Stag Field Environment Plan Permit WA-15-L

GF-70-PLN-I-00002

Rev 18

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Safety Critical:	**No**

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		OIM - Stag	**HSE Manager - Perth**	**Operations Manager**
14	14-Dec-17	A. Klompmaker	J. Williams	M. Robertson
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14B	05-Jul-18	K. Grljusich	J. Williams	M. Robertson
14.01	02-Jul-19	B. Spargo	H. Astill	O. Hobbs
14.02	16-Mar-20	D. Harms	H. Astill	T. Coolican
15	11-Sep-20	D. Harms	M. Patt	T. Coolican
16	19-Jan-21	K. Grljusich	M. Patt	T. Coolican
17	16-Mar-21	A. Klompmaker	M. Patt	T. Coolican
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		K. Grljusich	*R. Brazier*	*R. Curley*

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Jadestone Energy (Australia) Pty Ltd
The Atrium Building, Level 2, 168 St Georges Terrace
Perth, Western Australia, 6000 I PO Box 7060 Perth WA 6850
PH: +61 8 9486 6600 | www.jadestone-energy.com | ACN: 613 671 819

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ABBREVIATIONS AND DEFINITIONS

Abbreviation	Meaning
AFFF	Aqueous Film Forming Foam
AFZ	Australian Fishing Zone
AHV	Anchor handling vehicle
ALARP	as low as reasonably practicable
AMP	Australian Marine Parks
AMSA	Australian Maritime Safety Authority
API	American Petroleum Institute
AEP (formerly APPEA)	Australian Energy Producers (formerly Australian Petroleum Production and Exploration Association)
AMSIS	Australian Marine Spatial Information System
AQIS	Australian Quarantine and Inspection Service
AUV	Autonomous underwater vehicle
BCF	Bioconcentration Factor
BOP	Blowout preventer
Bq/g	Becquerel per gram
CAA	Civil aviation authority
CALM	Catenary Anchor Leg Mooring
CCTV	Closed circuit television
CGFU	Compact gas floatation unit
CHARM	Chemical Hazard and Risk Management
CMMS	Computerised Maintenance Management System
CP	Cathodic Protection
CPF	Central Production Facility
CPI	Corrugated plate interceptor
DA	Designated Authority
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Previously DAWE)
DAWE	Department for Agriculture, Water and Environment (previously DoEE)
DBCA	Department of Biodiversity, Conservation and Attractions
DPAW	Department of Parks and Wildlife (now DBCA)
DEC	Department of Environment and Conservation (now DBCA)
DIIS	Department of Industry, Innovation and Science
DMIRS	Department of Mines, Industry Regulation and Safety (previously Department of Mines and Petroleum, DMP)
DoC	Document of Compliance
DOEE	Department of the Environment and Energy (now DAWE)

Abbreviation	Meaning
DoF	Department of Fisheries (now DPIRD)
DP	Dynamically Positioned
DPIRD	Department of Primary Industries and Regional Development (previously Department of Fisheries)
DSMS	Diving safety management system
DSV	Diving support vessel
DSWEPaC	Department of Sustainability, Environment, Water, Population and Communities (now DAWE)
dwt	Dry weight tonnes
EEZ	Economic Exclusion Zone
EH&S	Environmental Health & Safety
EMBA	Environment that may be affected
EP	Environment Plan
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Emergency Shut-Down system
ESP	Electric Submersible Pump
GFU	Gas floatation unit
HCTS	Habitat Critical for the Survival (of species)
HLO	Helicopter landing officer
HVAC	Heating ventilation air conditioning (system)
HWU	Hydraulic Workover Unit
ICAO	International civil aviation organisation
IMO	International Maritime Organisation
IMS	Invasive Marine Species
IMR	Integrity, maintenance and repair
IWC	International Whaling Commission
Jadestone	Jadestone Energy (Australia) Pty Ltd
KEFs	Key Ecological Features
Kl	Kilolitre
Ksm^3	Thousand Standard Cubic Metres
Km	Kilometre
LAT	Lowest astronomical tide
LC50	Lethal concentration of a compound at which 50% of test species dies within a specified time frame
MAOP	Maximum Allowable Operating Pressure
MCR	Marine Conservation Reserve

Abbreviation	Meaning
mg/L	Milligrams per litre
MMA	Marine Management Area
mmscfd	Million Standard Cubic Feet per Day
m	Meter
MOC	Management of Change
MOPU	Mobile offshore production unit
MPRA	Marine Parks Reserves Authority
MSDS	Material safety data sheet
NCB	North Coast Bioregion
NDT	Non-Destructive Testing
NEBA	Net Environmental Benefit Assessment
NES	National Environmental Significance
NM	Nautical Mile
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NORM	Naturally Occurring Radioactive Materials
NSF	Northern Shark Fishery
NWS	North-West Shelf
NWSTF	North-West Slope Trawl Fishery
OCIMF	Oil Companies International Marine Forum
OCNS	Offshore Chemical Notification Scheme
ODS	Ozone Depleting Substances
OGP	Oil and gas producers (association)
OIM	Offshore Installation Manager
OIW	Oil-in-water
OPGGS (E) Regs	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPMF	Onslow Prawn Managed Fishery
OSCP	Oil Spill Contingency Plan
PAH	Polycyclic aromatic hydrocarbons
PLEM	Pipeline end manifold
PMST	Protected Matters Search Tool
ppm	parts per million
PRS	Production Reporting System
PTS	Permanent Threshold Shift
PW	Produced water
RO	Reverse Osmosis Plant

Abbreviation	Meaning
ROV	Remote Operated Vehicle
SBFTF	Southern Bluefin Tuna Fishery
SCM	Subsea control module
SRB	Sulphur Reducing Bacteria
SSS	Side-Scan sonar
SSWI	Ship Specific Work Instructions
STP	Sewage Treatment Plant
SWL	Safe Working Load
TPH	Total petroleum hydrocarbons
TTS	Temporary Threshold Shift
VBSA	Vessel based support activity
WA	Western Australia
WAF	Water accommodated fraction
WOMP	Well Operations Management Plan
WSTF	Western Skipjack Tuna Fishery
WTBF	Western Tuna and Billfish Fishery

ENVIRONMENT PLAN SUMMARY

This Stag Field Environment Plan Permit WA-15-L Summary has been prepared from material provided in this Environment Plan (EP) and associated Oil Pollution Emergency Plan (OPEP). The summary consists of the following as required by Regulation 35(7):

EP Summary material requirement	Relevant section of EP containing EP Summary material
The location of the activity	Section 1.2
A description of the receiving environment	Section 3 and Appendix C
A description of the activity	Section 2
Details of the environmental impacts and risks	Sections 6and 7
The control measures for the activity	Sections 6and 7
The arrangements for ongoing monitoring of the titleholders' environmental performance	Section 1
Response arrangements in the oil pollution emergency plan	Section 6.9 and the Oil Pollution Emergency Plan
Consultation already undertaken and plans for ongoing consultation	Sections 4and Appendix E
Details of the titleholders nominated liaison person for the activity	Section 1.5

1. OVERVIEW OF THE ACTIVITY

1.1 Introduction

Jadestone Energy (Australia) Pty Ltd ('Jadestone') is the operator and titleholder of the Stag Field Production and Export Facility (Stag Facility). The facility is located in permit area WA-15-L, approximately 60 km northwest of Dampier in approximately 49 m water depth (Figure 1-1). Oil is currently produced from the Stag Reservoir, via production wells, and seawater is injected via injection wells, with produced water discharged to sea.

The Stag Facility, shown in Figure 1-1 and Figure 1-2 includes:

- A fixed Central Production Facility (CPF), producing and processing oil from a number of wells.
- A single 2 km long carbon steel export oil pipeline on the northeast side of the CPF connecting to a Catenary Anchor Leg Mooring (CALM) buoy via a flexible submarine hose (underbuoy hose).
- A third-party tanker receives oil through a flexible offtake hose from the CALM buoy. Once loading is complete, the tanker departs the field for delivery of cargo to market. No offtake activity from the third-party tanker occurs in field.
- Water injection flowlines and wells to assist reservoir fluid recovery.
- Support/ supply vessels, work vessels and tugboats/ static tow vessels supporting third-party tanker movement, facility logistics, maintenance and provisioning
- Helicopter support.

Oil is loaded continuously to the third-party tanker at a production rate of up to 5,000 bbl/d. The CPF has been in production since 1998 with only minor modifications carried out during this time.

Stag oil is a medium crude (API 19) with a very low proportion of volatile compounds due to microbial degradation within the reservoir.

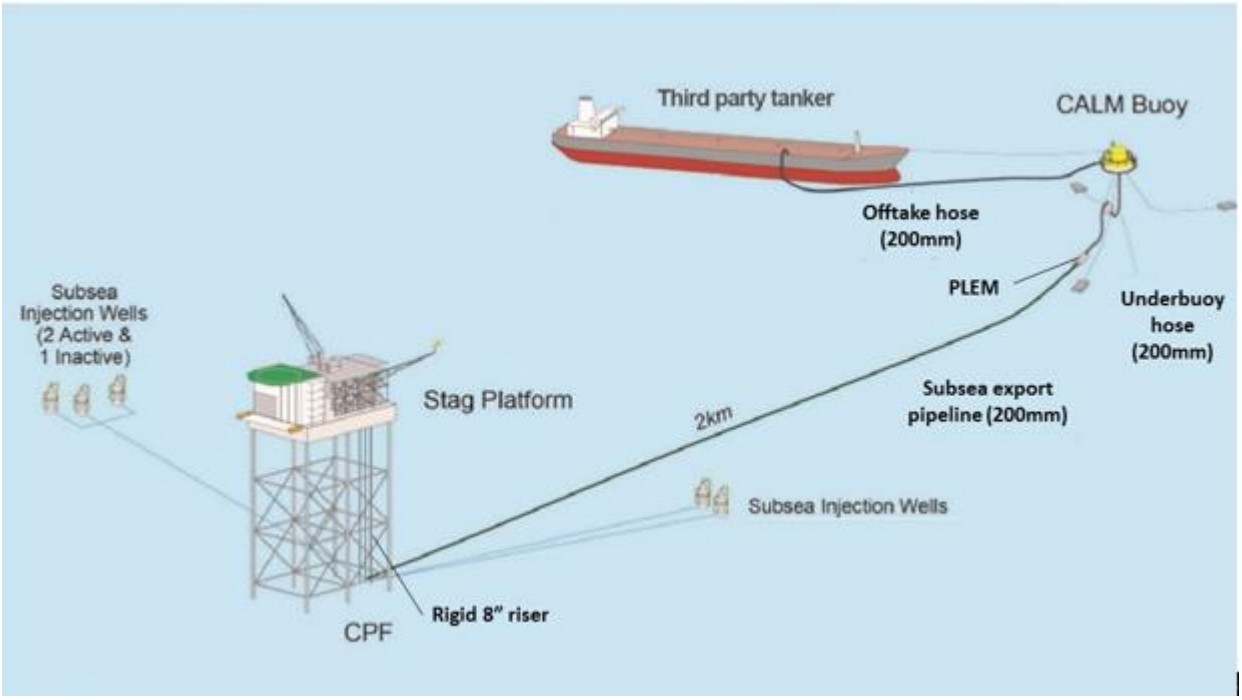


Figure 1-1: Schematic of the Stag Facility (not to scale)

Figure 1-2: Aerial view of Stag Facility

1.2 Scope

The scope of this EP covers the following activities associated with the Stag Facility:

- Routine production and well intervention.
- Crude oil loading activities to the third-party tanker.
- Routine inspection, maintenance and repair (IMR) of the CPF, subsea export pipeline, wells and associated subsea infrastructure (including use of remotely operated vehicle (ROV) and diving activities)
- Non-routine and unplanned activities and incidents associated with the above.
- The infrastructure covered by this EP includes the following as located within the defined Operational Area:
- Stag CPF.
- Pipelines and hoses.
- Subsea infrastructure tied back to the Stag CPF (including wells, wellheads, manifolds, risers, flowlines, etc.).
- CALM buoy.
- Support vessels assisting with activities defined above within the defined Operational Area
- Helicopter activity within the Operational Area.

This EP applies to activities undertaken within the Operational Area only as defined in the description of the activity (Section 2).

Activities that are not covered in this EP include third-party offtake tankers, nearby shipping activity, drilling or intervention activities undertaken by a mobile offshore drilling unit (MODU), or decommissioning. Vessels associated with Stag Operations when outside the Operational Area adhere to all applicable maritime regulations, and Commonwealth and State environmental management obligations, as relevant.

Activities proposed within the Operational Area outside the scope of this EP will be the subject of a separate EP or a revision.

1.3 Objective

This Environment Plan (EP) has been prepared in accordance with the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (Environment Regulations) under the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act) and as administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). Table 1-1 provides EP section references against the requirements of the OPGGS (E) Regulations.

The objectives of this EP are to ensure that:

- All operational activities associated with the Stag Facility are planned and conducted in accordance with Jadestone's Environmental Management Policy.
- Potential adverse environmental impacts and risks associated with the proposed activities, during both routine and non-routine operations, are continuously reduced to as low as reasonably practicable (ALARP) and of acceptable levels
- That the environmental performance outcomes (EPO) and environmental performance standards (EPS) outlined in this EP are met.

This EP contains the environmental impact assessment for Stag Facility operations. The assessment aims to systematically identify and assess the potential environmental impacts associated with operational activity and to stipulate mitigation measures to avoid and/ or reduce any adverse impacts to the marine environment to ALARP and acceptable levels. The implementation of the EPOs specified within this document will provide Jadestone with the required level of assurance that the activities are being managed in an environmentally responsible manner.

This EP is written to allow for the continuation of production at the Stag Facility for a period of five (5) years from the date of its acceptance by NOPSEMA.

Table 1-1: Requirements of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 and EP summary

Reg	Requirement	Section
21(1) 35(7)(i) 35(7)(iii)	*Description of the activity* The environment plan must contain a comprehensive description of the activity including the following: • the location or locations of the activity. • general details of the construction and layout of any facility or other structure. • an outline of the operational details of the activity (for example, seismic surveys, exploration drilling or production) and proposed timetables. • any additional information relevant to consideration of environmental impacts and risks of the activity.	2
21(2) 35(7)(a)(ii)	*Description of the environment* The environment plan must:	2.4.5

Reg	Requirement	Section
	• describe the existing environment that may be affected by the activity, as well as any relevant cultural, social and economic aspects of the environment that may be affected; and • include details of the particular relevant values and sensitivities (if any) of that environment.	
21(5) 35(7)(a)(iv)	*Description of environmental impacts and risks* The environment plan must include: • details of the environmental impacts and risks for the activity; and • an evaluation of all the impacts and risks.	6, 7
21(6)	For the avoidance of doubt, the evaluation mentioned in paragraph (3)(b) must evaluate all the significant impacts and risks arising directly or indirectly from: • all operations of the activity, including construction; and • potential emergency conditions, whether resulting from accident or any other reason.	6, 7
21(7) 35(7)(a)(v)	*Environmental performance objectives and standards* The environment plan must include environmental performance objectives, environmental performance standards and measurement criteria that: • address legislative and other controls that manage environmental features of the activity; and • define the objectives, and set the standards, against which performance by the operator in protecting the environment is to be measured; and • include measurement criteria for determining whether the objectives and standards have been met.	6, 7
21(4)	Requirements: The environment plan must describe the requirements that: • apply to the activity; and • are relevant to the environmental management of the activity	6, 7
22(1)	The environment plan must contain an implementation strategy for the activity in accordance with this regulation.	1
22(7) 35(7)(a)(vi)	The implementation strategy must include measures to ensure that the environmental performance objectives and standards in the environment plan are met.	1
22(2)	The implementation strategy must identify the specific systems, practices and procedures to be used to ensure that the environmental impacts and risks of the activity are continuously reduced to (ALARP) and that the environmental performance objectives and standards in the environment plan are met.	1
22(3)	The implementation strategy must establish a clear chain of command, setting out the roles and responsibilities of personnel in relation to the implementation, management and review of the environment plan.	1
22(4)	The implementation strategy must include measures to ensure that each employee or contractor working on, or in connection with, the activity is aware of his or her responsibilities in relation to the environment plan and has the appropriate competencies and training.	1
22(5)	The implementation strategy must provide for the monitoring, recording, audit, management of non-conformance and review of the operator's environmental performance and the implementation strategy.	1

Reg	Requirement	Section
22(6)	The implementation strategy must provide for the maintenance of a quantitative record of emissions and discharges (whether occurring during normal operations or otherwise) to the air, marine, seabed and sub-seabed environment, that is accurate and can be monitored and audited against the environmental performance standards and measurement criteria.	1
22(8) 35(7)(a)(vii)	The implementation strategy must contain an oil pollution emergency plan and provide for the maintenance of the plan.	**OPEP**
22(9)	The oil pollution emergency plan must: • be kept up to date; and • include emergency response arrangements.	**OPEP**
22(14)	The response arrangements in the oil spill contingency plan must be tested: • when they are introduced; and • when they are significantly amended; and • not later than 12 months after the most recent test; and • for a new location for the activity that is added to the environment plan after the response arrangements have been tested and before the next test is conducted — when the location is added to the plan; and • for a facility or other structure that becomes operational after the response arrangements have been tested and before the next test is conducted — when the facility or structure becomes operational.	**OPEP**
22(15) 37(7)(a)(viii)	The implementation strategy must provide for appropriate consultation with: • relevant authorities of the Commonwealth, a State or territory; and • other relevant interested persons or organisations	1
22(16)	The implementation strategy must comply with the Act, the regulations and any other environmental legislation applying to the activity.	1
22(6) 22(7)	The environment plan must include arrangements for: • recording, monitoring and reporting information about the activity (including information required to be recorded under the Act, the regulations and any other environmental legislation applying to the activity) sufficient to enable the Regulator to determine whether the environmental performance objectives and standards in the environment plan are met; and • reporting to the Regulator at intervals agreed with the Regulator, but not less often than annually.	1
23(1) 35(7)(a)(ix)	The environment plan must include the details for the titleholder and nominated liaison person	1.5
24 35(7)(a)(viii)	The environment plan must contain the following: • a statement of the operator's corporate environmental policy;	1.6
	• a report on all consultations between the operator and relevant authorities, interested persons and organisations in the course of developing the environment plan;	2.4.5
	• details of all reportable incidents in relation to the proposed activity.	9

1.4 Stag Facility Location

The Stag Facility is located on the North-West Shelf (NWS) off Western Australia (WA), approximately 60 km north-west of Dampier (Table 1-2, Figure 1-3).

Table 1-2: Distances from Stag Facility to key regional features

Regional feature	Distance from Stag CPF
Dampier Archipelago	32 km (17.3 Nm)
Closest Montebello Island	75 km (40.5 Nm)
Varanus Island	82 km (44.3 Nm)
Barrow Island	96 km (51.8 Nm)
Glomar Shoals	100 km (54 Nm)

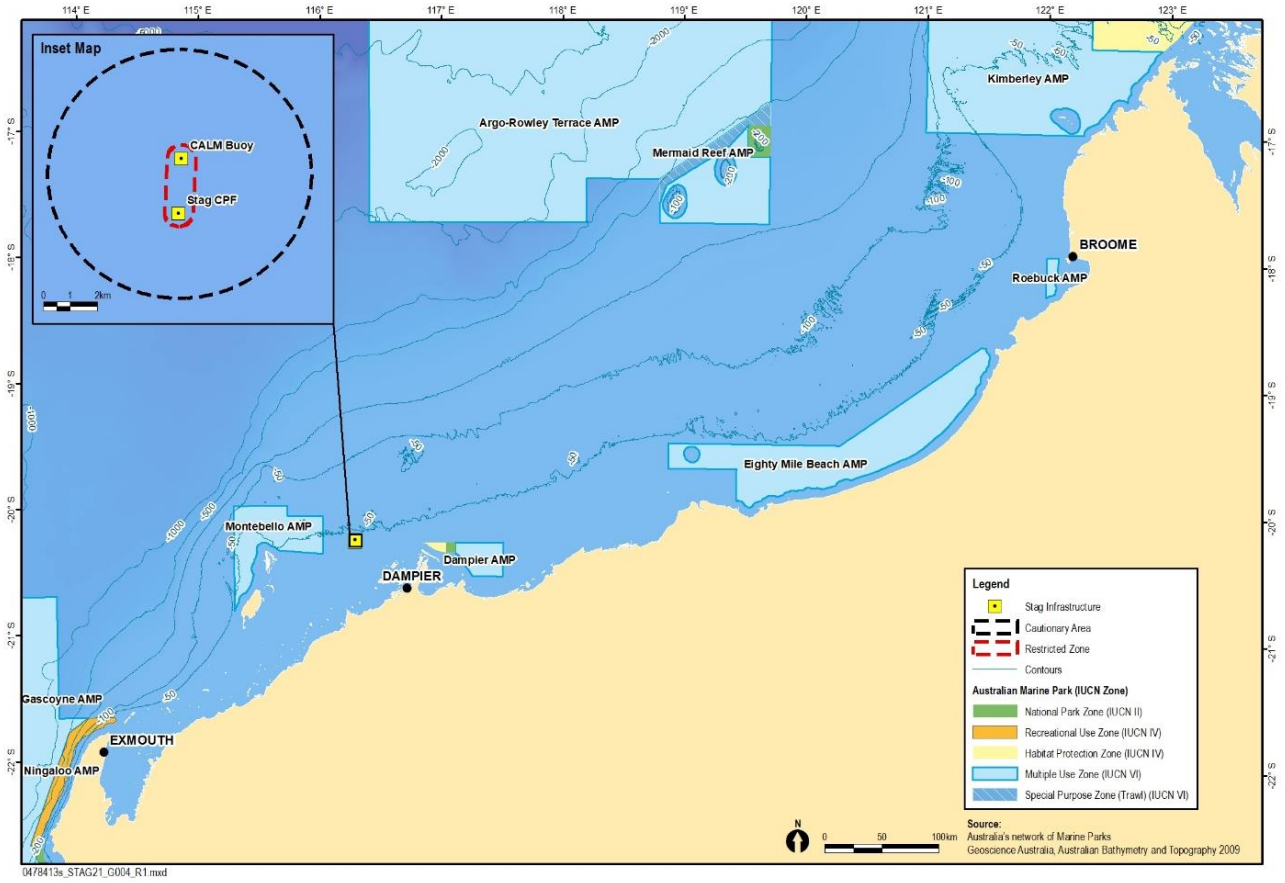


Figure 1-3: Location of the Stag Field

The CPF is located above the original Stag-6H well. The subsea export pipeline runs due north from the north-west side of the CPF to the CALM buoy. The CALM buoy is located in a water depth of approximately 49 m below lowest astronomical tide (LAT), approximately 2 km to the north of the Stag CPF (Table 1-3).

Table 1-3: Stag CPF and the CALM Buoy coordinates

Facility	Latitude	Longitude
Stag CPF	20º 17.5’ South	116º 16.433’ East
CALM Buoy	20° 16.395’ South	116° 16.492’ East

Water injection flowlines run 1,100 m off the north-eastern corner of the CPF where they connect to two sub-surface wellheads. A further three sub-surface water injection wellheads are located approximately 3 km west of the facility (Figure 1-1).

1.4.1 Restricted Zones and Cautionary Areas

A cautionary area is charted for Stag field facilities, a circle of 2.5 NM (approx. 5 km) radius around the facilities, with the centre located 1.4 km due north of the CPF. In addition, there is an exclusion zone of 500 m radius around the CPF, CALM buoy (and moorings) and pipeline. Vessels operating within this exclusion zone must not exceed a speed of five (5) knots.

1.4.2 Operational Area

The Operational Area is defined as the area within the 500 m radius Restricted Zone that extends around the CPF, subsea export pipeline, and CALM buoy.

1.5 Operator and Titleholder Details

Jadestone is engaged in exploration, appraisal and pre-development activities in Southeast Asia, with a portfolio of 10 exploration and pre-development assets. Jadestone is an active operator within the region and the Company's principal focus is on assets in Australia, Indonesia, Vietnam and the Philippines.

Jadestone is firmly committed to being a responsible corporate citizen. The company places safety, environmental and social responsibility considerations at the core of its business and operational decision-making.

Jadestone's Australian office is located at:

The Atrium Building, Level 2, 168 St Georges Terrace, Perth, Western Australia, 6000.

ACN 613 671 819

Jadestone's contact for the Stag Facility is:

Jadestone Operations Manager

Phone: +61 8 9486 6600

In the event contact details for Jadestone or the liaison contact change within the timeframe of this EP, the Regulator, the National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA) will be advised of the updated details.

1.6 HSE Policy

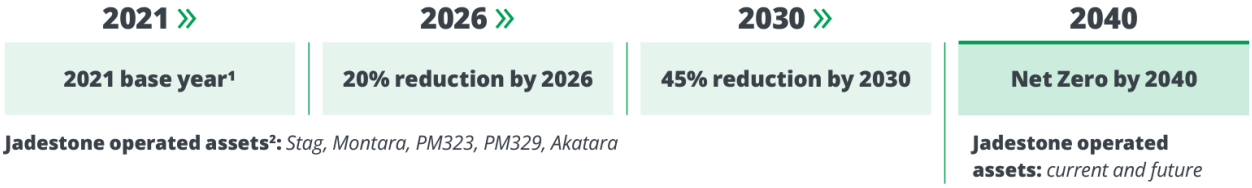
Protecting the environment, valuing cultural heritage and maintaining open stakeholder communication are an integral part of Jadestone's business approach. This is reflected in Jadestone's Health Safety and Environmental (HSE) Policy (JSE014/2021 last updated 3 April 2023) (Appendix A) and this EP.

1.7 Climate Policy

Jadestone recognises the need for action to arrest the impact of rising temperatures caused by human activities, and specifically Greenhouse Gas ("GHG") emissions derived from the production and use of fossil fuels. As a result, the world's energy mix must diversify towards a low-carbon future. To facilitate an orderly and just transition, we recognise that oil and gas will continue to play a role in providing essential energy during the transition to a low-carbon energy system. In the meantime, we will undertake immediate steps to reduce our direct emissions and plan for the transition.

As an upstream oil and gas operator, Jadestone will play its part in promoting a just and orderly energy transition, contributing to economic growth in the Asia-Pacific region, while reducing the carbon footprint of its oil and gas production in support of the aims of the Paris agreement. We are committed to achieving Net Zero for our Scope 1 and our Scope 2 GHG emissions no later than by 2040 and have developed interim reduction targets for Jadestone operated assets as per Figure 1-4. The Group is committing to reduce its Scope 1 and 2 GHG emissions from its operated assets by 20% by 2026 and by 45% by 2030 (from 2021 levels). This commitment covers Scope 1 direct emissions from our operated assets as well as Scope 2

indirect emissions from electricity purchased for our facilities. At the same time, we pledge to work with our business partners to reduce the Scope 1 and 2 GHG emissions on our current and future non-operated assets.



Note 1: Representing total Scope 1 and 2 GHG emissions in tonnes of CO_2-e for operated assets

Note 2: future acquisitions – Jadestone will make best endeavours to retain GHG reduction levels when integrating future acquisitions into the interim targets, subject to reviews of GHG abatement opportunities.

Figure 1-4: Net Zero Interim Reduction Targets (Jadestone Energy, 2024)

The interim 2026 and 2030 targets will be achieved through a combination of measures, ranging from operational GHG reductions, including minimising flaring, methane quantification, monitoring and reduction as well as reliance on some carbon credits within the regulatory schemes of Jadestone regions, as outlined in the following section. As an operator of mid-life assets, field decline with eventual production cessation forms a natural part of its Net Zero strategy, where safe and responsible phasing down of assets, including decommissioning, is carefully planned.

The ultimate responsibility for ensuring implementation of this policy rests with the Jadestone Board and Executive Directors. Jadestone expects its employees and contractors to comply with the policy. We will use our influence with contractors, suppliers and business partners to encourage them to follow similar principles in the assets where we do not have full operational control.

The Climate Change Steering Committee (CCSC) has been established for the purpose of assisting the Board and Executive Directors in fulfilling its oversight responsibilities with respect to the implementation of Jadestone's Climate Policy. The committee consists of the Management team representing key regions and functions, including the CEO and CFO.

1.7.1 Climate Change Steering Committee

The CCSC acts as a decision-making management forum reporting into the Board's HSEC Committee. The CCSC chair will formally report to the Board three times a year, or more often as required, during the Board's HSEC committee meeting. This will include making any relevant recommendations on all matters relating to Jadestone's climate strategy.

Country-level Climate Change Working Groups (CCWG) will support the CCSC in progressing country-specific elements of its remit. The outputs of the Country CCWG will be reported to the CCSC. Terms of reference are developed for each CCWG and include the priorities, actions and recommendations.

The immediate priorities for the Australia CCWG are:

- To determine the Safeguard Mechanism reforms' implications on Australia operations and determine the management options in the context of the Group's Net Zero roadmap.
- To monitor progress of the GHG reduction feasibility studies.
- Review new and emerging technologies to reduce flaring and GHG emissions.
- To finalise and provide a recommendation on the shortlisted GHG initiatives, including capex and estimated GHG reduction, including Workplan and budget (WPB) submission.
- GHG data availability – ensure that monthly inputs are complete and available for actual performance estimation and forecasting.

- Agree on an LDAR approach, as per the EP submission.

The Australia CCWG meets at least quarterly to progress the above priorities.

At a corporate level, the asset GHG forecasts are being incorporated into the 2024 WPB/3YP to further develop a baseline set of GHG forecasts with detailed underlying assumptions for both businesses as usual (BAU) and mitigated cases, ensuring overall consistency with the business planning process.

1.8 Legislative Framework

The activity is located within the Commonwealth Petroleum Jurisdiction Boundary and therefore regulated under Commonwealth legislation; primary under the OPGGS Act and the OPGGS(E) Regulations. In accordance with Regulation 21(4) of the OPGGS(E) Regulations, this section describes the Commonwealth legislation, international agreements and other relevant guidelines and codes of practice to the activity. In the unlikely event of an unplanned hydrocarbon release that migrates into state waters, Western Australia (WA) or Northern Territory (NT) legislation will be triggered. Applicable Commonwealth and state legislation are listed in Appendix B.

Jadestone shall have regard to all matters pertaining to the below by ensuring that activities are managed to ALARP and acceptable levels through a robust evaluation process and the implementation of identified control measures and mitigation as identified in this EP.

1.8.1 International Legislation

Australia is signatory to numerous international conventions and agreements that obligate the Commonwealth government to prevent pollution and protect specified habitats, flora and fauna. Those which are relevant to the operation of the Stag Facility are detailed in Appendix B**.**

1.8.2 Commonwealth Legislation

All activities conducted during the operation of the Stag Facility will comply with legislative requirements established under relevant Commonwealth legislation, and in line with applicable best practice guidelines and management procedures. These are further detailed in Appendix B**.**

1.8.3 Ecologically Sustainable Development

Australia has developed a National Strategy for Ecologically Sustainable Development (ESD), which identifies four principles and ways to apply them to a range of industry sectors and issues such as climate change, biodiversity conservation, urban development, employment, and economic activity, diversity and resilience. OPGGS(E) Regulation 4 states that any petroleum activity carried out in an offshore area is carried out in a manner consistent with the principles of ESD as set out in section 3A of the EPBC Act. These are listed below:

a. Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations

b. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

c. Principle of inter-generational equity: that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations

d. The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making, and

e. Improved valuation, pricing and incentive mechanisms should be promoted.

Jadestone Energy has incorporated the principles of ESD into the decision-making framework described in Section 4 and in the development of control measures and environmental performance outcomes (EPO) proposed in Sections 6 and 7 Jadestone Energy believes that the commitments made within this EP demonstrate that the environmental management of the activity will be conducted in accordance with the principles of ESD.

Australia is signatory to several international environmental protection agreements and conventions which are relevant to the region, including for the protection of wetlands and environmental values. Australia is also a signatory to several international conventions of potential relevance to the activity, including:

- Australia-Indonesia Memorandum of Understanding regarding the Operations of Indonesian Traditional Fishermen in Areas of the Australian Fishing Zone (AFZ) and Continental Shelf – 1974 (Memorandum of Understanding Box)
- Convention on the Conservation of Migratory Species of Wild Animals 1979 (Bonn Convention)
- International Convention on Oil Pollution Preparedness, Response and Co-operation 1990
- Protocol to International Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter 1996
- Marine Pollution – International Convention for the Prevention of Pollution from Ships (MARPOL)
- United Nations Convention on the Law of the Sea 1982.

1.9 This Environment Plan

The Stag Facility Five Year Operations Environment Plan (this EP hereafter) has been prepared in accordance with the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E) Regulations) under the OPGGS Act and as administered by NOPSEMA.

The objectives of this EP are to ensure that:

- All activities associated with the Activity are planned and conducted in accordance with Jadestone Energy's Health, Safety and Environmental (HSE) Policy (Appendix A)
- Potential adverse environmental impacts and risks associated with the proposed activities, during both routine and non-routine operations, are continually reduced to as low as reasonably practicable (ALARP) and of acceptable levels
- That the environmental performance outcomes (EPO) and environmental performance standards (EPS) outlined in this EP are met.

This EP contains the environmental impact assessment for the activity. The assessment aims to systematically identify and assess the potential environmental impacts and risks associated with the activity and to stipulate mitigation measures to avoid and/or reduce any adverse impacts to the marine environment to ALARP and acceptable levels. The implementation of the EPOs specified within this document will provide Jadestone Energy with the required level of assurance that the activities are being managed in an environmentally responsible manner.

NOPSEMA's Guidance Note for Environment Plan Content Requirements (GN-1344, January 2024) was referred to in the preparation of this EP.

2. DESCRIPTION OF THE ACTIVITY

Provided herein is a description of the activities, equipment and operations that Jadestone has responsibility for at the Stag Field. For noting, activities and equipment precluded from this EP are described in Section 2.2.

2.1 Facility Layout and Description

The CPF is a fixed oil production platform. It comprises a jacket, which is secured to the seabed by six drilled and grouted piles, a hull, which is supported on tubular legs, a process module and an accommodation module. The platform has accommodation, offices, medical and mess facilities for a maximum overnight manning level of 58 personnel onboard.

The platform has a helideck and a boat landing area.

Produced oil from the CPF is exported via an 8", 2 km rigid steel oil subsea export pipeline to a pipeline end manifold (PLEM) and then an 85 m long flexible submarine hose (underbuoy hose) to the CALM buoy. A flexible 200 mm offtake hose connects the CALM buoy to a third-party tanker.

There is associated gas production, which is used as fuel for the boiler and process blanketing with the excess being flared. Water and oil are separated throughout the process and directed to the produced water package for treatment prior to discharge or injection.

2.1.1 Central Processing Facility

The CPF stands approximately 20 m above sea level in a water depth of approximately 49 m LAT. The maximum topsides area is approximately 37 m x 57 m (2,109 m^2). The structure, including topsides and piles, weighs approximately 6,500 tonnes.

The CPF is located over a pre-installed mudline template as a guide and supports 12 well slots; in addition, five subsea water injection wells. Two subsea water injection wells are located approximately 1,100 m off the north-eastern corner of the facility, with the other three being located approximately 3,200 m west of the facility.

The topsides equipment includes the following process activities:

- Separation and processing of produced oil, gas and water
- Produced water treatment and disposal offshore
- Sand separation
- Seawater treatment and pumping for water injection wells
- Gas flaring.

The topsides also include the following utilities:

- Power generation and distribution
- Potable and utility water
- Utility and instrument air
- Heating, Ventilation and Air Conditioning (HVAC) system
- Hydraulic Workover Unit (HWU) for well operations.

The CPF has a helideck and a boat landing area. Helicopter is the normal means of transport for personnel (refer Section 2.2.15). The CPF is serviced by a single crane, with a boom length adequate to reach all required laydown areas (refer Section 2.2.12) located on a pedestal on the west side of the process module.

2.1.2 Wells and Subsea Infrastructure

The scope of this EP includes all subsea infrastructure associated with production and water injection, including:

- Trees/ wells
- Manifolds

- Rigid spools
- Flexible flowlines
- Electric submersible pumps
- Chemical injection system.

Hydrocarbons from the reservoir are pumped to the topside manifolds via the wells for processing at the CPF. The production wells are completed with electric submersible pumps (ESP). Provision has been made for the downhole injection of chemicals beneath the pump intake, including demulsifier, scale inhibitor and corrosion inhibitor.

Water injection is required to maintain bottom hole pressure and to aid recovery.

The current estimated end of field life for Stag is 2035. The current wells in use on title are expected to produce until end of field life and therefore a firm date for cessation of production is not currently available. Noting that on the CPF are 12 slots for platform wells, over time wells are abandoned as they water out and the slots are required for infill drilling from the same slot. Therefore, the maximum number of platform wells active at any one time is 12. There are also five subsea water injection wells with wellheads, one of these is currently inactive but may be reactivated in the future. At the end of field life, all wells shall be abandoned.

The wells authorised by title WA-15-L (or previous titles and within current title boundary) are provided in the table below, along with their status, type and other relevant information.

Table 2-1: Status of wells within WA-15-L

Well	Type	Status	Maintenance and monitoring
Antler 1, Centaur 1, Roebuck 1, Stag 1, Stag 16, Stag 2, Stag 22, Stag 3, Stag 34 Stag 35, Stag 4, Stag 41, Stag 42, Stag 5, Stag 7, Stag 8	Exploration/ Appraisal	Abandoned with wellhead removed and conductor / casing strings cut below the mudline.	N/a – no maintenance required as no wellhead in place
Stag-12H, Stag-15H, Stag-21H, Stag-25H, Stag-36H, Stag-37H, Stag-43H, Stag-45H, Stag-48H Stag 49H, Stag 50H, Stag 51H,	CPF	Active Production well	Wells are maintained and monitored in accordance with the accepted WOMP (GF-50-PLN-W-00001) Stag 50H and 51H drilled in Q4 2022
Stag-29H	Subsea	Inactive Injection well with wellhead and tree in situ. Stag 29H no longer has flowline attached (re-purposed on adjacent well)	Wells are maintained and monitored in accordance with the accepted WOMP (GF-50-PLN-W-00001 Revision 3) as they may be required for use again during the field life.
Stag-17H, Stag-18H, Stag-32H, Stag-40H	Subsea	Active Injection well with wellhead and tree in situ	Wells are maintained and monitored in accordance with the accepted WOMP (GF-50-PLN-W-00001 Revision 3)

2.1.3 Subsea Export Pipeline

The Stag 8" oil subsea export pipeline is a single 200 mm carbon steel pipeline that runs approximately 2 km from the Stag CPF to the Stag PLEM. A flexible underbuoy hose of 300 mm diameter connects the PLEM to the CALM Buoy.

The pipeline was installed in 1998 and was subject to a design life extension in 2013 and 2023, extending the service life by a further 10 years to 2033, through a planned re-lifing project and subject to ongoing inspection programs. The pipeline has been designed and constructed to all necessary Australian and International standards.

The primary means of stabilising the pipeline is self-weight by the application of concrete weight coating along its length. Remotely operated vehicle/ autonomous underwater vehicle (ROV/ AUV) (refer Section 2.2.16) surveys are undertaken of the pipeline to identify possible span exceedance or buckling.

The subsea property described here as the subsea export pipeline (that is, property starting at the CPF and terminated at the PLEM) is operated under pipeline license WA-6-PL. For information in relation to the WA-6-PL instrument, refer to Pipeline Licence WA-6-PL (nopta.gov.au).

2.1.4 CALM Buoy

The Stag CALM buoy is located approximately 2 km to the north of the CPF and is linked by the subsea export pipeline and the PLEM. Oil from the subsea export pipeline passes through the CALM buoy product piping, swivel and valve isolation system, and into the floating offtake hose and the third-party tanker.

The product swivel ensures that a leak free, rotational connection is achieved between the buoy product piping and the offtake hose.

The buoy consists of six watertight compartments and is constructed so that in the event of damage and flooding of one compartment, it remains stable.

It is moored by a six-chain catenary anchor system which is secured by means of gravity anchors covered by rock berms. It is designed for securing third-party tankers up to 150,000 dry weight tonnes (DWT).

Access to the buoy for maintenance and servicing is via a boat landing.

2.1.5 Third-party tanker

The tanker is operated by a third-party contracted to Jadestone and operates under International Safety Management (ISM) code. The tanker while in field, is moored to the CALM buoy and receives oil continuously from the CPF.

The following operations are carried out on or by the third-party tanker:

- Connection and disconnection from the CALM Buoy
- Crude oil loading operations
- Maintenance operations as per planned maintenance system for third party tanker.

Arrangements for the arrival, connection and disconnection of the third-party tanker are described in Jadestone's Stag Marine Tanker Handbook (GF-00-MN-H-00037) which is provided to the Vessel Operator during the contract pre-award engagement.

Oil passes from the CALM buoy into the third-party tanker via a 200 mm (8") diameter, up to approximately 220 m long offtake hose of double carcass construction with built-in flotation. The tanker is double-hulled and stores crude in cargo tanks.

The third-party tanker will use low sulphur heavy fuel oil or Stag crude oil as a fuel supply for its engines.

2.2 Operations and Process Description

Primary operations at the Stag CPF entail production and maintenance activities including:

- Production including water injection
- Operational and emergency flaring of excess gas through flare systems
- Processing and discharge of produced water within discharge limits
- Processing and discharge of drainage/ oily waters
- Produced sand handling
- Loading of crude oil onto the third-party tanker
- Inspection, Maintenance and Repair (IMR) activities (topsides and subsea) including well operations, plant modification and diving/ ROV operations.

Supporting activities associated with the facility operations include:

- Utility systems such as lighting, heating, ventilation and air conditioning, water systems, power generation, safety system, and accommodation facilities
- Collection, treatment and disposal of sewage and food waste
- Support vessel operations
- Lifting operations
- Helicopter operations for transporting personnel and urgent freight.

For noting, installation of new subsea equipment or the tie-in of new production or water injection wells is not covered by this EP.

2.2.1 Production

Production includes hydrocarbon recovery from the reservoir via subsea wells and equipment, topside separation and processing of fluids. The current expected commercial field life for Stag is estimated at 2035.

Oil is exported to the third-party tanker. Gas is utilised for steam generation in the boiler. Water is processed and is then discharged overboard or sent to the third-party tanker for storage.

Crude oil production

Oil is currently produced from twelve production wells and supported by seawater injected into dedicated injection wells.

Due to the low pressure of the reservoir, the wells are sub-hydrostatic and electric submersible pumps have been installed in the wells to draw reservoir fluids to the surface. Water injection is required to maintain reservoir pressure and to control the movement of oil within the reservoir to maximise its recovery. Seawater for water injection is pumped through coarse and fine filtration systems and de-aerated before it is pumped under high pressure into the water injection wells.

Reservoir fluids from the wells are typically delivered into two parallel production headers and then two first stage product separators that split the well production into oil, gas and water streams. Oil is split from water and gas in the first stage separators, then heated and further treated to remove entrained water during the second stage. Oil polishing takes place in the electrostatic coalescer prior to export to the third-party tanker. Hot crude ready for export is cooled by heat exchangers and pumped to the oil export system. Crude oil is flowed from the export line and stored waiting to be conditioned and used as fuel in the main power generators. The 84m^3 crude fuel storage tank (T-921) is in a fully bunded area in the event that the

storage tank loses integrity, however the smaller (4m^3 each) crude conditioning tanks (T956 and T957) used for holding crude prior to conditioning are single walled in a small bund.

Produced sand

Produced sand from the Stag Reservoir consists of fine sand and glauconite containing traces of oil and some heavy metals. In normal operation, suspended solids in the separators are carried by process water to hydrocyclones removing solids greater than 20 µm from the water stream to the solids handling system for further processing. Larger particulates not carried through by the produced water stream accumulate in the separators requiring regular sparging. Solids are discharged into bulk bags (~1.7 t) ready to ship to shore for disposal and liquids discharged to the slops tanks for recycled processing.

Sand from the First Stage Separator (V101/ 102), Second Stage Separator (V103), electrostatic coalescer (V104) the desanding hydrocyclones (V205/ V206), and the corrugated plate interceptors (CPI V201/ V202) passes via the closed drains system to holding tank (T452) which is fitted with tank agitators. The sand handling system is a single -stage separation process with two-phases, solids and liquids. After settling, the clean produced water is discharged to the clean water slops tank (T411). The slurry is pumped from holding tank (T452) via a slurry pump to the decanter centrifuge.

The solids are separated in the decanter and discharged via a chute into a skip bin; the produced water is discharged to T451. Water is added to the skip bin to re-slurry and wash the solids before reintroducing them into the decanter for the second time. The clean and dry solids are discharged via chute into bulk bags for transport ashore and the wastewater is directed to T451. Produced water can be discharged to the clean water slops tank (T411) and oil to the dirty slops tank (T412) for treatment and disposal.

At the conclusion of the solids removal, some fine solids and oil may remain in the wash water, and these are then tested before being pumped into deep water injectors where they are returned to the reservoir.

Produced sands are not discharged to the marine environment.

2.2.2 Flaring

Gas that is excess to the fuel requirements for heating in the production process and excess blanket gas from the gas flotation unit, is burned as a continuous release through a flare system present on the CPF. Approximately 20% of the gas produced (current average flare rate of approximately 1 mmscfd) is used as fuel for equipment with the balance (80%) being flared.

The flare tip is supported on a 30 m boom attached to the side of the process module and is mounted to discharge vertically.

The flare system will accept the continuous release of:

- First stage separator gas in excess of fuel gas system demand
- Off gas from the second stage separator
- Excess blanket gas from the corrugated plate interceptors (CPIs)
- Purge gas.

The flare system will also accept the intermittent release of gas from:

- Relief valves
- Relief valve bypass vents
- Flow-line vents
- Blowdown valves
- Systems being prepared for maintenance.

The flare system is designed to handle a continuous flaring rate which may range between 0.3 and 10 million standard cubic feet per day (mmscfd); the flare typically operates at approximately 1 mmscfd. In addition, the flare system can accommodate an instantaneous flaring rate of 15 mmscfd.

2.2.3 Processing and Discharge of Produced Water

Production fluids from the reservoir arrive in a multi-phase state at the CPF where produced water is separated from the crude oil and treated. Provided below is a description of the stages of treatment of the original production fluid stream that results in the produced water discharge leaving the CPF.

The water flowing from the CPIs may be injected with an emulsion breaker and a polyelectrolyte before entering the Gas Flotation Unit (GFU), V203. The GFU is maintained under a fuel gas blanket at 100 kPag.

Cyclone turbine aerators within the flotation unit cause the entrainment of gas into the water. The gas bubbles preferentially attract the oil particles in the water stream which are floated to the surface where they coagulate / coalesce and are skimmed from the water surface. The skimmed oil is drained into the Recovered Oil Vessel together with the oil from the CPIs and directed to the Flare knock out drum V-310 for reprocessing.

The clarified water, which has a residual oil content of less than 30 mg/l, flows to the environment via a pipe that discharges 5 m above mean sea level. An option is being explored to discharge produced water through an alternative caisson which discharges below the surface. The flow of clarified water is controlled by the water level in the Gas Flotation Unit.

Clarified water quality is continuously monitored by an in-line oil-in-water (OIW) analyser. The monitor is integrated into the DCS to provide a continuous record of water quality and to alarm should water quality specifications be exceeded. Off-specification water will be redirected to the Open Hazardous Drain Slop Tank T 412.

Jadestone commissioned a new inline OIW analyser which was installed in Q3 2024 and tailored during commissioning to the exact specifications of the produced water stream at Stag. This ensures that the discharge overboard meets the requirements of the EP and considers any influence that the particular reservoir fluids and production chemicals can have on the readings of OIW content. If the chemicals used in the produced water stream change, fingerprinting can be undertaken on the CPF to ensure the analyser is re-calibrated to maintain accurate readings. The new analyser will also output the data in the same units as the laboratory analysis on board the CPF to minimise potential for reporting errors, the new OIW analyser is calibrated with Stag crude.

Produced water discharge volumes in the future are forecast level out at 5,250 kL/day (32,800 bbl/day).

Further information on produced water discharges made from the CPF is presented in Section 6.4.

On occasions, produced water is off-spec and is not able to be discharged overboard from the CPF. In these circumstances, the facility may either inboard the water to tanks on the CPF or push forward the water to the third party-tanker. If the water is inboarded on the facility, this water may later be cycled through the production process and cleaned to a quality that is then able to be discharged overboard at the CPF. If the water has been pushed forward to the third-party tanker, the water will remain in the tanker while it is on location at the CALM buoy and will not be discharged in field. Any water received by the third-party tanker during push forwards will be disposed of at the cargo receiving facility.

2.2.4 Drainage Systems

The Stag CPF drainage system collects hydrocarbon-based and other liquid wastes (rain and wash water etc.) from all areas across the facility via open (hazardous and non-hazardous) or closed drains.

Open drains

The Stag CPF open drains system consists of two separate collection systems, the hazardous open drain system and the non-hazardous open drain system. Hazardous areas and non-hazardous area drains are completely segregated to prevent ingress of hydrocarbons into a non-hazardous area via the drains system.

The hazardous open drains system is designed to remove and collect oily water from hazardous areas, such as wash down water and spillage of liquids on decks, detergents, equipment drip trays or bunded areas. Collected fluids are routed to two slops storage tanks with a total capacity of 250 m^3. All drains into the tanks are via standpipes into a water trap which prevents any back flow of oil/ gas. Liquids are recovered and processed through the second stage of the production separation system and treated prior to discharge.

Drainage from the helicopter landing deck is allowed to drain directly overboard.

The non-hazardous open drains system collects rainwater, wash down water and spillage of liquids from decks located in non-hazardous areas of the facility.

Closed drains

The closed drain system collects liquids from:

- Normally pressurised and hazardous equipment prior to maintenance
- Flare drum liquids
- Produced water degasser
- Operational drainage from the oil separators
- Liquid sampling draining from the oil separators
- Level bridle drains.

The closed drains system is combined with the flare system and consists of a flare knockout / closed drain drum and transfer pumps. The hydrocarbon liquid drained from the process equipment is drained by gravity flow to the flare / closed drains drum via drain headers. Under normal operations the liquids in the closed drains drum are pumped back under level control to the process upstream of the oil heaters.

2.2.5 Inspection, Maintenance and Repair Activities

IMR is undertaken at planned intervals to maintain performance, reliability and prevent deterioration or failure of equipment and ensure safe and reliable operation of the facility. IMR activities (including corrosion control; refer Section 2.2.6) are scheduled through CMMS and is conducted on all operating assets included suspended infrastructure at appropriate frequencies.

IMR activities include maintenance of the topside equipment and structural components of the CPF, all subsea infrastructure and crude oil transfer facilities (CALM buoy, transfer hose and associated appurtenances). This may include activities such as cycling of valves, pressure and leak testing, lubrication of rotating equipment, and cleaning and painting activities for corrosion protection.

Inspection of subsea infrastructure is the process of physical verification and assessment of components to detect changes to its as-built state. Inspections are planned to occur at planned intervals in accordance with the Subsea Inspection Strategy (JS-16-PR-U-00001) (Table 3-2) and techniques may include general visual inspections (GVI), cathodic protection (CP) surveys using ROV, side-scan sonar (SSS) using the vessel's transducer or autonomous underwater vehicle (AUV), and wall thickness measurements using ROV-deployable tools. Other inspections may be triggered by environmental effects, such as cyclone or earthquake, by JSE or external parties' activities, by significant anomalies reported at any time, or by inspection results that exceed defined limits.

Maintenance is managed using the Computerised Maintenance Management System (CMMS) as defined by performance standards. All systems and equipment shall be maintained to meet the specified functions in accordance with these Performance Standards and process requirements. All infrastructure present in field is recorded in the CMMS. If equipment is offline or shutdown, it is maintained in a state of readiness for when the equipment is back online. If the equipment is no longer required or not fit for purpose, the equipment /infrastructure is inspected and maintained to confirm and maintain its integrity to ensure property can be managed as required through an accepted EP. The CMMS provides information to enable:

- The ability to analyse equipment for better maintenance regimes, design changes or replacement
- The ability to schedule and plan timely removal of infrastructure in a safe and environmentally responsible manner
- Timely preventative maintenance schedules
- Improved control over maintenance expenditures
- Automatic parts ordering and inventory control
- Reduction of inventory costs and improved stores accountability
- Improved utilisation of labour.

Preventative maintenance is incorporated into the CMMS and includes:

- All routine inspections
- All statutory inspections
- All maintenance carried out on a usage basis such as machine running hours.

Maintenance activities are detailed and recorded in the CMMS. Each maintenance activity has a priority based on its integrity criticality. A history of the maintenance for a piece of equipment can be recalled by the system at any time, along with scheduling requirements for periodic inspection, testing and maintenance. Implementation of work and work closeout quality is assured for compliance by the Maintenance team and is subjected to oversight by the Technical Authorities at Quarterly Reviews and an external audit by an Independent Competent Person (ICP).

Jadestone requires that, on completing an inspection of any component, the inspector confirms the presence or absence of anomalies relating to that component within the limits of the inspection method.

Any measurement that the inspector identifies to be outside acceptable limits, or any significant feature that is identified not to be within operational or design parameters during the inspection of the component, shall be considered to be anomalous, recorded in a standard format, and reported in the appropriate section of the DPR and Final Report.

The anomaly report shall be communicated to the responsible JSE engineer in the form of a complete, stand-alone report at the earliest opportunity, and no longer than 24 hours after the anomaly is identified. It should uniquely and clearly identify the affected components, the nature and extent of the anomaly, and all related and contributing information that will allow the relevant Technical Authority to determine the significance of the anomaly and appropriate immediate and longer-term actions. These anomalies are also reviewed by the decommissioning working group to ensure that any anomalies which could impede future removal are reviewed and rectified to meet Jadestone's obligations under s572 of the OPGGS Act (refer Section 2.4).

Table 2-2: Summary of planned inspections and frequency

Item	Inspection type	Frequency[1]	Comment
CPF members, caissons and conductors	CP	1 Yr	Drop-cell survey of jacket & all attachments
	GVI & Cathodic Potential Measurement (CCP)	3 yr	Every component
CPF jacket members	Flooded Member Detection (FMD)	6 yr	50% of members, including low fatigue members
Underbuoy Hose & PLEM	GVI & CCP	2.5 yr	With Buoy & Mooring Class inspection
CALM buoy and moorings	In-water survey (IWS)[2]	2.5 yr	Oversight by Classification Society
Export pipeline	WT Mapping	10 yr	At identified corrosion risk locations, frequency to be updated based on inspection results.
Export pipeline and static flexibles	Acoustic & CCP	6 yr	Alternating with GVI
	GVI & CCP	6 yr	Alternating with acoustic
Risers & spools	GVI & CCP	3 yr	GVI full coverage, CP on flanges & outer clamps
Injection wells	GVI & CCP	3 yr	Oversight by well services team

Maintenance and repair activities may include corrective (e.g. repair of equipment) and non-routine maintenance, which may occur during shutdown periods. Wetblasting or grit blasting may be used to prepare structures or equipment prior to painting/ coating. Before commencing wet blasting or grit blasting, the work area is walled-in using sheeting that is taped down to create a fully contained work environment. Wastewater and particulate material (e.g. garnet if grit blasting, paint flakes and rust off old surface coatings) generated during the activity is managed within the work environment and is not discarded to the marine environment.

Other activities specific to subsea infrastructure during the life of field include repairs to damaged components, replacement of umbilicals, anode-retrofits, external inspection, measurement, non-destructive testing, rectification of scour or freespans, and cleaning of marine growth. These activities are largely unplanned and interrupt production and so are not expected/ wanted more than once every few years. Typical liquid discharges that may occur during maintenance and repair activities are cooling water that will discharge directly to the sea (refer Section 6.5) and freshwater associated with cooling circuits on the generators that will be discharged to the drainage system (refer Section 6.5).

Platform and diving frequencies are set ‘as required’ as per Subsea Inspection Strategy (JS-16-PR-U-00001) and are based on findings during ROV Surveys and planned maintenance requirements. Diving operations will be supported by a suitable Diving Support Vessel (DSV) operating in DP mode or moored in the field.

The underbuoy hose change out is conducted in accordance with the Oil Companies International Marine Forum (OCIMF) Guidelines for the handling, storage, inspection and testing of hoses in field. The process of change out includes clearing the line of oil followed by a flush with seawater to the third-party tanker

[1] As outlined in the Subsea Inspection Strategy (JS-16-PR-U-00001) which may be revised as required resulting in changes in frequency and inspection types

[2] As defined by Class requirements for marine assets

where the water is processed through the slops system. Discharges are thus as per slops discharge (refer Section 2.2.10).

Subsea integrity and maintenance activities carried out by Jadestone include the CPF, subsea export pipeline, CALM buoy (and mooring chains) and underbuoy hoses. The activities are undertaken and managed in accordance with CALM buoy – Operation and Maintenance Manual (GF-10-MN-G-00186), Jadestone's Subsea Inspection Strategy (JS-16-PR-U-00001), Stag Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007) and Subsea Flexible Hose Maintenance Procedure (GF-16-PR-L-00187). Other than discharges as per the underbuoy hose change out, there are no other planned discharges to the marine environment.

2.2.6 Integrity and Corrosion Control

Integrity and corrosion control work involves anode replacements on the various subsea pipelines and offshore facilities, cathodic protection monitoring, weld inspections, ultrasonic wall thickness testing, flooded member detection surveys, free span inspection of pipelines, coating inspection and repairs, protective leg wrap maintenance and installation, non-destructive testing (NDT) and general inspections and maintenance of subsea valves, Xmas trees and conductors, conductor guide centralisers and other subsea infrastructure. These activities can involve ROV/ AUV inspections or diver assisted surveys.

A program of ongoing fabric maintenance of the CPF is also undertaken as part of the Corrosion Management Strategy (JS-00-PR-N-00001). Prior to painting, the offshore structures are ultra high-pressure water or grit-blasted with garnet (a natural coastal sand product).

Following an inspection, it may be necessary to modify the seabed in the vicinity of subsea infrastructure such as the pipeline to correct for free spans (by placing grout bags under the free span) or burial (by jetting or airlifting sediments from on top of the pipeline). A freespan is an unsupported length of flowline suspended between two or more elevated points on the seabed. Stabilization of freespans is by installation of supporting appurtenances underneath the flowline at the mid-point of the span. Methods of stabilization include concrete mattresses, grout bags, concrete sleepers, and inflatable grout pyramids.

If the span is in evidence and remains over length during inspection, an engineering assessment would be conducted to determine the risk of damage (Subsea Inspection Strategy JS-16-PR-U-00001). If the risk assessment determines that freespan rectification is required, management of change process will ensue.

As part of the maintenance of these facilities, marine growth on the substructures is monitored using ROV and / or divers and if determined to be beyond the design imposed acceptable thickness it is periodically removed. This is usually undertaken by either water blasting or manual ROV, divers or bespoke automatic devices.

Inspections are scheduled to occur as per the Subsea Inspection Strategy (Table 2-2), and replacement programs are planned on inspection findings. No discharges to the marine environment occur with planned replacement activities or inspections.

2.2.7 Utility Systems

Power generation

Main electrical power is supplied by three generator sets powered by Caterpillar diesel engines. Primary fuel for these engines is treated Stag crude oil however they can also run on diesel if required. Each machine is contained within its own enclosure, which provides weather protection, sound attenuation and fire protection.

Cooling water

Seawater is used as a heat exchange medium for the cooling of the three onboard power generators. The cooling water is drawn through a segregated cooling system and is therefore not contaminated by engine oils or other liquid discharges from the process. Average discharge rates are up to 108 m^3/h for each of the

generators. Discharge water is approximately 3 °C above ambient marine waters and is discharged at hull level.

An industrial grade saltwater chlorinator is used to produce chlorinated water to dose the respective caisson and pumps utilising sea water to prevent the accumulation of marine growth throughout the system. More information on the discharges and process for cooling water are presented in Section 6.5.

Potable Water Discharges

Potable water is produced by a standalone Reverse Osmosis (RO) unit located in the hull. The RO purification process demineralises water by pressurising it via a semi-permeable membrane that selectively lets molecules pass through. The RO unit replaced the previous steam generated water maker (VDU). The seawater feed is taken from the Main Generator seawater cooling return line (P&ID GA-02-DP-270). The unit produces 14,000 L/d of potable water. There are no chemicals associated with any discharge of "off spec" potable water.

Potable water may also be delivered by supply vessel during extended maintenance periods. A unique hose connection is provided to prevent cross contamination by inadvertent transfer of diesel from the supply vessel.

Storage is provided in a single Potable Water Tank, T960, of 215 m^3 capacity located within the west side of the hull structure. The tank is fitted with both high- and low-level alarms with trips.

Heating Ventilation and Air Conditioning (HVAC) system

The purpose of the HVAC system is to:

- Purge enclosed designated areas of the accommodation and hull to maintain a non-hazardous classification and to prevent the entry of flammable gases
- Provide conditioned air to manned areas to ensure a comfortable working and living environment
- Provide controlled temperature in enclosed areas for the safe and efficient running of equipment
- Purge contaminated air from areas housing essential equipment before reoccupation (black start purging).

Two major air distribution systems are provided, one for the accommodation module and one for the hull. Each system has its own fans, ducting distribution system and fire dampers where required, but they share a common chilled water plant which supplies the cooling medium to both systems.

Facility lighting

The CPF is provided with lighting throughout the accommodation and process areas. In the event of a power failure, the system changes over to a low voltage emergency system.

Fuel gas

Gas produced from the process separators is used as fuel in the boiler and for process blanketing. The remaining gas is sent to flare.

Boiler blowdown

Blowdown from the auxiliary boiler is directed to T421 or directly overboard via an appropriately rated hose for discharge. During normal operations, up to 400 L boiler water is directed to T421 during blowdown activities. Blowdown occurs once per shift. Boiler water contains oxygen scavenger and scale inhibitor. Both of which have a low risk to the environment.

2.2.8 Well Operations

Well operations outside of standard production operations conducted on the Stag CPF are planned and conducted in accordance with the Jadestone Drilling Management System (DMS) (JS-50-PR-W-00001) and

include tasks from simple wellhead and tree maintenance, up to and including well completion, well interventions and workovers.

Well interventions and workovers are operations done on, within, or through the wellbore after the initial completion; and includes replacement of tubing retrievable safety valves and downhole pumps, wireline operations, and plug and abandonment / slot recovery activities.

Well operations on sub-pressured wells shall maintain a minimum of one well barrier envelope during the entire operation.

