



Scarborough State Waters Geophysical and Geotechnical Environment Plan Summary

Development

December 2018

Revision 1

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1. INTRODUCTION

Woodside Energy Ltd (Woodside), proposes to complete geophysical and geotechnical surveys to acquire survey data within Mermaid Sound. Primarily, the survey data will supplement previous geophysical and geotechnical surveys completed in the area, and is required to support the Front-End Engineering and Design (FEED) phase of the proposed Scarborough development. Additional survey data may also be acquired to help develop and/or operate Woodside's other assets in the region.

This Environment Plan (EP) Summary has been prepared as part of the requirements of *Regulation 11(7) and 11(8) of the Petroleum (Submerged Lands) (Environment) Regulations 2012* (Environment Regulations), as administered by the Department of Mines, Industry Regulation and Safety (DMIRS).

1.1 Defining the Activity

The activity comprises of geophysical and geotechnical surveys, hereafter referred to as the Petroleum Activities Program, primarily to support the proposed Scarborough development.

2. LOCATION OF THE ACTIVITY

The proposed Petroleum Activities Program will be conducted in the Operational Area as shown in **Figure 2-1**. Water depths range from 5 m to ~37 m. The Operational Area is adjacent to the shorelines of the Burrup Peninsula, and is ~3 km and < 1 km to the nearest shorelines to the west and east respectively. Coordinates are provided in **Table 2-2**.

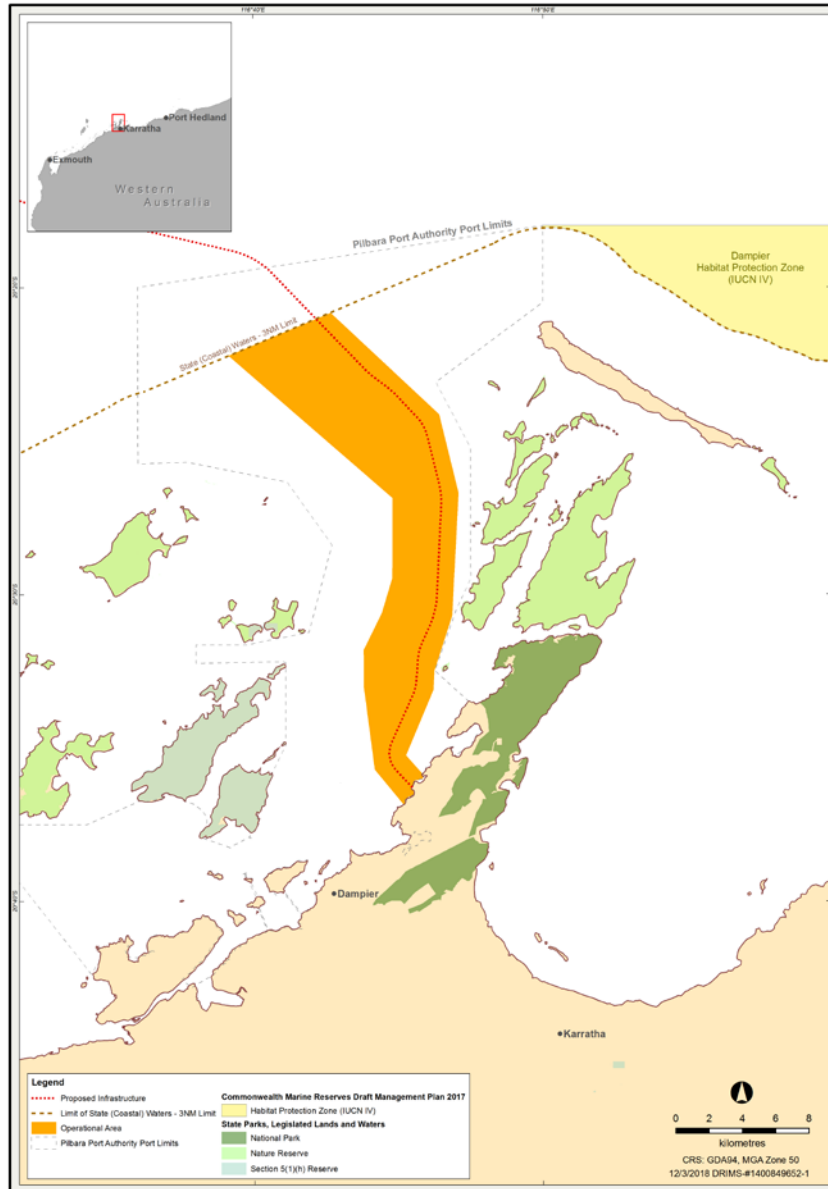


Figure 2-1: Location of the Petroleum Activities Program

Table 2-1: Coordinates of the Operational Area

Point	Latitude (GDA94)	Longitude (GDA94)
1	20°35'43.502"S	116°44'10.024"E
2	20°33'02.882"S	116°43'47.818"E
3	20°31'49.414"S	116°43'47.211"E

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4	20°30'36.963"S	116°44'25.673"E
5	20°29'28.954"S	116°44'47.007"E
6	20°26'52.662"S	116°44'47.938"E
7	20°22'14.190"S	116°39'08.028"E
8	20°20'50.318"S	116°42'40.008"E
9	20°24'08.725"S	116°46'24.632"E
10	20°26'42.595"S	116°47'04.762"E
11	20°30'43.220"S	116°46'51.381"E
12	20°32'30.078"S	116°46'14.151"E
13	20°33'07.877"S	116°46'12.121"E
14	20°35'15.627"S	116°45'15.312"E
15	20°35'50.624"S	116°45'48.353"E
16	20°36'50.913"S	116°45'09.178"E

3. DESCRIPTION OF THE ACTIVITY

3.1 Purpose of the Activity

Woodside is proposing to complete the Geophysical and Geotechnical Surveys to acquire data in the Mermaid Sound. Primarily, the survey data will supplement previous geophysical and geotechnical data collected in the region, and is required to support the FEED phase of the proposed Scarborough development.

3.2 Timing of the Activity

At the time of submitting this EP, one survey has been confirmed. This survey is planned to occur between the fourth quarter (Q4) of 2018 and first quarter (Q1) of 2019, lasting about 6–8 days. Timing and duration is subject to change due to project schedule requirements, vessel availability, unforeseen circumstances and weather.

After completing this survey, additional surveys in the Operational Area may be required. Up to two additional surveys each year could occur over the life of the EP. Refer to **Table 3-1** for additional details.

Table 3-1 Timing of surveys described within the Petroleum Activities Program

	Confirmed survey	Additional potential surveys
Survey #	1	A maximum of 2 surveys a year for the life of the EP
Duration	~ 6 – 8 days in the Operational Area	up to 14 days in the Operational Area
Timing	Between Q4 2018 and Q1 2019 for initial survey	From Q4 2018 until the end of the EP (i.e. 5 years).
Hours of Operation	24 hours	24 hours

3.3 Geophysical Surveys

The geophysical survey will be undertaken to acquire high-resolution data of the seafloor and may consist of some or a combination of the following survey methods:

- multibeam echo sounder (MBES)
- side scan sonar (SSS)
- sub-bottom profiler (SBP)
- video recording (drop camera or observation class remotely operated vehicle (ROV)).

