



DE BEERS GROUP

**REQUEST FOR A PART 1 AMENDMENT TO THE  
ENVIRONMENTAL MANAGEMENT PLAN REPORT**

**for  
SOUTH AFRICAN SEA AREAS 4C AND 5C  
PROSPECTING RIGHTS**

**NC 30/5/1/1/2/12043 PR  
and NC 30/5/1/1/2/12022 PR**

**Concession holder:**

**DE BEERS CONSOLIDATED MINES (PTY) LTD**

**Concession operator:**

**DE BEERS MARINE (PTY) LTD**

**SEPTEMBER 2019**

# **PART 1 AMENDMENT TO THE EMPr for SOUTH AFRICAN SEA AREAS 4C AND 5C PROSPECTING RIGHTS**

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Compiled by:

Lesley Roos

De Beers Marine (Pty) Ltd

PO Box 87 Cape Town 8000

Reference:

ROOS, L. (2019) Request for Part 1 Amendment to Environmental Management Plan Report for South African Sea Areas 4c and 5c Prospecting Rights NC 30/5/1/1/2/12043 PR and NC 30/5/1/1/2/12022 PR. Compiled by concession operator De Beers Marine for concession holder De Beers Consolidated Mines, 11 pp.

## 1. EXECUTIVE SUMMARY

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This document serves to amend the Environmental Management Programme Report prepared for the Prospecting Rights NC 30/5/1/1/2/12043 PR and NC 30/5/1/1/2/12022 PR, located in South African Sea Areas 4C (Figure 1) and 5C (Figure 2) respectively of the Northern Cape.

Belton Park Trading 127 (Pty) Ltd were granted prospecting rights for the prospecting of Diamond (General) (D) within South African Sea Area 4C (NC 30/5/1/1/2/12043 PR) and 5C (NC 30/5/1/1/2/12022 PR), District Namaqualand, Northern Cape Province. A single approved EMPr is applicable to both prospecting rights. The EMPr prepared for Geophysical Survey is dated September 2013, this was then followed by an Addendum for Sampling. This Amendment request applies only the Geophysical Survey activities.

On 22 February 2019, the prospecting rights were ceded to De Beers Consolidated Mines (Pty) Ltd (DBCM). The prospecting rights are operated by De Beers Marine (Pty) Ltd (DBM), the appointed operator of DBCM. DBCM would like to amend the above-mentioned EMPr to allow for the use of alternative survey techniques which were not included in the EMPr, namely towed equipment (and potentially the use of an autonomous underwater/surface vehicle) for the authorised geophysical survey activities.

## 2. DETAILS OF HOLDER OF THE PROPECTING PERMITS

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De Beers Consolidated Mines (Pty) Ltd is the applicant.

Address:	De Beers Consolidated Mines (Pty) Ltd Cnr Crownwood Road and Diamond Drive Theta Ext 4 Johannesburg 2013	
Responsible Persons:	Nompumelelo Dessederia Zikalala	Michelle Bossenger
Telephone:	+27 (0) 11 374 7000	+27 (0) 11 374 7203
Facsimile:	+27 (0) 11 309 3284	+27 (0) 11 309 3284

## 3. DETAILS OF THE OFFSHORE OPERATOR

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De Beers Marine (Pty) Ltd  
PO Box 87  
Cape Town 8000

Contact Persons:  
Geosciences Manager, De Beers Marine  
Tel: +27-21-658-3210  
[Michele.Kruse@debeersgroup.com](mailto:Michele.Kruse@debeersgroup.com)

Environmental Manager, De Beers Marine  
Tel: +27-21-658-3194  
[lesley.roos@debeersgroup.com](mailto:lesley.roos@debeersgroup.com)