Planned well operations that may be undertaken on Stag include the following:

- Wellhead and Tree Maintenance
- Replacement of tubing retrievable safety valves
- ESP replacement
- Zonal isolation
- Water shut off plug backs
- Setting and pulling of plugs, running drifts and other diagnostic runs
- Chemical injection, acid stimulation/injection
- Production logging of reservoir section for well performance assessment, or wireline evaluation logging of well
- Perforation and punching (mechanical and explosive)
- Removal and replacement of Tree and Wellhead components
- Tubing / Casing / Conductor milling, cutting, recovery
- Setting of downhole plugs / isolations (mechanical and / or cement)
- Annular cement squeeze
- Well Annulus diagnostics, fluid top up and bleed off
- Well Kill
- Well bore Clean-up
- Sand Clean-out
- Casing repair using straddle packer assemblies, expandable casing patches or installation / cementing of 7-5/8” casing from surface to below failure

Work overs and interventions are undertaken on an as needs basis. Based on previous years’ activities, approximately seven work overs/ interventions have been required per year. Based on historical activity, it is assumed that approximately 35 work overs/ interventions will be required over the lifetime of this EP.

During work overs and interventions, a dedicated workover crew, working day and night shifts undertakes the required well intervention activities. A brief description of each well intervention and workover activity as listed above is provided below. For noting, there are minimal discharges to the environment during workover operations due to the wells being sub-hydrostatic with no returns to surface unless a plug is set in the well to isolate the reservoir. The planned discharges during workover operations include excess clean treated seawater from the surface tanks and approved fluids with <30mg/l oil content during cementing and section milling activities.

Workover to replace ESP

Workovers and interventions are generally conducted utilising the Stag Hydraulic Workover Unit (HWU). The Stag HWU is operated under the procedures set out in the Stag Hydraulic Workover Unit Operations Manual (GA-18-MN-W-00221). This manual describes the operating and maintenance requirements of the HWU and details the policies and procedures specific to the unit.

The normal sequence of operations for an ESP workover is as follows:

- Well kill operations (injection of kill fluid (seawater treated with biocide) into well)
- Pull out of hole and lay down faulty completions
- Casing integrity tests (if required)
- Pick up and run in hole new completion.

Current Stag reservoir pressures range from approximately 1,380 kPa (200 psi) – 5,250 kPa (760 psi), equivalent to a 0.776 SG fluid gradient. Given Stag oil density is 0.893 SG, hydrostatic pressure of a full column of reservoir oil is greater than the maximum reservoir pressure, therefore the wellbore cannot hold a full column of fluid and cannot flow liquid to surface unassisted. With reservoir pressures being sub-normal, well kill operations are conducted using treated (biocide) sea water.

Casing integrity tests may be conducted if there is believed to be a well integrity issue with the production casing / liner. To test the casing integrity, a packer is run into the well on pipe to the selected test depth, set and the casing is pressure tested with seawater to a pre-determined pressure. The packer is then retrieved from the well and workover operations continue as programmed.

Wireline Interventions

Wireline interventions may be run as part of a workover program or as a separate, standalone operation.

Wireline operations include the running of electric tools into the well for conducting measurements. Measurements can include casing wall thickness, cement evaluation (behind casing), production logging (tools used to measure production properties of the well, for example fluid density, flowrate), formation logging (tools used to measure properties of the formation, for example rock density, resistivity, sonic properties), determining static fluid levels and setting of plugs to seal off the tubing or casing.

Wireline operations can be conducted with pressure containment equipment on live wells or on killed wells during workover operations.

Annulus Monitoring/ Treatment

Annulus monitoring is the measurement of pressure and fluid characteristics in the annuli of the well. This is a routine activity and completed as part of the well integrity management.

If pressures build up to unacceptable levels in the well annuli, annulus fluid will be bled off to the process so as to reduce the pressure. Samples of fluid will be taken so a determination as to the source of the pressure build-up can be identified. As required intermediate annuli may be topped up with treated seawater.

Perforating

Perforating is an activity that may be undertaken to increase productivity (or injectivity) of the well. Small shaped explosive charges are conveyed into the well to a predetermined depth and detonated. The explosive charges blast a small hole through the casing and cement and into the formation to enable fluids to flow from the formation into the well.

Perforating guns can be deployed into the well as part of a wireline intervention, on coiled tubing or on pipe with the HWU.

Explosive charges to sever pipe of plasma cut pipe are included in this perforating activity. These operations are conducted if a string is stuck and needs to be freed from the well.

While perforating activities cause the release of sound energy, as the energy is released hundreds of metres downhole there is no transmission of sound energy to the marine environment. Therefore, no impact assessment of this planned activity appears in Section 6 of the EP.

Water shut-off / zonal isolation

Water shut offs or zonal isolations are normally carried out by the HWU.

Depending on the location of the zone required to be shut-off will determine the tools and technique used to achieve the isolation. All shutoffs will be conducted utilising the deployment of mechanical barriers into the well, be it bridge plugs or straddle packers/ liners.

Sand clean out

During production, it is common for sand to be deposited and accumulate inside the horizontal sections of casing.

During workovers or interventions, this sand can impede access to the required section of the well. To gain access to the well, this sand has to be flushed away or recovered to surface with specialist tools.

With reservoir pressures being sub-normal and the limited pumping capacity of the Stag HWU, it is impossible to lift the sand to surface through simple circulation techniques. Specialist tooling may be used to vacuum sand trapped inside the casing which is then captured on surface once tool is retrieved. The sand is then managed as per standard operating procedures with the sand recovered from the production process.

Casing milling, cutting, recovery

During workover operations, or as part of abandonment preparation work, there may be a requirement to cut and recover casing or mill casing with downhole tools.

Casing cutting is achieved through the running of a casing cutting tool into the well. Metal blades on the casing cutter are activated by pumping through the tool. The tool is then rotated with the blades cutting the casing. After cutting the casing cutter is retrieved and the casing can then be recovered (pulled) back to surface.

Specialty milling fluids are used for section milling operations (casing cleaned and reservoir isolated from activity to ensure no hydrocarbons are returned to surface) with returns to surface to remove casing cuttings (swarf and debris) from the well.

At commencement of milling operations, the clean treated seawater is displaced from the cased well bore with the required milling fluid, this clean seawater is discharged directly overboard at sea surface. During milling operations additional milling fluid sweeps may be added to the system to optimise the milling fluid condition. These sweeps (nominally 25bbl size) will displace the same volume of existing milling fluid which is discharged directly overboard at sea surface.

Depending upon the well specific fluid requirements, the surface fluids equipment package can be configured as an open or closed system. When an open system is in use the swarf and debris are disposed of directly overboard along with the specialty milling fluid sweeps. In a closed system, the swarf (metal filings) is removed from the milling fluid stream to allow reuse of the milling fluid. This swarf is then placed into designated waste bins for disposal onshore.

On completion of this activity the milling fluid is displaced out of the well with clean fluids (treated seawater). This milling fluid is discharged directly overboard at sea surface. The milling fluid primarily consists of seawater with additives to provide viscosity to lift swarf and traces of biocide to assist with fluid longevity. For some applications chemicals are required for formation inhibition and, occasionally trace additives are included to assist cutting (lubricity) or to further aid in lifting swarf.

Well kill/ suspension

Well kill is the process of pumping fluid with a density greater than the produced fluid into the well to stop the well from flowing. This is done to control the well.

Current Stag reservoir pressures range from approximately 1,380 kPa (200 psi) – 5,250 kPa (760 psi), equivalent to a 0.776 SG fluid gradient. Given Stag oil density is 0.893 SG, hydrostatic pressure of a full column of reservoir oil is greater than the maximum reservoir pressure, therefore the wellbore cannot hold a full column of fluid and cannot flow liquid to surface unassisted. With reservoir pressures being sub-normal, well kill operations are conducted using treated (biocide) sea water.

Cementing Operations

Cementing operations may occur during repair or abandonment of well sections. Cementing operations involves pumping of cement downhole to a pre-determined location in the well. On placement of the cement surface equipment and the well above the target location are displaced to clean fluids (treated seawater) to ensure there is no excess cement that will cause blockages or future access once set. This excess cement is discharged directly overboard at sea surface.

Disposal of NORM contaminated tubing (onshore)

During workovers, the tubing is recovered from the well. During the production phase, naturally occurring radioactive materials (NORMs) may have been deposited on the walls of the tubing.

As tubing is recovered from the well it is tested for radioactivity. If found to be radioactive, the tubing is quarantined, shipped to shore and disposed of by the waste contractor in accordance with Jadestone's Transport Management Plan (JS-90-PLN-F-00002) the necessary requirements for the disposal of such waste.

2.2.9 Plant Modification

Plant modification may entail the removal, replacement or installation of new equipment to either surface or subsea equipment. Plant modification may occur in response to operational changes or new technology. Such modifications may include removing pipework and process units or upgrading the various components and equipment on the platform, including the addition of new equipment.

When equipment becomes obsolete, or requires change due to wear, corrosion or age, it will be changed out for new, more modern/efficient replacements. Prior to change out, flushing of the section will be undertaken using water and/or nitrogen, with discharges managed through the closed drainage network, after which the section will be isolated and changed out.

2.2.10 Slops management

Slops is a term used for off-specification liquids including those arising from the produced water system, produced sand treatment and collection from the hazardous drains system.

The solids handling tanks (T451 / T452) receive produced sands for solids handling. After settling in these tanks, the residual produced water is discharged to the west slops tank (T412). Clean water from T412 is directed to the east slops tank (T411) via underflow.

Both slops tanks (T411 / T412) have capacity for up to one hour of produced water at normal production levels (storage capacities of 250 m^3 each). Production upsets (e.g. hydrocarbon characteristics, chemical injection, boiler function, etc.) affecting the OIW concentration of produced water may be rectified to support clean discharge overboard. Contents of T412 are pumped to the produced water system for conditioning prior to discharge overboard.

Slops may accumulate in the process in T412, which can be managed by pumping into subsea injection wells. If subsea injection is unavailable (for example due to equipment failure, loss of integrity, compromised infrastructure), and the slops in T412 are nearing capacity, transfer of excess slops may be

effected through the slops / sand handling system via hose to a vessel for temporary storage. The slops may then be transferred back to the CPF for processing. Transfers from the CPF to vessel would occur during daylight hours only to ensure adequate monitoring for unplanned loss of containment (refer Section 7.3.2). This could occur on a weekly basis until the process is returned to normal operations with the transfer rate constrained by the size of the transfer hose and vessel tanks. This scenario is assumed to be similar to diesel bunkering.

If subsea injection of slops is not possible for an extended period, slops that have been transferred to a vessel for storage, may be transitioned and discharged from the vessel to onshore for disposal at a licensed facility. This is intended as a secondary contingency that is not a preferable option due to the costs associated with onshore disposal and the number of vessel transfers potentially required.

If capacity of T412 is reached and neither subsea injection or transfer to a vessel for temporary storage can occur (for example due to equipment failure, loss of integrity, compromised infrastructure), slops may be pushed forward to the offtake tanker as a contingency of last resort.

2.2.11 Waste Management

Jadestone's Waste Management Plan (JS-70-PR-I-00035) applies to activities in the Stag Field, which details the waste management practices during operation. The Waste Management Plan also addresses controlled waste management in accordance with the Environmental Protection (Controlled Waste) Regulations 2004. There are no planned discharges of solid wastes to the marine environment.

Non-Hazardous waste

Non-hazardous solid wastes include scrap metal, packaging, wood, cardboard, paper, empty containers and putrescible waste (food scraps) that will routinely be transferred onshore for recycling or disposal.

Non-hazardous wastes are segregated at source into recyclable and non-recyclable wastes and stored in marked containers for transport onshore to Dampier for recycling disposal.

Non-hazardous wastes produced on the Stag CPF that will be segregated to facilitate recycling include:

- Paper and cardboard
- Mixed plastics
- Aluminium cans
- Wooden pallets
- Scrap metal.

All non-hazardous solid wastes will be returned to the mainland for disposal or recycling by back-loading onto a support vessel in closed containers (e.g. skips, wheelie bins, tanks or bulk-bags). Jadestone's waste management contractor will dispose of general wastes to an approved landfill facility or appropriate treatment/ recycling facilities for segregated wastes.

Sewage and food waste

All food waste and sewage (including grey water) generated onboard the CPF is discharged through an inline macerator to comminute solids to a diameter of less than 25 mm. The discharge estimates are based on the known number of personnel on the Facility. Food waste may be stored and shipped to shore for disposal (refer Non-hazardous waste above) instead of directly discharged to sea and all discharges recorded.

Hazardous waste

Hazardous wastes routinely generated include oil contaminated material (e.g. sorbents, filters and rags), spent chemicals and chemical containers, used engine oil, paint cans, hydraulic fluids, batteries, fluorescent tubes, cooking oils and medical wastes. NORM in the form of scale and sands may also be generated. Wet

blasting, if performed, will generate a sludge waste comprising blasting medium (if used, i.e. garnet), rust and particles of old surface coatings (e.g. paint and epoxy). Oily waste material may also be generated because of oil spill response activities.

Hazardous wastes will be segregated at source and stored in clearly marked containers prior to transfer onshore to Jadestone's waste management contractor for recycling wherever practicable or disposal at a licensed waste disposal facility. Hazardous waste types to be segregated in accordance with the Waste Management Plan are:

- Aerosol cans (recyclable)
- Batteries (recyclable)
- Electronic waste (recyclable)
- Empty plastic / metal drums (recyclable)
- Flammable liquid wastes (non-recyclable)
- Fluorescent tubes (recyclable)
- Gas cylinders (recyclable)
- Glycol (non-recyclable)
- Hydrocarbon sludges (non-recyclable)
- Medical waste (non-recyclable)
- Produced sands (non-recyclable)
- Solid hazardous waste (non-recyclable)
- Waste Oil (recyclable).

Handling and storage of waste chemicals will be in accordance with the relevant Safety Data Sheet (SDS).

As described in Section 2.2.1 produced sands are generated on the Stag CPF from the Stag reservoir. The sands settle out in the separators where they are regularly flushed to the Stag sands solids washing and handling process. The dry sands are transported back to the mainland in 'bulki bags', each containing approximately 1.7 t of material.

A third-party assessment of NORM levels in Stag sands is undertaken annually – Radiological Assessment of Washed Sands generated from the Stag Offshore Production Platform (GF-70-REP-F-00001). The levels of NORM within Stag sands do not put them into the category of radioactive waste and that no special procedures/ guidelines are required for handling, transportation or disposal based on their NORM activity.

Table 2-3: ^{226}Ra and ^{228}Ra activity within Stag CPF produced sands between 2015 and 2022

Sample year	^{226}Ra (Bq/kg)	^{228}Ra (Bq/kg)
2015	127	155
2016	217	251
2017	188	189
2018	362	333
2019	305	377
2020	No samples due to COVID closing laboratories	No samples due to COVID closing laboratories
2021	349	608
2022	560	560

Sample year	^{226}Ra (Bq/kg)	^{228}Ra (Bq/kg)
2023	586 +/- 41	639 +/-45

Third-party tanker and Support Vessels

For the third-party tanker and support vessels against which MARPOL Annex V and/or *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Part IIIC)/ AMSA Marine Order 95 apply, wastes are contained, segregated, stored, labelled, processed and disposed of in accordance with a Garbage Management Plan, as specified in MARPOL Annex V or AMSA Marine Order 95. Waste may be incinerated onboard the third-party tanker.

2.2.12 Lifting Operations

The Stag Platform is equipped with a single Amclyde Model 20000 diesel-hydraulic pedestal crane, installed on the west side of the CPF. The crane pedestal is integral with the structure of the process module. The crane has a main hook, which was designed to be reeved with four or six lines, and an auxiliary hook with a single line, however, the main hook has been de-rated to four lines only due to the capacity of the crane pedestal. The maximum load of the crane is 26,309 kg.

The crane has an additional brake on the Whipline to facilitate personnel riding. The CPF also has monorails and pad eyes installed for use in lifting operations.

Lifting equipment and loose lifting gear are managed in CMMS. All personnel involved in lifting operations are suitably competent and hold the relevant qualifications. The lifting operations are managed using the permit to work (PTW) system and follow the Lifting Operations Procedure (JS-90-PR-F-00036).

2.2.13 Export and Offtake Operations

Transfer of Stag crude oil from the CPF to the third-party offtake tanker passes through several pieces of infrastructure and equipment:

- A rigid 8” riser
- Subsea export pipeline
- Pipeline end manifold (PLEM)
- Flexible riser at the PLEM
- The underbuoy hose up to the CALM buoy
- From the CALM buoy the oil passes through a 200 mm (8”), up to approximately 220 m long, double carcass type floatation hose (the offtake hose). Within the offtake hose a marine breakaway coupling (MBC) is positioned between hose sections 5 and 6
- At the end of the offtake hose the oil passes through a manifold connection at the third-party offtake tanker.

The equipment described above is indicated in Figure 1-1.

Transfer of crude oil through the export and offtake infrastructure and equipment is usually gravity fed. This means that the height difference between the Stag CPF where the transfer of cargo commences, and the height at the tanker manifold are different (i.e. the CPF is higher than the tanker manifold) and allows the cargo to flow across the field from the CPF to the tanker. The gravity feed process does not involve a pump.

In the circumstance that transfer is impeded from the CPF to the tanker (e.g. in cooler months when the cargo is more viscous, or when the tanker is empty and the manifold is higher), an export pump may be used. The export pumps are fitted with minimum flow valves which automatically recirculates the oil around the pump to maintain the level in the production process on the CPF. The maximum discharge of

the pumps can therefore only be the maximum production rate from the facility at the time (i.e. a maximum pumped rate of up to 5,000 bbl/d).

Periodically, once cargo loading is complete (approximately every three to four months) or during cyclone response (between the months of November to April inclusive each year), the third-party tanker will depart the field. During this period, either a replacement tanker will arrive, or the field will be shut in until a tanker arrives. In the event a third-party tanker is not in field, the offtake hose will remain shut in and connected to the CALM buoy.

Planned production shut ins / reduced production events will occur each year as required. Shutdowns are required for cyclone departure and reconnect of the tanker, as well as for planned maintenance programs of the CPF and subsea infrastructure. The field planning process manages the competing demands of the drivers to maintain a consistent frequency of shutdowns, so operations remain consistent for the facility. The primary risk associated with shutdowns due to any of the drivers listed is damage to the electrical submersible pumps that are used downhole in production wells which can be materially affected during production shut ins or shutdown periods. Increasing the number of stops on the pumps increases the potential for pump failures during restart so when possible, the intention is to reduce ESP speeds and produce into the crude fuel storage tank and utilise additional capacity within the Stag process when a third party tanker is not connected, in accordance with document Continuing Production During Tanker Changeover (GA-19-PR-P-00268).

Following reconnection of the third-party tanker, the underbuoy hose, offtake hose and CALM buoy connections will be leak tested to ensure integrity prior to recommencement of production and cargo transfer to the third-party tanker. in the event integrity defects are identified during pre-cargo transfer testing, an appropriate repair plan is implemented. Line flushing is carried out twice a year as routine for offtake hose section replacements to clear the offtake system of any oil residue. The flushing fluids are discharged via the slops system on the FPSO.

Inspection and maintenance activities, as well as operation of the offtake equipment, is the responsibility of Jadestone. The offtake equipment described here is also described in the Facility Description of the Stag Development Safety Case (GA-70-REP-F-00003.02). As such, Jadestone is also the Operator registered with NOPSEMA and is responsible for the operation and maintenance of the equipment, as required by an Operator of a Facility under the OPGGS Act.

Planned inspection and maintenance activities undertaken as a minimum for the offtake equipment includes the following:

- A monthly visual inspection of the offtake hose
- An annual pressure test of the offtake hose
- A five-year replacement of the offtake hose (including the MBC situated within the hose) guided by OCIMF standards.

2.2.14 Support Vessels

Supply/ support vessels provide support activities to the facility during operations, including transport materials, fuel and chemicals, for offloading and backload of equipment, waste and materials.

Support vessels may be used for survey activities, inspections, maintenance, static tow, and connect/ disconnect activities, as required.

These vessels may also be used to provide oil spill response services in the case of an incident.

2.2.15 Helicopter Operations

Helicopter operations contracted for Stag Facility operations encompasses routine crew change and access to 24-hour medivac coverage. The helicopter hanger and passenger processing facilities are currently

conducted out of the Karratha airport; however, the aircraft contract arrangements are reviewed on a regular basis and the contractor and heliport arrangements may be changed from time to time.

Helicopter contracting and technical and operational specification are referenced in accordance with IOGP Aircraft Management Guidelines.

Aircraft operations and aviation passenger safety are administered by the CAA of Australia which issues guidelines for aircraft take-off and landing facilities.

The helideck on the facility is designed, illuminated, marked out and operated/audited in accordance with these guidelines:

- CAP 437: UK C.A.A. 9th Edition February 2023: Standards for Offshore Helicopter Landing Areas
- AC 139.R-01 V2.0: Australian CASA- Guidelines for heliports design and operation

Selected core personnel on the facility are trained in helicopter operations and helideck procedures, enabling each of them to perform the duties of the helicopter landing officer (HLO) if required.

Wind speed and weather limitations for flights are defined by the aircraft operator and all aircraft operations are at the ultimate discretion of the pilot.

There are no helicopter refuelling facilities on Stag, and no planned helicopter operations on the third-party tanker.

2.2.16 Diving and ROV Operations

Diving operations (air diving or saturation diving) may be required at the Stag CPF and Stag CALM Buoy to conduct inspection and survey, maintenance and repair or intervention. A diving contractor with a NOPSEMA accepted Diving Safety Management System (DSMS) will be contracted to perform diving activities from a diving support vessel (DSV). No diving operations will be carried out from the Stag CPF.

ROV may be deployed from vessels or the CPF to conduct surveys of infrastructure and the seabed and conduct IMR activities.

Typical diving and ROV activities are summarised in Table 2-3. These activities may be initiated to maintain the safety and operation of the facility and are carried out using detailed planning and maintenance procedures.

Table 3-4: Typical diving and ROV activities undertaken at the Stag Facility

Diving/ ROV tasks	Specifications
Inspection and survey	Inspection of pipelines, pipeline risers and subsea infrastructure (including the CALM buoy and mooring inspection); non-destructive testing (NDT) inspection; photography and video; condition monitoring; seabed survey inspections.
Maintenance and repair	Cathodic protection measurements and anode/anode skid replacement; cleaning and marine growth removal using water jetting or chemical treatment; pipeline/ riser coating removal and repair; free span correction; air lifting and dredging; general maintenance of structures, pipelines and risers; underbuoy hose removal and replacement; mooring chain maintenance and replacement.
Intervention activities/ valve operations	Installation and recovery of subsea temporary pig receivers/ launchers; installation of pipeline and riser repair clamps; replacement of flexible risers/ pipelines; installation of protection frame and subsea structures; subsea tree valve operation.

2.3 Hazardous Substances and Chemical Selection Process

Production chemicals are required to be added to the production process to ensure the process is operating efficiently. Other chemicals are also used offshore that are planned to be discharged to the

marine environment such as subsea control fluids. The primary means of reducing the risk of environmental impacts from the composition of chemicals used is achieved through Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033). The procedure prioritises the use of environmentally low risk chemicals.

The risk assessment process assesses chemicals planned for discharge based on toxicity, biodegradation and bioaccumulation to select an appropriate product. Selection is based on the United Kingdom's Offshore Chemical Notification Scheme (OCNS):

- Chemicals that are Gold, Silver, group E and D under the OCNS Definitive Ranked Lists and have no substitution warning do not require further assessment, as they do not represent a significant impact on the environment in standard discharge scenarios.
- Chemicals not meeting the criteria above (i.e. OCNS white, blue, orange, purple, A, B, C or have product/ substitution warning) require additional assessment to understand the environmental implications for an expected portion to be discharged into the marine environment;
- Chemicals that are not OCNS registered require further assessment to determine the environmental implications if the chemical is discharged into the marine environment.

The selection of chemicals that fall into the last two assessment types require the additional development of an ALARP justification using a standard template in the procedure. The assessment considers the below before it can be approved for use and discharge offshore:

- Availability of alternative chemicals that are lower risk
- Availability of alternative chemicals that have no substitution warnings
- Technical, safety and process considerations; a reasoning for why an alternative is not available must be provided.
- The concentration and maximum dosage rates required. A suitable methodology to determine an environmental discharge limit for production chemicals based on toxicity of the products (noting this may include scenarios for each individual production chemical and/or the 'comingled' end-of-pipe discharge based on co-occurring production chemical dosing) is included in the procedure
- Periodic review of chemicals selected for use and stored offshore to check for new or alternative chemicals

An alternative methodology where the existing procedure is technically challenging or cannot be applied in strict accordance with the OCNS framework or becomes cost prohibitive may also be utilised. The quantity of chemicals used, and therefore the residual concentration discharged to the environment, is reduced to as low as practicable through routine sampling and assessment from various points in the production process. Concentrations and dosages of chemicals need to be maintained at certain levels to meet the production requirements, but excessive levels are not desirable due to increased operational costs as well as the potential for environmental impacts (Chemical Dosing – Process Chemicals, GA-19-PR-P-00015). Further detail on the ongoing monitoring of dosages and injection rates is provided in Section 6.4.4.

2.4 Maintenance and removal of property

2.4.1 Maintenance of property

Section 572(2) of the OPGGS Act requires that a titleholder must maintain in good condition and repair all structures that are, and all equipment and other property that is:

(a) in the title area; and

(b) used in connection with the operations authorised by the permit, lease, licence or authority

Through ongoing monitoring and maintenance (as described in Section 2.2.5), Jadestone will ensure that property is monitored, maintained and repaired as required throughout operations. This will also ensure that infrastructure is maintained in good condition and can be safely decommissioned when required. This includes:

- Routine inspections on operational and suspended infrastructure
- Assurance activities
- Maintenance activities
- Crane and lifting equipment load ability is maintained for decommissioning activities
- Disconnection of unused infrastructure in preparation for removal.

2.4.2 Asset Lifecyle and removal of property

Jadestone is committed to managing the lifecycle of its assets through the implementation of Jadestone's Management of Aging Assets Philosophy (JS-00-PHL-G-00001) which applies to all Jadestone's operating assets. The objectives of this philosophy are to:

- Describe the systematic approach taken to implement, verify and assure the management of ageing assets
- Identify how the organisation supports delivery on a sustainable basis
- Describe how planning and implementation is affected
- Identify how validation and assurance activities influence the overall program.

The philosophy also requires that Quarterly Technical Authority (TA) meetings provide assurance that aging asset issues are being managed appropriately against the risk profile of each asset and adequately prioritised against conflicting operational demands.

The current expected commercial field life for Stag is estimated at 2035 therefore, no end of facility life (EOFL) decommissioning activities for the subsea or topsides infrastructure is scheduled to occur within the 5-year in-force period of this EP. Table 2-4 below summarises the infrastructure within the field. Design life in the context of facilities is used in procurement to avoid any obsolescence issues arising during the nominated period, whereas facility integrity is indefinite subject to ongoing integrity management. As required, re-lifing projects occur which consider the age and integrity of property and future use in the consideration of life extension. Jadestone subsea facilities, or parts thereof, may approach the end of their certified design life and be subject to studies ensuring safe extension. These studies will normally use existing inspection data but may require additional inspection.

Structural components of the Stag facility were designed for a fatigue life of 50 years. Life extension beyond original design life is an ongoing independently certified process. Much of the structural components (Jacket, CALM buoy etc) have currently been extended out beyond 2023 subject to an agreed ongoing integrity management program), and the current strategy for decommissioning the Stag field is to undertake removal of property at the end of field life which is currently estimated at the end of commercial field life 2035. Property may also be decommissioned and removed, if that property is determined at any time to have no future utility between now and the end of commercial field life.

All the items listed in the below table as “active” are currently in service or planned to be in service in the field and maintained in accordance with the CMMS. All structures, equipment and property associated within the title area WA-15-L will be maintained in good condition and repair as described in Section 2.4 to ensure it can be removed, unless there is agreement at that time from NOPSEMA to do otherwise through an accepted EP.

Table 2-4: Infrastructure within Stag field

Infrastructure Type	Infrastructure Name	Status
Floating hose	Marine floating hose (21 segments)	Active
Offloading buoy	CALM buoy	Active
Buoy Mooring System	• Rock Anchors 1-3 • Moring Lines 1-6 (2 per anchor)	Active
Under Buoy Hose	• 7-segment bonded flexible hose c/w buoyancy and ballast collars	Active
Pipeline End Manifold	Oil Export Line PLEM c/w 4 clump weights	Active
Oil Export Flowline	Stag CPF to CALM buoy • 8” rigid steel production pipeline	Active
Risers	At the Central Processing Facility (CPF) • 8” oil export riser • 8” water injection riser (WS105) • 8” water injection riser (WS106) • 8” water injection riser (WS107)	Active
Wellhead Platform	Stag CPF platform	Active
Water Injection Flowlines	Stag CPF to Stag 32H & 40H wells – WS107 • 8” flexible water injection flowline Stag CPF to Stag 17H well – WS106 • 8” flexible water injection flowline Stag CPF to Stag 18H well – WS105 • 8” flexible water injection flowline	Active
Tie-in Spools	Oil Export Pipeline to Riser – 8” Equal Tee to Stag 40H – 8” Equal Tee to Stag 32H – 8”	Active
Flowline Stabilisation	Grout bags (various) Mattresses x 10 (on WS107 flowline) End anchor x 2 (on WS107 flowline) Mid anchor x 2 (on WS107 flowline)	Active
Subsea Wellheads	Stag 17H c/w anode skid Stag 18H c/w anode skid Stag 32H c/w anode skid Stag 40H c/w anode skid	Active
	Stag 29H c/w anode skid	Suspended
Wells[1]	Stag-12H Stag-15H L2 Stag 21H Stag-25H Stag 36H ST2 Stag 37H ST2 BHC1 Stag 43H Stag 45H Stag 49H Stag 48H Stag 50H Stag 51H	Active Production
	Stag 17H WI Stag 18H WI Stag 32H WI (seawater only) Stag 40H WI (seawater only)	Active Injection

Infrastructure Type	Infrastructure Name		Status
	Stag-29H		Inactive
	Stag 1 Stag 2 Stag 3 Stag 4 Stag 5 Stag 6 Stag 6H Stag 7 Stag 8 Stag-9H Stag-9H L1 Stag-9H ST1 Stag-9H ST2 Stag-9H ST3 Stag-10H Stag-10H L1 Stag-10H L1 BHC1 Stag-11H Stag-13H Stag-13H ST1 Stag-13H ST2 Stag-14H Stag-14H ST1 Stag-14H ST2 Stag-14H ST3 Stag-15H Stag-16 Stag-19H Stag-20H	Stag-22H Stag-23H Stag-24H Stag-26H Stag-27H Stag-28H Stag-30H Stag-30H BHC1 Stag-30H L1 Stag-30H ST1 Stag-33H Stag-33H ST1 Stag-33H ST2 Stag-33H ST2 BHC1 Stag-33H ST2 BHC2 Stag-34 Stag-35 Stag-36H Stag-36H ST2 Stag-37H Stag-37H ST1 Stag-37H ST2 Stag-38H Stag-39H Stag-41 Stag-42 Stag-44H Stag-46 Stag EAST-1	Plugged and abandoned

Section 572 (3) of the OPGGS Act requires that a titleholder remove from the title area all structures that are, and all equipment and other property that is, neither used nor to be used in connection with the operations:

(a) in which the titleholder is or will be engaged; and

(b) that are authorised by the permit, lease, licence or authority.

Stag-29H is a horizontal water subsea injection well drilled September 2006 from a subsea template 3.1 km west of the Stag CPF. In circa 2012, the subsea umbilical from the platform to the well was disconnected and assigned to Stag 40H. A blind flange was installed on the well where the flowline was disconnected. From the results of the well integrity review, the single barrier envelope in conjunction with performance standards as presented in the WOMP and combined with the reservoir being sub-normally pressured with no potential to flow, it is in an acceptable state of suspension. This wellhead is not currently in use and Jadestone are reviewing whether the wellhead will be re-used in future or can be removed.

Unless other arrangements are made to the satisfaction of NOPSEMA decommissioning activities are not covered as part of this EP (including the plug and abandonment of wells) and will be subject to separate approval. Prior to the end of field life (currently estimated as 2035) whilst the title is still in force, a decommissioning plan will be in place that sets out the strategy for removal of property from the permit area. As parts of the facilities and infrastructure become redundant, these will be part of a removal plan, whilst the decision for removal of these will be subject to approval and costs. Cost optimisation can be achieved through multi-asset campaigns to share mobilisation/demobilisation fees, decrease vessel day rates and improve labour and services unit cost rates. Therefore, for infrastructure to remain in field under

a maintenance and inspection regime (refer above) for any period of time following disuse, the assets will need to be assessed to ensure that:

- risks to other marine users by their presence is low
- environmental risks of leaving infrastructure in situ for a period of time are low
- the ability to remove the infrastructure at a future date is not compromised by leaving the infrastructure in situ for a period of time
- the costs to recover standalone pieces of equipment are considered disproportionate to the costs of leaving in situ until a later period when cost optimisation can occur.
- Following consideration of the above, there may be a change in the monitoring and maintenance regime that is in place, including additional maintenance for example, to ensure that Jadestone can continue to meet its obligations under the OPGGS Act.

2.4.3 Decommissioning Planning Process

2.4.3.1 Decommissioning & Restoration (D&R) liability Review

As part of ongoing validation of the Stag Asset Decommissioning & Restoration (D&R) liability, Jadestone completes an external review of the facilities D&R technical basis and associated cost estimate annually with a report compiled every 3 years which effectively follows a 3-year cycle of 2 years, top down review followed by a bottom up budget in the 3rd year. The cost estimate study is based on the available technical and market information using previous Operator D&R studies, facilities engineering documents, current Australia D&R Regulations and current Australia project and market execution cost norms. It is based on identification of key activities, high level estimation of activity duration or scope (including validation against previous D&R estimates). Jadestone acknowledges that there is inherent uncertainty in estimating CoP, and the D&R liability review undertaken annually will inform a definitive timeframe for EOFL to ensure adequate planning can occur.

In December 2022, Jadestone requested an independent review of the well Plug and Abandonment (P&A) and facilities D&R technical basis and associated cost estimate as a further update to consider current market conditions since the Q4 2019 D&R study and recent experience from the Stag well P&A completed during the 2022 Stag infill program.

The process used to develop the Q4 2019 facilities D&R cost liability was as follows:

- Establish the well P&A and facilities D&R technical basis for completion of the cost estimate.
- Identify the current costing basis for cost estimate development.
- Establish the cost methodology for cost estimate build-up, including pre-sanction, direct costs, indirect/overhead costs and contingency and allowances.
- Generate the well P&A and facilities D&R cost estimate for each facility.

The cost estimates were defined with some contingency to consider changes to assumptions, uncertainties and risks that could result in cost estimate escalation.

The cost estimate is based on stand-alone D&R activities for the Stag asset. Further cost optimisation can be achieved through multi-asset campaigns to share mob/demob fees, decreasing vessel and rig day rates and improving labour and services unit cost rates.

2.4.3.2 Suspension of Assets

The suspension of assets will require flushing and de-oiling immediately after field shutdown to leave the infrastructure without hydrocarbon inventory and ensure integrity is maintained as part of the “lighthouse keeping” process required before D&R operations are executed. This includes:

- WHP well and topsides flushing and purging
- Subsea Flowlines, umbilicals and risers flushing and de-oiling
- Removal of floating assets within 12 months of cessation of production i.e. CALM buoy and mooring chains recovered.
- PLEM and riser recovery and pipeline ends stabilised.
- Flushing and purging oil export and water injection pipelines

2.4.3.3 P&A of wells and removal of assets

It is assumed that all platform wells will be abandoned using the existing HWU, and the subsea wells abandoned using a Jack-up rig. The CALM buoy and mooring chains will be recovered, with the CALM gravity base to be left in-situ within the first 12 months following cessation of production. Preliminary cost estimates have been completed to consider the costs associated with heavy lift vessels to remove infrastructure, allowance for deck strengthening on the WHP to allow for lifting, and site remediation and restoration works to clear debris post removal. The cost estimate makes assumptions regarding the types of vessels that will be required to inform costs.

International Maritime Organisation (IMO) guidelines for the removal of offshore installations and structures stipulate that full jacket removal will be required if the abandoned installation is located in less than 75 m water depth and weighing less than 4,000 MT (excluding topsides). As the Stag CPF is in water depth of less than 75 m, this would require full removal of the Stag jacket.

Removal activities would be completed using a single lift of the jacket after water jet or explosive cutting of the piles at the mudline with the piles below the mudline planned to be left in-situ (subject to approval). An allowance for stiffening, flotation and removal aids will be made to allow efficient removal of the jacket as a single piece removal.

The base case for decommissioning at Stag is full removal, however consideration will be given to partial abandonment in situ which would be subject to further studies, management approval and regulatory approvals prior to execution and these options may change during the approvals process.

2.4.3.4 Decommissioning Working Group

In Q2 2024, Jadestone established a decommissioning working group to ensure timely planning and execution of decommissioning. The group meets quarterly to plan and execute the decommissioning of Jadestone's Australian assets.

The working group is a decision-making management forum which reports to the Country Manager, Australia and the Group Operations Manager to put forward recommendations for matters relevant to decommissioning in Australia.

The group is formed from representatives from HSE, Subsea, Drilling, Operations and Finance to inform decision making. The current agenda (Q3-Q4 2024) considers:

- Current regulatory requirements and guidelines including the Offshore Petroleum Decommissioning Guideline (DISER, 2018); and the NOPSEMA Decommissioning Compliance Strategy (February 2024).
- Commissioning of any required studies (refer Section 2.4.4) to inform decommissioning.
- Review of survey report results (e.g. infield subsea surveys of infrastructure conducted under the CMMS) with a particular focus on anomalies that could lead to complications with infrastructure removal if not rectified with review by a Jadestone approved Technical Authority.
- Planning and commissioning of regulatory approvals for the next stage of activity including cessation of operations and removal of floating assets.

- Opportunities register to identify potential removal or decommissioning options whilst conducting in field activities during operating field life

2.4.4 Planning Decommissioning Technical Studies

In developing the decommissioning framework, Jadestone intends to undertake further technical and environmental studies to further inform decisions and comparative assessment of options for removal. This may include comparison between full removal, partial removal and full in situ abandonment; technical studies are required to undertake the assessments and will be completed in the five years leading up to end of field life to inform decision making and planning. Planning for these studies will commence 6 years prior to EOFL with the establishment of the working group.

Some studies may be undertaken earlier as opportunities arise, such as water and sediment quality sampling that is undertaken for produced water monitoring which can be interrogated to inform any potential remediation required (for example); or any equipment that is removed from field can be sampled for contaminants to assist with decision making for decommissioning at EOFL.

These studies may include:

- Detailed materials inventory of all infield infrastructure. i.e. the components of each piece of infrastructure in field (e.g. steel, polymers, rubber) to inform degradation assessments of infrastructure that may be left in situ.
- Material degradation assessments of subsea infrastructure that may be considered for in situ abandonment; this assists in the understanding of the way that the individual components of infrastructure breaks down over time and the end fate of components. This may include the reaction of components as they break down over time in sediment and water, and the potential chemical reactions that could also occur.
- Engineering studies for removal of infrastructure based on current technologies, technical feasibility and availability of equipment and vessels to undertake removal of the infrastructure in field. This may also include studies to understand any modifications required (e.g. deck strengthening of the WHP) to facilitate removal.
- Waste management studies for end point disposal (comprising options for recycling, repurposing and disposal) of recovered infrastructure, including location and end fate. This may include re-purposing in situ (e.g. artificial reef or fish attraction device for commercial or recreational purposes), relocation of infrastructure to a different location for re-use, recycling of infrastructure onshore.
- Stakeholder consultation to understand the potential impacts of leaving infrastructure in situ long term or permanently vs. removing the infrastructure completely. This will include assessment of commercial fishery use and other marine users that may utilise the current operational area. Relevant persons that may have interests, functions or activities in the operational area will continue to be engaged through the decommissioning planning process to ensure any feedback is considered in the early planning stages.
- Legislative requirements including clearance below sea level for commercial fishers (currently <30m from the sea surface in the water column); requirement to remove all infrastructure (OPGGS Act); Sea Dumping Act for leaving any infrastructure in situ.
- Analysis of existing environmental data taken from in field monitoring (e.g. sediment and water quality, ROV footage) to identify ecological features and communities, potential impacts of infrastructure that has been in field long term and understanding any effects in sediment from long term discharges (such as produced water). This would also include understanding of any mercury or NORM that may be present in the infrastructure.

- Opportunistic analysis of infrastructure that is removed from field for presence of marine growth, NORM or other contaminants, or the potential for studies on the degradation of infrastructure in laboratory studies.
- Potential requirements for remediation and monitoring post removal of infrastructure.

The above studies may not all be required and will be completed in phases to inform equipment/vessel procurement, budgeting and regulatory approvals as outlined in Figure 2-1.

2.4.5 Decommissioning Planning Timeline

The timeframe allocated to planning for decommissioning allows for any studies to be scoped out and completed, comparative assessments to be completed and the preparation of necessary regulatory approvals and to have each assessed by the Regulator sufficiently in advance of activities commencing. Key objectives and tasks considered are outlined below. Jadestone have established a decommissioning working group that will drive the planning and execution of the strategy supported by financial and investor decisions. In the time leading up to five years prior to end of field life, Jadestone will continue monitoring and maintaining infrastructure and seek opportunities for decommissioning of property ahead of the proposed timeline.

Jadestone's commitment to having a decommissioning framework is provided in management control 055: *No later than five years prior to the end of field life, Jadestone will have a decommissioning framework that details how JSE will meet the obligations under s.572 of the OPGGS Act. This will include establishment of a detailed plan for decommissioning of well, structures, equipment and property to enable decommissioning in a timely manner. This will require detail on:*

- *Ongoing monitoring and maintenance commitments*
- *Baseline environmental monitoring requirements to inform decision making*
- *Any technical studies to support options assessment*
- *Timeframes for the planning and execution of all regulatory approval documents*
- *Full inventory of all in-field infrastructure*
- *Continually updated status of all in-field infrastructure*
- *Overall decommissioning* concept.

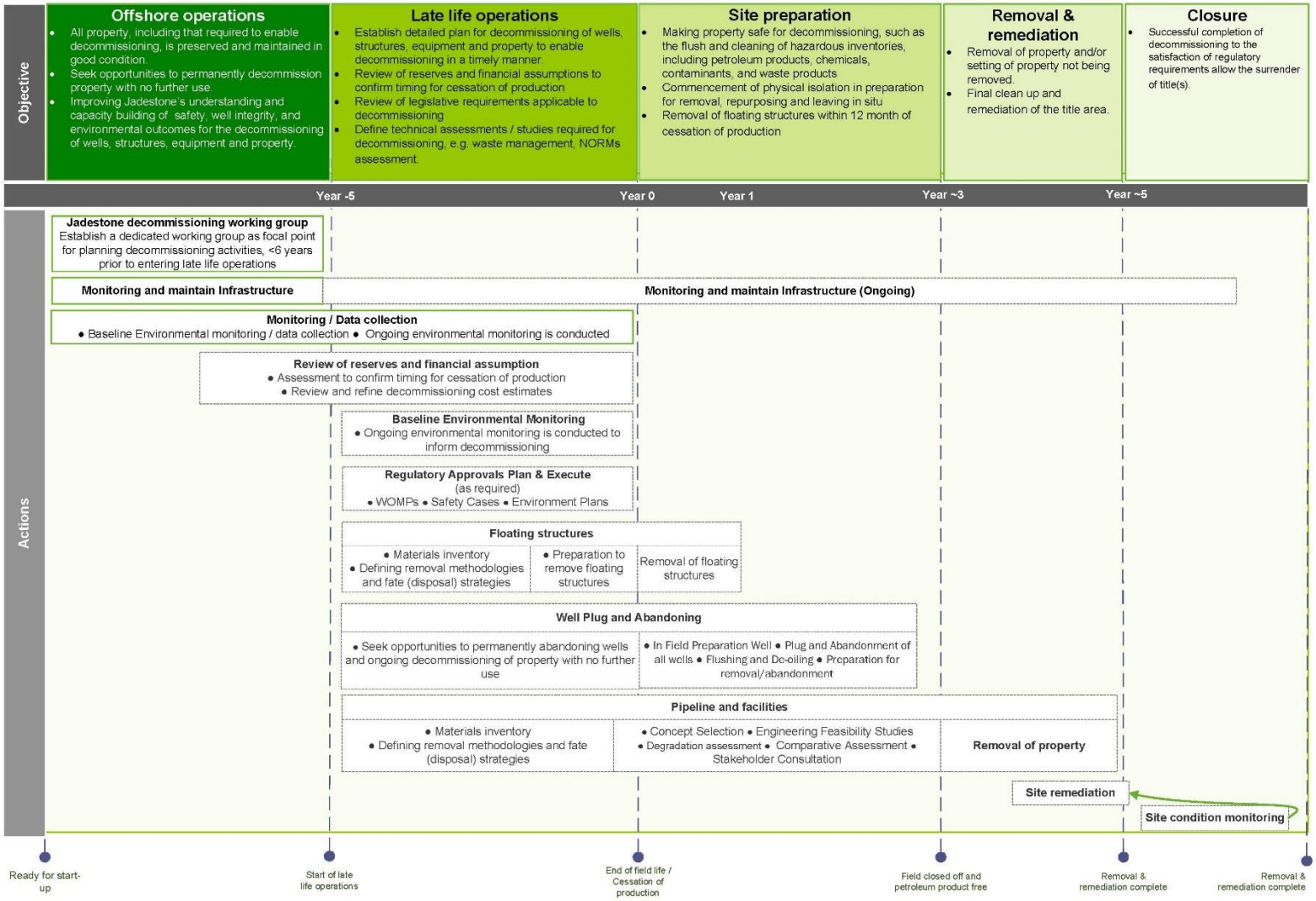


Figure 2-1: Jadestone Stag decommissioning timeline

3. DESCRIPTION OF THE ENVIRONMENT

OPGGS(E) Regulation 21(2) requires the proponent to '(a) describe the existing environment that may be affected by the activity; and (b) include details of the particular relevant values and sensitivities (if any) of that environment.'

To address this requirement, Jadestone has evaluated the values and sensitivities within two types of areas related to the activity:

- The Operational Area – the geographical area encompassing the environment that may be affected by the planned activities (Section 6)
- The Environment that May Be Affected (EMBA) – the geographical area encompassing the environment that has the potential to be affected by the unplanned events associated with the activities described (Section 7) depending upon the level of exposure.

The spatial extent of the EMBA and location of the Operational Area is presented in Figure 3-1. The EMBA is based on the low-level exposure of hydrocarbons on and in, the water and represents the largest extent of an oil spill due to the worst-case scenario as per NOPSEMA Bulletin #1. This is further described in Appendix G and below:

- Surface hydrocarbons EMBA – hydrocarbons that are 'on' the water surface (>1 g/m^2)
- Entrained hydrocarbons EMBA – hydrocarbon that is entrained 'in' the water (>10 ppb)
- Dissolved hydrocarbons EMBA – the dissolved component of hydrocarbon in' the water (>10 ppb), and
- Shoreline loading EMBA – hydrocarbons greater than 10 g/m^2.

Details of the environmental values and sensitivities in the Operational Area are described here in and in Appendix C. The environmental values and sensitivities in the EMBA have been used to inform the assessment of the unplanned events in particular, crude and marine diesel spills, oil spill response planning and oil spill risk assessment (Section 6.9 and 7.4). A full list of the environmental values and sensitivities in the EMBA is contained in the PMST reports in Appendix D.

Several spill scenarios have been modelled and the EMBA represents the worst case for all of the spills rather than the worst case of a single spill. Within the EMBA is a smaller RISK EMBA which is represented by higher thresholds (termed as 'moderate' in NOPSEMA bulletin #1), this represents the environment within which receptors could be affected (rather than just contacted) and is based on scientific knowledge to determine the potential for impact. This is further described in Section 7.4. All the receptors within the RISK EMBA are contained within the EMBA and therefore fully described within this section.

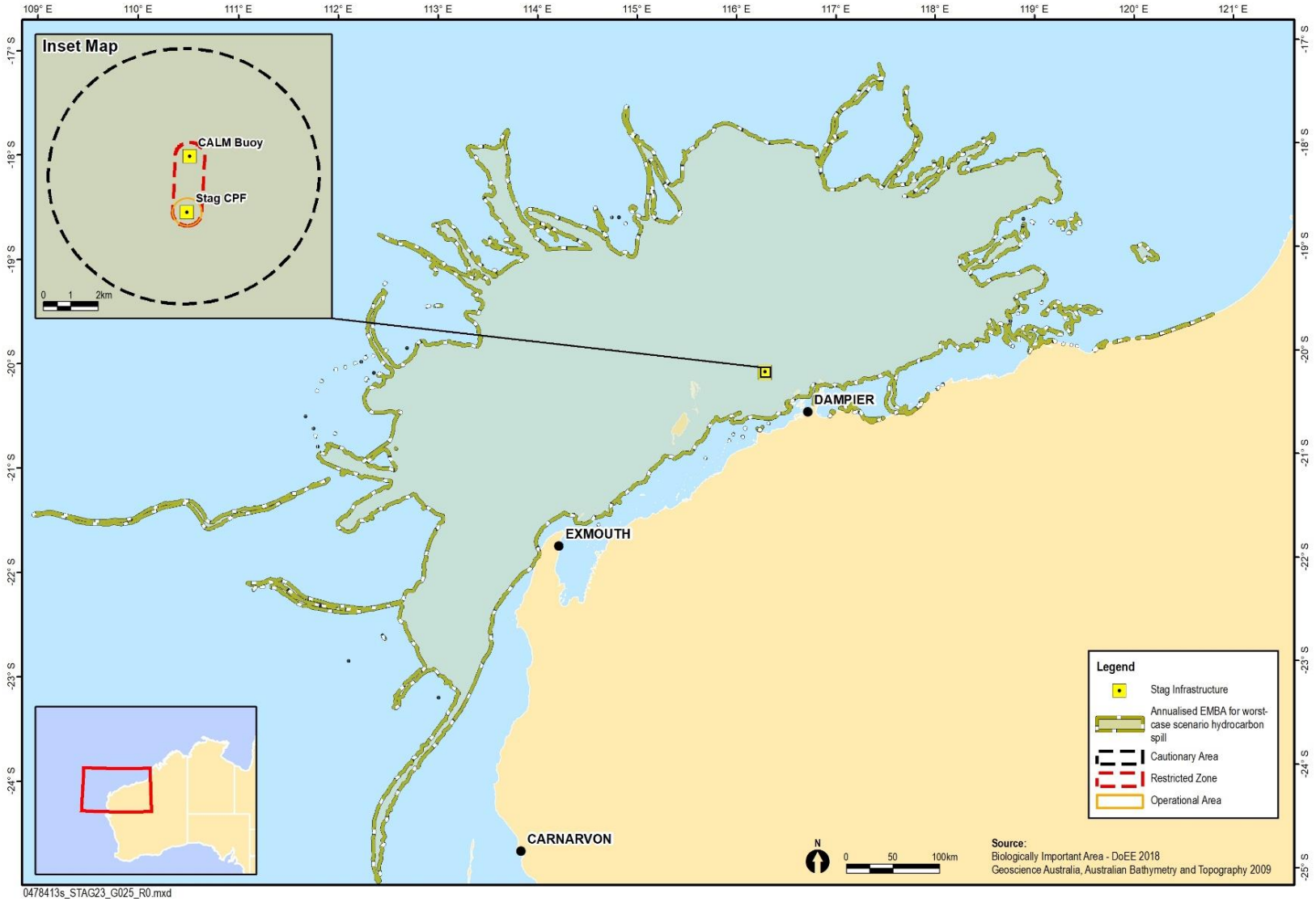


Figure** 3-1**: Annualised EMBA for worst-case scenario hydrocarbon spill

3.1 Regional Setting

The Operational Area and EMBA lie entirely within the Commonwealth waters of the North-west Marine Region (the region) and adjacent state waters between Ningaloo and Eighty Mile Beach. The region is distinguished by its predominantly wide continental shelf, very high tidal regimes (especially in the north), high cyclone incidence, unique current systems and warm, low-nutrient surface waters.

The region supports high species-richness of tropical Indo-west Pacific biota, but low levels of endemism (DSEWPaC 2012d). The offshore islands, coastline and waters within the region provide vital habitat to an extensive range of marine species including turtles, cetaceans, whale sharks and seabirds and has high fish biodiversity and consequently, is of value to commercial fish, prawn and crab fisheries.

The NWMR is further divided into provincial bioregions. The Operational Area lies within the Northwest Shelf Province while the EMBA also overlaps the Northwest Province, the Central Western Transition, Central Western Shelf Transition and the Northwest Transition **(Figure 3-2**).

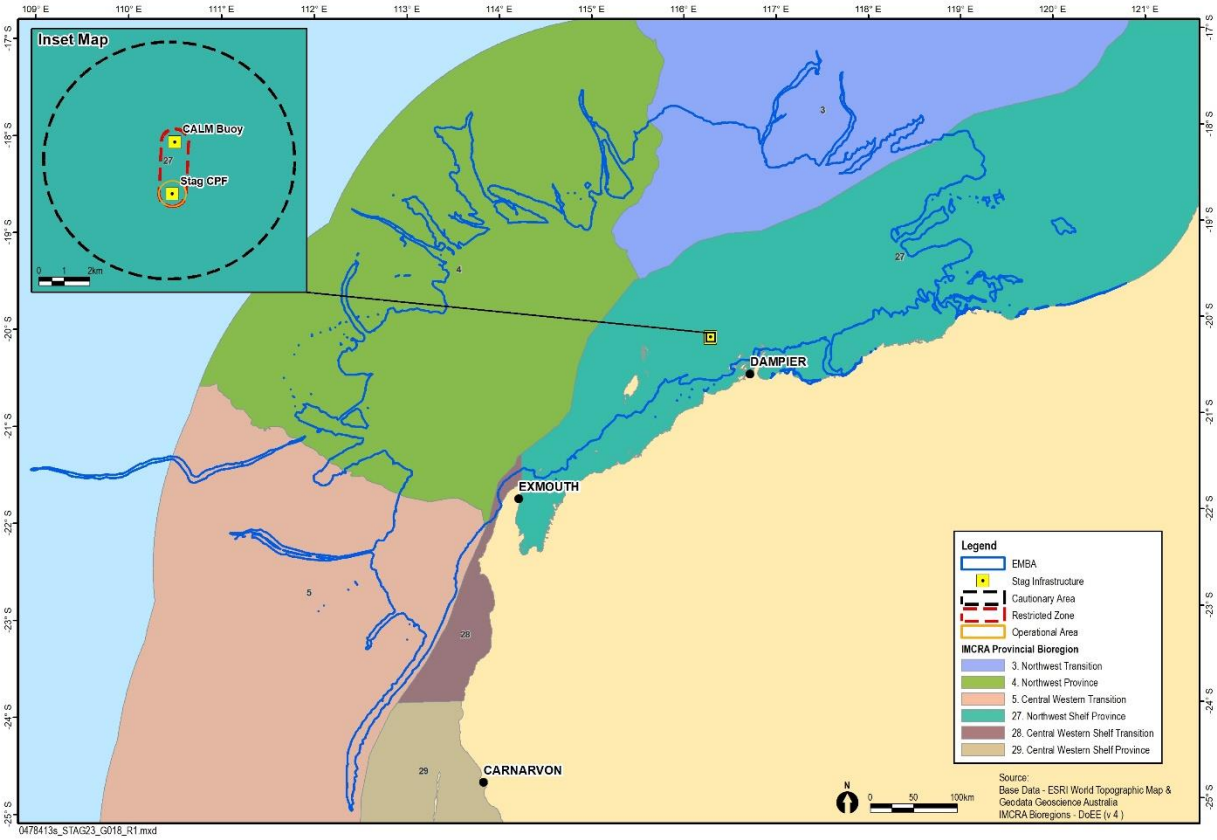


Figure 3-2 Provincial Bioregions relevant to the Operational Area

3.2 Threatened and Migratory Species

The EPBC Act lists both threatened and migratory species that are protected under Commonwealth legislation and various international conventions and treaties.

A search of the Department of Climate Change, Environment, Energy , Environment and Water) DCCEEW) Protected Matters Search Tool (PMST) was undertaken in August 2024 (Appendix D) identified a number of threatened species (endangered, vulnerable, and critically endangered) as occurring or having habitat within the EMBA (Table 3-2). Fifteen of these threatened species are terrestrial and have been excluded as it is unlikely that they would be impacted from an oil spill associated with the activity. Those species that have BIAs that overlap the OA and/or the EMBA but were not listed as threatened and migratory under the PMST have been included in counts as it is assumed that they will be present in the EMBA.

A summary of the number of threatened as well as migratory species (in their class category) occurring in the OA and EMBA is provided in Table 3-1.

Table 3-1 Summary of number of EPBC listed species in Operational Area and EMBA

EPBC Species Category	OA	EMBA
Fish Sharks and Rays	8	17
Marine Mammals	7	13
Marine Reptiles	6	8
Birds	14	63

The relevant sections of this EP discuss the likelihood of these species and their biologically important areas occurring within the Operational Area and EMBA. Those species that have been identified as likely to be present in the Operational Area and EMBA are summarised in Table 3-2 and further detailed below.

The PMST and the Australian Marine Spatial Information System (AMSIS) (Geoscience Australia (2023)) provide data on BIAs located in the OA and EMBA. BIAs such as an aggregation, resting, nesting or feeding areas or known migratory routes for these species are shown in Table 3-3 and Figure 3-3 to Figure 3-13. The relevant sections also outline the management such as:

- Recovery plans
- Conservation advice; or
- Threat abatement plan for the impacts of marine debris on vertebrate marine life (DoEE 2018).

The requirements of the species recovery plans and conservation advices are considered to identify any requirements that may be applicable to the risk assessment. Recovery plans, conservation advice, management plans and threat abatement plans relevant to species that occur or may occur within the Operational Area and EMBA are detailed in Table 3-3.

No listed threatened ecological communities were identified within the EMBA. Further detail on species identified as threatened or migratory is presented in Appendix C and Appendix D contains the full PMST search and includes additional listed species that are not classified as threatened or migratory under the EPBC Act but are considered 'Other matters protected by the EPBC Act'. This list comprises additional cetaceans, birds, fish (pipefish, pipehorses and seahorses) and reptiles (sea snakes).

