Information for relevant persons

Santos

Bedout Multi-well Exploration and Appraisal Drilling Environment Plan (Activity Update)

Activity Overview

Santos is proposing to undertake a multi-well exploration and appraisal drilling program within Commonwealth waters of the Bedout Basin.

Santos has a long history of hydrocarbon exploration, development and operations across offshore northern Western Australia, including in the Bedout Basin. Bedout Basin has the potential to be the next major liquids rich gas development off Western Australia.

The purpose of the drilling program is to identify hydrocarbon resources additional to Santos' known discoveries in the region.

The proposed activities are planned to commence from Q1 2027, subject to obtaining all regulatory and business approvals. All wells drilled will be permanently plugged and abandoned.

The Environment Plan (EP) being prepared for proposed activities will have a validity of five years, once accepted, to allow for the drilling of up to seven exploration and/or appraisal wells across three Operational Areas (OAs).

The closest OA to the Western Australia mainland – Curie – is approximately 172 km north west of Port Hedland, WA.

Consultation and Feedback

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

Under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023* (Cth) (OPGGS Environment Regulations), Santos is required to consult with relevant persons about proposed activities in the course of preparing an EP.

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

Santos meets this requirement by undertaking consultation. More details on consultation and providing feedback can be found on the back page of this factsheet.

The consultation period on this Activity Update closes **27 October 2026.**

More details about the Commonwealth Government environmental approval process can be found on the NOPSEMA website at **NOPSEMA.gov.au**.

