHAUST EMISSIONS FROM OPERATION OF SHIP ENGINES

Impact Description	Atmospheric pollution caused by NO _x , SO _x , CO ₂ , Volatile Organic Carbons (VOCs) during the generation of power from burning fossil fuels and incineration of waste
Status	Negative
Probability	5: Definite
Extent	2: Local (confined to a radius of between 2-20 km of the impact site)
Duration	2: Short term
Intensity	2: Mild Exceeding international standards for exhaust emissions of NO _x , SO _x , CO ₂ , Volatile Organic Carbons (VOCs) from ships
Significance	11: Medium

4.2.9 WASTE DISPOSAL

Impact Description	Risk of marine pollution due to inappropriate handling of wastes (violating MARPOL standards)
Status	Negative
Probability	1: Highly unlikely
Extent	2: Local (confined to a radius of between 2-20 km of the impact site)
Duration	2: Short term
Intensity	2: Mild
Significance	7: Low

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4.2.10 DISTURBANCE OF BIRDLIFE DUE TO AIRCRAFT ACTIVITY

<i>Impact Description</i>	Disturbance of estuarine birds at the Orange River Mouth RAMSAR site by noise caused by the use of helicopters and fixed-wing flights
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable; flight paths adjusted to avoid most sensitive areas
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	1: Very short term
<i>Intensity</i>	4: Severe
<i>Significance</i>	9: Low

4.2.11 EMERGENCIES

<i>Impact Description</i>	Marine pollution caused by spills of hazardous substances resulting from the grounding or sinking of a prospecting / mining vessel or a vessel collision
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable
<i>Extent</i>	4: Regional (Namaqua Bioregion)
<i>Duration</i>	3: Medium term
<i>Intensity</i>	4: Severe
<i>Significance</i>	13: Medium In mitigation it is noted that De Beers Marine enforces strict adherence to international maritime standards.

<i>Impact Description</i>	Air pollution and pollution from fire fighting residues resulting from a fire in any area
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	2: Minor
<i>Significance</i>	8: Low

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4.3 IMPACT ON SOCIOECONOMIC ENVIRONMENT

Information regarding the impact of the proposed operation on the socioeconomic environment in terms of Regulation 52(2)(b) of the MPRDA.

4.3.1 HERITAGE IMPACTS

<i>Impact Description</i>	Destruction of wrecks / damage of sites of heritage value during sampling activities
<i>Status</i>	Negative
<i>Probability</i>	1: Highly unlikely
<i>Extent</i>	1: Site specific (<1 km radius)
<i>Duration</i>	5: Permanent
<i>Intensity</i>	2: Mild
<i>Significance</i>	9: Low

4.3.2 EXCLUSION OF OTHER USERS – DIAMOND PROSPECTING / MINING

<i>Impact Description</i>	Potential exclusion of alternative resource use in the form of marine diamond prospecting / mining activity and potential hazard if vessels not adequately visible, due to the physical presence of vessels in an area
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable; Diamond prospecting rights are held in both the 1c and 2c concession areas and therefore there is a reasonable likelihood of some overlap in activity. However due to the nature of prospecting activities physical presence in the area for sampling or survey is limited and therefore reduces the risk overlap significantly.
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	4: Severe
<i>Significance</i>	10: Medium

4.3.3 EXCLUSION OF OTHER USERS – PETROLEUM EXPLORATION / EXPLOITATION

<i>Impact Description</i>	Potential exclusion of alternative resource use in the form of petroleum exploration /exploitation and potential hazard if vessels not adequately visible, due to the physical presence of vessels in an area
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable; To date the focus of activities has been beyond the current depths targeted by the De Beers' prospecting and mining activities. However comment (see Section 5) regarding the overlap of the application area with their rights areas have been received and will be addressed.
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	4: Severe
<i>Significance</i>	10: Medium