Table 3-2: Marine fauna and management considerations in the Operational Area and EMBA

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
Fish and Sharks	Grey nurse shark (west coast population)	*Carcharias taurus*	V	No	Yes	Marine debris[3]	Not relevant to EMBA	Yes	Yes	**Planned Events:** Light Emissions; Noise Emissions; Operational Discharges; Drilling Discharges; Physical disturbance; Spill Response Activities **Unplanned Events (all)**
	Great white shark	*Carcharodon carcharias*	V; M	No	Yes	No	Not relevant to EMBA	Yes	Yes	
	Dwarf sawfish	*Pristis clavata*	V; M	Yes	Yes	No	EMBA	Yes	Yes	
	Freshwater/ Largetooth sawfish	*Pristis pristis*	V; M	Yes	Yes	No	EMBA	Yes	Yes	
	Green sawfish	*Pristis zijsron*	V; M	Yes	Yes	No	EMBA	Yes	Yes	
	Whale shark	*Rhincodon typus*	V; M	Yes	No	No	EMBA	Yes	Yes	
	Scalloped Hammerhead	*Sphyrna lewini*	CD	No	No	No	None	Yes	Yes	
	Little Gulper Shark	*Centrophorus uyato*	CD	No	No	No	None	No	Yes	
	Blind Gudgeon	*Milyeringa veritas*	V	Yes	No	No	None	No	Yes	
	Blind Cave Eel	*Ophisternon candidum*	V	Yes	No	No	None	No	Yes	
	Narrow sawfish	*Anoxypristis cuspidata*	M	No	No	No	None	Yes	Yes	
	Oceanic Whitetip Shark	*Carcharhinus longimanus*	M	No	No	No	None	Yes	Yes	
	Reef Manta Ray	*Manta alfredi*	M	No	No	No	None	Yes	Yes	

[3] Threat abatement plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Giant Manta Ray	*Manta birostris*	M	No	No	No	None	Yes	Yes	
	Shortfin mako	*Isurus oxyrinchus*	M	No	No	No	None	No	Yes	
	Longfin mako	*Isurus paucus*	M	No	No	No	None	No	Yes	
	Porbeagle mackerel shark	*Lamna nasus*	M	No	No	No	None	No	Yes	
Marine mammals	Blue whale	*Balaenoptera musculus*	E; M	No	Yes	Marine debris	EMBA	Yes	Yes	**Planned Events:** Light Emissions; Noise Emissions; Operational Discharges; Drilling Discharges; Physical disturbance; Spill Response Activities; Unplanned Events (all)
	Bryde's whale	*Balaenoptera edeni*	M	No	No	Marine debris	None	Yes	Yes	
	Humpback whale	*Megaptera novaeangliae*	M	No	No	Marine debris	OA and EMBA	Yes	Yes	
	Australian Snubfin Dolphin	*Orcaella heinsohni*	M	No	No	No	Not relevant to EMBA	Yes	Yes	
	Killer whale	*Orcinus orca*	M	No	No	Marine debris	None	Yes	Yes	
	Australian Humpback Dolphin (also known as Sousa *chinensis*)	*Sousa sahulensis*	M	No	No	No	Not relevant to EMBA	Yes	Yes	
	Spotted bottlenose dolphin (Arafura/Timor Sea populations)	*Tursiops aduncus*	M	No	No	Marine debris	Not relevant to EMBA	Yes	Yes	
	Sei whale	*Balaenoptera borealis*	V; M	Yes	No	Marine debris	None	No	Yes	**Unplanned Events:** Unplanned release of Stag crude Oil
	Fin whale	*Balaenoptera physalus*	V; M	Yes	No	Marine debris	None	No	Yes	
	Southern right whale	*Eubalaena australis*	E; M	No	Yes	Marine debris	EMBA	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Antarctic minke whale	*Balaenoptera bonaerensis*	M	No	No	Marine debris	None	No	Yes	Unplanned release of marine diesel
	Dugong	*Dugong dugon*	M	No	No	Marine debris	EMBA	No	Yes	
	Sperm whale	*Physeter macrocephalus*	M	No	No	No	Not relevant to EMBA	No	Yes	
Marine reptiles	Loggerhead turtle	*Caretta caretta*	E; M	No	Yes	Marine debris	EMBA	Yes	Yes	**Planned Events:** Light Emissions Noise Emissions Operational Discharges Drilling Discharges Physical disturbance Spill Response Activities Unplanned Events (all)
	Green turtle	*Chelonia mydas*	V; M	No	Yes	Marine debris	EMBA	Yes	Yes	
	Leatherback turtle	*Dermochelys coriacea*	E; M	Yes	Yes	Marine debris	Not relevant to EMBA	Yes	Yes	
	Hawksbill turtle	*Eretmochelys imbricata*	V; M	No	Yes	Marine debris	EMBA	Yes	Yes	
	Flatback turtle	*Natator depressus*	V; M	No	Yes	Marine debris	OA and EMBA	Yes	Yes	
	Short-nosed seasnake	*Aipysurus apraefrontalis*	CE	Yes	No	No	None	No	Yes	**Unplanned Events:** Unplanned release of Stag crude Oil
	Leaf- scaled seasnake	*Aipysurus foliosquama*	CE	Yes	No	No	None	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
										Unplanned release of marine diesel
Birds	Curlew Sandpiper	*Calidris ferruginea*	CE; Mw	Yes	No	No	None	Yes	Yes	**Planned Events:** Light Emissions Atmospheric emissions Operational Discharges Drilling Discharges Physical disturbance Spill Response Activities Unplanned Events (all)
	Eastern Curlew	*Numenius madagascariensis*	CE; Mw	Yes	No	No	None	Yes	Yes	
	Red Knot	*Calidris canutus*	V; Mw	Yes	No	No	None	Yes	Yes	
	Southern giant-petrel	*Macronectes giganteus*	E; M	No	Yes	Marine Debris Bycatch	Not relevant to EMBA	Yes	Yes	
	Christmas Island White- tailed tropicbird	*Phaethon lepturus fulvus*	E	Yes	No	No	None	Yes	Yes	
	Red-tailed tropicbird	*Phaethon rubricauda westralis*	E	No	No	No	Not relevant to EMBA	Yes	Yes	
	Australian fairy tern	*Sternula nereis nereis*	V	Yes	Yes	No	EMBA	Yes	Yes	
	Common sandpiper	*Actitis hypoleucos*	Mw	No	No	No	None	Yes	Yes	
	Common noddy	*Anous stolidus*	M	No	No	No	Not relevant to EMBA	Yes	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Sharp-tailed sandpiper	*Calidris acuminata*	V; Mw	Yes	No	No	None	Yes	Yes	
	Pectoral Sandpiper	*Calidris melanotos*	Mw	No	No	No	None	Yes	Yes	
	Streaked shearwater	*Calonectris leucomelas*	M	No	No	No	None	Yes	Yes	
	Lesser frigatebird	*Fregata ariel*	M	No	No	No	EMBA	Yes	Yes	
	White-tailed tropicbird	*Phaethon lepturus*	M	No	No	No	EMBA	Yes	Yes	
	Ruddy turnstone	*Arenaria interpres*	V; Mw	Yes	No	No	None	No	Yes	
	Great Knot	*Calidris tenuirostris*	V; Mw	Yes	No	No	None	No	Yes	
	Greater Sand Plover	*Charadrius leschenaultii*	V; Mw	Yes	No	No	None	No	Yes	
	Lesser Sand Plover	*Charadrius mongolus*	E; Mw	Yes	No	No	None	No	Yes	
	Red Goshawk	*Erythrotriorchis radiatus*	E	Yes	Yes	No	None	No	Yes	
	Northern Siberian Bar-tailed Godwit (menzbieri)	*Limosa lapponica menzbieri*	E	Yes	No	No	None	No	Yes	
	Black-tailed godwit	*Limosa limosa*	E; Mw	Yes	No	No	None	No	Yes	
	Asian Dowitcher	*Limnodromus semipalmatus*	V; Mw	Yes	No	No	None	No	Yes	
	Northern giant petrel	*Maconectes halli*	V; M	No	Yes	Marine Debris Bycatch	Not relevant to EMBA	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	White- winged Fairy wren	*Malurus leucopterus edouardi*	V	Yes	No	No	No	No	Yes	
	Abbott's Booby	*Papasula abbotti*	E	Yes	No	No	None	No	Yes	
	Soft-plumaged petrel	*Pterodroma mollis*	V	Yes	No	No	Not relevant to EMBA	No	Yes	
	Grey Plover	*Pluvialis squatarola*	V; Mw	Yes	No	No	None	No	Yes	
	Australian painted snipe	*Rostratula australis*	E	Yes	No	No	None	No	Yes	
	Roseate tern	*Sterna dougallii*	M	No	No	No	EMBA	No	Yes	
	Indian Yellow-nosed albatross	*Thalassarche carteri*	V; M	No	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	
	Shy Albatross	*Thalassarche cauta*	E; M	Yes	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	
	Campbell Albatross	*Thalassarche impavida*	V; M	No	Yes	Bycatch	Not relevant to EMBA	No	Yes	
	Black-browed Albatross	*Thalassarche melanophris*	V; M	No	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	
	White-capped Albatross	*Thalassarche steadi*	V; M	No	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Common Greenshank	*Tringa nebularia*	E; Mw	Yes	No	No	None	No	Yes	
	Terek Sandpiper	*Xenus cinereus*	V; Mw	Yes	No	No	None	No	Yes	
	Fork-tailed swift	*Apus pacificus*	M	No	No	No	None	No	Yes	
	Flesh-footed Shearwater	*Ardenna carneipes*	M	No	No	Marine debris Bycatch	Not relevant to EMBA	No	Yes	
	Wedge-tailed shearwater	*Ardenna pacifica*	M	No	No	Marine debris Bycatch	OA and EMBA	No	Yes	
	Great frigatebird	*Fregata minor*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Caspian tern	*Hydroprogne caspia*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Bridled tern	*Onychoprion anaethetus*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Little tern	*Sternula albifrons*	M	No	No	No	EMBA	No	Yes	
	Masked booby	*Sula dactylatra*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Brown booby	*Sula leucogaster*	M	No	No	Marine debris	EMBA	No	Yes	
	Sanderling	*Calidris alba*	Mw	No	No	No	None	No	Yes	
	Red-necked Stint	*Calidris ruficollis*	Mw	No	No	No	None	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Oriental Plover	*Charadrius veredus*	Mw	No	No	No	None	No	Yes	
	Swinhoe's snipe	*Gallinago megala*	Mw	No	No	No	None	No	Yes	
	Pin-tailed snipe	*Gallinago stenura*	Mw	No	No	No	None	No	Yes	
	Oriental Pratincole	*Glareola maldivarum*	Mw	No	No	No	None	No	Yes	
	Broad-billed Sandpiper	*Limicola falcinellus*	Mw	No	No	No	None	No	Yes	
	Bar-tailed Godwit	*Limosa lapponica*	Mw	No	No	No	None	No	Yes	
	Little Curlew	*Numenius minutus*	Mw	No	No	No	None	No	Yes	
	Whimbrel	*Numenius phaeopus*	Mw	No	No	No	None	No	Yes	
	Osprey	*Pandion haliaetus*	Mw	No	No	No	None	No	Yes	
	Ruff	*Philomachus pugnax*	Mw	No	No	No	None	No	Yes	
	Pacific Golden Plover	*Pluvialis fulva*	Mw	No	No	No	None	No	Yes	
	Greater Crested Tern	*Thalasseus bergii*	Mw	No	No	No	None	No	Yes	
	Lesser Crested Tern[4]	*Thalasseus bengalensis*	M	No	No	No	EMBA	No	Yes	
	Grey- tailed Tattler	*Tringa brevipes*	Mw	No	No	No	None	No	Yes	
	Marsh Sandpiper	*Tringa stagnatilis*	Mw	No	No	No	None	No	Yes	
	Common Redshank	*Tringa totanus*	Mw	No	No	No	None	No	Yes	

Key EPBC: EPBC Act; V = vulnerable; OPF = Other Protected Fauna; CE = Critically Endangered; P1 = Priority Flora and Fauna List; M = Migratory marine; Mw = Migratory wetland; S = Schedule; LC = Least concern; CD = Conservation Dependant

[4] Lesser Crested Tern did not show up in the PMST search for Migratory species. It does, however, have a Breeding BIA located within the EMBA so it is assumed to be present in the EMBA.

Table 3-3: Biologically Important Areas located within the EMBA

Class	Common name	Scientific name	BIA area	Overlaps Operational Area	Overlaps EMBA
Sharks and Fish	Dwarf sawfish	*Pristis clavata*	Foraging	✗	✓
			Nursing	✗	✓
			Pupping	✗	✓
	Green sawfish	*Pristis zijsron*	Foraging	✗	✓
			Nursing	✗	✓
			Pupping	✗	✓
	Freshwater/ Largetooth sawfish	*Pristis pristis*	Foraging	✗	✓
			Pupping	✗	✓
	Whale shark	*Rhincodon typus*	Foraging	✗	✓
			Foraging (high density)	✗	✓
Marine mammals	Pygmy Blue whale	*Balaenoptera musculus brevicauda*	Foraging	✗	✓
			Migration	✗	✓
	Humpback whale	*Megaptera novaeangliae*	Migration (north and south)	✓	✓
	Dugong	*Dugong dugon*	Breeding	✗	✓
			Calving	✗	✓
			High Density foraging (seagrass beds)	✗	✓
			Nursing	✗	✓
	Southern Right Whale	*Eubalena australis*	Reproduction (May to September)	✗	✓
			Migration (April to October	✗	✓
			Habitat critical to the survival	✗	✓
Turtles	Loggerhead turtle	*Caretta caretta*	Foraging	✗	✓
			Internesting Buffer	✗	✓
			Nesting	✗	✓

Class	Common name	Scientific name	BIA area	Overlaps Operational Area	Overlaps EMBA
			Habitat critical to the survival (nesting)	✗	✓
	Green turtle	*Chelonia mydas*	Aggregation	✗	✓
			Basking	✗	✓
			Foraging	✗	✓
			Internesting	✗	✓
			Internesting Buffer	✗	✓
			Mating	✗	✓
			Migration Corridor	✗	✓
			Nesting	✗	✓
			Habitat critical to the survival (nesting)	✗	✓
	Hawksbill turtle	*Eretmochelys imbricata*	Foraging	✗	✓
			Internesting	✗	✓
			Internesting buffer	✗	✓
			Mating	✗	✓
			Migration corridor	✗	✓
			Nesting	✗	✓
			Habitat critical to the survival (nesting)	✗	✓
	Flatback turtle	*Natator depressus*	Aggregation	✗	✓
			Foraging	✗	✓
			Internesting	✗	✓
			Internesting Buffer	✓	✓
			Mating	✗	✓
			Migration corridor	✗	✓
			Nesting	✗	✓

Class	Common name	Scientific name	BIA area	Overlaps Operational Area	Overlaps EMBA
			Habitat critical to the survival (nesting)	✓	✓
Seabirds	Wedge-tailed shearwater	*Ardenna pacificus*	Breeding	✓	✓
	Lesser frigatebird	*Fregata ariel*	Breeding	✗	✓
	White-tailed tropicbird	*Phaethon lepturus*	Breeding	✗	✓
	Roseate tern	*Sterna dougallii*	Breeding	✗	✓
	Fairy tern	*Sternula nereis*	Breeding	✗	✓
	Brown booby	*Sula leucogaster*	Breeding	✗	✓
	Lesser Crested Tern	*Thalasseus bengalensis*	Breeding	✗	✓
	Little Tern	*Sterna albifrons*	Breeding	✗	✓

3.2.1 Listed Species Recovery Plans, Conservation Advice and Threat Abatement Plans

Jadestone considered recent updates to Recovery Plans, Conservation Management Plans, Threat Abatement Plans or approved Conservation Advice in place for EPBC Act-listed threatened species that may potentially occur or utilise habitat within the EMBA (Table 3-2).

Recovery Plans set out the research and management actions necessary to stop the decline of and support the recovery of listed threatened species. In addition, Threat Abatement Plans provide for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities. The Minister decides whether a threat abatement plan is required for key threatening processes listed under Section 183 of the EPBC Act.

Table 3-4 provides information on the specific requirements of the relevant conservation advice, species recovery plans and threat abatement plans that is applicable to this petroleum activity, and demonstrates how current management requirements have been taken into account during the preparation of the EP.

Table 3-4: Relevant management plans for listed threatened and migratory species

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
Fish, sharks and rays			
Grey nurse shark (west coast population)	Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE 2014a) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Pollution and disease	7.5, 7.6
		Climate variability and change including sea temperatures and ocean acidification	6.3
		Ecosystem effects – habitat modification	7.5, 7.6
Great white shark	Recovery plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a)	Ecosystem effects as a result of habitat modification	7.5, 7.6
All sawfish and river sharks	Sawfish and River Sharks Multispecies Recovery Plan (2015b)	Habitat degradation or modification	7.5, 7.6
		Marine debris	7.2
Dwarf sawfish	Approved Conservation Advice on *Pristis clavata* (dwarf sawfish) (DEWHA 2009)	Habitat degradation and modification	7.5, 7.6
Freshwater/largetooth sawfish	Approved Conservation Advice for *Pristis pristis* (largetooth sawfish) (DoE 2014b)	Habitat degradation and modification	7.5, 7.6
Green sawfish	Approved Conservation Advice for Green Sawfish (DEWHA 2008c)	Habitat degradation and modification	7.5, 7.6
Whale shark	Conservation Advice for Rhincodon typus (*whale shark*) (TSSC 2015a)	Boat strike from large vessels	6.7
		Habitat disruption from mineral exploration, production and transportation	7.5, 7.6
		Marine debris	7.2
		Climate change	6.3
Blind gudgeon	Approved Conservation Advice for *Milyeringa veritas* (blind gudgeon) (DEWHA 2008d)	Habitat degradation and modification including pollution	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
Blind cave eel	Approved Conservation Advice for *Ophisternon candidum* (Blind Cave Eel) (DEWHA 2008e)	Habitat degradation and modification including pollution	7.5, 7.6
Marine mammals			
Sei Whale	Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC 2015b) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Anthropogenic noise and acoustic disturbance	6.2
		Habitat degradation including pollution (increasing port expansion and coastal development)	7.5, 7.6
		Pollution (persistent toxic pollutants)	7.5, 7.6
		Climate Variability and Change	6.3
		Vessel strike	6.7
Blue whale	Blue Whale Conservation Management Plan 2015–2025 (DoE 2015b) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Noise Interference	6.2
		Habitat Modification	7.5, 7.6
		Marine Debris	7.2
		Vessel Disturbance/ strike	6.7
		Climate Variability and Change	6.3
Fin whale	Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC 2015c) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Anthropogenic noise and acoustic disturbance	6.2
		Habitat degradation including coastal development, port expansion and aquaculture	7.5, 7.6
		Pollution (persistent toxic pollutants)	7.5, 7.6
		Climate Variability and Change	6.3

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
		Vessel strike	6.7
Southern right whale	National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Entanglement/ marine debris	7.2
		Vessel disturbance/ strike	6.7
		Climate variability and change	6.3
		Noise interference	6.2
		Habitat modification	7.5, 7.6
Humpback whale	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Habitat degradation including coastal development and port expansion	7.5, 7.6
		Entanglement	7.2
		Vessel disturbance and strike	6.7
Bryde's whale	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine debris	7.2
Killer whale	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine debris	7.2
Spotted bottlenose dolphin (Arafura/Timor Sea populations)	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine debris	7.2
Antarctic minke whale	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine debris	7.2
Dugong	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine debris	7.2
Marine reptiles			
Short-nosed seasnake	Approved Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed seasnake) (DSEWPaC 2011a)	Habitat degradation	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
Leaf-scaled seasnake	Approved Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled seasnake) (DSEWPaC 2011b)	Degradation of reef habitat	7.5, 7.6
All marine turtles including: • Loggerhead Turtle • Green Turtle • Leatherback Turtle • Hawksbill Turtle • Flatback Turtle	Recovery plan for marine turtles in Australia 2017–2027 (DoEE 2017) National Light Pollution Guidelines for Wildlife (DCCEEW 2023) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Light pollution	6.1
		Habitat modification/ loss	7.5, 7.6
		Chemical and terrestrial discharge/ deteriorating water quality	6.4, 6.5, 7.4, 7.5, 7.6
		Marine debris	7.2
		Vessel disturbance/ strike	6.7
		Climate Variability and Change	6.3
		Noise interference	6.2
Leatherback Turtle	Approved Conservation Advice on *Dermochelys coriacea* (DEWHA 2008f)	Vessel strike	6.7
		Climate Variability and Change	6.3
		Degradation of foraging areas	6.7, 7.2
Birds			
All seabirds and migratory shorebirds	National Light Pollution Guidelines for Wildlife (DCCEEW 2023)	Habitat modification	7.5, 7.6
All seabirds	Wildlife Conservation Plan for Seabirds (CoA 2020)	Light pollution	6.1
		Climate Variability and Change	6.3
		Habitat loss and degradation from pollution	7.5, 7.6
Migratory shorebirds	Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)	Habitat loss and degradation	7.5, 7.6
		Climate change and variability	6.3
		Pollution (marine debris, light, water)	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
All threatened albatrosses and petrels including: • Southern Giant Petrel • Indian Yellow-nosed albatross • Shy albatross • Campbell albatross • Black-browed albatross • White-capped albatross • Soft-plumaged Petrel • Amsterdam Albatross • Southern Royal Albatross • Wandering Albatross • Northern Giant Petrel	National recovery plan for albatrosses and petrels (2022)	Marine Pollution	7.5, 7.6
		Climate change	6.3
Red knot	Approved Conservation Advice for *Calidris canutus* (Red knot) (DCCEEW2024c)	Habitat loss and habitat degradation	7.5, 7.6
		Climate change	6.3
		Chronic and acute pollution	7.5, 7.6
Curlew sandpiper	Approved Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW 2023a)	Habitat loss and degradation from pollution	7.5, 7.6
		Climate change	6.3
Great knot	Approved Conservation Advice for *Calidris tenuirostriss* (Great knot) (DCCEEW, 2024d)	Chronic and acute pollution	7.5, 7.6
		Climate change	6.3
Greater sand plover		Habitat loss and habitat degradation	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
	Conservation Advice for *Charadrius leschenaultii* (Greater sand plover) (DCCEEW 2023b)	Climate change	6.3
		Pollutant/ contaminant impacts	7.5, 7.6
Lesser sand plover	Conservation Advice for *Charadrius mongolus* (Lesser sand plover) (TSSC 2016d)	Habitat loss and habitat degradation	7.5, 7.6
		Climate change and variability	6.3
		Pollutant/ contaminant impacts	7.5, 7.6
Red Goshawk	Conservation Advice for *Erythrotriorchis radiatus* (red goshawk) (2023) National recovery plan for the red goshawk Erythrotriorchis radiatus (DoERM, 2012)	Habitat degradation or modification	7.5, 7.6
		Climate change	6.3
Northern Siberian bar-tailed godwit	Conservation Advice for *Limosa lapponica menzbieri* (Bar-tailed godwit (northern Siberian)) (DCCEEW, 2024f)	Habitat loss and habitat degradation	7.5, 7.6
		Pollutant/ contaminant impacts	7.5, 7.6
Southern giant petrel	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	7.5, 7.6
		Climate Variability and Change	6.3
Northern giant petrel	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Climate Variability and Change	6.3
		Marine pollution (marine debris, light, water)	7.5, 7.6
		Habitat loss, disturbance and modifications	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
Eastern curlew	Conservation Advice *for Numenius madagascariensis* (far eastern curlew) (DoE 2023d)	Habitat loss and degradation from pollution	7.5, 7.6
Abbott's booby	Approved Conservation Advice for the Abbott's booby - *Papasula abbotti* (TSSC 2020a)	Habitat loss, disturbance and modifications	7.5, 7.6
		Climate change – severe storm events and prey depletion	6.3
		Marine debris – plastics	7.2
Christmas Island white-tailed tropicbird	Conservation Advice for *Phaethon lepturus fulvus* white-tailed tropicbird (Christmas Island) (DoE 2014c)	Habitat degradation and modification	7.5, 7.6
Soft-plumaged petrel	Conservation Advice for *Pterodroma mollis* (soft-plumaged petrel) (TSSC 2015h)	Climate Variability and Change	6.3
Australian painted snipe	Approved Conservation Advice on *Rostratula australis* (Australian painted snipe) (DSEWPaC 2013b) National Recovery Plan for the Australian Painted Snipe (Rostratula australis) (2022a)	Oil spills	7.5, 7.6
		Marine plastics/ debris	7.2
		Habitat degradation and loss	6.7, 7.2, 7.4, 7.5
		Climate variability and change	6.3
		Marine pollution	7.5, 7.6
Australian fairy tern	National Recovery plan for the Australian Fairy Tern (*Sternula nereis nereis*) (COA 2020) Approved Conservation Advice for *Sternula nereis nereis* (fairy tern) (TSSC 2011)	Climate variability and change	6.3
		Marine pollution (marine debris, light, water)	7.2, 7.5, 7.6
		Habitat loss, disturbance and modifications	6.7, 7.2, 7.4, 7.5
Indian Yellow Nosed Albatross	National recovery plan for threatened albatrosses and giant petrels 2022 (CoA, 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018)	Climate variability and change	6.3
		Marine pollution (marine debris, light, water)	7.2, 7.5, 7.6
		Habitat loss, disturbance and modifications	6.7, 7.2, 7.4, 7.5

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)		
Shy albatross	Conservation Advice *Thalassarche cauta* Shy Albatross (TSSC 2020b) National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine plastics/ debris	7.2
		Climate Variability and Change	6.3
		Marine pollution	7.5, 7.6
White-capped albatross	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution (marine plastics/debris, light, water)	7.2, 7.5, 7.6
		Climate Variability and Change	6.3
		Habitat loss, disturbance and modification	7.5, 7.6
Black-browed albatross	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution (marine plastics/debris, light, water)	7.2, 7.5, 7.6
		Climate Variability and Change	6.3
		Habitat loss, disturbance and modification	7.5, 7.6
Campbell albatross	National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022) Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018)	Climate Variability and Change	6.3
		Marine pollution (marine plastics/debris, light, water)	7.5, 7.6
		Habitat loss, disturbance and modification	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
Flesh-footed Shearwater	Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)	Marine pollution	7.2, 7.5, 7.6
Wedge-tailed Shearwater	Threat Abatement Plan for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations (CoA 2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018) Wildlife conservation plan for seabirds (DAWE, 2020)	Marine pollution	7.2 ,7.5, 7.6
Brown Booby	Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018) Wildlife conservation plan for seabirds (DAWE, 2020)	Marine debris	7.2
Ruddy Turnstone	Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW 2024a)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6
Sharp-tailed Sandpiper	Conservation advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW 2024b)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6
Asian Dowitcher	Conservation advice for Limnodromus semipalmatus (*Asian dowitcher*) (DCCEEW 2024e)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6
Black-tailed Godwit	Conservation Advice for *Limosa limosa* (black-tailed godwit) (DCCEEW 2024g)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6
Grey Plover	Conservation advice for *Pluvialis squatarola* (grey plover) (DCCEEW 2024h)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6

Species or group	Relevant Plan/ Conservation Advice	Threats and/or management strategies relevant to the Activity	Addressed (where relevant) in EP Section
Common Greenshank	Conservation Advice for *Tringa nebularia* (common greenshank) (DCCEEW 2024i)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6
Terek Sandpiper	Conservation Advice for *Xenus cinereus* (terek sandpiper) (DCCEEW 2024j)	Climate change	6.3
		Chronic and acute pollution	7.5, 7.6

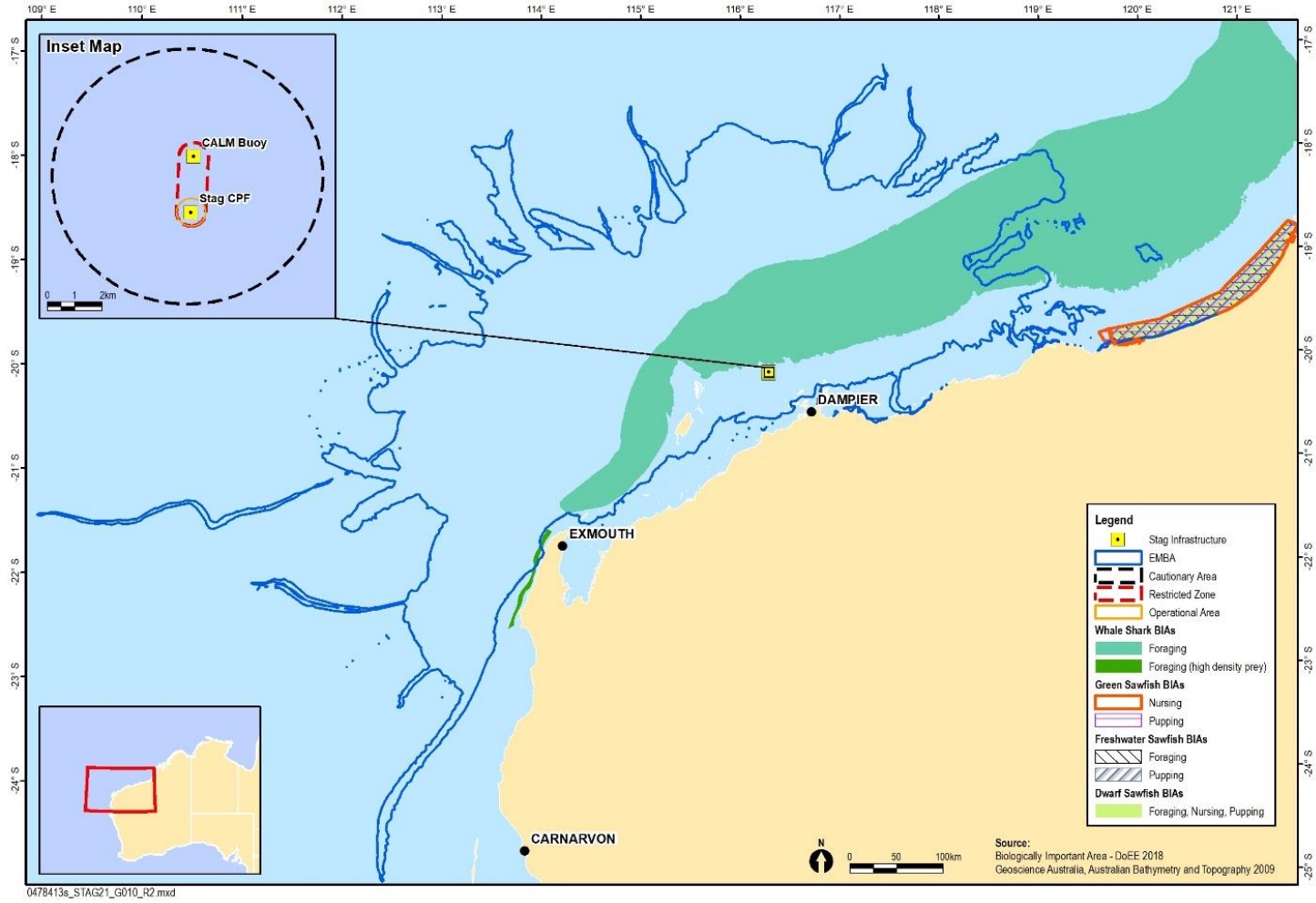


Figure 3-3: BIAs for sharks and fish within the EMBA

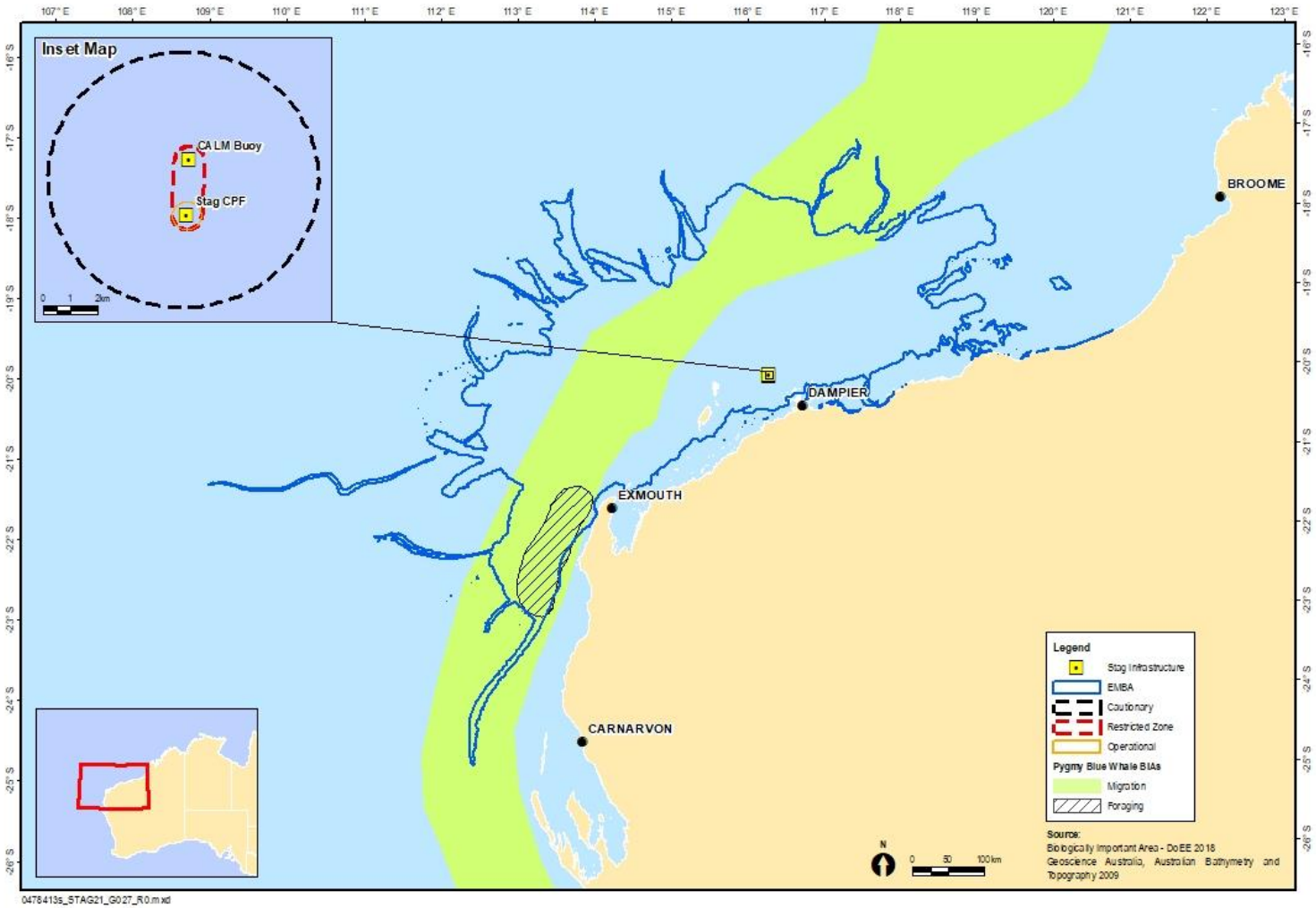


Figure 3-4: BIAs for pygmy blue whale within the EMBA

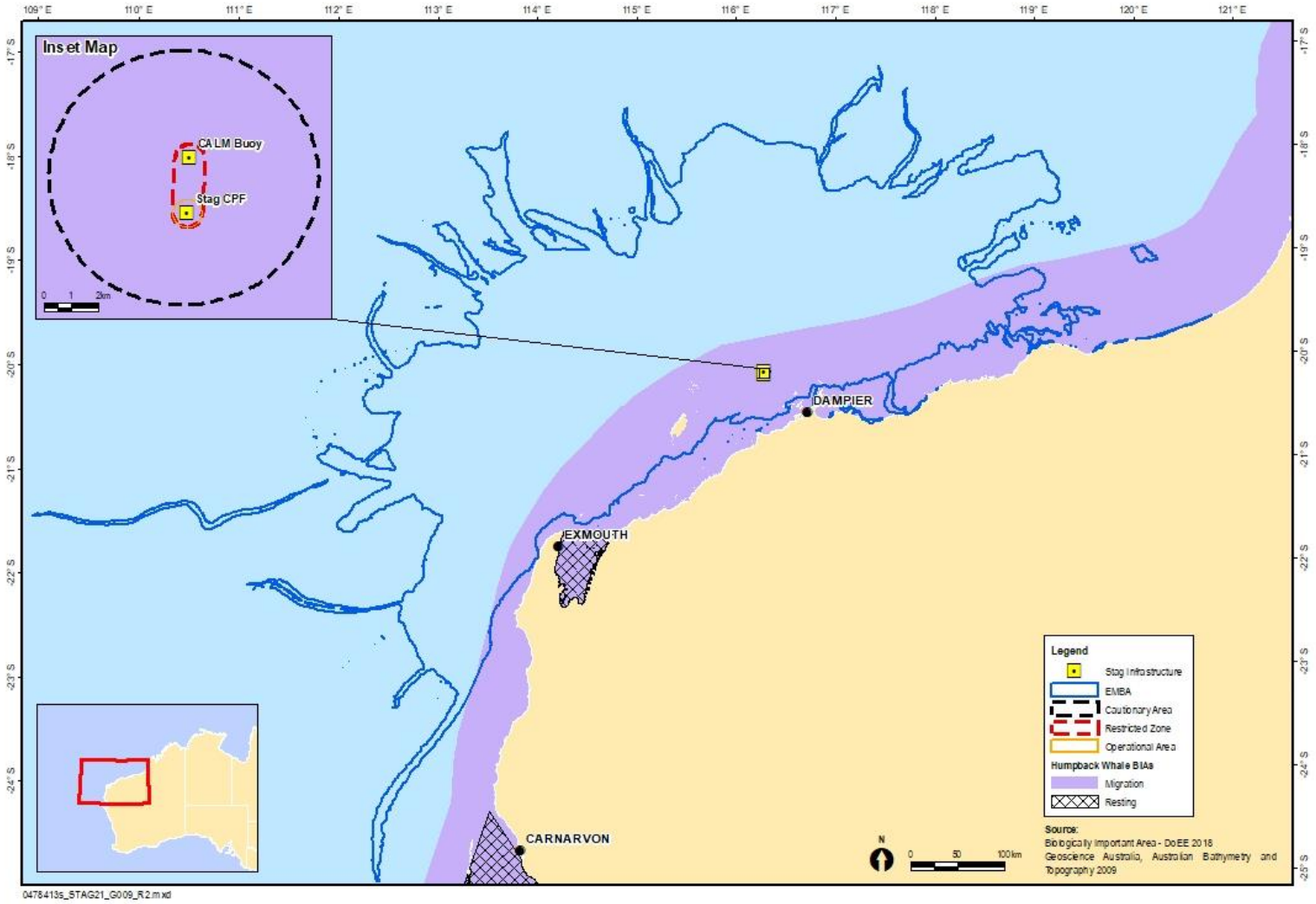


Figure 3-5: BIAs for humpback whale within the EMBA

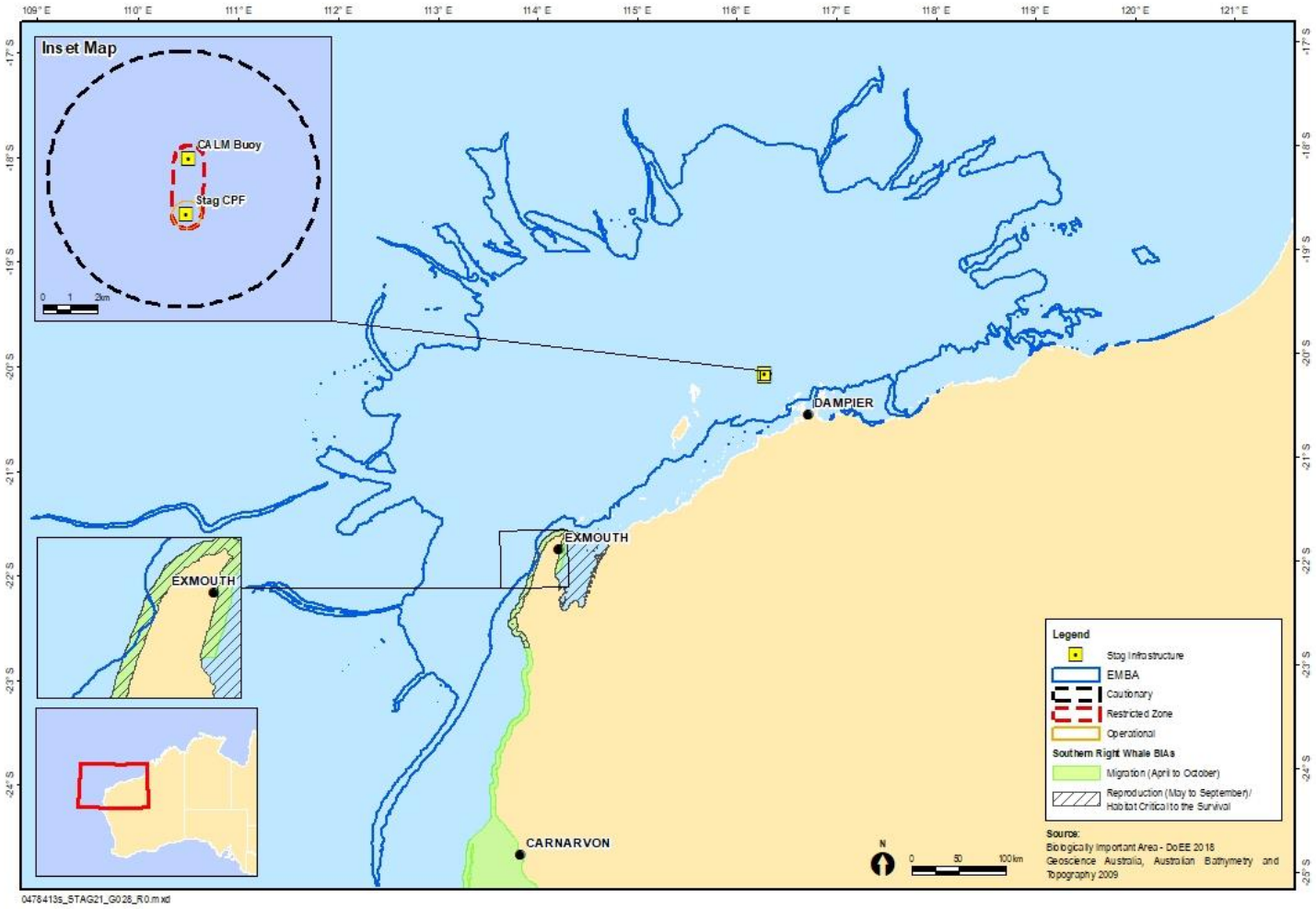


Figure 3-6: BIAs for southern right whale within the EMBA

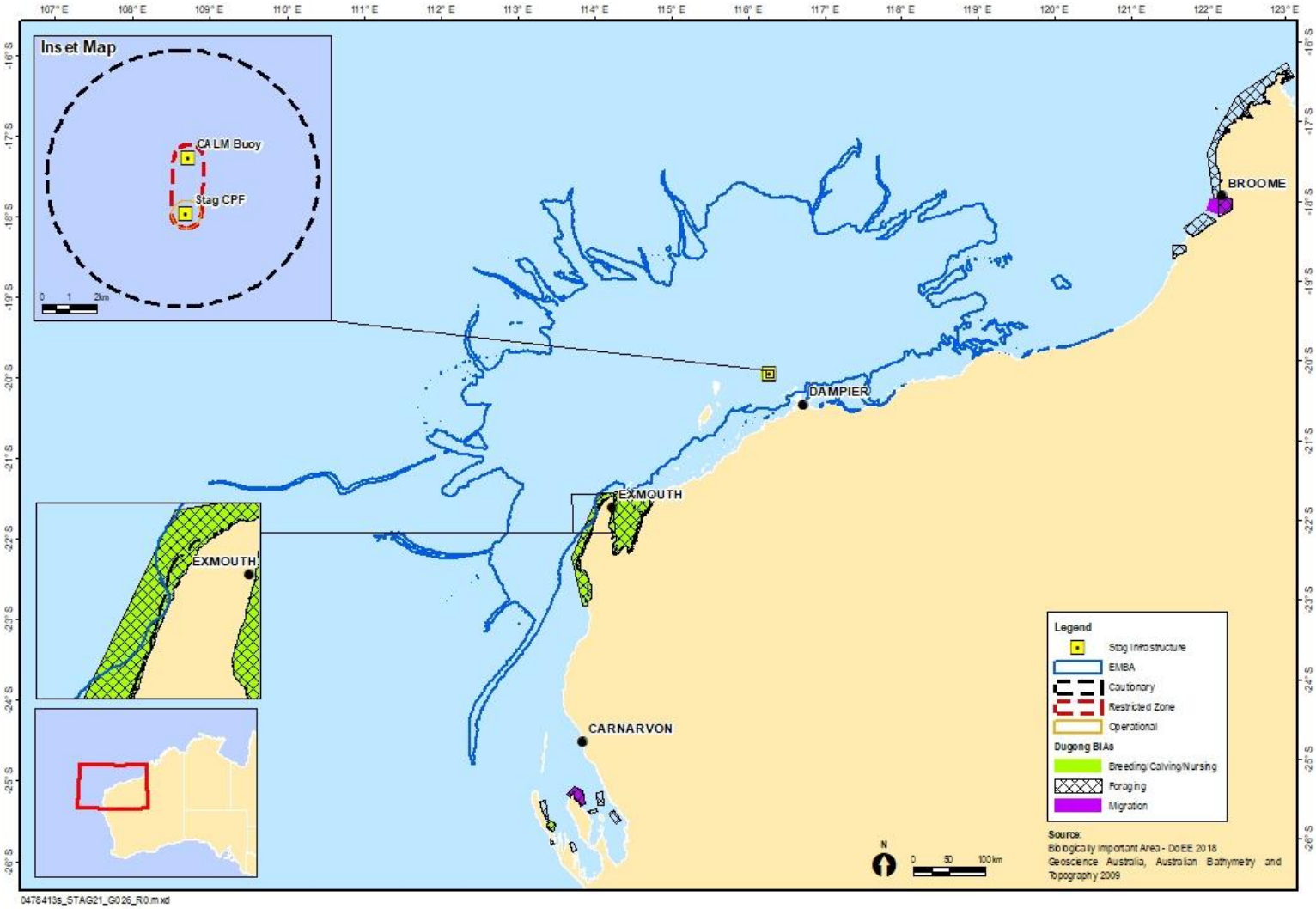


Figure 3-7: BIAs for the dugong

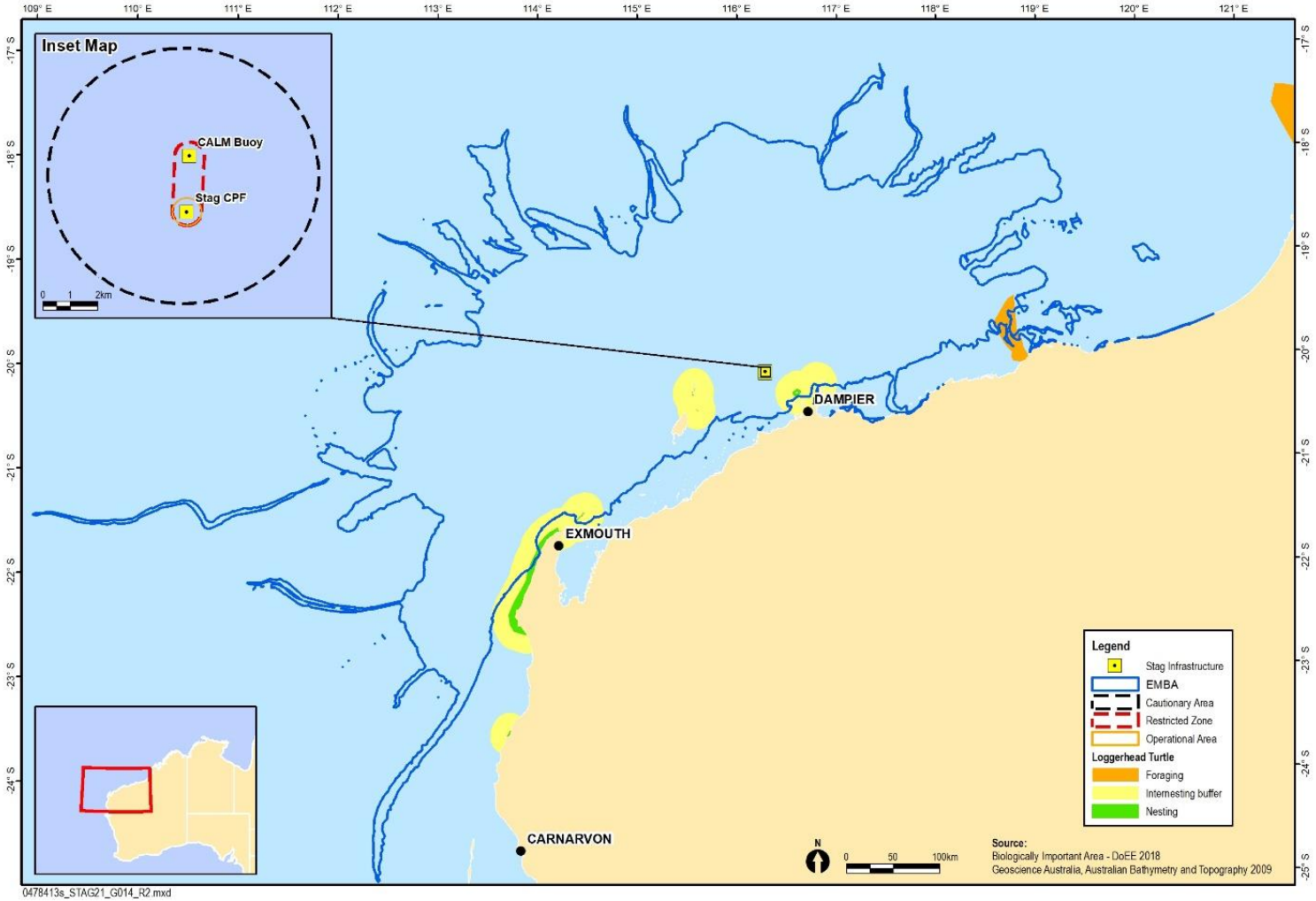


Figure 3-8: BIAs for the loggerhead turtle

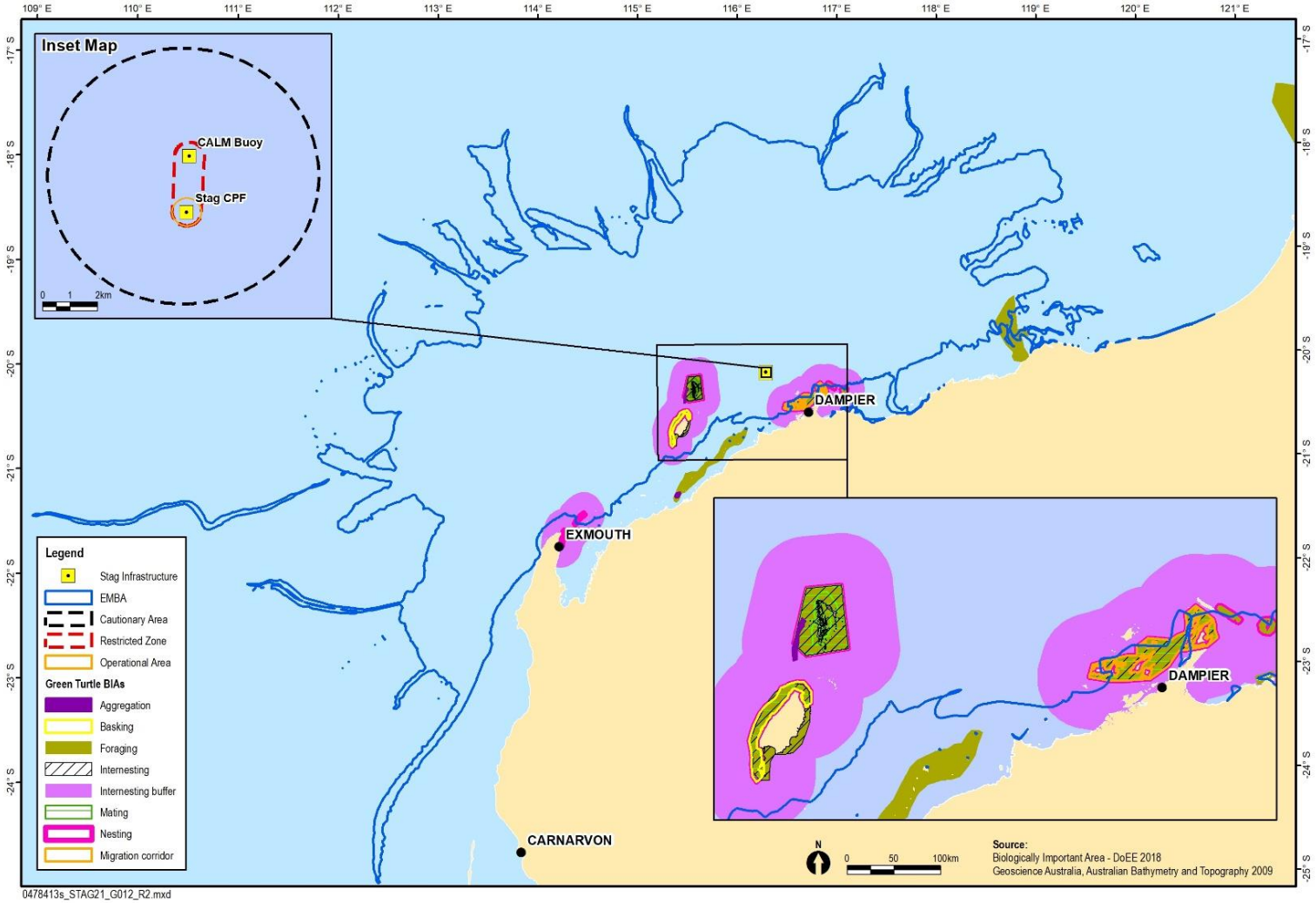


Figure 3-9: BIAs for the green turtle

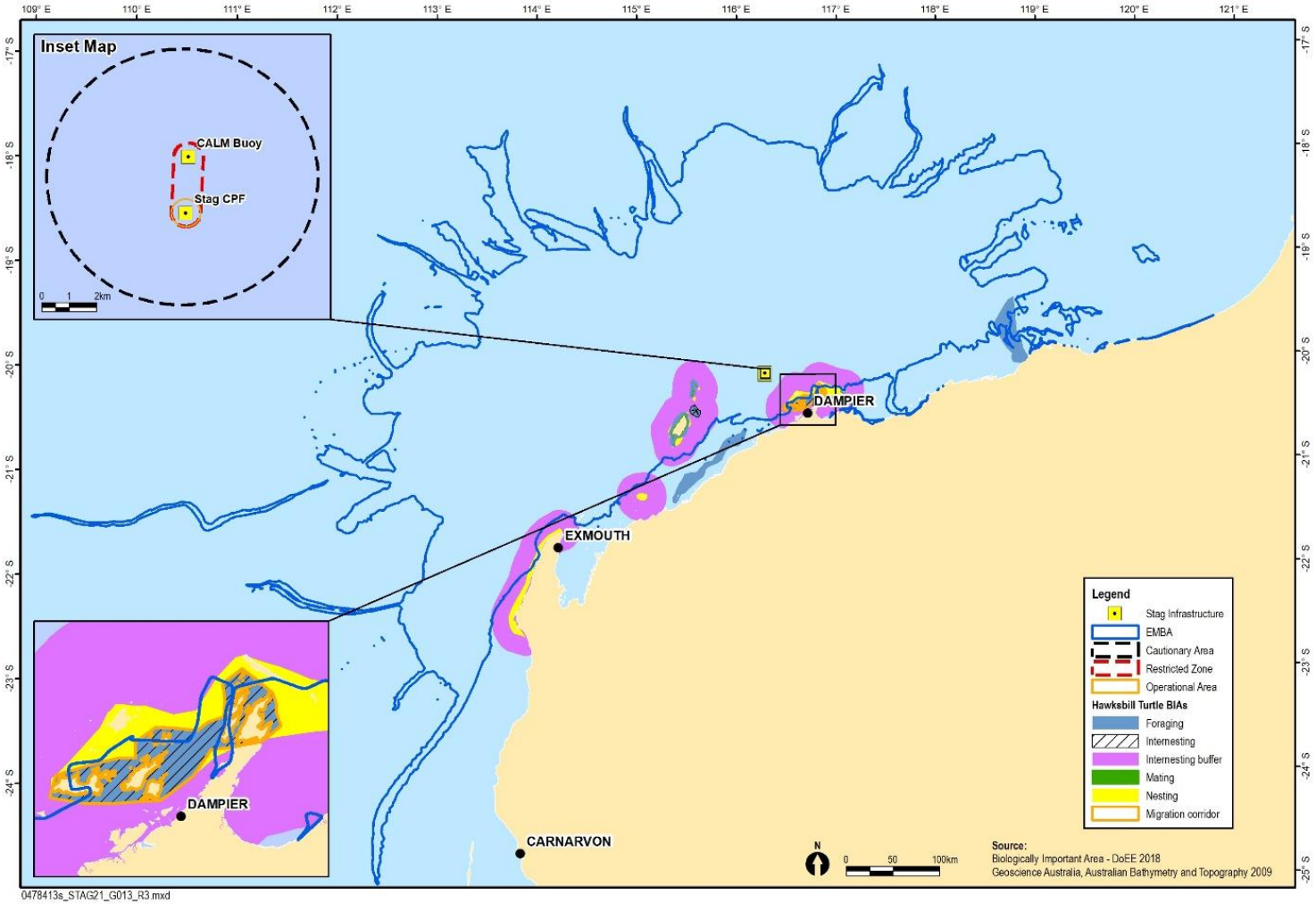


Figure 3-10: BIAs for the hawksbill turtle

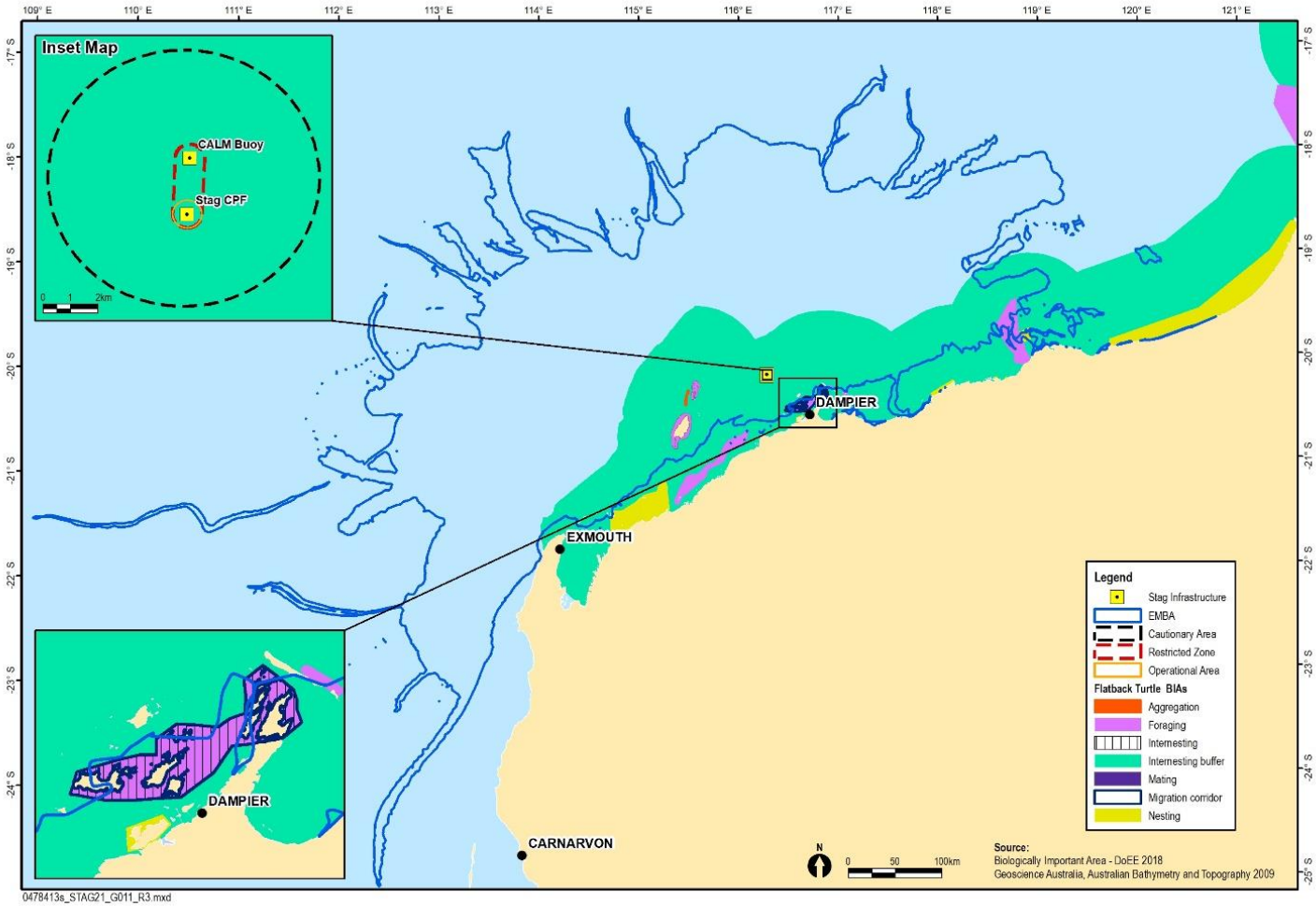


Figure 3-11: BIAs for the flatback turtle

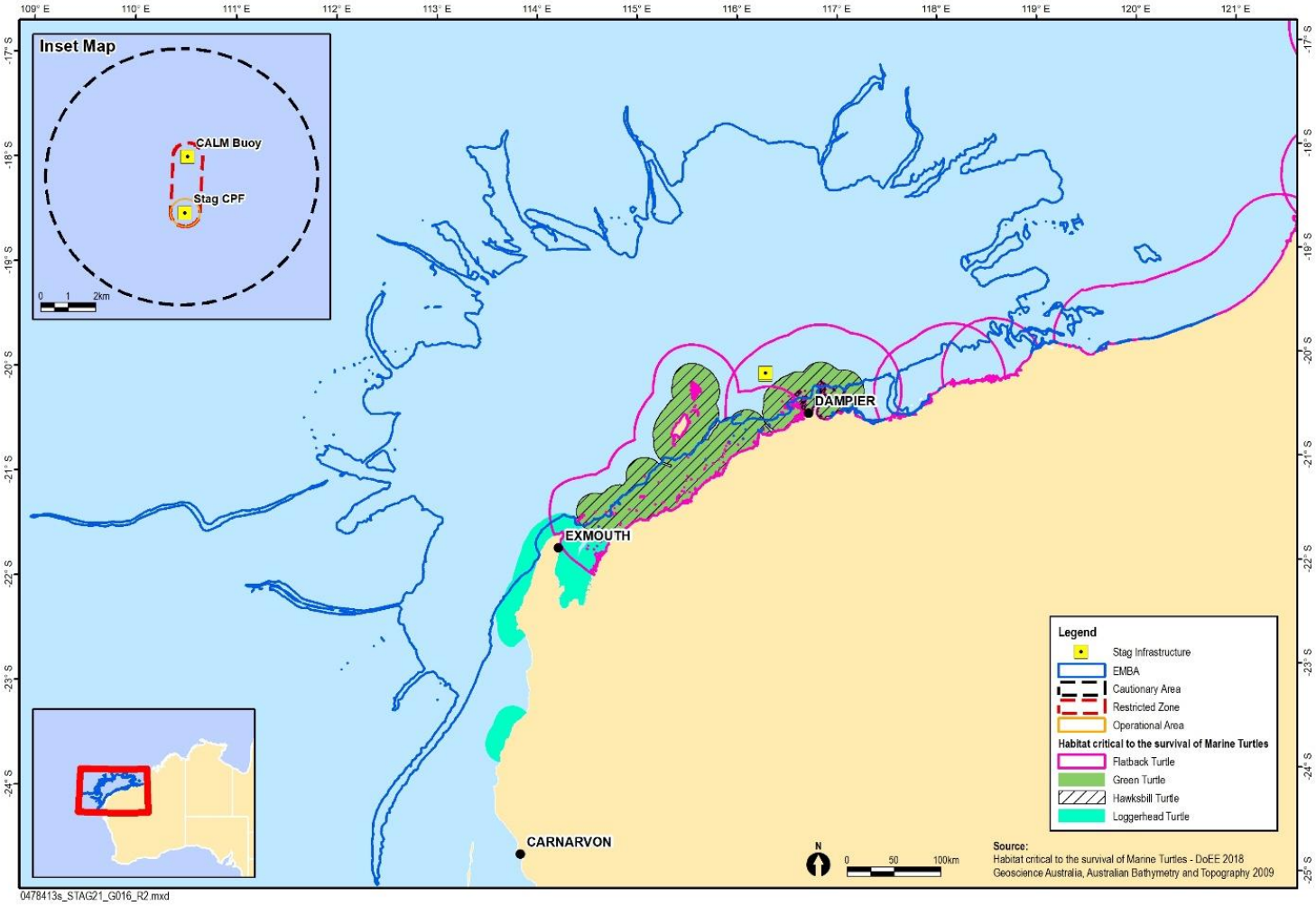


Figure 3-12: Habitat critical to the survival of marine turtles

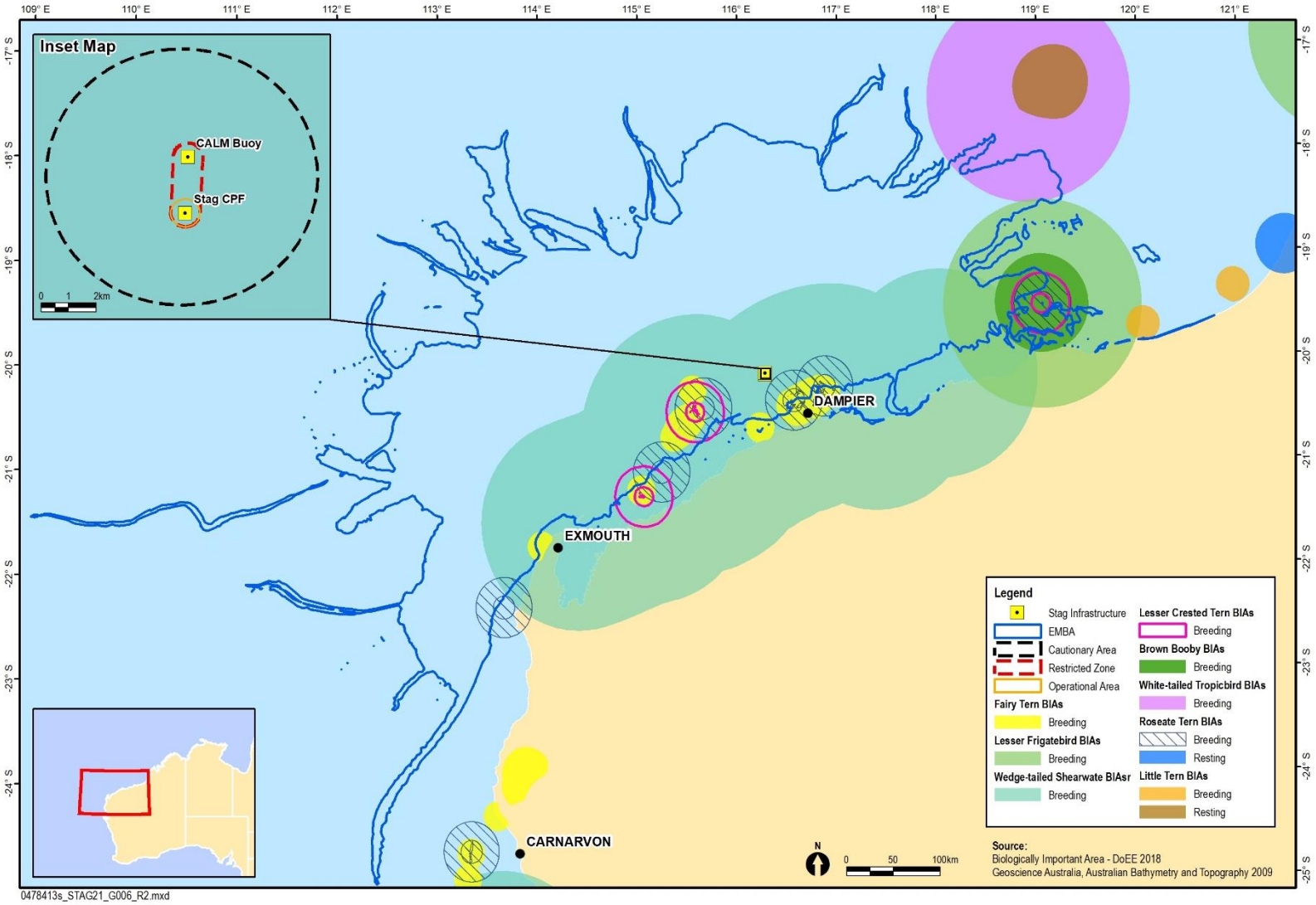


Figure 3-13: BIAs for seabirds within the EMBA

3.3 Protected Areas

A search of the EPBC Act Protected Matters Database in May 2023 listed a number of areas that are considered matters of National Environmental Significance (NES) as well as other matters protected under the Act. Those with marine elements or potentially contacted in the event of a crude spill are outlined in Table 3-5 and discussed in more detail in Appendix C.