3.4 Geotechnical Surveys

The geotechnical survey will collect further data for the proposed pipeline installation. Testing and sampling of the seabed may include piezocone penetration testing and the acquisition of piston core, vibro core, box core and water sampling.

3.5 Project Vessels

The Petroleum Activities Program may be done using general purpose vessels about 30–80 m long. A small inshore vessel may also be used in shallower waters.

Vessels will mobilise and demobilise out of Western Australian ports (planned to be Dampier, Broome or Exmouth), subject to negotiation with survey contractors. Port calls may be required, to change crew or reconfigure the vessel to use different survey equipment. No helicopter transfers are applicable.

4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The key existing environment characteristics, in line with the process of identifying and describing the existing environment in relation to the 'nature and scale' of the activity is provided below. The key existing environment characteristics are described in terms of the Operational Area and the Zone of Consequence (ZoC). The wider ZoC has been identified by hydrocarbon spill modelling of the credible worst case scenario (vessel grounding/vessel collision).

4.1 Physical Environment

The Operational Area is in the waters of the Mermaid Sound within the Dampier Archipelago, in waters ranging from ~ 5 m to 37m towards the State waters boundary. The coastal habitats along the Pilbara coast and nearshore islands, including the Dampier Archipelago, are part of the North West Shelf (NWS). The NWS is contiguous with the NWS province, which is a part of the wider North-west Marine Region (NWMR) as defined under the Integrated Marine and Coastal Regionalisation of Australia.

The climate of the NWMR is dry tropical, exhibiting a hot summer season from October to April and a milder winter season between May and September. There are often distinct transition periods between the summer and winter regimes, which are characterised by periods of relatively low winds. The region experiences a tropical monsoon climate, with distinct wet (January to July) and dry (August to November) seasons. Rainfall in the region typically occurs during the wet season, with highest falls observed during late summer, often associated with the passage of tropical low pressure systems and cyclones.

Winds vary seasonally, with a tendency for winds from the south-west during summer months (Sep – Mar) and the south-east in autumn and winter months (Apr – Aug). The summer south-westerly winds are driven by high pressure cells that pass from west to east over the Australian continent. During winter months, the relative position of the high pressure cells moves further north, leading to prevailing south-easterly winds blowing from the mainland. Winds typically weaken and are more variable during the transitional period between the summer and winter regimes, generally in April and August.

Tropical cyclones are a relatively frequent event in the region, with the Pilbara coast experiencing more cyclonic activity than any other region of the Australian mainland coast. Tropical cyclone activity can occur between November and April and is most frequent during December to March (i.e. considered the peak period), with an annual average of approximately one storm per month. Cyclones are less frequent in the months of November and April.

The large-scale ocean circulation of the NWMR is primarily influenced by the Indonesian Through Flow (ITF), and the Leeuwin Current. Both of these currents are significant drivers of the NWMR ecosystems. The ITF and Leeuwin Current are strongest during late summer and winter. Flow reversals to the north-east associated with strong south-westerly winds are typically weak and short lived but can generate upwelling of cold deep water onto the shelf.

In addition to the synoptic-scale current dynamics, tidally driven currents are a significant component of water movement in the NWS. Tides in the NWS are semi-diurnal and have a pronounced spring-neap cycle, with tidal currents flooding towards the south-east and ebbing towards then north-west. Wind driven currents become dominant during the neap tide. Storm surges and cyclonic events can also significantly raise sea levels above predicted tidal heights.

The operational area is located on the inner continental shelf, traversing from Holden Point through the Mermaid Sound in waters ranging from ~ 5 m to 37 m. Before construction, seabed surveys along the Pluto trunkline route concluded that sediments were predominantly fine sand with variable proportions of coarser sand fractions, silt, shells and shell fragments, and coral cemented materials (including calcarenite gravel and cobbles) (Golder, 2006). Hyperspectral mapping surveys characterised the majority of seabed around the Pluto trunkline as calcareous sand.

4.2 Biological Environment

Benthic Habitats

Benthic primary producer habitat is important to marine ecosystem functions, including acting as a substrate and providing shelter and food for marine fauna, and contributing to the physical stability of the seabed. Benthic primary producer habitats fringe the coast at locations across the Dampier Archipelago, and include scleractinian (reef building) corals, mangroves, seagrass and macroalgae.

Benthic habitats within the Operational Area are dominated by soft sand and silt, although small areas of coral reef are present in isolated locations. No other primary producers (e.g. mangroves or seagrass meadows) are known to occur.

Plankton

Primary productivity of the NWS is largely driven by offshore influences (as reported by Brewer et al., 2007), with periodic upwelling events and cyclonic influences driving coastal productivity, and with nutrient recycling and advection. Cyanobacteria and diatoms are the predominant phytoplankton contributors. It is expected that the dominant primary consumers are copepods, with a wide range of secondary consumers comprising larger planktonic taxa (including larval fish and invertebrates) (Brewer et al., 2007).

Pelagic and Demersal Fish Populations

Details of fish populations in the Operational Area are as follows:

- Fish fauna in the Pilbara region is considered diverse (Sainsbury et al., 1985) and shows a trend of decreasing species richness as depth increases (Last et al., 2005). Fish species richness has been shown to correlate with habitat complexity, with more complex habitat supporting greater species richness and abundance than bare areas (Gratwicke and Speight, 2005).
- The fish fauna of the Dampier Archipelago are diverse, with 735 species recorded (Hutchins, 2003). The fish fauna of the outer islands of the Dampier Archipelago are dominated by coral reef fishes (465 species), while mangrove and silty bottom dwellers (116 species) comprise the majority of fish assemblages in the inner area of the archipelago (Hutchins, 2004). The clearer waters in the northern perimeter of the archipelago near Legendre Island support the most diverse fish assemblages (Hutchins 2004). Closer to shore where waters are more turbid, fish diversity decreases.
- Coastal waters such as those of the Dampier Archipelago support schools of baitfish such as herring (*Herklotsichthys* spp.), sardine (*Sardinella* spp.) and anchovy (*Stolephorus* spp.) which provide food for pelagic fish, seabirds and cetaceans.
- Pelagic species in offshore waters of the NWS include marlin (*Makaira* spp.), sailfish (*Istiophorus* spp.), spanish mackerel (*Scomberomorus* spp.), golden trevally (*Gnathanodon* spp.), sharks (*Carcharhinus* spp.) and turrum (*Caranx* spp.). Some are targeted by recreational fishers (CALM, 2005).

4.2.1 Species

A total of 41 EPBC Act listed species considered to be MNES (i.e. listed as threatened or migratory) were identified as potentially occurring within the Operational Area or wider ZoC.(Table 4-1).