4.3.4 EXCLUSION OF OTHER USERS – ROCK LOBSTER FISHERY

<i>Impact Description</i>	Potential exclusion of alternative resource use in the form of the West Coast Rock Lobster fishery and potential hazard if vessels not adequately visible, due to the physical presence of vessels in an area
<i>Status</i>	Negative
<i>Probability</i>	1: Highly unlikely; Discussions with Marine and Coastal Management (DEAT) confirm that operations are unlikely not impact on rock lobster fishing which largely limited to the area inshore of the application area. This has been supported by the consultation with the West Coast Rock Lobster Sea Management Association which requests engagement where activities will occur inshore of the 100m isobath (see Section 5).
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	4: Severe
<i>Significance</i>	9: Low

4.3.5 EXCLUSION OF OTHER USERS – OFFSHORE TRAWL FISHERY

<i>Impact Description</i>	Potential exclusion of alternative resource use in the form of the offshore trawl fishery and potential hazard if vessels not adequately visible, due to the physical presence of vessels in an area
<i>Status</i>	Negative
<i>Probability</i>	1: Highly unlikely; The offshore trawl fishery is largely focussed in water depths of >200m and therefore little if any overlap is expected. This was confirmed during consultation with the Deep Sea Trawling Industry Association (see Section 5).
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	4: Severe
<i>Significance</i>	9: Low

4.3.6 EXCLUSION OF OTHER USERS – PELAGIC FISHERY

<i>Impact Description</i>	Potential exclusion of alternative resource use in the form of the pelagic fishery and potential hazard if vessels not adequately visible, due to the physical presence of vessels in an area
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable; The demersal fishery overlaps with the application area, however activity is concentrated below the 100m isobath with concentration of effort increasing significantly towards the shore. The degree of overlap will need to be managed as part of the EMP.
<i>Extent</i>	2: Local (confined to a radius of between 2-20 km of the impact site)
<i>Duration</i>	2: Short term
<i>Intensity</i>	4: Severe
<i>Significance</i>	10: Medium

4.3.7 LOSS OF EQUIPMENT TO SEABED

<i>Impact Description</i>	Irretrievable loss of sampling / mining / vessel equipment, resulting in the creation of obstacles on the seabed
<i>Status</i>	Negative
<i>Probability</i>	2: Improbable; lost equipment is unlikely to cause a hazard for other marine users due to the operating water depths and the very limited activity in the area of operation, mitigation measures are in place to ensure that the location and nature of hazards are reported to the appropriate Authority
<i>Extent</i>	1: Site specific (<1 km radius)
<i>Duration</i>	5: Permanent
<i>Intensity</i>	2: Mild
<i>Significance</i>	10: Medium

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SECTION 5: CONSULTATION

A process of Affected Party consultation has been undertaken as required in terms of Section 2.2 of the Department of Minerals and Energy's letter of acceptance of an Application by De Beers Consolidated Mines for a Prospecting Right for portions of Sea Areas 1(c) and 6(c) on the west coast of South Africa within the Namaqualand District (Ref NCS 30/5/1/1/2/908 PR). This requires De Beers Consolidated Mines to notify in writing and consult with the landowner or lawful occupier and any other affected party and submit the result of such consultation to the Directorate: Mineral Regulation, Northern Cape Region on or before the 4 February 2010. A Record of Consultation was submitted (Roos, 2010). Table 5.1 below provides a summary of the parties that received the Background Information Document, the reason for their Affected Party status, contact persons and responses received.