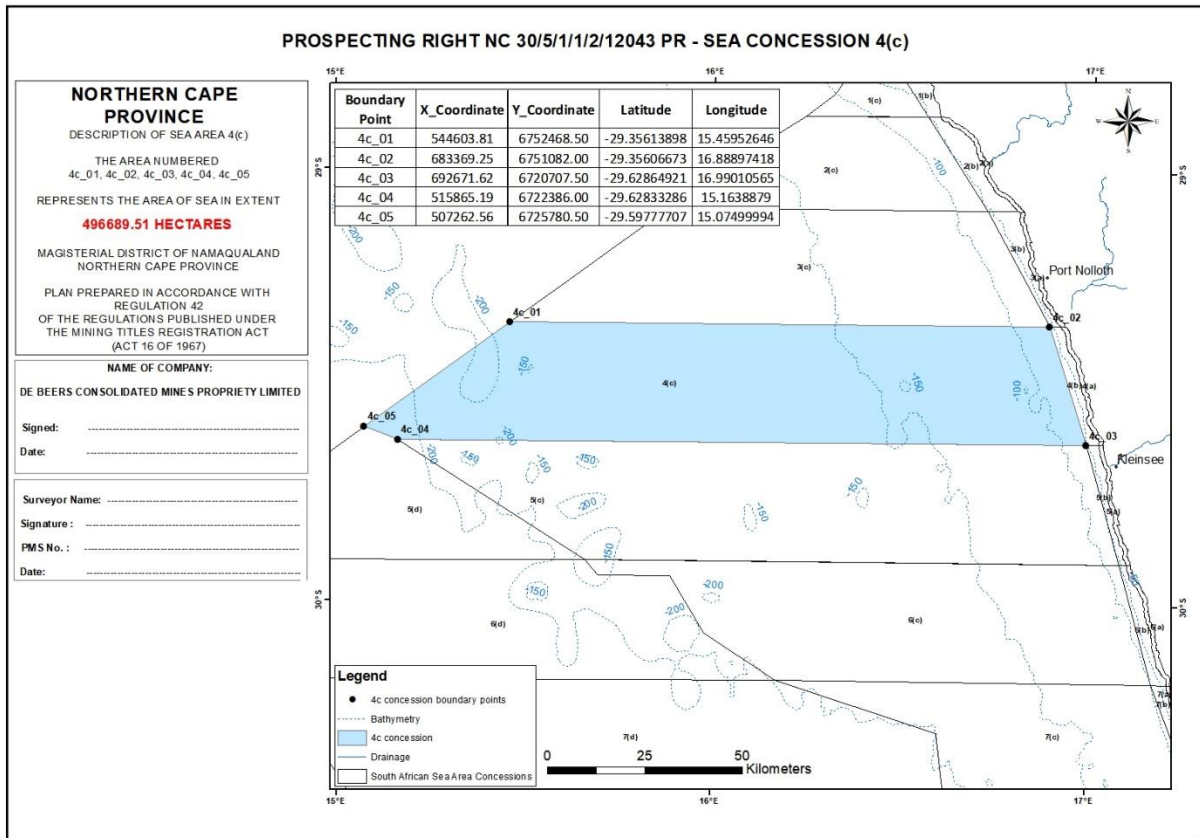


Figure 1: Map of the Prospecting Rights NC 30/5/1/1/2/12043 PR in South African Sea Area 4C