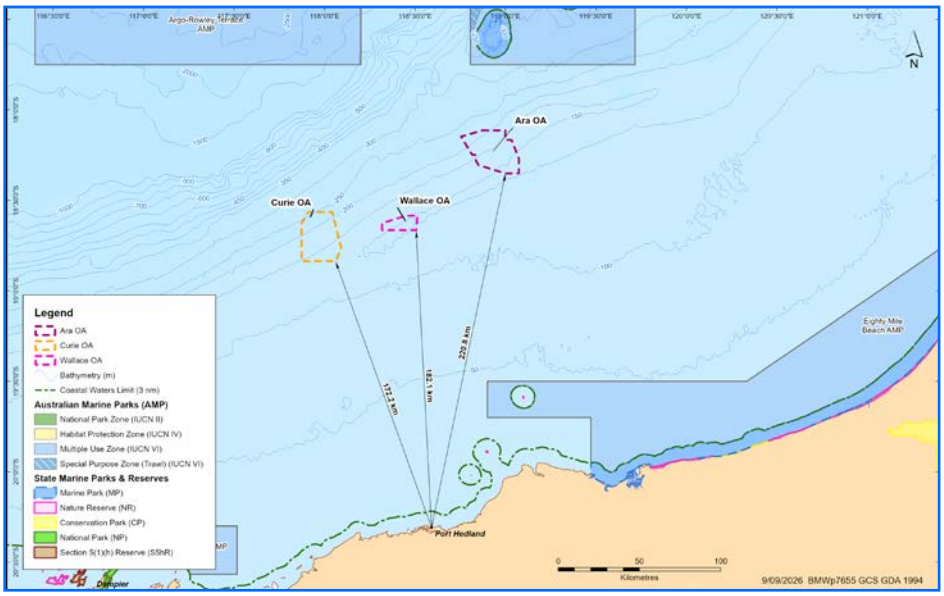

Figure 1. *Bedout Operational Areas, Marine Parks & Reserves.*

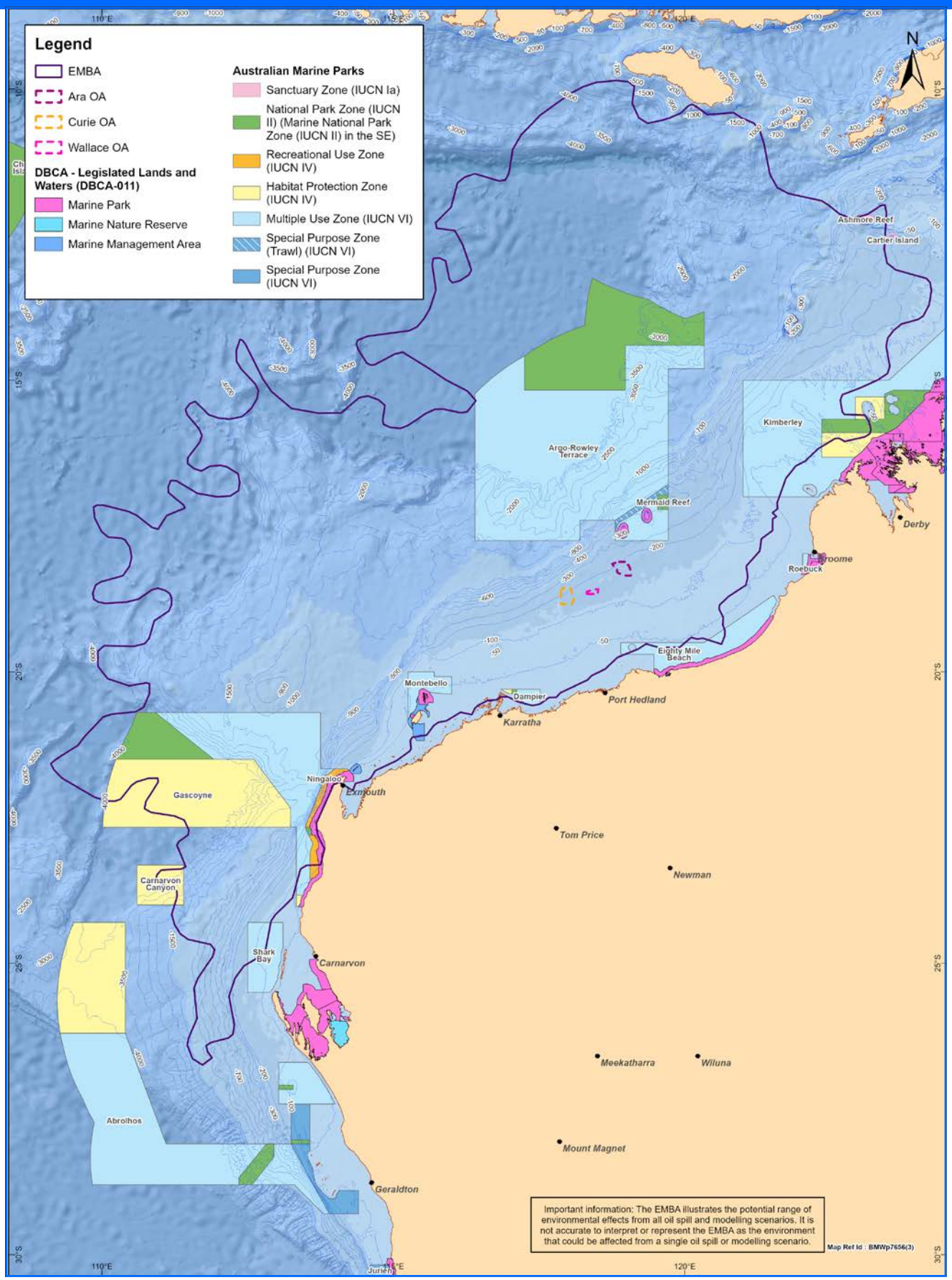

Figure 2. *Bedout Multi-well Exploration and Appraisal Drilling Activity EMBA.*

Activity Description

An overview of proposed activities is outlined in **Table 1**.
Activities are proposed in three OAs, details of which are outlined in **Table 2**.

Table 1. Planned Activities

Planned Activities	
Indicative timing	Drilling and appraisal activities may occur from Q1 2027, subject to obtaining all regulatory and business approvals.
Duration	Expected duration to drill each well is between 40 to 90 days, with drilling duration subject to change based on geological conditions and potential for operational challenges. The commencement and completion of individual drilling activities across the five-year period will vary, subject to vessel availability, weather conditions, and technical/equipment requirements, amongst others.
Planned activities	**Drilling activities** • Pre-mobilisation surveys • Drill up to 7 (exploration and/or appraisal) wells using a mobile offshore drilling unit (MODU) • Pre-lay moorings for the semi-submersible MODU • MODU and vessel mobilisation and demobilisation activities • Deploy, operate and remove temporary acoustic survey positioning system • Install risers, wellhead and blow-out preventer (BOP) • Pressure test BOP • Prepare and drill the well • Run well evaluation program and collect downhole data to assess the well and surrounding formation (vertical seismic profile, core, wireline) • Install a permanent barrier (cement plug) to permanently abandon well • Remove well casings and wellhead (below or at the seabed) • Demobilise the MODU or move MODU to commence drilling of another well in another OA **Vessel-based surveys** • Geophysical and geotechnical surveys to determine suitable MODU installation and operation locations • Duration of one to two weeks at each well and within an area of approximately 5 km by 5 km • Other geotechnical surveys, such as seabed sampling, core and grab, to establish a detailed evaluation of the foundation soils • Hydrographic surveys to measure the physical features underwater • Metrology surveys to provide subsea (infrastructure) measurements as part of installation

Vessels / aircraft and other equipment	• MODU • Up to four support vessels are required to assist with anchor handling, MODU towing, transportation of equipment and consumables, and bunkering (refuelling) • Helicopters will be used for crew changes; critical equipment supply and emergency response. Helicopter flights are planned as required as per drilling campaign • Remote operating vehicle (ROV) will be used to monitor drilling operations, conduct periodic visual surveys and any required manipulation of subsea equipment • Autonomous underwater vehicle (AUV) will be used to conduct several geophysical and inspection payloads, such as sub-bottom profilers, multibeam echosounders, cameras, side scan sonars and conductivity, temperature and depth instruments
Description of the natural environment in the OAs	The seabed within the OAs is generally flat and featureless, predominantly sand, with a proportion of silt and clay, which is consistent with much of the midcontinental shelf in the Northwest Shelf (NWS) region.
Description of the environment that may be affected (EMBA)	Santos has undertaken an assessment to define environmental and socio-economic values, and sensitivities that may be affected by proposed activities. To do this, Santos has considered the areas where activity impacts and risks may occur. Activity impacts typically may occur within Operational Areas, the locations of which is provided in **Figure 1**. The widest geographic extent of activity risk is defined by potential ecological and socio-economic impacts resulting from a credible worst-case spill event. For this EP, we have considered a loss of well control during drilling as being the most credible spill event. As part of spill response planning, Santos considered exposure values for the four oil phases of a spill, these being shoreline accumulation, floating oil, and dissolved and entrained oil in the water column. These thresholds, combined with advanced and sophisticated computer modelling, enable Santos to present the areas that could be affected in the unlikely event of a spill. The computer modelling overlays a great number (hundreds) of individual computer simulations, accounting for the range of metocean conditions experienced for the modelled events at their locations, to combine all these hypothetical oil spill events into a single map. Each simulation run starts from the same location for each scenario with each run subject to a different set of wind, weather and ocean current conditions derived from historical data. This modelling helps Santos to develop specific response strategies considering a range of spill scenarios. These strategies are described in the Oil Pollution Emergency Plan for this EP, (7720-650-EMP-0006) which will be reviewed and assessed by the Regulator as part of the environmental approval process.

Exclusion zones	A 500 m radius Petroleum Safety Zone (PSZ) exclusion zone will be in place around the MODU for the duration of the activity as a safety requirement to protect other marine users who might be in the area. A 2,000 m cautionary zone will be established during anchor handling operations (for 2-3 days either side of rig arrival and departure).
Petroleum permits and licences	Exploration permits WA-435-P, WA-436-P, and WA-541-P.

Table 2. Operational Area locations and water depths

OA	Permits	Latitude	Longitude	Water Depth
Ara	WA-435-P WA-436-P	18° 06’ 48.37” S 18° 06’ 50.13” S 18° 09’ 57.85” S 18° 09’ 59.04” S 18° 16’ 9.73” S 18° 21’ 1.9” S 18° 21’ 4.72” S 18° 18’ 17.64” S 18° 16’ 48.18” S 18° 14’ 53.53” S 18° 14’ 52.15” S 18° 08’ 50.51” S 18° 06’ 48.37” S	118° 52’ 22.75” E 118° 59’ 59.16” E 119° 00’ 0.79” E 119° 02’ 2.23” E 119° 04’ 26.12” E 119° 04’ 24.71” E 119° 00’ 1.11” E 118° 51’ 3.88” E 118° 50’ 10.82” E 118° 50’ 9.08” E 118° 48’ 58.02” E 118° 45’ 16.49” E 118° 52’ 22.75” E	130-235 m
Curie	WA-541-P	18° 37’ 37.76” S 18° 33’ 55.48” S 18° 33’ 51.32” S 18° 45’ 56.15” S 18° 50’ 10.39” S 18° 50’ 12.65” S 18° 37’ 37.76” S	117° 52’ 19.74” E 117° 54’ 34.55” E 118° 02’ 30.76” E 118° 05’ 32.99” E 118° 03’ 39.04” E 117° 52’ 23.61” E 117° 52’ 19.74” E	135-265 m
Wallace	WA-435-P	18° 39’ 52.96” S 18° 37’ 35.32” S 18° 35’ 6.28” S 18° 35’ 2.98” S 18° 39’ 54.22” S 18° 39’ 52.96” S	118° 19’ 4.57” E 118° 19’ 4.33” E 118° 26’ 58.41” E 118° 30’ 50.36” E 118° 30’ 23.55” E 118° 19’ 4.57” E	135-155 m