Table 5.1: Summary of consultation

Name & Organization	Date of response	Method	Correspondence Received
MARINE MINING COMPANIES			
Alexkor			No reply
Trans Hex Operations (Pty) Ltd (Trans Hex)	21-Jan-2010	Fax	<p>Correspondence from stakeholder: The application areas are situated within Trans Hex's prospecting area which is Concessions 6c and therefore, as part of impact assessment and where relevant upon approval of your Environmental Management Plan, kindly provide Transhex with the following:</p> <ul style="list-style-type: none"> - Notification in writing at least 14 days prior to prospecting activities, providing particulars regarding location, nature and extent of such operations; - Notification in the event of any spillage during prospecting activities; - An emergency response plan. <p>Other requirement</p> <ul style="list-style-type: none"> - Protection and indemnity cover to be provided to Transhex on request <p>Should you have any queries regarding this communication, please do not hesitate to contact the undersigned.</p>
OFFSHORE PETROLEUM INDUSTRY			
Petroleum Agency SA	19-Jan-2010	Email	<p>Correspondence from stakeholder: Steve Mills: Notification of some errors in the coordinates listed. These were amended and a corrected BID was emailed to IAPs.</p>
	2-Feb-2010	Email	<p>Correspondence from stakeholder: The matter refers to the Background Information Document (BID) received on 19 January 2010 in relation to the above and we would like to submit our comments as follows:</p> <ol style="list-style-type: none"> 1) The existing literature and research studies undertaken within the West Coast of South Africa reveals the possibility of the presence of sites of shipwrecks and therefore this should be investigated further during environmental assessment. 2) In terms of petroleum exploration and production applications and operations, Q Venture Development (SA) Limited has a pending application within the area. Other companies with petroleum interests and operations within the area include Forest Exploration International, PetroSA and Anschutz. We would like to advise that the above mentioned companies be consulted as affected parties. 3) There are recorded historic exploration wells in relation to petroleum resources in and around the proposed area and these should be identified so that an exclusion zone can be imposed around these wells prior to the commencement of any prospecting activities. <p>Further details regarding the specific location of these wells can be obtained from the Agency. In light of the above, the Agency does not have any objection with regard to the proposed prospecting application. We therefore as an interested party, would like to be kept informed of the application process and/or the outcomes thereof.</p> <p>Engagement with BHP Billiton was initially not included as they do not hold overlapping or adjacent concessions, but it was noted that the DME had specifically requested engagement with BHP in the approval letter. As a result the BID was submitted to them for comment on 2 February 2010. Since these areas are not proximate to our 3A/4A and 3B/4B exploration blocks, BHP Billiton has no comments re the applications. We remain interested in working with De Beers as activities in the general area progress, and appreciate the fact that you contacted us re the applications.</p>
BHP Billiton	02-Feb-2010	Email	

Organization	Date of response	Method	Correspondence Received
OFFSHORE PETROLEUM INDUSTRY			
Forest Exploration International (SA) (Pty) Ltd	08-Feb-10	Phone	Anschen Friedrichs confirmed via telephone that other than ongoing engagement as commented by CAA Environmental, Forest International (SA) has no further comment on the application.
PetroSA	27-Jan-2010	Fax	Correspondence from stakeholder (Jessica Courtoreille): No comment, but request to remain on mailing list for information
Q Venture Development (South Africa) Ltd	01-Feb-2010	Email	Correspondence from stakeholder (Trevor Ridley): QVD has no comments on your application, other than we would of course like to be kept informed of your plans to ensure they do not clash with our plans where our areas of activity overlap and to co-ordinate our respective activities when a clash of operations otherwise might occur.
Anschutz (South Africa) (Pty) Ltd			Unable to contact
CCA Environmental	19-Jan-2010	Email	Correspondence from stakeholder (Jonathan Crowther): Thank you for this information. I assume that you have forwarded this to all the oil and gas rights holders/applicants in the area, including Forest Exploration International, PetroSA and QVD? We have no specific comment in this regard, except to say that De Beers and the oil and gas industry need to continue interacting to ensure that there is no overlap of planned exploration activities.
FISHING INDUSTRY			
Deep Sea Trawling Association	01-Feb-2010	Email	Correspondence from stakeholder (Roy Bross): No Comment on Prospecting. Probably will have plenty to say if (and when) prospecting leads to commercial exportation because trawl grounds will be affected.
SA Pelagic Fish Industry Association			No comment received
South African Commercial Line Fishing Association			No comments received
West Coast Rock Lobster Association	29-Jan-2010	Email	Correspondence from stakeholder (Peter Foley): We wish to advise that the Association will be interested in any mining activities that are activated within the 100m contour line in our Fishing Zone A in the Northern Cape. Any activities deeper have no real effect on the inshore rock lobster resource.
GOVERNMENT			
Marine & Coastal Management			No comments received.
Marine & Coastal Management, Chief Directorate: Research, Antarctica and Islands			No comments received.
SANBI WWF Offshore MPA Project, South African National Biodiversity Institute			No comments received.