Table 4-1: Threatened and migratory marine species under the EPBC Act potentially occurring with the Operational Area or within the wider ZoC

Species Name	Common Name	Threatened Status	Migratory Status	Ops Area/ZoC	
				ZoC	Ops Area
Mammals					
<i>Balaenoptera musculus</i>	Blue Whale	Endangered	Migratory	Y	Y
<i>Megaptera novaeangliae</i>	Humpback Whale	Vulnerable	Migratory	Y	Y
<i>Balaenoptera edeni</i>	Bryde's Whale	N/A	Migratory	Y	Y
<i>Orcinus orca</i>	Killer Whale, Orca	N/A	Migratory	Y	Y
<i>Dugong dugon</i>	Dugong	N/A	Migratory	Y	Y
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin	N/A	Migratory	Y	Y
<i>Tursiops aduncus</i> (Arafura/Timor Sea populations)	Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)	N/A	Migratory	Y	Y
Reptiles					
<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Migratory	Y	Y
<i>Chelonia mydas</i>	Green Turtle	Vulnerable	Migratory	Y	Y
<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Endangered	Migratory	Y	Y
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Vulnerable	Migratory	Y	Y
<i>Natator depressus</i>	Flatback Turtle	Vulnerable	Migratory	Y	Y
<i>Aipysurus apraefrontalis</i>	Short-nosed Sea snake	Critically endangered	N/A	Y	Y
Sharks and Rays					
<i>Carcharodon carcharias</i>	White Shark, Great White Shark	Vulnerable	Migratory	Y	Y
<i>Manta birostris</i>	Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray	N/A	Migratory	Y	Y
<i>Anoxypristis cuspidata</i>	Narrow Sawfish, Knifetooth Sawfish	N/A	Migratory	Y	Y
<i>Manta alfredi</i>	Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray	N/A	Migratory	Y	Y

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Species Name	Common Name	Threatened Status	Migratory Status	Ops Area/ZoC	
				ZoC	Ops Area
<i>Pristis clavata</i>	Dwarf Sawfish, Queensland Sawfish	Vulnerable	Migratory	Y	Y
<i>Pristis zijsron</i>	Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable	Migratory	Y	Y
<i>Rhincodon typus</i>	Whale Shark	Vulnerable	Migratory	Y	Y
<i>Carcharias taurus</i>	Grey Nurse Shark (west coast population)	Vulnerable	N/A	Y	Y
Birds					
<i>Calidris canutus</i>	Red Knot, Knot	Endangered	Migratory	Y	Y
<i>Actitis hypoleucos</i>	Common Sandpiper	N/A	Migratory	Y	Y
<i>Anous stolidus</i>	Common Noddy	N/A	Migratory	Y	Y
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	N/A	Migratory	Y	Y
<i>Calidris melanotos</i>	Pectoral Sandpiper	N/A	Migratory	Y	Y
<i>Fregata ariel</i>	Lesser Frigatebird, Least Frigatebird	N/A	Migratory	Y	Y
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically endangered	Migratory	Y	Y
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (<i>baueri</i>), Western Alaskan Bar-tailed Godwit	Vulnerable	Migratory	Y	N/A
<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (<i>menzbieri</i>)	Critically endangered	Migratory	Y	N/A
<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	Endangered	Migratory	Y	Y
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Critically endangered	Migratory	Y	Y
<i>Sternula nereis nereis</i>	Australian Fairy Tern	Vulnerable	N/A	Y	Y
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	N/A	Migratory	Y	N/A
<i>Calonectris leucomelas</i>	Streaked Shearwater	N/A	Migratory	Y	Y
<i>Hydroprogne caspia</i>	Caspian Tern	N/A	Migratory	Y	N/A
<i>Sterna dougallii</i>	Roseate Tern	N/A	Migratory	Y	Y
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel	N/A	Migratory	Y	N/A
<i>Glareola maldivarum</i>	Oriental Pratincole	N/A	Migratory	Y	N/A
<i>Pandion haliaetus</i>	Osprey	N/A	Migratory	Y	Y
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	N/A	Migratory	Y	N/A

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Cetaceans

Several species of cetaceans were identified as potentially occurring within the Operational Area, including pygmy blue, humpback, Bryde's and killer whales, and the Spotted Bottlenose and Indo-Pacific Humpback Dolphin. A migration BIA for humpback whales overlaps the Operational Area during their annual seasonal migration. The peak of the northward migration in the Operational Area is during July, while the southern migration peaks in late August/early September. The southward migration of cow/calf pairs is slightly later during October (extending into November and December). Other cetacean species may infrequently transit the Operational Area; however, the Operational Area does not represent any critical habitat (feeding, resting or breeding aggregation areas) for other cetacean species that may occur in the region.

Marine Turtles

Five of the six marine turtle species recorded for the NWS have the potential to occur within the Operational Area and wider ZoC; the loggerhead turtle, green turtle, leatherback turtle, hawksbill turtle and the flatback turtle.

A number of BIAs overlap the Operational Area as well as a many areas considered habitat that is critical to the survival of marine turtle species, as identified in the Recovery Plan for Marine Turtles in Australia 2017–2027 (Commonwealth of Australia, 2017). These areas are:

- flatback turtle internesting buffer around the Montebello Islands and Dampier Archipelago during their summer nesting period; a nesting habitat critical to the survival of flatback turtles with a 40 km internesting buffer also overlaps this BIA.
- green turtle year-round internesting buffer over the Dampier Archipelago; a nesting habitat critical to the survival of green turtles with a 20 km internesting buffer also overlaps and slightly expands this BIA.
- hawksbill turtle internesting BIA over the Dampier Archipelago (peak season in spring and early summer); a nesting habitat critical to the survival of hawksbill turtles with a 20 km internesting buffer also overlaps and very slightly expands this BIA.
- loggerhead internesting buffer and nesting BIAs around Cohen and Rosemary Islands.

Sea Snakes

Sea snakes of the families *Hydrophidae* and *Laticaudidae* are widespread in the region, and are protected under the EPBC Act. The Protected Matters Search highlighted 16 species of sea snake listed under the EPBC Act that may occur in the Operational Area. The short-nosed sea snake (*Aipysurus apraefrontalis*) is a species endemic to WA and is listed as Critically Endangered. This species of sea snake inhabits shallow reefs and has been recorded from the Exmouth Gulf to the reefs of the Sahul Shelf (DSEWPaC, 2012b). The most commonly sighted sea snake in the region is the olive sea snake (*Aipysurus laevis*).

Sharks and Rays

Several shark/ray species, including the whale shark, great white shark, giant manta ray, reef manta ray, narrow sawfish, dwarf sawfish, green sawfish and grey nurse shark may be present within the Operational Area.

Seabirds and/or Migratory Shorebirds

The waters of the Operational Area are part of coastal open water foraging habitat of the Dampier Archipelago for a variety of seabirds. These waters near the coast may be used by seabirds that are resident in the area year-round, as well as migratory marine birds.

4.2.2 Socio-economic and Cultural

Heritage

There are no listed shipwrecks in the Operational Area or wider ZoC based on a search on the National Shipwreck Database

There are no heritage listed sites within the Operational Area; however, there are a number of gazetted and proposed National and Commonwealth heritage places in the wider ZoC, including:

- Dampier Archipelago (including Burrup Peninsula) Indigenous Heritage Place.

Ramsar Wetlands

There are no Ramsar-listed wetlands in the Permit Area.

