

Information Sheet

Keraudren Phase 3 Marine Seismic Survey Environment Plan



Activity Overview

Santos is planning to conduct a marine seismic survey (the survey) in Commonwealth waters, within petroleum titles WA-437-P, WA-438-P and surrounding waters.

The survey is part of a broader Santos exploration program in the offshore Bedout Basin, which includes exploration and appraisal drilling activities. The drilling activities are being progressed as part of separate environmental approvals.

Location

The survey location is approximately 130 km north-east of Port Hedland and 64 km north of Cartamina Point on the West Australian coastline at the closest point (see **Figure 2**. activity location).

Timing

The activity is scheduled to occur between 1 January and 30 June 2028 (and a contingency of 1 January and 30 June 2029) subject to obtaining all regulatory and business approvals.

Duration

The expected duration of the survey is approximately 20-40 days, with operations to be undertaken on a 24-hour basis. The expected duration is a forecast and is subject to change based on vessel availability, adverse weather conditions, standby periods, or technical/equipment issues that may arise during operations.

Consultation and feedback

All petroleum activities in Commonwealth waters must have an Environment Plan (EP) accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before any activities can take place.

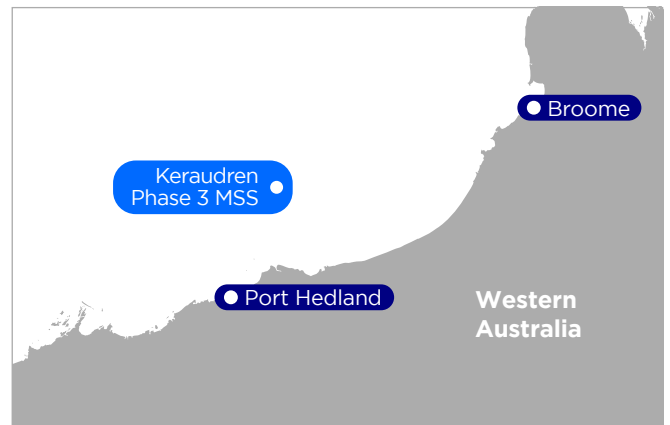


Figure 1. Bedout Basin, North West Shelf.

Under Commonwealth environment regulations, Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP. Santos consults to further ascertain, understand and assess potential environmental impacts and risks of a proposed activity and what, if any measures should be implemented to reduce these to 'as low as reasonably practicable' and to an acceptable level.

A relevant person includes Commonwealth and State agencies and authorities to which the proposed activity may be relevant, and persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Please contact us as soon as possible if you consider you may be a relevant person, to initiate consultation with you and so you can tell us how you would like to be consulted throughout the consultation process or if you need additional information.

The consultation period for this EP closes **30 March 2026**. More details on consultation and providing feedback can be found in the consultation section of this Information Sheet.