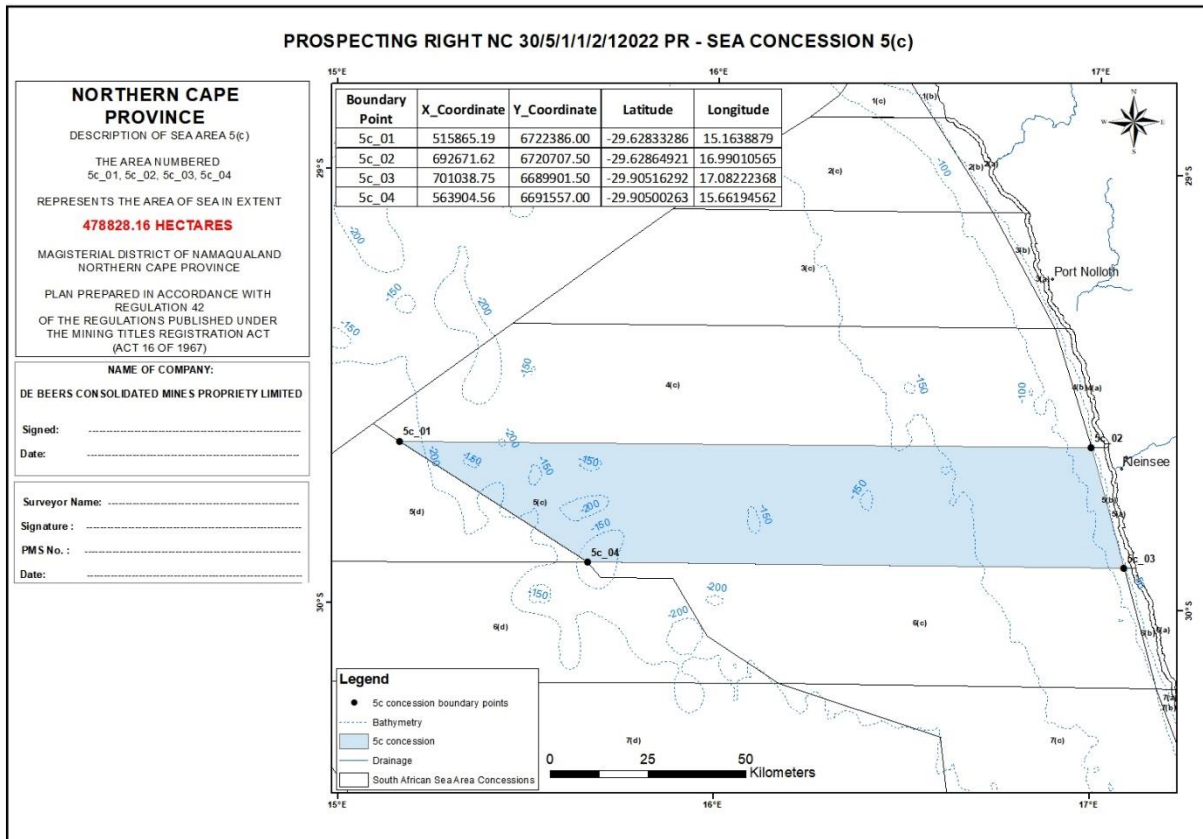


Figure 2: Map of the Prospecting Right NC 30/5/1/1/2/12022 PR in South African Sea Area 5C

#### 4. RATIONALE BEHIND THE AMENDMENT

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De Beers Consolidated Mines would like to amend the above-mentioned EMPr to allow for the use of alternative survey techniques which were not included in the EMPr, namely towed equipment (and potentially the use of an autonomous underwater/surface vehicle) for the authorised geophysical survey activities.

The approved EMPr makes provision for undertaking geophysical surveys using:

- *“a multibeam echosounder designed to produce high resolution digital terrain models of the seafloor by transmitting a 30 kHz sounding in a wide swath below the vessel; and*
- *a parametric sub-bottom profiler, which uses shallow (35 to 45 kHz) and medium penetration (1 to 10 kHz) “Chirp” seismic pulses to generate profiles up to 60 m beneath the seafloor thereby giving a cross section view of the sediment layers.”*

In the approved EMPr it was stated that the above-mentioned systems were hull-mounted onto the dedicated survey vessel, the *DP STAR*, and that no towed equipment would be used. The estimated sound levels from the above-mentioned acoustic equipment were stipulated as ranging from 190 to 220 dB re 1 µPa at 1 m.

De Beers Consolidated Mines now propose to amend the approved EMPr to make provision for undertaking geophysical surveys using alternative survey tools. The amendment also includes a change to the proposed vessel to a vessel of opportunity and the use of towed equipment and Autonomous Underwater Vehicles (AUV) /Autonomous Surface Vehicles (ASV).

#### 5. SECTIONS OF THE EMPR AFFECTED BY THE AMENDMENT

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The following sections of the EMPr are affected by the change in fuel type and are addressed within this application for amendment:

PART 1: General Information

- 1.6.2 Extent of Prospecting Area
- 1.6.3 Proposed Prospecting Method
- 1.6.4 Planned Prospecting Duration

PART 4: Description of the Proposed Project

- 4.1 Detailed Project Description
- 4.2 Proposed Timetable, Duration and Sequence: (Geophysics)

Correspondence received from Dr Andrea Pulfrich of Pisces Environmental Services (Pty) Ltd (Marine Fauna specialist and original author of the approved EMPr) notes that the proposed amendment to the planned geophysical survey techniques (and vessel to be used) would in no way affect the significance of the impacts previously assessed in the approved EMPr (see Appendix A). In addition, it is stated that the mitigation measures included in the approved EMPr would also remain the same. These are provided in Section 7 for reference. Thus, the proposed amendment can be considered a Part 1 Amendment in terms of Regulation 29 of the Environmental Impact Assessment (EIA) Regulations, 2014 (Government Notice (GN) No. 982 of 4 December 2014, amended by GN No. 325 of 7 April 2017), as the proposed amendment to the use of alternative geophysical survey tools would not “increase the level or nature of the impact ... initially assessed and considered” in the approved EMPr.