Activity Purpose

The purpose of the drilling program is to identify hydrocarbon resources additional to Santos' known discoveries in the region.

Importantly, the exploration and appraisal activities proposed to be undertaken are for the purpose of gathering geological and reservoir information to inform Santos' decision making on potential development opportunities.

Further, the number of wells proposed (seven in total) provides sufficient flexibility to undertake a robust exploration and appraisal campaign.

The exploration and appraisal wells are not planned to be drilled sequentially and so the term of this EP is set at five years to allow sufficient time for data processing and well construction planning cycles between exploration wells and appraisal wells.

Depending on the results of each well drilled, Santos will either continue drilling in the same location or move on to the next OA. As such, a single well or multiple wells may be drilled in any one OA, meaning not all the OAs will necessarily be drilled.

Bedout Basin has the potential to be the next integrated gas and liquids development off Western Australia. Exploration success during the Bedout exploration and appraisal drilling program will help inform a future development.

Defining the Environment that May Be Affected (EMBA)

In order to define the EMBA, we have considered the areas where impacts from planned activities and potential impacts from unplanned events that may occur. Activity impacts typically occur within Operational Areas (OAs), the location of which for proposed activities are summarised in **Table 3**.

The widest extent of these areas is called the EMBA, which for this activity is the combined EMBA for the modelled potential worst-case hydrocarbon spill scenarios. This EMBA for proposed drilling activities is illustrated in **Figure 2**.

Spill EMBAs are defined by overlaying a great number (usually hundreds) of individual, computer simulated, hypothetical hydrocarbon spill events into a single map. Each simulation run starts from the same location (release point), but each run will be subject to a different set of wind and weather conditions derived from historical data.

The use of advanced and sophisticated models enables us to present all the areas that could be affected.

While the modelled EMBA represents the theoretical spatial extent that could be contacted by the worst-case spill event(s), an actual spill event is more accurately represented by a single simulation run, resulting in a much smaller spatial extent impacted by the spill.

Indicative example of semi-submersible MODU.

Often, one or more simulation runs are selected to be representative of the 'worst-case' based on the nature and scale of the activity and the local environment. Please see the **NOPSEMA Spill Modelling Video** for more information on oil spill modelling and why it is required for the preparation of Environment Plans.

Santos has undertaken a review of publicly available information to identify environmental, social, economic and cultural values and sensitivities that may be affected by activity impacts and risks. The outcomes of this review are summarised in **Tables 3-6**.

Table 3. Environmental values and sensitivities

Value/Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Relevance to EP Activities
Biologically Important Areas (BIAs)	BIAs are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviour such as breeding, foraging, resting or migration.	Yes	Yes	The OAs overlap the following BIAs: • Lesser frigatebird (reproduction): Curie OA and Wallace OA. • White-tailed tropicbird (reproduction): Ara OA, Curie OA, and Wallace OA. • Whale shark (feeding): all OAs. The EMBA also includes BIAs for sharks, marine mammals and marine birds.
Key Ecological Features (KEF)	KEFs are elements of the Commonwealth marine environment that are considered to be of regional importance for either a region's biodiversity or its ecosystem function and integrity.	No	Yes	No KEFs intercept the OAs. The nearest KEF to the OAs is the Ancient Coastline at 125 m Depth Contour KEF, which is located approximately 7 km south of Ara OA. There are KEFs present within the EMBA.

Table 3. Environmental values and sensitivities ... continued

Value/Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Relevance to EP Activities
Protected Areas	World Heritage Areas (WHA) Commonwealth Heritage Listed (CHL) National Heritage Listed (NHL)	No	Yes	No WHAs, CHL or NHL areas intercept the Operational Areas. The closest WHA to the Operational Areas, is the Murujuga Cultural Landscape WHA located approximately 194 km from the Curie Operational Area. The EMBA contains: •Two WHAs: • Murujuga Cultural Landscape • The Ningaloo Coast • Two NHL areas: • Dampier Archipelago (including Burrup Peninsula) • The Ningaloo Coast • Five CHL areas: • Ashmore Reef National Nature Reserve • Learmonth Air Weapons Range Facility • Mermaid Reef - Rowley Shoals • Ningaloo Marine Area - Commonwealth Waters • Scott Reef and Surrounds - Commonwealth Area
	Australian Marine Parks (AMP)	No	Yes	No AMPs intercept the OAs. The Argo-Rowley Terrace is the closest AMP to: • Ara at 40km • Curie at 90km • Wallace at 96km Australian Marine Parks are present within the EMBA.

Table 3. Environmental values and sensitivities ... continued

Value/Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Relevance to EP Activities
Protected Areas	Western Australian Marine Parks and Marine Management Areas	No	Yes	There are no Western Australian Marine Parks or Marine Management Areas located within the OAs. The Rowley Shoals Marine Park is the closest WA State Protected area, to the following OAs: • 45km to Ara • 131 km to Curie • 106km to Wallace The EMBA has Western Australian Marine Parks and Marine Management Areas.
	Wetlands of International or National Importance	No	Yes	There are no Wetlands of International or National importance located within the OAs. The closest Wetland of National Importance to the OAs is: • Mermaid Reef – located 127 km from Ara One Wetland of International Importance was identified within the EMBA. Three Wetlands of National Importance were identified within the EMBA.