Table 3-5: Summary of protected areas (marine) within the EMBA

Area type	Title
World Heritage Area	• The Ningaloo Coast
National Heritage Properties	• The Ningaloo Coast • Dampier Archipelago (including Burrup Peninsula)
Commonwealth Heritage Place	• Ningaloo Marine Area - Commonwealth Waters
Wetland of International Importance (Ramsar)	• Eighty Mile Beach
Wetlands of National Significance	• Eighty Mile Beach System
Australian Marine Parks (AMP)	• Argo-Rowley Terrace AMP • Dampier AMP • Eighty Mile Beach AMP • Gascoyne AMP • Montebello AMP • Ningaloo AMP
Key Ecological Features (KEF)	• Ancient coastline at 125 m depth contour • Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula • Commonwealth Waters adjacent to Ningaloo Reef • Continental Slope Demersal Fish Communities • Exmouth Plateau • Glomar Shoals
Threatened Ecological Communities	None Identified
State Marine Reserves	• Barrow Island Marine Park • Barrow Island Marine Management Area • Eighty Mile Beach Marine Park • Great Sandy Island Nature Reserve • Montebello Islands Marine Park • Montebello Islands Conservation Park • Muiron Island Marine Management Area • Ningaloo Marine Park • Nyangumarta Warrarn Indigenous Protected Area

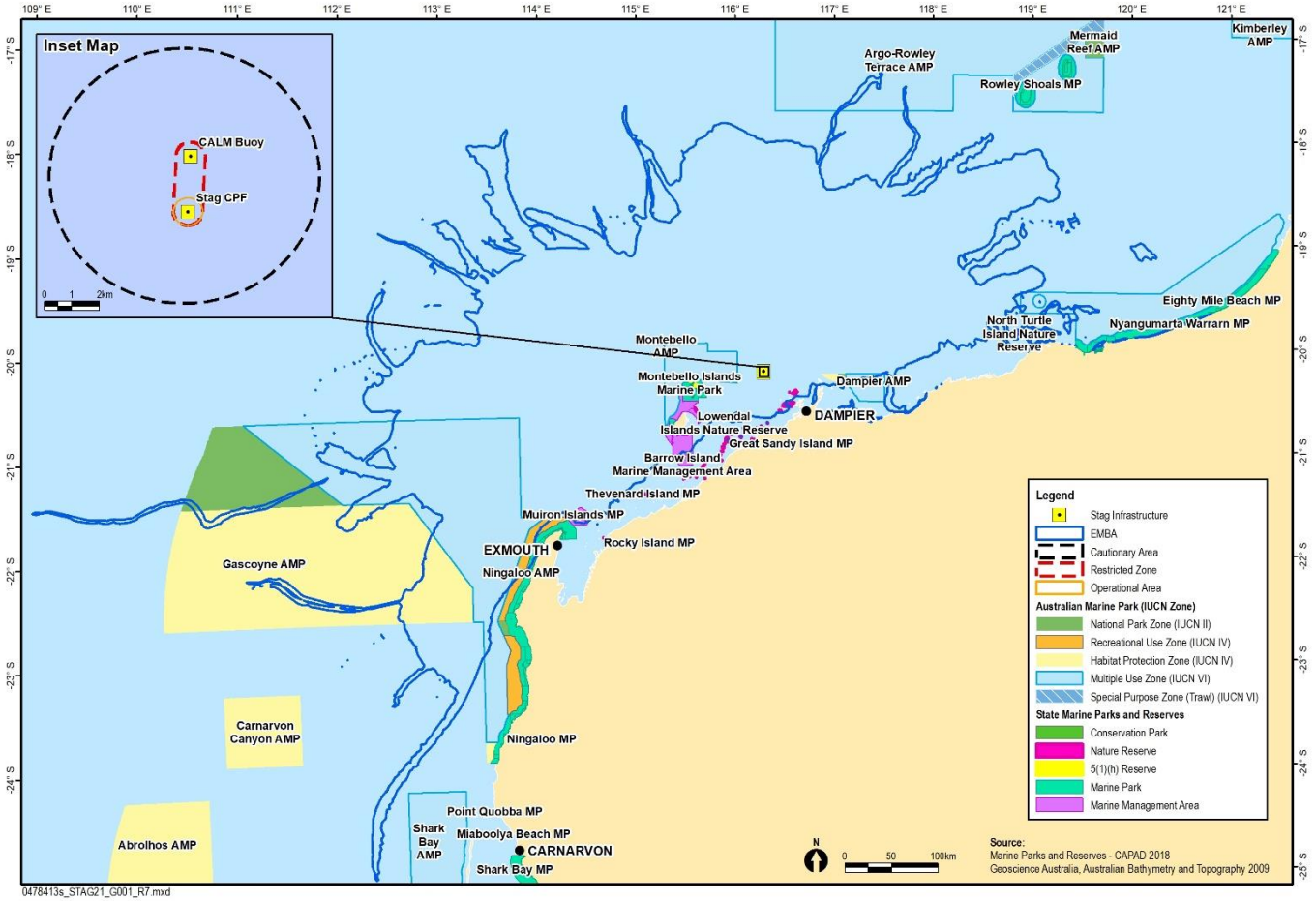


Figure 3-14: State Marine Reserves and Australian Marine Parks

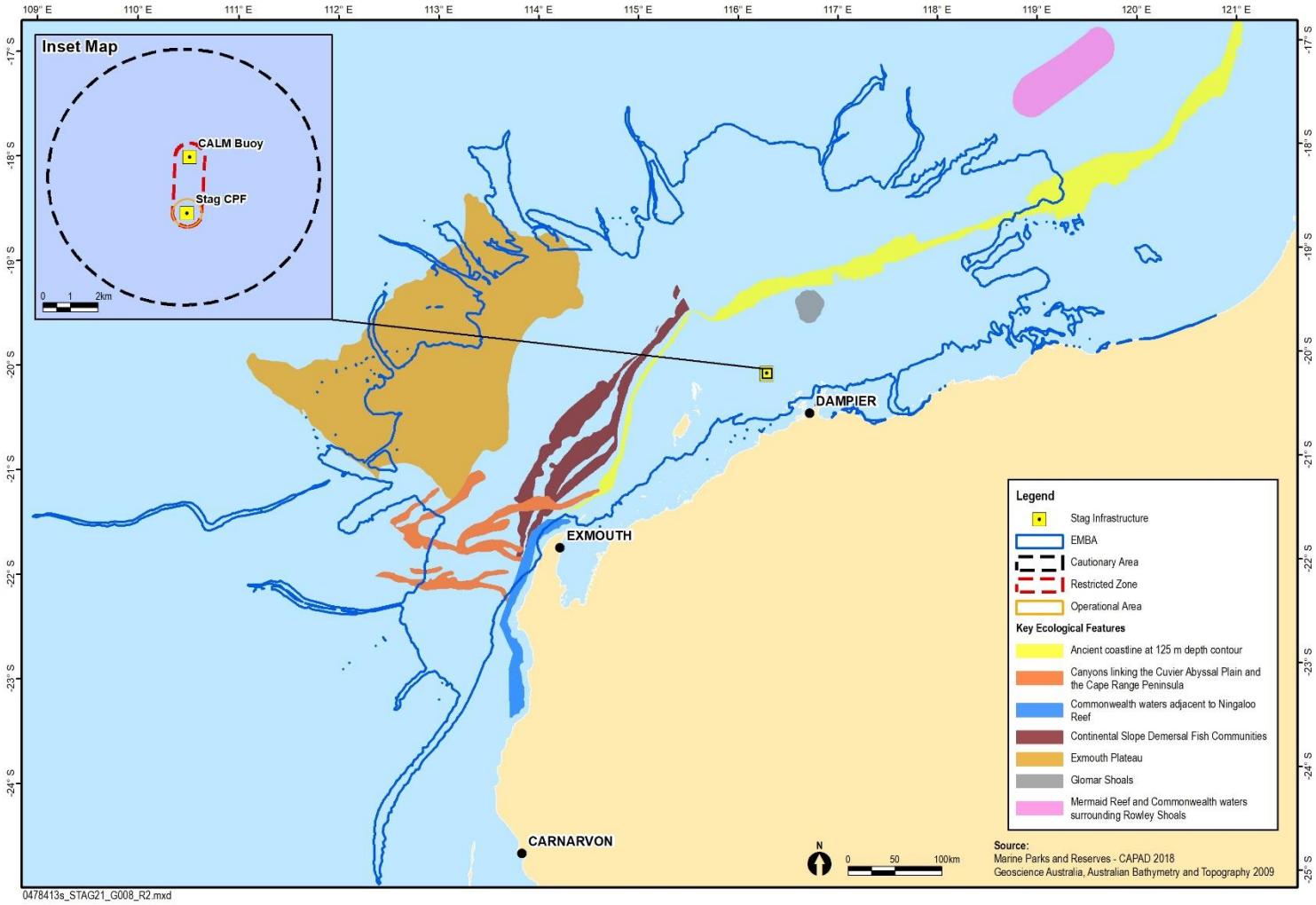


Figure 3-15: Key ecological features

3.4 Socio-Economic Environment

The socioeconomic environmental values and sensitivities (cultural and socio-economic) within the Operational Area, which also include all relevant matters of National Environmental Significance (NES) protected under the EPBC Act, are summarised in Table 3-6. Further details of these and what is located within the EMBA are provided in Appendix C.

Table 3-6 Summary of Socio-economic values and sensitivities

Value/ Sensitivity	Description	Operational Presence
World Heritage	Sites accepted to the World Heritage listing are only inscribed if considered to represent the best examples of the world's cultural and natural heritage. There are no World Heritage properties that intersect with the Operational Area.	None
Commercial Fishing	**The Mackerel Managed Fishery** - Area 2 overlaps Operational Area but interaction unlikely as fishery targets coastal reefs and headlands <40 m and 500 m restricted zone exists around Stag Facility. **Pilbara Demersal Scalefish Fishery (Line, Trap and Trawl)** - Trap fishing zone only overlaps Operational Area but interaction unlikely as fishery targets reef areas (no reef areas exist near Operational Area), and 500 m restricted zone exists around Stag Facility.	Minimal Effort
Recreational fishery	Remoteness of Operational area limits recreational fishing usage.	Limited
Aquaculture	Pearl farming occurs within the EMBA at Montebello Islands.	None within Operational Area
Oil and Gas	The nearest production activities to the Stag Facility include: • Wandoo Production Platforms located in Exploration Permit WA-14-L, ~ 20 km northeast; and • Gas pipelines run from the Reindeer platform (~ 29 km north) to the mainland (north to south). To the east (~ 6 km), another gas pipeline runs east to west, ~ 10 km north of the Stag Facility.	None within Operational Area
Shipping	No designated shipping route within operational area with nearest located ~ 5 km northwest, other vessels may wish to transit the area although shipping traffic excluded from the Operational Area	Limited.
Tourism	No regular tourism activity occurs in the Operational area due to its remoteness.	None within Operational Area
Cultural Heritage	No known sites of shipwrecks or Aboriginal Heritage significance within the Operational area.	None within Operational Area
Defence	The closest defence areas are near Exmouth (~88km) and Broome (~587km).	None within Operational Area

3.4.1 Aboriginal Heritage and First Nations Peoples

Jadestone understands that First Nations peoples have deep connections to, and concerns about the protection of Sea Country, also referred to as Saltwater Country, and is viewed the same way they view their onshore Country, without separation.

Sea Country is an important part of First Nations peoples culture and whilst the many coastal and island First Nations groups around Australia have different languages and their own unique belief systems, ceremonies and relationships with Country, they all regard the estuaries, beaches, bays and marine areas, or Sea Country, as essential parts of their traditional estates.

First Nations groups who reside along the coasts or on islands believe that Sea Country contains the evidence of creation stories, about animals, plants and people, as well as the creation of landscape features such as islands and reefs. Coastal and island communities held cultural responsibilities to ensure Sea Country is cared for and Sea Country was managed very carefully, and they are playing an increasingly important role in the management of their Sea Country, through formalised roles and programs that work alongside various State and Commonwealth government structures.

Values and sensitivities regarding Sea Country may include different features such as:

- Historic and contemporary cultural harvesting of marine fauna and flora
- Sea and landscape features that hold dreamtime and creation stories, such as offshore islands; and
- Different marine and avian species that hold deep connections to lore and represent spiritual emblems.

Further information is provided in Stag Existing Environment in **Appendix B** (including details of DPLH database search for the EMBA). Through ongoing engagement with indigenous groups, Jadestone continues to seek further information on relevant cultural values for this activity.

4. CONSULTATION

4.1 Consultation Background

Jadestone Energy (Jadestone) has a Stakeholder Management Plan (SMP) (JS-70-PR-I-00034) that guides its stakeholder consultation responsibilities and activities for its Australian operations – Montara and Stag.

The SMP has been written to assist in consistently engaging with Relevant Persons across its approvals. This provides a strategic and systemic approach to Relevant Person consultation, aiming to foster an environment where ongoing, open dialogue and two-way communication is undertaken to build positive relationships. This approach is in line with the International Association for Public Participation (IAP2) spectrum.

Stag is an existing facility that has been in operation since 1998. The previous operator had a Consultation Strategy that incorporated providing regular updates of Stag related activities to Relevant Persons. As a result, the identified Relevant Persons have been informed and consulted on a regular basis for some time.

Relevant persons were originally identified and classified according to criteria outlined in a consultation plan based on their interest / activity / function for the operations activity in 2016. A review of the originally identified and classified Relevant Persons was undertaken in June 2020 when the operations activity was planned to change from having a floating storage and offtake vessel in the field, to a third-party tanker. Relevant persons were again identified as part of previous drilling scopes in 2021 and 2022, and as part of this EP revision in 2022 and 2023.

The SMP has been further updated for the purpose of complying with the decision of the Federal Court in *Tipakalippa v National Offshore Petroleum Safety and Environment Management Authority (No 2)* (the Decision), the outcome of the subsequent unsuccessful appeal against the Decision (the Appeal), and the updated NOPSEMA *Guideline Consultation in the course of preparing an environment plan* (N-04750-GL2086 A900179) (the Guideline) published 20 May 2024.

4.2 Consultation Purpose

Consultation is required to ensure compliance with the applicable Regulations and with the Decision, the Appeal and the Guideline. Jadestone has now completed its consultation for this EP, including with recently identified additional Relevant Persons.

Jadestone also undertakes consultation for the purpose of compliance with its internal policies and procedures, and in recognition of its broader corporate responsibilities.

4.3 Applicable regulations

The OPGGS (E) Regulations 2023 stipulate several requirements in relation to consultation associated with an EP (Table 4-1).

Table 4-1: Applicable regulatory requirements

Legislation	Summary	Requirement
OPGGS Act S 280	No interference	A person carrying out activities in an offshore permit area should not interfere with other users of the offshore area to a greater extent than is necessary for the reasonable exercise of the rights and performance of the duties of the first person.

Legislation	Summary	Requirement
OPGGS(E)R 21	Environment description	Description of the environment (2) The environment plan must: (a) describe the existing environment that may be affected by the activity; and (b) include details of the particular relevant values and sensitivities (if any) of that environment. Note: The definition of environment in regulation 5 includes its social, economic and cultural features. (3) Without limiting paragraph (2)(b), particular relevant values and sensitivities may include any of the following: (a) the world heritage values of a declared World Heritage property within the meaning of the EPBC Act; (b) the national heritage values of a National Heritage place within the meaning of that Act; (c) the ecological character of a declared Ramsar wetland within the meaning of that Act; (d) the presence of a listed threatened species or listed threatened ecological community within the meaning of that Act; (e) the presence of a listed migratory species within the meaning of that Act; (f) any values and sensitivities that exist in, or in relation to, part or all of: (i) a Commonwealth marine area within the meaning of that Act; or (ii) Commonwealth land within the meaning of that Act.
OPGGS(E)R 25(1)	Relevant persons	In the course of preparing an environment plan, or a revision of an environment plan, a titleholder must consult each of the following (a Relevant Person): (a) each Department or agency of the Commonwealth to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant; (b) each Department or agency of a State or the Northern Territory to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant; (c) the Department of the responsible State Minister, or the responsible Northern Territory Minister; (d) a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the environment plan, or the revision of the environment plan; (e) any other person or organisation that the titleholder considers relevant.
OPGGS(E)R 25(2)	Sufficient information	For the purpose of the consultation, the titleholder must give each Relevant Person sufficient information to allow the Relevant Person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the Relevant Person.
OPGGS(E)R 25(3)	Reasonable period	The titleholder must allow a Relevant Person a reasonable period for consultation.

Legislation	Summary	Requirement
OPGGS(E)R 25(4)	Sensitive information	The titleholder must tell each Relevant Person the titleholder consults that: (a) the Relevant Person may request that particular information the Relevant Person provides in the consultation not be published; and (b) information subject to such a request is not to be published under this Part.
OPGGS(E)R 26(8)	Sensitive information	All sensitive information (if any) in an environment plan, and the full text of any response by a Relevant Person to consultation under regulation 25 in the course of preparation of the plan, must be contained in the sensitive information part of the plan and not anywhere else in the plan.
OPGGS(E)R 22(9)	Ongoing consultation	The implementation strategy of the environment plan must provide for appropriate consultation with: (a) Relevant authorities of the Commonwealth, a State or Territory; and (b) Other relevant interested persons or organisations.
OPGGS(E)R 24(b)	Consultation report	The environment plan must contain: A report on all consultations between the titleholder and any Relevant Person, for regulation 25, that contains: (i) A summary of each response made by a Relevant Person; (ii) An assessment of the merits of any objections or claim about the adverse impact of each activity to which the environment plan relates; (iii) A statement of the titleholder's response, or proposed response, if any, to each objection or claim; and (iv) A copy of the full text of any response by a Relevant Person.
OPGGS(E)R 34	Measures adopted from consultations are appropriate	For regulation 34, the criteria for acceptance of an environment plan are that the plan: (g) demonstrates that: (i) the titleholder has carried out the consultations required by Section 25; and (ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate.
OPGGS(E)R 52 (1) 52 (7)	Storage of records	• Records must be stored in a way that makes retrieval reasonably practicable during the following periods; • a) when the environment plan is in force for the activity • b) for 5 years beginning on the day that the environment plan ceases to be in force for the activity • Records generated through preparation of the environment plan, demonstrating environmental performance, incidents, emissions and discharges, calibration and maintenance, and in relation to the implementation strategy arrangements must be kept.

4.4 Applicable case law and guidance

The OPGGS(E) Regulations are the legal basis for undertaking offshore operations in the oil and gas industry. These Regulations are administered by NOPSEMA who are responsible for ensuring compliance.

A judicial review of a NOPSEMA decision to accept the Barossa Development Drilling and Completions Environment Plan was undertaken by Justice Bromberg in mid-2022. Justice Bromberg found in favour of the Applicant (Dennis Murphy Tipakalippa), that NOPSEMA could not be reasonably satisfied that all

Relevant Persons were consulted as is required under regulations 10A[5] and Division 2.2A and set aside the accepted EP (*Tipakalippa v National Offshore Petroleum Safety and Environmental Management Authority (No. 2) [2022] FCA 1121*) (the Decision)).

Santos NA Barossa Pty Ltd appealed the Decision made by Justice Bromberg, with a hearing held on 15 and16 November 2022. Justices Kenny, Mortimer and Lee JJ appeal decision, in favour of the Applicant, was given on 2 December 2022, confirming the Santos EP should be set aside *(Santos NA Barossa Pty Ltd v Tipakalippa [2022] FCAFC 193* (the Appeal)). The appeal decision represents the law regarding requirements for consultation in accordance with Environmental Regulations.

Based on these findings NOPSEMA developed a Guideline (*Consultation in the course of preparing an environment plan Doc No N-04750-GL2086 A900179)* (the Guideline) to assist Titleholders to comply with their obligations to consult Relevant Persons.

That guidance being:

- The representative bodies (Land Councils and Prescribed Body Corporates (PBCs) remain Relevant Persons.
- Traditional Owners are also Relevant Persons, i.e. they need to be actively consulted, and therefore through that process need to be given every encouragement to respond, formally through their representative spokesperson/s, i.e. the Clan leaders, generally identified as Elders, and the Directors of Prescribed Body Corporates (PBCs).
- The residents of the Indigenous lands are to be consulted, although those residents are not required to be individually identified and consulted directly. Rather providing reasonable means for those residents to become aware of a project, and its associated potential impacts and remedies, with a reasonable means to respond to the titleholder and a reasonable time to respond, is considered to be sufficient.

Consequently, Jadestone has sought to:

- Identify each relevant Traditional Owners and their Elders, and the Directors of PBCs that can be regarded as their representative spokesperson/s.
- Ensure every reasonable effort is made to provide the project information in a way that is clear and able to be understood by Traditional Owners, and that Traditional Owners (through their representative spokesperson/s) provide a response to Jadestone, even if considered 'no response'.
- Decide on the reasonable means by which residents are to become aware of a project, similarly in a way that is clear and able to be understood by residents, and their response opportunities.

Jadestone has taken particular care in gaining an understanding of the construct of Traditional Owners and their representatives. That is, Native Title holders associated with a PBC (generally an Aboriginal Corporation) as a result of a Native Title Determination.

Jadestone notes also that the Decision and the Appeal has implications also for consultation with the fishing industry, i.e. how individual fishery licence holders are to be regarded.

The Decision and subsequent appeal outcome must be applied as law and has been thoroughly considered and applied in the development of this EP, including but not limited to the following (extracts from the Decision, emphasis added):

> *138 For the exercise of identifying the universe of Relevant Persons falling within the description in reg 11A(1)(d), the titleholder will have to be faithful to that description. <u>The titleholder will need to properly understand its proposed activity and at least broadly understand the extent of the physical environment that may be affected, the values and sensitivities in that physical</u>*

[5] The OPGGS(E) Regulations that are referred to in this section are written as is in the *Santos NA Barossa Pty Ltd v Tipakalippa 2022 decision* and 2023 NOPSEMA guideline. These refer to the 2009 OPGGS(E) regulations and these do not correlate to appropriate regulation numbers in the new 2023 OPGGS(E) Regulations.

environment and thus the functions, interests or activities of each person or each category of persons that may intersect with that physical environment.

139 *The exercise of identifying the universe of Relevant Persons within the description in reg 11A(1)(d) is capable of being described person by person, category by category, or alternatively, by the titleholder describing the methodology utilised in terms which, as stated above, demonstrate an understanding of the considerations that have to be and which were taken into account in order for the exercise to be faithfully consistent with the description of Relevant Person in reg 11A(1)(d) (a methodological demonstration). A critical aspect of such a demonstration would be the identification of the totality of the sensitivities and values considered relevant and how each was evaluated to discover their possible intersection with the functions, interests and activities of particular people or organisations.*

140 *If that were done in an environment plan, NOPSEMA could then properly arrive at the foundational conclusion for the remainder of its tasks in relation to the consultation criteria, that the environment plan demonstrates that the universe of Relevant Persons was identified by the titleholder consistently with the description of a Relevant Person provided by reg 11A(1).*

4.5 Relevant Persons Identification Methodology

4.5.1 Relevant Persons Methodology Workflow

To ensure that all Relevant Persons for Stag are identified (self-identifying Relevant Persons excepted) Jadestone has now carried out, with regard to the Regulations and the applicable case law summarised in Section 4.4, a methodological approach to identification (Figure 4-1). This builds on the historical consultation already undertaken.

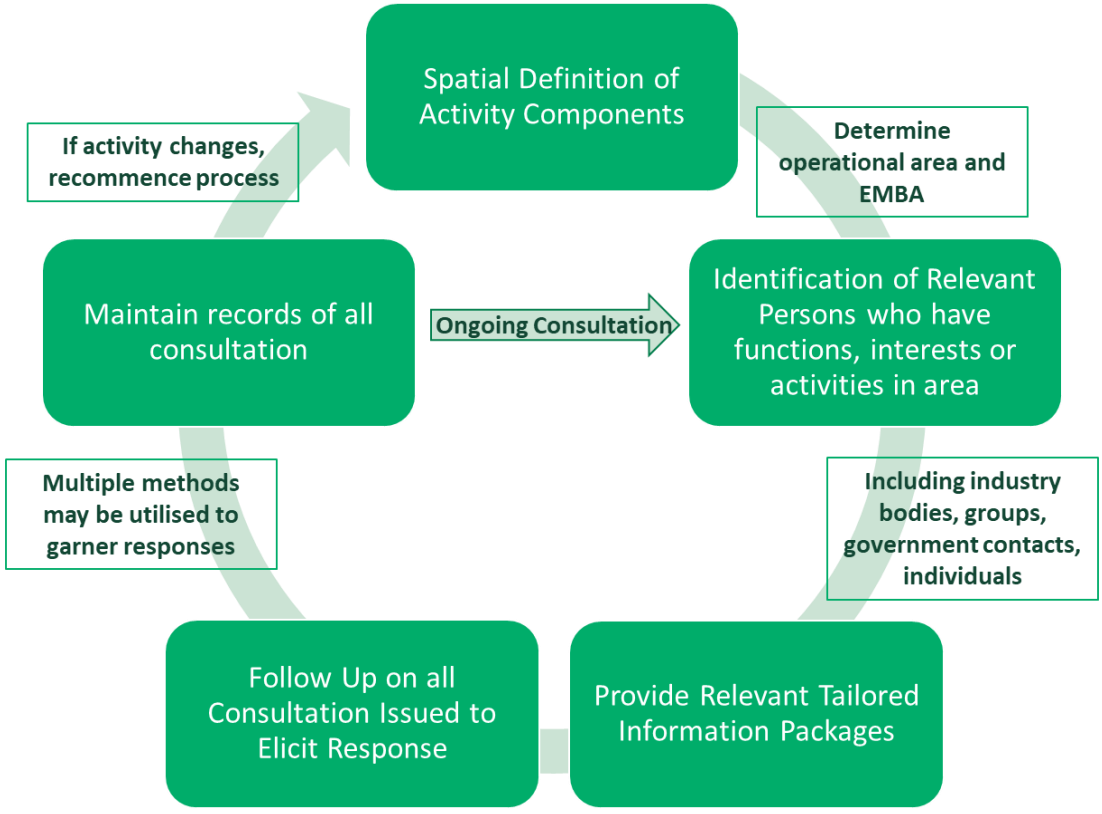


Figure 4-1: Relevant person identification and consultation process

4.5.2 Approach to identifying organisations and people

Organisations and people within each Relevant Person category of the OPGGS(E)R were identified using the following steps and resources:

- Jadestone's stakeholder database for Stag contains a list of organisations and people identified since 1998. Following the methodology applied to identify Relevant Person categories the database was reviewed for the purpose of identifying Relevant Persons who had been contacted previously.
- Jadestone has also contracted consultants with experience in stakeholder consultation in the Australian petroleum industry, including the identification of Relevant Persons, consultation and negotiation with Indigenous peoples in those coastal areas of Western Australia adjacent to the Stag EMBA to prepare a complete list of Relevant Persons.
- Figures developed for the EMBA showing overlap with fisheries, coastlines, protected areas and other areas of interest.

A Review of stakeholders contacted previously included;

- All Relevant Persons previously contacted through various campaigns undertaken at Stag (for historic drilling and operations EPs).
- Any Relevant Persons who had identified themselves through previous notifications.
- Any Relevant Persons who self-identified in historic consultation or were identified by other stakeholders previously consulted

As a result of the above, and as a consequence of the Decision, the Appeal and the Guideline, Jadestone identified gaps in Relevant Persons that had not been consulted on the Stag project previously, being a number of individual commercial fishery licence holders in both Commonwealth and Western Australian fisheries that intersect with the EMBA, the Traditional Owners with coastline, near shore and sea country interests within or immediately adjacent to the EMBA, and cruise, charter and dive operators operating in waters off of the Mid-West and Pilbara coast of Western Australia. New consultation packages were prepared to reflect the new legislative requirements to issue to all Relevant Persons identified for the activity.

Relevant Persons within the EMBA were identified by understanding if they had functions, activities or interests that overlapped the EMBA. The exception to this were eNGOs, there are further described in Section 4.5.7.

4.5.3 Initial approach to identifying Commercial Fishers

Jadestone has access to lists of all the individual commercial fishery licence holders in the Commonwealth and Western Australian fisheries that intersect with the EMBA and for the purpose of consultation has undertaken the approach described below:

- Once the EMBA had been defined, the fisheries that overlap were identified as shown in Appendix C.
- Jadestone contacted the Commonwealth Government's AFMA and the Western Australia's DPIRD seeking the names and addresses (noting that telephone numbers or email addresses are not provided through this process) of the commercial fisheries licence holders within the EMBA. That process was also supported by researching the individual fisheries. Such research identified that significant areas of each fishery zone were not fished. That research was able to identify those fisheries where no fishing activity occurred within or adjacent to the EMBA.
- Initially, all licence holders in the relevant Commonwealth and Western Australian commercial fisheries were consulted. The number of individual licence holders was significant, with the designated areas of many of the fisheries being over large areas of the Australian coast.

- Further analysis of the postal addresses of the individual licence holders suggests that many of those licence holders do not fish at any time within or adjacent to the EMBA; and Jadestone's initial consultation included a request that those individual licence holders that do fish within the EMBA indicate that in return correspondence

4.5.3.1 Changed approach to identifying Western Australian Commercial Fishers

In February 2023, the Western Australian Fishing Industry Council (WAFIC) posted on its website some advice to offshore petroleum titleholders that consultation with Western Australian commercial fishery licence holders is necessary only in the event of a significant unplanned event. In July 2023, NOPSEMA confirmed to Jadestone (through formal correspondence on the Stag Operations EP submission) that the advice from WAFIC was, if followed by offshore petroleum titleholders, and because all WA commercial fishery licence holders are mandated members of and are represented by WAFIC, sufficient to demonstrate consultation with WA commercial fishery licence holders.

The advice on the WAFIC website states:

The Western Australian Fishing Industry Council (WAFIC) is the peak industry body representing commercial fishing, pearling and aquaculture enterprises, processors and exporters in Western Australia.

WAFIC works to secure a responsible and sustainable industry that is confident of resource sustainability and security of access to a fair share of the resource; cost-effective fisheries management so that businesses can be operated in a safe, environmentally responsible and profitable way; and ensures investment in industry research and development is valued and promoted.

In response to the appeal decision made by the Federal Court of Australia Santos NA Barossa Pty Ltd v Tipakalippa [2022] FCAFC 193 (appeal decision) on 2 December 2022, WAFIC would like to communicate the preferred approach in undertaking consultation with commercial fishing licence holders that will only be affected by a significant unplanned event (emergency scenario).

To manage consultation fatigue with the commercial fishing licence holders, WAFIC requests titleholders develop separate consultation strategies for significant unplanned events (for example oil spill) where titleholders can demonstrate the likelihood of such events occurring is extremely low.

Consultation on unplanned events resulting in an emergency scenario should only be undertaken if an incident occurs.

Based on the advice from WAFIC in 2023 and confirmed by NOPSEMA, Jadestone did not intend to, except for a significant unplanned event (emergency scenario), consult with WA commercial fishery licence holders within or adjacent to the Stag EMBA.

However, on 2 April 2024 WAFIC advised Jadestone, in relation to another EP (Montara Skua-11 Drilling EP), that *WAFIC still considers it relevant to consult with commercial licence holders impacted by the operational area of a proposed oil and gas activity.*

Jadestone has completed its consultation with WA commercial fishery licence holders for the Stag EP (refer to Section 4.5.3), however, based on the 2 April 2024 WAFIC advice, should there be a need to consult further with WA commercial fishery licence holders for this activity, Jadestone will consult with those commercial fishery licence holders whose fishery zones overlap the Stag operational area.

4.5.4 Fishing Effort with the EMBA

Consideration was given to records of recent and current fishing effort in a number of fisheries, and advice was sought from the Australian Southern Bluefin Tuna Industry Association (ASBTIA) about the level of fishing effort for Australian Southern Bluefin Tuna within or adjacent to the EMBA.

Research into catch and effort data for the Western Tuna and Billfish Fishery and the Western Skipjack Tuna Fishery confirmed that fishing effort has occurred in the EMBA in recent years and as such the commercial licence holders for those fisheries were included in a follow up mail out.

As a consequence of the advice from ASBTIA, in addition to the removal of the Western Australian commercial fishery licence holders as Relevant Persons, the commercial fishery licence holders in the Commonwealth's Australian Southern Bluefin Tuna fishery have also been removed as Relevant Persons.

Tuna Australia have requested Jadestone consult with them instead of individual commercial tuna fishery licence holders. However, as a result of the Decision, consultation with Relevant Persons by consulting just with the representative bodies of those Relevant Persons was no longer deemed to be adequate consultation with those Relevant Persons.

It is for that reason that Jadestone has elected to, as necessary, continue to consult directly with the commercial fishery licence holders.

Jadestone continues to regard organisations such as Tuna Australia as Relevant Persons in their own right, but do not regard consultation with those organisations as a legal means of also consulting with the individual commercial fishery licence holders as Relevant Persons; particularly as it appears not all commercial fishery licence holders are members of those organisations.

In consideration of the above Jadestone has continued its practice of, as necessary, consulting with individual commercial fishery licence holders, and in addition the peak (representative) bodies of those licence holders, as Relevant Persons in their own right.

4.5.5 Approach to identifying Traditional Owners

The Decision, the Appeal and the Guideline has led to a significant change to the approach now required for identifying and consulting with Traditional Owners. The past wide-spread practice of consulting only with the Land Councils and not the Traditional Owners represented by PBCs, is no longer appropriate. If Traditional Owners are identified as Relevant Persons, consultation is required to be with the PBCs, and wherever possible face-to-face on country.

Given the Sea Country values and sensitivities (refer Section 3.4.1) Jadestone acknowledges that Traditional Owners will be Relevant Persons in relation to the proposed activities set out in this EP.

Nevertheless, legislative requirements mean working through Land Councils is the appropriate means by which the consultation with Traditional Owners is to be facilitated and aligns with cultural protocols.

Therefore, Jadestone has engaged with the Yamatji Marlpa Aboriginal Corporation (YMAC), to obtain:

- details of the PBCs representing the Traditional Owners with coastline, near shore and sea country within the EMBA.
- advice on the most appropriate and effective means of consulting directly with those PBCs.

Additionally, Jadestone has requested the assistance of YMAC to consult with those PBCs. YMAC will also continue to be identified as a Relevant Person.

Jadestone has contacted all the PBCs along the coastline adjacent to the Stag EMBA and to date has consulted face-to-face with nine of the eleven PBCs advised by YMAC as having functions, interests or activities within or adjacent to the Stag EMBA. Jadestone has offered to present to the remaining two PBCs multiple times. While Jadestone consider consultation to be complete, based on sufficient information provided and a reasonable period to respond provided, Jadestone, if requested, remain available for presentations to those two PBCs in the future, if requested.

In light of the lack of details on cultural values, Jadestone has also provided information sourced from public databases to the PBC's to help in their assessment of the proposed activities on potential values within their area of interest with tailored information provided specific to each PBC. Table 4-2 provides a summary as of October 2024, showing consultation with PBCs is complete. The cultural heritage information provided by PBCs through consultation as well as research Jadestone has conducted into areas of cultural significance for each PBC is detailed in Section 7.8.2 of Appendix C of the EP.

Table 4-2: Summary of PBC Engagement (January 2025)

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
Buurabalayji Thalanyji Aboriginal Corporation	Email has not bounced back. Email received 03.05.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 03.05.23. Follow up emails: 03.05.23 (x2) 09.05.23 16.05.23 17.05.23 (x2) 10.07.23 19.07.23 02.08.23 09.08.23 23.08.23 28.09.23 04.10.24 23.10.23 24.10.24 24.11.23 29.11.24 03.12.23 08.01.24 10.01.24 12.01.24 05.02.24 (x2) 06.02.24 09.02.24 13.02.24 07.03.24 21.03.24 26.03.24 08.04.24 30.05.24 10.07.24. PBC contact detail confirmation completed 25.11.24	Yes. Meeting with EMT held on 05.02.24 in South Perth.	Presentation meeting notes sent to BTAC on 07.03.24. BTAC requested JSE to fund review of EP by independent third party. JSE provided to BTAC (JSE-BTAC Stag EP Location Impact Analysis) on 30 May 2024, to enable BTAC and the Thalanyji people to assess the potential for Stag Field Operations to impact on their functions, interests and activities, pertaining to specific islands and coastal areas identified by the Corporation. Further details are provided in Table 4-10.	The Ashburton River is central to Thalanyji culture. Many detailed dreaming stories describe the creation of the river and imbue it with sacred significance. JSE have identified that the Stag EMBA does not overlap with any heritage sites within the Burrabalayji Thalanyji Aboriginal Corporation's Registered Native Title Area. Thalanyji values, interests and activities – and those of BTAC – extend beyond cultural heritage however and include, for example, fishing and collection of traditional foods and other materials and use of islands within the EMBA including Montebello Islands, Barrow Island, Weld Island, Karratha, North and South Islands, Mary Anne Group and islands within 150km of the Ashburton River.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 3.12.23 & 10.01.24 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend. Meeting held with PBC on 05.02.2024.	First contact 20.04.23. Follow ups >30. Deadline for response 15.01.24. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meeting with BTAC. BTAC has requested analysis of the EP for specific areas (islands and coastal areas) which JSE has provided. JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Thalanyji people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. • If there have been any changes to boundary of native title area adjacent BTAC and Wirrawandi Aboriginal Corporation. If unavailable reach out to YMAC and relevant land council to confirm contact.
Kariyarra Aboriginal Corporation	Email has not bounced back. Email received 23.06.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 23.06.23. Follow up emails: 03.05.23 08.06.23 21.06.23 03.07.23	Yes. Meeting held on 28.07.23 in Port Hedland.	Presentation meeting notes sent to KAC on 01.09.23. PBC to write to JSE to convey the outcome of the Corporation's private discussions that occurred during the meeting.	Whelk shells and stone shards were used to create engravings in limestone ridges, often depicting hunting methods for dugongs, turtles and fish.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors.	First contact 20.04.23. Follow ups >20. Deadline for response 15.01.24. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meetings with KAC. JSE has undertaken research to inform themselves of any areas of significance.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Kariyarra people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
		14.07.23 19.07.23 28.07.23 07.08.23 28.08.23 01.09.23 23.10.23 (x2) 24.11.23 10.01.24 (x2) 31.01.24 02.02.24 13.02.23 15.02.24 14.03.24. PBC contact detail confirmation completed – 02.12.24.		PBC to provide names of the Directors and Elders that attended. JSE and KAC currently negotiating consultation protocol agreement. JSE awaiting KAC response to current draft.	JSE have identified that the Stag EMBA overlaps one heritage site within the Kariyarra Aboriginal Corporation's Registered Native Title Area.	habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	Meeting held with PBC on 28.07.2023. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 10.01.24 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend.		Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
Malgana Aboriginal Corporation	Email has not bounced back. Email received 21.06.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 21.06.23. Follow up emails: 03.05.23 16.05.23 23.05.23 21.06.23 19.07.23 28.08.23 17.10.23 23.10.23 14.11.23 24.11.23 03.12.23 08.01.24 31.01.24 (x2) 13.02.24. Call placed on 15.11.23. Emails sent to confirm PBC contact details: 25.11.24 06.12.24 17.12.24. Contact details confirmed via phone: 23.12.24 Emails sent to offer presentation opportunity to newly elected chairperson: 05.01.25 23.01.25 PBC confirmed they will discuss with board to arrange Jadestone presentation if required: 23.01.25	No	N/A	The RNTBC area encompasses Shark Bay and extends to cover Dirk Hartog Island. JSE have identified that the Stag EMBA does not overlap with any heritage sites within the Malgana Aboriginal Corporation's Registered Native Title Area.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 03.12.23 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend.	First contact 20.04.23. Follow ups >10. Deadline for response 15.01.24. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested. JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Malgana people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. Remain available for presentation to PBC if requested. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
Nanda Aboriginal Corporation	Email has not bounced back. Email received 23.05.23 confirming information has been received.	Responded to 03.05.23 initial introductory email on 23.05.23. Follow up emails: 16.05.23 23.05.23 (x2) 08.06.23 21.06.23 20.07.23 (x2) 09.08.23 10.08.23 (x2) 27.09.23 18.10.23 23.10.23 02.11.23 15.11.23 21.11.23 22.11.23 24.11.23 03.12.23 13.02.24. PBC contact detail confirmation completed – 29.11.24.	Yes. Meeting held on 13.09.23 (JSE participated via Teams).	Presentation sent on 27.09.23. Presentation meeting notes sent to PBC on 22.11.23. PBC to write to JSE to convey the outcome of the Directors private discussions.	The Nanda People are the traditional owners of the coastal land from southern Shark Bay down to Kalbarri. JSE have identified that the Stag EMBA does not overlap with any heritage sites within the Nanda Aboriginal Corporation's Registered Native Title Area.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	03.05.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. Meeting held with PBC on 13.09.23. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 03.12.23 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend.	First contact 03.05.23. Follow ups >20. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meeting with PBC – none have been identified by PBC. JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Nanda people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP submission, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
Nganhurra Thanardi Garrbu Aboriginal Corporation	Email has not bounced back. Email received 21.04.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 21.04.23. Follow up emails: 03.05.23 21.06.23 07.07.23 19.07.23 20.07.23 23.10.23 24.10.23 (x2) 03.12.23 04.12.23 10.01.24 13.02.24. PBC contact detail confirmation completed – 27.11.24.	Yes. Meeting held on 16.08.23 in Exmouth.	Presentation meeting notes sent to PBC on 24.11.23. PBC to write to JSE to convey the outcome of the Directors private discussions.	Nganhurra Thanardi Garrbu Aboriginal Corporation have strong connection to sea country relying on marine resources including turtle, egg, fish and shellfish. JSE have identified that the Stag EMBA does not overlap with any heritage sites within the Nganhurra Thanardi Garrbu Aboriginal Corporation's Registered Native Title Area.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 16.08.23 Meeting held with PBC. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 03.12.23 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend.	First contact 20.04.23. Follow ups >10. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meetings NTGAC., JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Gnulli Yinggarda Baiyungu and Thalanyji people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP submission, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.
Ngarluma Aboriginal Corporation	Email has not bounced back. Email received 24.05.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 24.05.23. Follow up emails: 03.05.23 16.05.23 23.05.23 08.06.23 (x2) 21.06.23 10.07.23 19.07.23 02.08.23 09.08.23 17.10.23 (x2) 23.10.23 24.11.23 08.01.24 10.01.24	No	N/A	River systems and coastline of the west Pilbara including Burrup Peninsula and islands of the Dampier Archipelago. The Ngarluma People have several culturally significant "totem species" that may have been identified in the PMST search. Their animal totems include dugong, turtle, dolphin, hammerhead shark and manta ray.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 10.01.24 Email sent requesting information on community engagement	First contact 20.04.23. Follow ups >10. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested. JSE has undertaken research to inform themselves of any areas of significance. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Ngarluma people provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. Remain available for presentation to PBC if requested. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written).

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
		16.01.24 13.02.24 Phone call 15.11.23. Further follow up email 09.05.24. Emails sent to confirm PBC contact details: 25.11.24 06.12.24 17.12.24.			Jadestone have identified that the Stag EMBA overlaps a number of heritage sites within the Ngarluma Aboriginal Corporation's Registered Native Title Area.		sessions be passed onto members of the PBC and with invitation to attend.		• control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	Every 6 months from EP submission, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.
Nyangumarta Karajarri Aboriginal Corporation	Emails have not bounced back. Email received on 16.05.23 confirming the information has been received.	Responded to 03.05.23 initial introductory email on 16.05.23. Follow up emails: 16.05.23 (x2) 17.05.23 08.06.23 (x2) 21.06.23 (x2) 19.07.23 02.08.23 03.08.23 09.08.23 17.10.23 24.11.23 28.11.23 10.01.24 31.01.24 01.02.24 14.02.24 21.03.24 25.03.24 03.04.24 (x2) 04.04.24 09.04.24 09.05.24 (x2). PBC contact detail confirmation completed – 26.11.24.	21.08.23 Meeting cancelled by PBC in the morning of the meeting. Meeting held on 10.04.24 in Broome.	Presentation meeting notes sent on 09.05.24. JSE to inform PBC if a spill occurs. PBC to provide any further questions and feedback to JSE and confirm when like to meet JSE again. PBC to confirm the names of the Directors and Elders that attended.	Native Title across 2,000 square kilometres of land and sea country across Anna Plains Station, a portion of Mandora Station and 80 Mile Beach, in the East Pilbara and West Kimberley.	None required. PBC raised no comments in the meeting around potential unplanned impacts but would like to remain informed in the event of a spill. EP assesses the potential impact on marine receptors present in sea country in general. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of marine environment in the event of a large spill. OPEP includes EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	03.05.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 10.01.24 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend. 10.04.24 Meeting held with PBC.	First contact 03.05.23. Follow ups > 20. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested and discussed in meeting on 10.04.2024 – none have been identified by the PBC. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • Maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Nyangumarta and the Karajarri people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	**Effort**	**Meeting Held**	**Meeting Actions**	**Cultural Heritage**	**Relevant Sections**	**25(2) Sufficient Information provided**	**25(3) Reasonable Period**	**Assessment**	**Actions**
Nyangumarta Warrarn Aboriginal Corporation	Email has not bounced back. Email received 16.05.23 confirming the information has been received.	Responded to 03.05.23 initial introductory email on 16.05.23. Follow up emails: 16.05.23 (x2) 17.05.23 (x2) 08.06.23 21.06.23 (x2) 03.07.23 02.08.23 09.08.23 23.10.23 24.11.23 (x2) 10.01.24 (x3) 14.02.24 15.02.24. 07.05.24 email to organise meeting. 24.05.24 meeting minutes sent. PBC contact detail confirmation completed – 26.11.24.	Yes. Meeting held on 15.08.23 in Perth with EMT. Meeting held on 23.05.24 in Perth.	Presentation meeting notes sent on 24.11.23. PBC to discuss outcomes of meeting with CEO and advise next steps. Meeting notes sent on 24.05.24. JSE to inform PBC if a spill occurs. PBC to confirm the names of the Directors and Elders that attended.	Recognise Eighty Mile Beach for significant ecological values including migratory birds and flatback turtle populations. They are the traditional custodians of the land to the east of Port Hedland. JSE have identified that the Stag EMBA does not overlap with any heritage sites within the Nyangumarta Warrarn Aboriginal Corporation's Registered Native Title Area.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	03.05.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 15.08.23 Meeting held with PBC. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 10.01.24 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend. 23.05.24 Meeting held with PBC.	First contact 03.05.23. Follow ups >20. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meetings with NWAC. JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • Maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Nyangumarta people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
Wanparta Aboriginal Corporation	Email has not bounced back. Email received 27.04.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 27.04.23. Follow up emails: 27.04.23 23.05.23 08.06.23 05.07.23 10.07.23 02.08.23 23.10.23 14.11.23 24.11.23 (x2) 10.01.24 24.01.24 14.02.24 13.05.24. Calls placed 20.11.23 – 24.11.23 (x4) 22.01.24. Emails in relation to meeting logistics: 15.08.24 06.11.24 08.11.24 11.11.24. Emails in relation to meeting minutes: 23.12.24 14.01.24 16.01.24, PBC contact detail confirmation completed – 05.12.24.	Yes. Meeting held on 16.08.23 in South Hedland. Meeting held in Perth 13.11.24.	Summary of meeting sent on 24.11.23. WAC to provide any further questions and feedback to JSE and confirm when like to meet JSE again. Summary of meeting minutes sent on 23.12.24 detailing questions WAC asked in relation to mudflats, mangroves and islands and request for mangrove mapping. JSE response included mangrove mapping (16.01.25).	Land and waters in adjacent eastern portion of the 80 Mile Beah Marine Park. The WAC allocate particular importance to their totem species – the octopus, stingray, spiny bream fish and kestrel. The spiritual connection to sea country and the protection and management of marine life plays a significant role in the practice of lore, culture and customs for the WAC. JSE have identified the Stag EMBA overlaps with one heritage site within the Wanparta Aboriginal Corporation's Registered Native Title Area.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 16.08.23 Meeting held with PBC. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 10.01.24 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend.	First contact 20.04.23. Follow ups >20. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meetings with WAC and PBC have noted the importance of totem species and spiritual connection to sea country. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • Maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Ngarla people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.
Wirrawandi Aboriginal Corporation	Email has not bounced back. Email received 21.04.23 confirming information has been received.	Responded to 20.04.23 initial introductory email on 21.04.23. Follow up emails: 03.05.23 (x3) 04.05.23 16.05.23 23.05.23 08.06.23 (x2) 21.06.23	Yes. Meeting held on 12.05.23 in Perth with General Manager before presentation to the board.	Summary of meeting on 18.07.23 sent on 24.10.23. The other meetings were informal. PBC: Provide information on the cultural awareness training that WAC provide for JSE to consider attendance by	These groups (Mardudhunera and Yaburara People) are the traditional owners of the coastal land west of Dampier. JSE have identified the Stag EMBA overlaps with one heritage sites within	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of	20.04.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. 12.05.23	First contact 20.04.23. Follow ups >30. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meetings with WAC. JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times.	In the event of a change in the activity which could lead to the functions, activities or interests of the Yaburara and Mardudhunera people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill:

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
		03.07.23 (x2) 10.07.23 (x2) 14.07.23 20.07.23 01.08.23 02.08.23 23.10.23 24.10.23 31.10.23 09.11.23 24.11.23 10.01.24 (x2) 11.01.24 (x2) 15.01.24 13.02.24. PBC contact detail confirmation completed – 25.11.24.	Meeting held on 18.07.23 in Karratha with Directors. 03.11.23 in Perth with CEO. 12.01.24 in Perth with CEO.	key personnel. Provide JSE with any information requests that can be prepared for future meetings.	the Wirrawandi Aboriginal Corporation's Registered Native Title Area.	habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	Meeting held with PBC General Manager. 18.07.23 Meeting held with PBC Directors. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 03.11.23 Meeting held with PBC CEO. 10.01.24 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend. 12.01.24. Meeting held with PBC CEO.		Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	• if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. • If there have been any changes to boundary of native title area adjacent to WAC and BTAC. If unavailable reach out to YMAC and relevant land council to confirm contact.

PBC	Relevant PBC Info		Meetings		Information	EP Updates	OPGGS(E)R Obligations			Ongoing Consultation
	Correct Detail confirmation	Effort	Meeting Held	Meeting Actions	Cultural Heritage	Relevant Sections	25(2) Sufficient Information provided	25(3) Reasonable Period	Assessment	Actions
Yinggarda Aboriginal Corporation	Email has not bounced back. Email received 15.06.23 confirming information has been received.	Responded to 10.05.23 initial introductory email on 15.06.23. Follow up emails: 23.05.23 15.06.23 24.07.23 25.07.23 01.08.23 28.08.23 23.10.23 21.11.23 22.11.23 24.11.23 29.11.23 03.12.23 11.01.24. PBC contact detail confirmation completed – 26.11.24.	Yes. Meeting held on 03.08.23 in Perth.	Summary of meeting sent on 22.11.23. YAC wrote to JSE requesting significant payment value into their legal advisors Trust Account and subsequently wrote a further letter requesting JSE's agreement to indemnify the PBC against legal costs the PBC may incur if it's agreement to consult with JSE resulted in a legal challenge. JSE advised the PBC that it could not agree to either request but remained willing to consult further at an ordinary scheduled meeting of Directors, at a reasonable cost. JSE awaiting response from YAC.	Yinggarda Aboriginal Corporation are the traditional owners of an area of land surrounding Carnarvon. JSE have identified that the Stag EMBA does not overlap with any heritage sites within Yinggarda Aboriginal Corporation's Registered Native Title Area.	None required. EP assesses the potential impact on the marine environment in general in the EP. No additional control measures required to manage potential impacts from planned events. OPEP includes for scientific monitoring of habitats and fauna in the event of a large spill. OPEP includes an EPS to inform PBC if spill trajectory modelling indicates a significant spill moving towards WA coastline.	10.05.23 Initial email, with Invitation for Consultation document for Stag Operations EP attached, seeking opportunity to make presentation to Directors. Meeting held with PBC on 03.08.2023. 23.10.23 Email sent identifying cultural heritage sites, providing figure and asking for Corporation's advice in relation to further details on these or other heritage sites. 03.12.23 Email sent requesting information on community engagement sessions be passed onto members of the PBC and with invitation to attend.	First contact 10.05.23. Follow ups >10. Deadline for response 15.01.2024. Total time = > 12 months.	**Consultation considered complete.** A reasonable period has been provided (Reg 25(3)). Information on cultural heritage has been requested through meeting with YAC. JSE has undertaken research to inform themselves of any areas of significance. Offers to present to PBC Directors and Elders have been sent multiple times. Offer to attend community sessions was provided ahead of the sessions. JSE have provided Information packages describing sufficient information (Reg 25(2)): • the operational area and EMBA • the potential impacts to the waters and coast adjacent to the PBC • maps showing the operational area and EMBA • NOPSEMA guidance brochure • control measures and mitigation measures in place for the activity • Full EP available online at JSE website.	In the event of a change in the activity which could lead to a significant increase in risk or impact to the functions, activities or interests of the Gnulli Yinggarda Baiyungu and Thalanyji people, provide: • updated details of the change to the PBC • offer a meeting to present and discuss the change. For a level 2 or 3 spill: • if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Every 6 months from EP acceptance, reach out to PBC contact to confirm: • Contact name • Contact details • JSE contact details • Who to inform in the event of a spill event heading towards the coastline. If unavailable reach out to YMAC and relevant land council to confirm contact.

The purpose of the presentations to the PBCs are to:

- develop a respectful relationship with the Relevant Persons identified for current and future activities;
- seek advice on the format and type of information the Relevant Persons require to enable them to make an informed decision as to whether the activity may affect their functions, interests or activities;
- provide sufficient information to inform Relevant Persons of the potential impacts from the Stag activity;
- seek information on the cultural heritage and sea country values within the EMBA;
- document and address any comments on the activity and the potential impacts;
- seek advice of any preference on how Jadestone contact them in the future, or continue consultation dialogue (e.g. further meetings, regular updates, community sessions);
- request the Relevant Persons identify whether they need anything further from Jadestone to assist them with comments they might wish to make; and
- confirm if the Relevant Persons do not wish to receive further updates for activities associated with the Stag Field.

Information gathered from the consultation presentations has assisted Jadestone to inform the environmental impact assessment for the activity by providing further information on the cultural heritage values that may be present within the EMBA. Jadestone has also used the consultation to identify those sensitive cultural and environmental places that may be prioritised in the event of a significant oil spill. Whilst in the event of a spill, Jadestone would seek the advice of a heritage advisor (as described in the OPEP), the information gathered on the locations of sensitive places through the consultation presentations will assist response planning and provide a means of direct communication with Traditional Owners through their PBC.

In the absence of responses from PBCs on the potential cultural and environmental places, Jadestone has conducted research into the likely areas of interest. On the 23 of October 2023 Jadestone emailed each PBC with a list of the publicly available cultural heritage sites on or adjacent to their respective coastlines, seeking advice on:

- any concerns about potential impacts to these areas of interest in the unlikely event of an unplanned spill;
- other data sources we should interrogate; and
- any further details on these or other heritage sites that may be of interest to your community.

4.5.6 Community Engagement Sessions

Jadestone organised community engagement sessions at Coral Bay, Exmouth, Carnarvon, Denham, Onslow, Karratha, Dampier and Port Hedland. These meetings were held between 12 – 14 December 2023 and 17 – 19 January 2024 and further details are provided in Table 4-3.

Jadestone undertook newspaper and social media advertising between one and two weeks before each community engagement session to ensure as many people as possible were informed of the opportunity to meet with Jadestone.

The sessions were also advertised through Jadestone's Instagram and Facebook accounts.

A half page advertisement in the Pilbara News reached members of Coral Bay and Exmouth communities and a half page advertisement in the Midwest Times reached members of Carnarvon and Denham communities. A half page advertisement in the Pilbara News reached members in Onslow, Karratha and

Dampier communities and a half page advertisement in the Northwest Telegraph reached members in Port Hedland communities.

Posters were also produced and displayed on community notice boards in Exmouth, Denham, Shire of Ashburton and Dampier Community Hub. Advertisements were placed in local Facebook groups for Carnarvon, Karratha and Port Hedland.

A QR code that took people to the Jadestone Stag field webpage was inserted into the newspaper advertisements and the posters displayed at the community notice boards.

The purpose of these sessions was to ensure that community members who were not represented by PBCs and businesses and organisations that Jadestone had already consulted, and other potentially Relevant Persons could speak directly with Jadestone representatives and should they wish to, had the opportunity to self-identify as a Relevant Person.

At each session the Invitation for Consultation document, copies of PowerPoint presentations and maps were available to provide context to discussions and queries were available to be taken. NOPSEMA's (current at the time) *Consultation on offshore petroleum environment plans*: *Information for the community* brochure was also available at each session. A summary of the community engagement sessions is provided in Section 4.9.4. Jadestone believe that they have made reasonable efforts to engage with any person who wishes to be consulted.

The Land Councils and the PBCs representing Traditional Owner Clans continue to be identified as Relevant Persons.

Table 4-3 Summary of Community Information Sessions

Location	Date and Time	Venue
Coral Bay	Tuesday 12 December 2023, 12.30pm	Bill's Bar Function Room
Exmouth	Tuesday 12 December 2023, 5.30pm	Ningaloo Centre Mandu Mandu Room - West
Carnarvon	Wednesday 13 December 2023, 5.30pm	Gwoonwardu Mia Conference Room
Denham	Thursday 14 December 2023, 12.30pm	Denham Town Hall
Onslow	Wednesday 17 January 2024, 12.30 pm – 1.30pm	RM Forrest Hall
Karratha	Thursday 18 January 2024, 12.30pm – 1.30pm	Pegs Creek Pavilion
Dampier	Thursday 18 January 2024, 5.30pm – 6.30pm	Dampier Community Hub Multi-Purpose Room Two
Port Hedland	Friday 19 January 2024, 12.30pm – 1.30pm	Gratwick Hall

4.5.7 Non-Government Environment Organisations (eNGOs)

Jadestone carried out a review to identify the non-government environment organisations (eNGOs) that may have interests in the environment of the area within the EMBA and more broadly and added in those organisations as Relevant Persons. They include those eNGOs that have publicly declared interest in the potential impacts associated with climate change.

The review included the examination of the EPs of other titleholders in proximity to Stag, and a search of the Australian Department of Foreign Affairs and Trade (DFAT) NGO list for Western Australia based eNGOs that had identified an interest in oil and gas or climate change impacts. Coastal conservation groups

adjacent to the EMBA were also identified through a search for registered conservation groups on the DBCA website, and the identified organisations were reviewed to determine if they were a Relevant Persons for Stag.

In addition, through advertisements and exposure through other mediums, Jadestone provided the opportunity for other eNGOs to self-identify (though to date none have done so.

4.5.8 Self-identified Relevant Persons

Promulgation of project information, through a range of mediums, may result in the identification of additional Relevant Persons through self-identification. Throughout the life of each of its projects, including Stag, Jadestone is continually assessing the merits of self-identified Relevant Persons and, as appropriate, adding to the list of Relevant Persons.

4.6 Project Activities

Section 2 of this EP details the activity description including the location, timing, infrastructure, vessels, and each relevant on-going Stag activity.