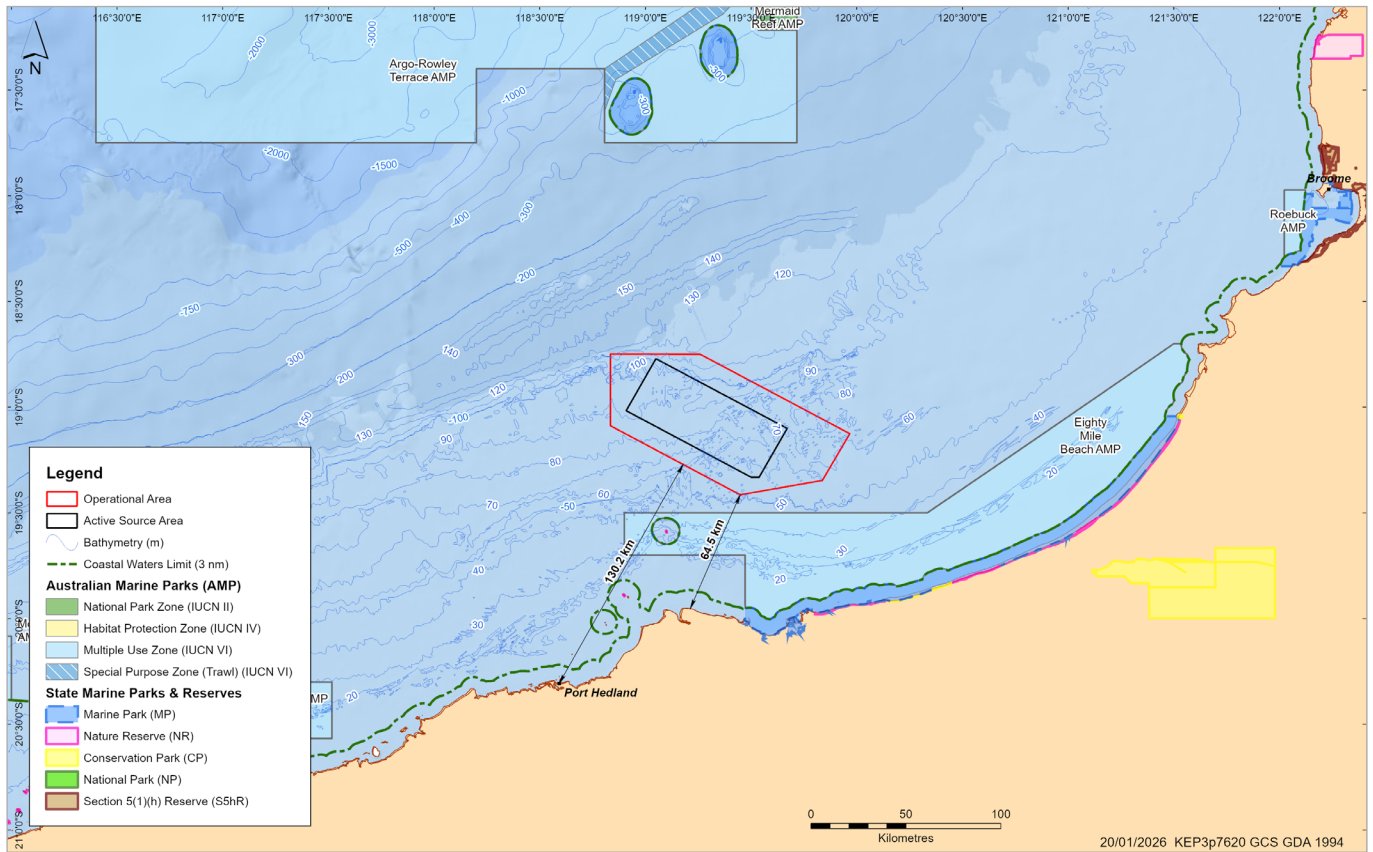


Figure 2. Activity Location



Figure 3. Example of a seismic array and marine seismic vessel for 3D or 4D surveys.

Table 1. Activity description

Activity Details	
Activity	<ul style="list-style-type: none"> • Seismic acquisition will be via methods and procedures consistent with other seismic surveys conducted in Australian waters. • The survey vessel will travel along a series of predetermined lines towing an array of acoustic sources and a series of cables (known as streamers or acoustic receivers) which contain microphones (known as hydrophones). • As the survey vessel travels along the lines, sound waves will be emitted from the seismic source and directed down through the water and into the geology below the seabed. • The sound that reflects back will be measured by the hydrophones and later processed to provide information about the structure and composition of geological formations below the seabed.
Operational Area and Active Source Area	<ul style="list-style-type: none"> • The survey is planned to occur within a defined Operational Area (OA). • Within the OA is a smaller area called the Active Source Area (ASA), where seismic data will be acquired. • The OA is larger than the ASA to provide sufficient room for safe manoeuvring of the seismic vessel and the trailing streamers. • The seismic source will only be discharged within the ASA.
Vessels, aircraft and other equipment	<ul style="list-style-type: none"> • One survey vessel will tow the seismic source arrays and streamers (see Figure 3. Image of a 3D seismic survey). • Up to two dedicated support vessels (one being a chase vessel) will accompany the seismic survey vessel to provide logistical, safety and equipment management duties. • A minimum of one support vessel will be in the OA when the survey vessel is acquiring data. • Helicopters may be used for crew changes, equipment supply, surveillance and emergency response.
Exclusion and cautionary zones	<ul style="list-style-type: none"> • A 3 nm (5.6 km) exclusion (safety) zone will be in place around the seismic vessel and trailing streamers for the duration of the activity.

