



WA-474-P EXPLORATION DRILLING ENVIRONMENT PLAN SUMMARY

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1 INTRODUCTION

Hess Australia (Offshore) Pty Ltd (Hess) proposes to conduct exploration drilling activities (hereafter referred to as 'the Activity') of one (1) gas / gas-condensate well within Permit Area WA-474-P, located in the Northern Carnarvon Basin in Commonwealth waters. As part of previous exploration programs, Hess has already drilled twenty (20) exploration and appraisal wells within the adjacent Permit Area WA-390-P between 2008 and 2012.

This WA-474 Exploration Drilling Environment Plan (EP) was assessed by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) and accepted on 4 August 2015. This EP summary has been prepared in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 11(3) and 11(4).

2 LOCATION OF THE ACTIVITY

Permit Area WA-474-P is located approximately 145 km (78 nmi) north of the North West Cape (Exmouth area) and about 275 km (148 nmi) west of Dampier. The well will be drilled within permit area WA-474-P (Figure 2-1). During the Activity, the Operational Area is defined as the 500 m (0.27 nmi) exclusion zone surrounding the Mobile Offshore Drilling Unit (MODU) once anchored or held in position via a Dynamic Positioning (DP) system at the well location. There are no islands or emergent land masses within the permit area and the nearest landfall will be the Barrow Island located approximately 180 km (97 nmi) towards the south-east of the permit area.

The scope of the Activity includes all operations associated with the drilling as described in Section 3 within a notional drilling area¹ within permit area (Figure 2-1) upon arrival of the MODU into the area through to demobilisation and exit of the MODU from a notional drilling area. Support vessels and aircraft activities associated with the drilling campaign are included within the scope of the EP only when they are within the permit area.

¹ As the drilling location within WA-474-P is not yet confirmed, the drilling location can be any point within the permit area i.e. the notional drilling point. The exact location will be determined before commencement of the drilling Activity.

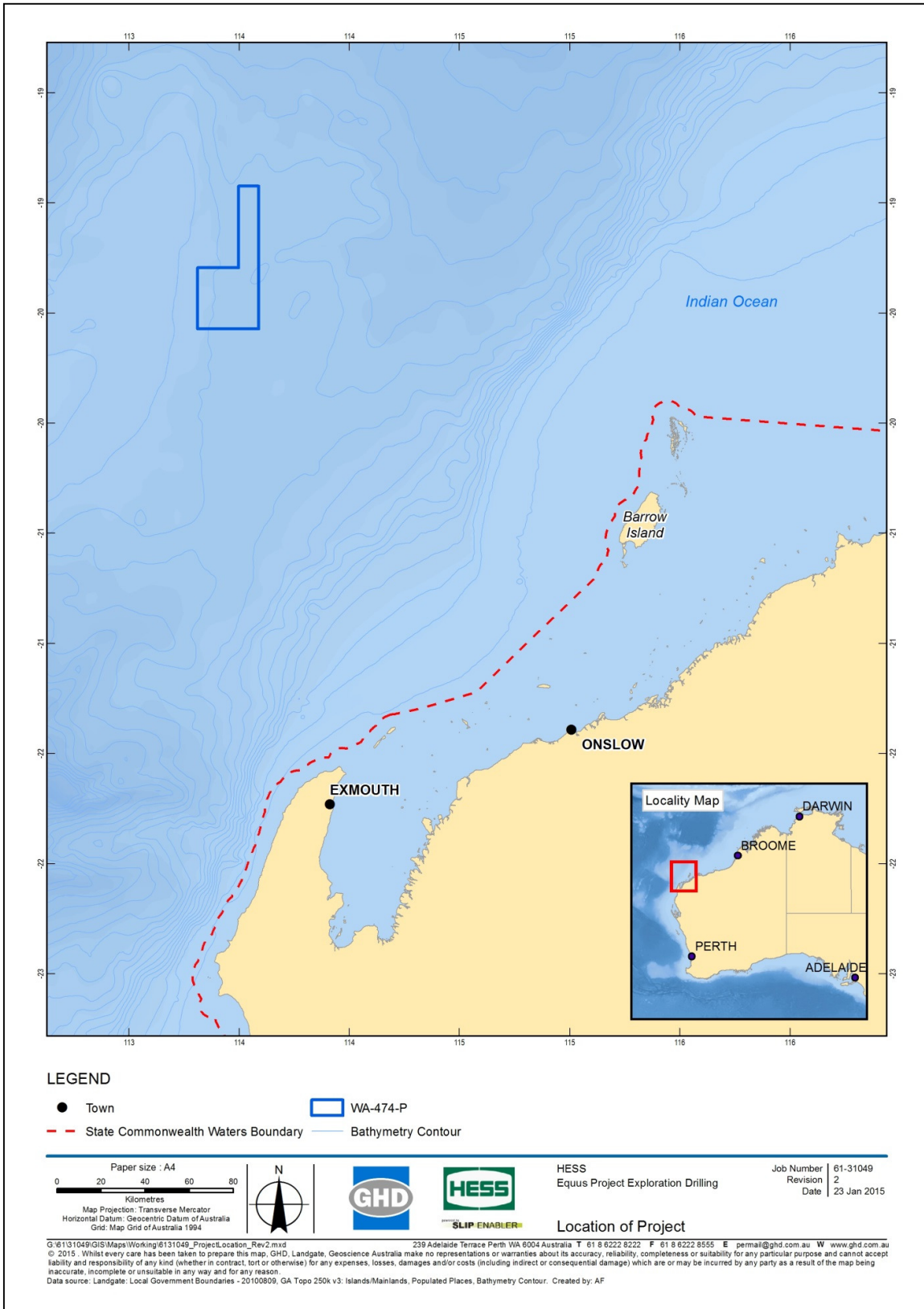


Figure 2-1: Location of Activity - Permit Area WA-474-P



3 DESCRIPTION OF THE ACTIVITY

3.1 GENERAL OVERVIEW

One (1) exploration well will be drilled within Petroleum Permit Area WA-474-P in Commonwealth waters to determine whether hydrocarbon resources with commercial potential exist. The exploration well will allow Hess to establish the limits of the reservoir, the productivity of the well and the properties of the gas and/or gas-condensate.

The well is anticipated to take approximately 45–50 days to drill, with active drilling taking place 24 hours per day, 7 days per week. The drilling is scheduled to occur between Q4 2015 and Q1 2016. Since the actual timing of the Activity is dependent on rig availability and weather conditions, the EP has accounted for drilling to occur in all seasons.

The Activity will be undertaken with a floating-type (either semi-submersible or drillship) MODU because of the water depth range of 1,000 - 1,200 m (3,280 - 3,940 ft). It is anticipated that the MODU will be supported by up to three support vessels.

The well will be drilled to a depth of approximately 4,600 – 4,800 m (15,090 – 15,750 ft) TVDSS (True Vertical Depth, Subsea). The first section of the well will be drilled to a depth of approximately 250 m (820 ft) below mud line (BML); this section will be drilled riserless (i.e. pumping seawater and high viscosity bentonite sweeps with cuttings and the fluid system discharged directly at the seabed). A 508 mm (20") surface casing string is installed and cemented; after which, the blow out preventer (BOP), and marine riser is installed. In the subsequent section, the hole is drilled for a 340 mm (13 $\frac{3}{8}$ ") casing set at approximately 1,090 m (3,576 ft) below mud line (BML) depth. At depths between 2,420 m (7,940 ft) and 3,520 m (11,549 ft) TVD BML, the sections will be drilled with a synthetic-based drilling fluid (SBM) with the cuttings discharged to the sea, following handling by a solids control package. The final hole sections will intersect the anticipated target formation.

Once the target depth is reached, and the well has been evaluated with wireline logging tools, the well will be suspended or plugged and abandoned. In the event that the well is suspended, the wellhead system (including suspension cap) will remain above the mudline and a mud-mat (attached to the 0.9 m [36"] conductor) may be in place on the seabed measuring approximately 3 m x 3 m (10 ft x 10 ft). The base case is to plug and abandon the well whereby the abandoned well casing will be cut below the seabed and all wellhead infrastructure will be recovered to the sea surface. Verified barriers will be in place to ensure well integrity as per the NOPSEMA-accepted Well Operation Management Plan (WOMP). Permanent abandonment will be designed to protect aquifers, ensure isolation between distinct permeable zones, and prevent flow to the surface or seabed.



3.2 FLOATING-TYPE MODU

For a moored MODU, the eight to twelve mooring lines will be made up of chain and wire rope and in some cases synthetic fibre rope each terminating with a drag embedment anchor set into the seabed. The anchors will be carried by the support vessels to pre-identified deployment locations and lowered to the seabed. Removal of anchors is reverse of the deployment procedures.

For a DP drill rig, Global Positioning System (GPS) and seabed reference points will keep the MODU on station by constantly adjusting dynamic thrusters on the vessel. A computerised system automatically employs the thrusters when necessary on the basis of information about the position of the vessel that is transmitted by special sensors deployed on the ocean floor. Additionally, satellite, weather and wind information are also relayed to the computer system to control movements via the thrusters to overcome any changes to the position of the vessel.