SECTION 6: ENVIRONMENTAL MANAGEMENT

6.1 ENVIRONMENTAL MANAGEMENT SYSTEM

De Beers Marine has implemented an ISO14001 compliant Environmental Management System (EMS) covering all marine mining and associated activities. This system was certified in August 1998 by the South African Bureau of Standards, and ongoing surveillance audits ensure that the system meets all requirements of the ISO14001 standard.

The scope of the EMS includes all shore-based and marine activities, products and services in all areas of operation over which De Beers Marine (Pty) Ltd has control or influence, related to:

- marine surveying, sampling and mining services,
- vessel conversions and in-port periods.

6.1.1 ENVIRONMENTAL POLICY

De Beers Marine's Environmental Policy forms the foundation for its ISO14001 Environmental Management System and specifically addresses the responsible management of activities in the South African Marine Areas. The Policy is reviewed on a regular basis to ensure that it is relevant to the business.

6.1.2 ENVIRONMENTAL ASPECTS AND IMPACTS

The company's activities, environmental aspects and impacts are documented in database, which is maintained and updated on a regular basis. This will include all aspects and impacts identified through the Environmental Impact Assessment for the Prospecting Area, so that these can be managed as an integral part of the EMS.

6.1.3 LEGAL AND OTHER REQUIREMENTS

Legal and other requirements are documented in the intranet-based environmental 'Impacts and Legal Register' and are updated according to the Environmental Legislation Procedure.

6.1.4 ENVIRONMENTAL MANAGEMENT PROGRAMMES

Environmental objectives and targets are established to ensure that the Environmental Management Plan is implemented. Appropriate management plans, responsibilities and deadlines are set for each objective and target and progress towards achieving these is reviewed on a regular basis.

6.1.5 STRUCTURE AND RESPONSIBILITIES

The company is divided into business units, the heads of which form the Management Team. One permanent staff member is dedicated full-time to environmental management within DBM and is the management representative in terms of ISO14001. Specific environmental responsibilities are documented in an Environmental Responsibilities Procedure.

6.1.6 TRAINING, AWARENESS AND COMPETENCE

A procedure has been implemented to ensure that employees and suppliers/contractors performing tasks that can have a significant impact on the environment;

- are competent to perform these tasks, based on appropriate education, training and/or experience or where necessary receive appropriate training / communication / re-orientation
- understand the environmental impacts of their activities and the consequences of departure from specified procedures,
- know how to respond to emergencies which can cause environmental damage,
- are able to recognize potential environmental impacts in their work area,
- understand the environmental benefits of improved performance,
- are informed of the relevant procedures that have been implemented to reduce or remove these impacts, e.g. pollution prevention and control, waste management.
- where applicable, comply with the Safety, Health and Environmental Rules for Contractors

6.1.7 COMMUNICATION

Channels of communication are documented in two procedures:

- The Internal Environmental Communication Procedure details Company top-down, lateral and bottom-up communication channels and includes reference to the Company Balanced Score Card.
- The External Environmental Communication Procedure documents communication external to the company. This includes, making available information about the company's significant aspects and impacts to interested and affected parties, addressing concerns, notifying other marine users of planned activities.

6.1.8 OPERATIONAL CONTROL

Standard operating procedures exist for addressing activities which can lead to environmental impacts and which cover the statutory and regulatory requirements.

6.1.9 EMERGENCY PREPAREDNESS AND RESPONSE

Emergency preparedness and response procedures for all activities that can lead to environmental impacts are detailed in emergency manuals. These include a Shipboard Oil Pollution Emergency Response Plan for all vessels operated by De Beers Marine.

6.1.10 MONITORING AND MEASUREMENT

Environmental monitoring programmes conducted by De Beers Marine in terms of its ISO14001 EMS include:

- Benthic invertebrate fauna surveys.
- Marine mammal sightings surveys.
- Monitoring of resource use, waste management and recycling.
- Recording of anchor and other equipment losses.

6.1.11 CORRECTIVE AND PREVENTATIVE MEASURES

Environmental non-conformances include, legal non-compliance, deviations from EMS requirements and environmental incidents. The process for dealing with environmental non-conformances is laid out in the Environmental Non-conformance Procedure. The company Incident Reporting and Investigation Policy is followed when dealing with environmental incidents and the investigation thereof.