Table 2. Activity coordinates

	Approximate total area	Approximate water depth	Latitude	Longitude
Operational Area	5,631 km ²	50-135 m	19° 0' 54.699" S	118° 41' 54.401" E
			18° 40' 22.954" S	118° 54' 10.086" E
			19° 12' 57.212" S	119° 54' 51.410" E
			19° 20' 48.243" S	119° 50' 13.533" E
			19° 24' 52.891" S	119° 26' 53.029" E
Active Source Area	2,315 km ²	55-95 m	18° 51' 2.966" S	119° 2' 22.387" E
			19° 9' 12.320" S	119° 36' 10.653" E
			19° 18' 58.423" S	119° 30' 23.392" E
			19° 1' 0.290" S	118° 56' 37.002" E

Environment that May Be Affected

Activity impacts and risks

In preparing EPs, Santos considers the environment that may be affected (EMBA) by proposed activities, inclusive of expected impacts from planned activities and potential risks from unplanned events (see **Figure 4**. Activity OA and EMBA location).

Our understanding of activity impacts and risks is informed by our experience over many years of managing offshore exploration, development, operations and decommissioning activities.

The majority of environmental or socio-economic impacts arising from planned activities typically occur within, or within proximity of, the OA.

Table 4 of this sheet provides a summary of key impacts.

Activity risks are adverse potential effects to the environment from unplanned events or accidents.

Table 5 of this sheet provides a summary of key risks.

For both impacts and risks, Santos is required by law to reduce these to as low as reasonably practicable and to an acceptable level as judged by the relevant Regulator.

Spill prevention, preparedness and response

For offshore marine operations, including those in the energy industry, a key management priority is preventing spills into the marine environment. This is achieved through robust equipment and facility design, rigorous inspection and maintenance programs, comprehensive workforce training, and adherence to the control measures outlined in **Table 4** and **Table 5**.

Preparedness and response are equally important. Preparedness begins with identifying all potential spill scenarios, including the worst case. Response planning involves developing strategies for managing each scenario, ensuring any incident can be addressed rapidly, effectively and at the appropriate scale.

To support our preparedness and response planning we use sophisticated computer modelling to simulate hypothetical spills and predict how a spill may behave and spread in the marine environment.

These models start with a single hypothetical spill from a set release point, subject to a single set of wind and weather conditions, considering the hydrocarbon type and volume that may be lost to the environment. Additional wind and weather conditions for different times of the year are then applied to the model.

This level of detail is essential because different hydrocarbons behave differently depending on their properties, the release location and the environmental conditions at the time. For example, lighter hydrocarbons such as condensate break down more quickly than heavier hydrocarbons, especially in warmer offshore waters.

Santos considers hundreds of hypothetical spills for each EP, which we then combine into a single “worst case” map (see **Figure 4** for this EP) assuming no responses are implemented and to present all areas that could be affected.

Understanding this full extent allows us to develop appropriate response strategies and demonstrate our capability to respond effectively, regardless of where a spill might occur.

It should be noted that the geographic extent of an actual spill would be significantly smaller than the extent shown in the map presented at **Figure 4**.

In the unlikely event of an actual spill, new modelling using near real-time wind and weather conditions would be undertaken to predict where the spill may go and how it may behave in the marine environment.

This helps us in conjunction with State, Territory or Commonwealth agencies (where appropriate) to prioritise environmental social, economic and cultural features for protection, as well as implement the most effective response strategy.

Please see the **[NOPSEMA Spill Modelling Video](#)** for more information on oil spill modelling and why it is required for the preparation of Environment Plans.