Table 4. Social values and sensitivities

Value/Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Relevance to EP Activities
Communities	Local Government Area	No	Yes	No Local Government Areas intercept the Operational Areas. The closest Local Government Area to the Operational Areas is the Town of Port Hedland, which is located approximately 172 km from the Curie Operational Area. There are nine Local Government Authorities near to the EMBA.
Indigenous, subsistence or customary fishing	Indigenous, subsistence or customary fishing areas	No	Yes	Traditional indigenous fishing in WA waters predominately occurs within inshore tidal waters and is not expected in the OAs. Traditional indigenous fishing in WA waters may occur in the EMBA.
Recreational fishing	Recreational fishing areas	No	Yes	Recreational fishing is unlikely to occur within the OAs. Recreational fishing is known to occur within the EMBA.

Table 5. Economic values and sensitivities

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Commercial fishing	Commercial fishing (Cth)	Yes	Yes	Three Commonwealth managed fisheries overlap the OAs, none of which have had any recent activity within the OAs. Commercial fishing in the North West Slope Trawl Fishery, Western Tuna and Billfish Fishery, Southern Bluefin Tuna Fishery, Western Skipjack Tuna Fishery and the Western Deepwater Trawl Fishery occur within the EMBA.
	Commercial fishing (WA)	Yes	Yes	Ten Western Australian managed fisheries overlap the OAs of which the following fisheries have had recent activity: • Mackerel Managed Fishery (Area 2) - Ara, Curie and Wallace OAs. • Pilbara Demersal Scalefish Fisheries specifically the Pilbara Trawl Interim Managed Fishery) - Ara, Curie and Wallace OAs.
Defence	Designated defence activity areas	No	Yes	The OAs do not intersect any designated defence activity areas. The closest defence area to the OAs is the RAAF Base Learmonth, which is located around 350 km from the nearest OA (Curie). The EMBA has a designated defence activity in near proximity.

Table 5. Economic values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Energy Industry	Offshore carbon capture and storage activities	No	Yes	The OAs do not intersect any Greenhouse Gas (GHG) assessment permits for offshore carbon capture and storage activities. There is an offshore carbon capture and storage activity within the EMBA.
	Oil and gas activities	No	Yes	The OAs do not intersect any other oil and gas activity and associated infrastructure. The activity occurs in a particularly isolated area of the North West Shelf. There are currently no operating fields in the OAs. There are oil and gas activities within the EMBA.
	Offshore renewables activities	No	No	The OAs do not intersect any Offshore Energy Infrastructure (OIE) licences for proposed offshore renewables activities. There are no offshore renewables activities within the EMBA.

Table 5. Economic values and sensitivities ... continued

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Shipping	AMSA shipping fairways and recorded vessel movements and shipping routes	No	Yes	No OAs overlap shipping fairways. There are shipping fairways and vessel movements within the EMBA.
	Port areas	No	Yes	The OAs do not intersect any port authority boundaries. The EMBA intersects the port authority boundaries of two Pilbara ports, these being Port of Dampier and Port of Port Hedland. The closest port is the Port of Hedland, which is approximately 172 km from the nearest boundary of the Curie OA.
Telecommunications infrastructure	Subsea telecommunications cables	Yes	Yes	The JASURAUS submarine communication cable intersects the Wallace OA. Its capacity and role was overtaken in 2000 by other subsea cables out of Australia. However, Telstra continues to manage the cable as it remains an emergency backup link out of Australia. There are subsea telecommunications cables within the EMBA.
Tourism	Marine and coastal tourism	No	Yes	No known tourism activities occur in the OAs. Tourism activities are known to occur in the EMBA.

Table 6. Cultural values and sensitivities

Value / Sensitivity	Description	Spatial overlap with OA	Spatial overlap with EMBA	Public Information Review
Aboriginal Heritage	Registered Aboriginal Heritage sites protected under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)*	No	Yes	There are no registered Aboriginal Heritage sites within the OAs. Aboriginal Heritage sites are present along the southern and eastern boundaries of the EMBA.
	Registered Aboriginal Heritage sites protected under the *Aboriginal Heritage Act 1972 (WA)*	No	Yes	There are no registered sites within the OAs. There are Aboriginal Heritage sites present along the boundaries of the EMBA.
Cultural Heritage	Registered cultural sites under the: • *Underwater Cultural Heritage Act 2018 (Cth)* • *Maritime Archaeology Act 1973 (WA)*	No	Yes	There are no known sites of shipwrecks, sunken aircraft or other types of underwater cultural heritage within the OAs using the "Australian National Shipwrecks" dataset (before it was removed last year – can still be viewed online). The closest known shipwrecks to the OAs are the Pearl (lost at North Turtle Island) and the Lively (lost in 1806 at Mermaid Reef). There are shipwrecks within the EMBA.

Environmental impact and risk assessment considers planned activities and unplanned events:

- **Planned activities** come with unavoidable and known impacts that occur as part of the Activity, such as noise and atmospheric emissions.
- **Unplanned events** are not expected to occur, such as accidental discharges or spills. These events are assessed to ensure that, in the unlikely of an occurrence, the risks are managed adequately (through contingency measures).

Table 4 summarises the potential environmental impacts, risks and associated management measures for the proposed Activity. Physical, biological, socio-economic and cultural aspects will be risk-assessed within the EP on a case-by-case basis, with proposed management measures listed in **Table 7** designed to reduce the environmental consequences to minor and As Low As Reasonably Practicable (ALARP).

Table 7. Planned Activity impacts and management measures

Potential activity impacts	
Noise emissions	

Description of impacts
Noise will be generated by:
• MODU operations (although MODUs have no repulsion removing any noise generated from propellers)
• Drilling operations
• Flaring
• Activity support and survey vessels
• Helicopters
Elevated underwater noise has the potential to change marine fauna behaviour such as attraction, avoidance and disorientation. The sensitivity of fauna to elevated noise levels varies depending on individual response.
Noise from drilling operations activities are not expected to impact socio-economic receptors as the impacts to fish from underwater noise are limited to localised behavioural changes that will not have any flow on impact to commercial fishing operations.
	Compliance with the following key management measures
	• Implement Santos' *Protected Marine Fauna Interaction and Sighting Procedure* for vessel and aircraft movements. This procedure limits marine fauna approach distances and speed, allowing marine fauna to be avoided or to move away which complies with Part 8 of *Environment Protection and Biodiversity Conservation Regulations* (EPBC Regulations) for interacting with cetaceans including:
	  • Support vessels will not travel faster than 6 knots within 300 m of a cetacean or turtle (caution zone) and minimise noise;
	  • Implement Santos' Protected Marine Fauna Interaction and Sighting Procedure;
	  • Support vessels will not approach closer than 50 m to a dolphin or turtle and/or 100 m for a whale; and
	  • Vessels' movements and helicopter flights comply with Part 8 of EPBC Regulations for interacting with cetaceans.
	• Marine assurance standards and planned vessel maintenance will minimise noise generated from vessels and MODU by ensuring they are operated, maintained and crewed in accordance with industry standards and regulatory requirements.
	• Vessel planned maintenance system to maintain vessel dynamic positioning engines and machinery.
	• Vessel bridge crew receive induction in marine fauna observations and marine fauna interaction requirements.