## 6. AMENDMENT TO PART 1 – GENERAL INFORMATION

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### 6.1 Extent of Prospecting Area (section 1.6.2 of EMP Report)

The geophysical survey data planned to be acquired within a 1000km<sup>2</sup> area in each concession area (4c and 5c).

### 6.2 Proposed Prospecting Method (section 1.6.3 of EMP Report)

Geophysical Surveys will be conducted using equipment described in section 7.1 below.

### 6.3 Planned Prospecting Duration (section 1.6.4 of EMP Report)

Geophysical surveying is expected to be conducted in stages with the total period not exceeding 6 months in concessions 4C and 5C.

## 7. AMENDMENT TO PART 4 – DESCRIPTION OF THE PROPOSED PROJECT

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### 7.1 Detailed Project Description (section 4.1 of EMP Report)

The inshore portions of Concessions 2C, 3C, 4C and 5C have undergone geophysical surveys, sampling and test mining programmes over the past 30 years. Based on these investigations and subsequent geological, geotechnical and mineralization models, a patchy, low to medium grade diamond deposit has been identified overlying the Pre-Cambrian and Cretaceous bedrock. The diamonds are concentrated in gravels associated with storm lag beach deposits between up to around 160 m below current sea level.

As resource generation in the marine environment is an ongoing process, the principal objective of the current proposed prospecting is to further delineate and re-estimate the potential diamond resource for further future mining in the area. The prospecting activities would be conducted in a phased approach, with each phase dependent on the results of the previous phase.

The first phase of the proposed prospecting activities would entail conducting geophysical surveys in order to identify geological features of interest for possible further exploration. The geophysical survey equipment will be deployed from a fit-for-purpose vessel that is suited to the water depth and selected survey method. The proposed survey tools may include the following:

- **Swath bathymetry:**  
Swath bathymetry typically utilises backscattered sound energy from sonar signals to produce a digital terrain model of the seafloor and develop textural models.

- **Sub-bottom profiler seismic systems:**

The sub-bottom profiler seismic systems (e.g. boomer, chirp and sleeve gun) that may be used for the proposed survey work are typically powerful low frequency echo-sounders that provide profiles of the upper layers of the ocean floor. Some examples of the sub-bottom profilers that may be used are given below:

Chirp or e.g. IXSEA Echoes: A typical low frequency bottom profiler that emits an acoustic pulse at frequencies ranging from 1.5 – 12.5 kHz and typically produces sound levels in the order of 202 - 227 dB re 1 $\mu$ Pa at 1 m.

Sleeve Gun system: Sleeve Gun systems generate medium penetration profiles typically up to 50 m beneath the seafloor in order to provide a cross section view of the sedimentary layers. The emitted pulse would be at frequencies ranging from 100 – 800 kHz and typically would produce sound levels in the order of 220 dB re 1 $\mu$ Pa at 1 m.

Boomer: The boomer is a broad-band sound source operating in the 300 Hz – 3 kHz range. The system electrically charges two spring loaded plates that repel one another to generate an acoustic pulse while being towed behind the vessel. The reflected signal from the acoustic pulse is then received by a towed hydrophone streamer. Depending on the subsurface material types, resolution of the boomer system ranges from 0.5 to 1 m with a penetration depth from 25 to 50m. Source level sound is expected to be around 215 dB re 1 $\mu$ Pa at 1 m.

- **Side scan sonar systems:**

Side scan sonar systems produce acoustic intensity images of the seafloor and are used to map the different sediment textures of the seafloor. Side-scan uses a sonar device, towed from a surface vessel, mounted on the ship's hull or pole-mounted, that emits conical or fan-shaped pulses down toward the seafloor across a wide angle perpendicular to the path of the sensor through the water. The intensity of the acoustic reflections from the seafloor of this fan-shaped beam is recorded in a series of cross-track slices. When stitched together along the direction of motion, these slices form an image of the sea bottom within the swath (coverage width) of the beam. A typical side scan sonar emits a pulse at frequencies ranging from 135 to 850 kHz and typically produces sound levels in the order of 190 – 242 dB re 1 $\mu$ Pa at 1 m.