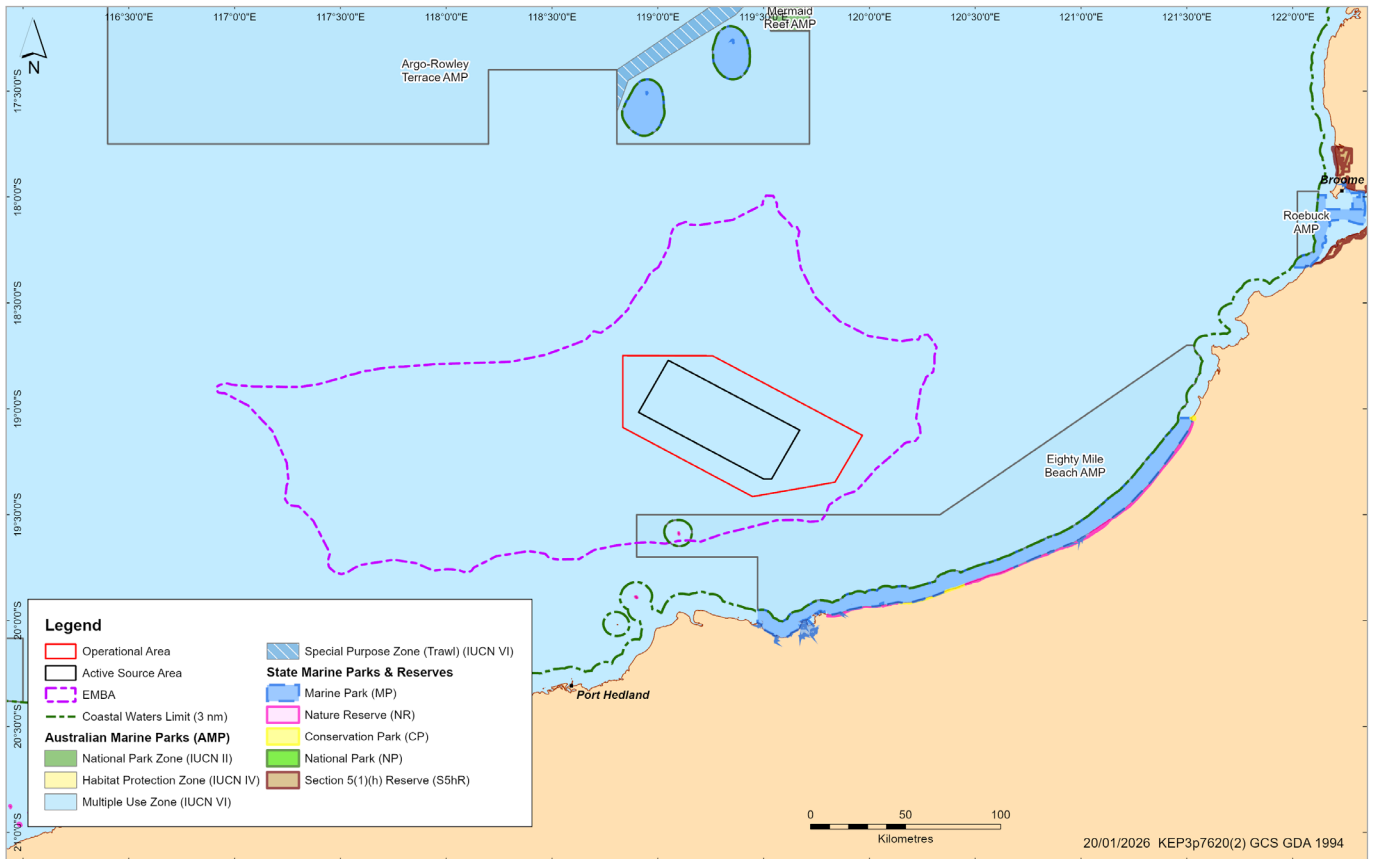


Figure 4. Activity OA and EMBA location.