Table 7. Planned Activity impacts and management measures ... continued

Light emissions	
Description of impacts	**Compliance with the following key management measures**

Light will be generated by:
• Flaring activities
• Artificial lighting for:
  • operational and navigational safety during the Activity;
  • spot lighting when needed, such as deploying or retrieving equipment; and
  • when ROVs are working underwater.
Light may impact threatened, migratory or local fauna (e.g. marine mammals, marine turtles, sharks, rays, other fish and seabirds) and socio-economic receptors (cultural features). For example, fish may be attracted to artificial light, leading to a short-term localised increase in fauna activity.
The vessels, including the MODU are expected to produce similar light levels to other marine vessels in the region.
	• Lighting is to be limited to that required for safe operations and navigation and will comply with the following maritime regulations:
	  • International Regulations for Preventing Collisions at Sea (COLREGS) / Marine Orders 30: Prevention of Collisions, and
	  • Marine Orders 21: Safety of Navigation and Emergency Procedures.
	The Commonwealth *National Light Pollution Guidelines for Wildlife (2023)* will be followed as reasonably practicable.

Table 7. Planned Activity impacts and management measures ... continued

Physical presence and interaction with other marine users	
Description of impacts	**Compliance with the following key management measures**

Interaction with other marine users may occur as a result of vessel or helicopter activities, including:
• Support vessels
• MODU
• Helicopters
For commercial fishing licence holders, the level of interaction could lead to temporary displacement to fishing grounds.
The presence of vessels could pose a navigational hazard and a collision risk.
	• All project vessels operating within the OAs will adhere to the navigation safety requirements:
	  • *International Regulations for Preventing Collisions at Sea 1972*,
	  • Chapter 5 of *International Convention for the Safety of Life at Sea 1974*,
	  • *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978*, and
	  • the *Navigation Act 2012* and any subsequent Marine Orders that specify standards for crew training and competency, navigation, communication, and safety measures.
	• The Australian Hydrographic Office will be advised of project activities and installed infrastructure to facilitate issuing Notices to Mariners and maintaining nautical charts.
	• The MODU and activity vessels will maintain navigation aids to facilitate identification by other users.
	• A 500 m exclusion zone will be established and maintained around all drilling activities.
	• Exclusion zones/ petroleum safety zones will be limited to the minimum area necessary to exercise rights and perform duties under project specific petroleum titles.
	• Residual impacts to other marine users of the environment are managed to not interfere with their rights.
	• Lighting will be used as required for safe work conditions and navigational purposes.
	• Pre-lay anchors are marked with surface buoys when semisubmersible MODU is not connected.

Table 7. Planned Activity impacts and management measures ... continued

Seabed and benthic (above seabed level) habitat disturbance	
Description of impacts	**Compliance with the following key management measures**
Seabed disturbance will occur by: • MODU mooring (anchoring) • Well construction • Placement of objects on the seabed such as drilling equipment Seabed disturbance could result in localised removal of epifauna or decreases in the abundance and diversity of local infauna. The total area of seabed disturbance that has been calculated for the proposed activities: • Grab sampling - approximately 5m2 per sample • Pre-lay of MODU anchors in OAs where the semi-submersible will be used – approximately 2,520 m2 per well.	• The semi-submersible MODU anchor mooring design and station keeping system will be designed to limit the extent of seabed disturbance by minimising the length of mooring line deployed. • No planned mooring of support vessels. • All deployed equipment is to be recovered at the end of a drilling campaign to enable seabed and habitat recovery. • Santos continues to consider risks and impacts to cultural values and additional control measures may be adopted following site surveys.

Table 7. Planned Activity impacts and management measures ... continued

Operational discharges - vessels	
Description of impacts	**Compliance with the following key management measures**
The types of vessel discharges are typical of most offshore commercial vessels and include: • Bilge water • Cooling water • Deck drainage • Desalination brine • Food waste • Sewage and greywater • Ballast water • Firefighting foam • Discharges from the MODU and support vessels may create a localised and temporary reduction in marine water quality.	• Santos' chemical selection process will be implemented so that environmentally acceptable chemicals are used. • Additives will be selected and optimised for biodegradability as well as low aquatic toxicity and bioaccumulation potential. • All wastewater discharges will comply with relevant MARPOL 73/78, *Navigation Act 2012*, Protection of the Sea (Prevention of Pollution) Act 1983 and subsequent Marine Order requirements (as appropriate for vessel classification). • Marine Order 91 (Marine Pollution Prevention – Oil), which implements Annex I of MARPOL 73/78. • Marine Order 95 (Marine Pollution Prevention – Garbage), which implements Annex V of MARPOL 73/78. • Marine Order 96 (Marine Pollution Prevention – Sewage), which implements Annex IV of MARPOL 73/78. • Santos Waste (Garbage) Management Procedures.

Table 7. Planned Activity impacts and management measures ... continued

Operational discharges - drilling	
Description of impacts	**Compliance with the following key management measures**
The types of routine drilling discharges include: • Brine • Drilling muds, which will be water-based for this activity • Drilling fluids and cuttings • Subsea control fluids • Cement and completion fluids (such as well clean up and suspension fluids) • Formation water • Chemicals such as tracer dyes Drilling discharges will be intermittent during the activity with volumes discharged dependent on a range of variables. Drilling discharges to the marine environment will result in a localised (around the discharge location) and temporary (minutes to hours) reduction in water quality. The OAs are in an area with strong tidal flows which characterise a high-energy, well mixed deep open water environment. The discharges are expected to be dispersed and diluted rapidly with concentrations significantly dropping the further away from the discharge location. Water quality change outside the OAs is therefore unlikely to occur.	• Chemical selection procedures so that only environmentally acceptable products are used in the activity. • Cuttings management system to ensure all drilling fluid will be recovered prior to the cuttings discharge to the sea. • Use only water-based mud as drilling fluid.