6.1.12 AUDITING

As part of their ISO14001 Environmental Management System, De Beers Marine conduct environmental audits to evaluate compliance with, and effectiveness of, the system. This includes annual Surveillance Audits conducted by external auditors. In addition, environmental protection, emergency procedures, drills, equipment, incident reporting and investigation are also dealt with during regular safety management system audits and audits to confirm compliance with the International Safety Management (ISM) Code of the International Maritime Organisation (IMO).

6.1.13 ADDRESSING BIODIVERSITY IMPACTS / THREATS

The prospecting area falls within the sub-photic (below the depth of light penetration) continental shelf zone of the Namaqua Bioregion, as defined in the "South African National Spatial Biodiversity Assessment 2004. Technical Report. Volume 4: Marine Component". This report notes that there is, as yet, no biodiversity-conservation Marine Protected Area (MPA) in the Namaqua Bioregion, and recognises that demersal trawling and deepwater mining constitute the main potential threats to west coast soft-sediment habitats in this region. With specific regard to mining, the report recommends that:

"Mining on the west coast (diamonds, oil and gas) needs to be countered with good research on the effects of this mining, and the setting aside of representative habitats, in which no mining is permitted. These representative areas are also required for benchmarks and research (as reference sites). We need a better understanding of the impacts of mining on biodiversity and marine habitats. The shallow /on-shore mining operations cause the greatest environmental problems."
(LOMBARD ET AL 2004)

The need to find effective ways of conserving representative areas of marine benthic biodiversity in this bioregion have been addressed at length in a Specialist Scoping Workshop for the De Beers' EMPR which was conducted as part of the ML3/2003 diamond mining licence application in 2005. Recommendations are as follows:

- Increasing attention has been given in recent years to "non-use" of certain marine areas, through establishment of Marine Protected Areas focussed on conserving biodiversity in representative coastal regions.
- Inadequate data exist with which to assess benthic biodiversity in the subtidal west coast area. Without such data, it is impossible to identify or adequately assess the "sensitivity" of various areas to potential future activities.
- Mining companies have an obligation to gather and contribute data on benthic diversity, impacts and recovery processes, but only in areas that they will impact in some way. Appropriate pre-mining baseline benthic biodiversity surveys need to be conducted in areas to be affected by planned prospecting or mining activities, before such activities are extended to these areas. Surveys should be designed to determine composition of macro-benthic communities in relation to sediment distribution patterns. These surveys should be integrated with the benthic Impact / Recovery surveys. Designing and conducting of these surveys should be done in cooperation with any National Biodiversity Survey that may be initiated on the west coast. Resultant baseline biodiversity data should be offered to any National Biodiversity Survey initiated on the west coast.
- Marine benthic biodiversity over wider areas needs to be evaluated under the auspices of a national programme run by DEAT: MCM or the National Biodiversity Institute over the next 5 to 10 years.
- A broad consultative process must be initiated prior to promulgation of any west coast MPA, to provide all stakeholders with the opportunity to contribute to evaluation of MPA positioning and management options.

Following on from these recommendations, De Beers Marine has been partnering with the World Wildlife Fund for Nature and the South African National Biodiversity in the Offshore Marine Protected Areas (OMPA) project. The partnership involves:

- sharing of information, expertise and tools towards addressing the lack of benthic biodiversity knowledge in the Namaqua bioregion,
- making offshore biodiversity information from surveys and sediment samples available
- providing accurate spatial information about offshore mining activities and their impacts to enable conservation planners to more accurately reflect the pressures on offshore biodiversity
- support of and engagement in the planning phase for the development of a network of Offshore Marine Protected Areas, that adequately protects South Africa's offshore marine biodiversity and enjoys wide support from all stakeholders.