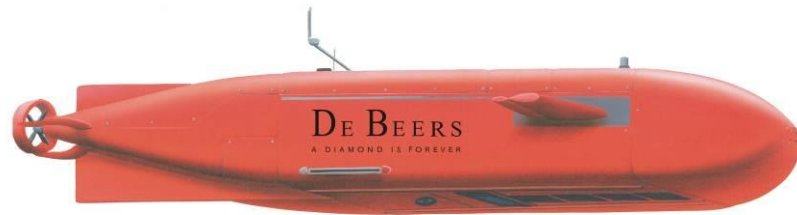
- **Magnetometer:**

A 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. A magnetometer is useful in defining magnetic anomalies which represent ore (direct detection), or minerals associated with ore deposits (indirect detection).

- **Multibeam Echo Sounder:**

The use of multi-beam bathymetry survey allows the operator to produce a digital terrain model of the seafloor. The multi-beam system provides depth sounding across a swath width of approximately two times the water depth. Typical multi-beam echo sounder emits a fan of acoustic beams from a transducer at frequencies ranging from 200 kHz to 400 kHz and typically produces sound levels in the order of 221 db re 1µPa at 1 m.

An Autonomous Underwater/Surface Vehicle (AUV/ASV) may also be used for survey. The AUV/ASV typically includes survey tools mentioned above (Figure 3).



**Figure 3:** Autonomous Underwater Vehicle (AUV)

## 7.2 Proposed Timetable, Duration and Sequence (section 4.2 of EMP Report)

### Geophysics

The proposed geophysical prospecting activities would be undertaken within Sea Concessions 4C and 5C, located off the West Coast of South Africa. The target mineral for the prospecting activities is marine diamonds and the proposed geophysical work is expected to be as follows:

The first stage of the proposed prospecting activities would entail conducting regional scale geophysical surveys in order to identify geological features of interest for possible further exploration. The line spacing of the surveys for this phase of prospecting is planned such as to enable regional scale seabed coverage.

Should geological features of interest be identified from the regional surveys, then a decision will be made regarding the feasibility of proceeding to follow-up localised/higher resolution geophysical surveys and exploration sampling (part of subsequent phase). These follow-up localised geophysical surveys would be undertaken in order to refine the definition of the target features identified from the regional scale surveys.

These geophysical survey data are expected to be acquired in a total period not exceeding 6 months in concessions 4C and 5C and within a 1000km<sup>2</sup> area in each concession.

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

## 8. ENVIRONMENTAL MANAGEMENT PROGRAMME FOR PROPOSED ACTIVITIES

Table 1 provides the mitigation measures that will be implemented as per the Environmental Management Programme for the Geophysical Survey activities. These remain unchanged from the approved EMPr, apart from the updates which ensure that the references to petroleum and mineral rights holders are current. These changes are underlined in Table 1 for ease of reference.



**Table 1:** Environmental Management Programme for proposed prospecting activities

6.1 EMP MONITORING AND PERFORMANCE ASSESSMENT			
Item No.	Action Plans & Control Measures	Responsibilities	Timing
6.1.1 Compliance	<ul style="list-style-type: none"> <li>Ensure that a copy of the EMP is onboard the survey vessel.</li> <li>Conduct monitoring of EMP compliance.</li> <li>Compile and submit EMP Performance Assessment Reports to the Department of Mineral Resources (DMR).</li> <li>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.</li> </ul>	Manager	Continuous
6.1.2 EMP Amendments	<ul style="list-style-type: none"> <li>On an ongoing basis, identify and address new activities and remove obsolete ones, particularly when new or changed surveying and prospecting methods and/or equipment are used. Amend the EMP as required and submit to DMR for approval.</li> </ul>	Manager	When there is a Change in scope
6.1.3 Financial Provisioning	<ul style="list-style-type: none"> <li>Ensure that the requirements of the MPRDA in terms of financial provision for remediation of environmental damage are met by: - <ul style="list-style-type: none"> <li>Allocating operational costs to meet EMP requirements;</li> <li>Maintaining adequate Protection and Indemnity (P&amp;I) Insurance Cover to allow for cleanups in the event of oil spills and other eventualities; and</li> <li>Providing sufficient funds 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 successfully executed.</li> </ul> </li> </ul>	Manager	Ongoing
6.1.4 Closure	<ul style="list-style-type: none"> <li>When applying for closure, submit the following documentation to the DMR: <ul style="list-style-type: none"> <li>A final layout plan; application</li> <li>A Closure Plan as contemplated in Regulation 62 of the MPRDA;</li> <li>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; and</li> <li>A completed application form to transfer environmental responsibilities and liabilities, if such transfer has been applied for.</li> </ul> </li> <li>Submit Performance Assessment Report to the Department of Environmental Affairs.</li> </ul>	Manager	Prior to closure application