Table 7. Planned Activity impacts and management measures ... continued

Atmospheric emissions	
Description of impacts	**Compliance with the following key management measures**
Atmospheric emissions will occur from: • Fuel combustion to operate the MODU, vessels and helicopters • Operation of vessel incinerators • Flaring during well testing of appraisal wells Atmospheric emission from the above activities may result in a temporary, localised reduction of air quality in the environment immediately surrounding the discharge point during the activity. Non-GHG emissions (NOx and SOx), can lead to a reduction in local air quality. Other atmospheric emissions may include greenhouse gases (GHG) such as CO_2, N_2O and CH_4. GHG emissions are linked to global warming and climate change.	• The MODU and support vessels will comply with MARPOL Annex VI (Prevention of Air Pollution from Ships), the *Navigation Act 2012*, the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and subsequent Marine Orders, which require vessels to have a valid International Air Pollution Prevention Certificate (for vessels more than 400 tonnage), and to use low-sulphur fuel. • Ozone-depleting substances onboard vessels and the facilities will comply with relevant MARPOL 73/78 (Annex VI - air pollution), *Navigation Act 2012*, *Protection of the Sea (Prevention of Pollution) Act 1983* and subsequent Marine Order requirements (as appropriate for vessel classification). • Vessel preventative maintenance systems. • Measure, monitor or estimate fuel and flare emissions (in accordance with the National Pollutant Inventory). • Emissions, energy consumption and energy production data will be reported annually to the Clean Energy Regulator by the vessel contractors in accordance with *National Greenhouse and Energy Reporting Act 2007* requirements. • Well flowback flaring is planned to be temporary and of short duration (approximately 2-3 days) and flowback procedures are to be adopted for effective flaring of hydrocarbons. • MODU planned maintenance system – reduces emissions by ensuring contracted MODU is operated, maintained and manned in accordance with industry standards and regulatory requirements. • The control measures to be adopted are designed to be consistent with maritime regulations and petroleum industry standards.

Table 7. Planned Activity impacts and management measures ... continued

Potential activity risks	
Unplanned introduction of invasive marine species (IMS)	
Description of risks	**Compliance with the following key management measures**

Introduction of invasive marine species (IMS) may occur due to:
• Biofouling on vessels and external/internal niches (such as sea chests, seawater systems)
• Biofouling on equipment that is routinely submerged in water (such as ROVs)
• Discharge of high-risk ballast water
If successfully established, IMS can:
• Outcompete native species for food or space
• Prey on native species
• Change the nature of the environment
• Impact fisheries or aquaculture
• Impact human health through released toxins
• Reduce coastal aesthetics
• Cause damage to marine and industrial equipment and infrastructure
	• Ballast water exchange operations will comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (as appropriate to vessel class), Australian Ballast Water Management Requirements (DAWE 2020), *Protection of the Sea (Harmful Anti-fouling Systems) Act 2006*, and *Biosecurity Act 2015*, including:
	  • all ballast water exchanges conducted more than 12 nm from land.
	  • vessel Ballast Water Management Plan stipulating that ballast water exchange records will be maintained Compliance with Santos IMS Management Plan.
	• Biofouling management for vessels will be in accordance with the IMO Guidelines.
	• Compliance with the International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001.
	• Valid International Anti-Fouling Systems Certificate.

Table 7. Planned Activity impacts and management measures ... continued

Unplanned interaction with marine fauna	
Description of risks	**Compliance with the following key management measures**

Potential interaction with marine fauna may occur as a result of:
• MODU operations
• Vessel operations
• Helicopter operations
Marine fauna in surface waters that are most at risk from vessel collision include marine mammals, marine turtles and whale sharks.
The MODU is not self-propelled and will be stationary once on location and MODU related marine fauna interactions are not anticipated.
Potential strike or collision may result in severe injury or mortality.
	• Monitoring of surrounding marine environment by support vessel(s).
	• Santos' Procedure for interacting with marine fauna, which is designed to align with the EPBC Regulations 2000. This procedure limits marine fauna approach distances and speed, allowing marine fauna to be avoided or to move away.
	• Vessels within the designated OA will adhere to the requirements of the EPBC Regulations Part 8.1 – Interacting with cetaceans, (except in emergency conditions or when manoeuvring is not possible), which include:
	  • Implement a caution zone of 150 m for dolphins and 300 m for whales;
	  • Vessels will not knowingly approach closer than 50 m to a dolphin and 100 m to a whale (i.e. no approach zone);
	  • Make sure a vessel does not drift or approach within 50 m of a dolphin or 100 m of a whale; and
	  • Vessels will not knowingly travel more than 6 knots within the caution zone of a dolphin or whale.
	• Helicopters within the designated OA will adhere to the requirements of the EPBC Regulations Part 8.1 – Interacting with cetaceans (except in emergency conditions or when manoeuvring is not possible), which includes:
	  • not operating the helicopter at a height lower than 1650 feet or within a horizontal radius of 500 m of a cetacean, and
	  • not allowing the aircraft to approach a cetacean from head on.
	• Vessel standard operating procedure.

Table 7. Planned Activity impacts and management measures ... continued

Unplanned release of solid objects	
Description of risks	**Compliance with the following key management measures**

Objects that could be accidentally released to the marine environment from vessels or during installation activities include:
• Non-hazardous solid wastes (paper, plastics and packaging)
• Hazardous solid wastes, (such as batteries, fluorescent tubes and aerosol cans)
• Equipment and materials (supplies, hard hats, tools or infrastructure parts)
Dropped objects from the MODU or support vessels may occur due to:
• Overfull or uncovered bins
• Incorrectly disposed items
• Incidents during transfers of waste or supplies
• Accidentally dropped objects/lost equipment
• Solid objects, equipment and other items lost at sea could lead to disturbance of benthic habitats in the area where the object has been dropped
	• All wastewater discharges will comply with relevant MARPOL 73/78, *Navigation Act 2012*, *Protection of the Sea (Prevention of Pollution) Act 1983* and subsequent Marine Order requirements (as appropriate for vessel classification).
	• Objects dropped overboard will be recovered where practicable to mitigate the environmental consequences from objects remaining in the marine environment, unless the environmental consequences are minor, or safety risks are disproportionate to the environmental consequences.
	• Waste management procedures will include:
	  • Classification of wastes including segregation of wastes into recyclable and non-recyclable materials.
	  • Appropriate storage of wastes.
	  • Transportation and disposal of wastes by a licenced waste contractor at licenced waste management facilities in accordance with waste classifications.
	• Crane and lifting operations will comply with the following:
	  • Lifting equipment will be inspected and certified.
	  • Preventative maintenance will be carried out, and lifting operators will be competent and qualified.