6.2 ENVIRONMENTAL MANAGEMENT PLAN

A. EMP MONITORING AND PERFORMANCE ASSESSMENT		RESPONSIBILITIES	TIMING
#	ACTION PLANS & CONTROL MEASURES		
A.1 EMP Compliance	<ul style="list-style-type: none"> ➤ Conduct monitoring of EMP compliance using the mechanism of De Beers Marine's ISO 14001 Environmental Management System. ➤ Compile and submit EMP Performance Assessment Reports to the Department of Minerals and Energy. ➤ Ensure compliance with the International Maritime Organisation's International Safety Management (ISM) Code developed for the proper development, implementation and assessment of safety and pollution prevention management in accordance with good practice. 	Environmental Manager, DBM	Continuous
A.2 EMP Amendments	<ul style="list-style-type: none"> ➤ On an ongoing basis, identify and address new activities and remove obsolete ones, particularly when new or changed mining methods and/or equipment are used and amend the EMP, if required and submit to Department of Minerals and Energy for approval. 	Environmental Manager, DBM	When there is a change in scope
A.3 Financial Provisioning	<p>Ensure that the requirements of the MPRDA in terms of financial provision for remediation of environmental damage are met by:</p> <ul style="list-style-type: none"> ➤ Allocate operational costs to meet EMP requirements. ➤ Maintain adequate Protection and Indemnity (P&I) Insurance Cover to allow for cleanups in the event of oil spills and other eventualities. ➤ Provide sufficient funds for to execute the environmental management plan in the event of premature closure or in then event that on closure the environmental management plan has not been successfully executed. 	Project Manager, DBM	Ongoing
A.4 Closure	<ul style="list-style-type: none"> ➤ When applying for closure, submit the following documentation to the Department of Minerals and Energy: <ul style="list-style-type: none"> - A final layout plan - A Closure Plan as contemplated in Regulation 62 of the MPRDA - An Environmental Risk Report as contemplated in Regulation 60 of the MPRDA - A Final Performance Assessment Report as contemplated in Regulation 55(9) of the MPRDA - A completed application form to transfer environmental responsibilities and liabilities, if such transfer has been applied for. 	Environmental Manager, DBM	Prior to closure application

B. NATURAL ENVIRONMENTAL FACTORS		
#	ACTION PLANS & CONTROL MEASURES	TIMING
B.1 Seismic surveying	<ul style="list-style-type: none"> ➢ Maintain the Sightings Programme (including marine mammals, turtles etc.) from vessels. 	Ongoing
B.2 Sampling	<ul style="list-style-type: none"> ➢ Calculate and report on annual and cumulative sampled area ➢ Collect data on organisms appearing on the sorting screens ➢ Make available data of a non-confidential nature to relevant agencies / regional or national programmes involved in biodiversity conservation / evaluation and management of marine ecosystems. 	Ongoing
B.3 Loss of ferrosilicon in tailings	<ul style="list-style-type: none"> ➢ Maintain records of all FeSi used / discarded overboard with tailings & continue initiatives to maximise retrieval of ferrosilicon, for example, use shell crushing equipment when operating in shelly substrates. 	Ongoing
B.4 Air emissions	<ul style="list-style-type: none"> ➢ Comply with the MARPOL requirements with regards exhaust emissions ➢ As part of the Planned Maintenance System, service all equipment regularly and repair as required to reduce consumption of fuels and other petrochemical materials, and to minimise the release of green house gases 	Ongoing
B.5 Waste management	<ul style="list-style-type: none"> ➢ Implement all applicable MARPOL standards for disposal of general waste, hazardous waste, organic waste (food waste and sewage effluent), greywater, sewerage, bilge water, incineration of shipboard waste and the maintenance of waste records. 	Ongoing
B.6 Control of aircraft flight paths	<ul style="list-style-type: none"> ➢ Recognise the International importance of the entire Orange River RAMSAR conservation area and maintain appropriate flying altitudes when flying over this area 	Ongoing