4.7 Environment, Values and Sensitivities

4.7.1 Spatial extent of the environment that may be affected

Section 3 of the EP sets out a detailed description of the environment that commences with the spatial extent of the EMBA, different zones and thresholds within those area, enabling the first step in identification of Relevant Person categories. Once the operational area and EMBA spatial footprints have been created, the information is overlaid on a number of environmental, social and economic geospatial information layers to identify values and sensitivities within the operational area and EMBA, respectively, enabling the Relevant Persons and the values or sensitivities that might be affected to be identified.

Sources of information are to include:

- National matters of environmental significance;
- Conservation atlas (biologically important areas);
- Exclusive Economic Zone for Australia, and Commonwealth and State waters;
- Commercial and State fishing jurisdictions;
- Shipping fairways;
- Other commercial operations such as oil and gas facilities, ecotourism;
- Protected areas, parks, reserves, management areas, special zones;
- Intertidal and benthic habitats (may include point data, satellite, remote sensing or aerial imagery);
- Management and recovery plans;
- Public and scientific literature;
- Non-Government environment organisations (eNGOs); and
- Cultural heritage sites and values, including the identification of Traditional Owner Clans with coastline, near shore and sea country interests.

Due to their broader interest in climate change eNGOs as Relevant Persons have interests that extend beyond an EMBA and therefore may include National organisations in addition to State/Territory organisations.

4.7.2 Totality of environmental values and sensitivities

The totality of the defined activities, the EMBA, the relevant values and sensitivities of that environment, identification and assessment of risks and impacts, have been re-assessed to identify where a person's or organisation's functions, interests or activities may be affected by the activities to be carried out in the EP.

Consistent with the description of Relevant Person provided by Regulation 25(1), to be affected means the functions, interests or activities of a person or organisation would be affected by activities to be carried out under the EP, including the totality of the environment values and sensitivities considered relevant. This is based on the EMBA of the low exposure value from the worst-case credible spill scenario.

The EMBA boundary was used to determine the Relevant Persons that may be affected. However, the EMBA is adjacent to shorelines along the WA coast, and therefore in these instances Relevant Persons were considered to be those who may use the coastline adjacent to the EMBA as well as waters within the EMBA. Arguably the EMBA is overly conservative as it delineates the low exposure threshold which does not necessarily equate to potential environmental impact to a receptor or a Relevant Persons functions, activities or interests (typically this is triggered at the moderate exposure threshold). Therefore, the totality defined by the low threshold EMBA is considered to be overly conservative

In addition, the potential impacts from climate change as a result of the activity have been considered. This led to the identification of eNGOs with an interest in climate change, and an attempt to capture any other self-identified Relevant Persons by the publication of project information through a range of mediums.

4.7.3 Relevant persons Categories – regulation 25 (1)(a), (b), (c), (d) and (e)

Table 4-4 outlines the government departments and agencies that have been identified as relevant within Regulation 25 (1)(a), (b), (c), (d) and (e).

Table 4-4: Assessment of relevance of identified stakeholders

Relevant person	Relevance to the activity	Functions, interest or activities
Commonwealth government department or agency		
Australian Fisheries Management Authority (AFMA)	Considered Relevant Persons under Regulation 25(1)(a)	AFMA is the Australian Government agency responsible for the efficient management and sustainable use of Commonwealth fish resources on behalf of the Australian community. AFMA manages and monitors commercial Commonwealth fishing to ensure Australian fish stocks, and the Australian fishing industry is viable now and in the future. Relevant when the activity has the potential to impact on fisheries resources in AFMA-managed fisheries.
Australian Hydrographic Office (AHO)	Considered Relevant Persons under Regulation 25(1)(a)	AHO is part of the Department of Defence, responsible for providing Australia's national charting service under the terms of SOLAS and the *Navigation Act 2012* (Cth). Role includes provision of nautical charting (including charts in electronic form) and associated services in support of maritime safety. Responsible for the publication and distribution of nautical charts and other information required for the safe shipping and navigation in Australian waters. Relevant when the activity may impact operational requirements and where nautical products and other maritime safety and information is required to be updated, including Notice to Mariners.
Australian Maritime Safety Authority (AMSA)	Considered Relevant Persons under Regulation 25(1)(a)	AMSA is the statutory authority established under the *Australian Maritime Safety Act 1990*. Principal functions are promoting maritime safety and protection of the maritime environment, preventing and combating ship-sourced pollution in the marine environment, providing infrastructure to support safety of navigation in Australian waters, and providing national search and rescue service to the maritime and aviation sectors.
Clean Energy Regulator (CER)	Considered Relevant Persons under Regulation 25(1)(a)	The Clean Energy Regulator administers schemes legislated by the Australian Government for measuring, managing, reducing or offsetting Australia's carbon emissions, determined by climate change law. The Regulator has administrative responsibilities for the National Greenhouse and Energy Reporting Scheme, the Emissions Reduction Fund, the Renewable Energy Target and the Australian National Registry of Emissions Units. As an economic regulator, the Regulator does not have any direct role or powers under our legislation to enforce work health and safety, environmental protection, or planning laws.

Relevant person	Relevance to the activity	Functions, interest or activities
Department of Agriculture, Fisheries & Forestry (DAFF)	Considered Relevant Persons under Regulation 25(1)(a)	Department responsible for managing biosecurity for incoming goods and conveyances. Relevant due to the potential for the transfer of marine pest between MODU, vessels and the mainland. Activities such as seismic surveys, drilling, exploration, geotechnical surveys, construction and installation of sub-sea infrastructure have the potential to affect commercially important fish species, their prey and habitats, and the business activities of commercial fishers.
Department of Defence (DOD)	Considered Relevant Persons under Regulation 25(1)(a)	Responsible for Australian defence activities. Relevant when the activity encroaches on known training areas and /or restricted airspace.
Department of Industry, Science & Resources (DISR)	Considered Relevant Persons under Regulation 25(1)(a)	DISR is responsible for development and reform of policy relating to the resources sector, including oil and gas. Relevant due to influence on Commonwealth Government sector policy.
Director of National Parks Parks Australia, part of the Department of Climate Change, Energy, the Environment and Water (DCCEEW)	Considered Relevant Persons under Regulation 25(1)(a)	Parks Australia supports the Director of National Parks who has responsibility under federal environment law for six Commonwealth national parks, the Australian National Botanic Gardens and 60 Australian Marine Parks. Relevant when activities undertaken outside of an Australian Marine Park may impact on the values within a Marine Park.
Maritime Border Command (MBC), part of Australian Border Force (ABF), part of the Department of Home Affairs (DHA)	Considered Relevant Persons under Regulation 25(1)(a)	MBC is enabled by ABF and the Australian Defence Force (ADF), supporting the whole of government effort to protect Australia's national interests by responding with assigned maritime and air assets for civil maritime security operations. Relevant when the activity may impact on border protection activities (e.g. vessel patrols).
National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)	Considered Relevant Persons under Regulation 25(1)(a)	NOPSEMA is Australia's independent expert regulator for health and safety, structural (well) integrity and environmental management for all offshore oil and gas operations and greenhouse gas storage activities in Commonwealth waters, and in coastal waters where regulatory powers and functions have been conferred.
National Offshore Petroleum Titles Administrator (NOPTA)	Considered Relevant Persons under Regulation 25(1)(a)	NOPTA is responsible for the day-to-day administration of petroleum & greenhouse gas titles in Commonwealth waters in Australia.

Relevant person	Relevance to the activity	Functions, interest or activities
WA government department of agency		
Department of Biodiversity, Conservation and Attractions (DBCA)	Considered Relevant Persons under Regulation 25(1)(b)	Manage State marine parks and reserves and protected marine fauna and flora. Relevant when activities undertaken outside of a marine park may impact on the values within a marine park.
Department of Biodiversity, Conservation and Attractions (DBCA) Shark Bay World Heritage Advisory Committee (SBWHAC)	Considered Relevant Persons under Regulation 25(1)(b)	The SBWHAC provides advice to the Minister for the Environment and the Environment Protection Heritage Council on matters relating to protection, conservation, presentation and management, research priorities and new information or developments to help manage the Shark Bay World Heritage Property.
Department of Mines, Industry Regulation and Safety (DMIRS)	Considered Relevant Persons under Regulation 25(1)(b)	The mission of DMIRS is to support a safe, fair and responsible future for the Western Australian community, industry and resources sector. The DMIRS Resource and Environmental Regulation Group is responsible for regulating one of Western Australia's largest industry sectors and plays a critical role in building Western Australia's economy while ensuring the State's resources are developed in a sustainable and responsible manner.
Department of Planning, Lands & Heritage (DPLH)	Considered Relevant Persons under Regulation 25(1)(b)	Protect aboriginal heritage, assist with compliance with the *Aboriginal Heritage Act 1972* and provide access to heritage information. Relevant if the activity results in impacts to Aboriginal heritage.
Department of Primary Industries and Regional Development (DPIRD)	Considered Relevant Persons under Regulation 25(1)(b)	A primary responsibility of the Department of Primary Industries and Regional Development is to conserve, sustainably develop and share the use of Western Australia's aquatic resources and their ecosystems for the benefit of present and future generations, through managing fisheries and aquatic ecosystems, assessment and monitoring of fish stocks, enforcement and education, biosecurity management and licensing commercial and recreational fishing activity, including commercial aquaculture.
Department of Transport (DOT)	Considered Relevant Persons under Regulation 25(1)(b)	In accordance with the WA *Emergency Management Act 2023* (the Act) and Emergency Management Regulations 2006 (the Regulations), the WA DoT is the Hazard Management Agency (HMA) for the Marine Oil Pollution (MOP) hazard in State waters. The MOP hazard is prescribed in the Regulations as an; 'actual or impending spillage, release or escape of oil or an oily mixture that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment'.
Department of Water & Environmental Regulation (DWER)	Considered Relevant Persons under Regulation 25(1)(b)	The Department is responsible for managing and regulating the state's environment and water resources.

Relevant person	Relevance to the activity	Functions, interest or activities
Local Government Authorities		
City of Karratha	Considered Relevant Persons under Regulation 25(1)(d)	Local government area in the Pilbara region.
Shire of Ashburton	Considered Relevant Persons under Regulation 25(1)(d)	Local government area in the Pilbara region.
Shire of Exmouth	Considered Relevant Persons under Regulation 25(1)(d)	Local government area in the Gascoyne region.
Oil and Gas Industry		
Australian Maritime Oil Spill Centre (AMOSC)	Considered Relevant Persons under Regulation 25(1)(d)	AMOSC operates the Australian oil industry's major oil spill response facility. AMOSC's stockpile of oil spill response equipment includes oil spill dispersant and containment, recovery, cleaning, absorbent and communications equipment. Relevant due to the immediate availability of support in recovering from an oil spill event.
Oil Spill Response Limited (OSRL)	Considered Relevant Persons under Regulation 25(1)(d)	OSRL is the largest international industry-funded oil spill response cooperative, and provides preparedness, response and intervention services anywhere in the world. Relevant due to the immediate availability of support in recovering from an oil spill event.
WA Commercial fishers and fishing associations		
Gascoyne Demersal Scalefish Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Mackerel Managed Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Marine Managed Aquarium Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.

Relevant person	Relevance to the activity	Functions, interest or activities
Nickol Bay Prawn Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Northern Demersal Scalefish Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Pilbara Crab Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and finished WAFIC. Relevant when the activity could impact on commercial fishing activity.
Pilbara Demersal Scalefish Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Onslow Prawn Managed Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Specimen Shell Managed Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Western Australian Fishing Industry Council (WAFIC)	Considered Relevant Persons under Regulation 25(1)(d)	Peak industry body representing the interests of the Western Australian commercial fishing, pearling and aquaculture sectors. Relevant when the activity could impact on commercial fishing activity.
West Coast Deep Sea Crustacean Managed Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and through WAFIC. Relevant when the activity could impact on commercial fishing activity.
Commonwealth Commercial fishers and fishing associations		
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	Considered Relevant Persons under Regulation 25(1)(d)	Peak body representing Southern Bluefin Tuna companies in Australia. The SBTF overlaps the EMBA.

Relevant person	Relevance to the activity	Functions, interest or activities
Northwest Slope Trawl Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and follow-up mail-out. Relevant when the activity could impact on commercial fishing activity.
Southern Bluefin Tuna Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation. ASBTIA subsequently confirmed there is no Southern Bluefin Tuna fishing effort within or adjacent to the EMBA. Relevant when the activity could impact on commercial fishing activity.
Western Deepwater Trawl Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and follow-up mail-out. Relevant when the activity could impact on commercial fishing activity.
Western Skipjack Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and follow-up mail-out. Relevant when the activity could impact on commercial fishing activity.
Western Tuna and Billfish Fishery	Considered Relevant Persons under Regulation 25(1)(d)	Consultation through mail-out of Invitation for Consultation and follow-up mail-out. Relevant when the activity could impact on commercial fishing activity.
Commonwealth Fisheries Association (CFA)	Considered Relevant Persons under Regulation 25(1)(d)	The peak body representing the collective rights, responsibilities and interests of a diverse commercial fishing industry in Commonwealth regulated fisheries. Relevant when the activity could impact on commercial fishing activity.
Seafood Industry Australia (SIA)	Considered Relevant Persons under Regulation 25(1)(d)	Seafood Industry Australia is committed to ensuring there is appropriate consultation between the Australian seafood industry and oil and gas companies on matters including impact, access, regulation and the long-term impacts to fish-stocks from petroleum-related activities. To that end, SIA has facilitated a series of frank conversations between the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) and interested parties on what adequate consultation with oil and gas companies means, and how it can be done better. SIA is a member of the NOPSEMA Transparency Taskforce Steering Committee and recently chaired a reinvigorated Seafood and Petroleum Industry Roundtable. Relevant when the activity could impact on commercial fishing activity.
Tuna Australia	Considered Relevant Persons under Regulation 25(1)(d)	Formed in 2016, Tuna Australia represents statutory fishing right owners, holders, fish processor and sellers, and associate members of the Eastern and Western tuna and billfish fisheries of Australia.

Relevant person	Relevance to the activity	Functions, interest or activities
Recreational fishing associations		
Recfishwest (WA)	Considered Relevant Persons under Regulation 25(1)(d)	Peak body representing recreational fisheries in Western Australia. Relevant when the activity could impact on recreational fishing activity.
First Nations peoples and representative bodies		
Buurabalayji Thalanyji Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Kariyarra Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Malgana Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Nanda Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Nganhurra Thanardi Garrbu Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Ngarluma Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Nyangumarta Karajarri Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.

Relevant person	Relevance to the activity	Functions, interest or activities
Nyangumarta Warrarn Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Wanparta Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Wirrawandi Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
Yamatji Marlpa Aboriginal Corporation (YMAC)	Considered Relevant Persons under Regulation 25(1)(d)	Native title representative body for the Yamatji and Pilbara regions of WA, YMAC is a not-for-profit Aboriginal corporation. Relevant when the activity could impact on the coast, near shore waters and sea country.
Yinggarda Aboriginal Corporation	Considered Relevant Persons under Regulation 25(1)(d)	Relevant person and representative of Traditional Owners whose lands include coastline adjacent to the EMBA. Relevant when the activity could impact on the coast, near shore waters and sea country.
eNGOs		
Australian Conservation Foundation (ACF)	Considered Relevant Persons under Regulation 25(1)(d)	Australian's national environment organisation influencing governments and businesses to protect animals, rivers and reefs.
Australian Marine Conservation Society (AMCS)	Considered Relevant Persons under Regulation 25(1)(d)	Australian national independent charity dedicated solely to protecting ocean wildlife and working for healthy seas with representation in Western Australia.
Conservation Council of Western Australia (CCWA)	Considered Relevant Persons under Regulation 25(1)(d)	CCWA is WA's foremost not for profit, non-government conservation and environment organisation. A current active campaign of the CCWA is Say No to Scarborough Gas. Relevant due to in principle opposition to the extraction and use of fossil fuels. Would have the potential to delay but not prevent the Project going ahead.
Greenpeace	Considered Relevant Persons under Regulation 25(1)(d)	Independent campaigning organisation that uses peaceful protest and creative confrontation to expose global environmental problems and promote solutions that are essential to a green and peaceful future.

Relevant person	Relevance to the activity	Functions, interest or activities
Protect Ningaloo	Considered Relevant Persons under Regulation 25(1)(d)	Work with leading scientists, the Exmouth community and local businesses and the broad WA community to raise awareness around the extraordinary values of Exmouth Gulf, Ningaloo.
The Wilderness Society (WA)	Considered Relevant Persons under Regulation 25(1)(d)	Public company that works to support the living world. They take on transnational corporations, rogue operators, and the armies of lobbyists and politicians who defend them in relation to projects that could affect the environment. They have been active in Western Australia in the past.
World Wildlife Fund (WWF)	Considered Relevant Persons under Regulation 25(1)(d)	Independent conservation organisation for the protection of wildlife in Australia and around the world.
Other Associations		
Australian Council of Prawn Fisheries	Considered Relevant Persons under Regulation 25(1)(d)	Is made up of membership from local industry bodies and companies that deal with wild prawns or the prawn industry.
Exmouth Game Fishing Club	Considered Relevant Persons under Regulation 25(1)(d)	Is a non-profit organisation that is run by volunteers to promote and encourage recreational fishing in all its form. Relevant when the activity could impact on coastal waters and coastlines.
Karratha and Districts Chamber of Commerce and Industry	Considered Relevant Persons under Regulation 25(1)(d)	A non-for-profit organisation delivering a unique range of services and representation to the Karratha business community.
King Bay Game Fishing Club	Considered Relevant Persons under Regulation 25(1)(d)	The King Bay Game Fishing Club operates out of the Dampier Archipelago. Relevant when the activity could impact on coastal waters and coastlines.
Marine Tourism Association of Western Australia (MTWA)	Considered Relevant Persons under Regulation 25(1)(d)	Represents the tourism industry in Western Australia (in the context of this project the fishing charter sector). Association currently has one Kimberley member. Relevant when the activity could impact on coastal waters and coastlines.

Relevant person	Relevance to the activity	Functions, interest or activities
Nickol Bay Sportsfishing Club	Considered Relevant Persons under Regulation 25(1)(d)	The Nickol Bay Sportsfishing Club is a division of the Hampton Harbour Boat and Sailing Club and is one of Western Australia's most successful Sportfishing Clubs. Relevant when the activity could impact on coastal waters and coastlines.
Onslow Chamber of Commerce and Industry (OCCI)	Self-identified during community session	Active, independent not for profit organisation that promotes the interests of members and business community in Onslow and the Pilbara Region.
Port Authorities/ Maritime Facilities		
Carnarvon Boat Harbour	Considered Relevant Persons under Regulation 25(1)(d)	Carnarvon Boat Harbour is an important hub for the commercial fishing industry and recreational boating community. Relevant when the activity could impact on Port infrastructure and operations.
Coral Bay Maritime Facility	Considered Relevant Persons under Regulation 25(1)(d)	Coral Bay Maritime Facility is located south of the Coral Bay town centre and services recreational, tourism, charter and commercial vessels. Relevant when the activity could impact on Port infrastructure and operations.
Denham Maritime Facility	Considered Relevant Persons under Regulation 25(1)(d)	The Denham Maritime Facility is located on the town's foreshore and services the charter and tourism industry and recreational vessels. Relevant when the activity could impact on Port infrastructure and operations.
Exmouth Boat Harbour	Considered Relevant Persons under Regulation 25(1)(d)	The boat harbour is a busy commercial hub that supports the local fishing, charter and recreational industries, as well resources projects in the region. Relevant when the activity could impact on Port infrastructure and operations.
Onslow Beadon Creek	Considered Relevant Persons under Regulation 25(1)(d)	The main users of the facility are the resources sector and recreational, fishing and charter vessels. There has been extensive growth of oil and gas projects in the region and the facility has become a supply base for offshore operations. Relevant when the activity could impact on Port infrastructure and operations.
Pilbara Ports Authority	Considered Relevant Persons under Regulation 25(1)(d)	Pilbara Port Authority encompasses the Port of Ashburton, Dampier, Port Hedland and Varanus Island. Relevant when the activity could impact on Port infrastructure and operations.
Point Samson Johns Creek Boat Harbour	Considered Relevant Persons under Regulation 25(1)(d)	Facilities include boat pens, boat launch ramps, fuel and public toilets. Relevant when the activity could impact on Port infrastructure and operations.

Relevant person	Relevance to the activity	Functions, interest or activities
Academic and Research Organisations		
Australian Institute of Marine Science (AIMS)	Considered Relevant Persons under Regulation 25(1)(d)	Organisation concerned with conservation and research outcomes in the area.
Tourism and Business Associations/ Tour Operators		
Apache Charters	Considered Relevant Persons under Regulation 25(1)(d)	Live aboard fishing charter at the Abrolhos, Shark Bay, Dirk Hartog Island and Montebello Islands. Relevant when the activity could impact on the coastline and coastal waters.
Blue Juice Charters	Considered Relevant Persons under Regulation 25(1)(d)	Luxury cruise company operating extended wilderness expeditions along the WA coast, including the Montebello Islands. Relevant when the activity could impact on the coastline and coastal waters.
Blue Lightning Charters	Considered Relevant Persons under Regulation 25(1)(d)	Fishing charter operating from the Montebello Islands to Abrolhos Islands. Relevant when the activity could impact on the coastline and coastal waters.
Cape Immersion Tours	Considered Relevant Persons under Regulation 25(1)(d)	Family friendly ocean wildlife tours of Ningaloo Marine Park. Relevant when the activity could impact on the coastline and coastal waters.
Coral Bay Eco Tours	Considered Relevant Persons under Regulation 25(1)(d)	Marine tour company specialising in marine interactions in Ningaloo Marine Park. Relevant when the activity could impact on the coastline and coastal waters.
Cossack Boat Hire	Considered Relevant Persons under Regulation 25(1)(d)	Boat hire company in Cossack, in vicinity of Wickham and Point Samson and Dampier Archipelago. Relevant when the activity could impact on the coastline and coastal waters.
Dirk Hartog Island Eco Lodge	Considered Relevant Persons under Regulation 25(1)(d)	Eco lodge located on Dirk Hartog Island. Relevant when the activity could impact on the coastline and coastal waters.
Dive Ningaloo	Considered Relevant Persons under Regulation 25(1)(d)	Dive school operating out of Exmouth. Relevant when the activity could impact on the coastline and coastal waters.

Relevant person	Relevance to the activity	Functions, interest or activities
Exmouth Dive Centre	Considered Relevant Persons under Regulation 25(1)(d)	Diving and whale shark tours at Ningaloo Reef. Relevant when the activity could impact on the coastline and coastal waters.
Live Ningaloo	Considered Relevant Persons under Regulation 25(1)(d)	Luxury tour operator offering whale shark and humpback whale swims at Ningaloo Marine Park. Relevant when the activity could impact on the coastline and coastal waters.
Mac Attack Fishing Charters	Considered Relevant Persons under Regulation 25(1)(d)	Fishing charter boat service in the Shark Bay region. Relevant when the activity could impact on the coastline and coastal waters.
Mackerel Islands	Considered Relevant Persons under Regulation 25(1)(d)	Accommodation, activities and tours on the Mackerel Islands. Relevant when the activity could impact on the coastline and coastal waters.
Ningaloo Blue Dive	Considered Relevant Persons under Regulation 25(1)(d)	Privately owned charter operation offering whale shark and humpback whale swims operating from Exmouth. Relevant when the activity could impact on the coastline and coastal waters.
Ningaloo Coral Bay Boats	Considered Relevant Persons under Regulation 25(1)(d)	Range of eco-certified tours and cruises of Ningaloo Reef, operating out of Coral Bay. Relevant when the activity could impact on the coastline and coastal waters.
Ningaloo Discovery	Considered Relevant Persons under Regulation 25(1)(d)	Eco-certified experience swimming with the whale sharks operating out of Exmouth. Relevant when the activity could impact on the coastline and coastal waters.
Ningaloo Glass Bottom Boat	Considered Relevant Persons under Regulation 25(1)(d)	Family-owned business offering glass bottom boat trips at Ningaloo Reef. Relevant when the activity could impact on the coastline and coastal waters.
Ningaloo Reef Dive & Snorkel	Considered Relevant Persons under Regulation 25(1)(d)	Diving and snorkelling adventures in Coral Bay. Relevant when the activity could impact on the coastline and coastal waters.
Ningaloo Safari Tours	Considered Relevant Persons under Regulation 25(1)(d)	Boat tours of Yardi Creek and Ningaloo Marine Park operating out of Exmouth. Relevant when the activity could impact on the coastline and coastal waters.

Relevant person	Relevance to the activity	Functions, interest or activities
Ocean Eco Adventures	Considered Relevant Persons under Regulation 25(1)(d)	Niche boutique cruise company specialising in marine interaction cruises in World Heritage Listed, Ningaloo Reef Marine Park. Relevant when the activity could impact on the coastline and coastal waters.
Pelican Charters	Considered Relevant Persons under Regulation 25(1)(d)	Luxury private boat charters along the WA coast. Relevant when the activity could impact on the coastline and coastal waters.
Perfect Nature Cruises	Considered Relevant Persons under Regulation 25(1)(d)	Eco-certified sailing catamaran tours from Monkey Mia. Relevant when the activity could impact on the coastline and coastal waters.
Pilbara Tours	Considered Relevant Persons under Regulation 25(1)(d)	Fishing and other tours operating from Port Hedland. Relevant when the activity could impact on the coastline and coastal waters.
Reef Seeker Charters	Considered Relevant Persons under Regulation 25(1)(d)	Day trips and sunset cruises within the Dampier Archipelago. Relevant when the activity could impact on the coastline and coastal waters.
Sail Ningaloo	Considered Relevant Persons under Regulation 25(1)(d)	Reef sailing, snorkelling, diving and whale shark tours at Ningaloo. Relevant when the activity could impact on the coastline and coastal waters.
Shark Bay Boat Hire	Considered Relevant Persons under Regulation 25(1)(d)	Private fishing charters and boat hire operating out of Shark Bay. Relevant when the activity could impact on the coastline and coastal waters.
Shark Bay Dive & Marine Safaris	Considered Relevant Persons under Regulation 25(1)(d)	Full day safari and dive and snorkel tours operating out of Shark Bay. Relevant when the activity could impact on the coastline and coastal waters.
Shark Bay World Heritage Discovery & Visitor Centre	Considered Relevant Persons under Regulation 25(1)(d)	Visitor centre showcasing the significance and history of the Shark Bay region. Relevant when the activity could impact on the coastline and coastal waters.
Three Islands Whale Shark Dive	Considered Relevant Persons under Regulation 25(1)(d)	Whale shark tours operating out of Exmouth. Relevant when the activity could impact on the coastline and coastal waters.

Relevant person	Relevance to the activity	Functions, interest or activities
View Ningaloo	Considered Relevant Persons under Regulation 25(1)(d)	Semi-submersible catamaran vessel operating at Ningaloo Reef. Relevant when the activity could impact on the coastline and coastal waters.
Yardie Creek Boat Tours	Considered Relevant Persons under Regulation 25(1)(d)	Boat cruises of Yardi Creek. Relevant when the activity could impact on the coastline and coastal waters.

4.8 Consultation methodology

The approach Jadestone is undertaking for consultation in this EP is outlined below:

- Identify Relevant Persons (as per Section 4.5)
- Provide detailed information sheet and area map to commence the consultations via various avenues such as consultation packages and the Jadestone website
- Provide a table of risks and management measures for those seeking additional information
- Respond to requests for additional information from Relevant Persons who have concerns or interests and offer direct consultation with relevant technical staff where applicable
- Advertise and offer information sessions
- Allow a reasonable period of time for the Relevant Person to review and respond to any information provided, at least four weeks
- Follow up with Relevant Persons whose functions, interests, or activities may be affected by the activities of the EP, via phone, email/s or in person to ensure they have received the information and verify if they have remaining questions or concerns
- Ensure Relevant Persons were informed about the consultation process and how their feedback, questions and concerns were considered in the EP, including the management of sensitive information.

A number of communication methods may be used to exchange information during consultation, including:

- Written documentation or information provided in person or remotely by methods such as post, email, via website or social media; and/ or
- Verbal communication during telephone calls (pre-emptory or in response / follow up), targeted meetings, focus groups, workshops, information sessions; webinars and/or
- Other means as recommended, particularly in relation to cultural heritage values and sites.

Regardless of the method applied, the information provided to the Relevant Person has been targeted as much as possible to reduce the information burden on the Relevant Person, to reduce the possibility of confusion or misinformation, and to improve the likelihood of receiving valuable feedback from the consultation process. The methods Jadestone is using are listed below. The method/s adopted has depended on the nature and scale of an activity and advice on the most appropriate method as advised by each Relevant Person at the time of the initial consultation.

- Email
- Post
- Phone calls
- Public meetings, including by way of webinars
- For Traditional Owners, presentations face-to-face on country
- Newspaper advertisements
- Social media
- Community noticeboards
- Liaison with other titleholders to collaborate in undertaking consultation and thereby reduce stakeholder fatigue.

Where post is returned to sender, this is lodged and a follow up issued to the custodian of the individual licence holder database (e.g. DPIRD, AFMA) to request confirmation of the postal address. Similarly, if

emails are undelivered, Jadestone make attempts to identify the correct email address to issue correspondence to and follow up with phone calls to confirm receipt if no email response is received (wherever feasible).

4.8.1 General Follow-up

Jadestone has developed a procedure (Figure 4-2) for follow-up with Commonwealth and State/Territory Government Departments, agencies and authorities, with Local Governments, with representative peak industry bodies, with other petroleum title holders, and with businesses, including tourism businesses. It should be noted that timeframes for follow up may change depending on the nature and scale of changes to activities and information provided to each Relevant Person.

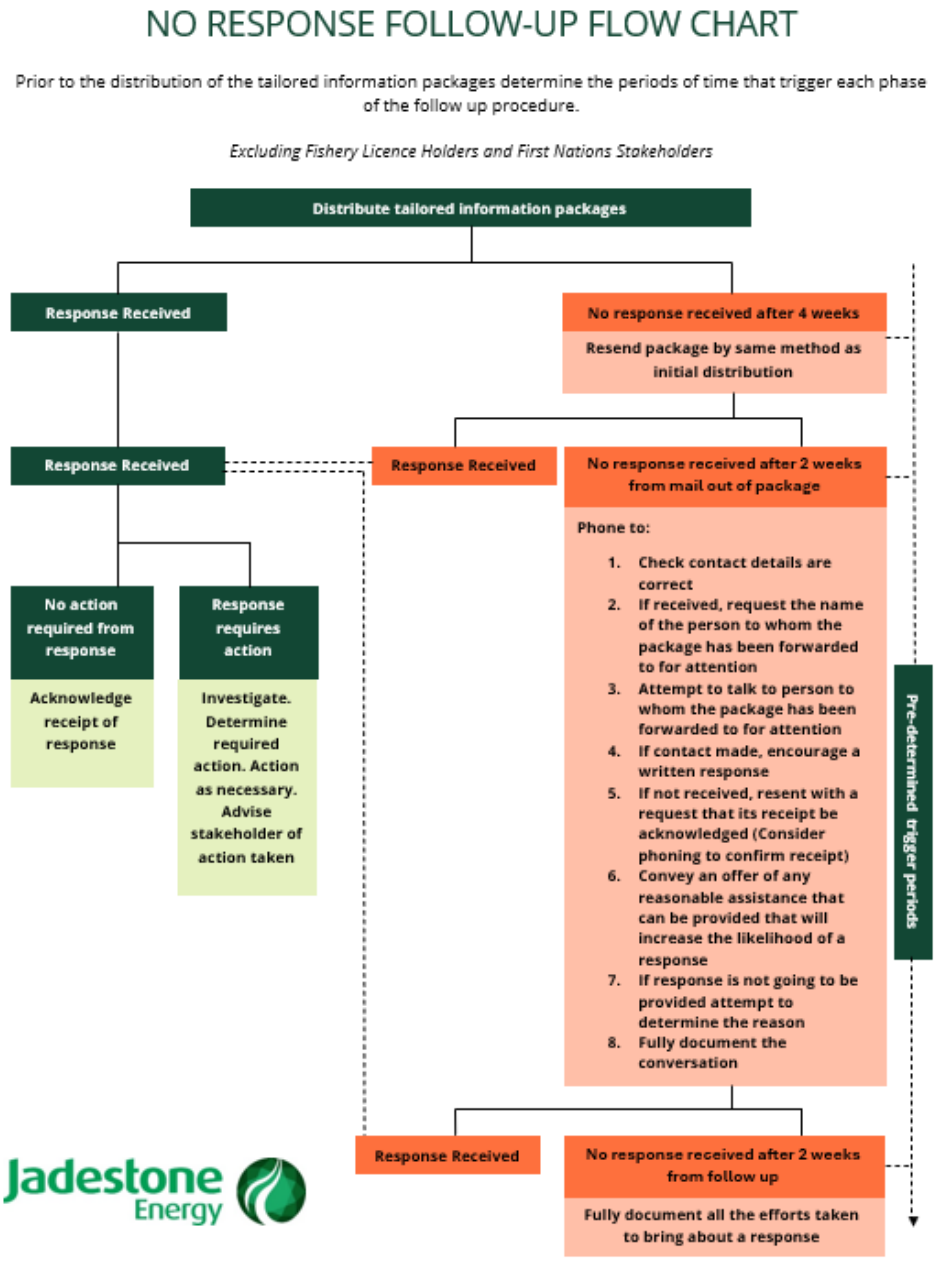


Figure 4-2: No response follow-up flowchart

4.8.2 Newspaper Advertisements

To assist Relevant Persons to self-identify display advertisements inviting consultation were placed in a number of newspapers in March 2023 (Appendix E):

- The Australian
- The West Australian
- Northwest Telegraph
- Koori Mail
- Pilbara News
- Midwest Times

To date, no responses have been identified as being elicited by the newspaper adverts with no additional Relevant Persons self-identifying themselves.

Notifications on upcoming community engagement sessions held at various locations (refer to Table 4-3) were also advertised in the Mid-West Times and Pilbara News from 6-13 December 2023 and North-West Telegraph and Pilbara Times from 10-17 January 2024 and to ensure relevant persons had opportunity to engage with Jadestone directly at the sessions, or through the advertisements themselves which had a QR code for the Jadestone website where key information packages and the EP are available for review.

4.8.3 Provision of Information

The OPGGS(E) Regulations require titleholders to give each Relevant Person sufficient information to allow the Relevant Person to make an informed assessment of potential effects on their functions, interests or activities from the activities in the EP. Provision of information is responsive and adaptive to the individual needs and circumstances of the Relevant Person seeking the information.

Updates on the Stag project, and advice about future activities have been provided via email and published on the Jadestone website. Copies of these emails (and responses from Relevant Persons) and consultation specific to this EP revision has been included in Appendix E and the Sensitive Information Report submitted to NOPSEMA.

Jadestone believe that reasonable timeframes have been afforded to all Relevant Persons and following completion of community presentations is in a position to close consultation required for the development of this EP. A further email was issued to all Relevant Persons requesting that to enable feedback to be included in this resubmission that feedback is received by 15th January 2024.

As at the time of this current re-submission, Jadestone's attempts to consult with Relevant Persons have been occurring for in excess of twelve months.

4.8.4 Management of Objections and Claims

Objections or claims raised by Relevant Persons during consultation have been assessed and substantiated, as appropriate, by evidence, such as publicly available credible information and/or scientific data, including fishing data.

Where the objection or claim is substantiated, it has been assessed against Jadestone's risk assessment process and, where appropriate, controls applied to manage impacts and risks to ALARP and an acceptable level. Relevant persons have been provided with feedback as to how their objection or claim has been assessed and if any controls were put in place to manage the risk or impact to ALARP and an acceptable level. If the objection or claim is raised after the EP is accepted and triggers a revision of the EP this will be managed in accordance with Jadestone's Management of Change processes and the Relevant Person will be advised of the process.

4.9 Engagement Process

4.9.1 Historical engagement

Stag is an existing facility that has been in operation since 1998. Jadestone Energy purchased the existing Stag Facility from Quadrant Energy in 2016. Quadrant Energy had a Consultation Strategy that incorporated updates to Relevant Persons of Stag related activities. As a result, Relevant Persons identified for Stag have been informed and consulted on a regular basis for some time and had already been in contact with many stakeholders regarding their intended review of the Operations Environment Plan. This included engaging WAFIC to consult with the relevant Western Australian managed commercial fisheries and fishing associations.

Following the completion of the purchase, updates on the Stag project, and advice about future activities were provided via email to stakeholders and posted on the Jadestone website. Key notices were issued in February 2018, when an email with drilling update fact sheet (general and fisheries) was sent to Relevant Persons and in January 2019 a commencement of drilling notification email was sent to Relevant Persons. In March 2020 an email with fact sheet was sent to Relevant Persons notifying them that Jadestone was preparing an EP for ongoing drilling operations over the coming five years.

4.9.2 Additional Consultation – Stag 50H and 51H Drilling EP

Additional consultation was undertaken as part of the Stag 50H and 51H Drilling EP (GF-70-PLN-I-00008), including:

- December 2021 – Email with factsheet (general and fisheries package) sent to Relevant Persons notifying them of two EPs at Stag facility – ongoing production and maintenance at the Stag facility over the next five years and plug and abandonment of two production wells and then drilling of two new production wells at the Stag Facility.
- July 2022 – commencement of drilling notification email sent to WAFIC, DMIRS and Recfishwest (as detailed in Table 9.1 of the EP) (NOPSEMA, AMSA & AHO / JRCC contacted by Jadestone directly).

A summary log is included in Table 1, Appendix E and associated emails in the Sensitive Information Report.

4.9.3 Consultation – Current

Table 4-5 provides a summary of consultation undertaken to date for this revision of the EP and Table 4-7 provides a status of current consultation.

Table 4-5: Information provided to Relevant Persons

Format	Description
Consultation document	An Invitation for Consultation document was prepared and distributed. The document was prepared with sub-regulation 25(2) and associated guidance in mind to ensure it adequately described the activity, including the risks associated with the activities. The document can be found in Appendix E.
Individual Responses	Jadestone provided written responses to all written enquires received from stakeholders to address their specific concerns throughout the duration of EP development. A separate sensitive information report (SIR) submitted to NOPSEMA contains all individual responses provided to stakeholders as part of this process.
Mail-outs, emails and phone calls	Mail-outs, emails and phone calls were used to consult with Relevant Persons as part of the development of the EP. The sensitive information report contains all of the mail-out correspondence, emails and phone call details, captured as part of Relevant Person consultation.

Format	Description
Community Engagement Sessions	In summary, eight community engagement sessions were held between 12-14 December 2023 and 17-19 January 2024. All sessions were advertised in newspapers, on social media and on local notice boards (where available). All Relevant Persons that Jadestone have email addresses for were also informed of the sessions to provide further opportunity for engagement.

4.9.4 Community Engagement Sessions Summary

Community engagement sessions were held in December 2023 and January 2024 to ensure engagement with as many members of the communities along the coastline adjacent to the EMBA as possible. This was undertaken to complement the extensive searches and historical engagement already undertaken to identify Relevant Persons. The sessions ensured that Jadestone are confident that all potentially Relevant Persons have been identified and provided with adequate information and a reasonable timeframe to respond in accordance with Regulation 25 of the OPGGS(E)R. The overall statistics for the newspaper and social media reach are provided in Table 4-6. Through the advertising of these sessions, there was potential for over 33,769 readers (newspaper advertisements) and over 67,932 social media users to become aware of the community engagement sessions. Although attendance at the sessions was not close to this, the QR code on the advertisements also provided quick and easy access to further information.

Table 4-6: Summary of community information session statistics

Location	Advertising			Newspaper	Attendance
	Reach[1]	Impressions[2]	Clicks[3]	Readership	Attendees
Coral Bay	658	1,333	3	11,545	0
Exmouth	5,384	7,641	8		0
Carnarvon	5,688	8,103	11	16,739	0
Denham	2,302	3,882	9		1
Onslow	7,044	9,988	11	11,545	2
Karratha	17,158	23,625	16		3
Dampier	12,508	17,234	14		1
Port Hedland	17,190	24,285	16	5,485	0
TOTAL	**67,932**	**96,091**	**88**	**33,769**	**7**

1. *Reach: The number of people who saw the ad at least once.*
2. *Impressions: The number of times the advertisement was seen (e.g. if 1 person sees an ad 5 times, the reach would be 1 and impressions would be 5).*
3. *Clicks (links): The number of clicks on links within the advertisement.*

Overall, the areas of concern related to:

- No significant concerns from the communities, not overly concerned in relation to environment matters, more interested in commercial opportunities.
- Request to be added to Relevant Persons list by representatives in Onslow information session.
- Three communities expressed an interest in decommissioning (Onslow, Karratha and Dampier).

- Two communities expressed an interest in spill response, oil spill risk and potential shoreline contact (Onslow and Karratha).

In response to the above, Jadestone have included updates to the OPEP ensuring notifications to PBCs in the event of a level 2 or 3 spill moving towards the WA coastline.

Table 4-7: Current status of consultation (October 2024)

Stakeholder	Key dates and information	Next steps
All Relevant Persons excluding commercial fishing licence holders and First Nations peoples.	22 December 2022 – information package emailed. 17 February 2023 – follow up email sent. Follow up phone calls completed. 5 December 2023 & 10 January 2024 – email notifying Relevant Persons of upcoming community information sessions.	If two weeks later no response had been received, Jadestone commenced follow up phone calls to determine if the contact details were correct and if the information package had been received. If not received, the information package was sent to other contact details provided on the call. This process is complete, and evidence detailed in the stakeholder log, Appendix E. **Consultation complete. No further actions required.**
Commercial fishing licence holders Details of licence holders consulted as part of the initial mailout and follow up mail out provided in the Sensitive Information Report.	9 January 2023 – Hard copy information package posted. To date two responses have been received from individual Tuna Fishery licence holders. 4 August 2023 – Follow-up mailout and emails (where possible) to licence holders still considered Relevant Persons.	Jadestone undertook a second mail out to licence holders still considered relevant persons as detailed in Section 4.5.3. To minimise stakeholder fatigue, the correspondence is issued with information on other Jadestone activities at the same time. **Consultation complete. No further actions required**.
YMAC	4 April 2023	Following meeting and advice from YMAC initial contact has been made with 11 Aboriginal Corporations seeking the first available opportunity to make presentations to their directors.
Traditional Owners	Jadestone has provided initial consultation presentations to the Directors and Elders of the following PBCs: • Buurabalayji Thalanyji Aboriginal Corporation • Kariyarra Aboriginal Corporation • Nanda Aboriginal Corporation • Nganhurra Thanardi Garrbu Aboriginal Corporation • Nyangumarta Karajarri Aboriginal Corporation • Nyangumarta Warrarn Aboriginal Corporation • Wanparta Aboriginal Corporation • Wirrawandi Aboriginal Corporation	As detailed in Section 4.5.5 Jadestone remain available for meetings with Directors for the following PBCs if requested: • Malgana Aboriginal Corporation • Ngarluma Aboriginal Corporation Evidence of the correspondence effort to organise these meetings is detailed in Appendix E and the Sensitive Information Report. **Consultation complete. No further actions required**

Stakeholder	Key dates and information	Next steps
	• Yinggarda Aboriginal Corporation Meeting minutes are included in the Sensitive Information Report.	
Community Engagement Sessions	12 – 14 December 2023: Community presentations held in Coral Bay, Exmouth, Carnarvon and Denham. 17 – 19 January 2024: Community presentations held in Onslow, Karratha, Dampier and Port Hedland. Further details provided in Table 4-3.	No further actions required. Information provided to six people/organisations who requested additional information following the sessions. **Consultation complete. No further actions required.**

4.10 Reasonable period

Recipients of the Invitation for Consultation document were encouraged to provide comment within a six-week period, allowing time for postal letters to be delivered and potential return posts to be received, as well as a timeframe for consideration of a response. Comments provided outside of this time were still considered and incorporated into the approvals process wherever practicable. Following this period, email reminders and phone calls were undertaken to remind Relevant Persons to respond, and Jadestone afforded a further four weeks to those Relevant Persons.

The Stag EP includes emergency response plans. Pursuant to the environment regulations, Commonwealth and State government departments, agencies and authorities have been, and will continue to be, consulted on response preparedness for an uncontrolled discharge of oil from vessels or the well.

As of November 2023, any Relevant Persons who had not yet responded to any consultation efforts were contacted again to ask for responses to be sent by 15th January 2024. Allowing a further six-week timeframe for response. Consultation effort for this activity has now extended for in excess of twelve months.

4.11 Assessment of Relevant Persons objections and claims

Prior to engaging with Relevant Persons, Jadestone reviewed the comments, objections and claims raised through the previous Stag Operations EPs.

For all responses received by Jadestone during the engagement, the merit of each of these responses was assessed. Assessment of merit for the historical Stag 50H and 51H drilling EP is found in Table 4-8 (as it is considered relevant to the ongoing operations activity subject to this EP). Assessment of merit for current consultation (post the Decision) for all Relevant Persons excluding PBC's is found in Table 4-9. An Assessment of Merit for each PBC is provided in Table 4-10. The responses provided for other approvals were specific to those documents, therefore the references to tables and sections of the EP and OPEP have likely changed. However, as relevant, the required changes have been incorporated into the Stag Operations EP and OPEP.

The summary provides details of the information sent to Relevant Persons and others, and any responses received. It also details the assessment undertaken of any objection or claims. Consultation undertaken prior to this time has been reported in other EPs prepared for the Stag Project, along with all of Jadestone's and previous Stag titleholders accepted EPs and can be viewed on the NOPSEMA website.

Where an objection or claim was raised by a Relevant Person, they were provided feedback as to how it was assessed, whether the objection or claim was substantiated and, if so, if additional controls were put in place to manage the impact or risk to ALARP and an acceptable level.

Where an objection or claim was substantiated by evidence such as publicly available credible information and/or scientific data, including fishing data, this was assessed as per the risk assessment process detailed in Section 4.12 and controls applied where appropriate to ensure impacts and risks are managed to ALARP and an acceptable level.

Copies of the full text of any responses by Relevant Person have been provided to NOPSEMA as a Sensitive Information Appendix under regulation 26(8) of the OPGGS(E).

Table 4-8: Assessment of merit – Historical Drilling EP

Stakeholder	Stakeholder concern, objection or claim	Jadestone assessment of merit	Jadestone response
Australian Maritime Safety Authority	**Stakeholder Engagement** To notify AMSA's Joint Rescue Coordination Centre (JRCC) (rccaus@amsa.gov.au, Ph 1800 641 792) 24-48 hrs prior to operations commencing and at cessation of operations. Australian Hydrographic Office (datacentre@hydro.gov.au) to be contacted no less than 4 working weeks prior to operations commencing for the promulgation of related notices to mariners. To plan to provide updates to both the Australian Hydrographic Office and the JRCC on progress and, importantly, any changes to the intended operations.	Jadestone considers this comment has merit and has been actioned through changes to the EP.	Item included in Table 4-11.
Australian Fisheries Management Authority (AFMA)	Unable to comment on individual proposals but noting resources for consultation with representative bodies or licence holders.	Comment has merit and has been actioned.	In accordance with this guidance, as part of Jadestone's standard approach to consultation the representative bodies for Commonwealth fisheries have been engaged with during the development of the EP.
Australian Hydrographic Office (AHO)	Acknowledged and noted will be included in charting information.	Noted	No further action required.
Department Transport (DoT)	Comments received on Revision 0 of the OPEP in relation to: • responsibility of response activities as defined in the State Hazard Plan – MEE • Clarification on "no dispersant" zones • Further details on the role of the Environmental & Scientific Coordinator for providing advice and dispersant testing details of a media plan or	Comment has merit and has been actioned through changes to the OPEP.	DoT were issued Revision 0 of the OPEP upon submission to NOPSEMA. Responses to DoT comments have been incorporated into Revision 1 of the OPEP and a response to comment issued to DoT. A summary is provided below: • Changes have been made throughout the OPEP, amending use of HMA to the SMPC where relevant. Section 5.3 of Appendix A7 has also been amended to reflect the role of the HMA versus the SMP.

Stakeholder	Stakeholder concern, objection or claim	Jadestone assessment of merit	Jadestone response
	consultation and involvement of indigenous communities • Arrangements for cost recovery		• Section 10.7 of the OPEP does provide criteria for where dispersant must not be applied. A new Section 10.9 has been added that provides guidance on use of dispersant in State Waters when DoT is required to provide consent. • In seeking the consent of the HMA/SMPC to use dispersants in State waters, the Incident Commander is expected to have had the option assessed by a panel formed within the IMT. This panel should be chaired by the Incident Controller and include the participation of the State Environmental Scientific Coordinator (ESC). The involvement of the CSIRO or other subject matter experts on the panel should also be considered. • Appendix A7, Section 9 of the OPEP outlines under Notifications and Media Strategy that the IMT Leader will work with the Media Team to ensure a media holding statement is prepared. • Deputy Public Information Officer's role has been updated to include (Table A7-9 of Appendix A7) – Advise on appropriate Aboriginal engagement and management strategies in the event of potential exposure of Aboriginal heritage sites, lands or waters to hydrocarbon spills, or for the potential access of responders to Aboriginal heritage sites or land. • A 'Cost Recovery' section has been added to Appendix A7, Section 8.4 of the OPEP, and includes the following statement: As required under Section 571(2) of the OPGGS Act 2006, Jadestone has financial assurances in place to cover any costs, expenses and liabilities arising from carrying out its petroleum activities, including major oil spills. This includes costs incurred by relevant control agencies (e.g. DoT) and third-party spill response service provider.

Stakeholder	Stakeholder concern, objection or claim	Jadestone assessment of merit	Jadestone response
Department of Mines (DMIRS)	**Stakeholder Engagement** To provide DMIRS (petroleum.environment@dmirs.wa.gov.au) with pre-start notification confirming the start date of the proposed activity and a cessation notification to inform DMIRS upon completion of the activity Ensure the EP includes information about the reporting of environmental incidents that could potentially impact on any land or water in State jurisdiction, including that any notifications or reports are to be sent to petroleum.environment@dmirs.wa.gov.au.	Jadestone considers this comment has merit and has been actioned through changes to the EP.	Item previously included in implementation section of EP (no longer required as activity has commenced). Item included in 'Routine and incident reporting requirements.
Department of Primary Industry and Regional Development (Fisheries Branch)	Stakeholder Engagement Suggested changes/ additions to current mitigation and management measures for IMS: • changing the wording from "if required" to "as required" • Notification of potential detection of IMS in WA waters is made to DPIRD within 24 via Fishwatch (ph 1800 815 507) or by email to Aquatic.Biosecurity@dpird.wa.gov.au and will follow subsequent advice provided by Aquatic Biosecurity Use the online tool Vessel Check to manage the biosecurity risk for vessels entering WA waters https://www.vessel-check.com	Jadestone considers these comments to have merit, and they have been addressed in the EP.	Section 7.1.3 of the EP includes requirements to comply with the Biosecurity Manual (JS-70-MN-G-00001). DPIRD notification already included in Table 4-11. Email address has been updated throughout the EP. Jadestone has a Marine Biosecurity Manual (JS-70-MN-G-00001) which applies to vessels (including third party tanker at Stag Field) and mobile offshore drilling units (MODUs) under contract by Jadestone, and to all marine vessel operations in Jadestone Operational Areas with the exception of offtake tanker activities at Montara. This manual has also been inspected by NOPSEMA and deemed to meet EP requirements. All vessels engaged by Jadestone are to be subject to biofouling risk evaluation and management procedures in a manner consistent with Australian national (i.e. Commonwealth) policies and regulations, and relevant State and NT regulations, as applicable. The manual includes a comprehensive vessel risk assessment using tailored risk evaluation tools for international and domestic vessels and MODUs.

Stakeholder	Stakeholder concern, objection or claim	Jadestone assessment of merit	Jadestone response
Director of National Parks (DNP)	**Stakeholder Engagement** Confirmed no authorisation required as outside AMP When preparing the EP avoiding impacts on migratory species should be considered such as the use of low power and shut down zones and timing of the activity – with particular attention to managing the risk to turtle foraging and internesting locations. When preparing the EP AMP values and representativeness should be considered and all impacts and risks to AMPs identified and shown to be managed to acceptable level and ALARP. Consistency with the management plans should also be included. Confirmed DNP do not need any further notification on progress unless change of activity results in overlap with or new impact to a marine park or for emergency responses. DNP should be made aware of oil/gas pollution incidences which occur with a marine park or are likely to impact on a marine park as soon as possible. Notification should be provided to the 24-hour Marine Compliance Duty Officer on 0419293465. Notification should include: • Titleholder details • Time and location of the incident (including name of marine park likely to be affected) • Proposed response arrangement as per the Oil Pollution Emergency Plan • Confirmation of providing access to relevant monitoring and evaluation reports when available, and • Contact details for the response coordinator.	Jadestone considers these comments to have merit, and they have been addressed in the EP.	EP has been drafted to include information on the AMPs in Appendix C With no AMP in the operational area there is not expected to be any impact from planned activities on any AMPs. EP has been drafted to include information on managing risk to turtle foraging and interesting, in particular in relation to light (Section 6.1) low power and shut down zones are not relevant to the drilling activity (applicable to seismic or VSP surveys only). Triggered consultation item included to notify AMP DG if any change to planned activity that results in change in risk to AMP (Table 4-12). Notification of DNP in the event of an oil or gas pollution incident has been included in the EP.

Stakeholder	Stakeholder concern, objection or claim	Jadestone assessment of merit	Jadestone response
Department of Water and Environmental Regulation (DWER)	No comments on the activity	Noted	No action required.
Recfishwest	Suggested Jadestone contact the two main fishing clubs in Karratha. Would like to be updated on the project going forward	Jadestone considers these comments to have merit, and they have been addressed in the EP.	King Bay Game Fishing Club and Nickol Bay Sportsfishing Club have both been contacted and Jadestone are awaiting response. Item included in Stag Drilling EP to ensure notification to Recfishwest on commencement and cessation of activity.
Western Australian Fishing Industry Council (WAFIC)	WAFIC asked for information on the following: • Baseline scientific data on aquatic organisms and the aquatic environment • Detailed post spill scientific monitoring of aquatic organism and aquatic environment • Communication strategy that considers the commercial fishing industry in the event of a spill event • Support to the commercial fishing industry with regards to traceability of fish products to manage tainting risks, if required. • Financial assistance to the commercial fishing industry in the event of a spill event.	Comment has merit and has been actioned.	Response was issued to WAFIC on 18 January 2022. Summary of responses below, no changes have been made to the EP or OPEP: • Baseline scientific data on aquatic organisms and the aquatic environment • There are a number of existing baseline data sources that Jadestone uses including Industry-Government Environmental Metadata System (I-GEMS), Australian Ocean Data Network (AODN), Oil Spill Response Atlas (OSRA) and The Atlas of Living Australia (ALA). • Detailed post spill scientific monitoring of aquatic organism and aquatic environment • Jadestone has a comprehensive Framework for Scientific Monitoring that includes post-spill monitoring of the following marine receptors: Water Quality, Sediment Quality, Intertidal Mudflats, Sandy Beaches and Rocky Shores, Mangroves, Benthic Habitats, Marine Fauna, Seafood Quality, Fisheries and Aquaculture, Fish and Invertebrates. • Communication strategy that considers the commercial fishing industry in the event of a spill event.

Stakeholder	Stakeholder concern, objection or claim	Jadestone assessment of merit	Jadestone response
			• In the event of a spill, Jadestone has a defined process for conducting notifications to regulatory authorities and support organisations. Section 17.2 of the OPEP includes an initial action outlining this, and references Appendix A6 (Regulatory Notifications). Appendix A6 includes a requirement for Jadestone to contact AFMA and DPIRD (Fisheries) within 8 hours. From this notification, Jadestone will liaise with those agencies and contact the relevant active commercial fisheries. • Support to the commercial fishing industry with regards to traceability of fish products to manage tainting risks, if required. • This is included in SMP 7 – Seafood Quality, Fisheries and Aquaculture. In the event of a significant hydrocarbon spill event that triggers scientific monitoring, the aim of SMP 7 is to identify potential health risks due to the presence of hydrocarbons in the flesh of targeted fish/ fisheries/ aquaculture species. • Financial assistance to the commercial fishing industry in the event of a spill event • As required under Section 571(2) of the OPGGS Act, the titleholder must, at all times while the title is in force, maintain financial assurance sufficient to give the titleholder the capacity to meet costs, expenses and liabilities arising in connection with, or as a result of the carrying out of the petroleum activity. Further details on each of these bullet points is provided in email correspondence in the SIR.

Table 4-9: Assessment of Merit – Current consultation (post-Tipakalippa decision) as of January 2025

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
Australian Council of Prawn Fisheries (ACPF)	**No objection, concern or claim** Asked Jadestone to consult with WAFIC.	Noted. Jadestone has already consulted with WAFIC.	No action required
Australian Fisheries Management Authority (AFMA)	***No objection, concern or claim*** Noted the importance of consulting with all fishers who have entitlements to fish within proposed area, either through the relevant fishing industry associations or directly with fishers	Comment has merit and has been actioned.	In accordance with this guidance, as part of Jadestone's standard approach to consultation the relevant fishing industry associations and/or individual fishers have been engaged with during the development of the EP.
Australian Hydrographic Office (AHO)	***No objection, concern or claim*** Acknowledged and noted will be included in charting information.	Noted	No further action required.
Australian Institute of Marine Science (AIMS)	***No objection, concern or claim*** Planned activities will not interfere with AIMS operations.	Noted	No action required
Australian Maritime Oil Spill Centre (AMOSC)	***No objection, concern or claim*** Requested a copy of EP and OPEP.	Noted	Stag OPEP and relevant risk scenarios from Stag EP sent as requested.
Australian Maritime Safety Authority (AMSA)	***No objection, concern or claim*** Stakeholder Engagement	JSE considers these comments have merit and have	• Item included in Table 4-11 to ensure notification 4

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
	• Australian Hydrographic Office (datacentre@hydro.gov.au) to be contacted no less than 4 working weeks prior to operations commencing for the promulgation of related notices to mariners. • Notify AMSA's Joint Rescue Coordination Centre (JRCC) (rccaus@amsa.gov.au, Ph 1800 641 792) 24-48 hrs prior to operations commencing and at cessation of operations. • Plan to provide updates to both the Australian Hydrographic Office and the JRCC on progress and, importantly, any changes to the intended operations.	incorporated these into the EP.	working weeks prior to commencement. • Item included in Table 4-11 to ensure notification 48 hours prior to operations commencing and at cessation. • Item included in Table 4-11 to ensure notification to AHO and JRCC.
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	***No objection, concern or claim*** Correspondence in relation to commercial Southern Bluefin Tuna fishing effort within the EMBA.	Noted	No action required.
City of Karratha	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required.
Clean Energy Regulator (CER)	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required.
Commonwealth Fisheries Association (CFA)	***No objection, concern or claim*** CFA are not resourced to give feedback. Advised to direct enquiries to the associations that represent the directly affected fisheries/fishers. May need to engage on a fee for service basis.	Comment has merit and has been actioned.	In accordance with this guidance, as part of Jadestone's standard approach to consultation the representative bodies for Commonwealth

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
			fisheries have been engaged with during the development of the EP.
Community Engagement Sessions Feedback	• ***No objection, concern or claim*** Community not overly concerned in relation to environmental matters, more interested in commercial opportunities. • General request to be added to Relevant Persons list. • Expressed interest in decommissioning and oil spill response.	Comment has merit and has been actioned.	Added to Relevant Persons list and sent information on decommissioning and spills as requested.
Coral Bay Maritime Facility and Exmouth Boat Harbour	***No objection, concern or claim*** No concerns or comments on the proposed activity.	Noted	No action required
Department of Biodiversity, Conservation and Attractions (DBCA) (WA)	• Requested baseline data • Request for amendment to incident and emergency response notification requirements in OPEP.	Jadestone considers these comments to have merit, and they have been addressed in the OPEP.	Baseline data summary for SMPs sent to DBCA and notification requirements amended in A6 of OPEP and EPS added.
Department of Biodiversity, Conservation and Attractions (DBCA) Shark Bay World Heritage Advisory Committee (SBWHAC)	Requested information on: • Addressing and mitigating any adverse effects on marine and shorebird migratory behaviour from project marine traffic and potential oil spill events • How Jadestone will effectively prevent and/or and manage oil spills • How Jadestone will evaluate and mitigate potential impacts from ballast water discharge • How Jadestone will assess relevant seabed ecology, predict impacts on it and the content of a project rehabilitation plan • Jadestone's view on fossil fuels extraction and consumption. Offer for Jadestone to present the project in greater detail.	Jadestone considers these comments to have merit, and they have been addressed in the EP and OPEP.	Response sent with requested information. Jadestone offered to meet the committee.