The main power requirement to operate the MODU will be onboard diesel powered generators, with additional 'back-up' diesel powered generator(s) available as emergency standby. The transfer of fuel and bulk chemicals will be by hose and pumped from a supply vessel in accordance with procedures for preventing spills to the marine environment.

3.3 MARINE OPERATIONS AND SUPPORT SERVICES

3.3.1 Support Vessels

During the Activity, the MODU will be supported by up to three support vessels. The support vessels will primarily be used to transport equipment and materials between the MODU and the onshore supply base at Dampier. During this transit, the vessels will be governed by the relevant marine legislation, outlined within vessel specific operating guidelines and the vessel contract approved by Hess prior to mobilisation. The support vessels may also be used to tow the rig to the drilling location, if the MODU is not self-propelled.

Refuelling of support vessels will only occur in an established port facility in accordance to established guidelines.

The support vessels will be on rotation and at least one support vessel will be present at all times providing (among other tasks) watch for other vessels that may enter to 500 m (0.27 nmi) exclusion zone around the rig. The support vessels will also assist in responding to emergencies (including hydrocarbon spills) as and when required. The support vessels will only form a part of the Petroleum Activity when they are working alongside the MODU (transferring cargo, bunkering, and possibly personnel transfers).



3.3.2 Helicopters

Helicopters will be used to transfer personnel to and from the MODU mobilising from either Exmouth or Karratha. Helicopter transfers to the MODU may occur five times or more per week depending on requirement. Personnel transfers will occur during daylight hours where possible, but may occur at night in the event of an operational emergency, medical evacuation or other non-routine circumstances.

3.3.3 Remotely Operated Underwater Vehicles

As part of the Activity, remotely operated underwater vehicles (ROV) will be used for:

- Pre-spud seabed survey;
- Placement and retrieval of sonar buoys in the case of a DP MODU;
- Monitoring of drilling prior to landing the BOP;
- Monitoring for gas emissions;
- Monitoring of BOP and wellhead;
- Monitor subsurface infrastructure, gas watch, and unplanned discharges; and
- Final site survey.

3.3.4 Well Formation Evaluation

Well formation evaluation will be undertaken through interpretation of a combination of measurements taken inside a wellbore to detect and quantify oil and gas resources in the adjacent rock, namely:

- Mud-logging (collection and processing of rock cuttings samples, analysis of drilling-mud gas, monitoring and recording of all drilling parameters, pit levels and pressure detection) will be undertaken during drilling with a closed-loop system to evaluate the rock formations.
- Wire-line logging (continuous measurement of rock formation properties with electrically powered instruments to enable decisions to be made about drilling operations and to evaluate the formations) may be required prior to running the casing and/or at the end of drilling if the rock formation differs significantly from that expected or in the case of a hydrocarbon discovery.
- Vertical Seismic Profiling (VSP) may be required to obtain detailed velocity data of the formations in the wellbore.



4 EXISTING ENVIRONMENT DESCRIPTION

4.1 REGIONAL GEOGRAPHICAL SETTING

Permit area WA-474-P is located on the Continental Slope of the Commonwealth waters in deep waters of 1,000 to 1,200 m (3,280 - 3,940 ft) north of Exmouth coastline adjacent to the Exmouth Plateau on the North West Shelf (Figure 2-1). The Activity will be undertaken within the Northern Carnarvon Basin, which is dominated by a southwest-trending set of troughs, these being the Exmouth, Barrow, Dampier, and Beagle Sub-basins. These are the major Mesozoic depocentres of the southern North West Shelf that contain up to 15 km (9 nmi) of Mesozoic sedimentary rock.

4.2 RELEVANT VALUES AND SENSITIVITIES OF THE ENVIRONMENT

The areal extent of environmental values and sensitivities (i.e. the area that may be affected [AMBA]) that are described in the EP include those known to occur within the permit area and also encompass the greatest areal extent predicted by hydrocarbon spill modelling of a maximum credible subsea well blowout during the Activity. An online search of Matters of National Environmental Significance or other matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) was conducted to identify potential environmental receptors within the Operational Area and the wider AMBA.

4.2.1 Habitats

Operational Area

Although targeted benthic assessment of the permit area has not been undertaken, previous surveys (box coring, pre-drilling ROV surveys, sediment grabs, and seismic and sonar surveys) throughout the adjacent WA-390-P permit area are available. Given the proximity and similar characteristics of the WA-390-P permit area to the Operational Area, it is assumed that WA-474-P exhibits similar benthic attributes. Hence, the Operational Area is likely to be comprised of deep, soft sediments with typical infauna and epifaunal macroinvertebrates that are typical of deep waters within the North West Province and on a larger scale, the North West Shelf region. In this region, benthic communities in depths greater than 200 m are primarily comprised of scavengers, detrital feeders and filter feeding organisms with percentage cover of epibenthic communities typically less than shallower regions. As the Operational Area lies in waters deeper than 1,000 m (3,280 ft) with a homogenous seafloor, it is unlikely that sensitive benthic habitats will be encountered. No Critical Habitats, as listed under the EPBC Act, are known to occur within the Operational Area.



Wider AMBA

Subtidal/intertidal (e.g. coral, macroalgae, seagrass) and shoreline (e.g. mangroves) habitats occur in the geographic features encompassed by the wider AMBA, namely the proximal North West Islands (Barrow, Muiron, Montebello, Dampier) and the mainland Ningaloo region. No Critical Habitats, as listed under the EPBC Act, are known to occur within the wider AMBA.

Barrow Island, the Lowendal Islands and the Montebello Islands are part of a shallow submarine ridge, which extends north from the mainland near Onslow. The ridge contains extensive areas of intertidal and shallow subtidal limestone pavement surrounding the numerous, mostly small islands which are found in the region. The seabed is largely less than 5 m deep and consists of sand veneered limestone pavement with patches of fringing coral reef.

The Montebello Islands are a protected group of islands that support globally unique mangroves. The Montebello's are also importance for the migratory pathway of the protected humpback whale, provide foraging area for marine turtles adjacent to important nesting sites, provide foraging area adjacent to important breeding areas for migratory seabirds and provide foraging areas for whale sharks. The green, flatback and hawksbill turtles also nest on this island group.

The coral reefs near the Muiron Islands are noted as being luxuriant and comparable with the best of coastal reef systems in WA, and a number of new fish species have been recorded in the area. The islands and reefs are of high aesthetic value. These islands are also noted to support mangroves, some sandy beaches, macroalgae and seagrass beds in the shallow waters (particularly on the eastern sides). It is also an important nesting and foraging habitat for green turtles, important foraging and nesting habitat for seabirds. The flatback, hawksbill, loggerhead and leatherback turtle is also known to nest on these islands.

The Ningaloo Coast is a world heritage listed coastal marine environment which stretches from the North West Cape south to Red Bluff, comprising of 200 km of the Ningaloo Barrier Reef. The Ningaloo Coast forms an important constituent of the nature-based tourism industry in the Exmouth region. This region provides key foraging areas for whale sharks, part of the annual migratory pathway for humpback whales, foraging areas for marine turtles adjacent to important nesting sites and foraging areas adjacent to important breeding areas for migratory seabirds.

The Dampier Archipelago consists of a group of many islands around Dampier. The region is a hotspot for sponge diversity and provides protection of important foraging areas for listed and migratory species, foraging areas adjacent to important breeding areas for migratory seabirds, foraging areas adjacent to important nesting sites for marine turtles and a migratory pathway of the protected humpback whale.



4.2.2 Marine Flora and Fauna

A search of the protected matters database was undertaken for the Operational Area and wider AMBA to identify the likelihood of fauna listed under the EPBC Act occurring. Listed threatened and migratory species that may occur within the Operational Area and the wider AMBA are provided in Table 4-1. No Threatened Ecological Communities, as listed under the EPBC Act, are known to occur within the Operational Area or wider AMBA.

There are four species of sharks/rays listed as vulnerable and/or migratory identified as potentially occurring within the Operational Area and an additional four species of fish/sharks within the wider AMBA, which includes the whale shark - the largest fish species worldwide. Whale sharks are known to seasonally occur in Western Australia with one of the more well-known aggregation sites located at Ningaloo Reef between March and June.

There are six species of marine mammals listed as endangered, vulnerable and/or migratory identified as potentially occurring within the Operational Area. Pygmy blue whale and humpback whale individuals could be encountered traversing through the Operational Area as they travel near to the Australian coastline migrating from tropical water breeding grounds in winter to temperate and polar feeding grounds in the summer. An additional four species may occur within the wider AMBA.

There are five species of marine turtles listed as endangered or vulnerable and migratory identified as potentially occurring both in the Operational Area and wider AMBA. Although the Operational Area does not include any important feeding or foraging habitats for marine turtles, the coastal beaches and offshore islands in the region support significant rookeries of marine turtles. The critically endangered seasnake is likely to occur in the wider AMBA associated with coral reefs and inshore waters.

A large number of seabirds and shorebirds migrate across the region to coastal habitats including offshore islands, sandy beaches, tidal flats and mangroves that support important habitat (feeding, roosting and breeding). In the Operational Area, the Southern giant petrel, listed as endangered and migratory, may be encountered, although does not contain critical habitats for any bird species. A further ten marine bird species listed as vulnerable and/or migratory have been recorded in the wider AMBA.