6.2 NATURAL ENVIRONMENTAL FACTORS			
Item No.	Action Plans & Control Measures	Responsibilities	Timing
6.2.1 Geophysical surveying	<ul style="list-style-type: none"> <li>• Ensure that Geophysical survey activities are conducted in compliance with the following:               <ul style="list-style-type: none"> <li>○ Carry out visual scans around the survey vessel prior to the initiation of any acoustic impulses.</li> <li>○ Pre-survey scans should be limited to 15 minutes prior to the start of survey equipment.</li> <li>○ 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.</li> <li>○ "Soft starts" should be carried out for any equipment of source levels greater than 210 dB re 1 <math>\mu</math>Pa at 1 m over a period of 20 minutes.</li> <li>○ The geophysical surveying should largely be undertaken between December and May, however, during the transition periods in June and November<sup>1</sup> surveying would be possible with stricter mitigation measures.</li> <li>○ Ensure that PAM (passive acoustic monitoring) is incorporated into any surveying taking place in June and and/ or November.</li> <li>○ A Marine Mammal Observer (MMO) should be appointed to ensure compliance with mitigation measures during geophysical surveying.</li> </ul> </li> </ul>	Manager	Ongoing
6.2.2 Air emissions	<ul style="list-style-type: none"> <li>• Ensure that survey vessel complies with the MARPOL requirements with regards to exhaust emissions.</li> </ul>	Manager	Ongoing
6.2.3 Pollution control and waste management (of products disposed of: into the air (exhausts, CFCs and incinerators, to sea (sewage, food, oils), to land (used oils etc., metals, plastic, glass, etc.)	<ul style="list-style-type: none"> <li>• Ensure that the survey vessel:               <ul style="list-style-type: none"> <li>○ Implements all applicable MAR POL 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.</li> <li>○ Minimises the discharge of waste material should obvious attraction of fauna be observed</li> <li>○ Records types and volumes of chemical and hazardous substances brought on board during the prospecting programme (e.g. neon lights, fluorescent tubes, toner cartridges, batteries etc.) and destination of wastes.</li> <li>○ Disposes of wastes generated during operations through an acceptable recycling company or at a licensed landfill site.</li> </ul> </li> <li>• Ensure applicable crew is trained in spill management.</li> </ul>	Manager	Ongoing

6.2 NATURAL ENVIRONMENTAL FACTORS			
Item No.	Action Plans & Control Measures	Responsibilities	Timing
6.2.4 Dealing with emergencies / marine pollution (owing to collision, vessel break-up, refueling etc.)	<ul style="list-style-type: none"> <li>• Ensure that the survey vessel:               <ul style="list-style-type: none"> <li>○ Maintains all emergency procedures as legally required.</li> <li>○ Adheres to obligations regarding other vessels in distress</li> <li>○ Where diesel, which evaporates relatively quickly, has been spilled, the water should be agitated or mixed using a propeller boat/dinghy to aid dispersal and evaporation.</li> </ul> </li> <li>• In the event of an emergency including fire, grounding or sinking, or collision, ensure that the approved Shipboard Oil Pollution Emergency Plan and Emergency Response Manuals are followed, which include:               <ul style="list-style-type: none"> <li>○ Ensuring safety of personnel onboard;</li> <li>○ Stabilising the ship and limit damages;</li> <li>○ Containing the spill, if possible; and</li> <li>○ Immediately reporting accidental spills to the relevant Authorities and Professional Bodies providing full details of the incident.</li> </ul> </li> </ul>	Manager	Ongoing
	<ul style="list-style-type: none"> <li>• In the event of an oil spill immediately implement emergency plans and notify (a) the Principal Officer of the nearest SAMSA office, (b) the DEAs Chief Directorate of Marine Pollution in Cape Town and (c) PASA Information that should be supplied when reporting a spill includes:               <ul style="list-style-type: none"> <li>○ The type and circumstances of incident, ship type, port of registry, nearest agent representing the ships company;</li> <li>○ Geographic location of the incident, distance offshore and extent of oil spill;</li> <li>○ Prevailing weather conditions, sea state in affected area (wind direction and speed, weather and swell); and</li> <li>○ Persons and authorities already informed of the spill.</li> <li>○ Where feasible, provide facilities to rescue, stabilise, and fly oiled seabirds to SANCCOB for further rehabilitation.</li> </ul> </li> </ul>	Manager	Per event
	<ul style="list-style-type: none"> <li>• Notification to <u>neighbouring diamond concession holders</u> of the occurrence of any Moderate or Major overboard spills during prospecting activities.</li> </ul>	Manager	Per event