Values and Sensitivities of the OA and EMBA

The EP includes a detailed description of the environment, including the social, economic and cultural features in the OA and EMBA. (see **Figure 4.**)

These are summarised below:

Environmental Values and Sensitivities

No protected places (Commonwealth Heritage Places, National Heritage Places, Wetlands of International Importance or National Importance) intersect the OA or the EMBA.

There are no Threatened Ecological Communities in the OA or the EMBA.

There are no activities occurring in Australian or Western Australian marine parks. However, the following marine parks and reserves are within the EMBA:

- Eighty Mile Beach Marine Park (Cth)
- Bedout Island Nature Reserve and an unnamed reserve (WA).

The OA overlaps the ancient coastline and Biologically Important Areas for flatback turtles (interesting), whale sharks (foraging), and humpback whales (migration).

A variety of marine fauna that are either known to occur or may occur include whales, sharks, turtles and seabirds.

A small section of the OA intersects the Ancient Coastline Key Ecological Feature.

Socio-Economic Values and Sensitivities

Four Commonwealth managed fisheries overlap the OA and EMBA, of which none have had any recent activity within the OA (as per available data from 2018-2023 seasons).

Multiple Western Australian managed fisheries overlap the OA and EMBA, of which the following have been active in the OA:

- Mackerel Managed Fishery
- Pilbara Line Fishery
- Pilbara Trap Managed Fishery
- Pilbara Fish Trawl Interim Managed Fishery

No local government areas intersect the OA. The Town of Port Hedland is responsible for Bedout Island which is located within the EMBA.

Recreational fishing may occur in the EMBA.

Marine and/or coast tourism organisations may operate in the EMBA.

Numerous energy industry titles and permits are within the EMBA, but none intersect the OA.

The OA overlaps one designated shipping fairway servicing Port Hedland.

The North West Cable System and the Darwin Jakarta Singapore Cable overlap the EMBA.

Heritage Values and Sensitivities

The OA and the EMBA does not include:

- Registered Aboriginal heritage sites
- Indigenous Land Use Agreements
- Indigenous Protected Areas
- Pending or registered Native Title claim areas

The OA does not intersect any Native Title Determined Areas. The EMBA intersects one Native Title Determined Area.

The OA and the EMBA overlap the Native Title Representative Body region for the Kimberley.

There are no historic shipwrecks in the OA. The nearest historic shipwreck located in the EMBA is the Koombana which is approximately 27 km from the OA.

Consultation

Consultation is an important part of EP development as it allows Santos to receive feedback from relevant persons (agencies/ authorities, persons and organisations) whose functions, interests or activities may be affected by proposed petroleum activities.

This feedback may help Santos to refine or change the management measures we are proposing to address activity impacts and risks.

Santos will assess the merits of any objection or claim about the adverse impact of the activities proposed provided through the consultation process, with any responses summarised and included in the EP submitted to the Regulator for assessment.

Under government environment regulations Santos is required to provide relevant persons with:

- **sufficient information** to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities, and
- **a reasonable period** for the consultation

More information

More information about how community members can participate in environmental approvals for activities proposed in Commonwealth waters has been published in a [brochure](#) by NOPSEMA.

Contact us

Engaging with this consultation will help Santos better understand the values and sensitivities of the environment and inform evaluation of the potential impacts and risks associated with the activity, and how to manage them properly.

To engage with our consultation or request for further information, please contact Santos on details provided below.

You may request that particular information you provide during consultation not be published. If you choose to do so, Santos will ensure that it is included in a separate report which is not published on NOPSEMA's website. Please refer to below links on privacy.

[Santos' Privacy Statement](#)

[NOPSEMA Privacy Policy](#)

Consultation dates for proposed activities are published on Santos' Consultation Hub website.

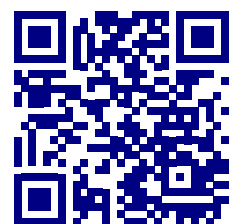
Consultation on this EP closes **30 March 2026**.