Table 4-1: Threatened and migratory marine fauna occurring in the operational area and wide AMBA

| Value / Sensitivity | | EPBC Act Status CE = Critically Endangered E = Endangered V = Vulnerable M = Migratory - = Not present | Presence | |
|--|--|---|------------------|------------|
| Common Name | Scientific Name | | Operational Area | Wider AMBA |
| Fish and Sharks | | | | |
| Great white shark | <i>Carcharodon carcharias</i> | V, M | ✓ | ✓ |
| Grey nurse shark | <i>Carcharias taurus</i> | V | - | ✓ |
| Dwarf sawfish | <i>Pristas clavata</i> | V | - | ✓ |
| Whale shark | <i>Rhincodon typus</i> | V, M | - | ✓ |
| Shortfin mako | <i>Isurus oxyrinchus</i> | M | ✓ | ✓ |
| Longfin mako | <i>Isurus paucus</i> | M | ✓ | ✓ |
| Giant manta ray | <i>Manta birostris</i> | M | ✓ | ✓ |
| Porbeagle shark | <i>Lamna nasus</i> | M | - | ✓ |
| Plus 35 other listed species of seashore and pipefish | | - | - | ✓ |
| Marine Mammals – Whales, Dolphins and Sirienias | | | | |
| Blue whale | <i>Balaenoptera musculus</i> | E, M | ✓ | ✓ |
| Humpback whale | <i>Megaptera novaeangliae</i> | V, M | ✓ | ✓ |
| Southern right whale | <i>Eubalaena australis</i> | E, M | - | ✓ |
| Bryde's whale | <i>Balaenoptera edeni</i> | M | ✓ | ✓ |
| Antarctic minke whale | <i>Balaenoptera bonaerensis</i> | M | ✓ | ✓ |
| Sperm whale | <i>Physeter macrocephalus</i> | M | ✓ | ✓ |
| Indo-Pacific humpback dolphin | <i>Sousa chinensis</i> | M | - | ✓ |
| Spotted bottlenose dolphin | <i>Tursiops adundus</i> | M | - | ✓ |
| Killer whale | <i>Orcinus orca</i> | M | ✓ | ✓ |
| Dugong | <i>Dugong dugon</i> | M | - | ✓ |
| 10 other listed species of whale | | - | - | ✓ |
| 8 other listed species of dolphin | | - | - | ✓ |
| Marine Reptiles | | | | |
| Loggerhead turtle | <i>Caretta caretta</i> | E, M | ✓ | ✓ |
| Green turtle | <i>Chelonia mydas</i> | V, M | ✓ | ✓ |
| Leatherback turtle | <i>Dermochelys coriacea</i> | E, M | ✓ | ✓ |
| Flatback turtle | <i>Natator depressus</i> | V, M | ✓ | ✓ |
| Hawksbill turtle | <i>Eretmochelys imbricata</i> | V, M | ✓ | ✓ |
| Short-nosed seasnake | <i>Aipysurus apraefrontalis</i> | CE | - | ✓ |
| 10 other listed species of seasnake | | - | - | ✓ |
| Marine Birds | | | | |
| Southern giant-petrel | <i>Macronectes giganteus</i> | E, M | ✓ | ✓ |
| Soft-plumaged petrel | <i>Pterodroma mollis</i> | V | - | ✓ |
| White-bellied sea-eagle | <i>Haliaeetus leucogaster</i> | M | - | ✓ |
| Campbell albatross | <i>Thalassarche melanophris impavida</i> | V | - | ✓ |
| Fork-tailed swift | <i>Apus pacificus</i> | M | - | ✓ |
| Flesh-footed shearwater | <i>Puffinus carneipes</i> | M | - | ✓ |
| Wedge-tailed shearwater | <i>Puffinus pacificus</i> | M | - | ✓ |
| Bridled tern | <i>Sterna anaethetus</i> | M | - | ✓ |
| Lesser crested tern | <i>Sterna bengalensis</i> | M | - | ✓ |
| Caspian tern | <i>Sterna caspia</i> | M | - | ✓ |



| Value / Sensitivity | | EPBC Act Status CE = Critically Endangered E = Endangered V = Vulnerable M = Migratory - = Not present | Presence | |
|---|-------------------------|---|------------------|------------|
| Common Name | Scientific Name | | Operational Area | Wider AMBA |
| Roseate tern | <i>Sterna dougallii</i> | M | - | ✓ |
| 11 other listed species of marine birds | | - | - | ✓ |

4.2.3 Marine Protected Areas

There are no marine protected areas in the Operational Area. Marine protected areas within the wider AMBA (with distances from the permit area) are summarised in Table 4-2.

Table 4-2: Commonwealth marine reserves and State marine parks

| Sensitivity | Distance from Permit Area | Values Description |
|--|---------------------------|---|
| Gascoyne CMR | 78 km | Covering an area of 81,766 km ² , this large CMR lies in waters ranging from 15-5,000 m. The CMR includes areas zoned as Multiple Use, Habitat Protection and Marine National Park. The CMR encompasses some of the most diverse continental slope habitats in Australia and several hundred fish species have been recorded from the area. Key sensitivities relating to the CMR are foraging areas for migratory seabirds, hawksbill and flatback turtles and whale sharks. The CMR contains three key ecological features: Canyons between the Curvier Abyssal Plain and the Cape Range Peninsula; Exmouth Plateau; and the Continental slope Demersal Fish Communities. |
| Ningaloo CMR | 185 km | The Ningaloo CMR, formally known as the Ningaloo Marine Park, covers a total area of 2,326 km ² and runs parallel to the State-managed Ningaloo Marine Park along the Cape Range peninsula. The CMR covers a depth range of 15-150 m. Key sensitivities are foraging areas for whale sharks; foraging areas adjacent to important breeding areas for migratory seabirds; foraging areas for marine turtles adjacent to important nesting areas; and part of the annual migratory pathway for humpback whales. |
| Montebello CMR | 148 km | The reserve abuts the Barrow Island and the Montebello islands WA Marine Parks. The depth range from 15-150 m, the reserve includes a variety of shelf and slope habitats as well as pinnacle and terrace seafloor features, representative of the continent shelf environment. Key sensitivities of the CMR are foraging areas for marine turtles adjacent to important nesting sites; foraging areas adjacent to important breeding areas for migratory seabirds; foraging areas for whale sharks; and migratory pathway of the protected humpback whale. |
| Ningaloo Marine Park | 193 km | The Ningaloo Marine Park (NMP) was originally declared in 1987 and in June 2011 became part of the World Heritage listed Ningaloo Coast. The NMP is a multiple-use Marine Park that stretches approximately 300 km along the west coast of the Cape Range Peninsula near Exmouth from Bundegi in the north to Red Bluff in the south. The NMP consists of both State and Commonwealth waters, which are declared under Western Australian and Commonwealth legislation. The NMP provides habitat for a diverse range of marine species including corals, reef fish, marine turtles, manta rays, sharks, whale sharks, dugongs, dolphins, and whales. Intertidal systems such as rocky shores, sandy beaches, estuaries, and mangroves are also found within the NMP. The most dominant marine habitat is the Ningaloo Reef comprising areas of hard coral, macroalgae, turfing algae, limestone pavement and sand. |
| Barrow Island Marine Park, Barrow Island Marine Management | 172 km | The Barrow Island Marine Park, the Barrow Island Marine Management Area and the Montebello Island Marine Park lie adjacent to one another and cover areas of approximately 42 km ² , 1,147 km ² , and 583 km ² respectively. The Marine Parks and Marine Management Area comprise numerous low lying limestone islands, islets and rocky stacks with intertidal and subtidal coral reefs, mangrove macroalgal communities and sheltered lagoons. The island group lies entirely within WA State waters, with the |



| Sensitivity | Distance from Permit Area | Values Description |
|--|---------------------------|--|
| Area and Montebello Islands Marine Park Area | | State-Commonwealth boundary extending out to encompass the islands and waters 3 nm west of Barrow Island and north of the Montebello Islands. Specific ecological values include foraging areas for seabirds, migratory shorebirds, whale sharks; aggregation and nesting sites for marine turtles; feeding grounds for dugongs; mangrove communities (those on the Montebello Islands are considered to be globally unique); migratory pathway of the protected humpback whale; special purpose zones for commercial pearling; and fringing coral reef communities. |

4.2.4 Key Ecological Features

Key ecological features (KEFs) are areas within the Commonwealth marine environment that are considered to be of regional importance for biodiversity or ecosystem function and integrity. KEFs identified as occurring in the Operational Area and wider AMBA during a search of the EPBC Act protected matters database are described in Table 4-3.