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
WA Department Transport (DoT)	***No objection, concern or claim*** Provided guidance note. Provided comments on Stag OPEP.	Noted	Comments incorporated into OPEP.
Director of National Parks (DNP)	***No objection, concern or claim*** Stakeholder Engagement • Confirmed no authorisation required as outside AMP and no objections or claims at this time • Link to guidance note on Marine Parks provided • When preparing the EP AMP values and representativeness should be considered and all impacts and risks to AMPs identified and shown to be managed to acceptable level and ALARP. Consistency with the management plans should also be included • Notification details in the event of an incident provided • DNP should be made aware of oil/gas pollution incidences which occur with a marine park or are likely to impact on a marine park as soon as possible. Notification should be provided to the 24-hour Marine Compliance Duty Officer on 0419 293 465. Notification should include: ○ Titleholder details ○ Time and location of the incident (including name of marine park likely to be affected) ○ Proposed response arrangement as per the Oil Pollution Emergency Plan ○ Confirmation of providing access to relevant monitoring and evaluation reports when available, and ○ Contact details for the response coordinator.	Jadestone considers these comments to have merit, and they have been addressed in the EP.	Guidance note is referenced in EP (Appendix B). EP has been drafted to include information on the AMPs in Appendix C. With no AMP in the Operational Area there is not expected to be any impact from planned activities on any AMPs. Triggered consultation item included to notify AMP DG if any change to planned activity that results in risk to AMP (Table 4-12). Item included in Table 4-12 to ensure DNP notification in event of an oil/gas pollution incident.
Department of Defence (DOD)	***No objection, concern or claim***	Jadestone considers these	Item included in Table 4-11 to ensure

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
	• Activity is located outside any Defence Training Areas and restricted airspace. • Advised of risk of UXOs. • Continued liaison with AHS for Notice to Mariners required.	comments to have merit, and they have been addressed in the EP.	AHS notification three weeks prior to commencement of activities.
Department of Primary Industry and Regional Development (DPIRD)	***No objection, concern or claim*** Have previously provided comments.	Previous comments have been included in the EP. No significant changes in relation to biosecurity.	No action required
Department of Water and Environmental Regulation (DWER) (WA)	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required.
Greenpeace	Requested information on emissions, spill modelling and spill response plan as well as information on how Jadestone have identified Relevant Persons and why Greenpeace is considered a Relevant Person.	Comment has merit and has been actioned.	Response sent with information detailing how Relevant Persons have been identified, as well as requested information on emissions, spill modelling and spill response plans.
Tuna Australia	Requested consultation with individual tuna fishery licence holders through Tuna Australia only.	Noted	Tuna Australia advised that Jadestone will continue its practice of consulting directly with individual tuna

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
			fishery licence holders.
King Bay Game Fishing Club (KBGFC)	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required.
Mackerel Islands	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required
National Offshore Petroleum Titles Administrator (NOPTA)	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required.
Ningaloo Coral Bay Boats	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required
PBCs (general)	General discussion with PBCs. • Every 6 months confirm PBC contact details • If oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written). Refer to Table 4-2 for further detail.	Noted	Item included in Triggered Consultation Actions (Table 4-12) to ensure relevant PBCs notified.
Pilbara Port Authority	***No objection, concern or claim*** No comments on the proposed activity.	Noted	No action required.
Point Samson John's Creek Boat Harbour	***No objection, concern or claim*** Asked Jadestone to consult with Marine Pollution Team.	Noted. Jadestone has already consulted with Marine Pollution Team.	No action required
Recfishwest	***No objection, concern or claim*** Requested to be added to the EP incident notifications.	Comment has merit and has been actioned.	Item included in Table 4-12 to ensure Relevant Persons are

Stakeholder	Stakeholder concern, objection or claim	JSE assessment of merit	JSE response
			notified in event of an oil/gas pollution incident.
Shire of Ashburton (SOA)	***No objection, concern or claim*** Risk of impact to Montebello Islands and further afield should a hydrocarbon spill occur.	Comment has merit and has been actioned.	Confirmation that EP includes appropriate measures to mitigate environmental impacts should a spill occur. The Montebello Islands is listed as a protection priority for spill response in the Stag EP and OPEP.
Western Australian Fishing Industry Council (WAFIC)	***No objection, concern or claim*** Ongoing correspondence in relation to advice on identifying commercial fishing licence holders.	Noted	No action required.
Yamatji Marlpa Aboriginal Corporation (YMAC)	***No objection, concern or claim*** Discussions seeking guidance and parties to contact for fair and meaningful consultation process.	Noted	No action required.

Table 4-10 Assessment of Merit for PBCs

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
Buurabalayji Thalanyji Aboriginal Corporation	Consultation meeting held with the Executive Management Team (EMT) of the Buurabalayji Thalanyji Aboriginal Corporation on 5 February 2024. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. The notes included: *BTAC indicated:* • *they, the EMT, could not provide comment on the EP.* • *Prior to JSE presenting to the Board and Common-Law holders BTAC would need to have undertaken an independent review of the Stag Operations EP, with JSE funding that work.* • *Opportunities for BTAC and Thalanyji to undertake work for JSE need to be explored.* *BTAC questioned the likely differences between the Stag Operations and Stag Drilling EPs. JSE indicated that due to the negative pressure of the reservoir there will be no material difference in the risk profiles for each activity, i.e. Operations and Drilling.* *JSE indicated it was preparing a draft consultation agreement for PBCs to consider.* *In relation to the questions at the end of the JSE PP presentation, BTAC indicated:* 1. *What values are important to you within our operational area and EMBA? –* ***For the identification of priority areas for protection requires discussion with the Directors.*** 2. *Do you have any comments on the activity and the potential impacts on you or your organisation's interests? -* ***Requires discussion with the Directors and Common Law holders.*** 3. *Would you like to hear from us again? Yes. If so when and how?* ***CEO will convey in writing.*** 4. *Is there anyone else you think we should talk to? -* ***Common Law holders****.* The Corporation emailed Jadestone on 6 February 2024 foreshadowing the Corporation would *like to engage (at Jadestone's cost) an independent environmental expert to undertake a quick review of the EP [linked below] with the aim of assisting informed consultation and an informed assessment about proposed offshore activities that may affect BTAC and Thalanyji people's interests and activities.* Jadestone responded to the Corporation on 13 February 2024, indicating *With regard to BTAC's proposal to engage an independent environmental expert to undertake a quick review of the Stag Environment Plan (EP), Jadestone agrees in the first instance, to BTAC identifying the aspects of the Stag EP that it wishes the expert to review, identifies at least two experts to undertake the review and obtains, for Jadestone's consideration, quotations from each to undertake the proposed review.* On 15 March 2024 Jadestone received a letter from the Corporation's CEO requesting Jadestone agree to pay the Corporation an amount to enable the Corporation to engage a named independent environmental expert to undertake a quick, targeted review of the Stag Operations EP relevant to Thalanyji's area of offshore interest. On 30 May 2024 Jadestone emailed the Corporation, stating: *As previously advised (by phone on 17 April 2024) Jadestone has, in the first instance, prepared for BTAC's consideration the attached presentation (JSE-BTAC Stag EP Location Impact Analysis), utilising extracts from the Stag EP, to indicate the potential impacts on the features BTAC identified and indicated in the independent environmental expert's proposal.* *The potential impacts advised are from oil spill modelling work carried out by a professional third-party contractor.* *NOPSEMA's assessment of the Stag EP considers carefully the validity of the modelling and the resultant indications of potential impact.* On 25 June 2024 the Corporation advised Jadestone that: *BTAC respectfully requests that Jadestone uphold its in-principle support for BTAC to progress an independent review of the Stag EP, consistent with the proposal we provided to you on 15 May 2024.* On 10 July 2024 Jadestone responded: *Thank you for passing on the letter of 24 June 2024 from the Buurabalayji Thalanyji Aboriginal Corporation (BTAC) Chief Executive Officer.* *Jadestone notes the letter confirms that the activities set out in the Jadestone's Stag Field Operations Environment Plan (EP) may affect BTAC and Thalanyji's peoples function, interests and activities, and those functions, interests and activities extend beyond the existing native title area including, but not limited to, the Montebello Islands, Barrow Island and the Mackerel Islands.* *Despite previous requests, it has been as a result of receiving the independent environmental expert's proposal that Jadestone was able to definitively determine from BTAC those areas of particular interest to BTAC and the Thalanyji people. This has now been noted in the latest version of the EP which is to be resubmitted to NOPSEMA in August.*	Jadestone did not indicate, at any time, in-principle agreement to the Corporation that Jadestone would fund the Corporation to undertake a quick review of the EP with the aim of assisting informed consultation and an informed assessment about proposed offshore activities that may affect BTAC and Thalanyji people's interests and activities. Jadestone did however indicate it would give consideration to funding such a review, subject to BTAC identifying the aspects of the Stag EP that it wishes the expert to review, identifies at least two experts to undertake the review and obtains, for Jadestone's consideration, quotations from each to undertake the proposed review. The Corporation provided a proposal and quotation from one independent environmental expert. After considering that one quotation Jadestone determined that by utilising extracts from the Stag EP the potential impacts on the features BTAC identified and indicated in the independent environmental expert's proposal could be explained to the Corporation in clear language. Jadestone proceeded on that basis, on 30 May 2024 provided the Corporation with the JSE-BTAC Stag EP Location Impact Analysis presentation which included details on the receptors and spill modelling outcomes as well as spill response information. The outcomes of this research and identified areas of interest (Montebello Islands, Barrow Island, Weld Island, Karratha, North and South Islands, Mary Anne Group and islands within 150km of the Ashburton River) are included in Appendix C. Some areas identified as important to BTAC are not within the Stag EMBA and therefore no additional description is provided in the EP or OPEP. Whilst Jadestone does not agree to paying for the proposed independent environmental expert to undertake a quick review of the EP (as only 1 quotation was provided and Jadestone provided a tailored package to the PBC based on this), Jadestone remains committed to attending	Due to the information provided to the Corporation, including the JSE-BTAC Stag EP Location Impact Analysis, a face-to-face meeting with the Corporation's EMT, and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Given Jadestone's significant attention to those areas of interest identified in the Stag Field Operations EP Jadestone believes the information in the EP, provided to BTAC, would enable BTAC and the Thalanyji people to assess the potential for Stag Field Operations to impact on their functions, interests and activities. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
	Jadestone does note that although the Montebello Islands and Barrow Island have been described in the EP, the specific functions, interests and activities of BTAC and the Thalanyji people for those Islands have not been indicated to Jadestone. Also, as previously noted, the Mackerel Islands are outside of the Stag Field Operations Environment that may be affected (EMBA). *Given Jadestone's significant attention to those areas in the Stag Field Operations EP Jadestone believes the information in the EP, provided to BTAC (in the attached JSE-BTAC Stag EP Location Impact Analysis) on 30 May 2024, would enable BTAC and the Thalanyji people to assess the potential for Stag Field Operations to impact on their functions, interests and activities.* *Jadestone continues to welcome advice on any additional known areas of interest and Jadestone will, at any time, update the Stag Field Operations EP as new information becomes available.* *It should be noted the EP describes the potential impact on area in the event of a spill, and the measures in place to prevent and manage any impacts from a spill. The Stag Field Operations planned activities will not, due to the distance from the operational area, impact on the areas specifically mentioned above.* *As discussed, Jadestone agreed to consider BTAC engaging an independent consultant to review the EP and did consider the independent environmental expert's proposal. However, to provide information in a more appropriate format for BTAC to assess the potential impact of the Stag Field Operations, Jadestone prepared a presentation specific to the areas identified to be of interest to BTAC and the Thalanyji people with information taken directly from the EP. Jadestone would like the opportunity to elaborate on this information at a further meeting with BTAC.* *Jadestone has presented in the EP submission all of its efforts to engage with Relevant Persons, including BTAC, and indicated the information provided and the time available to respond to the information.* *Whilst Jadestone believes the information provided and the time available to respond has been appropriate Jadestone remains committed to continued engagement with BTAC and the Thalanyji people in order to ensure it fully understands their functions, activities and interests, and can receive at any time relevant information about those functions, activities and interests, and therefore as necessary update the EP with that relevant information, and also put in place any required additional controls as a result of that information.*	further consultation meetings with the Directors of the Corporation should the opportunity arise in the future, including if requested to do so.	
Buurabalayji Thalanyji Aboriginal Corporation (matter raised in letter dated 24/06/24)	BTAC considers that general community engagements are not appropriate forums for meaningful engagement with traditional owner groups such as BTAC.	Statement has merit.	Jadestone agrees that community engagement sessions do not replace meetings with Traditional Owner groups, however they are another means to ensure all potentially Relevant Persons have the opportunity to engage with Jadestone. The offer to attend the community engagements sessions is extended to all potentially Relevant Persons when these sessions are held. Jadestone also wishes to have a constructive working relationship with BTAC and continue meaningful engagement through specific meetings and correspondence as appropriate.
	Registered Aboriginal heritage sites on the State's register should be viewed as indicative, rather than an absolute representation of heritage values in an area.	Statement has merit.	Jadestone agrees, these sites are provided as indicative sites in the absence of information provided by BTAC. Jadestone continues to welcome advice on any additional known areas of interest and Jadestone will, at any time, update the Stag Field Operations EP as new information becomes available.
	The protection and management of cultural heritage is important to BTAC and Thalanyji people. Thalanyji values, interests and activities – and those of BTAC – extend beyond cultural heritage and include, for example, fishing and collection of traditional foods and other materials and use of islands within the EMBA. BTAC seeks support from Jadestone to define and articulate heritage and other values within BTAC/Thalanyji's area of interest, to the extent this intersects with Jadestone's EMBA. BTAC is concerned that statements made in your EP appear to misrepresent, and over-simplify, this situation to NOPSEMA. For example, Table 4-2 (p. 106) notes that the 'Stag EMBA does not overlap with any heritage sites within the Thalanyji native title area'. The above statement eschews BTAC assertions that Thalanyji people have interests and undertake activities that extend beyond the	Statement has merit.	Jadestone understands this and has incorporated this information into Appendix C of the EP (Section 7.8.2) and Section 4.5.5 to further articulate that BTAC/ Thalanyji's interests are not limited to registered heritage sites. In providing information to BTAC in the "JSE-BTAC Stag EP Location Impact Analysis" presentation, Jadestone hope to garner further discussion on the

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
	current native title determination area and include offshore islands that intersect with the Stag EMBA. Thalanyji interests and activities include but are not limited to cultural heritage management.		intersection of the Stag Operations activity with BTAC/ Thalanyji's area of interest.
	BTAC is concerned that during our meeting in February 2024, and as conveyed in your follow-up communications on 13 February 2024, Jadestone is understood to have supported in-principle and would fund BTAC engaging an independent environmental expert to review the Stag EP, subject to provision of scope for services and quote.	Statement has merit.	Jadestone agreed to consider BTAC engaging an independent consultant to review the EP and did consider the proposal. However, to provide information in a more appropriate format for BTAC to assess the potential impact of the Stag Field Operations, Jadestone prepared a presentation specific to the areas identified to be of interest to BTAC and the Thalanyji people with information taken directly from the EP. Jadestone would like the opportunity to elaborate on this information at a further meeting with BTAC.
	BTAC is concerned that it seems to have wasted considerable time and effort in progressing a scope of work and obtaining a quote from an impartial and qualified environmental expert to review the EP when, after waiting over two and a half months for confirmation, Jadestone's revised position as conveyed in your email of 30 May 2024 is that summary information provided by Jadestone should be considered a suitable 'alternative' to BTAC obtaining independent advice.	Statement has merit.	All of Jadestone's correspondence and consultation is provided to NOPSEMA. Although summarised in the EP, the full details are given in the Sensitive Information Report (SIR) submitted to NOPSEMA. As an independent regulator NOPSEMA is required to assess all information provided within the EP and the potential impacts and risks identified. The SIR includes all correspondence on both sides from Jadestone and BTAC and any attachments provided.
	BTAC is concerned that summary information provided by Jadestone appears to imply that planned and unplanned activities under the Stag EP pose insignificant risk to Thalanyji interests and activities.	Statement has merit.	The EP describes the potential impact on area in the event of a spill, and the measures in place to prevent and manage any impacts from a spill. The Stag Field Operations planned activities will not, due to the distance from the operational area, impact on the areas specifically mentioned. Jadestone recognises the importance of the locations identified as being of potential risk within the EMBA in the highly unlikely event of a spill.
	BTAC is concerned that Jadestone has previously had an oil spill at its Stag operations. BTAC is concerned that Jadestone is understood to have misrepresented the extent of that oil spill to the federal regulator NOPSEMA.	Statement has merit.	Jadestone did have a spill at the Stag facility in 2020 and, as a result, a series of improvements and changes were made at the facility and are reflected in the new EP. The EP considers the 2020 incident in Section 7.5, and the EP considers the potential impact and Jadestone's response to spill scenarios of 17.2m^3 (17,200 litres) and 86.5m^3 (86,500 litres) – both scenarios for spills well over and above the 2020 incident.
	BTAC is concerned that it appears to be understating the potential impact of Stag operations on BTAC and Thalanyji functions, interests and/or activities before taking reasonable steps to understand them in relation to the Stag EMBA.	Statement has merit.	In lieu of a detailed response from BTAC/ Thalanyji regarding functions, interests and activities, Jadestone believes they have

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
			made all reasonable efforts to determine these through the provision of the JSE-BTAC Stag EP Location Impact Analysis (informed by the independent consultant proposal) but remains open to further discussion with BTAC regarding this information and any new details provided. Jadestone remains committed to continued engagement with BTAC and the Thalanyji people, in order to ensure it fully understands their functions, activities and interests, can receive at any time relevant information about those functions, activities and interests, and therefore as necessary update the EP with that relevant information, and also put in place any required additional controls as a result of that information. This is stated in Section 4.12 of the EP, whereby when new information is identified Jadestone commits to undertake an assessment to understand if the new information requires the EP to be updated or noted.
Kariyarra Aboriginal Corporation	Consultation meeting held with the Directors of the Kariyarra Aboriginal Corporation on 28 July 2023. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. Questions raised during the meeting of relevance included: **Q. Why is Jadestone consulting on Stag when it is so far away for Kariyarra country.** *Jadestone response was by referring to the Stag EMBA, and how EMBA's are modelled.* **Q. The Kariyarra chairperson questioned why Jadestone had only just made contact with the Kariyarra Aboriginal Corporation and the people it represents when the Stag oilfield commenced production in 1998, and Jadestone purchased the field in 2016.** *Jadestone answered by indicating that in the past consultation had occurred with Land Councils and organisations like YMAC, and the offshore petroleum industry and the industry regulator, the National Offshore Petroleum Safety and Environment Authority (NOPSEMA), had considered that to be adequate.* *Consultation with Traditional Owners by that means and to that level was recently determined in the Courts to be inadequate. Jadestone accepts that method and level of consultation was inadequate and is now dedicated to full, detailed and on-going consultation.* Jadestone introduced the concept of the desirability of knowing the sensitive coastal, near shore and sea country of the Kariyarra people, enabling Jadestone to prioritise the protection of those places should a spill ever occur areas. No specific places or locations were identified. No correspondence has been received from the Corporation regarding the notes. Jadestone has received correspondence from the Corporation's legal advisor requesting the payment of a very substantial amount[6] to be held for the costs of future consultation. Jadestone declined to make such a contribution and offered and subsequently sent a draft consultation protocol. The legal adviser subsequently indicated the Corporation was engaging an in-house legal adviser who would contact Jadestone. Nothing more has been heard from the Corporation.	No queries or concerns pertaining to the proposed activity and its management were raised during the meetings. Jadestone remains committed to attending further consultation meetings with the Directors of the Corporation should the opportunity arise in the future, including if requested to do so.	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the Directors of the Corporation, and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. There has been no response to a draft consultation protocol sent to the Corporation. Corporation was also consulted for the Skua-11 Drilling EP. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Malgana Aboriginal Corporation	Numerous unsuccessful attempts have been made over an extended period to communicate with the Malgana Aboriginal Corporation in order to facilitate a consultation meeting with the Directors of the Corporation. The Stag Facility Environment Plan Invitation for Consultation has been provided to the Corporation on several occasions.	Jadestone remains committed to attending a consultation meeting with the Directors of the Corporation should the opportunity arise in the future, including if requested to do so.	Due to the information provided to the Corporation (Stag Facility Environment Plan Invitation for Consultation) and the time provided for the Corporation to respond,

[6] Exact amount disclosed to NOPSEMA in Sensitive Information Report

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
			Jadestone deems consultation to be completed. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Nanda Aboriginal Corporation	Consultation meeting held with the Directors of the Nanda Aboriginal Corporation on 13 September 2023. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. No concerns or queries were raised during the meeting. Directors were welcoming of JSE and found the presentation informative and had noted the level of JSE's production compared to industry majors. The response of the Corporation would be in alignment with the YMAC consultation framework that had been previously provided to JSE. No correspondence was received from the Corporation regarding the notes, nor on any other matter.	No queries or concerns pertaining to the proposed activity and its management were raised during the meetings. No queries or feedback received following the meeting and forwarding Jadestone's notes from the meeting.	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the Directors of the Corporation, and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Nganhurra Thanardi Garrbu Aboriginal Corporation	Consultation meeting held with the Directors of the Nganhurra Thanardi Garrbu Aboriginal Corporation on 16 August 2023. During the meeting no queries or concerns of relevance to the EP were raised. JSE were advised following the presentation that: • *Directors were welcoming of JSE and found the presentation informative and had noted the level of JSE's production compared to industry majors.* • *The response of the Corporation would be in alignment with the YMAC consultation framework that had been previously provided to JSE.* • *The Directors anticipate that a half day workshop with JSE would be necessary to further understand JSE's Stag activity and its potential impacts.* • *Directors would be interested in knowing about JSE's social investments.* Following the meeting Jadestone's notes of the meeting were sent to the Corporation. No correspondence has been received from the Corporation regarding the notes nor any other matter.	No queries or concerns pertaining to the proposed activity and its management were raised during the meetings. No queries or feedback received following the meeting and forwarding Jadestone's notes from the meeting.	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the Directors of the Corporation, and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Ngarluma Aboriginal Corporation	Numerous unsuccessful attempts have been made over an extended period to communicate with the Ngarluma Aboriginal Corporation to facilitate a consultation meeting with the Directors of the Corporation. The Stag Facility Environment Plan Invitation for Consultation has been provided to the Corporation on several occasions.	Jadestone remains committed to attending a consultation meeting with the Directors of the Corporation should the opportunity arise in the future, including if requested to do so.	Due to the information provided to the Corporation (Stag Facility Environment Plan Invitation for Consultation) and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Corporation was also consulted for the Skua-11 Drilling EP. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
			emergency response due to an unplanned event.
Nyangumarta Karajarri Aboriginal Corporation	Consultation meeting held with the Directors of the Nyangumarta Karajarri Aboriginal Corporation on 10 April 2024. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. Questions asked and answers given at the 10 April 2024 meeting were: **Q: *How will the Corporation and its members know if an oil spill has occurred?*** *A: The Environment Plans have a notification requirement that if an oil spill occurred and the oil was heading towards the Corporation's coast the Corporation would be advised. Also have a commitment to check contact details are valid every six months.* ***Q: Are there job opportunities for members of the Corporation?*** *A: Jadestone is part of the National Energy Technician Training Scheme (NETTS) Apprentice Program run by Programmed. The Program welcomes and encourages Aboriginal and Torres Strait Islander people to apply.* ***Q: Can Jadestone provide any support for our marine ranger program?*** *A: As a small company, Jadestone is not in a position to provide funding to marine ranger groups for oil spill response. Jadestone currently use resources through the Australian Marine Oil Spill Centre (AMOSC) who also provide training in oil spill response.* No correspondence has been received from the Corporation regarding the notes nor any other matter.	No changes were proposed to the EP following the meeting, No queries or feedback received following the meeting and forwarding Jadestone's notes from the meeting.	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the Directors of the Corporation, and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Corporation also consulted for the Montara Operations and Skua-11 Drilling EP. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Nyangumarta Warrarn Aboriginal Corporation	Consultation meeting held with the Executive Management Team (EMT) of the Nyangumarta Warrarn Aboriginal Corporation on 15 August 2023 and a consultation meeting with the Directors of the Corporation was held on 23 May 2024. Following each meeting Jadestone's notes of the meeting were sent to the Corporation. Questions asked and answers given at the 23 May 2024 meeting were: ***Q: Are Jadestone drilling any new wells? i.e. exploration wells*** *A: No, our fields are already established, and we are not planning to drill any new wells. We operate late life assets which are all existing infrastructure in both the Stag and Montara Fields and may work on existing wells.* ***Q: How many people are on Stag and how do they sleep?*** *A: We have about six people per room and there is space for approximately 60 persons that can be on board. They get to the facility via helicopter and Jadestone have fatigue management plans in place for their personnel to ensure the safety of their people and facilities.* ***Q: Can Jadestone provide any training for spill response?*** *A: As a small company, Jadestone is not in a position to provide funding to marine ranger groups for oil spill response or to provide training. We currently use resources through the Australian Marine Oil Spill Centre (AMOSC) who also provide training in oil spill response.* ***Q: Are our responses published on your website?*** *Jadestone is being fully transparent through this process and have published every EP submitted on their website even though it is not yet accepted. The sensitive information report containing contact details and full email responses is not published but is provided to NOPSEMA as part of the regulatory submission. If you provide us with any details that you do not want published, please let us know.*No correspondence has been received from the Corporation regarding the notes nor any other matter.	No queries or concerns pertaining to the proposed activity and its management were raised during the meetings. No queries or feedback received following the meeting and forwarding Jadestone's notes from the meeting.	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the EMT and subsequently with Directors of the Corporation, and the time provided for the Corporation to respond Jadestone deems consultation to be completed. Corporation was also consulted for Skua-11 Drilling EP. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Wanparta Aboriginal Corporation	Consultation meeting held with the Directors of the Wanparta Aboriginal Corporation on 16 August 2023. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. Questions asked and answered at the August 2023 meeting included general interest in produced water discharges, how the oil is produced from the field, duration of drilling activities, general interest in the drilling activity itself (how it works, how we manage oil flow), how to stop leaks and resourcing and compensation in the event of a spill. WAC remarked that they are a small group of 5 family groups and about 100 people. The logo for the WAC depicts both freshwater and saltwater and the flora and fauna associated with the coastlines are very important to their culture and stories and they want to ensure they will be protected. WAC remarked that they would like to send a representative from each family group (five in total) to visit the Stag facility when JSE offered the opportunity. They also remarked that they would like to see JSE again. Jadestone stated they are also a small operator compared with other operators and as such it's unlikely a request for multiple people from the same PBC or clan can be accommodated. On 1 December 2023 the Corporation requested Jadestone attendance at a Directors meeting in early 2024 to facilitate consultation and discussion.	Information on species important to WAC has been included in Appendix C. In the event of a spill, the scientific monitoring includes monitoring of water quality and habitats that are of importance to these species. Through the implementation of the OPEP and OSM-BIP in the event of a spill, Jadestone will be making every effort to prevent impacts to areas and species of importance. Jadestone provided information answering Wanparta questions from November 13 meeting in relation to mudflats, mangroves and the islands. Wanparta requested mangrove mapping showing intersection	Due to the information provided to the Corporation, including two face-to-face consultation meeting with the Directors of the Corporation and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Corporation was also consulted for the Skua-11 Drilling EP. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
	On 22 January 2024 Jadestone discussed the request with the Wanparta representative and on 25 January emailed the representative, reiterating the points in the discussion. On 4 April 2024 Jadestone received a request from the Corporation to attend a half-day workshop with Directors on 17 May 2024 at a substantial estimated cost [7]. Jadestone indicated it deemed the cost as excessive, requested a justification for the need for a half-day workshop at the indicated cost, whilst indicating a better approach which Jadestone would agree to would be for a further consultation opportunity at a scheduled meeting of the Directors of the Corporation. The cost to Jadestone for the initial consultation meeting with the Directors of the Corporation on 16 August 2023 had been significantly less than the recently requested amount for the half-day workshop. Jadestone received an email from the Corporation on 14 August 2024 requesting a further consultation meeting at a scheduled meeting of the Directors on 13 November 2024. Jadestone attended this meeting on 13 November 2024 and following the meeting Jadestone's notes of the meeting were sent to the Corporation. Questions asked and answers given at the 13 November 2024 meeting were: ***Q: Do JSE contribute to ranger group projects?*** *A: JSE do not currently contribute to any ranger group projects.* ***Q: Have there been any spills at Stag or Montara facilities in the past?*** *A: Yes, there was a large spill at the Montara facility in 2009, this was prior to JSE taking ownership of the facility. Since then, there has been a huge change in the regulation of offshore oil and gas with the inception of NOPSEMA and the requirement for Environment Plans, Oil Pollution Emergency Plans and Operational and scientific monitoring to demonstrate the controls in place to prevent a spill and how the operator would respond (mitigation and stopping any leaks).* ***Q: How do you prevent shoreline impact?*** *A: There are multiple control measures in place to prevent a spill in the first place, but if there is a larger spill that is heading to shorelines there are measures that can be taken to prevent shoreline impact. This is described in our OPEP as "protection and deflection, Section 16 of the Stag Operations OPEP". Multiple strategies can be employed depending on the type of shoreline.* ***Q: Will you call our rangers?*** *A: We have a commitment in the EP that we will contact any Prescribed Body Corporate (PBC) within the potential spill impact area. If rangers are available to support spill response efforts then this can be agreed at the time.* **Q: How do NOPSEMA investigate and inspect?** *A: JSE self-reports any incident as detailed within the EP (Section 9 of the Stag Operations EP). There are statutory timeframes and required details for reporting to NOPSEMA. JSE also have internal audits undertaken regularly to ensure continued environmental performance and improvements.* During the meeting Wanparta also asked Jadestone questions about mudflats, mangroves and the surrounding islands, which were also raised again in a letter received 12/12/2024 and are further detailed below. During the meeting Jadestone committed to responding to these questions by providing mangrove mapping, which was sent to Wanparta on 13/01/2025.	with the EMBA in the Ngarla Determination Area. Jadestone provided this mapping to Wanparta and received feedback that the amendments to meeting minutes and map would assist the board.	
Wanparta Aboriginal Corporation (matter raised in letter dated 12/12/2024) and updates to meeting minutes (received 8/01/2025)	Requested mapping depicting the mangroves (including those on islands) and their intersection with the EMBA in the Ngarla Determination Area.	Statement has merit.	JSE provided mangrove mapping showing the intersection with the EMBA in the Ngarla Determination Area to Wanparta on 13/01/2025. No particular area was mentioned in meeting, but noted that mangroves are all along the coastline and are an important home to many species, including those of significance to the WAC. JSE notes the concern raised and assured WAC that mangroves are described in the EP (Refer to Appendix C, Section 4.2 of the Stag Operations EP) including areas along

[7] Exact amount disclosed to NOPSEMA in Sensitive Information Report

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
			the Dampier Archipelago and WA coastline and offshore islands. JSE recognises and describes mangrove areas as potentially being affected in the event of a large unplanned oil spill (impacts described in Section 7.5 and Appendix G of the Stag Operations EP for example). JSE understand the potential impacts associated with mangrove oiling as described in this EP section. JSE has also noted the potential for effects on mangrove communities through climate change (refer to Section 6.3 of the Stag Operations EP).
	Further information regarding the EMBA interaction with mudflats within the Ngarla Determination Area requested, noting mudflats are a significant area of hunting and gathering to the Ngarla People.	Statement has merit.	WAC identified that mudflats are important to the community for hunting and gathering e.g. mud crabs, cockles. As above, JSE recognise that mudflats occur along the islands and WA coastline and describe the coastal saltmarsh in Section 4.4 of Appendix C of the Stag Operations EP. JSE has also noted the potential for effects on saltmarsh and coastal freshwater wetlands through climate change (refer to Section 6.3 of the Stag Operations EP).
	Information regarding Montara and Stag operations' EMBA interaction with the islands within the Ngarla Determination Area, including Little Turtle Island and Bedout Island requested. WAC noted that Bedout Island may have been historically used by the Ngarla people and is an important place for birds. WAC noted that an ethnological study is being completed on the island to understand the history of its use by the Ngarla people and should be available in 2025.	Statement has merit.	Turtle Island is an intertidal island that is recognised of having importance to WAC. This island is within the EMBA for an unplanned oil spill. Please refer to figure below. Intertidal rocky reefs are identified as being within the EMBA, although Little Turtle Island is not explicitly mentioned (refer Section 4 of Appendix C of the Stag Operations EP). The name of the island infers that turtles may be sighted here resting at low tide as they do close to Barrow Island on intertidal platforms. JSE recognises and describes intertidal reefs and platforms areas as potentially being affected in the event of a large unplanned oil spill (impacts described in Section 7.5 and Appendix G of the Stag Operations EP for example). JSE understand the potential impacts associated with intertidal reef oiling as described in this EP section.

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
			In the event of an oil spill, JSE will implement operational and scientific monitoring as described in Stag Field Operational and Scientific Monitoring (OSM): Bridging Implementation Plan available on the JSE website. Operational Monitoring (OM) is instrumental in providing situational awareness of a hydrocarbon spill, enabling Incident Management Teams (IMT) to mount a timely and effective spill response and continually monitor the effectiveness of the response. Scientific Monitoring (SM) is the principal tool for determining the extent, severity and persistence of environmental impacts from a hydrocarbon spill and for informing resultant remediation activities. JSE will implement OSM, as applicable, for oil spills across both State and Commonwealth waters and this would include consideration of impacts to coastlines, including mangroves, mudflats and offshore islands, as determined by the spill.
Wirrawandi Aboriginal Corporation	Consultation meeting held with the Directors of the Wirrawandi Aboriginal Corporation on 18 July 2023. Other meetings held between Jadestone and Wirrawandi CEO raised no queries or concerns regarding the activity as they were for the purposes of relationship building. Questions raised during the meeting were general in nature pertaining to oil extraction processes, facility details, cultural awareness training, any further consultation topics or key dates to be aware of. Question asked '*is there any impact to the Montebello Islands where the turtle surveys are conducted?*' WAC were also interested in knowing more about the environmental sensitivities, but Jadestone asked for detail on what they would like to know about, noting that there is a lot of information in the EP available online as well. WAC remarked that the facility has existed for some time, but this is the first they have heard from JSE. Relationships could be better as reconciliation is a two-way thing. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. Other meetings held between Jadestone and Wirrawandi CEO raised no queries or concerns regarding the activity as they were for the purposes of relationship building. No correspondence has been received from the Corporation regarding the notes nor any other matter.	Of relevance to the discussion and WAC, were the potential interest in the Montebello Islands and turtles. Impact assessment on the Montebello Islands in the event of a spill is described in the EP and impacts to turtles from both planned and unplanned events are also detailed. Jadestone's planned activity does not affect the Montebello Islands as it is in the ocean rather than on land. If there was a large oil spill then there is the possibility that oil could contact the Islands. JSE have monitoring plans in place for water quality, turtles, fish etc. in the EMBA that would be activated in the event of a spill. We would also work with Chevron to tie in with their monitoring data. JSE commented that we understand this is the first meeting of many and are keen to adapt and learn and build a respectful relationship with WAC and its members. No queries or feedback received following the meeting and forwarding Jadestone's notes from the meeting.	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the Directors of the Corporation, and the time provided for the Corporation to respond, Jadestone deems consultation to be completed. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.
Yinggarda Aboriginal Corporation	Consultation meeting held with the Directors of the Yinggarda Aboriginal Corporation on 3 August 2023. Following the meeting Jadestone's notes of the meeting were sent to the Corporation. No questions or concerns pertaining to the proposed activity or management were raised during the meeting. No correspondence has been received from the Corporation regarding the notes.	No queries or concerns pertaining to the proposed activity and its management were raised during the meetings. Whilst Jadestone does not agree to paying a substantial amount of funds into the	Due to the information provided to the Corporation, including at a face-to-face consultation meeting with the Directors of the Corporation, and the time provided for

PBC	Summary of the relevant person response, objection or claim (Reg 24(b)(i))	Titleholder assessment of merits of any objection or claim (Reg 24(b)(ii))	Titleholders' response (Reg 24(b)(iii))
	Jadestone received correspondence from the Corporation's legal advisor requesting the payment of a substantial amount into the advisor's Trust Account and that Jadestone provide a complete indemnity for Yinggarda Aboriginal Corporation regarding any litigation the Corporation may be exposed to as a result of consulting with Jadestone. Jadestone advised by email on 21 November 2023 that neither condition is agreed, but Jadestone remains in agreement to payment for reasonable costs for future consultation meetings. Jadestone received an email on 21 November 2023 advising Jadestone's response will be put before the Directors for the purpose of taking instructions and providing a prompt response. Jadestone received an email on 24 November 2023, in response to Jadestone's email to the Corporation advising of the re-submission of the Stag EP, stating the Corporation does not consider Jadestone's actions to date to constitute appropriate consultation. Jadestone received an email on 4 December 2023 indicating the Corporation will not consult further with Jadestone without a consultation agreement being in place. Jadestone sent an email to the Corporation on 11 January 2024 reiterating its wish to continue meaningful consultation and that it remains in agreement to the payment of reasonable costs for future consultation meetings. Jadestone has not received a response.	Corporation's legal advisor's Trust Account, nor does it agree to provide indemnity to the Corporation, Jadestone remains committed to attending further consultation meetings with the Directors of the Corporation should the opportunity arise in the future, including if requested to do so.	the Corporation to respond, Jadestone deems consultation to be completed. Jadestone's Stakeholder Management Plan requires contact with the Corporation every six months for the purpose of updating its contact information for the Corporation, including the appropriate person for Jadestone to contact in the event of an emergency response due to an unplanned event.

4.12 Ongoing Consultation with Relevant Persons

Whilst Jadestone considers that, for the purpose of this EP, its consultation is now complete, it will continue to seek the opportunity to make presentations to the Directors of the two PBCS it is yet to meet with, and for all Relevant Persons provide project updates as information becomes available in relation to specific activities and broader project information, via emails and by the provision of information on the Jadestone website or other means (such as advertising) as appropriate. Jadestone will also remain available to attend meetings and presentations as requested where reasonable.

Table 4-11 outlines the ongoing consultation (and timing) requirements for the activity. Records of ongoing Relevant Person consultation are maintained in Jadestone's electronic Document Management System (eDMS). Any changes to the activity that could result in a change to the interests, functions, or activities to Relevant persons will be subject to Jadestone's Management of Change (MOC) process (Section 8.4.3) in order to determine if Relevant Persons and potentially Relevant Persons would be significantly affected by the change. If so, additional information will be provided to Relevant Persons and any potentially Relevant Persons for the purpose of seeking feedback on the proposed changes. Additional triggered consultation actions are provided in Table 4-12.

Table 4-11: Standard consultation actions

Activity	Frequency and method	Responsibility
Provisions of updates on activity progress.	Updates to Jadestone website on the Stag Operations activity provided as needed.	HSE Manager
Notification of Australian Hydrographic Office.	No less than four weeks prior to any significant change to operations commencing email AHO (datacentre@hydro.gov.au) for the promulgation of related notices to mariners.	HSE Manager
Notification of AMSA Joint Rescue Coordination Centre (JRCC).	To notify AMSA's JRCC (rccaus@amsa.gov.au Ph 1800 641 792) 24-48 hrs prior to operations commencing with following details regarding the unit: • Name • Call sign • Maritime mobile service identity (MMSI) • Satellite communications details (including INMARSAT-C and satellite telephone • Area of operation • Requested clearance from other vessels • Operations start and end.	HSE Manager
Notification of DPIRD (Fisheries).	No less than four weeks prior to operations commencing notify DPIRD (Fisheries) of actual commencement date and any change to proposal.	HSE Manager

Activity	Frequency and method	Responsibility
Notification of Director National Parks.	No less than four weeks prior to operations commencing notify DNP of actual commencement date and any change to proposal.	HSE Manager
Close out of communication commitments made during pre-start consultation including: • Notification of NOPSEMA EP acceptance to stakeholders that have requested.	Email stakeholders contact within three months of EP approval.	HSE Manager
Review of Relevant Persons list.	Annually unless triggered earlier. Review the list of Relevant Persons within the EMBA to confirm relevance and any updates due to responses received through the consultation mailbox.	HSE Manager
Confirmation of fishery licence holders within EMBA.	Annually – request contact details of fishers within the operational area and EMBA, compare against database for any additions to the list. Provide information package via post.	Country Manager
Notify PBCs of acceptance of EP and provide NOPSEMA's Statement of Reasons.	Within 4 weeks of EP acceptance.	HSE Manager
Review of PBC contacts within EMBA.	Every 6 months, Jadestone will confirm contact name and details of PBCs to ensure strong relationship is maintained.	HSE Manager
Provide response organisations with a copy of the OPEP.	Email response organisations within three months of acceptance.	ER Lead
Notification of commencement activity to NOPSEMA.	Acceptance of the EP is taken to be the notification of commencement of the activity.	Environment Lead
Notification of updates to JRCC on progress and changes to intended operations.	Notification as required.	Environment Lead
Notification of AMSA Joint Rescue Coordination Centre (JRCC).	48–24 hours from commencement of operations.	Emergency Response Lead

Table 4-12: Triggered consultation actions

Trigger	Action	Responsibility
Feedback received from Relevant Person.	Follow consultative process outlined in of the Stakeholder Management Plan (SMP) (JS-70-PR-I-00034) to understand if a revision to the EP is required.	HSE Manager
Meeting with PBC identifies new information not currently addressed in EP.	Follow Jadestone Management of Change process to identify if a change to the EP is required. Log correspondence.	HSE Manager

Trigger	Action	Responsibility
Deviation to Stag operations from those originally provided in consultation.	Notification to Relevant Persons via email. Email DPIRD stakeholder contact a minimum of 4 weeks prior to commencement of any varied activity. Notify AMP Director General any change to risk within AMPs. The deviation will be assessed through the Management of Change procedure to understand which other Relevant Persons and potentially Relevant Persons may need to be notified.	HSE Manager
Change to risk profile in operational area.	The deviation will be assessed through the Management of Change procedure to understand which Relevant Persons and potentially Relevant Persons may need to be notified describing the change in risk profile and proposed risk management.	HSE Manager
Change to risk profile in EMBA.	The deviation will be assessed through the MOC procedure to understand which Relevant Persons and potentially Relevant Persons may need to be notified describing the change in risk profile and proposed risk management.	HSE Manager
Oil spill event.	Notification to response agencies and government agencies by phone. • Attempt to electronically notify all Relevant Persons listed in Stag EP Consultation plan within 72 hours of spill. • Ongoing updates and communication in accordance with requirements and response procedures. • Notification of DPIRD via environment@fish.wa.gov.au within 24 hours of incident report. • If oil spill trajectory modelling shows potential contact with the Western Australian coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation. • Notify AMP Director General of spill response activities within AMP (prior to response activities within a MP) on 0419 293 465. To include titleholder details, time and location of the incident, proposed response arrangements and locations as per the OPEP, confirmation of providing access to relevant monitoring and evaluation reports when available and contact details for the response coordinator.	IMT Lead
Biosecurity incident: suspected marine pest or disease	Notification of DPIRD via Aquatic.Biosecurity@dpird.wa.gov.au or 1800 815 507 within 24 hours.	HSE Manager

Trigger	Action	Responsibility
Change to Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2009 consultative requirements	Review of SMP.	HSE Manager
Change to Stag's operating jurisdiction such that other legislative instruments stipulate new or additional consultative requirements	Review of SMP.	Country Manager
An element of Jadestone's continuous improvement process identifies a procedure that needs to be amended	Review of SMP.	Country Manager
AMP access	Notify AMP Director General of SMP (or other response activities) within AMP 10 days prior to entering (where possible) and at the cessation of activities in AMPs.	IMT Leader
Change to infrastructure that affects exclusion zone	Notify the Australian Hydrographic Service of activities and infrastructure for inclusion in Marine Notices.	Operations Manager

The purpose of ongoing consultation is not to elicit further information for the management of the activity, but rather to maintain relationships and notify Relevant Persons of any significant changes to the activity or risk.

Any potentially new Relevant Persons or changes to existing Relevant Persons will be identified through ongoing consultation through the EP review process, in accordance with Section 6.5. Where potentially new Relevant Persons are identified, they will be contacted and provided information about the activity relevant to their functions, interests, or activities. Any objections or claims will be managed as per Section 4.8.4.

Jadestone will undertake additional triggered consultation as outlined in Table 4-12, should an unplanned event occur.

Whilst Jadestone considers that, for the purpose of this EP, its consultation is now complete it is committed to continue its efforts to consult with all of the Traditional Owner Relevant Persons that have been identified, including the two PBCS its as not yet had the opportunity to meet with. As a result of the community engagement sessions and the presentations to PBCs that have already occurred, and presentations to PBCs in the future, Jadestone will make any necessary amendments to its ongoing consultation strategy.

Presently the ongoing consultation strategy includes attendance at appropriate community forums, meetings with the Directors and Elders of the PBCs as needed, meetings with Australian Energy Producers (AEP) and other titleholders.

4.13 Environmental Performance

Hazard		Relevant Person consultation		
Performance outcome		Relevant Persons are kept informed of activities		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
001	Stakeholder Management Plan (JS-70-PR-I-00034)	Relevant Persons identified according to current Regulatory requirements.	Consultation records	HSE Manager
002		Relevant Persons provided a minimum 4-week period to respond to stakeholder information issued on the proposed planned activities and followed up in accordance with the Plan.		
003		If there is a potential significant change in the risks or impacts to Relevant Persons due to planned activities the Relevant Persons are to be consulted prior to the activity commencing.		

5. EVALUATION OF ENVIRONMENTAL IMPACTS AND RISKS

As required by Regulation 21(5) of the Environment Regulations, this section of the EP provides an outline of Jadestone's methodological approach to evaluate impacts and risks due to an activity (Section 5.1), and the outcomes of the impact and risk assessment undertaken for the Stag Facility operational activities (Section 5.6).

5.1 Impact and Risk Assessment Methodology

The environmental impacts and risks associated with operational activities of the Stag Facility within permit WA-15-L have been assessed using the Jadestone Risk Management Framework and methods consistent with HB 203:2012 and AS/NZS ISO 31000:2018.

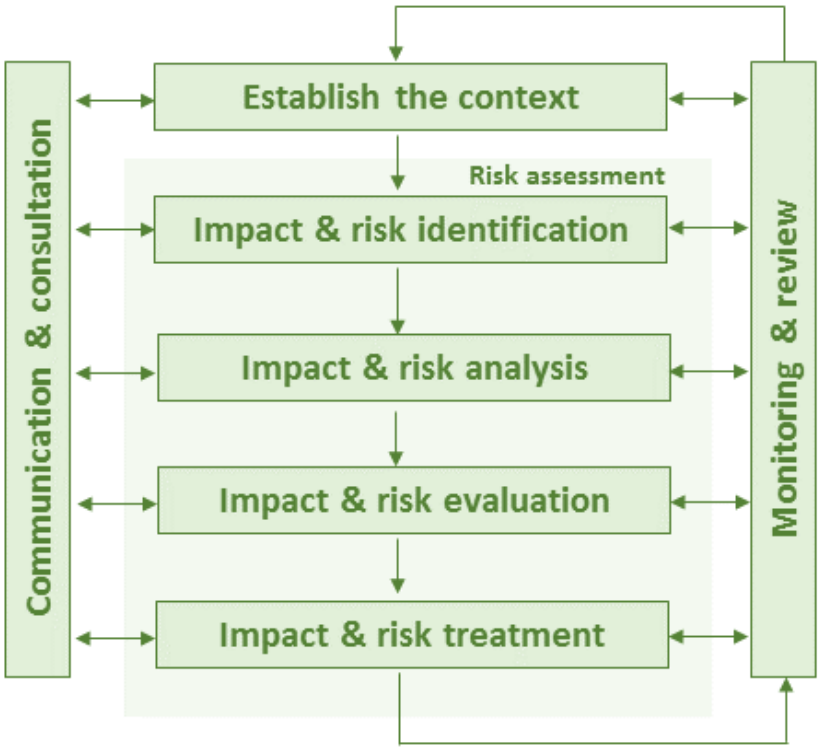
Impact is evaluated in terms of the extent, duration, severity and certainty pertaining to the effect that will or may occur in the environment due to a planned or accidental event associated with the activity.

Risk is evaluated in terms of likelihood and consequence, where likelihood is defined as the probability or frequency of the event occurring, while consequence, like impact, is defined as the extent, duration, severity and certainty pertaining to the effect that will or may occur in the environment due to a planned or accidental event associated with the activity.

The assessment methodology provides a framework to demonstrate:

- That the identified impacts and risks are reduced to as low as reasonably practicable (ALARP) (Regulation 34(b))
- The impacts and risks are acceptable (Regulation 34(c)).

The impact and risk management process is shown in Figure 5-1.



Source: NOPSEMA (GN0165 Risk Assessment Rev 5 2017)

Figure 5-1: Impact and risk evaluation process

Further detail on the steps involved in the impact and risk evaluation process is provided below.

5.2 Risk Assessment

The assessment process evaluates impacts and risks associated with planned and accidental events that will or have the potential to impact the environment. Impacts and risks are identified through a number of activities:

- Workshopping process attended by team that includes relevant technical knowledge and experience in the activities being assessed
- Information relating to previous operational performance relevant to the activity being assessed such as findings of audits and inspections, incident investigations, performance reports
- Feedback from relevant persons
- Industry related information of exploration and production activities relevant to the activity being assessed.

Analysis of the impacts and risks identified for the activity includes a number of steps intended to treat the impacts and risks to levels that are acceptable and ALARP for the business. The steps are:

- Identification of appropriate control measures (preventative and mitigative) to treat likelihood and consequence/ impact (below)
- Determination of the residual risk rankings (Section 5.6).

5.2.1 Identification of control measures

The following framework tools are applied, as appropriate, to assist with identifying control measures:

- **Legislation, Codes and Standards** – identifies the requirements of legislation, codes and standards which are to be complied with for the activity
- **Good Industry Practice** – identifies further engineering control standards and guidelines which may be applied over and above that required to meet the legislation, codes and standards
- **Professional Judgement** – uses relevant personnel with the knowledge and experience to identify alternative controls. When formulating control measures for each environmental impact or risk, the 'Hierarchy of Controls' philosophy (see below), which is a system used in the industry to minimise or eliminate exposure to impacts or risks, is applied
- **Risk Based Analysis** – assesses the results of probabilistic analyses such as modelling, quantitative risk assessment and/or cost benefit analysis to support the selection of control measures identified during the risk assessment process
- **Company Values** – identifies values referenced in Jadestone's HSE Policy
- **Societal Values** – identifies the views, concerns and perceptions of relevant stakeholders and addresses relevant stakeholder concerns as gathered through consultation.

In addition, Jadestone applies a hierarchy of control measures to help evaluate potential management controls to ensure reasonable and practicable solutions have not been overlooked:

- **Elimination** – it is preferable to remove the impact or risk altogether
- **Substitution** – substitute the impact or risk for a lower one
- **Engineering control measures** – use engineering solutions to prevent or detect the hazard or control the severity of consequences/impacts
- **Administrative control measures** – use of procedures, JHA etc to assess and minimise the environmental impacts or risks of an activity
- **Protective** – use of protective equipment (e.g. the use of appropriate containers).

5.2.2 Risk ranking process

Risks are ranked using the Jadestone Qualitative Risk Matrix (Table 5-1) Environmental ranking of a measure between **Low** to **Extreme** is determined by evaluating the likelihood of the accidental event occurring, and evaluation of the expected severity of the consequence with standard control measures in place.

Table 5-1: Jadestone qualitative risk matrix

Rating		**Consequence**				
		Negligible	Minor	Moderate	Major	Critical
Likelihood	Very Likely - Likely	Medium	Medium	High	Extreme	Extreme
	Likely - May	Low	Medium	High	High	Extreme
	Moderate	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	Medium
	Very unlikely – extremely unlikely	Low	Low	Low	Low	Medium

Consequence levels for accidental events are assigned on the basis of the expected extent of area that may be affected, the duration of effect and the severity of the effect. A consequence level of **Negligible** to **Critical** may be assigned (Table 5-2).

Table 5-2: Definition of consequence levels

Consequence	**Consequence description**	**Socio-economic**
5. Critical	Catastrophic effect; recovery in decades	International impact
4. Major	Major effect; recovery in 1–2 years	National impact
3. Moderate	Local effect; recovery in months to a year	Considerable impact
2. Minor	Minor effect; recovery in weeks to months	Limited impact
1. Negligible	No or slight effect; recovery in days to weeks	Slight impact

Likelihood levels for accidental or unplanned events are assigned on the basis of preceding performance in relation to the specific activity at the Facility, in the region or in the industry. A likelihood level of **Extremely unlikely** to **Very Likely** maybe be assigned to accidental or unplanned events (Table 5-3). A likelihood level is not assigned to planned events.

Table 5-3: Definition of likelihood levels

Likelihood	
5.	Very Likely - Likely to occur several times in the lifetime of facility
4.	Likely - May occur in the lifetime of the facility
3.	Moderate - Has occurred in the region
2.	Unlikely - Has occurred in the industry
1.	Very Unlikely - Extremely unlikely but possible.

Once assessed and treated, an assessment as to whether the impacts and risks recorded can be demonstrated as being acceptable and ALARP is made. The processes for determining if risks and impacts have been reduced to ALARP and acceptable levels are described below.

5.3 Impact Assessment

Environmental impacts that will occur as a result of planned activities may cover a wider range of issues, multiple species, persistence, reversibility, resilience, cumulative effects and variation in severity. The degree of impact and the corresponding level of acceptability is assessed against several guiding principles:

- Principles of ecologically sustainable development (ESD)
- Conservation and management advice
- Stakeholder feedback
- Reputational ramifications
- Environmental context
- Jadestone's HSE Policy and Management System.

The application of the guiding principles within the acceptability matrix are outlined in Table 4-1.

The following process has been applied to demonstrate acceptability in the reduction of planned impacts:

- **GREEN** residual impacts are Tolerable, if they meet management requirements, stakeholder requirements, environmental context, and the Jadestone Energy HSE Policy and management system requirements
- **ORANGE** residual impacts are Intolerable and therefore unacceptable. Planned impacts with this rating will require further investigation and mitigation to reduce them to a lower and acceptable level. If after further investigation the impact remains in the unacceptable category, the impact requires appropriate business sign-off to accept the impact.

A reduction of impacts to ALARP follows the process described in Section 5.5.

5.4 Demonstration of Acceptability

An acceptable level of risk of an unplanned event occurring must be scored with a low or medium rating. Risks receiving a score of high (orange) or extreme (red) risk ratings in Table 5-4 are unacceptable. For those risks found to have an unacceptable rating, a return to the planning process for the activity is required to determine if an alternative approach to undertaking the activity can be identified.

Table 5-4: Jadestone Energy's acceptability matrix

Guiding principles		**Impact level**				
		1	**2**	**3**	**4**	**5**
A	**Principles of ESD**	Discharges/ emissions have slight effect – recovery in days to weeks	Discharges/ emissions have minor effect – recovery in weeks to months	Discharges/ emissions have local effect – recovery in months to a year	Discharges emissions have major effect – recovery in multiple years	Discharges emissions have catastrophic effect – recovery in decades
B	**Conservation and management advice**	Activity does not contact/ interact with sensitivities	Activity Triggered and adopts conservation	Activity must be modified to uphold conservation	Activity as planned cannot uphold conservation	Activity as planned will contravene conservation

Guiding principles		Impact level				
		1	2	3	4	5
		protected by conservation and management advice	and management advice of affected sensitivities	and management requirements of affected sensitivities	and management requirements of affected sensitivities	and management requirements of affected sensitivities
C	**Stakeholders**	No issues raised by stakeholders	Concern/ query received by stakeholders due to activity	Delay in commencement of activity due to stakeholder consultation	Modification of planned activity to achieve negotiated outcome	Executive involvement in resolving stakeholder concerns
D	**Reputation**	Slight impact – no media coverage	Limited impact – State media coverage	Considerable impact – national coverage	National impact – persistent national coverage	International impact – international coverage
E	**Environmental context**	Slight effect – recovery in days to weeks	Minor effect – recovery in weeks to months	Local effect – recovery in months to a year	Major effect – recovery in multiple years	Catastrophic effect – recovery in decades
F	**Policy and Management System compliance**	Proposed activity complies with JSE HSE Policy and Management System	Parts of the activity will not align with JSE HSE Policy and Management System	Proposed activity must be modified to align with JSE HSE Policy and Management System	Proposed activity cannot uphold intent of JSE HSE Policy and Management System	Proposed activity does not comply with JSE HSE Policy and Management System

5.5 Demonstration of ALARP

Regulation 34(b) of the Environment Regulations requires a demonstration that risks are reduced to ALARP.

The ALARP principle states that it must be possible to demonstrate that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The ALARP principal arises from the fact that infinite time, effort and money could be spent attempting to reduce a risk to zero. An iterative evaluation process is employed until such time as any further reduction in the residual ranking is not reasonably practicable to implement. Following identification of the residual ranking, the ALARP principle is applied:

- Where the residual rank is **LOW** as:
  - Good industry practice or comparable standards will be applied to control the risk, because any further effort towards reduction is not reasonably practicable without sacrifices grossly disproportionate to the benefit gained.
- Where the residual rank is **MEDIUM**:
  - Good industry practice is applied for the situation or risk
  - Alternatives will be identified, and the control measures selected to reduce the risks to ALARP. This may require assessment of Company and industry benchmarking, review of local and international codes and standards, consultation with stakeholders, etc. to demonstrate that alternatives have been considered, and reasons for rejection provided.

- Where the residual rank is **HIGH** or **EXTREME** the risk is not considered to be acceptable, and the activity cannot continue as described. Further control measures must be applied such that an acceptable risk is demonstrated, and the residual risk is reduced to 'Medium' or lower as described above. The activity should not be carried out if the residual risk remains 'High' or 'Extreme'.

The process of evaluating the reduction of impacts and risks to ALARP is illustrated in Figure 5-2.

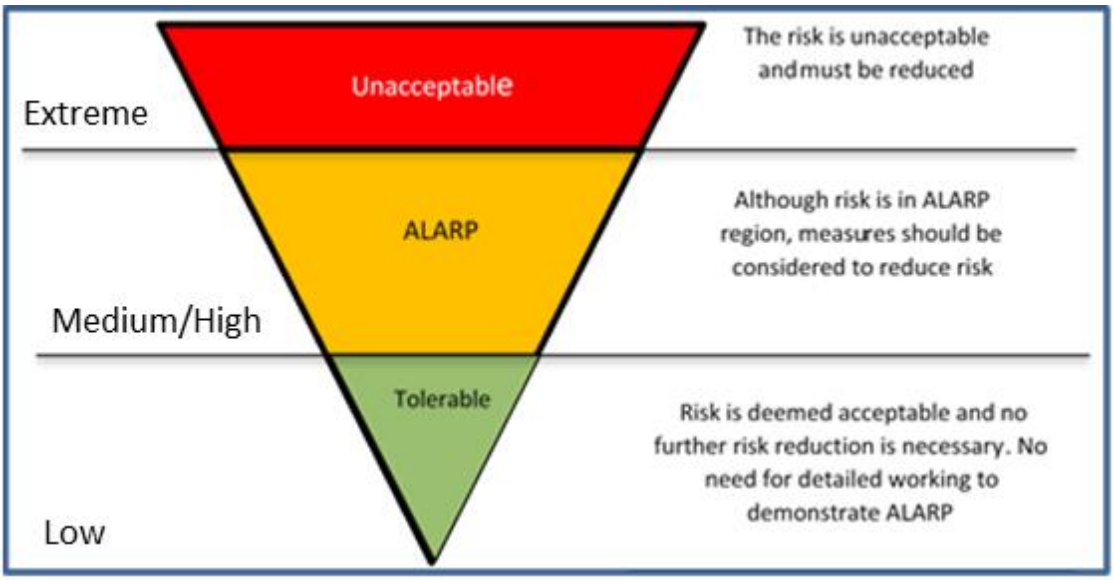


Figure 5-2: ALARP triangle

5.6 Evaluation Summary

An impact and risk assessment workshop was conducted by Jadestone in July and October 2022 to revise the existing hazard register and develop an updated register to reflect the Jadestone Energy Impact and Risk Management Framework (JS-70-PR-F-00009). The assessment was undertaken by a multidisciplinary team with sufficient breadth of knowledge, training and experience to reasonably assure that risks and impacts were identified and assessed. The assessment team included management, engineering, operations, maintenance, emergency response and environmental personnel. Following this assessment, a series of workshops have been undertaken to focus on certain areas such as produced water and atmospheric emissions to ensure alignment with the team implementing the EP.

The assessment process undertaken by Jadestone for operational activities at the Stag Facility identified nine planned hazards and six unplanned hazards and their associated environmental impacts and risks that will or may occur during operation of the Stag Facility.

The output of the assessment process is documented in the Stag Facility ENVID Register and this EP and is summarised in Table 5-3. Further detail underpinning the assessment record is provided in Sections 6 and 7.

Table 5-5: Summary of the environmental impact and risk assessment rankings for hazards associated with planned and unplanned events during operation of the Stag Facility

Hazard	Consequence Ranking
Planned activities	
1. Light emissions	Negligible
2. Noise emissions	Negligible
3. Atmospheric emissions	Minor

Hazard	Consequence Ranking
4. Discharge of produced water	Negligible
5. Liquid discharges	Negligible
6. Interaction with other users	Negligible
7. Interaction with fauna	Negligible
8. Physical footprint	Negligible
9. Spill response activities	Negligible

Unplanned activities	Consequence	Likelihood	Residual Ranking
1. Invasive marine species introduction	Moderate	Very unlikely – extremely unlikely	Low
2. Unplanned release of solids	Minor	Moderate	Medium
3. Unplanned release of non-hydrocarbon liquids	Minor	Unlikely	Low
4. Unplanned release of Stag crude oil	Major	Unlikely	Medium
5. Unplanned release of Diesel	Minor	Unlikely	Low

5.7 Risk Assessment Approach for Worst-case Hydrocarbon Spill Response

The risk assessment approach for the worst-case hydrocarbon spill response follows the risk assessment process as described above, with additional steps and considerations to determine an environmentally acceptable oil spill response strategy and an ALARP level of response preparedness:

- Determine threshold concentrations to be used in oil spill modelling to define the RISK EMBAs as per NOPSEMA Bulletin #1
- Determine the environment that may be exposed (RISK EMBA)
- Determine the environmental receptors that may be affected within the RISK EMBA as per Appendix C
- Identify sensitive receptors
- Determine protection priorities, and
- ALARP and Acceptability evaluation for spill response activities.

5.7.1 Determine Oil Spill Modelling Thresholds

Threshold concentrations for each of the hydrocarbon component types (floating oil, entrained oil and dissolved aromatic hydrocarbons (DAH)) are specified as inputs for the model to determine what potential exposure is recorded for each hydrocarbon type and the receptor/ location, to ensure that potential exposure is assessed as per NOPSEMA Bulletin #1.

5.7.2 Determine the RISK EMBA

The RISK EMBA for hydrocarbon concentration thresholds for the worst-case spill scenario for this EP is shown in Figure 3-1 and described in Appendix C. These contact concentrations are used to describe potential exposure to receptors at risk from the worst-case credible spill scenario. A description of the worst-case credible spill scenario resulting in the RISK EMBA is provided in Section 7.4

5.7.3 Determine the impact threshold

Threshold concentrations for each of the hydrocarbon component types (shoreline accumulated oil, floating oil, entrained oil and DAH) are specified as inputs for the model to determine what contact is recorded for each hydrocarbon type and the receptor/location, to ensure that recorded contacts are assessed at environmentally meaningful concentrations. Meaningful concentrations are those concentrations at which environmental (or biological) impacts may occur, and at which societal values (e.g. visual aesthetics, economics) may be impacted.

The determination of environmentally meaningful impact thresholds is complex since the degree of impact will depend on the sensitivity of the value, the duration of the contact (exposure) and the toxicity of the hydrocarbon mixture making the contact. The chemical and physical properties of a hydrocarbon change over time due to weathering processes altering the composition. To ensure conservatism in defining the subsequent impact/risk assessment, the threshold concentrations applied to the model are based on the most sensitive environmental resources that may be exposed, the longest likely exposure times and on toxicity information for the hydrocarbon. Impact pathways and impact threshold concentrations are detailed in Appendix G.