Commonwealth and State Fisheries

A number of Commonwealth and State fisheries are located within both sections of the Operational Area and wider ZoC. **Table 4-2** provides further detail on the fisheries that have been identified through desk-based assessment and consultation.

Table 4-2 Commonwealth and State fisheries relevant to the Petroleum Activities Program (overlapping the ZoC and relevant sections of the Operational Area)

Fishery	Operational Area overlap	Expected effort in Operational Area	ZoC
Commonwealth Managed Fisheries			
Southern Bluefin Tuna Fishery	✓	✗	✓
Western and Eastern Skipjack Tuna Fishery	✓	✗	✓
Western Tuna and Billfish Fishery	✓	✗	✓
North West Slope Trawl Fishery	✓	✗	✓
Western Deepwater Trawl Fishery	✗	✗	✓
State Managed Fisheries			
Pilbara Demersal Scalefish Fishery (fish trawl, trap and line)	✓	✗	✓
West Coast Deep Sea Crustacean Managed Fishery	✓	✗	✓
Specimen Shell Managed Fishery	✓	✓	✓
Onslow Prawn Managed Fishery	✓	✓	✓
Pearl Oyster Managed Fishery	✓	✓	✓
Marine Aquarium Managed Fishery	✓	✓	✓
West Australian Abalone Fishery	✓	✗	✓
Mackerel Managed Fishery	✓	✓	✓
South West Coast Salmon Managed Fishery	✓	✗	✓

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Fishery	Operational Area overlap	Expected effort in Operational Area	ZoC
Nickol Bay Managed Prawn Fishery	✓	✓	✓

Tourism and Recreation

Recreational fishing in the NWS is mainly concentrated around the coastal waters and islands (including the Dampier Archipelago) (Department of Fisheries, 2011). The many islands of the Dampier Archipelago provide opportunities for nature-based tourist activities including fishing, diving, snorkelling, boating, wildlife appreciation, island tours, camping and a limited amount of surfing (CALM, 2005). Consequently, much of the recreational fishing activity is boat-based and concentrated in nearshore areas (Fletcher and Santoro, 2012). Licensed fishing tours are also a popular attraction, for which there are a number of operators in the region.

As most marine nature-based activities take place close to shore and among the islands, and generally away from the working port areas between the Dampier Cargo Wharf and NWS LNG jetties, it is expected that there is little potential for interacting with tourism and recreational fishing within the Operational Area.

Shipping

The region supports significant commercial shipping activity, mostly associated with the mining and oil and gas industries. Major shipping routes in the area are associated with entering the ports of Dampier and Barrow Island. Shipping activities in the region include:

- international bulk freighters/tankers arriving and departing from Dampier including mineral ore, hydrocarbons (LNG, liquefied petroleum gas, condensate) and salt carriers
- domestic support/supply vessels servicing offshore facilities and Barrow Island development
- construction vessels/barges/dredges
- offshore survey vessels.

The Australian Maritime Safety Authority (AMSA) has introduced a network of commercial shipping fairways on the NWS to reduce the risk of vessels colliding with offshore infrastructure. The fairways are not mandatory, but AMSA strongly recommends commercial vessels remain within the fairway when transiting the region.

Oil and Gas Infrastructure

The Operational Area abuts the Burrup Peninsula, which is an area of established oil and gas and port operations including the Karratha Gas Plant (operated by Woodside), King Bay Supply Base and Dampier Port. Subsea infrastructure in the operational area includes the Pluto Trunkline and the NRC Trunklines.

Defence

There are designated Department of Defence practice areas in the offshore marine waters off Ningaloo and the North West Cape. The boundary of the military flying training area is ~90 km west of the Operational Area, therefore not interactions between the Department of Defence and the activity are anticipated.

4.3 Values and Sensitivities

The offshore environment of the NWMR contains environmental assets (such as habitat and species) of high value or sensitivity including coastal waters and habitats of the Dampier Archipelago and the associated resident, temporary or migratory marine life including EPBC Act species such as marine mammals, turtles and birds.

Sensitive receptor locations are protected as part of Commonwealth and State managed areas and have been allocated conservation objectives (International Union for Conservation of Nature (IUCN) Protected Area Category) based on the Australian IUCN reserve management principles in *Schedule 8 of the EPBC Regulations 2000*. These principles determine what activities are acceptable within a protected area under the EPBC Act. The Operational Area does not overlap any protected areas, with the closest to the operational area being the Dampier Australian Marine Park (**Figure 4-2; Table 4-3**).

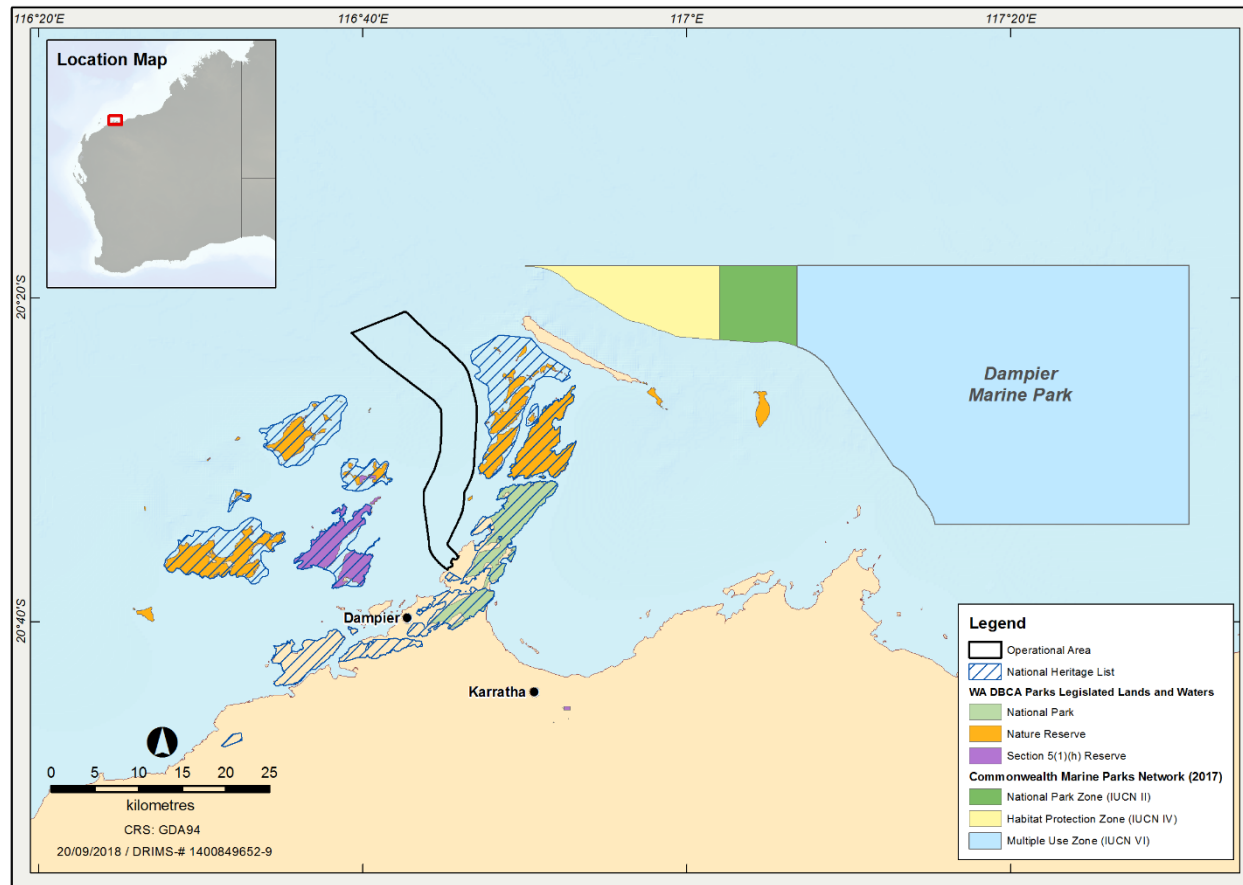


Figure 4-1: Commonwealth and State Marine Protected Areas in relation to the Operational Area