Our contact and Hub details are

E: offshore.consultation@santos.com

T: 1800 267 600

W: [santos.com/offshoreconsultation](https://www.santos.com/offshoreconsultation)



Activity impacts/risks and management measures

In preparing the EP, Santos' objective is to carry out the proposed activities in a manner by which the environmental impacts and risks of the activity will be reduced to a level that is As Low As Reasonably Practicable (ALARP) and acceptable. Aspects of the proposed activities will be risk-assessed within the EP. **Table 4** and **Table 5** summarise the potential environmental impacts, risks and associated mitigation and/or control measures for the proposed Activity.

Table 4. Potential Impacts for Planned Activities

Aspect	Description of impact	Proposed mitigation and/or control measures
Interaction with other marine users.	Physical presence of the survey vessel and supporting vessels could potentially inhibit or be an inconvenience to marine user groups.	<ul style="list-style-type: none"> • Notify commercial fishing licence holders via Western Australian Fishing Industry Council (WAFIC) prior to commencing activities. • Notify AHO prior to commencing activities. • Notify AMSA prior to commencing activities. • Exclusion safety zone established around the survey vessel and trailing streamers. • All vessels fitted with AIS systems and radars Navigation equipment and procedures.
Noise emissions from survey vessel, supporting vessels and helicopters.	<p>The seismic survey will be considered to have greatest noise impact from the array of acoustic sources discharged in a pre-determined order and at regular intervals, producing pulses of high-intensity low-frequency sound.</p> <p>Supporting vessels will emit noise from propellers, thrusters and operation of machinery and equipment. Most sounds associated with these vessels are broadband and continuous.</p>	<ul style="list-style-type: none"> • Implementation of EPBC Policy Statement 2.1 (Part A): <ul style="list-style-type: none"> • Pre start-up visual observations. • Soft start procedures. • Start-up delay procedure. • Operations procedure. • Shut-down procedure. • Night-time and low visibility procedures. • Marine fauna observation on board the survey vessel. • EPBC Regulations (Part 8) for interacting with cetaceans. • Adaptive management measures as relevant. • Adopt UK Diving Medical Advisory Committee Guidance Note DMAC 12.1 (DMAC 2020) as relevant.

Table 4. Potential Impacts for Planned Activities ... continued

Aspect	Description of impact	Proposed mitigation and/or control measures
Cumulative and additive impacts from performing the activity over the ASA.	<p>Cumulative impacts may occur where the effects of previous surveys overlap the same area and receptors.</p> <p>Additive impacts may result from other surveys where the effects may or may not overlap spatially but when taken together have an incremental effect on the same receptors.</p>	<ul style="list-style-type: none"> • Seismic source separation distance during concurrent surveys: minimum 40 km while operating. • Management of concurrent seismic surveys.
Light emissions from safety and navigational lighting on vessels.	During the activity, safety and navigational lighting on vessels will generate light emissions that may potentially affect marine fauna behaviour.	<ul style="list-style-type: none"> • Lighting will be used as required for safe work conditions and navigational purposes. • Review lighting in line with NLPG best practice lighting design (e.g. block out blinds).
Operational discharges	Small volumes discharged may cause localised nutrient enrichment, organic and particulate loading, toxic impacts to marine fauna, thermal impacts and increased salinity.	<ul style="list-style-type: none"> • Sewerage treatment system. • Oily water treatment system. • Waste management procedure. • General chemical management procedures. • Hazardous chemical management procedure.
Atmospheric emissions from use of fuel to power vessel engines, generators, mobile and fixed plant and equipment.	During the activity, localised and temporary impacts to air quality will occur.	<ul style="list-style-type: none"> • Use of MARPOL compliant fuel oil. • Waste incineration managed in accordance with MARPOL and Marine Orders. • All vessel engines to be maintained. • Ozone-depleting substance handling procedures. • Air pollution prevention certification.