Table 7. Planned Activity impacts and management measures ... continued

Unplanned hazardous liquid release (non-hydrocarbon)	
Description of risks	**Compliance with the following key management measures**
Unplanned hazardous liquid release (non-hydrocarbon) may occur during: • Transferring, storing or using bulk products (e.g., mixed cement) • Mechanical failure of equipment, such as a tank or pipework failure • Handling and storage spill and leaks due to insufficient fastening • Hose or hose connection failure or leak • Lifting – dropped objects damaging liquid vessels (containers) inadequate bunding Non-hydrocarbon liquids include miscellaneous chemicals and waste streams (brine, mixed cement, cleaning and cooling agents, stored or spent chemicals and leftover paint materials) used or stored on board activity vessels, including the MODU. • Impacts to water quality are expected to be short-term and localised due to the selection of environmentally acceptable chemicals, the relatively small size of an unplanned spill and the rapid dispersal. • A decrease in water quality is likely to be restricted to the immediate area surrounding the spill location and contained within the OA. • Due to the small volumes and expected rapid dilution to concentrations below impact thresholds, impacts to water quality are not expected to cause flow-on effects to sediment quality, benthic habitats or socio-economic receptors such as commercial fisheries and/or cultural features.	Santos has a suite of procedures to manage the selection, storage, handling and clean-up of chemicals and other non-hydrocarbon liquids. All project vessels operating within the OAs will adhere to the navigation safety requirements including: • International Regulations for Preventing Collisions at Sea 1972. • Chapter 5 of International Convention for the Safety of Life at Sea 1974. • International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978. • The *Navigation Act 2012* and any subsequent Marine Orders that specify standards for training and competency, navigation, communication, and safety measures. • All vessels involved in the project will have a valid SOPEP or Shipboard Marine Pollution Emergency Plan (as appropriate for vessel classification). Vessels will have spill response plans. • Santos chemical selection process will be implemented so that environmentally acceptable chemicals are used. • All project vessels subject to Santos' marine assurance procedures ensuring contracted vessels are operated, maintained and crewed in accordance with industry standards and regulatory requirements. • A 500 m exclusion zone will be established and maintained around the drilling activities. • Spill kits will be available on-board vessels and personnel will receive an induction/training to inform them of deck spill response requirements. • Chemical storage areas will typically be set up in cabinets or bunded storage areas. • Vessel lifting standards and cargo transfer procedures. • Hydraulic equipment on board vessels will be subject to routine servicing and inspection to ensure it is fit for purpose.

Table 7. Planned Activity impacts and management measures ... continued

Unplanned minor hydrocarbon release	
Description of risks	**Compliance with the following key management measures**
Unplanned minor hydrocarbon release may occur due to: • ROV failure • Loss of primary containment • Pipework failure or rupture, hydraulic hose failure • Lifting – dropped objects damaging diesel infrastructure • Human error during tank filling or storage container transfers Minor releases refer to relatively small volumes of hydrocarbons from storage containers, transfer equipment and pipework on the MODU or support vessels that enters the marine environment. Most of these types of release occur within bunded deck areas, and are less than 1m^3, however it remains possible for such spills to enter the marine environment. A localised decrease in water quality may occur, however due to the relatively small volumes impacts are expected to be short term as the hydrocarbon would rapidly dilute and dissolve into the ocean. Marine fauna may transit through the OAs and encounter the release. However, it is expected impacts to fauna would be short term and result in behavioural changes, as they move away from the area where the spill occurred. Minor hydrocarbon releases are not expected to impact any socio-economic receptors such as commercial fisheries and/or cultural features.	• Dropped object prevention procedures to reduce the potential for dropped objects during lifting operations (including tote tanks and drum lifts). • Hazardous chemical management procedures to reduce the potential of spills and leaks (discharges) to the marine environment by controlling the storage, handling and clean-up of hazardous chemicals. • General chemical management procedures to reduce spills, leaks and discharges by implementing procedures for the safe handling and storage of chemicals. • Dangerous goods managed in accordance with International Maritime Dangerous Goods Code to reduce the potential of an accidental minor spills. • MODUs and vessels have spill response plans. • Remotely operated vehicle (ROV) inspection and maintenance procedures. • Documented maintenance program is in place for equipment on vessels and MODU that provides a status on the maintenance of equipment. • Emergency response capability (including equipment, personnel contracts, MOUs) will be maintained in accordance with approved SOPEPS accepted EPs and OPEPs. • Bulk liquid transfer procedure to provide detail about chemical bunkering processes being undertaken. • Well test procedures to reduce the risk of hydrocarbons being released to sea and air.