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Table 4-3: Summary of established and proposed Marine Protected Areas (MPAs) and other sensitive locations in the region relating to the Operational Area

	Distance from Operational Area to Values/Sensitivity boundaries (km)	IUCN Protected Area Category*
Australian Marine Parks (formerly Commonwealth Marine Reserves) **		
Dampier	20	II, IV and VI
State Marine Parks and Nature Reserves		
Marine Parks		
None overlapping the Operational Area or ZoC		
Marine Management Areas		
None overlapping the Operational Area or ZoC		
Fish Habitat Protection Areas		
None overlapping the Operational Area or ZoC		
Nature Reserves		
Dampier Archipelago Island Reserves (Rosemary Island)	10	IA
Heritage		
World Heritage Areas		
None identified		
National Heritage Places		
Dampier Archipelago (including Burrup Peninsula)	< 1	Not applicable
Commonwealth Heritage Places		
None identified overlapping the Operational Area or ZoC.		
Key Ecological Features		
None identified overlapping the Operational Area or ZoC.		

*Conservation objectives for IUCN categories include:

IA: Strict nature reserve – protected from all but light human use.

II: National park – protect ecosystems and natural values, but facilitate human visitation.

IV: Habitat/species management area – conservation of a particular species, taxonomic group or habitat.

VI: Protected area with sustainable use of natural resources – allow human use but prohibits large scale development.

**All Australian Marine Parks (AMPs) overlapping the Operational Area and wider ZoC are part of the North-west Marine Parks Network. The North-west Marine Parks Network Management Plan comes into effects 1 July 2018.

5. ENVIRONMENTAL IMPACTS AND RISKS

Woodside undertook an environmental risk assessment to understand the potential environmental risks associated with the Scarborough Shallow Water Geophysical and Geotechnical Survey to ensure they are reduced to As Low As Reasonably Practicable (ALARP) and will be of an acceptable level using a method consistent with Woodside standards.

The key environmental risks/impacts and control measures to be applied to the Scarborough Shallow Water Geophysical and Geotechnical Survey are shown in **Appendix A**. These are consistent with Woodside corporate and project-specific objectives, standards and criteria. All control measures associated with the hazards will be used to reduce environmental risk to ALARP and will be of an acceptable level.

6. MANAGEMENT APPROACH

The Petroleum Activities Program will be managed in compliance with the Scarborough State Waters Geophysical and Geotechnical EP which has been submitted to DMIRS for assessment under the Environment Regulations.

The objective of the Scarborough State Waters Geophysical and Geotechnical EP is to identify, mitigate and manage potentially adverse environmental impacts associated with the Petroleum Activities Program, during both planned and unplanned operations, to ALARP and an acceptable level.

For each environmental aspect (risk) and associated environmental impacts (identified and assessed in the Environmental Risk Assessment of the EP) specific environmental performance outcomes, controls, environmental performance standards and measurement criteria have been developed. The control measures (available in **Appendix A**) will be implemented in accordance with the relevant environmental performance standards to achieve the environmental performance outcomes. The specific measurement criteria provide the evidence base to demonstrate that the environmental performance standards and outcomes are achieved.

The implementation strategy detailed in the Scarborough State Waters Geophysical and Geotechnical EP identifies the roles/responsibilities and training/competency requirements for all personnel (Woodside and its contractors) in relation to implementing controls, managing non-conformance, emergency response and meeting monitoring, auditing, and reporting requirements during the activity.

7. CONSULTATION

In support of the Scarborough State Waters Geophysical and Geotechnical EP Woodside conducted a stakeholder assessment and engaged with relevant stakeholders to inform decision-making and planning of the Scarborough State Waters Geophysical and Geotechnical EP in accordance with the requirements of the Environment Regulations.

Woodside conducted a stakeholder assessment based on the activity location, timing and potential impacts. A consultation fact sheet was sent electronically to all stakeholders identified through the stakeholder assessment process prior to lodgement of the Scarborough State Waters Geophysical and Geotechnical EP. Woodside provided information about the Petroleum Activities Program to the relevant stakeholders listed in **Table 7-1**. Woodside considers relevant stakeholders for routine operations as those that undertake normal business or lifestyle activities in the vicinity of the Operational Area or have a State or Commonwealth regulatory role.

Table 7-1: Relevant stakeholders identified for the Petroleum Activities Program

Organisation	Relevance
Australian Maritime Safety Authority (maritime safety)	Maritime safety
Australian Hydrographic Service	Maritime safety
Pilbara Ports Authority – Port of Dampier (PPA)	Marine traffic Marine oil pollution response
Department of Primary Industries and Regional Development (formerly Department of Fisheries (Western Australia))	Fisheries management
Western Australian Fisheries	Commercial fisheries – State <ul style="list-style-type: none"> • Pilbara Demersal Scale Fishery (Pilbara Trap and Trawl) • Marine Aquarium Managed Fishery • Specimen Shell Managed Fishery • Onslow Prawn Managed Fishery • Nickol Bay Prawn Managed Fishery • West Australian Mackerel Fishery • Sea Cucumber Fishery • Pilbara Developing Crab Fishery • Pearl Producers Association
Commonwealth Fisheries Association	Commercial fisheries – Commonwealth
Charter boat operators and Recreational Fishers	Charter boat operators and recreational fishers <ul style="list-style-type: none"> • Nickol Bay Sport Fishing Club • King Bay Game Fishing Club • Hampton Harbour Boat & Sailing Club • Port Walcott Yacht Club • Port Walcott Volunteer Marine Rescue • West Pilbara Volunteer Sea Search and Rescue Group • Discovery Cruising • Warrior Princess Charters • Blue Lightning Charters

	<ul style="list-style-type: none"> • Pelican Charters
Recfishwest	Recreational fishers
Department of the Environment and Energy	Matters of National Environmental Significance and Department of Commonwealth Environment Minister
Department of Water and Environmental Regulation	Department responsible for the state environment and water resources
Department of Transport	Hydrocarbon spill preparedness (Western Australian waters)
Western Australian Fishing Industry Council (WAFIC)	Commercial fisheries – State

Woodside also made available advice about the Petroleum Activities Program to other stakeholders who may be interested in the activity or who have previously expressed an interest in being kept informed about Woodside’s activities in the region. The following are stakeholders that have been identified as ‘interested’ in the Petroleum Activities Program:

- Australian Fisheries Management Authority (AFMA);
- Australian Maritime Safety Authority (marine pollution);
- Aboriginal Corporations;
 - Ngarluma Yindjibarndi Foundation Ltd
 - Murujuga Aboriginal Corporation
- Karratha Community Liaison Group;
 - Karratha & Districts Chamber of Commerce & Industry
 - Dampier Community Association
 - Karratha Community Association
 - City of Karratha
 - Regional Development Australia
 - Pilbara Development Commission
 - Pilbara Ports Authority
 - Ngarluma Yindjibarndi Foundation Ltd
 - Yara Pilbara
- Australian Conservation Foundation;
- Australian Marine Oil Spill Centre (AMOSOC);
- Australian Petroleum Production and Exploration Association (APPEA);
- Department of Defence;
- Pearl Producers Association;
- World Wildlife Foundation;
- Wilderness Society;
- Australian Customs Service - Border Protection Command;
- Department of Biodiversity, Conservation and Attractions (*formerly Department of Parks and Wildlife*); and

- International Fund for Animal Welfare.

7.1 Ongoing Consultation

Consultation activities conducted for the proposed activities builds upon Woodside's extensive and ongoing stakeholder consultation for its offshore petroleum activities in the region. Woodside has been a part of the Karratha community for more than 30 years. Karratha-based stakeholders are engaged about Woodside's offshore petroleum activities.

Feedback received through community engagement and consultation will be captured in Woodside's stakeholder database and actioned where appropriate through the Petroleum Activities Program Project Manager. Implementation of ongoing engagement and consultation activities for the Petroleum Activities Program will be undertaken by Woodside Corporate Affairs consistent with Woodside's External Stakeholder Engagement Operating Standard.

Woodside will continue to receive and address any additional stakeholder feedback following EP submission. Stakeholder feedback should be made to the nominated liaison person, identified in **Section 8** of this EP Summary.

8. TITLEHOLDER NOMINATED LIAISON PERSON

For further information on this Petroleum Activities Program, please contact:

Dayna Burns
Corporate Affairs Adviser
11 Mount St, Perth WA 6000, Perth, Western Australia
Telephone: 08 9348 4000
Fax: 08 9214 2777
Email: feedback@woodside.com.au

9. ABBREVIATIONS AND ACRONYMS

Abbreviation	Meaning
µm	Micrometer
AFMA	Australian Fisheries Management Authority
AHS	Australian Hydrographic Service
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Maritime Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
APPEA	Australian Petroleum Production and Exploration Association
AS/NZS	Australian Standard/New Zealand Standard
ATSB	Australian Transport Safety Bureau
AusSAR	Australian Search and Rescue
BIA	Biologically Important Areas
BoM	Bureau of Meteorology
CA	Corporate Affairs Adviser
CAR	Corrective Action Register
CCP	Cyclone Contingency Plan
CEO	Chief Executive Officer
CICC	Corporate Incident Communication Centre
CMT	Crisis Management Team
CS	Cost/Sacrifice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CV	Company Values
dB	Decibel
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage
DEWHA	Department of the Environment, Water, Heritage and the Arts
DMIRS	Department of Mines, Industry Regulation and Safety
DoEE	Department of Environment and Energy
DotE	Department of the Environment
DoT	Department of Transport
DP	Dynamic Positioning
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
E&P	Exploration and Production
EA	Environment Adviser

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Abbreviation	Meaning
EEZ	Exclusive Economic Zone
EMS	Environmental Management System
ENVID	Environmental hazard Identification
EP	Environment Plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act, 1999.</i>
EPO	Environmental Performance Objective
ERP	Emergency Response Plans
ESD	Ecologically Sustainable Development
F	Feasibility
FEED	Front-End Engineering and Design
FPU	Floating Production Unit
g/m ²	Grams per square metre
GDA94	Geocentric Data of Australia 1994
GNSS	Global Navigation Satellite Systems
GP	Good Practice
GPGT	Geophysical and Geotechnical
GTO	Geotechnical Operations
HAZID	Hazard Identification
HD	High Definition
HS	Health and Safety
HSE	Health, Safety and Environment
HSP	Hydrocarbon Spill Preparedness
Hz	Hertz
IAPP	International Air Pollution Prevention
IC	Incident Controller
IMCA	International Maritime Contractors Association
IMCRA	Integrated Marine and Coastal Regionalisation of Australia
IMO	International Maritime Organisation
IMS	Invasive Marine Species
IS	Implementation Strategy
ISO	International Standards Organisation
ISPP	International Sewage Pollution Prevention Certificate
ITF	Indonesian Throughflow
IUCN	International Union for Conservation of Nature
JRCC	Joint Rescue Coordination Centre
JSA	Job Safety Analysis
KEF	Key Ecological Feature

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Abbreviation	Meaning
KGP	Karratha Gas Plant
kHz	Kilohertz
km	Kilometre
L	Litres
LCS	Legislation, Codes and Standards
LNG	Liquefied Natural Gas
MAE	Major Accident Event
MBES	Multibeam Echo Sounder
MC	Measurement Criteria
MEE	Major Environment Event
MFO	Marine Fauna Observer
MMSI	Maritime Mobile Service Identity
MNES	Matters of National Environmental Significance
MOC	Management of Change
MODIS	Moderate Resolution Imaging Spectrometer
MODU	Mobile Offshore Drilling Unit
MPA	Marine Protected Areas
MPRA	Marine Parks and Reserves Authority
ms ⁻¹	Metres per second
MSIN	Maritime Safety Information Notifications
NCDSF	North Coast Demersal Scalefish Fishery
NIMS	Non-indigenous Marine Species
nm	Nautical mile (1,852 m) a unit of distance on the sea
NOPTA	National Offshore Petroleum Titles Administrator
NRC	North Rankin Complex
NTM	Notice to Mariners
NWMR	North West Marine Region
NWP	North Western Province
NWS	North West Shelf
NWSP	North West Shelf Province
NWSTF	North West Slope Trawl Fishery
OCIMF	Oil Companies International Marine Forum
OIW	Oil in Water
OVID	Offshore Vessel Inspection Database
PAM	Passive Acoustic Monitoring
PCPT	Piezocone Penetration Testing
PJ	Professional Judgement

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Abbreviation	Meaning
PM	Project Manager
PO	Performance Objective
PPA	Pilbara Ports Authority
ppb	Parts Per Billion
ppm	Parts Per Million
PS	Performance Standard
PSRA	Process Safety Risk Assessment
PSU	Practical Salinity Unit
PTS	Permanent Threshold Shift
Q1	First Quarter
Q4	Fourth Quarter
RBA	Risk Based Analysis
RCC	Rescue Co-ordination Centre
rms	Root Mean Square
ROV	Remotely Operated Vehicle
S&EM	Security & Emergency Management
SBP	Sub Bottom Profilers
SEEMP	Ship Energy Efficiency Management Plan
SEL	Sound Exposure Level
SIMOPS	Simultaneous Operations
SMP	Spill Monitoring Programme
SMPEP	Spill Monitoring Programme Execution Plan
SOLAS	Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
SPL	Sound Pressure Level
SSF	Specimen Shell Managed Fishery
SSS	Side Scan Sonars
SV	Societal Values
TL	Transmission Loss
TTS	Temporary Threshold Shift
USBL	Ultra Short Baseline
WA	Western Australia
WAFIC	Western Australian Fishing Industry Council
WCC	Woodside Communication Centre
WCSS	Worst Credible Spill Scenario
WEL	Woodside Energy Ltd
WMS	Woodside Management System