Table 4-3: Summary of Key Ecological Features

| Key Ecological Feature | Presence / Absence | | Values Description |
|--|--------------------|------------|---|
| | Operational Area | Wider AMBA | |
| Exmouth Plateau | ✓ | X | The Exmouth Plateau is a regionally and nationally unique deep-sea plateau in tropical waters. The plateau is a large topographic obstacle that may modify the flow of deep waters, generating internal tides and may contribute to upwellings of nutrients thus servicing an important ecological role. |
| Ancient coastline at 125 m depth contour | X | X | Parts of the ancient coastline, particularly where it exists as a rocky escarpment, are thought to provide biologically important habitats in areas otherwise dominated by soft sediments. The topographic complexity of these escarpments may also facilitate vertical mixing of the water column, providing relatively nutrient-rich local environments. |
| Canyons on the slope between the Cuvier Abyssal Plain and the Cape Range Peninsula | X | ✓ | The canyons are a unique seafloor feature with ecological properties of regional significance. Within the canyons, the soft bottom habitats are likely to support important assemblages of epibenthic species and the upwelling zones at the canyon heads are sites of species aggregation. The canyons are thought to significantly contribute to the biodiversity of Ningaloo Reef. Aggregations of whale sharks, manta rays, fish and seabirds are known to occur in the area. |
| Commonwealth waters surrounding Ningaloo Reef | X | ✓ | Ningaloo reef is the only extensive coral reef in the world that fringes the west coast of a continent and the waters support enhanced biological productivity due to the upwelling associated with canyons and interactions with currents. Aggregations of whale sharks, manta rays, humpback whales, fish and seabirds are known to occur in the area. |
| Continental slope demersal fish communities | X | ✓ | The diversity of demersal fish assemblages on the continental slope in the Timor Province, the Northwest Transition and the Northwest Province is high compared to elsewhere along the continental slope. |



4.2.5 Fisheries

The Commonwealth and State managed fisheries that occur within the Operational Area include:

- Commonwealth managed fisheries: Skipjack Tuna Fisheries, Southern Bluefin Tuna, Western Deepwater Trawl Fishery, Western Tuna and Billfish Fishery, and North West Slope Trawl Fishery; and
- State managed fisheries of the North Coast Bioregion: Mackerel Managed Fishery and West Coast Deep Sea Crustacean Managed Fishery.

Additional fisheries that are within the wider AMBA include:

- State managed fisheries of the North Coast Bioregion: North Coast Demersal Fisheries, Northern Shark Fishery (closed to fishing), and Pearl Oyster Managed Fishery (Zone 1); and
- State managed fisheries of the Gascoyne Coast Bioregion: Exmouth Gulf Prawn Managed Fishery and Gascoyne Demersal Scalefish Fishery.

4.2.6 Tourism

Tourism activities have not been identified to occur within the Operational Area. There are a number of sources of marine-based tourism within the wider AMBA. Aquatic recreational activities such as boating, diving and fishing occur near the coast and islands off the Ningaloo, Pilbara and Kimberley coasts. Nature-based tourism, primarily Ningaloo Reef and Cape Range National Park, is popular in the North West coastal region, with seasonal attractions including humpback whale watching, whale shark encounters and tours of turtle hatchings. Fishing charters off of the Montebello Islands are also popular.

4.2.7 Commercial Shipping

A recognised shipping fairway traverses the permit area. Commercial shipping fairways are established by the Australian Maritime Safety Authority (AMSA) and any alerts to changes or hazards within these fairways are managed by 'Notice to Mariners'.

4.2.8 World Heritage Property

The AMBA includes the western shoreline of the Ningaloo Coast World Heritage property. No World Heritage Areas are located within the Operational Area.

4.2.9 National Heritage Properties

Three national heritage properties are listed within the wider AMBA including the Ningaloo Coast, Barrow Island and the Montebello-Barrow Islands Marine Conservation Reserves, and the Dampier



Archipelago (including Burrup Peninsula). No national heritage properties are located within the Operational Area.

4.2.10 Ramsar Wetlands

There are no Ramsar wetlands occurring within the Operational Area or within the wider AMBA.



5 ENVIRONMENTAL IMPACTS AND RISKS

5.1 RISK ASSESSMENT AND MANAGEMENT FRAMEWORK

Hess Corporation has an established strategy to manage Environment, Health, Safety and Social Responsibility (EHS&SR) risks. The Hess EHS&SR Management System framework provides a risk-based methodology to manage EHS&SR through their global operations and activities. This involves:

- Identification of EHS&SR hazards and aspects (both business and operational);
- Assessment and ranking risks associated with operations and activities;
- Selection, implementation and maintenance of a structured system of controls; and
- Monitoring the effectiveness of the process and identifying areas for improvement.

Hess assesses the impact of planned (i.e. routine) events and risk of unplanned (i.e. accidents/incidents) events associated with their Drilling and Completions activities through a similar process.

5.2 ENVIRONMENTAL RISK ASSESSMENT APPROACH

An environmental risk assessment (ENVID) was undertaken for all the planned (i.e. routine) and unplanned (i.e. accidents/incidents) events covered within the EP with Hess' Global Drilling and Completions Risk Management Standard with methodologies that are consistent with the approach outlined in the following standards:

- Australian Standard/New Zealand Standard (AS/NZS) ISO 31000:2009 Risk Management – Principles and Guidelines; and
- AS/NZS Handbook 203:2012 Environmental Risk Management – Principles and Process.

5.2.1 Unplanned Events

The main components of the risk assessment methodology for unplanned events include:

- Identify the activities and the associated events that could cause a potential impact to the values (attributes) at risk within and adjacent to the Operational Area.
- Determine the likelihood (for unplanned events only) and severity (i.e. consequence) of the events with standard control measures. Where practicable, quantification of the magnitude of the stressor, the concentration of the contaminant and/or level of disturbance was made. Further, timing, duration and other factors affecting the impact and risk were considered.
- The environmental risk rating of an unplanned event was determined from the combination of the likelihood and the expected severity (i.e. consequence). Risks were rated with the Hess EHS&SR Qualitative Risk Matrix.



The likelihood of an event's occurrence is assessed 'with' standard industry controls in place. Review of the standard industry control measures for each of the risks and proposing additional control measures is then considered, as required. Additionally, control measures to mitigate the impacts of these unplanned events are also risk assessed (e.g. spill response activities) and are included if it reduces the risk to As Low As Reasonably Practicable (ALARP) and to ensure the risk is acceptable to Hess.

5.2.2 Planned Events

The impact assessment methodology for planned events is as for unplanned events, except environmental impacts are assessed solely on the severity (i.e. consequence) that has corresponding Hess acceptability criteria and response guidance.

5.3 IMPACT AND RISK ASSESSMENT

The ENVID assessment identified eight (8) **planned** events representing sources of environmental impact with severity ratings of all the impacts determined to be 'slight' as per the established Hess severity criteria. The ENVID assessment identified seven (7) **unplanned** events representing sources of environmental risk with the risk ratings determined to be 'low' for six (6) unplanned events and 'medium' for one (1) event. Table 5-1 provides a summary of all the **planned** event impacts and **unplanned** event risks identified and controls-mitigation measures to be applied in which to manage them. For each of the **planned** and **unplanned** events the potential impacts and risks, respectively, arising have been reduced to ALARP and to an acceptable level.

5.3.1 Determination of ALARP

Control measures were identified for each hazard/risk with the aim of eliminating the hazard, or minimising the risk to as low as reasonably practicable (ALARP). The hierarchy of control is:

- Eliminate – Remove the risk; eliminate the hazard.
- Substitute – Replace risk with a less hazardous one.
- Engineering – Introduction of engineering controls to prevent the source of risk.
- Administrative – Implementation of procedures, competency and training to minimise the risk.
- Protective – Introduce protective measures and equipment.

For an activity to be considered ALARP, no other practicable control measures could reasonably be implemented to reduce the environmental impacts and risks of the Activity without grossly disproportionate 'costs'. Such costs include health risks, safety risks, alternative environmental impacts/risks, financial cost and/or schedule related costs.



5.3.2 Acceptability Determination

Impacts and risks are considered acceptable once all reasonably practicable alternatives and additional control measures have been applied to reduce the potential consequence and likelihood to ALARP.

The environmental impacts and risks associated with the drilling activity and emergency response procedures were determined to be acceptable if:

- For planned (routine) events, the residual environmental severity (i.e. consequence) is considered 'Minor Effect' or 'Slight Effect', and has been demonstrated ALARP; or
- For unplanned (i.e. accident/incident) events, the residual environmental risk is considered 'Medium' (tolerable) or 'Low' (acceptable), and has been demonstrated ALARP; and
- The activity (and associated potential risk and impacts) to the environment is consistent with relevant legislation, industry standards and guidelines, offshore practice or benchmarking, and Hess corporate policies, standards and procedures.