Table 7. Planned Activity impacts and management measures ... continued

Unplanned marine diesel oil (MDO) release	

Description of risks
An unplanned release of MDO to the marine environment could occur from:
• A collision between the activity vessels and an errant third-party vessel due to factors such as human error, poor navigation, vessel equipment failure or poor weather. Such events could have sufficient impact to result in the rupture of a diesel tank leading to a loss of integrity and releasing 325 m^3 in the environment. This is considered credible given the diesel tanks may not be protected or double-hulled and fuel tank ruptures resulting in a hydrocarbon release have occurred before within the maritime industry.
• Vessel - MODU Refuelling:
  • spills during refuelling can occur through several pathways, including fuel hose breaks, coupling failure or tank overfilling, where fuel bunkering would need to be stopped manually.
  • Fuel released prior to the cessation of pumping as well as fuel remaining in the transfer line may escape to the environment releasing 37.5m^3 of MDO.
Potential impacts that may occur as a result of hydrocarbon exposure could include:
• Sub-lethal stress and, in some cases, total or partial mortality of sensitive benthic organisms (e.g., corals) and the early life stages of resident fish and invertebrate species.
• A reduction in water quality has the potential to impact marine fauna. Some species of marine fauna may have cultural significance.
• Seabirds that encounter sea surface hydrocarbons may experience secondary effects through ingestion of condensate after eating exposed fish or preening.
Potential for temporary disruption to fishing activities e.g. disruption/ displacement of fishing activities caused by the physical presence of the slick, loss of catch, decline in commercially important fish stocks and/or suspension of fishing operations
	Compliance with the following key management measures
	• Bulk liquids transferred in accordance with the bulk transfer procedure to reduce the risk of a release to sea.
	• MODUs and vessels have spill response plans.
	• Remotely operated vehicle (ROV) inspection and maintenance procedures.
	• Documented maintenance program is in place for equipment on vessels and MODU that provides a status on the maintenance of equipment.
	All project vessels operating within the OA will adhere to the navigation safety requirements including:
	• International Regulations for Preventing Collisions at Sea 1972,
	• Chapter 5 of International Convention for the Safety of Life at Sea 1974,
	• International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, and
	• the *Navigation Act 2012* and any subsequent Marine Orders that specify standards for crew training and competency, navigation, communication, and safety measures.
	• The AHS will be advised of project activities to facilitate issuing Notices to Mariners and maintaining nautical charts prior to commencement of installation or drilling activities and operations.
	• At least one support vessel on standby at all times to monitor the MODU 500 m exclusion zone to identify approaching third-party vessels and communicate with the vessels.
	• Accepted EP/OPEP in place for all Bedout drilling activities.
	• A 500 m exclusion zone will be established and maintained around the drilling activities.
	• Oil-spill modelling and environmental risk assessments for development of Bedout Drilling EP and OPEP will consider the full range of credible worst-case scenario consequences based on best available oil-spill modelling.
	• The MODU and vessels will maintain navigation aids.
	• Santos will undertake consultation with relevant persons for all petroleum activities within the scope of these activities in accordance with the OPGGS (E) Regulations 2023.

Table 7. Planned Activity impacts and management measures ... continued

Unplanned hydrocarbon release from loss of well control during drilling	

Description of risks
Based on industry statistics and Santos' risk assessments, the likelihood of a loss of well control event leading to a spill of this size is considered 'remote' – requires exceptional circumstances and is unlikely even in the long term.
The combination of the standard prevention control measures (i.e., safe drilling methods), and the spill response strategies, as presented in the OPEP, together reduce the hydrocarbon spill risk to a low level
Potential impacts that may occur as a result of hydrocarbon exposure could include:
• Sub-lethal stress and, in some cases, total or partial mortality of sensitive benthic organisms (e.g., corals) and the early life stages of resident fish and invertebrate species.
• A reduction in water quality has the potential to impact marine fauna. Some species of marine fauna may have cultural significance.
• Seabirds that encounter sea surface hydrocarbons may experience secondary effects through ingestion of condensate after eating exposed fish or preening.
• Potential for temporary disruption to fishing activities e.g. disruption/ displacement of fishing activities caused by the physical presence of the slick, loss of catch, decline in commercially important fish stocks and/or suspension of fishing operations.
	Compliance with the following key management measures
	• Industry standard safe drilling methodologies, including inherently safe well designs and well control measures, are to be implemented.
	• Drilling and Completions Management Process, including well integrity standards and NOPSEMA accepted Well Operations Management Plan (WOMP).
	• Safety options have been considered in well design and equipment choice for the activity.
	• MODU and support vessel spill response plans including predrilling source control plan.
	• A 500 m exclusion zone will be established and maintained around the drilling activities.
	• Oil-spill modelling and environmental risk assessments for development of Bedout Drilling EP and OPEP will consider the full range of credible worst-case scenario consequences based on best available oil-spill modelling.
	• The AHS will be advised of project activities to facilitate issuing Notices to Mariners and maintaining nautical charts prior to commencement of installation or drilling activities and operations.
	• Marine assurance standards and planned maintenance to ensure that MODU and vessels are operated, maintained and crewed in accordance with industry standards and regulatory requirements.
	• Documented maintenance program is in place for equipment on MODU that provides a status on the maintenance of equipment.
	• Prior to each campaign commencement, an assurance check will be undertaken in accordance with Santos Environment Management of Change Procedure.
	• Prior to the drilling there will be a source control plan in place
	• Source control emergency response plans in place for all drilling activities, including but not limited to:
	  • Relief Well Drilling; and
	  • Activation of Blow-out preventer stack.

Consultation

In preparing an EP for submission to NOPSEMA, a titleholder must consult with each 'relevant person', including relevant Commonwealth and State Departments or agencies, and persons (or organisations) whose functions, interests or activities may be affected by the activity proposed to be carried out under an EP.

Your input is important:

- So that Santos can understand the environmental values in the OAs and the EMBA, and the environmental impacts and risks associated with the Activity to inform development of the Bedout Multi-Well Exploration and Appraisal Drilling EP;
- To inform Santos how consultation processes may need to be adapted for different relevant persons; and
- To ensure that Santos provides information to relevant persons in an appropriate and accessible manner.

Consultation also helps Santos to identify values and sensitivities where information is not publicly available, such as spiritual and cultural connections to land and sea country. This enables Santos to receive first-hand feedback on commercial and recreational fishing, tourism and local community activities and interests.

Consultation provides Santos with an opportunity to receive feedback from authorities, persons and organisations whose interests or activities may be affected by proposed petroleum activities.

This feedback helps Santos to refine or change the management measures it plans to address any potential activity impacts and risks. Santos' objective for the proposed activities will be carried out in a manner by which the environmental impacts and risks of the activity will be reduced to a level that is ALARP and acceptable over the life of the Activity.

Providing feedback

You might be a relevant person if, for example, you have spiritual or cultural connections to land and sea country in accordance with Indigenous tradition that might be affected by our activity, or if you otherwise carry out recreational or commercial fishing, tourism or other activities that might be affected by our proposed activity, or if you are part of a local community that might be affected by our proposed activity.

Relevant persons being consulted on EPs under the OPGGS Environment Regulations should note that they:

- are entitled to be given sufficient information to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities;
- are entitled to be allowed a reasonable period for the consultation; and
- may request particular information provided in consultation not be published.

The merits of relevant person feedback will be considered during the EP development with a summary of responses summarised and included in the EP submitted to NOPSEMA for assessment. Please let us know if you would like your personal/organisational details or any particular information provided during consultation to not be published, and we will ensure that it is included in a separate report which is not published on NOPSEMA's website.

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

Environment plans for offshore petroleum exploration activities are also subject to a mandatory public comment period. Public comment must be done before the environment plan is submitted to NOPSEMA for assessment.

Contact **E:** offshore.consultation@santos.com **T:** 1800 267 600 **santos.com/offshoreconsultation**