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Abbreviation	Meaning
Woodside	Woodside Energy Ltd
WSR	Woodside Site Representative
ZoC	Zone of Consequence

APPENDIX A: ENVIRONMENTAL IMPACTS, RISKS AND CONTROL MEASURES

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
Planned Activities (Routine and Non-routine)			
Physical presence	Interference with/exclusion of third party vessels	Interference with/exclusion of commercial fishing, recreational fishing, tourism, charter boats, research activity operations and commercial and shipping operations	<p>Marine Order 30 (Prevention of collisions) 2009, including:</p> <ul style="list-style-type: none"> adhering to steering and sailing rules including maintaining lookouts (e.g. visual, hearing, radar, etc.), proceeding at safe speeds, assessing risk of collision and taking action to avoid collision (monitoring radar); adhering to navigation light display requirements, including visibility, light position/shape appropriate to activity; adhering to navigation noise signals as required. <p>Marine Order 21 (Safety of navigation and emergency procedures) 2012, including:</p> <ul style="list-style-type: none"> adhering to minimum safe manning levels; maintaining navigation equipment in efficient working order (compass/radar); using navigational systems and equipment specified in Regulation 19 of Chapter V of Safety of Life at Sea (SOLAS); using Automatic Identification System (AIS) that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. <p>Notify Australian Hydrographic Service (AHS), Pilbara Ports Authority (PPA) and the Department of Transport (DoT) of activities, movements, and provide consultation fact sheets.</p> <p>Notify AMSA JRCC of activities and movements.</p> <p>Notify relevant stakeholders on activities prior to the commencement of each survey.</p>
	Disturbance to seabed as a result of geotechnical and geophysical activities (including anchoring)	Smothering of benthic communities and increased localised turbidity Minor localised disturbance to	The potential impacts from seabed disturbance are deemed to be ALARP in its current risk state. No reasonable additional/alternative controls were identified that would further reduce the impacts and risks without grossly disproportionate sacrifice.

¹ Note – Controls identified have been listed for the first initial Risk/Impact. Some controls do mitigate multiple impacts/risks identified.

Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
		seafloor beneath footprint of equipment	
Routine acoustic emissions	Generation of acoustic signals from vessels during normal operations (including dynamic positioning systems)	Short-term localised disturbance to marine fauna such as alteration of behaviours and localised displacement	The potential impacts from survey vessel noise emissions are deemed to be ALARP in its current risk state. No reasonable additional/alternative controls were identified that would further reduce the impacts and risks without grossly disproportionate sacrifice.
	Generation of acoustic signals from geophysical and geotechnical survey equipment	Disturbance to marine fauna, particularly whales, marine turtles, potentially as physical damage or as a behavioural effect	Trained marine crew on-board the survey vessel to observe for marine fauna. Prestart visual observations and operating procedures for cetaceans, whale sharks and turtles.
Routine light emissions	External light emissions on-board survey vessels	Disturbance to marine fauna, particularly whales, marine turtles, potentially as or as a behavioural effect	The potential impacts from routine light emissions from the survey are deemed to be ALARP in its current risk state. No reasonable additional/alternative controls were identified that would further reduce the impacts and risks without grossly disproportionate sacrifice.
Routine atmospheric emissions	Routine atmospheric emissions from fuel use	Contribution to global greenhouse gas emissions and consumption of non-renewable natural resources	Marine Order 97 (Marine pollution prevention – air pollution) which details requirements for: <ul style="list-style-type: none"> • an International Air Pollution Prevention Certificate, required by vessel class • use of low sulphur fuel when available • a Ship Energy Efficiency Management Plan, where required by vessel class
Routine and non-routine discharges	Routine discharge of grey water to marine environment from survey vessels	Localised eutrophication of the water column, and localised adverse effect to marine biota	Marine Order 95 – pollution prevention – garbage (as appropriate to vessel class) which includes the following requirements: <ul style="list-style-type: none"> • Maintenance of a Garbage Log Book. • Discharge of putrescible waste not permitted within EP Operational Area (i.e. < 3NM from land). • Discharges of greywater permitted. Marine Order 96 – pollution prevention – sewage (as appropriate to vessel class) which includes the following requirements:
	Routine discharge of deck and bilge water to marine environment from survey vessels		
	Routine discharge of cooling water or brine to the marine environment from		

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
	survey vessels		<ul style="list-style-type: none"> • a valid International Sewage Pollution Prevention Certificate, as required by vessel class. • an AMSA-approved sewage treatment plant. • a sewage comminuting and disinfecting system. • a sewage holding tank sized appropriately to contain all generated waste (black and grey water). • discharge of sewage which is not comminuted or disinfected to only occur at a distance of more than 12 NM from the nearest land. • discharge of sewage which is comminuted or disinfected using a certified approved sewage treatment plant to only occur at a distance of more than 3 NM from the nearest land (i.e. outside of EP Operational Area). • discharge of sewage to occur at a moderate rate while the support vessel is proceeding (> 4 knots), to avoid discharges in environmentally sensitive areas. <p>Marine Order 91 – oil (as relevant to vessel class) requirements which includes mandatory measures for processing oily water before discharge, including:</p> <ul style="list-style-type: none"> • Shipboard Oil Pollution Emergency Plan (SOPEP) <ul style="list-style-type: none"> • Machinery space bilge/oily water shall have IMO-approved oil filtering equipment (oil/water separator) with an on-line monitoring device to measure Oil in Water (OIW) content to be less than 15 ppm before discharge. • IMO-approved oil filtering equipment shall have an alarm and an automatic stopping device or be capable of recirculating if OIW concentration exceeds 15 ppm. • A deck drainage system shall be capable of controlling the content of discharges for areas at high risk of fuel/oil/grease or hazardous chemical contamination. • There shall be a waste oil storage tank available, to restrict oil discharges. • If machinery space bilge and deck drainage discharges cannot meet the oil content standard of < 15 ppm without dilution or being treated by an IMO-approved oil/water separator, they will be contained onboard and disposed onshore.