B. NATURAL ENVIRONMENTAL FACTORS		
#	ACTION PLANS & CONTROL MEASURES	TIMING
B.7 Marine pollution resulting from the grounding of a vessel or a vessel sinking or a collision or an accident during refuelling at sea	<ul style="list-style-type: none"> ➤ Maintain all emergency procedures as legally required ➤ In the event of an emergency including fire, grounding or sinking, or collision follow the South African Maritime Safety Authority approved Shipboard Oil Pollution Emergency Plan and Emergency Response Manuals, which include: <ul style="list-style-type: none"> - Ensuring safety of personnel onboard - Stabilising the ship and limit damages - Containing the spill if possible - Immediately reporting accidental spills to the relevant Authorities and Professional Bodies providing full details of the incident. ➤ Maintain the required onboard oil pollution response equipment ➤ In the event of an oil spill, where feasible, provide facilities to rescue, stabilise, and fly oiled seabirds to SANCCOB for further rehabilitation ➤ Notification to Transhex Operations of the occurrence of any Moderate or Major overboard spills during prospecting activities 	<p>Ongoing</p> <p>Ongoing</p> <p>Per event</p>
	<p>Operations Manager, DBM</p> <p>Environmental Manager, DBM</p> <p>Environmental Manager, DBM</p>	

C. SOCIOECONOMIC FACTORS			RESPONSIBILITIES	TIMING
#	ACTION PLANS & CONTROL MEASURES			
C.1	Communication with Interested and Affected Parties	<ul style="list-style-type: none"> Maintain an up to date IAP database and communicate with the relevant IAPs regarding activities in areas of overlapping interest, this includes both the fishing and petroleum industries. 	Environmental Manager, DBM	Ongoing
C.2	Presence of vessel / impact of prospecting activities on other industries	<ul style="list-style-type: none"> Liaise with overlapping marine diamond concession and petroleum licence holders regarding prospecting plans, including information regarding location of operations, specific starting and finishing dates, as well as progress of operation 	Project Manager, DBM	During Work Plan Preparation & Quarterly thereafter
C.2	Presence of vessel / impact of prospecting activities on other industries	<ul style="list-style-type: none"> Inform the West Coast Rock Lobster Sea Management Association if any activities are activated within the 100m contour line Notify the Director: Mineral Development of Northern Cape Department of Minerals and Energy, overlapping marine diamond concession, petroleum licence holders fishing industry associations and other Affected Parties 14 days prior to operations, providing particulars regarding the location, nature and duration of such operations 	Project Manager, DBM	Per event
C.3	Heritage sites	<ul style="list-style-type: none"> Should any archaeological sites or historical material be identified during survey or sampling operations ensure that: <ul style="list-style-type: none"> Position of the site should be documented The Maritime Archaeologist at the South African Heritage Resources Agency, Cape Town and the Maritime Archaeology Unit of Isiko Museum, Cape Town are notified Sampling in the immediate area to be avoided to prevent damage until feedback from the authorities is received. 	Project Manager, DBM	14 days prior to operations
C.4	Incidental loss of equipment – obstacles	<ul style="list-style-type: none"> Maintain hazards database listing the type of gear left on the seabed and/or in the mine/prospecting area with the dates of loss and locations and where applicable, the dates of retrieval. If requested, report these data to the relevant authority 	Operations Manager, DBM	Per event
C.5	Location of oil & gas exploration wellheads	<ul style="list-style-type: none"> Ensure that location of wellheads is mapped on the prospecting database and that the necessary exclusion zone is applied 	Operations Manager, DBM / Mine Surveyor	Per event
			Mine Surveyor	Prior to survey or sampling operations

6.3 QUANTUM OF FINANCIAL PROVISION

During Phase I of the prospecting, work is restricted to desk top work and geophysical surveys, with no disturbance of the seabed. Phase II will involve coring and potential use of megadrill sampling equipment. The number of samples taken will be dependent upon the outcome of earlier survey work. Natural rehabilitation of the sample holes will occur with time – see findings of Rehabilitation Report submitted to DME in 2004 (PENNEY, A.J. and PULFRICH, A. (2004) Recovery and Rehabilitation of Deepwater Marine Diamond Mining Operations off the Southern African West Coast, prepared by PISCES Environmental Services (Pty) Ltd for De Beers Marine. This report presents the evidence of natural rehabilitation that has been gathered from benthic surveys conducted in mined out areas off the west coast of southern Africa.