Table 5-1: Summary of key impacts and risks with control measures that will be applied

| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|---|---|---|-------------------------------|
| PLANNED (ROUTINE & NON-ROUTINE) ACTIVITIES | | | |
| Physical Presence | Interference/displacement of shipping, fishing and/or other third party vessels from the physical presence of the MODU and support vessels while drilling. Damage to commercial fishing gear from the presence of subsea infrastructure. | Navigation, bridge and communication equipment compliant with appropriate marine navigation and vessel safety requirements under the International Convention of the Safety of Life at Sea (SOLAS) 1974 and <i>Navigation Act 2012</i> (or equivalent). Navigational aids (AIS). Bridge-watch on support vessels. Crew undertaking vessel bridge-watch qualified in accordance with International Convention STCW95; AMSA Marine Order – Part 3: Seagoing Qualifications or certified training equivalent. 500 m exclusion zone around the MODU. Notification of drilling activities to AMSA Rescue Coordination Centre (RCC) and to the Australian Hydrographic Service (AHS). Stakeholders will be consulted/ advised of relevant activities associated with drilling campaign. In the event that the well is temporarily suspended, AHS will be notified. | Slight |
| Seabed Disturbance | Disturbance of seabed habitats or displacement of benthic fauna from mooring anchors (if MODU not employing DP System) and placement of wellhead/spudding. | Contractor MODU positioning and anchoring procedures. MODU Move and Mooring Plan. Mooring study using detailed bathymetry to inform position of anchor, mooring lines and chain locations to avoid geological hazards including hard substrates. Pre-spud ROV surveys to assess seabed conditions prior to well head placement. Support vessels will not anchor within the 500 m exclusion zone around the MODU during normal operations unless in an emergency (and only if safe to do so). | Slight |
| Noise Emissions | Generation of underwater noise causing interference with marina fauna/mammals resulting in behavioural changes or physical injury. | Vessels will not knowingly travel greater than 6 knots within 300 m of a cetacean or whale shark (Caution Zone) and minimise noise. Vessels will not knowingly approach closer than 100 m of a cetacean or whale shark known to be in the area, or 50 m of a dolphin (with the exception of bow riding). Vessels must move at a constant slow speed and with minimal noise away from a cetacean that is approaching so that the vessel remains at least 300 m from the cetacean. Environmental awareness induction provided to support vessel crew prior to activities to advise marine fauna interaction requirements. Precaution zones will be implemented (Observation Zone (3+ km); Low Power Zone (1 km); Shut-down Zone (500 m)). | Slight |



| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|--|--|---|-------------------------------|
| | | <p>Pre-start visual observation of precaution zones (at least 30 minutes before soft-start procedures). VSP will not commence if cetacean are sighted within Low Power or Shut-down Zone.</p> <p>Visual observations by trained crew maintained continuously from pre-start to end of VSP activity. VSP activity will be shut down if cetacean enters Shut-down Zone.</p> <p>Relevant crew members are briefed on EPBC Act Policy Statement requirements.</p> <p>Soft-start, start-up delay, operations and stop work procedures.</p> <p>Night-time and low visibility procedures.</p> <p>Sightings to be recorded and reported.</p> | |
| Atmospheric Emissions | Localised reduction in air quality from generation of greenhouse gases. | <p>Emission producing equipment including engines maintained based on a Preventative Maintenance System.</p> <p>Only low sulphur diesel will be used.</p> <p>MODU and support vessels will hold a current International Air Pollution Prevention (IAPP) Certificate.</p> <p>Equipment containing ozone-depleting substances (ODS) shall be maintained and, in the case of a support vessel having rechargeable systems containing ODS, an ODS Record Book shall be maintained onboard.</p> <p>No discharge of ODS.</p> <p>No waste incineration will occur onboard the MODU and AHTS/support vessels will not use incinerators within 500 m safety exclusion zone around the MODU.</p> | Slight |
| Drilling Fluids and Cuttings Discharges | Smothering of benthic habitats and fauna by deposition of drill cuttings. Localised decrease in water quality from increase in turbidity from discharge of drilling fluids and cuttings. Localised toxicity effects to marine biota. | <p>Where Offshore Chemical Notification Scheme (OCNS) rating of D or E or a CHARM rating of Silver or Gold rated drilling fluid chemicals are used, no further control required. If other non-rated drilling fluid chemicals are required, chemical selection procedures described in Hess Chemical Risk Assessment Procedure will be followed.</p> <p>SBM cuttings returned to the rig are treated through the onboard SCE (shale shakers, centrifuges and cuttings dryers) and discharged with an average of <10% oil on cuttings for sections drilled with SBM, which includes SBM base oil and cuttings contaminated with reservoir liquid hydrocarbons.</p> <p>No planned overboard discharge of SBM.</p> <p>Daily measurements of SBM base oil on cuttings when drilling with SBM.</p> <p>Daily inspections of SCE equipment during SBM use to ensure maximum retention of fluids within the active mud system for re-use.</p> <p>Record volumes of cuttings to be discharged when riser in place.</p> | Slight |



| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|--|---|--|-------------------------------|
| Cementing Activities | Smothering of benthic habitats and fauna. Localised decrease in water quality (turbidity and toxicity). | <p>Pumping of cement slurry until cement returns are verified at the seabed (for riserless cement jobs).</p> <p>Calculation of cement volume requirements.</p> <p>Measurement of displacement volumes.</p> <p>When cementing prior to riser installation, volumes of cement returned to the seabed are minimised by establishing hole size from offset and well design requirements for fatigue management.</p> <p>Monitoring cement returns in open water by the use of an ROV.</p> <p>Where Offshore Chemical Notification Scheme (OCNS) rating of D or E or a CHARM rating of Silver or Gold rated cementing chemicals are used, no further control required.</p> <p>If other non-rated cementing chemicals are required, chemical selection procedures described in Hess Chemical Risk Assessment Procedure will be followed.</p> | Slight |
| Routine Liquid Waste Discharges | Localised and temporary change in water quality potentially impacting on marine fauna and flora in the immediate vicinity resulting from minor increase in water temperature, increase in nutrients, increase in salinity and toxicity effects. | <p>MODU and support vessels to have a valid International Sewage Prevention Pollution (ISPP) Certificate.</p> <p>Vessels to have a valid current International Oil Pollution Prevention (IOPP) certificate.</p> <p>Where Offshore Chemical Notification Scheme (OCNS) rating of D or E or a CHARM rating of Silver or Gold rated chemicals are used that are to be released to the marine environment, no further control required.</p> <p>If non-rated chemicals are required that are to be released to the marine environment, chemical selection procedures outlined in Hess Chemical Risk Assessment Procedure will be followed.</p> <p>No discharge of untreated sewage within 12 nmi of the territorial baseline.</p> <p>No discharge of treated sewage within 3 nmi of the territorial baseline.</p> <p>No discharge of sewage to cause discoloration or visible solids.</p> <p>Putrescible and other food waste discharge from the MODU and support vessels (when inside the 500 m safety exclusion zone) must be ground or comminuted to <25 mm and discharged only when >12 nmi from the territorial baseline.</p> <p>Liquid from drains is only discharged if the oil in water content does not exceed 15 ppm.</p> <p>Liquids with oil in water content exceeding 15 ppm must be contained and disposed of at a licensed onshore reception facility or to a carrier licensed to receive waste.</p> | Slight |
| Solid Waste Discharge | Generation of hazardous and non-hazardous waste materials. | <p>Waste containers clearly marked and suitably covered.</p> <p>All solid waste contained onboard and tracked, logged and sent to shore for recycling or disposal at a government approved waste disposal site.</p> <p>Any loss or discharge to sea of harmful materials is reported to the AMSA Rescue Coordination</p> | Slight |



| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|---|--|--|-------------------------------|
| | | <p>Centre (RCC).</p> <p>Implementation of waste management plan.</p> <p>Inventory of waste type, source and quantities will be maintained.</p> <p>Site inductions conducted include Hess waste management requirements.</p> | |
| UNPLANNED (ACCIDENTS & INCIDENTS) EVENTS | | | |
| Condensate Spill from Loss of Well Control | <p>Reduction in water quality and toxic effects on marine fauna and flora, shallow subtidal and coastal habitats, marine protected areas and socio-economic receptors.</p> <p>Displacement of other sea users (e.g. fishing and shipping) and potential interference with tourism activities and the activities of other regional petroleum operators.</p> | <p>Well Basis of Design. Well casing and tubing design.</p> <p>Bridging Document between Hess D&C and the Drilling Contractor to align management systems and establish primacy.</p> <p>Testing of barriers to ensure integrity.</p> <p>Cementing program that incorporates cement specifications to maintain wellbore integrity for the life-of-well.</p> <p>Blowout Preventer (BOP) System.</p> <p>Regular function testing of BOP and associated equipment.</p> <p>A Well Control Contingency Plan (WCCP).</p> <p>All permeable zones (if they are hydrocarbon bearing, or over-pressured and water bearing), penetrated by a well bore, are isolated to prevent flow from them to the surface or seabed by a minimum of two independently verified physical barriers.</p> <p>NOPSEMA-accepted Well Operations Management Plan (WOMP).</p> <p>NOPSEMA-accepted MODU Vessel Safety Case.</p> <p>Hess WA-474-P Exploration Drilling Oil Pollution Emergency Plan (OPEP).</p> <p>Mutual Aid MOU's, AMOSC contract and third party agreements for provision of equipment/supplies and assistance in the event of a loss of well control incident.</p> <p>Notification to AMSA RCC and to the Australian Hydrographic Service (AHS).</p> | Medium |
| Diesel Spill from Fuel Tank Rupture | <p>Localised reduction in water quality and localised toxic effects on marine fauna (pelagic fish, cetaceans, marine mammals and marine reptiles) and flora (phytoplankton).</p> | <p>Navigation, bridge and communication equipment will be compliant with appropriate marine navigation and vessel safety requirements.</p> <p>Automatic Identification System (AIS).</p> <p>Crew undertaking vessel bridge-watch will be qualified in accordance with International Convention of STCW95, AMSA Marine Order – Part 3: Seagoing Qualifications or certified training equivalent.</p> | Low |



| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|--|--|--|-------------------------------|
| | | <p>Bridge-watch on all support vessels.</p> <p>500 m exclusion zone around the MODU.</p> <p>Notification AMSA RCC and to the Australian Hydrographic Service (AHS).</p> <p>Relevant stakeholders consulted/advised of drilling activities prior to commencement of the drilling campaign.</p> <p>In line with MARPOL Annex 1, all vessels involved with the drilling campaign of over 400 gross tonnage will have a current Shipboard Oil Pollution Emergency Plan (SOPEP) in place.</p> <p>Oil spill response executed in accordance with vessels' SOPEP.</p> <p>Hess WA-474-P Exploration Drilling OPEP.</p> | |
| <p>Spill of Diesel during Bunkering or SBM during Transfer Operations</p> | <p>Localised reduction in water quality and localised toxic effects on marine fauna (pelagic fish, cetaceans, marine mammals and marine reptiles) and flora (phytoplankton).</p> | <p>All MODU machinery space oily water exceeding 15 ppm must be contained and disposed of at a licensed onshore reception facility or transferred to a carrier licensed to receive waste.</p> <p>Liquids from drains may only be discharged if the oil-in-water content does not exceed 15 ppm after treatment in a MARPOL-compliant oily water filter system.</p> <p>Vessels will have a current International Oil Pollution Prevention (IOPP) certificate for oily water filter system.</p> <p>Fuels, oils and hazardous chemicals must be stored with secondary containment.</p> <p>Critical hoses outside bunded areas are identified and regularly inspected/maintained/replaced as part of the Preventative Maintenance System.</p> <p>Dry-break couplings will be used on hoses used for transfer/bunkering activities.</p> <p>Continuous bunding or drip trays used around machinery or equipment with the potential to leak chemicals/ fuel.</p> <p>Scupper plugs or equivalent deck drainage control measures available where hazardous chemicals and hydrocarbons are stored and frequently handled.</p> <p>MODU and support vessels will have current MARPOL-compliant Shipboard Oil Pollution Emergency Plan (SOPEP) and Shipboard Marine Pollution Emergency Plan (SMPEP – for noxious liquid) – the latter may be combined with a SOPEP.</p> <p>All shipboard hazardous liquid, chemical and hydrocarbons spills will be managed in accordance with the SOPEP/SMPEP.</p> <p>Spill clean-up equipment is located where hazardous chemicals and hydrocarbons are frequently</p> | <p>Low</p> |



| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|---|--|---|-------------------------------|
| | | <p>handled.</p> <p>Hess WA-474-P Exploration Drilling OPEP.</p> <p>Where Offshore Chemical Notification Scheme (OCNS) rating of D or E or a CHARM rating of Silver or Gold rated chemicals are used that are to be released to the marine environment, no further control required.</p> <p>If other non-rated drilling chemicals are required, chemical selection procedures as described in Hess Drilling and Completions Chemical Risk Assessment Procedure will be followed.</p> | |
| <p>Spill of Environmentally Hazardous Chemicals or Refined Oil</p> | <p>Localised reduction in water quality and localised toxic effects on marine fauna (pelagic fish, cetaceans, marine mammals and marine reptiles) and flora (phytoplankton).</p> | <p>All MODU machinery space oily water exceeding 15 ppm must be contained and disposed of at a licensed onshore reception facility or transferred to a carrier licensed to receive waste.</p> <p>Liquids from drains may only be discharged if the oil-in-water content does not exceed 15 ppm after treatment in a MARPOL-compliant oily water filter system.</p> <p>Vessels will have a current International Oil Pollution Prevention (IOPP) certificate for oily water filter system.</p> <p>Fuels, oils and hazardous chemicals must be stored with secondary containment.</p> <p>Critical hoses outside bunded areas are identified and regularly inspected/maintained/replaced as part of the Preventative Maintenance System.</p> <p>Continuous bunding or drip trays used around machinery or equipment with the potential to leak chemicals/fuel.</p> <p>Scupper plugs or equivalent deck drainage control measures available where hazardous chemicals and hydrocarbons are stored and frequently handled.</p> <p>MODU and support vessels will have current MARPOL-compliant Shipboard Oil Pollution Emergency Plan (SOPEP) and Shipboard Marine Pollution Emergency Plan (SMPEP – for noxious liquid) – the latter may be combined with a SOPEP.</p> <p>All shipboard hazardous liquid, chemical and hydrocarbons spills will be managed in accordance with the SOPEP/SMPEP.</p> <p>Any loss or discharge to sea of harmful materials to be reported to the AMSA Rescue Coordination Centre (RCC).</p> <p>Spill clean-up equipment is located where hazardous chemicals and hydrocarbons are frequently handled.</p> <p>Hazardous waste materials are contained onboard for onshore disposal at a licensed reception facility or transferred to a carrier licensed to receive waste.</p> | <p>Low</p> |



| Source of Risk (Hazard) | Potential Environmental Impact/Risk (Consequences) | Controls – Mitigation Measures | Residual Severity/Risk Rating |
|--|--|---|-------------------------------|
| | | <p>Where Offshore Chemical Notification Scheme (OCNS) rating of D or E or a CHARM rating of Silver or Gold rated drilling chemicals are used, no further control required.</p> <p>If other non-rated drilling chemicals are required for discharge, chemical risk assessment procedures as described in Hess Drilling and Completions Chemical Risk Assessment Procedure will be followed.</p> | |
| Interference with Marine Fauna | Potential injury or fatality of marine fauna (cetaceans, whale sharks, turtles) due to vessel strike from vessel movements in the Permit Area. | <p>Compliance with EPBC Regulations 2000 - Part 8 Division 8.1 Interacting with cetaceans.</p> <p>A bridge watchkeeper will keep lookout out for cetaceans, whale sharks and turtles during vessel movements in the permit area. If sighted near the path of the vessel, the vessel shall gradually divert to avoid it, or slow down to idling speed, if safe and within the vessel's capability.</p> <p>Environmental awareness briefing provided to marine crew that includes marine fauna interaction requirements.</p> <p>Sightings of cetaceans, whale sharks and turtles will be recorded and reported.</p> | Low |
| Dropped Objects | Disturbance to seabed habitat in footprint of dropped object. | <p>All lifts to be completed in accordance with the contractor procedures.</p> <p>All lifting equipment will be certified, is regularly inspected/ maintained and will be used by crew trained in task required.</p> <p>Records of any equipment lost overboard completed.</p> | Low |
| Introduction of Invasive Marine Species | Changes in ecosystem function and ecological diversity resulting from competition and/or over-predation of native flora and fauna due to translocation of invasive marine species. | <p>Vessel anti-fouling systems are maintained.</p> <p>MODU and AHTS/support vessels have AQIS clearance to be in Australian waters.</p> <p>MODU and AHTS/support vessels sourced from International or interstate will complete a biofouling Vessel Risk Assessment Score Sheet (VRASS), before mobilisation to permit area.</p> <p>Ballast water exchange to occur in accordance with the Australian Ballast Water Management Requirements.</p> <p>Suspected or confirmed presence of any marine pest or disease will be reported to FishWatch within 24 hours.</p> | Low |



6 OIL POLLUTION EMERGENCY PLAN SUMMARY

Hess has prepared the WA-474-P Exploration Drilling Oil Pollution Emergency Plan (OPEP) to be compliant with the *OPGGS (Environment) Regulations*. The OPEP is the primary reference document and key control measure to be implemented in the event of an hydrocarbon spill during the drilling campaign and has been developed as a formal means of establishing the processes and procedures to ensure that Hess maintains a constant vigilance and readiness to prevent and, where required, respond to and effectively manage hydrocarbon spill incidents that may occur during the drilling activity.

6.1 SELECTION OF RESPONSE STRATEGY OPTIONS

Preliminary net environmental benefit analysis (NEBA) of potential response strategies as to their applicability to credible worst-case spill scenarios that could occur during drilling was carried out by accounting for several criteria including their benefit(s), associated environmental impacts and risks, and the operational and functional constraints. If applicable, the response option was assessed to evaluate appropriateness as a primary (to be used as soon as possible) or secondary (only applied as needed and when practical) response. Further, the ALARP principle has been applied across a range of control measures of the selected spill response strategies for this Activity on the basis of the preliminary NEBA to develop an appropriate response strategy.

In the event of a hydrocarbon spill, operational NEBAs will be regularly undertaken to evaluate spill response options that have a net environmental benefit. Hence, in the event of an incident the combination of spill response options and their implementation characteristics will evolve over time as conditions change on the basis of operational NEBAs.

6.2 PRIMARY RESPONSE STRATEGIES

The following primary response strategies will be applied in the event of a hydrocarbon spill:

- **Source Control:**
 - **Vessel Control** is the primary response strategy for responding to a vessel-based spill to prevent further release of diesel to the marine environment including spill response in accordance with MODU or support vessel Shipboard Oil Pollution Emergency Plan (SOPEP) (e.g. measures such as closing valves, isolating pipework, temporary sealing of holes, use of onsite spill response equipment [e.g. small booms, absorbent pads, absorbent litter, recovery containers, cleaning agents], and transfer of hydrocarbons between tanks on the vessel or between vessels).