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
			<ul style="list-style-type: none"> • Valid International Pollution Prevention Certificate. fuel/oil/grease or hazardous chemical contamination. • There shall be a waste oil storage tank available, to restrict oil discharges. • If machinery space bilge and deck drainage discharges cannot meet the oil content standard of < 15 ppm without dilution or being treated by an IMO-approved oil/water separator, they will be contained onboard and disposed onshore. • Valid International Pollution Prevention Certificate. <p>Detergents used for deck wash on all Woodside contracted vessels will be biodegradable and phosphate free</p>
Unplanned Activities (Accidents / Incidents)			

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
Physical presence	Invasive species in vessel ballast tanks or on vessels/submersible equipment	Short-term localised disturbance to marine fauna such as alteration of habitat and localised displacement	<p>All vessels will exchange or treat ballast water using an approved ballast water treatment system.</p> <p>The following requirements will be met by the survey vessel:</p> <ul style="list-style-type: none"> • Carry a valid Ballast Water Management Plan; • Carry a Ballast Water Management Certificate (if required by the vessel class); Maintain records of ballast water exchange and submit reports (where required) through Maritime Arrivals Reporting System (MARS) or seek a low risk exemption if applicable; • Where ballast water exchange occurs it is managed using one of the approved Ballast Water management options as per Section 4 of the <i>Australian Ballast Water Management Requirements</i> <p>Woodside's IMS risk assessment process will be applied to project vessels which enter the Operational Area. Based on the objectives of each IMS risk assessment, management measures commensurate with the risk (such as treating internal systems, IMS inspections or cleaning) will be implemented to minimise the likelihood of introducing IMS.</p>
	Collision between survey vessel and marine fauna	Injury to or fatality of marine fauna (single animal) including protected species	<p>EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans which include the following measures:</p> <ul style="list-style-type: none"> • Survey vessels will not travel faster than 6 knots within 300 m of a cetacean or turtle (caution zone) and not approach closer than 100 m from a whale. • Survey vessels will not approach closer than 50 m for a dolphin or turtle and/or 100 m for a whale (with the exception of animals bow-riding). • If the cetacean or turtle shows signs of being disturbed, survey vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots. • Survey vessels will not travel faster than 8 knots within 250 m of a whale shark, and not approach closer than 30 m.

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
	<p>Accidental loss of significant geophysical or geotechnical equipment</p> <p>Vessel grounding resulting in seabed disturbance</p> <p>Dropped objects resulting in seabed disturbance</p>	<p>Damage to benthic communities</p>	<p>Marine Order 30 (Prevention of collisions) 2009, including:</p> <ul style="list-style-type: none"> • adhering to steering and sailing rules including maintaining lookouts (e.g. visual, hearing, radar, etc.), proceeding at safe speeds, assessing risk of collision and taking action to avoid collision (monitoring radar) • adhering to navigation light display requirements, including visibility, light position/shape appropriate to activity • adhering to navigation noise signals as required. <p>Marine Order 21 (Safety of navigation and emergency procedures) 2012, including:</p> <ul style="list-style-type: none"> • adhering to minimum safe manning levels • maintaining navigation equipment in efficient working order (compass/radar) • using navigational systems and equipment specified in Regulation 19 of Chapter V of Safety of Life at Sea (SOLAS) • using Automatic Identification System (AIS) that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. <p>Contracted survey vessel will be equipped with a depth sounder.</p> <p>Safe work procedures to prevent dropped objects from project vessel and during deployment and retrieval of geophysical/ geotechnical equipment.</p> <p>Reasonable attempts made to recover objects lost overboard.</p> <p>Vessel inductions include control measures and training for crew in dropped object prevention.</p>
<p>Unplanned discharges</p>	<p>Accidental loss of hazardous or non-hazardous wastes/equipment to the marine environment</p>	<p>Pollution and contamination of the environment and secondary impacts of marine fauna (e.g. ingestion, entanglement)</p>	<p>Marine Order 95 – pollution prevention – garbage (as appropriate to vessel class) which includes the following requirements:</p> <ul style="list-style-type: none"> • Maintenance of a Garbage Log Book. • Discharge of putrescible waste not permitted within EP Operational Area (i.e. < 3NM from land). • Discharges of greywater permitted. <p>The Vessel Waste Management Plan includes requirements for waste to</p>

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
			ensure no waste is lost to the marine environment, including: <ul style="list-style-type: none"> Records shall be maintained of all waste to be disposed, treated or recycled. They shall include quantity and type of waste, and disposal/recycle location. Waste streams shall be handled and managed according to their hazard and recyclability class. All waste storage facilities in good working order and designed in such a way as to prevent or contain any discharges. All hazardous wastes will be segregated prior to onshore disposal.
	Accidental discharge to the ocean of other hydrocarbons/chemicals from survey vessel deck activities and equipment (e.g. cranes)	Localised contamination of the water quality and localised temporary affect to the marine environment	Scarborough State Waters Geophysical and Geotechnical Survey Oil Pollution First Strike Plan details expectations on first response and emergency management when a hydrocarbon spill has occurred. Chemicals will be stored safely to prevent the release to the marine environment. Deck bunding and spill response kits on board vessels.
	Subsea release of hydraulic fluid from survey equipment		
Accidental hydrocarbon release	Loss of hydrocarbons to marine environment due to a vessel collision (e.g. other survey vessels or marine users) Loss of hydrocarbons to marine environment due to a vessel grounding	Biological and ecological impacts to megafauna, plankton, deepwater benthic communities, offshore fish species, and fisheries	Marine Order 21 (Safety of navigation and emergency procedures) 2012, including: <ul style="list-style-type: none"> adhering to minimum safe manning levels maintaining navigation equipment in efficient working order (compass/radar) using navigational systems and equipment specified in Regulation 19 of Chapter V of Safety of Life at Sea (SOLAS) using Automatic Identification System (AIS) that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. Notify Australian Hydrographic Service (AHS), Pilbara Ports Authority (PPA) and the Department of Transport (DoT) of activities, movements, and provide consultation fact sheets. Notify AMSA JRCC of activities and movements Marine Order 91 – oil (as relevant to vessel class) requirements which includes mandatory measures for processing oily water before discharge, including:

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Aspect	Source of Risk/Impact	Key Potential Environmental Impacts	Controls ¹
			<ul style="list-style-type: none"> • Shipboard Oil Pollution Emergency Plan (SOPEP) <ul style="list-style-type: none"> • Machinery space bilge/oily water shall have IMO-approved oil filtering equipment (oil/water separator) with an on-line monitoring device to measure Oil in Water (OIW) content to be less than 15 ppm before discharge. • IMO-approved oil filtering equipment shall have an alarm and an automatic stopping device or be capable of recirculating if OIW concentration exceeds 15 ppm. • A deck drainage system shall be capable of controlling the content of discharges for areas at high risk of fuel/oil/grease or hazardous chemical contamination. • There shall be a waste oil storage tank available, to restrict oil discharges. • If machinery space bilge and deck drainage discharges cannot meet the oil content standard of < 15 ppm without dilution or being treated by an IMO-approved oil/water separator, they will be contained onboard and disposed onshore. • Valid International Pollution Prevention Certificate <p>Scarborough State Waters Geophysical and Geotechnical Survey Oil Pollution First Strike Plan details expectations on first response and emergency management when a hydrocarbon spill has occurred.</p> <p>SIMOPS will be developed if more than one Woodside contracted vessel is operating in the Operational Area at any one time.</p> <p>Woodside Marine Offshore Assurance Procedure (W0000PV1400355151) which details requirements for all vessels, including:</p> <ul style="list-style-type: none"> • Ensure Operation in sufficient water depth • Operation by qualified navigators/masters • Use of most recent marine charts