6.3 SOCIOECONOMIC FACTORS			
Item No.	Action Plans & Control Measures	Responsibilities	Timing
6.3.1 Communication with Interested and Affected Parties	<ul style="list-style-type: none"> <li>• Through normal maritime communication channels, Radio Navigation Warnings, Notices to Mariners and other notifications keep the following interested and affected parties updated on the prospecting activities:               <ul style="list-style-type: none"> <li>○ Overlapping and neighbouring users with delineated boundaries in the oil and gas exploration and production industries and any prospecting and mining industries;</li> <li>○ SAN Hydrographic Office (Silvermine);</li> <li>○ Fishing industry (including Association of Small Hake Industries, SA Deep Sea Trawling Industry Association, SA Pelagic Fishing Industry Association, SA Commercial Linefish Association, SA Tuna Longline Association, and SA West Coast Rock Lobster Association);</li> <li>○ Government departments with jurisdiction over marine activities, particularly DEA, DAFF: MRM, PASA and</li> <li>○ DMR; and</li> <li>○ SAMSA and local Port Captains.</li> </ul> </li> </ul>	Manager	14 days prior to operations
6.3.2 Presence of vessel / impact of prospecting activities on other industries	<ul style="list-style-type: none"> <li>• Liaise with <u>neighbouring and overlapping petroleum and mineral rights holders</u> regarding prospecting plans, including information regarding location of operations, specific starting and finishing dates, as well as progress of operation.</li> </ul>	Manager	During Work Plan Preparation and when appropriate thereafter
	<ul style="list-style-type: none"> <li>• Inform the West Coast Rock Lobster Sea Management Association if any activities are activated within the 100 m contour line.</li> </ul>	Manager	Per event
	<ul style="list-style-type: none"> <li>• Ensure that the Vessel master records sightings of and interactions with other vessels to note potential conflicts over rights of passage and access to resources.</li> </ul>	Manager	Per event
6.3.3 Heritage sites	<ul style="list-style-type: none"> <li>• Should any archaeological sites or historical material be identified during survey operations ensure that:               <ul style="list-style-type: none"> <li>○ Position of the site is documented; and</li> <li>○ The Maritime Archaeologist at the South African Heritage Resources Agency, Cape Town and the Maritime Archaeology Unit of Isiko Museum, Cape Town are notified</li> </ul> </li> </ul>	Manager	Per event
6.3.4 Incidental loss of equipment / obstacles	<ul style="list-style-type: none"> <li>• Maintain hazards database listing the type of gear lost to the seabed and/or in the prospecting area with the dates of loss and locations and where applicable, the dates of retrieval.</li> <li>• If requested, report these data to the relevant authority</li> </ul>	Manager	Per Event

6.3 SOCIOECONOMIC FACTORS			
Item No.	Action Plans & Control Measures	Responsibilities	Timing
6.5.5 Inform relevant parties of survey completion	<ul style="list-style-type: none"><li>Inform all key stakeholders that the survey vessel has completed operations as per normal maritime communication practice.</li></ul>	Manager	Within two weeks of completion

## **APPENDIX A**



5 September 2019

Dear Sir/Madam

**EA AMENDMENT - GEOPHYSICAL SURVEYING IN SASA CONCESSIONS 4C and 5C**

The approved EMPR for geophysical surveying in SASA Concessions 4c and 5c covers the use of a hull-mounted multibeam echosounder and parametric sub-bottom profiler using ‘chirp’ seismic pulses. De Beers Consolidated Mines Limited now require an amendment to the EMPR for prospecting for diamonds in Concessions 4c and 5c to include various additional geophysical exploration tools. Table 1 below lists the frequency, cycle and source level of the currently approved and proposed new acoustic equipment that may be utilised during future geophysical surveys. The equipment would be deployed from a vessel of opportunity and would be towed or mounted onto Autonomous Underwater Vehicles (AUV) and/or Autonomous Surface Vehicles (ASV).