Table 5. Potential Risks of Unplanned Events

Aspect	Description of risk	Proposed mitigation and/or control measures
Fuel release from a vessel collision	Marine Diesel Oil (MDO)/ Marine Gas Oil (MGO) spills have the potential to impact on marine environment through reduction in water quality and exposure to fauna and habitats.	<ul style="list-style-type: none"> • Compliance with regulatory requirements for the prevention of vessel collisions and safety and emergency events. • Consultation activities so that other marine users are informed and aware of the timing and location of proposed activities. • Notice to Mariner notifications issued via the Australian Hydrographic Office. • Constant bridge watch. • Vessels fitted with AIS systems and radars (virtual or installed). • Exclusion (safety) zone established to reduce potential for collision or interference with other marine user activities. • In the event of a hydrocarbon spill, an activity specific Oil Pollution Emergency Plan (OPEP) will be implemented to mitigate environmental impacts.
Spill response operations	In the event of a spill, response strategies will be implemented to reduce environmental impacts to ALARP.	<ul style="list-style-type: none"> • Oil Pollution Emergency Plan (OPEP) Spill response activities selected on basis of a Net Environmental Benefit Analysis (NEBA).
Minor hydrocarbon release	This can occur from refuelling a vessel resulting in loss of hydrocarbons to the marine environment at sea surface. Impacts to marine environment through reduction in water quality and marine fauna exposure.	<ul style="list-style-type: none"> • Use of MARPOL compliant fuel oil. • Deck drainage control measures in areas where chemicals and hydrocarbons are stored and frequently handled. • General and Hazardous Chemical Management Procedures. • Maritime dangerous goods code. • Bulk fuel transferred in accordance with vessel contractor procedure. • Vessel spill response plans. • Oil Pollution Emergency Plan (OPEP).

Table 5. Potential Risks of Unplanned Events ... continued

Aspect	Description of risk	Proposed mitigation and/or control measures
Hazardous and Non-hazardous Unplanned discharges – liquids	<p>Accidental loss of liquid wastes to the marine environment could occur via tank pipework failure or rupture, inadequate bunding and/or storage, insufficient fastening or inadequate handling leading to dropped objects, which may result in impacts to water quality and hence sensitive environmental receptors.</p> <p>In the event that the spill is not contained on deck, there would be a release to the marine environment, which would be likely to rapidly disperse and evaporate.</p>	<ul style="list-style-type: none"> • General and Hazardous Chemical Management Procedures. • Equipment maintenance in accordance with PMS. • Maritime dangerous goods code. • Dropped object prevention procedure. • Vessel spill response plans. • Oily water treatment system.
Unplanned discharges – solids	<p>Non-hazardous solid wastes (including paper, plastics and packaging) and hazardous solid wastes (such as batteries, fluorescent tubes, medical wastes, and aerosol cans) may be dropped unintentionally to the marine environment, potentially impacting on sensitive receptors.</p> <p>Localised as all non-buoyant waste material or dropped objects are expected to remain within the OA. Buoyant waste material or dropped objects could potentially move beyond the OA under wave action.</p>	<ul style="list-style-type: none"> • Equipment maintenance in accordance with PMS. • Streamers fitted with streamer recovery devices. • Waste management procedure. • Dropped object prevention procedures.
Equipment or vessels colliding with marine fauna	<p>The main collision risk associated with the Activity is through vessel collision or equipment collision with large, slow moving marine mammals potentially resulting in severe injury or mortality.</p>	<ul style="list-style-type: none"> • Use of a 'turtle friendly' tail buoy. • Marine fauna observations. • EPBC Regulations (Part 8) for interacting with cetaceans. • Streamer deployment/retrieval procedure. • Constant bridge watch.
Introduction of invasive marine species (IMS)	<p>IMS could be introduced into the OA and surrounds by vessels carrying IMS on external biological fouling, internal systems (sea chests, seawater systems etc.), on marine equipment such as seismic streamers, or through ballast water exchange.</p>	<ul style="list-style-type: none"> • Biosecurity risk management. • Ballast water management plan. • Aquatic Biosecurity Solution vessel check tool and immersible equipment cleaned. • Anti-foulant system.