- A **Relief Well** is the initial and highest priority response strategy for responding to a loss of well containment through interception of the uncontrolled hydrocarbon zones from the well to stop or limit further hydrocarbon release into the marine environment.
- A **Capping Stack** allows a subsea well to be capped and thereby restrict any hydrocarbon release into the marine environment until the relief well is drilled.
- The **Subsea First Response Tool Kit (SFRT) emergency accumulator** enables emergency BOP intervention (i.e. in the case of rig failure to close BOP).
- The **SFRT debris clearance toolkit** allows debris to be cleared around the area of the wellhead to prepare installation of the capping stack or to clear obstructions to allow emergency BOP intervention.
- **Oiled Wildlife Response** through:
 - The collection and rehabilitation of oiled marine fauna and return to a suitable habitat.
 - Reduce impacts to marine fauna through pre-emptive response such as hazing, pre-emptive capture and onshore exclusion barriers.
- **Monitoring and Evaluation (Operational Monitoring)** through a range of methods as needed (e.g. oil spill trajectory modelling, vessel and aerial surveillance, satellite tracking buoys, satellite imagery, hydrocarbon weathering, shoreline assessment) will be conducted for all spills to identify emerging risks to sensitive receptors, to inform response planning and to assess the effectiveness of response actions during a spill event.
- **Scientific Monitoring** through a range of studies (e.g. water and sediments, subtidal habitats, mangroves, fish tissue, marine megafauna and avifauna) to determine the extent, severity and persistence of environmental impacts and subsequent recovery from a hydrocarbon spill event.

6.3 SECONDARY RESPONSE STRATEGIES

The following secondary response strategies may be applied in the event of a hydrocarbon spill event:

- **Shoreline Protection and Deflection** can be undertaken if operational monitoring indicates a likelihood of impacts to sensitive emergent receptors through the deployment of booming equipment.
- **Mechanical Dispersion** via vessel propellers may enhance dispersion and break-up of surface hydrocarbon slicks to facilitate natural degradation processes.



- **Shoreline Clean-Up** may be undertaken if sufficient hydrocarbons accumulate on shorelines to minimise impacts to shoreline and intertidal habitat impacts, and to reduce the likelihood of re-entrainment of hydrocarbons back into the marine environment.

6.4 POTENTIAL IMPACTS OF RESPONSE STRATEGIES

While spill response activities are intended to reduce the potential environmental impacts from a hydrocarbon spill, they can exacerbate or cause further environmental impact. In order to respond effectively to a hydrocarbon spill the following must be considered:

- Feasibility of the response option: time, availability, cost, benefit, local conditions.
- Impact of utilising the response option.

Natural processes, evaporation and decay (biodegradation and photo-oxidation) will mitigate a substantial proportion of spilled hydrocarbons. These natural recovery processes are likely to be the de facto primary response measure that will attenuate spill impacts in the event of a spill incident for this Activity due to the relatively modest nature and scale of the predicted impacts (e.g. maximum predicted shoreline loading <200 kg). Nonetheless, Hess accepts a degree of uncertainty with regards to these predictions, and will mobilise resources to respond to a hydrocarbon spill to the marine environment.

In the event that response activities are required, poorly planned or executed responses can result in:

- Disturbance to marine fauna and flora from increased vessel, aircraft and/or helicopter operations;
- Spreading of hydrocarbons further beyond the zone of contamination (e.g. secondary contamination due to hull contamination of response vessels);
- Inadequate surveillance leading to poor information and unforeseen impacts; and
- Inappropriate response implemented and additional sensitive receptors impacted (e.g. shoreline clean-up for low loadings of highly weathered condensate).

Impacts associated with each of the selected response options are described next.

6.4.1 Vessel, Aircraft and Helicopter Operations

Most of the identified response strategies will be implemented primarily with the use of vessels and aircraft. The impacts and risks associated with vessel and aircraft operations are summarised in Table 5-1, but will potentially generate a level of impact greater than associated with the Activity (due to the number required for a response, and the duration of the response). To re-iterate the impacts from vessel and aircraft operations during a spill response include:

- Planned events including:



- Disturbance to heritage values/sites;
- Interference with other sea users;
- Seabed disturbance due to anchoring;
- Noise generation from vessels;
- Emissions from exhaust gases from combustion;
- Liquid discharges from vessels;
- Solid waste from vessels;
- Unplanned events including:
 - Hydrocarbon spills from vessel collision, refuelling, deck spills;
 - Vessel collisions, interaction and disturbance (to fauna); and
 - Seabed disturbance due to dropped objects; and
 - IMS/Quarantine for Australian sourced vessels/MODU.

Light generation from vessels is not considered to have material impacts.

6.4.2 Source Control

The control of the source of hydrocarbons spilled to the marine environment will not result in further impact to the marine environment in the event of a tank rupture or deck/refuelling leak as the activities will be undertaken on board the MODU or vessel. However, in the event of a loss of well control (Tier 3 spill), a relief well will be drilled to control the source and will generate the same impacts as those previously summarised for drilling in Table 5-1 with the exception of noise emissions from VSP, as this will not be undertaken for a relief well.

6.4.3 Monitor and Evaluate

No additional impacts are associated with this activity as it will be vessel- and aircraft-based (see Section 6.4.1). Vessel-based monitoring during operational and scientific monitoring will likely occur close to shorelines and sensitive habitats that could lead to an increased possibility of behavioural and/or physiological impacts on marine fauna.

6.4.4 Mechanical Dispersion

No additional impacts are associated with this activity as it will be vessel-based (see Section 6.4.1).

6.4.5 Shoreline Protection and Deflection

In addition to impacts associated with generic vessel use (see Section 6.4.1), there is an increased risk of impact to sensitive receptors (e.g. coral reefs, macroalgae and seagrasses) in the event of a vessel grounding, anchoring and propeller wash. Incorrect placement of booms could result in redirection of hydrocarbons to areas where impacts could be more severe.



6.4.6 Shoreline Clean-Up

Shoreline clean-up activities will impact shoreline and terrestrial habitats through:

- Establishment and maintenance of staging areas for personnel, transportation activities (equipment and personnel across land with potential trampling of habitat and species) and poor waste management;
- Incorrect selection of shoreline response equipment could lead to the exacerbation of impacts as hydrocarbons could be driven further into habitat therefore increasing recovery time;
- Incorrect waste management and transportation can result in impacts spreading from a contained area to habitat above the shorelines that may not otherwise have been impacted from a spill; and
- Vessels utilised to transport personnel inshore can also lead to potential impacts on shoreline habitats.

6.4.7 Oiled Wildlife Response

Oiled wildlife response activities, if not planned and implemented correctly, have the potential to increase impacts on marine fauna as previously summarised in Table 5-1 by increasing the risk of oiling. This can occur through the incorrect cleaning and handling of oiled wildlife, or driving wildlife into hydrocarbon areas that can increase the stress levels of the oiled wildlife and lead to lethal or sub-lethal impacts. Hazing could re-direct fauna into spill areas if not implemented correctly and could also result in collisions with marine fauna.

6.5 OIL POLLUTION EMERGENCY ARRANGEMENTS

Hess has the following emergency response arrangements in place:

- Hess is an associate member of the Australian Marine Oil Spill Centre (AMOSC) and have a call-off agreement to all relevant AMOSC equipment and resources;
- Hess is a participant member with Oil Spill Response Limited (OSRL) that offers guaranteed and immediate response, access to supplementary services and regional response services, and provision of resources (e.g. specialist personnel, well source control equipment, chemical dispersants, oiled wildlife support);
- Access to Wild Well Control's capping stack and relevant experienced personnel;
- Mutual Aid Memorandum of Understand (MOU) with other regional oil and gas operators to assist (including to source and mobilise a MODU and offshore support vessels) in an oil spill situation; and
- Other support services such as 24/7 oil spill trajectory modelling and satellite monitoring services as well as 'on-call' aerial, marine, logistics and waste management support.