Table 1: Acoustic equipment that may be utilised in the proposed geophysical surveys in SASA concessions 4c and 5c. The additional equipment covered by this amendment are highlighted in grey.

Sound Type	Frequency	Cycle (impulses per second)	Source level (dB re 1 µPa at 1m)
Multibeam Echo Sounder	200 khz - 400 khz	40	221
Sub Bottom Profiler - Chirp	1.5 - 12.5 kHz	4	202 - 227
IXSEA Echo	1.7 - 5.5 kHz	-	224-227
Swath bathymetry	200 - 455 kHz	15 - 40	190 - 220
Side Scan Sonar	135 khz - 850 khz	10	190 - 242
Magnetometer:	Passive system	1	Not Applicable
Sleeve gun system	100 - 800 Hz	1	220
Boomer	300 Hz - 3.0kHz	-	215

The assessment of impacts of noise on marine fauna undertaken as part of the approved EMPR noted that there is considerable difference in the hearing sensitivities of marine animals, with the greatest auditory sensitivity of marine animals likely to be encountered during geophysical surveying operations being:

- Fish and elasmobranchs : <50 Hz to 1 kHz
- African penguins : 600 Hz to 4 kHz, with the upper limit of hearing at 15 kHz;
- Marine Turtles : 250 - 700 Hz;
- Fur seals : 2-32 kHz, with greater sensitivity to higher frequency sounds (>1 kHz);
- Baleen whales : <1 kHz; and
- Toothed whales and dolphins : 10 and 100 kHz.

The noise generated by the acoustic equipment to be utilized during the proposed geophysical surveys was thus deemed to fall within the hearing range of most fish and marine mammals, and would be audible for considerable distances (in the order of tens of km) before attenuating to below threshold levels. The emission of underwater noise from geophysical surveying and vessel activity is, however, not considered to be of sufficient amplitude to cause auditory or non-auditory trauma in marine animals in the region. Only directly below the systems (within metres of the sources) would received sound levels be in the range where exposure result in trauma or physiological injury. As most pelagic species likely to be encountered within the concessions are highly mobile, they would be expected to flee and move away from the sound source before trauma could occur. The underwater noise from the survey systems may, however, induce localised behavioural changes in some marine mammal, but evidence of significant behavioural changes that may impact on the wider ecosystem is lacking. Given the evidence available from the scientific literature, and that the noise produced during geophysical surveys would be localised and of short duration only, it was concluded that the impact of sounds generated by multibeam echo-sounders and sub-bottom profilers was of LOW significance without mitigation and VERY LOW significance with mitigation.

From the above, it follows that the use of the alternative acoustic equipment proposed for SASA concessions 4c and 5c would in no way affect the significance of the impacts as previously assessed in the approved EMPR. In addition, the mitigation measures included in the approved EMPR would remain the same. These measures are based on the guidelines developed by the Joint Nature Conservation Committee (JNCC 2017) for planned marine sonar operations and have been revised to be more applicable to the southern African situation.

For the sake of completeness, the relevant mitigation measures are copied below:

- Onboard Marine Mammal Observers (MMOs) should conduct visual scans for the presence of cetaceans around the survey vessel prior to the initiation of any acoustic impulses.
- Pre-survey scans should be limited to 15 minutes prior to the start of survey equipment.
- “Soft starts” should be carried out for any equipment of source levels greater than 210 dB re 1  $\mu$ Pa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity.
- 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. As no seasonal patterns of abundance are known for odontocetes occupying the proposed exploration area, a precautionary approach to avoiding impacts throughout the year is recommended.
- Ensure that PAM (passive acoustic monitoring) is incorporated into any surveying taking place between June and November.
- A MMO should be appointed to ensure compliance with mitigation measures during seismic geophysical surveying.

Yours sincerely



(Director)