5.7.4 Sensitive Receptor Identification

Jadestone has generated spatial layers of known environmental and socio-economic values within the marine and coastal environment in WA State, Northern Territory, Commonwealth and adjacent international jurisdictions, to identify sensitive receptors (locations with highest environmental and/or socio-economic values relative to other locations). The RISK EMBA is overlaid as a boundary to identify the sensitive receptors that exist within.

Sensitive receptor assessment considers:

- Protected Area Status: used as an indicator of the biodiversity values contained within that area (e.g. World Heritage Areas, Ramsar sites and Marine Protected Areas)
- Biologically Important Areas (BIA) of Listed Threatened and Migratory Species: these are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviour such as breeding, feeding, resting or migratory
- Social values: socio-economic and heritage features (e.g. commercial fishing, recreational fishing, amenities, aboriginal and cultural heritage and aquaculture)
- Economic values: recreations and commercial fishing areas
- Listed species status and predominant habitat (surface versus subsurface): critically endangered/ endangered species, listed species, surface species (e.g. reptiles and birds) and subsurface species (e.g. mammals, sharks and fish)
- Recovery Plans, Conservation Advice for threatened species.
- Once the sensitive receptors within the RISK EMBA have been identified, the potential oil pollution risks are described and evaluated (refer Sections 8.5 and 8.6). In addition, the environmental risks from implementing spill response control measures are described and evaluated.
- Sensitive receptors are further evaluated by considering what values are contained within them when determining appropriate spill response strategies (refer Section 6.9 and 7.5). This informs the OPEP and guides spill response preparedness and planning.
- The next step is to determine those sensitive receptors within the RISK EMBA that are considered the highest risk from the worst-case credible oil spill scenario and are common across ALL modelled scenarios and seasons, that is the protection priorities.

5.7.5 Protection Priorities

It is important to note that in the event of a single worst-case hydrocarbon spill, not all sensitive receptors and areas within the RISK EMBA will be exposed or contacted at the same time or at all. Instead, the RISK EMBA is a collation of numerous possible scenarios (generally 100 or more) to develop the areas for focus in response preparedness and strategic planning. As such, only a portion would be contacted during a spill event.

It is best practice to develop spill response strategies for those areas most likely to be contacted in a single maximum credible worst-case spill. To be able to develop these strategies, the sensitive receptors in the RISK EMBA and their vulnerability to a hydrocarbon event (considering nature and scale of spill) need to be understood. A critical first step is to identify these areas – a concept termed here as 'protection priorities. The selection of protection priorities is based on stochastic modelling of multiple hydrocarbon spills.

Defining protection priorities determines the scale and needs of the oil spill response strategy. Thus, protection priorities (as a subset of all the sensitive receptors present within the full extent of the RISK EMBA) specific to a particular spill are selected using the following criteria:

- Sensitive receptors within RISK EMBA; AND
- Emergent receptors (i.e. coastal areas and islands) that are predicted to be contacted at moderate thresholds at greater than 5% probability; AND
- Receptors predicted to be contacted within the shortest timeframe; OR
- Receptors predicted to be contacted at the highest volumes; OR
- Vulnerable to impact from hydrocarbons – e.g. mangroves are more vulnerable than intertidal rock pavement; known turtle nesting beaches are vulnerable during nesting periods[8] OR
- Any other area of interest within the RISK EMBA including areas that have a high social value or are a concern raised through stakeholder consultation (refer Section 4).

Implementation of operational and scientific monitoring may focus on other receptors, including submerged receptors, as outlined in the Stag OSM-BIP (GF-70-PLN-F-00003).

It is logical and best practice to focus spill response planning and strategies on those locations most likely to be contacted in the credible worst-case oil spill scenario; that is, the scenario that represents the highest risk across all modelled scenarios covering any season, rather than attempt to cover the full spatial extent of the RISK EMBA. This allows for flexibility in response planning as plans are developed for environmental resources at greatest risk of being contacted by an oil spill and can be adapted for any scenario that occurs.

5.7.6 ALARP and Acceptability Evaluation for Spill Response

Jadestone applies a robust and systematic process to ensure that credible spill scenarios are adequately evaluated, to promote a clear link between the nature and scale and the protection priorities, and, to ensure that effective control measures exist to mitigate environmental risks and impacts to a level that is ALARP and acceptable. This process is depicted in Figure 5-3.

The process promotes a clear link between the nature and scale of the maximum credible worst-case spill scenario and the identified protection priorities to ensure that selected response strategies are appropriate and demonstrated to be effective and adequate.

As part of the risk assessment process, the spill response strategies selected are evaluated for their environmental impact (Figure 5-4).

[8] IPIECA, the global oil and gas industry association for environmental and social issues, the International Maritime Organisation (IMO) and International Association of Oil and Gas Producers (OGP) developed a guidance document for 'Sensitivity mapping for oil spill response' IPIECA/IMO/OPG (2012). This document was used as a reference and basis for the sensitivity of habitats vulnerability assessment

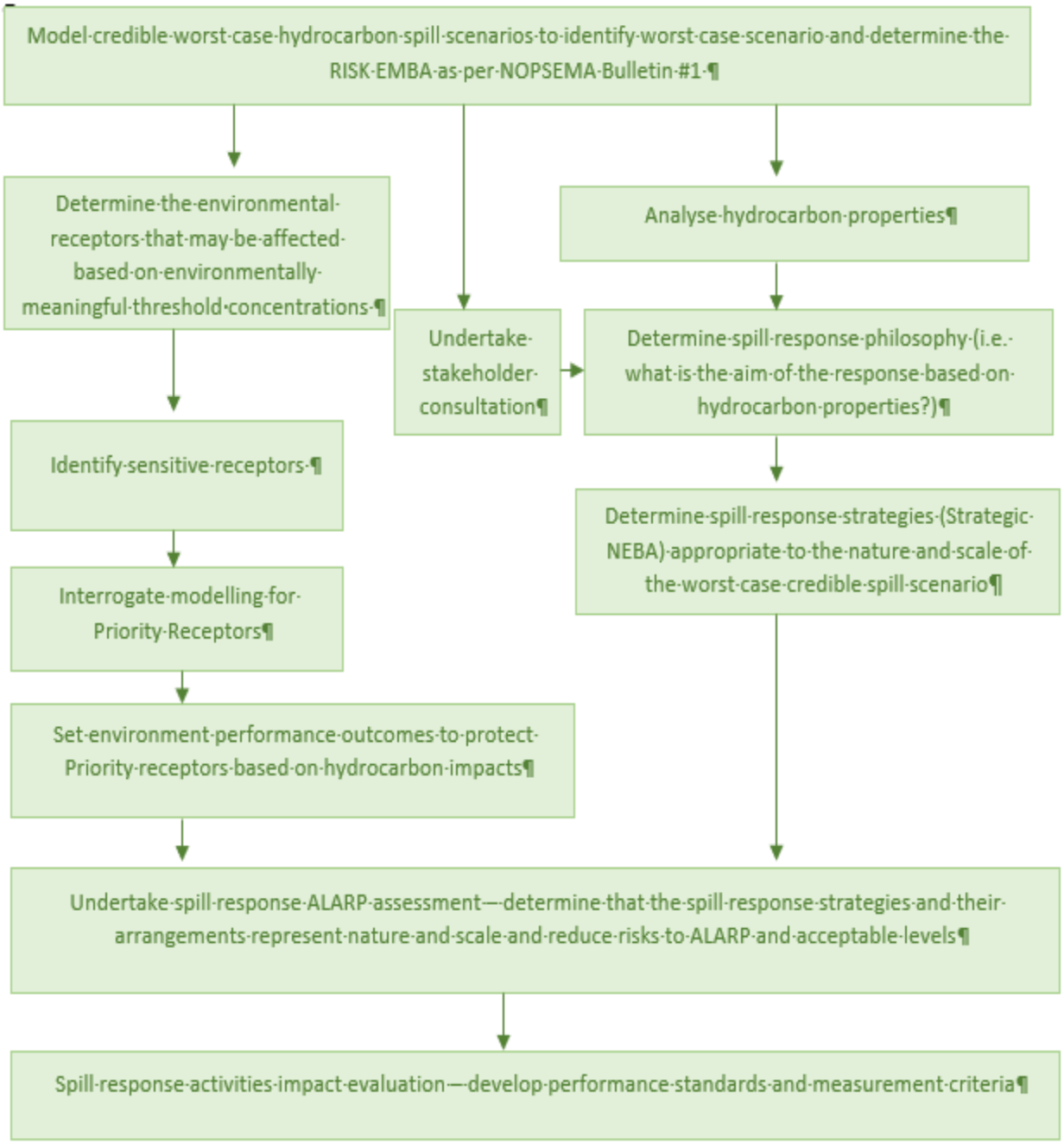


Figure 5-3: Spill scenario evaluation and ALARP determination process

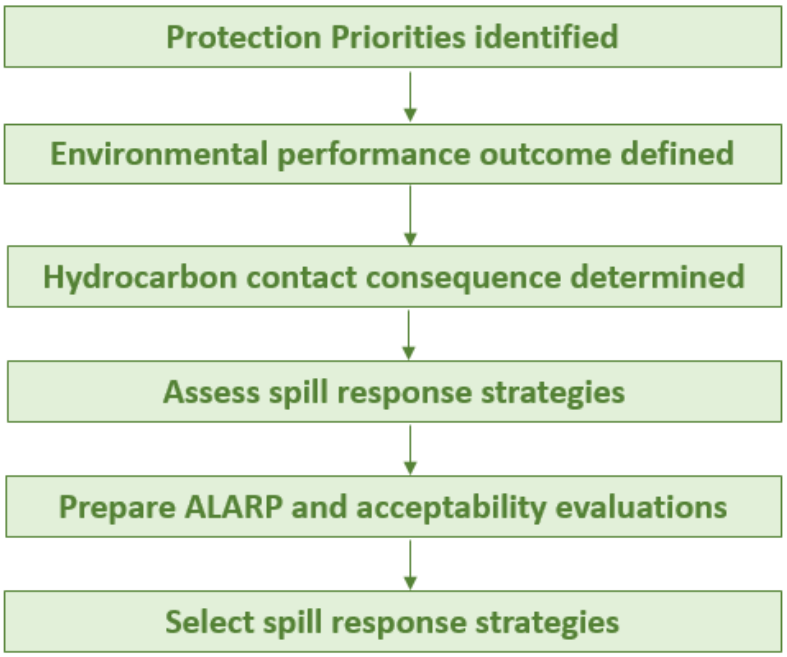


Figure 5-4: Spill control analysis and ALARP determination process

6. HAZARD ASSESSMENT – PLANNED ACTIVITIES

This section of the EP describes the environmental impacts that may or will arise from planned activities associated with operation of the Stag facilities. In addition, mitigation and management measures that will be implemented to reduce impacts to an acceptable level are defined.

The impact assessment process identified nine environmental hazards associated with planned operating activities. The residual consequence rankings for the hazards listed are summarised in Table 6-1 and presented in detail in this section.

Table 6-1: Summary of the environmental consequence assessment rankings for hazards associated with planned activities

Hazard	Consequence ranking
1 Light	1 – Negligible
2 Noise	1 – Negligible
3 Atmospheric emissions	1 – Negligible
4 Discharge of produced water	1 – Negligible
5 Discharge of liquids	1 – Negligible
6 Interaction with other users	1 – Negligible
7 Interaction with fauna	1 – Negligible
8 Physical footprint	1 – Negligible
9 Spill response activities	3 – Moderate

The evaluation of impacts identified during the assessment process for hazards associated with planned activities is provided as follows:

- Description of the hazard

- Impacts – a discussion and assessment of the environmental impacts associated with the proposed activity
- Environmental performance – a description of a measurable level of performance required for the management of environmental aspects to ensure that the environmental impacts and risks will be of an acceptable level; and a statement of performance required of a control measure. This includes a description of the control measures in place to reduce the impacts
- Demonstration of ALARP and Acceptability – a demonstration that the environmental impacts will be reduced to ALARP and will be of an acceptable level, and the rationale for these statements.

For noting, a cumulative impact assessment of the brines and cooling water has been provided in Section 6.5, as this is a mixed effluent stream with a common discharge point at the CPF. The produced water discharge stream at the CPF is separate and distinct from the cooling water and brine discharges and so was therefore not considered in the cumulative impact assessment of the brines and cooling water discharges; the impacts of the produced water discharge from the CPF have been considered in Section 6.5.

Jadestone believes that with the information provided for liquid discharges as presented in the EP, adequate information is available to be able to undertake a comprehensive evaluation of the impacts and risks to the environment due to these discharges, and their subsequent management.

6.1 Light

6.1.1 Description of Hazard

Aspect	Light emitted from the CPF and support vessels, as well as flaring associated with production at the CPF.

6.1.2 Impacts

Direct light spill on surface waters from the facility will be limited to the area directly adjacent to the CPF and support vessels present from time to time within the Operational Area.

Depending on weather conditions, the Stag Facility lighting, is visible at distances of tens of kilometres, with intensity attenuating with distance. Light from support vessels is visible over shorter distances since lights on vessels are closer to the sea surface. In all cases (Stag Facility, support vessels and flaring), lighting is not expected to illuminate any beaches with the closest being >30 km away (Dampier Archipelago).

Modelling

Light modelling undertaken for Santos' Dorado Development for an FPSO operational lighting with no flaring, and with flaring on the FPSO, was undertaken in 2020 (Santos 2021). In the non-flaring scenario, the model results show that radiance has reduced to ambient (less than 0.01 full moon equivalent) at 17.7 km from the source. In the flaring scenario, the flare is no longer directly visible at 42.4 km, when the flare drops below the horizon. As the flare drops below the horizon, radiance declines rapidly and is no longer visible. This was based on a flare boom of 110 m above the deck. The flare tip is approximately 30 m high on the Stag facility and therefore the distance at which light from flaring may be visible is likely to be less that that modelled for the Dorado scenario.

Lighting impacts are not only related to the amount of artificial light, but also the types of light and the wavelengths that the different light types emit. Measurements of light emitted from an FPSO recorded peak wavelengths between 530 and 620 nm, which is within the range that is visible to marine turtles and seabirds (300 to more than 700 nm) (Woodside 2019). This lighting was likely metal halide, halogen or fluorescent lighting rather than LED. Light emitted from a natural gas flare recorded peak wavelengths between 750 and 900 nm (Pendoley 2000, in Woodside 2019). While this peak is outside the visible spectrum which is most disruptive to wildlife, including marine turtles and seabirds (CoA 2020), light

emissions from gas flares tend to be high intensity which is also an important factor. Therefore, light emissions from gas flares still pose a potential risk to wildlife.

There is no evidence to suggest that artificial light sources adversely affect the migratory, feeding or breeding behaviours of cetaceans. Cetaceans predominantly utilise acoustic senses to monitor their environment rather than visual sources (Simmonds et al. 2004). Therefore, light from the Stag Facility is not considered to be a significant factor in influencing cetacean behaviour or survival.

Potential impacts to marine fauna from artificial lighting associated with the Stag Facility are:

- Disorientation, attraction or repulsion
- Disruption to natural behavioural patterns and cycles.

These potential impacts are dependent on:

- Density and wavelength of the light emitted and the extent to which light spills into areas that are significant for breeding and foraging
- Timing of overspill relative to breeding and foraging activity
- Resilience of the fauna populations that are affected.

A PMST Search was conducted on a 20 km buffer around the defined operational area to identify any MNES species within the recommended 20 km threshold that light impacts may occur. Loggerhead and Hawksbill internesting buffers and the Roseate tern breeding BIA was identified as potentially occurring within the 20 km buffer and potentially affected by light emissions in addition to those species identified to occur within the defined operational area. Within 42 km of the flare, it is feasible that light may be visible, however species that may be affected beyond the 20 km boundary are considered to be marine turtles attracted by sky glow and ambient light from the flare given the distance to land. It is recognised that light emissions from the flare may be visible at turtle nesting beaches, but given they are >35 km away, the effects are considered to be negligible; impacts are assessed further below.

Marine Turtles

Turtles are known to use a variety of cues for navigation when in the water. However, light is not thought to be an important cue for adults, although adults are considered to have a preference for non-illuminated beaches (EPA 2010). The significant concern is to nesting beaches as identified in the Recovery Plan for Marine Turtles in Australia (DoEE 2017).

The National Light Pollution Guidelines states that a 20 km buffer (based on sky glow) to important habitat for turtles should be applied when considering possible impacts (DCCEEW 2023). However, the demonstrated impacts on which this buffer is based were in response to light emissions associated with a liquified natural gas (LNG) plant. Although details around the individual light sources of the case study and the light sources on the vessels are unknown, it is expected that light emissions associated with vessels and flaring at the facility will be notably lower compared to an LNG plant. Given the operational area is located greater than 20 km away from the nearest turtle nesting beach, light emissions will not be visible.

The Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA 2017) highlights artificial light as a threat to marine turtles. Specifically, the plan indicates that artificial light may reduce the overall reproductive output of a stock, and therefore recovery of the species, by:

- inhibiting nesting by females
- disrupting hatchling orientation and sea-finding behaviour
- creating pools of light that attract swimming hatchlings and increase their risk of predation.

The most significant risk posed to marine turtles from artificial lighting is the potential disorientation of hatchlings following their emergence from nests by light spill on beaches, although breeding adult turtles

can also be disoriented (Longcore & Rich 2016, in EPA 2010). The Recovery Plan for Marine Turtles in Australia: 2017-2027 specifies the following priority actions for turtles in relation to artificial light:

- Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats.

Internesting and Foraging turtles

Experienced nesting females are unlikely to be disturbed by light, but first-time nesters may be disturbed by light when they are selecting their first nesting beach (Pendoley 2014).

The Flatback turtle inter-nesting buffer and habitat critical BIA overlaps the operational area, while the hawksbill and loggerhead internesting buffer BIA and green and hawksbill habitat critical BIA overlap the 20km buffer. The 42 km light buffer overlaps the foraging, internesting, mating migration corridor and nesting, BIAs for flatback, green and hawksbill turtles, the nesting BIA for loggerhead turtles as well as habitat critical for the survival of these species. Although there may be transient individuals, most females inter-nest close to their nesting beaches, typically in shallow (0–10 m) nearshore waters within 5–60 km of the nesting beach (Chevron 2008). The activities are in a water depth of approximately 49 m depth, and the nearest significant nesting beaches are 35 km away on Dampier Archipelago and the Montebello/ Barrow/ Lowendal Islands (75 km SW). The lighting visible on nesting beaches from flaring is considered unlikely to be biologically relevant due to the attenuation of light over distance and the intensity reducing from a single point source.

Adult turtles transiting or foraging (e.g. flatback turtles during internesting) through permit WA-15-L, may temporarily alter their behaviour while attracted to the light spill from infrastructure and flaring.

If individual turtles are present, light emissions from vessels are unlikely to be of concern. There is no evidence, published or anecdotal, to suggest internesting, mating, foraging or migrating turtles are impacted by light from offshore vessels, and nothing in their biology would indicate this as a plausible threat as marine turtles do not use light as a cue during these behaviours (Pendoley 2019; Witherington and Martin 2003). As such, light emissions from vessels and the CPF are unlikely to result in displacement of or behavioural changes to individuals in these life stages. Potential impacts to foraging turtles are limited to local attraction to prey species attracted to light (Kebodeaux 1994). Marine turtles do not feed during the breeding season (Limpus et al. 2013), and light is not a cue to internesting behaviours. Therefore, potential impacts of artificial light from vessels or flaring to internesting turtles are not considered likely.

Adult turtles have been observed feeding on prey presumed to be attracted by lights of oil production platforms in the Gulf of Mexico (Kebodeaux 1994). However, illuminating fishing nets has been shown to reduce the bycatch of green turtles as they are thought to alert them to the presence of a net (Ortiz et al. 2016). This suggests that, although aggregation of foraging turtles may occur around light sources as a secondary response to effects of light on prey distribution, light does not appear to act as a cue to foraging behaviour.

Hatchlings

Hatchlings disoriented or misoriented by artificial lighting may take longer, or fail, to reach the sea. This may result in increased mortality through dehydration, predation or exhaustion (Salmon and Witherington 1995).

Once hatchlings enter the ocean, they are thought to employ a survival strategy that involves rapid dispersal away from predator rich nearshore habitats to reach deeper waters where they develop into juveniles. An internal compass set while crawling down the beach, together with wave cues, are used to reliably guide them offshore (Lohmann & Lohmann 1992; Stapput & Wiltschko 2005; Wilson et al. submitted). In the absence of wave cues however, swimming hatchlings have been shown to orient towards light cues (Lorne & Salmon 2007; Harewood & Horrocks 2008) and in some cases, wave cues were overridden by light cues (Thums et al. 2013, 2016). The speed and direction of at-sea dispersal is substantially influenced by currents; the offshore trajectory of flatback hatchlings at Thevenard Island was

displaced by tidal currents which ran parallel to the beach, an effect that increased as the hatchlings moved further offshore (Wilson et al. 2018, 2019).

However, when light was present this effect was diminished, showing that hatchlings actively swam against currents and towards the light source, which slowed their offshore dispersal from 0.5 m/s when no light was present, to 0.35–0.44 m/s, depending on the type of light (Wilson et al. 2018). The mean swimming of flatback hatchlings under natural light conditions (0.5 m/s) were similar to speeds of green turtle hatchlings (0.49 m/s) (Thums et al. 2016).

The locations of the proposed activities are greater than 35 km from the turtle nesting beaches of the Dampier Archipelago and Montebello Islands and therefore negligible impact to marine turtle hatchlings is expected as the flaring lighting that may reach these locations will likely be reduced to near ambient at this distance.

Seabirds

The light from the CPF and vessels may provide enhanced capability for seabirds to forage at night (BHPB 2005). Studies in the North Sea indicate that migratory birds are attracted to lights on offshore platforms when travelling within a radius of 3–5 km from the light source. Outside this area their migratory path will be unaffected (Marquenie et al. 2008).

According to the National Light Pollution Guidelines for Wildlife, a 20 km threshold provides a precautionary limit based on observed effects of sky glow on marine turtle hatchlings demonstrated to occur at 15–18 km from the light source and fledgling seabirds grounded in response to artificial light 15 km away. The intensity and extent of light glow, and the potential to result in biological impact, will be dependent upon the light source itself, including the number, intensity, spectral output and position of individual lights at the source. The effect of light glow may occur at distances greater than 20 km for some species and under certain environmental conditions (Commonwealth of Australia 2020). The Wildlife Conservation Plan for Seabirds (CoA 2020) identifies light as a threat and includes navigation aids, but also recognises that adult seabirds are less impacted than fledglings. The matrix identifies potential impacts to seabirds from light pollution as minor and recommends mitigation of light pollution around breeding colonies and from boats.

Given that only a small number of seabirds are likely to be affected by light spill from the activities whilst in transit, any behavioural disturbances that may occur such as disorientation and attraction are expected to be minor and temporary. The breeding BIA of the EPBC migratory species – wedge tailed shearwater overlaps the Operational area and the breeding BIA for the Roseate Tern overlaps the 20 km buffer. Light is identified as a threat in the Wildlife Conservation plan for Seabirds (COA 2020).

Plankton, Fish and sharks

The response of fish to light emissions varies according to species and habitat. Experiments using light traps have found that some fish and zooplankton species are attracted to light sources (Meekan et al. 2001). Lindquist et al. (2005) concluded from a study that artificial lighting resulted in an increased abundance of clupeids (herring and sardines) and engraulids (anchovies); these species are known to be highly photopositive. Shaw et al. (2002), in a similar light trap study, noted that juvenile tuna (Scombridae) and jack (Carangidae), which are highly predatory, may have been preying upon higher than usual concentrations of zooplankton that were attracted to a vessels light field.

There is a potential for individuals to be impacted by light emissions from lighting. However, as the Operational Area does not contain any significant feeding, breeding or aggregation BIAs for fish it is more likely there will be individuals traversing the area then large groups of species.

Light associated with the activity will affect a small portion of the vast biologically important foraging area for whale sharks. However, impacts at a population level are not expected due to the limited duration of the activities.

Overall Consequence assessment: Negligible

6.1.3 Environmental Performance

Hazard		**Light**		
Performance outcome		**Activity lighting managed in accordance with navigational and safety requirements**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
004	Stag Safety Critical Elements Performance Standards Report: PS-04 Navigational Aids (GA-70-REP-F-00007) ensure navigational lights are present and working	Aircraft warning lights mark tall objects that may be an obstruction to a helicopter approach to the helideck. Marine Navigational lights are positioned on the platform and CALM buoy such that at least one light is visible to a vessel approaching from any direction.	Formal inspection every 90 days confirms lights present and functioning, recorded in CMMS	Production and Maintenance Supervisor
005	Vessel navigation aids and equipment meet regulatory and safety requirements by aligning with *Navigation Act 2012*	Vessels will comply with maritime safety and navigation requirements including: • International Regulations for Preventing Collisions at Sea 1972 (COLREGS) • Chapter V of Safety of Life at Sea (SOLAS) • Marine Order 21 (Safety of navigational and emergency procedures) (as appropriate to vessel class) • Marine Order 30 (Prevention of collisions) (as appropriate to vessel class) • Vessels to maintain radio channels and other communication systems.	Vessel maintenance system confirms navigational equipment is maintained to regulatory and safety standards Records confirm that required navigation equipment is fitted to all vessels to ensure compliance with maritime safety and navigation requirements. Records confirm vessels maintain communication systems.	Marine Superintendent

6.1.4 ALARP Assessment

On the basis of the impact and risk assessment process completed, Jadestone considers the control measures described above are appropriate to manage the risk of light emissions to ALARP, the residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated, no further controls are required. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
All activities completed in daylight hours only	Eliminate	No	No	Daylight operations only considered to introduce unnecessary cost (i.e. 12 vs 24 hr. ops.), whilst delivering little / no environmental benefit. The operations cannot be shut down on a daily basis, and there would be a >50% reduction in production over the course of a year resulting in significant costs. Light from the Stag facility does not illuminate beaches where receptors (including turtle hatchlings) sensitive to light emissions are present.
Replace external lights or reduce the lighting	Substitute	No	No	Lights are required to create illumination levels needed for safe working, emergencies and navigational requirements. No additional cost; but introduces unacceptable safety risks to personnel and vessels. Little benefit given relatively low numbers of turtles and seabirds in operational area and surrounding waters.
Add filters to lights or re-design placement/ positioning	Engineering	No	No	Lighting has been positioned such that maximum illumination of work surfaces within facility structures is achieved. Costly and considered grossly disproportional to any gain when considering the distances that the facility is from turtle or seabird nesting areas.
Reduce usage of lighting in peak sensitive receptor windows	Isolation	No	N/a	To ensure lighting meets health and safety requirements, lighting is required throughout the day/ night and across the year. To isolate usage such that lights were not used during sensitive receptor windows would create a non-conformance with health and safety requirements.
None identified	Administrative	N/a	Na/a	N/a

6.1.5 Acceptability Assessment

The potential impacts due to light emissions are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. No control measures are proposed as a reduction below maintenance of light levels in accordance with health and safety regulations as is currently the case.

Policy COMPLIANCE	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regards to impacts from lighting on sensitive receptors.

Laws and standards	Lighting on the Stag facility has been designed to meet health and safety requirements. All vessels in Australian waters adhere to the navigation safety requirements contained within the *Navigation Act 2012* and subordinate Marine Orders with respect to navigation and workplace safety equipment (including lighting). There are no standards for acceptable levels of lighting to seabirds or turtles.
Industry best practice	Lighting on the Stag facility is designed to be at minimum safe operational levels.
Environmental context	While there is direct light spill to sea surface immediately around the Stag facility, the impact and risk assessment process indicates that the light spill will not cause significant behavioural effect to adult turtles and marine mammals that may transit the Operational Area or light EMBA. Light is identified in the National recovery plan for Turtles (2017) as a threat to turtles on nesting beaches only. Although the operational area overlaps an internesting BIA for flatback turtles, impacts to adults from lighting is not expected to significantly affect the adult turtle behaviour. There will be no direct light spill on nesting beaches, though some increase from ambient may be expected from the flaring emissions on turtle nesting beaches within 42 km of the flare (though very unlikely) and therefore the activity is considered to be conducted in a manner that is consistent with the Recovery Plan and the National Light Pollution Guidelines for Wildlife (DCCEEW 2023). Light is also identified as a threat to seabirds in the Wildlife Conservation Plan for Seabirds (CoA 2020), however the operational area is not within 20 km of a breeding colony and lighting is essential for the activity (navigational lighting). Light is not identified as a threat to the wedge tailed shearwater which a breeding BIA overlaps the Stag Facility. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	Light is identified in the National recovery plan for Turtles (2017) as a threat to turtles on nesting beaches only. There will be no very limited indirect light spill from flaring on nesting beaches and therefore the activity is considered to be conducted in a manner that is consistent with the Recovery Plan and the National Light Pollution Guidelines for Wildlife (DCCEEW 2023). Light pollution is identified as a threat in the Wildlife Conservation Plan for Seabirds (CoA 2020) and includes navigation aids. Though the plan does identify lighting from vessels as having potential impacts, the operational area is not in close proximity to any breeding areas and therefore only individuals overflying the location are considered likely and the impacts are considered negligible. No explicit controls are listed in the plan to manage lighting impacts. Jadestone has had regard to the representative values of the protected areas within the RISK EMBA, and the respective management plans and other published information. Impacts from light emissions will have a negligible impact on any of the social and ecological objectives and values, of any AMPs, or state marine parks. This is consistent with the objectives of the protected area management plans and considered acceptable.
ALARP	The residual risk has been demonstrated to be ALARP.

6.2 Noise

6.2.1 Description of hazard

Aspect	Noise is generated by activity vessels (including support vessels) and helicopters. Highest noise levels are likely to occur where vessels use bow thrusters. Noise is also generated by equipment such as generators and pumps on the CPF. The median sound level for five FPSOs on the NWS has been recorded at 181 dB re 1 µPa (Erbe et al. 2013). Side-scan sonar (SSS) is an activity that may be used during inspection, maintenance and repair work, likely to be applied for several days at a time every few years.

Vessels

Under normal operating conditions when vessels are idling or moving between sites, support vessel noise would be detectable only over a short distance (tens of metres). When a support vessel is using main engines and bow thrusters to hold position, the noise may be detectable above background noise levels for hundreds of metres or more during calm weather conditions, although this range of audibility will be reduced under noisier (windier) background conditions (BHPB 2005). Studies of the radiating underwater noise generated from the propellers of support vessels when holding position ('DP') indicate highest measured levels of up to 182 dB re 1Pa with levels of 120 dB re 1Pa measured at 3–4 km (McCauley 1998). McCauley (1998) also measured underwater sound levels from the Pacific Ariki, a 64 m long support vessel with 8000 HP (6,000 kW) main engines during calm conditions in the Timor Sea in 110 m of water while transiting at 11 knots, and found the distance to 120 dB re 1 µPa to be approximately 1 km.

Helicopters

The extent of helicopter noise impacts is limited to take off and landing at the MODU as they do not fly close to the ocean surface (with a typical cruising height of between approximately 1,000–1,400 m) except to undertake these tasks.

The main acoustic source associated with helicopters is the impulsive noise from the main rotor and high-speed impulsive noise related to trans-sonic effects on the advancing blade. Dominant tones in noise spectra from helicopters and fixed wing aircraft are generally below 500 Hz (McCauley 1994). Other tones associated with the main and tail rotors and other engine noise can result in a larger number of tones at various frequencies (BHPB 2005).

Sound traveling from a source in the air (e.g. a helicopter) to a receiver underwater is affected by both in-air and underwater propagation processes, which are further complicated by processes occurring at the air seawater surface interface (e.g. wind and waves). The level of noise received underwater depends on source altitude and lateral distance, receiver depth, water depth, and other variables.

Helicopter engine noise is emitted at various frequencies however, the dominant tones are generally of a low frequency below 500 Hz (Richardson et al. 1995). Sound pressure in the water directly below a helicopter is greatest at the surface and diminishes with increasing receiver depth. Noise also reduces with increasing helicopter altitude, but the duration of audibility often increases with increasing altitude, with sound penetrating water at angles less than 13°. The noise from the flyover of a Bell 214 helicopter (stated to be a noisy model) has been recorded underwater (Richardson et al. 1995). The sound source was 162 dB re 1 µPa @ 1 m at its peak and had frequency of 155 Hz.

CPF Activities

Noise from platform operations is expected to be low as operating equipment including generators, engines and machinery is above sea level. The frequency and noise level received underwater will depend on a number of variables including the type of infrastructure; the types and sizes of engines; as well as the local hydro-acoustic and geo-acoustic environment.

IMR Activities

For the IMR activities covered in the EP, side-scan sonar (SSS) is a rare activity that would only occur for several days at a time within the operational area every few years. SSS transmits at high frequencies (approximately 70–400 Hz) and produces a highly focussed beam of sound down towards the seabed, due to this there is very limited horizontal sound propagation. SSS is generally considered a high acoustic density source and medium frequency generator. The level of sound pressure ranges from about 200–235 dB re 1µPa SPL. The frequency ranges from about 75–900 kHz (Jimenez-Arranz et al. 2017). The maximum potential duration of exposure is limited to the time taken for a migrating whale to pass a vessel performing side-scan sonar in the operational area, potentially only minutes per individual.

6.2.2 Impacts

The nature and scale of impacts from noise emissions generated during this activity must be considered in the context of the ambient noise environment. Ambient underwater noise levels are dependent on location, and are often dominated by local wind noise, waves, biological noise and ship traffic. Wind speed and seabed conditions have a clear influence on the ambient noise level. Existing anthropogenic underwater noise sources in the region of the activity include shipping, small vessel traffic servicing the Stag CPF and other nearby operators, as well as the overarching operations that are ongoing at the Stag CPF.

The response of marine fauna when exposed to underwater noise from anthropogenic sources is dependent on a number of factors, including distance from the sound source, water depth and bathymetry, the animal's hearing sensitivity, type and duration of sound exposure and the animal's activity at time of exposure. Potential impacts to marine fauna due to noise and vibration in the underwater environment may occur, and can result in a range of responses including (Richardson et al. 1995; Southall et al. 2007):

- Injury to hearing or other organs: hearing loss may be temporary (temporary threshold shift (TTS)) or permanent (permanent threshold shift (PTS))
- Masking or interfering with other biologically important sounds (including vocal communication, echolocation, signals and sounds produced by predators or prey)
- Disturbance leading to behavioural changes or displacement of fauna. The occurrence and intensity of disturbance is highly variable and depends on a range of factors relating to the animal and situation. This includes attraction to the noise sources as well as avoidance.

EPBC Act listed and threatened migratory species that may be present near the activities include whales migrating through the operational area, whale sharks and turtles. Noise is identified as a threat within the conservation advice or recovery plans (refer Table 3-4) for a number of the EPBC species that may occur in the operational area including humpback whales, whale sharks and turtles. The operational area also overlaps BIAs humpback whale (migration) (***Figure 3-5***) and flatback turtle (internesting) (Figure 3-11).

A PMST Search was conducted on a 20 km buffer around the defined operational area to identify any MNES species within the vicinity upon which noise impacts may occur. The following species (potentially impacted by noise) were identified as potentially occurring within a 20 km buffer in addition to those identified to occur within the defined operational area:

- Sei Whale
- Fin whale
- Dugong
- Shortfin mako
- Longfin Mako

Marine Mammals

Cetaceans may travel through the area, particularly given the migration BIA for the humpback whale overlaps the operational area. Additionally, conservation advice and management plans for humpback whales, southern right whales and blue whales list noise interference as a potential threat. All these species are low-frequency cetaceans. Low (baleen whales) and mid-frequency (toothed whales except porpoises) cetaceans may frequent the operational areas. There are no known aggregation, resting, breeding or feeding areas for cetaceans in close proximity to the operational area.

Dugongs may also frequent the area, although the BIA is not within the operational area or 20 km buffer (Figure 3-7). While dugongs may occur in the area, dugongs spend most of their time in shallow tidal and subtidal seagrass meadows. There are no assessments for impacts of vessel noise on dugongs (sirenians) using the Southall et al. (2019) criterion. As their frequency-weighting is most similar to HF cetaceans, and their thresholds are higher (as they are less sensitive), results for vessel noise impacts on HF cetaceans have been used as a proxy for those on dugong, noting that this is likely to be conservative.

Whales are low-frequency hearing cetaceans with an estimated functional hearing frequency range of 7–22 kHz (Southall et. al.2007). Dugong sensitivity range is between the low-frequency and mid-frequency cetaceans (NMFS, 2018), for the purposes of risk assessment dugongs are classed as 'low frequency' in accordance with the NMFS guidance.

The threshold criteria that is currently recognised for the potential behavioural impacts to marine mammals is 120 dB re 1 µPa SPL (unweighted) for non-impulsive noise sources (NOAA 2019).

PTS and TTS onset thresholds have been identified for low frequency cetaceans and dugongs, and high-frequency cetaceans which are weighted SEL24h received levels.

Table 6-2 details cetacean behavioural, TTS and PTS thresholds for continuous noise (vessels and CPF), and Table 6-3 details cetacean behavioural, TTS and PTS thresholds for impulsive noise (survey equipment).

Table 6-2: Continuous noise: summary of cetacean impact thresholds

Hearing group	NOAA (2019)	Southall et al. (2019)	
	Behaviour	PTS onset thresholds (received level)	TTS onset thresholds (received level)
	SPL (dB re 1 µPa)	Weighted SEL_{24h} (dB re 1 $\mu Pa^2 \cdot s$)	Weighted SEL_{24h} (dB re 1 $\mu Pa^2 \cdot s$)
LF cetaceans	120	199	179
HF cetaceans		198	178

Source: Derived from Southall et al. (2019) and National Oceanic and Atmospheric Administration (2019)

Table 6-3: Impulsive noise: summary of marine mammal impact thresholds

Hearing group	PTS onset thresholds5F9		TTS onset thresholds3		Behaviour (SPL, dB re 1 µPa)
	Weighted SEL24h (dB re 1 µPa2·s)	PK (dB re 1 µPa)	Weighted SEL24h (dB re 1 µPa2·s)	PK (dB re 1 µPa)	
HF cetaceans	185	230	170	224	160
LF cetaceans	183	219	168	213	

Source: Derived from Southall et al. (2019) and United States National Marine Fisheries Service (2014)

[9] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset.

Potential impacts from CPF and vessels

Using predicted source levels described above, estimated distances from activity vessels to behavioural and physiological thresholds (as listed in Table 6-2) for cetaceans are provided below.

The predicted extent of thresholds for a vessel in transit have been estimated using measurements of the *Pacific Ariki* (McCauley 1998) and the ranges predicted for the CPF operating in isolation, are as follows:

- The range to the 120 dB re 1 µPa NOAA (2019) criterion for behavioural responses in marine mammals is estimated to be 1 km.
- PTS and TTS in LF cetaceans could occur within approximately 20 or 200 m respectively, if the animal remains within that range for 24 hours.
- PTS is not predicted in HF cetaceans, although they could experience TTS within 50 m if the animal remains within that range for 24 hours.

Considering modelling assessments of other similar operations (such as the Artisan-1 Exploration Well), and applying a conservative approach, a range to TTS of 50 m for HF cetaceans will be used to represent potential effects on odontocetes within this assessment.

Auditory masking impacts may occur when there is a reduction in audibility for one sound (signal) caused by the presence of another sound (noise). For this to occur the noise must be loud enough and have a similar frequency to the signal and both signal and noise must occur at the same time. Therefore, the closer the marine mammal is to the vessel, and the more overlap there is with their vocalisation frequencies, the higher the probability of masking. The potential for masking and communication impacts is therefore classified as high near the vessel (within tens of metres), moderate within hundreds to low thousands of metres (Clark et al. 2009).

Generally, the spatial and temporal scale of behavioural response effects on marine mammals would be limited to the localised area surrounding the CPF (thousands of metres) and the periods of intensified activities. These ranges will be greater during resupply operations. Because the operations will be focused at a static site, and therefore only influence a small region within the region not known to be a critical habitat for any cetacean species, significant effects at the population level are not expected.

Potential impacts from survey equipment

Modelling of survey geophysical equipment has been undertaken at a number of locations including the coast of Russia, Greenland, California and the Otway basin (Zykov et al. 2013; Austin et al. 2012; McPherson and Wood 2017; Zykov et al. 2012). These studies, along with the example of accumulation provided in McPherson (2020) indicate that both peak and frequency-weighted SEL noise emissions from survey equipment such as SSS operating at 75–900 kHz are typically below sound levels that could result in low and high-frequency marine mammal TTS or PTS from either PK or SEL criteria (Table 6-3) in a horizontal direction. The threshold for behavioural disturbance (Table 6-3) could be exceeded within 120 m (McPherson 2020). SSS impulses are outside the auditory range of LF species and baleen whales (such as humpback and pygmy blue whales) but within the mid-frequency (MF) and HF cetacean marine fauna auditory range (such as sperm whales and dolphins). However, PTS and TTS thresholds for these species (Table 6-3)) are only expected to be exceeded close to the source. Due to the lack of aggregating areas for these species, individuals are expected to be transitory only, displaying behavioural responses, and moving away from the source, before TTS and PTS thresholds are exceeded.

Survey equipment could cause masking of vocalisations of cetaceans due to the overlap in frequency range between signals and vocalisations. Masking will primarily apply to HF cetaceans, with all signals above 2 kHz. Higher frequency sounds have limited propagation, and attenuate rapidly, resulting in a relatively small area of influence. Therefore, the range at which masking impacts could occur would be limited to within hundreds of metres from the sound source.

The risk of impact is further reduced as the survey vessels will be moving around subsea equipment when conducting these types of surveys and for very short durations. The likelihood of an individual remaining within the distances above for any length of time is highly unlikely.

The Blue Whale Conservation Management Plan 2015–2025 (DoE 2015) lists noise disturbance as a threat, specifically relating to impulsive sound sources and acute industrial noise such as pile driving. Shipping noise in busy shipping channels is also identified as a potential source of noise emissions, although the risk assessment determines that consequences would be restricted to individuals, and no population level effects expected. The plan also recognises that avoidance of these activities is typically shown. The plan requires that anthropogenic noise in distribution areas will be managed such that any blue whale continues to utilise the area without injury. As defined by the guidance on key terms in the CMP (DAWE 2021), injury is considered to be either PTS or TTS from underwater noise. The received levels from the CPF and vessels will decline rapidly from the source and be below thresholds for PTS at source and below TTS within approximately 1 km of the source. As injury is not expected as a result of continuous sound sources resulting from the activity, impacts will be managed in adherence with the Management Plan.

The National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) (DCCEEW, 2024) lists anthropogenic underwater noise (as having a potentially significant impact on marine mammals as they rely on sound for basic life functions such as communication (including for mating), navigation, foraging and predator avoidance. The potential impacts from anthropogenic underwater noise is of particular concern within or close to habitat critical for the survival of southern right whales (where the reproduction BIA is located, Figure 3-6) where whales including pregnant and nursing females and calves are resident for long periods of time. Right whales have demonstrated increases in the amplitude of their upcall in response to increasing background noise levels, particularly in the frequency below 400 Hz, which is the range they use to communicate (Parks et al. 2010). The plan states that the first approach to reduce the risk of impacts from key threats such as noise impacts to southern right whales is to avoid their BIAs and particularly their habitat critical for survival areas wherever practicable at any times whales are present, predominantly between April to November and to implement temporal avoidance measures in or adjacent to HCTS during the critically important calving season.

Where it is not possible to avoid HCTS when southern right whales are present in those areas, reasonably practicable minimisation controls supported by appropriate whale detection and adaptive management measures must be adopted that clearly demonstrate risk minimisation to achieve the actions set out in this Recovery Plan.

The Operational Area is approximately 250km away from the reproduction and migration BIA and the HTCS for southern right whales (Figure 3-6). Given the distance of BIAs and HTCS from the operational area and vessels adhering to control measures noise impacts will be managed in adherence with the Recovery Plan.

Generally, the spatial and temporal scale of behavioural response effects on marine mammals would be limited to the localised area surrounding the CPF and vessels (thousands of metres) and the periods of intensified activities such as vessel re-supply.

Impacts to cetaceans from underwater noise generated by the activity is considered negligible.

Marine Reptiles

The internesting buffer BIA and habitat critical to the survival for flatback turtles intersect the operational area (Figure 3-11). Studies have demonstrated however, that the suitable internesting habitat for marine turtles is more likely to remain in water depths of <20 m and within 10 km of the coastline (Whittock et al. 2016), Fossette et al.2021). Therefore, while marine turtles may be present in offshore waters during the internesting period, they are typically freely moving through these areas before they return to shallow waters to rest in the days leading up to nesting activity, and foraging can occur outside of designated BIAs but typically in shallower water depths than those of the operational area.

The Recovery Plan for Marine Turtles in Australia (2017) identifies noise interference as a threat to marine turtles and suggest the impact of noise on turtle stocks may vary depending on whether exposure is acute

or chronic. The plan refers to vessel noise and the operation of some oil and gas infrastructure as sources of chronic (continuous) noise in the marine environment, exposure to which may lead to avoidance of important turtle habitat. This activity will result in chronic noise rather than acute, from the vessel movements.

While numerical thresholds have been developed for impacts of impulsive noise sources to marine turtles (e.g. Finneran et al. 2017), the approach defined by Popper et al. (2014) has been applied to impulsive and continuous noise (Table 6-4 and Table 6-5).

Table 6-4: Acoustic effects of continuous noise on marine turtles

Potential marine fauna receptor	Masking	Behaviour
Marine turtle	(N) High (I) High (F) Moderate	(N) High (I) Moderate (F) Low

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Source: Adapted from Popper et al. (2014)

Table 6-5: Criteria for impulsive noise exposure for marine turtles

Potential marine fauna receptor	Masking	Behaviour	TTS	Recoverable injury	Mortality and potential mortal injury
Marine turtle	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) High (I) Low (F) Low	(N) High (I) Low (F) Low	>210 dB SEL_{24h} or >207 dB PK

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Source: Adapted from Popper et al. (2014)

Potential impacts from the CPF and vessels

Based on the criteria detailed within Table 6-4, there is a low risk of any injury to marine turtles from activity vessel noise. Behavioural changes, such as avoidance and diving, are only predicted for individuals near the activity vessels (high risk of behavioural impacts within tens of metres of a vessel and moderate risk of behavioural impacts within hundreds of metres of a vessel). There is a high risk of masking within hundreds of metres of the vessel, and a moderate risk of masking within thousands of metres from the vessel. Little is known regarding masking in marine turtles, and behavioural reactions have been found to be highly context specific, with behavioural sensitisation and habituation affecting the onset threshold for reactions and impacts (Ellison et al. 2012). However, given the relatively low-level increase in sound, it is unlikely that vessel noise will cause significant masking impacts in turtles.

Sea snakes may also be affected by noise, although as they generally associated with reef systems including at coral reefs (the closest are approximately 32 km away from the Operational Area at the Dampier archipelago), it is considered unlikely they will frequent the Operational Area. It is considered that there is a moderate risk in the near and intermediate distances (which extends hundreds of metres) of behavioural impacts to seasnakes, with the impacts being limited to temporary avoidance of the area. Such impacts are unlikely to result in substantial impacts to seasnake populations or distribution.

Potential impacts from SSS

The sound levels of the survey equipment are below those associated with the PK criterion for injury (Table 6-5) beyond a few metres (McPherson 2020), and due to the low per-pulse SEL (McPherson 2020), the SEL criterion will also not be exceeded. Recoverable injury and TTS could occur within tens of metres applying the relative risk criteria from Popper et al. (2014) ((Table 6-5). Behavioural changes, such as

avoidance and diving, are only predicted for individuals in close proximity to the activity vessels (high risk of behavioural impacts within tens of metres of source and moderate risk of behavioural impacts within hundreds of metres of the source).

Turtles are unlikely to experience masking even at close range to the source. This is in part because the sounds from survey equipment are all outside of the hearing frequency range for turtles (approximately 50–2,000 Hz, with highest sensitivity to sounds between 200 and 400 Hz) (Ridgway et al. 1969; Bartol et al. 1999; Ketten and Bartol 2005; Bartol and Ketten 2006; Yudhana et al. 2010; Piniak et al. 2011; Lavender et al. 2012, 2014).

Impacts to marine turtles from underwater noise generated by survey equipment are unlikely to result in substantial impacts given that impacts are likely to be limited to physiological impacts in individuals located within tens of metres of the sound source, and behavioural impacts in individuals located within hundreds of metres of the sound source. The risk of impact is further reduced as the vessels will be moving when undertaking surveys and it is highly unlikely that any individual would remain within the distances above for any length of time.

Impacts to marine reptiles from underwater noise generated by the activity is considered negligible.

Fish, sharks and rays

A number of shark species may also occur in the region, including the EPBC Act listed whale shark, though the operational area does not overlap any fish, shark or ray BIAs. Approved Conservation Advice for Rhincodon typus (whale shark) (2015) does not identify noise interference as a threat to the species. Elasmobranchs (rays, skates, sharks) rely on low frequency sound to locate prey (Myrberg 1978). The large hearing structure of the whale shark will be most responsive to long-wave, low-frequency sound (Myberg 2001) in the range of 20–800 Hz. Elasmobranchs do not have swim bladders and are not typical hearing specialists (Baldridge 1970).

Fish sensitivity and resilience to underwater noise varies greatly depending on the species, hearing capability, habits, proximity to the noise source, and the timing of the noise (i.e. the noise may occur during a critical part of the fish's lifecycle; McCauley and Salgado-Kent 2008). Most marine fish are hearing generalists (Amoser and Ladich 2005) with relatively poor hearing. Hearing generalists are not as sensitive to noise and vibration as hearing specialists, which have developed hearing specialisations and can be particularly vulnerable to intense sound vibrations because many possess an air-filled swim bladder (Nedwell et al. 2004).

Popper et al. (2014), a working group of leading experts, suggested that behavioural responses in fish, which are less sensitive to noise than cetaceans, are more likely to occur within tens or hundreds of metres from vessels and other continuous/ non-impulsive noise sources. While fish may show an initial behavioural response, fish are known to quickly habituate to continuous noise sources (Smith et al. 2004; Wysocki et al. 2006; Spiga et al. 2012; Nichols et al. 2015; Johansson et al. 2016; Holmes et al. 2017). In particular, many fish species are known to aggregate around the foundations of oil and gas platforms and subsea structures, despite operational noise. Therefore, behavioural impacts fish are expected to be limited and highly localised.

The criteria defined in Popper et al. (2014) for continuous noise sources has been applied to the assessment of impacts to sharks, rays and fish (Table 6-6).

Table 6-6: Continuous noise: criteria for noise exposure for fish

Potential marine fauna receptor	Mortality and potentially mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Type 1 Fish: No swim bladder (particle motion detection) includes sharks and rays.	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Type 2 Fish: Swim bladder not involved in hearing (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Type 3 Fish: Swim bladder involved in hearing (primarily pressure detection)	(N) Low (I) Low (F) Low	170 dB SPL for 48 h	158 dB SPL for 12 h	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Fish eggs and fish larvae	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) Moderate (I) Moderate (F) Low

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Source: Adapted from Popper et al. (2014)

Based on this study, vessel/CPF noise has a low risk of resulting in mortality for all fish types. The risk of recoverable injury to Type 1 and 2 fish is low, however is moderate for TTS and behavioural impacts when fish are within tens of metres of an activity vessel (Popper et al. 2014). For Type 3 fish, recoverable injury and TTS may occur within 60 m of the source (McPherson et al. 2019), with a high risk of behavioural impacts occurring within tens of metres of an activity vessel (Popper et al. 2014).

The most likely impacts to fish from noise will be behavioural responses. Popper et al. (2014) identified a moderate risk of behavioural impacts to fish in near (tens of metres) and intermediate distances (hundreds of metres) from the noise source. Masking in fish could also occur within thousands of metres under a worst-case scenario.

Impacts to fish from underwater noise generated by vessel and CPF operations are unlikely to result in substantial impacts to populations or distribution given that impacts are likely to be limited to physiological impacts in individuals located within tens of metres of the vessel, behavioural impacts in individuals located within hundreds of metres of the vessel, and masking of fish within thousands of metres. Fish are considered unlikely to remain in proximity to vessels and are therefore unlikely to be exposed to sound at the above thresholds. Noise effects to fish of potential commercial value would be restricted to within hundreds of metres of the noise source.

Potential impacts from SSS

The criteria defined in Popper et al. (2014) for impulsive noise sources has been adopted (Table 6 7). Impulsive noises from survey equipment could result in physiological impacts to fish located within metres of the sound source considering the results presented in McPherson (2020). The likelihood of fish being close enough to the sound source for physiological impacts to occur is considered remote.

Table 6-7: Criteria for impulsive noise exposure for fish

Marine fauna group	Mortality and potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
I Fish: No swim bladder (particle motion detection)	>219 dB SEL_{24h} or >213 dB PK	>216 dB SEL_{24h} or >213 dB PK	>>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
II Fish: Swim bladder not involved in hearing (particle motion detection)	210 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	>>186 dB SEL_{24h}	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low
III Fish: Swim bladder involved in hearing (primarily pressure detection)	207 dB SEL_{24h} or >207 dB PK	203 dB SEL_{24h} or >207 dB PK	186 dB SEL_{24h}	(N) Low (I) Low (F) Moderate	(N) High (I) High (F) Moderate
Fish eggs and fish larvae	>210 dB SEL_{24h} or >207 dB PK	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low

Note: Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N) – tens of metres, intermediate (I) – hundreds of metres, and far (F) – thousands of metres.

Source: Adapted from Popper et al. (2014)

Behavioural impacts to fish from survey equipment noise may occur in individuals located within hundreds of metres of the source. The proposed survey equipment does not have energy below 1 kHz, and therefore it is unable to be heard by most fish, which further reduces the risk of impact (Ladich and Fay 2013). The impact of masking is low at all ranges, apart from fish who specialise in pressure detection, which can be impacted in a moderate way at thousands of metres. However, as these signals are outside the hearing range of most fish in the region, the risk of impact is reduced.

Impacts to fish from underwater noise generated by survey equipment are unlikely to result in substantial impacts to populations or distribution given that impacts are likely to be limited to behavioural impacts within hundreds of metres and masking within thousands of metres. Fish are considered unlikely to remain in proximity of the sound source for long periods of time and are therefore unlikely to be exposed to sound at the above thresholds.

Impacts to fish and sharks from underwater noise generated by the activity is considered negligible.

6.2.3 Environmental Performance

Hazard		**Noise**		
Performance outcome		Controls implemented to prevent death, injury or significant long-term behavioural effects to marine fauna from noise		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
006	Vessel contractors to ensure that support vessels comply with EPBC Regulations 8.05 and 8.06	Support Vessel Masters will comply with relevant parts of EPBC Regulation (2000): Reg. 8.05 & 8.06 respectively, where safe to do so: • Within the caution zone for a cetacean (including a calf) (within 300 m of a cetacean), the Vessel Master must operate the vessel at a constant speed of less than 6 knots and minimise noise • If a calf appears within an area that means the vessel is then within the caution zone of the calf, the Vessel Master must immediately stop the vessel and turn off the vessel's engines or disengage the gears or withdraw the vessel from the caution zone at a constant speed of less than 6 knots. The above requirements will also apply to whale sharks if they are sighted within 300 m of the vessel.	Incident reports record any incidences of non-compliance with EPBC Regulations 2000 – Part 8 Division 8.1 (interacting with cetaceans)	Marine Superintendent
007	Helicopter contractors to ensure that helicopters comply with EPBC Regulations 8.07	Helicopters will comply with the following elements of EPBC Regulations 2000 Regulation 8.07, except during take-off / landing, during an emergency or when action is required to maintain safe operations: • A helicopter will not operate at a height lower than 1,650 feet or within a horizontal radius of 500 m of a cetacean • A helicopter will not deliberately approach a cetacean from head-on. Helicopter operators are required to report any instances where these standards are breached, and any event involving injury to or death of marine fauna due to helicopter operations.	Incident reports record any incidences of non-compliance with EPBC Regulations 2000 – Part 8 Division 8.1 (interacting with cetaceans)	Logistics Lead
008	Valid Flag State (Class Issued) Certificate	Vessel machinery is maintained in accordance with Flag State (Class) certification requirements.	Flag State (Class) Certificate / ISM	Marine Superintendent

Hazard		Noise		
Performance outcome		Controls implemented to prevent death, injury or significant long-term behavioural effects to marine fauna from noise		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
	indicates vessel engines and equipment is maintained	Maintenance is conducted in accordance with the vessel Safety management system – Planned Maintenance System.		
009	Vessels operate at speeds in accordance with Stag Marine Facility Operating Manual (GF-90-MN-G-00038) to reduce potential for collision with marine fauna	Vessels operating within the restricted zone must not exceed a speed of five (5) knots.	Vessel Masters provided and required to operate in accordance with the Stag Marine Facility Operating Manual (GF-90-MN-G-00038) – Sign-off sheet for completed by Vessel Master.	Marine Superintendent
010	Competency and Training Management System (JS-60-PR-Q-00015) provides a process for ensuring that Contractors and Services Providers have the appropriate level of HSE capability	Online induction includes information on speed limits in the PSZ and requirements on interacting with marine fauna	Induction Records (OSV Vessel Masters)	Marine Superintendent

6.2.4 ALARP Assessment

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage the impact and risk of noise due to operation of machinery, vessels and helicopters. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated, no further controls are required. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost-effective	Justification
Remove machinery that emits noise	Eliminate	No	N/a	Noise from vessels, helicopters and machinery cannot be eliminated. Without vessels, helicopters and machinery the operation cannot be undertaken. SSS is necessary for integrity
Replace machinery that emits noise with quieter machinery	Substitute	No	No	All equipment as listed is required; no opportunities for substitution were identified.
Provide additional muffling on machinery, or design to reduce noise emissions	Engineering	No	No	Machinery is generally designed with human health hearing requirements taken into consideration, reducing operating noise to as low as efficiently and cost effectively as possible.
Do not operate noisy machinery in areas of sensitivity	Isolation	No	N/a	The Activity is located at distance from sensitive receptors and the coastline. Other fauna in the vicinity may experience short term behavioural effects only and cannot be prevented from being in the vicinity of the activity
Additional facility specific noise emissions procedures for vessels, helicopters and machinery	Administrative	No	No	Through the application of EPBC Regulation 8 for helicopter and vessel marine fauna interaction procedures, vessel speed restrictions, inductions for personnel on interacting with marine fauna and application of machinery maintenance, potential impacts are reduced. No further procedures are considered necessary.
Dedicated Marine Mammal Observer (MMO) (as per EPBC Policy Statement 2.1 – Part B.1)	Administrative	No	No	This would require an additional cost of contracting several specialist marine fauna observers, and even if marine fauna are identified, noise sources cannot be shut down in the event marine fauna are detected, since they are integral to safe operation of vessels and CPF. Therefore the cost is disproportionate to the increase in environmental benefit given the potential impacts are expected to be limited to behavioural impacts to marine fauna.

6.2.5 Acceptability assessment

The potential impacts of machinery, helicopter and vessel noise emissions are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.

Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.

Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regards to impacts from noise on sensitive receptors.
Laws and standards	Noise emissions from topsides equipment on the CPF, supply and support vessels machinery are managed through maintenance of equipment as per safety legislative and regulatory requirements administered by NOPSEMA and Flag State. EPBC Regulation 8 and the Australian National Guidelines for Whale and Dolphin Watching 2017 (Commonwealth of Australia 2017b) control vessel speeds
Industry best practice	Noise from CPF, helicopters and vessel equipment are designed to be at minimum safe operational levels. The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regards to offshore production operations.
Environmental context	While there are noise emissions to sea surface immediately around the Stag facility and high frequency noise associated with SSS, the impact and risk assessment process indicates that noise will not result in death, injury or significant long-term behavioural effects to marine fauna. This is in alignment with relevant conservation advice and recovery plans for EPBC species that may occur in the Operational Area including humpback, blue whale and whale sharks. Jadestone intends that any impacts from noise generating activities are not inconsistent with protected area management plans or relevant IUCN principles. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	Noise interference is identified as a threat to fauna that may be present in the operational area and 20 km buffer in: • The Recovery Plan for Marine Turtles in Australia (2003) • The Blue Whale Conservation Management Plan 2015–2025 (DoE 2015b) • Approved Conservation Advice for Balaenoptera borealis (sei whale) (TSSC 2015b) • Approved Conservation Advice for Balaenoptera physalus (fin whale) (TSSC 2015c) Which suggest noise may lead to the avoidance of important habitat in marine turtles and mask cetacean vocalisations. The Operational Area overlaps with the flatback turtle internesting BIA (Figure 3-11), the humpback whale migration BIA (Figure 3-5) Given the noise sources used during the activity, distance from the Operational Area to the closest turtle nesting site at Dampier Archipelago (32 km) and the large navigable area available in the open ocean to these species, it is expected that the impact of noise interference on individual transient turtles or cetaceans travelling through the Operational Area is expected to result in temporary avoidance reactions. The risk matrix presented within the Recovery Plan for Marine Turtles in Australia provides a risk rating of low to moderate associated with industrial and shipping noise on turtles. No further controls are considered appropriate given the distance from turtle BIAs and the low levels of noise from the proposed activity. Blue whales may transit the area as identified by the PMST search, though no BIA is present, the risk matrix presented within the Conservation Management Plan for Blue Whales (DoE (2015)) provides a risk rating of low to moderate associated with industrial and shipping noise on blue whales. The proposed controls including reduction of vessel speed in the vicinity of a whale align with the priority for action recommended in this

	management plan. Jadestone has had regard to the representative values of the protected areas within the RISK EMBA, and the respective management plans and other published information. Impacts from noise will have a negligible impact on any of the social and ecological objectives and values, of any AMPs, or state MPs. This is consistent with the objectives of the protected area management plans and considered acceptable. The Approved Conservation Advice for *Balaenoptera borealis* (sei whale) and *Balaenoptera physalus* (fin whale) (TSSC 2015b, c) identify anthropogenic noise and acoustic disturbance as a threat with a consequence rating of minor. No specific controls to manage noise are identified. EPBC Regulation 8 and the Australian National Guidelines for Whale and Dolphin Watching 2005 (DEH 2006) set the requirements for vessels interacting with cetaceans.
ALARP	The residual risk has been demonstrated to be ALARP.