7 MONITORING AND REPORTING OF ENVIRONMENTAL PERFORMANCE

To ensure that Hess' environmental performance outcomes are achieved, contractors will be required to comply with all relevant requirements of Hess' EHS Policy and the commitments made in the EP. The implementation strategy for the EP includes:

- **Environmental Management System** that describes how work instructions, procedures and plans will be implemented and achieve the environmental performance outcomes for the Activity.
- **Key Roles and Responsibilities** for Hess and contractor personnel (onshore and offshore) in relation to implementation, management and review of the EP. Hess will use a variety of processes to brief contractors such as campaign briefings; desk-top exercises, provision of copies of the OPEP and EP; and general contractor management (setting up of contracts, scope of works, face-to-face meetings).
- **Competency, Training and Awareness** requirements for all Hess and contractor personnel with responsibilities under the EP are described. Certifications are recorded in Hess and its contractors' record systems. Offshore crew and other key personnel involved in the exploration drilling campaign will be made aware of the environmental requirements of the program (and the EP) via a project-specific induction prior to commencing the Activity. Regular vessel emergency response training (i.e. drills and exercises) is conducted and daily onboard vessel meetings (e.g. pre-start, job hazard analysis, toolbox meetings) will reinforce environmental awareness during the Activity.
- **Monitoring, Recording, Auditing and Review** of the requirements of the EP will be carried out in the lead up to, during and after the Activity. Hess conducts reviews and audits of contractors at various stages including pre-award of contract, and prior to and during the Activity in accordance with its EHS&SR Management System. The auditing procedure will align with the WA-474-P Drilling Project Quality Plan. The following audits are planned: pre-activity EHS and condition audits of the MODU and vessels; and EHS audit of the MODU during operations during the early stages of the program by Hess EHS personnel. The audits will be documented and corrective actions tracked to completion in accordance with the Hess Incident Reporting and Investigation Procedure.
- **Emergency Response** management and plans in the event of an environmental incident including testing and training prior to the Activity. In the event of a hydrocarbon spill incident, the Operational and Scientific Monitoring Plan will be implemented. The plan is critical for informing response management (e.g. situational awareness) and quantifying impacts (and recovery) to environmental sensitivities.



- **Monitoring and Reporting of Environmental Performance** in regards to routine reporting (e.g. end of Activity environmental report) and non-routine reporting (i.e. recordable and reportable incidents). Environmental performance monitoring, inspections and audits will be used to assure compliance. Records and reports will be stored for a period of five years upon completion of the Activity, including but not limited to the following:
 - Training – details of crew environmental inductions;
 - Waste management – quantities of waste landfilled, recycled, and discharged;
 - Fauna interactions – cetacean, whale shark and turtle sightings. Any interactions between marine fauna and vessels;
 - Invasive marine species – MODU/support vessel clearance (if mobilising from outside of Australia waters);
 - Refuelling – Details of vessel bunkering;
 - Incident reporting – Compliance with EP performance outcomes;
 - Maintenance – Maintenance schedule for applicable equipment;
 - On-going consultation – Records with stakeholders;
 - Emissions and discharges – Oil in water discharge overboard from vessels >400 tonnes; waste from vessels; VSP noise discharges; dropped objects; fuel use and associated atmospheric emissions; and sewages from vessels >400 tonnes.

7.1 CHANGES TO EP SCOPE

Identification and potential approval of changes to scope (e.g. timing, location or location details described in the EP) is the responsibility of Hess' Drilling Manager. In conjunction with Hess' Australia General Manager, a risk assessment will be undertaken for any change in scope in order to assess potential impacts of the change. If the change represents a significant modification that is not provided for in the accepted EP in force for the Activity, a revision of the EP will be conducted in accordance with Regulation 17(6) of the OPGGS (Environment) Regulations.

Hess' Management of Change (GDC-S-003) will be used to ensure changes to approved work programs (e.g. systems, legislation, procedures, equipment, products, materials, planning and execution phases of Well Delivery Excellence, etc.) are properly considered, and approved if acceptable, the appropriate personnel.

8 STAKEHOLDER CONSULTATION

Hess is committed to consulting with those stakeholders who may be impacted by the WA-474-P Exploration Drilling Campaign. Consultation with potentially affected stakeholders has been undertaken to provide information on the Activity, to identify and understand any concerns and issues and to inform the development of the Activity, the EP and the OPEP as appropriately and practically



as possible. Hess maintains a comprehensive project Stakeholder Register which lists all identified stakeholders, the individual contact details and a summary of the consultation undertaken to support the management of these relationships throughout the life of the Activity.

Stakeholders identified for the project are provided in Table 8-1. Each of organisations was issued a project information sheet and follow up phone calls were made where necessary.

Table 8-1: Relevant stakeholders identified for WA-474-P exploration drilling campaign

| Stakeholders | |
|---|--|
| Australian Fisheries Management Authority (AFMA) | WA Department of Mines and Petroleum |
| Australian Hydrographic Service (Dept. of Defence) | WA Department of Parks and Wildlife – Environmental Management Branch |
| Australian Institute of Marine Science (AIMS) | Department of Regional Development (Now Dept of Lands) |
| Australian Institute of Petroleum (API) | WA Department of Transport |
| Australian Marine Conservation Society | Exmouth Chamber of Commerce and Industry |
| Australian Marine Oil Spill Centre (AMOSC) | Exmouth Freight and Logistics (Toll IPEC) |
| Australian Maritime Safety Authority (AMSA) – Marine Environment Division (Marine Environment Pollution Response) | Gascoyne Development Commission |
| Australian Maritime Safety Authority (AMSA) – Nautical Advice | Karratha and Districts Chamber of Commerce and Industry |
| Australian Petroleum Production and Exploration Association (APPEA) | Jamaclan Marine Services |
| Australian Southern Bluefin Tuna Industry Association | Member for North West Central (State Government Elected Representative) |
| BHP Billiton Petroleum | Minister for Environment; Heritage |
| Cape Conservation Group | National Offshore Petroleum Safety and Environment Management Authority |
| Centre for Whale Research | National Offshore Petroleum Titles Administrator |
| Chevron Australia | North West Cape Exmouth Aboriginal Corporation |
| City of Karratha (formerly Shire of Roebourne) | Pearl Producers Association |
| Commonwealth Fisheries Association including the following Commonwealth managed fisheries associations: Skip Jack Fishery, Southern Bluefin Tuna Fishery, Western Deepwater Trawl Fishery, Western Tuna and Billfish Fishery, and North West Slope Trawl Fishery. | Western Australian Fishing Industry Council (WAFIC) including all licence holders in the following State Fisheries: Mackerel Managed Fishery and West Coast Deep Sea Crustacean Managed Fishery. |
| Defence Airspace (aerial activity only) | Pilbara Ports Authority |
| Department of Defence - Defence Public Affairs (WA) | Pilbara Development Commission |
| Department of Defence - Defence Support and Reform Group | RecFishWest |
| Department of Defence - Border Protection Command | Royal Australian Air Force |
| WA Department of Environment Regulation (formerly Department of Environment and Conservation) | Shire of Exmouth |
| Department of the Environment Offshore Assessment, Environmental Assessment and Compliance Division | Total E&P Australia |



| Stakeholders | |
|---|---------------------|
| Department of the Environment Commonwealth Marine Reserves, Parks Australia Division | Woodside Energy Ltd |
| WA Department of Fisheries | |

Overall, there have been no objections and few specific issues or concerns raised by stakeholders regarding the WA-474-P Exploration Drilling campaign at the time of submission. Stakeholders who provided feedback to Hess and those whom provided information or advice were responded to directly. Information provided by stakeholders was collated and provided in the EP. Information provided to Hess was assessed in the same manner as risks identified by Hess.

Hess considers it has undertaken best endeavours to understand and address matters raised, which are relevant to the scale, nature and duration of the Activity. Hess recognise that stakeholders may continue to have an interest in the exploration drilling campaign, particularly the timing of operations once these are confirmed, and therefore Hess will provide for continued and ongoing engagement with stakeholders throughout project planning and operations as shown in Table 8-2, which provides for the flexibility to accommodate new stakeholders that may emerge. Should Hess consider amendment to the approved EP or OPEP be required as a result of stakeholder feedback, Hess will seek to make these amendments in accordance with NOPSEMA's requirements. Hess will advise stakeholders of the response to the feedback provided and any resultant action taken.

Table 8-2: Ongoing stakeholder engagement program

| Stakeholder | Activity | Purpose of Engagement | Timing |
|---|----------------------|---|---|
| All identified stakeholders | Letter / Email | Advise stakeholders of NOPSEMA approval of the EP and OPEP directing stakeholders to the summary of the EP. Provide further opportunity for stakeholders to raise queries and further comment. | Commence within four weeks following NOPSEMA acceptance of the EP. |
| Organisations involved in emergency response (AMOSC, AMSA, DoT, OSRL) | Email | Provide notification when drilling rig has been contracted, drilling position and timing of operations. Consultation regarding emergency spill response activities. | Commence within one week after the drilling rig has been contracted. |
| NOPSEMA and DMP | Written Notification | Formal notification that the Activity is about to commence, to confirm start date, and after its completion. | At least 10 days before the Activity commence, and as soon as practicable no later than 10 days after the completion. |
| Joint Rescue Coordination Centre (AMSA) | Email | Contact for Auscoast warning broadcasts. Provide notification of drill rig and support vessel details and timing/location of operations. Advise when drilling program has completed. | Commence no less than two weeks prior to commencing drilling program and at completion of drilling program. |
| Australian Hydrographic Service (Department of Defence) | Email | Provide notification when drilling rig has been contracted, drilling position and timing of operations for promulgation of Notice to Mariners. | Commence no less than two weeks prior to commencing drilling program and at completion of drilling program. |



| Stakeholder | Activity | Purpose of Engagement | Timing |
|-------------------------|----------------|--|--|
| Department of Fisheries | Letter / Email | Ongoing consultation update as per prior correspondence. | 3 months prior to start of operations. |

9 TITLEHOLDER NOMINATED LIAISON PERSON

For further information about this Activity, please contact:

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