Financial provisioning, in the form of Protection and Indemnity (P&I) Insurance, is provided for all De Beers Marine vessels to address oil spills in the event of a maritime emergency such as grounding or sinking of a vessel. P&I is insurance in respect of third party liabilities and expenses arising from owning ships or operating ships. Ship owners insure against these liabilities through P&I Clubs, which are non-profit, mutual insurance associations. They have existed for over 140 years and have a convincing track record of commitment to P&I insurance. P&I Clubs provide the most comprehensive cover available and letters of undertaking from P & I Clubs are generally accepted worldwide not requiring bank guarantees to free ships from arrest. P & I Clubs pool larger risks under the auspices of the International Group of P & I Clubs.

In addition, R60 000 will be provided, in the form of a financial guarantee, to execute the Environmental Management Plan in the event of premature closure or in the event that on closure the Environmental Management Plan has not been fully executed. This includes an Assessment of Performance against the Environmental Management Plan as outlined in section 6.2, collation of data and the preparation of a closure report. The proposed quantum of the financial guarantee has been aligned with the financial provisioning requested by the Directorate of Mineral Regulation for the Northern Cape Region for the 2c, 3c, 4c & 5c prospecting application.

THE REGIONAL MANAGER
NORTHERN CAPE REGION

REFERENCES

CARTER, R.A. (2008) *Evaluation of Water Quality Risks in the SASA ML3 Mining Area*. Prepared for De Beers Marine (Pty) Ltd by Lwandle Technologies (Pty) Ltd. Pp 24.

FINDLAY, K. (2005) *Assessment of the Potential Acoustic Impacts of Marine Diamond Prospecting on Marine Mammals of the South African West Coast Region*. Prepared by Cetus Projects cc for De Beers Marine (Pty) Ltd. 64pp.

LANE, S.B. & CARTER, R. (1999). *Generic environmental management programme for marine diamond mining off the west coast of South Africa*. Marine Diamond Mines Association, Cape Town, South Africa. 6 volumes.

LOMBARD, A.T., STRAUSS, T., HARRIS, J., SINK, K., ATTWOOD, C. & HUTCHINGS, L. 2004: *South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 4: Marine Component*. South African National Biodiversity Institute, Pretoria.

MCM: DEAT (2005) *Policy for the Allocation and Management of Commercial Fishing Rights in the Small Pelagics (Anchovy and Sardine Purse-Seine) Fishery: 2005*. Department of Environmental Affairs and Tourism, Branch Marine and Coastal Management. 16pp.

PENNEY, A.J. and PULFRICH, A. (2004) *Recovery and Rehabilitation of Deepwater Marine Diamond Mining Operations off the Southern African West Coast*. Prepared by PISCES Environmental Services (Pty) Ltd for De Beers Marine. 92pp.

PENNEY, A.J. (2005) *Scoping Report: Review of the EIA and EMPR for De Beers South African Sea Areas Prospecting and Mining Concessions along the West Coast*. Prepared by PISCES Environmental Services (Pty) Ltd for De Beers Marine. 93pp

ROOS, L . (2005) *Environmental Management Programme Report for South African Sea Areas Mining Licence ML3/2003*. Compiled by concession operator De Beers Marine for concession holder De Beers Consolidated Mines, 163 pp.

ROOS, L.A (2010) *Record of Consultation: De Beers Consolidated Mines Application for Prospecting Right for Sea Areas 1(c) and 6(c)*. Prepared by De Beers Marine (Pty) Ltd on behalf of De Beers Consolidated Mines.23pp.

VAN BALLEGOOYEN, R. and MORANT, P. (2006) *Oil Spill Modelling and Impact Assessment for De Beers' Horizontal Mining Vessels Operating in South Africa Sea Areas Mining Licence Area ML3/2003 and Namibian Atlantic 1 Mining Licence Area*. Prepared by the CSIR on behalf of De Beers Marine (Pty) Ltd. CSIR Report No. CSIR/NRE/ECO/ER/2006/0191/C.

VISSER, J. (2006) *Desktop Analysis and Recommendations on the Phase I Pre-disturbance Survey of the Area Designated for South African Sea Areas Prospecting Licence 7b*. Isiko Museums of Cape Town. Prepared for De Beers Marine (Pty) Ltd. 20pp.