6.3 Atmospheric Emissions

6.3.1 Description of Hazard

Aspect	Atmospheric emissions generated during the Stag operations include atmospheric pollutants (non-greenhouse gases) that can have an impact on local air quality as well as greenhouse gas emissions. The operations will result in emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHG such as sulphur oxides (SO_x) and nitrous oxides (NO_x). Vessels may use ozone-depleting substances (ODS) in closed-system rechargeable refrigeration systems. **Direct GHG emissions (Scope 1)** Sources of atmospheric emissions during operational activities are: • Gas that is excess to the fuel requirements for heating in the production process and excess blanket gas from the gas flotation unit, is burned as a continuous release through a flare system present on the CPF • Increased flaring can occur during commissioning, shutdown and upset and emergency conditions; • Crude combustion for power generation for generators; • Diesel combustion for mobile and fixed plant as well as back-up power. In addition, the below sources contribute to emissions, albeit making a less material contribution compared to the main sources above: • Fugitive emissions from infrastructure including losses during loading, offtake and upset and emergency conditions; and • Use of refrigerants for air conditioning and refrigeration on board the CPF. Fugitive emissions are inherent in the design of a facility and can originate from pressurised equipment, with such sources as e.g. valves, flanges, pump seals, process drains, open-ended lines, casing, tanks etc. Jadestone follows the methods stipulated by the National Greenhouse and Energy Reporting Scheme (NGERS) when quantifying its fugitive emissions. Smaller volumes of fugitives and process vents are also associated with operations and include emissions from crude oil production leaks, natural gas processing and emission of sulphur hexafluoride from use of lubricants. Liquid fuels (oils and greases) are also used as lubricants. **Indirect GHG emissions electricity (Scope 2)** Jadestone does not procure any electricity for its Stag operations, its Scope 2 GHG emissions are therefore null. **GHG emissions from support vessels and helicopter support (Scope 3)**

	GHG and atmospheric emissions are generated by the support vessels and helicopters servicing and supporting the Stag field. Sources of emissions are from fuel use in combustion engines and fugitive emissions as well as small volumes of refrigerants. The types of volumes of emissions vary depending on the types of activities undertaken and include: • Travelling to and from the field • Undertaking safety standby activities whilst on DP • Minimal emissions if vessels are at anchor • Holding station on DP whilst loading or unloading • Undertaking IMR work The expected annual GHG emissions from vessel and helicopter activities have been estimated for 2022 based on some actual emissions data from contractors as well as using a high-level spend-based estimation, as summarised in Scope 3 GHG Emissions" in this chapter.

As per the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (2015, GHG emissions are categorised as:

- Scope 1: GHG emissions are direct emissions from sources owned or controlled by the company.
- Scope 2: GHG emissions are indirect emissions from the consumption of purchased electricity.
- Scope 3: GHG emissions are indirect emissions that are a consequence of the activities of the company, but occur from sources not owned or controlled by the company

In relation to the Stag CPF, scope 1 and scope 3 emissions are relevant, but Scope 2 emissions are not as electricity purchased from the grid is not used on the facility.

6.3.1.1 Scope 1 Emissions

A summary of the carbon dioxide equivalent emissions at the Stag facility during 2024 - 2032 is provided in Figure 6-1. Forecasted emissions over the producing life estimate a GHG total (tonnes of CO_2-e) of between ~42,000 and ~59,000 tonnes (including CO_2, N_2O and CH_4). GHG forecasts are based on current business plans, as per WP&B 2024, which may be subject to change. The profile has been modelled using business-as-usual flaring, gas as fuel and crude oil as well as diesel consumption forecasts, that will inevitably carry a margin of error. Fugitive emissions have also been included based on historical values.

Combustion emissions of Stag crude oil are released to atmosphere and comprise predominantly of CO_2 gas that is excess to the fuel requirements for heating in the production process and excess blanket gas from the gas flotation unit, is burned as a continuous release through a flare system present on the CPF. As these sources are predominantly methane, the combustion in the flare converts the methane to CO_2.

The auxiliary boiler, which provides steam for heating in the production process to aid in the separation of the crude oil and produced water uses fuel gas (natural gas) recovered from the process to fire it. Products of combustion of the gas (predominantly CO_2) are exhausted to the atmosphere.

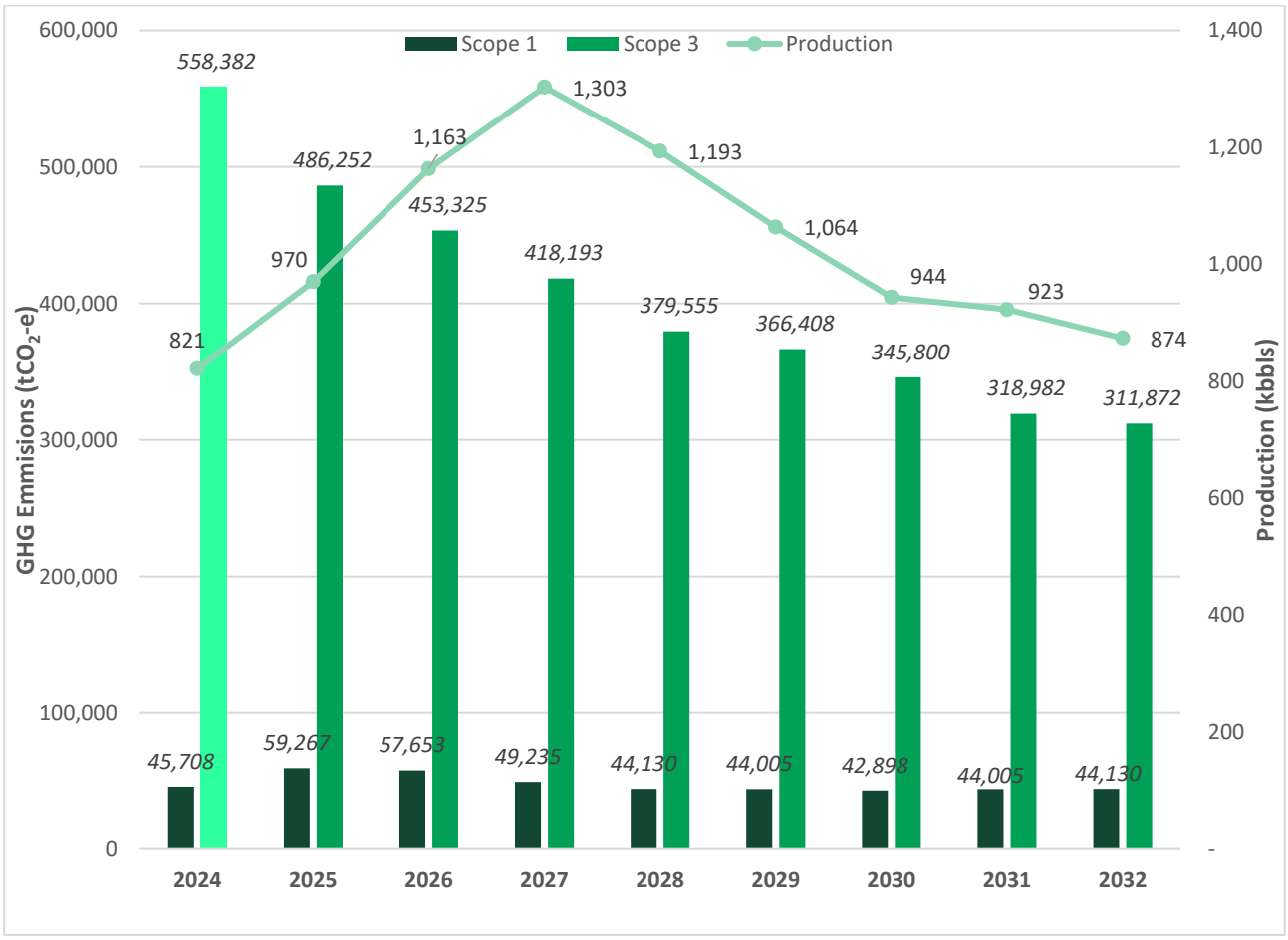


Figure 6-1: GHG emissions at Stag facility in 2024- 2032

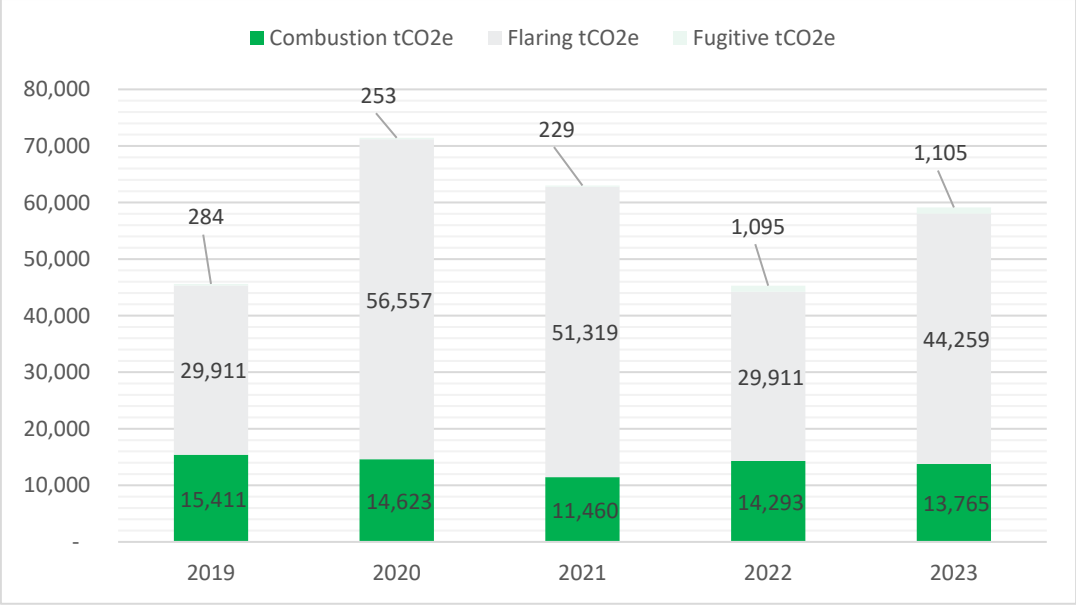


Figure 6-2 Historical scope 1 GHG emissions at the Stag facility

In June 2023, two errors were found in the flowmeter electronics during routine calibration by a third party; this has since been corrected. Due to this previously unknown error in the flowmeter readings, the

historical data prior to this service has been corrected. The re-calculated flowrates have been used to update Jadestone's reported emissions and the Stag flare flowrate readings have been re-calculated and forecasted. This has also been reported to the Clean Energy Regulator to allow for correction of historic emissions reporting. Fuel (crude oil, diesel and avgas) burning equipment on the CPF will contribute to emissions of gases including CO_2, CO and NO_2. The crane on the platform is driven by a diesel engine which exhausts directly to atmosphere. Other diesel-powered portable equipment will also generate localised point source emissions from their operation on an intermittent basis.

The flare system is designed to handle a continuous flaring rate which ranges between 0.3 and 10 mmscfd, and typically operates at approximately 1 mmscfd. In addition, the flare system can accommodate an instantaneous flaring rate of 15 mmscfd. The gas flared on the CPF is primarily composed of methane and combustion releases carbon dioxide, carbon particles and water (Table 6-8).

Table 6-8: Composition of flaring gas

Element	Percentage
CH_4	96.08%
H_20	3.02%
N_2	0.67%
CO_2	0.16%
C_2H_6	0.07%

Minor amounts of fugitive emissions occur on the facility. Hydrocarbon vapours are released from storage tanks and equipment on filling of the CPF day tanks and continuous minor venting. Emissions of Volatile Organic Compounds (VOCs) are extremely low during crude offloading, as Stag crude has low VOCs due to its weathered nature (Batelle 1998). Blanket gas (inert gas from the boiler flue gas) is pumped into cargo tanks of the third-party tanker minimising any fugitive VOC emissions.

Scope 1 emissions are reported by Jadestone to the Clean Energy Regulator as part of the statutory annual National Greenhouse and Energy Reporting Act 2007 (NGER Act). The NGER Scheme is a single national framework for reporting company information about GHG emissions, energy production, and energy consumption. Key NGER Scheme legislation includes the National Greenhouse and Energy Reporting Act 2007, the National Greenhouse and Energy Reporting Regulations 2008, and the National Greenhouse and Energy Reporting (Measurement) Determination 2008. NGER reporting includes direct emissions from fuel use, venting and fugitive emissions associated with the facilities but does not include indirect emissions associated with helicopters transfers and vessels used.

6.3.1.2 Scope 3 Emissions

Scope 3 emissions are defined as all indirect GHG emissions (not included in Scope 1 or 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions Scope 3 GHG emissions can be considered indirect consequences of the activity and therefore have impacts (EPBC Act 1999 in Section 527E). Scope 3 GHG emissions are not reported under the NGER Scheme and have been estimated using the most appropriate emission factors available.

Jadestone has engaged a specialist third-party to undertake a review of its Scope 3 emissions relating to Stag operations. When defining its approach, the Greenhouse Gas Protocol and relevant sector guidance have been consulted, which included:

- GHG Protocol: Corporate Accounting and Reporting Standard
- GHG Protocol: Corporate Value Chain Accounting and Reporting Standard
- IPIECA: Estimating petroleum industry value chain (Scope 3) greenhouse gas emissions

As a first step, Group reporting boundaries were defined and a consolidation approach for direct GHG emissions selected. As Jadestone reports its GHG direct emissions based on the operational control principle, Scope 1 boundary clearly delineated relevant value chain activities falling within Scope 3 categories.

Subsequently, in order to establish a view of the likely material Scope 3 emission categories, benchmarking of relevant E&P operators was undertaken. Materiality of value chain categories is dependent on the type of business operations and there is no uniform approach to Scope 3 across the industry, however key Scope 3 trends have been established through the benchmarking exercise.

As a next step, Jadestone has undertaken a detailed review of the value chain activities pertaining to Stag operations, considering all 15 categories defined by the GHG Protocol. Factors such as relevance to Jadestone business operations, materiality threshold as well as availability of data were taken into account, with the following categories shortlisted:

- Category 1: Purchased goods and services (supply vessels and drilling)
- Category 3: Fuel and energy related activities
- Category 4: Upstream transportation and distribution
- Category 6: Business travel (helicopters)
- Category 10: Processing of sold products
- Category 11: Use of sold products

Table 6-9 provides an overview of the assumptions and methods applied for quantifying the value chain emissions for Stag.

Table 6-9: Overview of the assumptions and methods applied for quantifying the value chain emissions for Stag

Category	Assumptions	Method of quantification
1: Purchased Goods and Services	Supply vessels: Includes emissions from supply boats and vessels that are contracted for ongoing supply of goods and support of maintenance activities. Drilling: Estimated from past/planned campaign (Stag 2022 drilling) with diesel consumption estimations and campaign duration (days).	Supply vessels: Spend-based method, using the monetary spend on OSVs in the year and applying the most relevant emission factor Drilling: Diesel consumption per day is derived from past/planned campaign; campaign duration is estimated for future campaigns NGER emission factors had been applied to diesel used.
3: Fuel and energy related activities	Includes all upstream (i.e. cradle-to-gate) emissions from the extraction, production and transportation of diesel, being the only fuel type consumed in the generation of power at the Stag facilities, that was acquired by Jadestone in the reporting year and was not included in scope 1 or scope 2. Purchased diesel is the only fuel source that is purchased from outside of Jadestone Energy.	Jadestone determined the quantity of diesel purchased and utilised at Stag operations and then applied cradle-to-gate emission factors
4: Upstream transportation and distribution	Includes marine transportation of sold products paid for by Jadestone. All transportation of crude is by vessel hired by Jadestone Energy from	The monetary amount spent for an offtake tanker by Jadestone in the reporting year was multiplied by the relevant emission factor

Category	Assumptions	Method of quantification
	Dampier WA to Jurong Singapore, emissions only included for one way trip.	
6: Business travel (helicopters)	Includes emissions from helicopters only that are contracted for ongoing crew transfers.	For helicopter contracts were GHG emission data could be sourced, actuals were used, combining with a spend-based method for remaining contracts, applying a conversion factor based on actual data
10: Processing of sold products	Stag crude oil is marketed by Jadestone's trading services contractor in the deeply fungible oil market. This means that it is not possible to determine how the product will be processed as it is not possible to predict the buyer. In recent years, Stag crude has attracted buyers that deploy the product directly as bunker fuel. As bunker fuel is utilised in combustion engines and results in net greater emissions, it is assumed that only a small amount (~5%) of Stag crude sales generate Scope 3 emissions from processing.	Crude oil refining emission factors were applied to processed crude only
11: Use of sold products	To be conservative with emissions associated with use, it is assumed that all Stag crude is combusted as bunker fuel. This is a conservative estimate as a significant portion of globally traded crude is processed into products that effectively sequester the carbon.	All sales volumes in the reporting year were converted into combustion emissions by applying IPCC emission factors

Table 6-10: Summary of Scope 3 GHG emissions in 2023

Scope 3 category	Total emissions (tCO_2e)	% coverage
1 Purchased Goods and Services	1,016	0.24
3 Fuel and Energy Related Activities	75	0.02
4 Upstream transportation and distribution	2,798	0.66
6 Business travel - Helicopters	1,648	0.39
10 Processing of Sold Products-Oil	19,657	4.62
11 Use of Sold Products-Oil	423,255	94.08
Scope 3 Total	**425,919**	**100.00**

In 2022, the majority of Scope 3 emissions came from Use of Products (category 11) (93% of quantified scope 3 emissions). This category covers the use of refined products by the consumer, assumed to be 100% combustion of bunker oil by marine vessels. Processing emissions (category 10) comprise 4.55%, upstream transport and distribution (category 4) comprise 0.65% and upstream emissions of diesel use (category 3) comprise 0.04% of quantified Scope 3 emissions Scope 1 emissions are approximately 10% of the total direct and indirect emissions (scope 1 and 3) associated with the Stag facility.

In 2023, Jadestone increased engagement with suppliers to understand their emissions data and GHG ambitions establish more accurate data on the GHG emissions in its supply chain and to progressively identify opportunities for reductions where possible.

6.3.1.3 GHG emissions outlook

Jadestone developed Scope 1 business-as-usual GHG emissions forecasts over the life of the assets for all of its operated assets as part of the workstreams underlying the Net Zero by 2040 pledge. In December 2023, Jadestone announced Net Zero interim reduction targets to 2030 as part of its Net Zero by 2040 pledge. This involved development of robust GHG forecasts for Jadestone's current asset base and reviewing potential GHG options across all assets including Stag to establish the Net Zero roadmap.

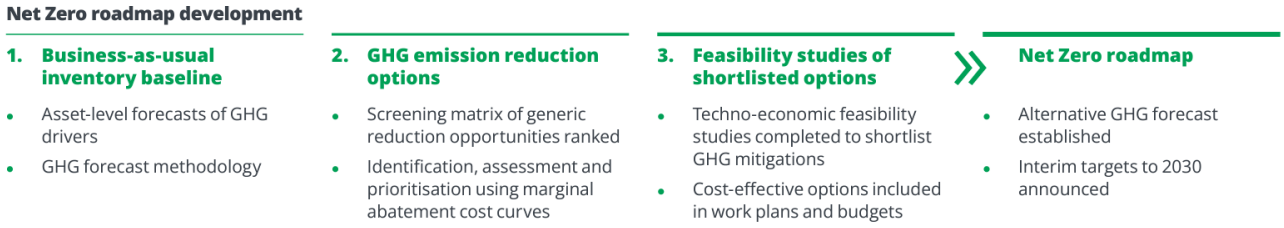


Figure 6-3: Net Zero roadmap development (Jadestone Energy, 2024)

Direct GHG emissions sources such as combustion of fuels (associated gas, diesel, crude etc.) and flaring are included in the forecast.

Over the remaining 12 years of field life, when considering a business-as-usual scenario, Scope 1 emissions are expected to increase whilst Scope 3 emissions are expected to decrease (Figure 6-1. This is because as the reservoir is depleted, more energy is required to extract the reduced output and as a result, the Scope 1 emissions will increase. With reduced production output, emissions from processing and combustion/use of the processed product will be reduced due to fewer barrels to process and combust. Cumulative Scope 3 emissions (extrapolated from those quantified here) are expected to be approximately 5,237,199 tCO_2e over the remaining life of the field.

Forecasts are calculated using NGER methodology and include flaring, gas as fuel and crude oil consumption, representing over 95% of emission sources. Forecasts are aligned with workplan and budget and include allowances for planned and unplanned downtime. These calculations are revisited annually by the subsurface and production teams.

For the Stag forecast, several assumptions have been made to determine the forecast based on previous activities and planned shutdowns. Each year, an allowance is made for mandatory corrosion integrity checks and corrective maintenance for the tanker changeout. For the forecast shown in Figure 6-1, assumptions also included a shutdown in 2024 to facilitate pigging and integrity inspection of the export line and a major shutdown every 4 years (first planned in 2026) to complete internal inspections (as required by code). The period of shutdown is based on the duration of previous shutdowns and campaigns at the facility. The annual emissions forecast is calculated taking planned shutdowns into account. The duration of the yearly shutdowns will vary depending on operational requirements.

For Stag, the uptime is high throughout the year (typically 95%) but is dependent on the availability of individual wells. The emissions forecast is derived from the production forecast proportional to the flaring, diesel consumption and crude combustion.

The annual work, plan and budget (WP&B) involves detailed reservoir analysis and performance profile forecast which is approved by the Board and forms the basis of annual production targets.

It is also recognised that baseline and mitigated scenarios will need to be revised over time, at least on an annual basis, and may require more frequent revisions in case of e.g.:

- An anticipated change in activity level relative to the baseline, where the effect of the change is significant enough to warrant a change to the baseline scenario;
- New information with regard to GHG reduction projects (e.g. post feasibility studies)

- Impact post infill well drilling
- The remaining life of equipment;
- Potential implications of legislative or regulatory changes; and
- A change in available resources (e.g., a gas pipeline to the area).

The EPO adopted for the Stag facility represents a 10% increase on the highest historic total of scope 1 emissions over the past five years (i.e. 71,433 tCo_2e +10%, refer the year 2020 in Figure 6-2). This allows for any reservoir property uncertainties (e.g. gas break though) that may occur during future operations, and accounts for ~6% downtime for all wells, representing historic activity in field.

6.3.2 Impacts

Emissions can reduce air quality in the immediate vicinity of the Facility. Under normal circumstances, any gaseous emissions from the facility will quickly dissipate into the surrounding atmosphere. As Stag Facility operations occur in offshore waters, the combustion of fuels in such remote locations will not impact on air quality in coastal towns or other sensitive locations, and impacts to nearby petroleum activities such as Wandoo facility operated by Vermillion Energy (approximately 20 km northeast) are not expected.

Greenhouse gases are persistent by nature and the key impact of these emissions is that they accumulate in the atmosphere. Once released from a facility, CO_2 persists for thousands of years in the atmosphere, nitrous oxides persist for hundreds of years, and methane persists for a least a decade (EPA, 2022). Whilst CO_2 is naturally cycled out of the atmosphere by various carbon sinks (such as vegetation and the ocean surface) this natural source/sink cycle has been disrupted since the beginning of the industrial revolution. The combustion of fossil fuels like coal, along with reduced sink capacity due to development, has led to a continuous rise in greenhouse concentrations in the atmosphere. This increasing concentration has led to a greenhouse or warming effect resulting in the physical, chemical and biological consequences associated with climate change.

Global climate change is the result of atmospheric accumulation of GHG emissions and reduction of GHG sinks since the beginning of the industrial revolution. Predicting GHG emissions' impacts at the ecosphere level is an inherently complex exercise because of the influence of variables such as surface pressure, wind, temperature, humidity and rainfall within multiple ecosystems. These are all interdependent variables that would have to be considered in determining a contribution to global temperature increase.

Annually, direct emissions from Stag represent ~0.1% of emissions from energy industries in Western Australia and ~0.02% of energy industries nationally (DCCEEW 2022). Whilst this facility is a relatively low contributor to state and national emissions, due to the persistent nature of greenhouse gases, it is important to acknowledge that all emissions contribute to climate change. Stag has been operational since 1998, however Jadestone only acquired the asset in late 2017. The facility is expected to stay operational until approximately 2035.

Table 6-11: Comparison of Stag's annual emissions with State and National emissions profiles (Energy Industries category)

Emissions profile	Annual (2022)
Stag Scope 1 emissions	45,299
Western Australia energy industry* emissions*	36,536,000
Australian energy industry emissions*	207,566,000

** Source: Australia's Greenhouse Gas Inventory, DCCEEW, 2022*

It is important to acknowledge that climate change impacts cannot be directly attributed to any one activity, as they are the result of global GHG emissions, minus global GHG sinks, that have accumulated in the atmosphere since the industrial revolution began. Therefore, there is no direct link between GHG emissions from the Stag facility operations and climate change impacts to specific ecological receptors.

The consequence of GHG accumulation in the atmosphere will result in an increase in temperature and will have an adverse effect on ecosystems and threaten biodiversity (IPCC, 2021). Ecosystems that are particularly vulnerable to the negative effects of climate change include alpine habitats, coral reefs, wetlands and coastal ecosystems, polar communities, tropical forests, temperate forests as well as arid and semi-arid environments (DoEE, 2019). Human-induced global warming has already resulted in observed changes in the climate system including increased land and ocean temperatures, and more frequent and prolonged heatwaves on land and in marine environments (Hoegh-Guldberg et al. 2018).

Extreme weather events such as droughts, floods, storms and fire can affect population dynamics, species boundaries, morphology, reproduction, behaviour, community structure and composition and ecosystem processes. The changes in the frequency and intensity of these events may have a greater impact on many species and communities than temperature increases and rainfall pattern changes (Steffen et al. 2009).

Hoegh-Guldberg et al. (2018) concludes that constraining global warming to 1.5ºC, as opposed to 2ºC, provides significant benefits for terrestrial wetland ecosystems. Species range losses, increased extinction risks, changes in phenology together with projected increases in extreme weather events all contribute to the disruption of ecosystem functioning and loss of services provided by these ecosystems to humans such as avoidance of desertification, flood control, water and air purification, pollination, nutrient cycling, some sources of food, and recreation.

Impacts on ecosystems from this are spatially variable and species dependent due to the varying degrees of sensitivity to changes in the local and global ecosystem. At the point where global temperature rise, due to climate change, reaches 2°C, increasing numbers of receptor groups suffer impacts which are high to very high, and likely to be irreversible (terrestrial ecosystems, warm-water corals, unique and threatened systems, and arctic regions) (Hoegh-Guldberg et al. 2018).

In Australia, the values and sensitivities that have been identified as having a potential to be impacted by climate change include:

- Terrestrial ecosystems: Alpine regions, rainforests, wetlands, grasslands, forests
- Marine ecosystems: coral reefs, mangroves, estuaries and inland waterways

The Australian Natural Resource Management Ministerial Council (NRMMC) recognizes climate change as a key additional threat to the conservation of Australia's biodiversity (Steffen et al., 2009). The impacts on physical, biological and socioeconomic receptors within these areas can vary greatly between ecosystems and even within them, affecting both the structure of the ecosystems and their flora and fauna. While the impacts of climate change on biodiversity are often worsened by other pressures like land clearing and invasive species, there are instances where the impacts can be directly attributed to climate change (Hughes et al., 2019). A summary of the potential impacts on each of these is provided in Table 6-12.

Table 6-12: Potential impacts of climate change on identified receptors from greenhouse gas emissions

Receptor	Potential Impacts
Terrestrial Ecosystems	
All terrestrial ecosystems are likely to be impacted by a changing climate (Steffen et al 2009, Hughes 2011, Dunlop et al. 2012, Hoegh-Guldberg et. Al. 2018). The predicted impact of climate change on these ecosystems is highly variable, both between ecosystems and within individual ecosystems (Dunlop et al. 2012). A warming climate has significant effects on El Niño and La Niña phenomena (Cai et al., 2023), which in turn have profound impacts on terrestrial ecosystems. The frequency of strong El Niño and La Niña events is expected to increase significantly as a result of a warmer climate. Impacts of the two phenomena are also expected to be more intense due to climate change. During El Niño, warmer and drier conditions prevail, leading to increased droughts, reduced rainfall, and elevated temperatures. Increasing the magnitude of these events can result in more water scarcity, wildfires, and stress on plants and animal species, causing disruptions in ecosystems and further threatening biodiversity. Conversely, La Niña brings cooler and wetter conditions, with climate change predicted to increase rainfall, flooding, and shifts in vegetation patterns. These changes can affect water quality, soil erosion and the distribution of species.	
Tropical Rainforests	Changes in the timing of seasons resulting in longer hot or wet seasons which could in turn result in changes in seasonal responses and alterations to species range and abundance (Hoegh-Guldberg et al., 2018) through the change in patterns of flowering, fruiting or leaf flush. Increased temperatures leading to hotter and potentially more intense fires and cyclones. An increased probability of fires may change the dynamics of the rainforest, promoting a shift from fire-sensitive vegetation to fire-tolerant species (McInnes, 2015). Increasing disturbance to rainforest as cyclones become more intense (Hughes, 2011). Change in vegetation structure or vegetation species dominance due to tolerance/intolerance of increased CO_2 levels (Steffen et al, 2009).
Temperate forests	An increased probability and intensity of fires may change the dynamics of the forest, with a change from fire-sensitive vegetation to fire-tolerant species (Steffen et al., 2009) resulting in a change of ecosystem structure. Increases in temperature and decreases in rainfall may result in reduction in productivity and forest cover as soils dry out. Increased rainfall may increase productivity of temperate forests and result in greater areas of coverage (Steffen et al., 2009). The ranges of the majority of Australia's eucalypt species are predicted to shrink in size over the next 60 years (González-Orozco et al. 2016). Eucalypts dominate forest canopies and ecosystems across Australia. They were once more widespread but are now restricted to small ranges and are predicted to disappear or shift their location, with both scenarios introducing significant flow-on effects for ecosystem structure and function.
Alpine Regions	Alpine and montane areas are considered to be very vulnerable to climate change (Hughes, 2003) due to the increase in temperature reducing the areas covered by snow. Alpine ecosystems and biodiversity in Australia are particularly vulnerable to climate change that affects snow depth and the spatial and temporal extent of snow, which have all declined since the late 1950s (BOM & CSIRO 2020). Long-term monitoring of alpine vegetation in Australia has shown shifts in plant species composition and diversity, changes in the timing of flowering, and declines in endangered fauna such as the mountain pygmy possum (Hoffmann et al. 2019). Species that are dependent on snow coverage for stable temperature maintenance (during hibernation), or for protection from predation may be more vulnerable (Hughes, 2003).
Grasslands	Increased CO_2 levels may result in a shift in species dominance between woody and grass species due to individual species tolerance. This will affect herbivores and change the spatial availability of habitat for fauna associated with specific plant species (Steffen et al., 2009). Increased temperatures may lead to hotter and potentially more intense fires that may also increase in size and frequency due to a shift in the vegetation fuelling the fires.

Receptor	Potential Impacts
Arid and semi-arid regions	Reduction in patches of fire-sensitive mulga in spinifex grasslands potentially leading to landscape-wide dominance of spinifex. Increased drying due to increase in CO2, with a large shift in vegetation distribution due to changes in annual precipitation. Shifts in the seasonality or intensity of rainfall which can result in enhanced runoff distribution which will intensify vegetation patterning. Reduction in rainfall can result in increased fire frequency and intensity. Dryland salinity could be affected by changes in the timing and intensity of rainfall. Surface melting and runoff from Antarctic ice shelves is expected to increase with a warming global climate (Gilbert, E. & Kittel, C., 2021). Even a relatively moderate increase in global temperatures of 1.5oC and 2oC could significantly contribute to increased surface melting and the formation of melt ponds, which can weaken the ice shelf structure. Some parts of the Antarctic ice sheet have experienced increased melt rates in recent decades and this trend is expected to continue (Shepard, A. et al., 2019). An overall increase in ice loss was observed from 1992 to 2017.
Marine and freshwater ecosystems	
Sea surface temperatures have increased across the globe over recent decades which poses a significant threat to marine ecosystems, including changes to species abundance, community structure and increased frequency and intensity of thermally induced coral bleaching events (CSIRO, 2017). Sea surface temperatures in the Australian region have been increasing. Since 1900, they have risen by approximately 1.1 °C (BOM & CSIRO 2020). As on land, most of the increase has occurred since the 1950s. The increase of sea surface temperatures has been more gradual when compared to temperatures on land. Sea-surface temperatures are projected to continue to increase. The western Tasman Sea has warmed especially quickly in recent decades, with some areas having warmed by more than 1 °C since 1980 (BOM & CSIRO, 2020). Since near-global satellite altimetry records began in 1993, global mean sea level has been rising at a rate of 3.3 millimetres per year (mm/yr), amounting to a total increase of about 9 centimetres (cm) from 1993 to 2020 (DCCEEW, 2021). Ocean currents have also been shown to be affected by a change in temperature and stratospheric ozone depletion with currents increasing in strength (Cai and Cowan, 2006), subsequently resulting in suppression of upwellings (leading to a shift in productivity) and a change in the distribution and productivity of marine ecosystems both spatially and temporally (Steffen et al, 2009).	
Coral reefs	An increase in sea surface temperatures across the globe has resulted in changes to species abundance, community structure and increased frequency of coral bleaching events (CSIRO, 2017a). Climate change has emerged as a threat to coral reefs, with temperatures of just 1°C above the long-term summer maximum for an area over 4–6 weeks being enough to cause mass coral bleaching and mortality (Hoegh-Guldberg 1999, Hughes et al. 2017, Spalding and Brown 2015). An increase in the frequency of bleaching events can result in less time for reefs to recover and therefore remaining in early successional state (unable to support extensive habitat for organisms) or be replaced by ecosystems dominated by macroalgae. Coral mortality or die off following coral bleaching events can stretch across thousands of square kilometres of ocean (Hoegh-Guldberg 1999, Hughes et al. 2017). The impacts associated with a warming ocean, coupled with increasing acidification, are expected to undermine the ability of tropical coral reefs to provide habitat for fish and invertebrates, which together provide a range of ecosystem services (e.g., food, livelihoods, coastal protection) (Hoegh-Guldberg et al. 2018). As CO_2 is gradually absorbed by oceans and fresh water, the water becomes more acidic, which increases the solubility of calcium carbonate, the principal component of the skeletal material in aquatic organisms (Steffen et al. 2009) reducing the capacity for corals to build and maintain skeletons.

Receptor	Potential Impacts
	Coral reefs are likely to degrade over the next 20 years, presenting fundamental challenges for those who derive food, income or coastal protection from coral reef ecosystems (Hoegh-Guldberg et al. 2017).
Saltmarsh and coastal freshwater wetlands	Sea levels are predicted to increase by 18 to 59 cm by 2100 in response to both thermal expansion and melting of icesheets (Solomon et al. 2007). This will lead to some coastal inundation affecting mangroves, salt marshes and coastal freshwater wetlands. Changes to the upstream freshwater habitats will result in changes to the spatial distribution of saltwater intolerant species further upstream with freshwater swamps and groundwater affected and areas of riparian vegetation being replaced by mangroves over time (Steffen et al., 2009). Further inland, reduction in rainfall may result in reduced river flows and changes in seasonality of flows as well as potentially exacerbating the frequency and intensity of droughts. Altered water quality, as well as quantity, will be a major trigger for climate change effects on freshwater biodiversity. For example, the combination of hot conditions, low flows and significant algal blooms during the recent major drought (2018–20) resulted in mass fish kills in the Murray–Darling Basin (Koehn et al. 2020). Changes in water quality including nutrient flows, sediment loading, O2 and CO2 concentration can result in increased intensity, duration and frequency of eutrophication (Steffen et al., 2009). Rocky shore and saltmarsh species in areas of low topographic relief will be vulnerable to complete loss of habitat, especially when bounded by cliff lines or coastal development (Steffen et al, 2009).
Mangroves	Mangrove ecosystems in Australia will face higher temperatures, increased evaporation rates and warmer oceans (McInnes 2015) as well as an associated sea-level rise (Hoegh-Guldberg et al. 2018). Mangrove species may increase their southern range as temperatures increase in the region, but the higher temperatures, ocean acidification and sea level rise may also result in a decrease in mangrove abundance (Duke et al., 2017). There is some evidence to suggest that sea level rise may not affect mangroves in such a negative way as they can accumulate more peat or mud to constantly adjust to the gradual sea level rise (Field, 1995). However, as mangroves are found along the coastline, they can be exposed to multiple pressures such as drought and sea level drop, el Niño events or other extreme weather systems combined with increased sea surface temperatures; this occurred in the Gulf of Carpentaria in 2015-2016 along a 1,000 km stretch of coastline (Duke et al 2017). Climate projections indicate an increased occurrence of anomalously low and high sea level events in the coming century. This, alongside enhanced temperature stress, is likely to significantly increase risk to mangrove health in the Gulf of Carpentaria (Chung et al., 2023).
Biodiversity	
Changes occur in species interactions as responses to environmental change, and usually have knock-on effects for communities and whole ecosystems. These higher order changes range from direct species–species interactions – such as mutualism, competition and predation – to changes in the ways in which species influence the structure and functioning of ecosystems, including cascading impacts through ecosystems, and the formation of novel communities and ecosystems (Steffen et al, 2009) including invasion of species.	
Mammals	Terrestrial mammals may be affected by a change in fire regime and extreme weather events resulting in drought, vegetation loss and starvation. Removal or addition of key species in the food web can also result in ecological cascades. Terrestrial mammals across Australia have experienced high rates of extinction and are subject to population decline. This is evidenced by further increase in the number of species listed as threatened or vulnerable (DCCEEW, 2021). Narrow-ranged endemics (particularly in montane regions) are susceptible to rapid climate change in situ (Williams et al. 2003). Changes in ocean temperatures, upwellings, ocean acidification and melting of Antarctic Sea ice may impact krill availability, the major food source for blue whales (DoE 2015). It is predicted that cetaceans limited to warmer areas such as pygmy blue whales will experience

Receptor	Potential Impacts
	a southward shift in distribution as ocean temperature increases. There is evidence of these changes already occurring in other marine mammal species, but such changes are difficult to detect for whales due to the complexity of ecological systems and the lack of long-term records (DoE 2015). Due to rising sea surface temperatures (SST) and/or reducing sea ice extent, many cetacean species have demonstrated a poleward shift, following their preferred SSTs to higher latitudes, while some have altered the timing of their migrations (van Weelden et al., 2021). Climate change drives range shifts through effects on habitat and shelter, impacts on reproduction and disease, and changing distribution of sources of food (Grose et al., 2020).
Birds	Impacts to birds can include (Steffen et al. 2009): - Changes in phenology of migration and egg laying (Chambers et al. 2005); - Increased competition of resident species with migratory species as the latter species stay at breeding grounds for longer periods; - Reduced breeding of waterbirds susceptible to reduction of freshwater flows into wetlands; - Changes in food supply as a result of ocean warming (Smithers et al. 2003); - Rising sea levels will affect birds that nest on or burrow in sandy and muddy shores, salt marshes, inter-tidal zones, coastal wetlands and low-lying islands; - Saltwater intrusion into freshwater wetlands, especially in northern Australia, will affect breeding habitat (Williams et al. 1995) Bird species in Australia are suffering population declines and increased risks of extinction (DCCEEW, 2021). Numerous Australian landbirds have undergone significant southward range expansions (Silcocks & Sanderson, 2007) with some species moving as much as 200-300 km in just two decades (Olsen, 2007). Within the south-western region of Australia, notable changes have been observed in the migration timing of many waterbirds and landbird species (Chambers, 2008). Species that arrive in spring are tending to arrive earlier, while species arriving in autumn and winter arrived later.
Reptiles	Warming temperatures may alter sex ratios of species with environmental sex determination (ESD) such as crocodiles and turtles (some species likely to modify use of microhabitats to cope with warming in situ) (Steffen et al., 2009) Climate change is likely to have impacts on marine turtles and sea snakes across their entire range and at all life stages. Climate change is expected to cause changes in dispersal patterns, food webs (e.g. seagrass die-off), species range, primary sex ratios, habitat availability (e.g. loss of nesting beaches due to sea level rise), reproductive success and survivorship. Impacts will differ based on the ability of a stock to adapt to changes in suitable nesting beaches and food availability (DEE 2017a). Sea level rise presents a risk of nests flooding which may complicate increase hatchling mortality. The magnitude of sea level rise is expected to be greater at more southerly latitudes, particularly for WA.
Amphibians	Increased drying in bog and swamp areas will limit the range of habitat available to frogs and toads. Threatened alpine species (such as the southern corroboree frog *Pseudophryne corroboree*) at risk from changes to their breeding sites as snow coverage is reduced and suitable habitat dries out (Steffen et al, 2009). Increased outbreaks of pathogenic chytrid fungus in frogs as high temperatures provide optimum growth conditions (Laurance, 2008). Cane toad distribution may increase resulting in increased predation and competition as their range expands with warming.

Receptor	Potential Impacts
Invertebrates	Invertebrates are expected to be more responsive than vertebrates due to short generation times, high reproduction rates and sensitivity to climatic variables. Flying insects such as butterflies may be able to adapt by shifting ranges, as long as they are not limited by host plant distributions; non-flying species with narrow ranges are susceptible to rapid change in situ (e.g. Wilson et al. 2005 estimated that 25% of insect diversity in the wet tropics may be threatened this century). Invertebrate herbivores may also be affected by reduced foliar quality under elevated CO_2 and changes in rainfall and localised ecosystem changes. Some marine invertebrate groups are expected to experience significant impacts resulting from ocean acidification (OA). There is constant gas exchange between our oceans and the atmosphere and human-driven increased levels of atmospheric CO_2 result in more CO_2 dissolving into the ocean. In the past 200 years, ocean water has become 30 percent more acidic – faster than any known change in ocean chemistry in the last 50 million years (Barker & Ridgwell, 2012)). The building of skeletons of many marine invertebrates is particularly sensitive to acidity. Shell-building organisms rely on extracting carbonate ions from the water column to create calcium carbonate structures. Increasing ocean acidity binds up available carbonate and reduces the availability for invertebrates that rely on it (Steffen et al. 2009). In some extreme cases, calcium carbonate shells may even be dissolved in particularly acidic conditions. Blue mussel (*Mytilus edulis*) has been observed to produce outer shell that is more brittle while inner shell is softer and less stiff under OA conditions, which could be problematic in predation scenarios (Fitzer et al., 2015). Most threatened invertebrates are suffering from large-scale habitat degradation and loss of biodiversity.
Fish and plankton	Many marine fauna are sensitive to average temperature changes, even by less than 3 degrees, resulting in effects on dispersal, growth rates, reproduction, susceptibility to disease and survival; this includes impacts throughout the food web starting with phytoplankton production and secondary production in benthic communities. Changes in seasonal cycles of plankton abundance, with potential for mismatch between phytoplankton blooms and zooplankton growth, leading to cascading effects to the rest of the marine food chain (Hays et al. 2005). Freshwater species are vulnerable to changes in water flow and quality with limited capacity for species to move to new waterways. Many marine organisms are highly sensitive to changes in temperature, leading to effects on growth rates, survival, dispersal, reproduction and susceptibility to disease. Increasing temperatures may reduce larval development time, potentially reducing dispersal distances and warm-water assemblages may replace cool-water communities.
Plants	Longer-lived plants such as trees may be highly vulnerable if climate change 'moves' suitable establishment sites for seedlings beyond seed dispersal distance at a rate exceeding generation time. Narrow-ranged endemic plants requiring a very specific set of environmental characteristics (such as specific soil types) will have limited capacity to disperse to similar, rare sites. Elevated CO_2 will increase photosynthetic rates as long as other factors, such as water and nutrients, are not limiting (Steffen et al, 2009). There is potential for productivity to be boosted in some regions by a combination of increased CO_2 and longer growing seasons (e.g. Dunlop and Brown 2008). This effect, however, may not occur in regions where drying occurs. Increasing CO_2 will increase water use efficiency at an individual plant level. But at an ecosystem level, total water use may not necessarily decrease, due to decreased total leaf area and increased evaporation from soil as a consequence of warmer temperatures (Steffen et al, 2009). Any changes in productivity and foliar nutrients will have flow-on effects to herbivores. Changes to fire regimes will have significant impacts on vegetation; increases in frequency and intensity of fires may disadvantage obligate seeders relative to vegetative resprouters. Changes in the timing of plant phenology and insect life cycles will affect pollination and some forms of dispersal.

Receptor	Potential Impacts
Socioeconomic factors	Socioeconomic impacts resulting from climate change include impacts on the functions, interests or activities of other users which rely on these ecological values, including commercial and recreational fisheries and aquaculture. There may also be impacts to cultural heritage sites and places of spiritual importance in coastal locations due to sea level rises. Climate change could also be a severe hindrance to many tourism industries. Range shifts may result in shorter or more infrequent visitation by tour targeted species (e.g. cetaceans).
Consequence	**Ranking**
Minor	Acceptable

Table 6-13: Potential impacts of atmospheric emissions on identified receptors within the operational area

Receptor	Impact description within the operational area
Air quality	Emissions can reduce air quality in the immediate vicinity of the Facility in the Operational Area. The quantities of gaseous emissions are relatively small, and will under normal circumstances, quickly dissipate into the surrounding atmosphere. As the facility operations occur in offshore waters, the combustion of fuels in such remote locations will not impact on air quality in coastal towns or other sensitive locations, and impacts to any other nearby petroleum activities are not expected. As such impacts to air emissions are considered ***negligible.***
Birds	A reduction in air quality may have a temporary effect on transient bird species passing through the operational area. As described in Section 3.2, 1 avifauna BIA overlaps the Operational area, and 63 threatened and/or migratory seabirds were identified as potentially occurring within or having habitat potentially occurring within the EMBA. These species may be impacted by deterioration in air quality if they are transiting the immediate area of the CPF and vessel exhaust release points. Symptoms of exposure could include irritation of eyes and respiratory tissues or breathing difficulties. Given that the Operational area is outside a flyway, and the nearest migratory bird breeding/ roosting site is Montebello Islands which is located approximately 75 km south-west of the CPF only a small number of seabirds are expected to be affected by a reduction in air quality whilst in transit, any behavioural disturbances such as alteration of flight path would be a *Slight effect; recovery in days to week* There are no known air quality standards or guidelines specifically for avifauna. However, if avifauna are exposed it is expected they would only be exposed to changes in air quality for an extremely short period. Chronic exposures are not considered credible given that avifauna would be transiting through the area. As such impacts to seabirds are considered ***negligible.***
Social receptors	As Stag Facility operations occur in offshore waters, the combustion of fuels in such remote locations will not impact on air quality in coastal towns or other sensitive locations. No impacts are therefore expected.
Consequence	**Ranking**
Negligible	Acceptable

6.3.3 Environmental Performance

Hazard		**Atmospheric emissions**		
Performance outcome		**Develop and implement emission reduction strategy for Australia that contributes to the JSE Net Zero interim reduction targets and manages Stag field emissions to ALARP** **Reduce impacts to air quality (GHG and non-GHG emissions) from combustion engines and incinerators by maintaining atmospheric emissions in accordance with standard maritime practices, legislative requirements and Marine Order 97** **Monitor and manage Scope 1 emissions** **Collate data on Scope 3 emissions to inform forecasting and Net Zero commitments** **Scope 1 emissions not to exceed 79,000t Co_2e annually**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
011	Production is maintained and monitored to ensure accurate reporting under NGERS	Ultrasonic flare flow meter (FQI 3110) measures the volume of gas passing through the flare continuously and is monitored by production monitoring system	Production monitoring system (P2) records	Production Maintenance Supervisor
012	Maintenance and servicing of emissions producing equipment	Flare purges are monitored for changes in trend of flared gas to indicate any change from the established norm. Where a significant change is detected in the accuracy of the flare meter, corrective action is implemented 2 Yearly NGERS flare calibration	CMMS Records	Stag OIM
013		The flare system and tip are maintained and inspected to ensure efficient burning. This includes testing of the ignition system	CMMS records show maintenance and testing of flare and flare tip	Maintenance Team Lead
014	Flag State Certificate (IAPP) certifies measures are in place to manage air emissions	A current International Air Pollution Prevention (IAPP) Certificate that confirms: • Incinerators are certified to meet prescribed emissions standards • Diesel engines >130 kW are certified to meet prescribed emission standards • Vessels have a Ship Energy Efficiency Management Plan (SEEMP) • Use of low sulphur diesel (<0.50% m/m) • Current waste management plan • measures to prevent ozone-depleting substance (ODS) emissions are in place	Valid and current statutory Certificate (IAPP) Waste Management Plan SEEMP Plan	Marine Superintendent (Vessels)

Hazard		Atmospheric emissions		
Performance outcome		**Develop and implement emission reduction strategy for Australia that contributes to the JSE Net Zero interim reduction targets and manages Stag field emissions to ALARP** **Reduce impacts to air quality (GHG and non-GHG emissions) from combustion engines and incinerators by maintaining atmospheric emissions in accordance with standard maritime practices, legislative requirements and Marine Order 97** **Monitor and manage Scope 1 emissions** **Collate data on Scope 3 emissions to inform forecasting and Net Zero commitments** **Scope 1 emissions not to exceed 79,000t Co_2e annually**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
015	Fugitive emissions surveys are completed annually	Fugitive emissions surveys (for example using a FLIR camera) are undertaken annually on the CPF to detect any weeps and seeps to confirm tightness of the system and where discrepancies are found, they will be prioritized and addressed according to the CMMS. Fugitive emissions are also checked after startup of any newly installed equipment to ensure they are fitted correctly. The next survey is planned for 2025.	CMMS records demonstrate fugitive emissions surveys carried out Survey records and integrity management prioritisation Completed CMMS job orders evidence any corrective actions	Stag OIM
016	NGERS reporting to the CER is undertaken and results fed back into the emissions inventory	Reporting of direct GHG emissions is undertaken as per the NGERS regulatory requirements Forecasts of GHG emissions for Stag are undertaken following NGERS methodology and compared against the NGERS submission to the CER This review will also result in any re-forecasting and baseline review required to ensure Jadestone can achieve emissions targets. In addition, to IAPP Certificate, tankers are issued with a Statement of Compliance - FO Consumption Reporting & Operational Carbon Intensity Rating	NGERS reporting completed annually GHG forecasting estimates reviewed annually in line with the business plans	Group HSE Manager – NGERs reporting Group ESG Manager – GHG forecasting

Hazard		Atmospheric emissions		
Performance outcome		**Develop and implement emission reduction strategy for Australia that contributes to the JSE Net Zero interim reduction targets and manages Stag field emissions to ALARP** **Reduce impacts to air quality (GHG and non-GHG emissions) from combustion engines and incinerators by maintaining atmospheric emissions in accordance with standard maritime practices, legislative requirements and Marine Order 97** **Monitor and manage Scope 1 emissions** **Collate data on Scope 3 emissions to inform forecasting and Net Zero commitments** **Scope 1 emissions not to exceed 79,000t Co_2e annually**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
017	Emissions performance review	Monthly flare and fuel usage review undertaken to track forecasted emissions vs. actual emissions at the facility to allow for forecasting throughout each year Comparison of actual emissions vs forecasted emissions undertaken at least 6 monthly	Records maintained in P2	Operations Manager
018	Climate Change working group (Australia)	Australia CCWG established in 2023 to support the Climate change steering committee and implementation of the Climate Change Policy in - providing advice and recommendations to the board on climate related issues - Reviewing Jadestone actual and forecast climate related targets, and re-baselining as appropriate - Incorporating external influences (such as legislation changes) into business level strategies - Maintain and review the asset reduction options for Stag to manage any excess emissions as guided by the corporate Net Zero pledge and interim reduction targets and inform emissions optimization management - Review of new and emerging technologies for their readiness for implementation and application on Jadestone facilities, including Stag. - Increase our understanding of Scope 3 indirect value chain emissions and seek opportunities to reduce them where the Company has direct control and/or influence - Review and document the outcomes of asset reduction options and opportunities to ensure that emissions are managed to ALARP and acceptable levels throughout the life of the field	CCWG Terms of reference and meeting minutes Presentation records of technologies reviewed	Group HSE Manager Group ESG Manager
019	Scope 3 emissions data collation undertaken	Data enquiry questionnaires provided to suppliers through Jadestone's procurement process to allow for evaluation and calculation of scope 3 emissions	Supplier questionnaires	Supply Chain Manager

6.3.4 ALARP Assessment

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage atmospheric emissions from production and operations equipment. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated, no further controls are required. Additional controls considered but ultimately rejected are detailed below. Jadestone continues to review control options periodically.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
All emissions producing equipment is removed	Eliminate	No	N/a	Atmospheric emissions from production and operating equipment including vessels and helicopters are required to undertake the Activity. Equipment cannot be removed completely.
Anchor vessels instead of using DP whilst waiting to service the facility	Reduce	Yes	Yes	There is a designated anchoring area within the Stag field for vessels to utilise when on standby, therefore vessels can reduce emissions through use of this when not required to service the facility.
No incineration of vessel wastes	Eliminate	No	N/a	Costs associated with transporting waste to shore for landfill and/or incineration outweighs onboard incineration. There are health implications for storage of waste onboard, and implications for deck space and additional vessel transfers to remove waste.
Utilise carbon capture and storage on the current wells to minimize gas emissions.	Substitute	No	N/a	Rejected – The reservoir is not considered competent for carbon capture and storage.
Equipment is re-designed/ replaced with equipment designed to reduce emissions. The facility is modified to reduce air emissions e.g. new well for reinjection, scrubbers	Engineering	Yes	No	Risk and impact reduction are achieved through planned maintenance ensuring clean and efficient running of engines. While scrubbers could be installed on generators and the boiler, to purchase the scrubbers would be high (more than $500,000 per piece of equipment), a cost higher than the generator itself, for example. Reinjection of produced natural gas would not be technically feasible in the Stag reservoir.
Waste heat recovery	Engineering	Yes	Not currently economical	Jadestone has considered installing waste heat recovery on power generators. The process would involve pre-heating the crude to achieve higher thermal efficiency. This opportunity will continue to be considered but is presently uneconomic.

Debottlenecking of pumps	Engineering	TBC	Not currently economical	This option involves modifying the seawater injection pumps to reduce power requirements. This opportunity will continue to be considered but is presently uneconomic.
Power generator conversion to bifuel	Engineering	TBC	Not currently economical	This option involves converting the power generator from crude to bifuel (crude and gas) to reduce crude consumption by the power generators. The additional fuel gas for the bifuel would be diverted from the flare resulting in a decrease in emissions and a reduction in crude use for fuel. This opportunity will continue to be considered but is presently uneconomic.
None identified	Isolation	N/a	N/a	The Activity is located at distance from sensitive receptors and the coastline.
None identified	Administrative	N/a	N/a	Compliance with relevant and appropriate MARPOL requirements

6.3.4.1 Mitigations

Jadestone is committed to achieve Net Zero Scope 1 and 2 GHG emissions for its operated assets by no later than 2040 with interim reduction targets set for 2026 and 2030 (Figure 1-4). Jadestone defines Net Zero as the state reached when its GHG emissions are reduced in line with the goals of the Paris agreement, and any remaining emissions that cannot be reduced further, are fully neutralised by like-for-like permanent removals. For those emissions that are economically or technically difficult to eliminate, Jadestone will employ nature-based solutions and offsets to mitigate. Jadestone has developed a Net Zero Plan. The use of offsets to mitigate hard to abate emissions is the least preferred option in the mitigation hierarchy and Jadestone will continue to assess reduction options over the life span of the facility. Where offsets are used, Jadestone will ensure they are properly measured, verified, and represent permanent removal of carbon from the atmosphere. Jadestone has also committed to the World Bank Zero Routing Flaring Initiative that aims to end flaring by 2030.

Jadestone are currently reviewing a number of options to improve efficiency at the Stag facility with an aim of reducing emissions. This is reviewed in the Australia Climate Change Working Group; recommendations to implement the efficiency measures are then taken to the CCSC for approval. This may require approval from the Board depending on the Capex and MAC outcomes. The decision-making process for any identified option is in Figure 6-4, this is managed through the CCWG with decisions to trial any mitigation option based on high-level MAC.

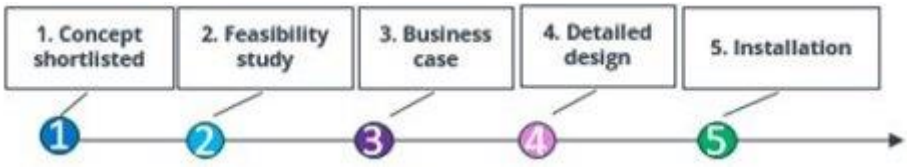


Figure 6-4:Decision making process for concepts shortlisted for trial

The MAC is adjusted over time as the cost and scale of carbon reduction opportunities changes with the price of oil and capital costs. Therefore, concepts that are feasible but may not make business sense to implement now, may become more favourable in future and therefore the concepts are reviewed regularly by the CCWG. Jadestone also reviews new and emerging technologies in the CCWG highlighting technologies of varying Technology Readiness Levels (TRL; NASA, 2023) that could be implemented on Jadestone Energy assets to significantly reduce flaring and GHG emissions.

Through the continued review of potential improvement opportunities and new technologies, Jadestone will continue to manage emissions to ALARP.

6.3.5 Acceptability Assessment

The potential impacts of atmospheric emissions are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regards to impacts from atmospheric emissions from ongoing operations.
Laws and standards	Atmospheric emissions from production, operation and asset equipment are compliant with MARPOL and AMSA Marine Orders.
Industry best practice	Atmospheric emissions from production, operation and asset equipment are designed to be at a minimum safe operational level. The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regards to offshore production operations.
Environmental context	Whilst direct impacts to localised receptors is considered negligible, the cumulative impact of Stag's annual emissions does contribute to climate change. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD. The potential impact is considered acceptable after further specific consideration at the Stag facility of the: • Remaining project life span • Decreasing emissions • Limited options to reduce actual emissions • Offset hard to abate emissions in line with objectives of Paris Agreement • Commitments to Jadestone's roadmap to Net Zero which includes interim reduction targets for operated assets in 2026 and 2030 (prior to Stag's current predicted EOFL)
Conservation and management plans	A number of management plans include consideration of the effects of climate change on species, including the following: • Marine Bioregional Plan for the North Marine Region • Recovery Plan for the White Shark (*Carcharodon carcharias*) • Recovery plan for the Southern Right Whale (*Eubalaena Australia*) 2024 • Approved Conservation Advice for Rhincodon typus (whale shark) • Conservation Management Plan for the Blue Whale 2015–2025 • Approved Conservation Advice for Balaenoptera physalus (fin whale) (2015) • Approved Conservation Advice for Balaenoptera borealis (sei whale) (2015) • National Light Pollution Guidelines for Wildlife (DCCEEW, 2023)

	• Recovery Plan for Marine Turtles in Australia 2017–2027 (CoA, 2017) • Commonwealth Conservation Advice on Dermochelys coriacea (2008) • Approved Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled seasnake) (2011) • Wildlife Conservation Plan for Seabirds (CoA, 2020b) • Wildlife Conservation Plan for Migratory Shorebirds • Approved Conservation Advice for Numenius madagascariensis (Eastern Curlew) (2015) • Conservation Advice for the Abbott's Booby *Papasula abbotti* (2020) • Conservation Advice for the Christmas Island Frigatebird *Fregata andrewsi* (2020) • National recovery plan for the Christmas Island Frigatebird (*Fregata andrewsi)* (2004) • Conservation advice *Accipiter hiogaster natalis* (Christmas Island Goshawk) (2016) • National Recovery Plan for Christmas Island Goshawk Accipiter fasciatus natali (2004) • Conservation advice *Chalcophaps indica natalis* (Christmas Island emerald dove) • Conservation Advice for *Phaethon lepturus fulvus* (white-tailed tropicbird) (2014) • Approved Conservation Advice for *Rostratula australis* (Australian painted snipe) (2013) • National Recovery Plan for the Australian Painted Snipe (*Rostratula australis*) (2022) • Conservation Advice *Falco hypoleucos* Grey Falcon (2020) • Conservation Advice *Falcunculus frontatus whitei* crested shrike-tit (northern) (2016) • Conservation Advice for *Erythrotriorchis radiatus* (red goshawk) (2023) • National recovery plan for the red goshawk *Erythrotriorchis radiatus* (2012) • Conservation Advice *Erythrura gouldiae* Gouldian finch (2016) • National Recovery Plan for the Gouldian Finch (*Erythrura gouldiae)* (2006) • Conservation Advice *Tyto novaehollandiae* masked owl (northern) (2015) • Approved Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW, 2024a) • Approved Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW, 2024b) • Approved Conservation Advice for *Calidris canutus* (Red knot) (DCCEEW, 2024c) • Approved Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW, 2023a) • Approved Conservation Advice for *Calidris tenuirostriss* (Great knot) (DCCEEW, 2024d) • Approved Conservation Advice for *Limnodromus semipalmatus* (Asian dowitcher) (DCCEEW, 2024e) • Approved Conservation Advice for *Charadrius leschenaultii* (Greater sand plover) (DCCEEW, 2023b) • Approved Conservation Advice for *Limosa lapponica menzbieri* (Bar-tailed godwit (northern Siberian) (DCCEEW, 2024f) • Approved Conservation Advice for *Limosa limosa* (black-tailed godwit) (DCCEEW, 2024g) • Approved Conservation Advice for *Pluvialis squatarola* (grey plover) (DCCEEW, 2024h) • Approved Conservation Advice for *Tringa nebularia* (common greenshank) (DCCEEW, 2024i) Jadestone has had regard to the representative values of the protected areas within the RISK EMBAs, and the respective management plans and other published information. Impacts from atmospheric emissions will have a negligible impact on any of the social and

	ecological objectives and values, of any AMPs, or state MPs. This is consistent with the objectives of the protected area management plans and considered acceptable. Jadestone is committed to achieve Net Zero (scope 1 and 2) GHG emissions for its operated assets by no later than 2040 and has set interim reduction targets for 2026 and 2030 (Figure 1-4) to reduce emissions from its operated assets. Jadestone defines Net Zero as the state reached when its GHG emissions are reduced in line with the goals of the Paris agreement. This target will in turn reduce the potential effects of climate change and meet the objectives of the recovery plans and conservation advices. Through the continued monitoring and management of emissions, and review of improvement opportunities for the Stag field, Jadestone will continue to manage the emissions for the Stag facility to acceptable levels. It is important to acknowledge that climate change impacts cannot be directly attributed to any one activity, as they are the result of global GHG emissions, minus global GHG sinks, that have accumulated in the atmosphere since the industrial revolution began. Therefore, the contribution of GHG emissions from the Stag facility operations to climate change impacts to specific ecological receptors is considered to be broadly acceptable. It is also noted that the Safeguard Mechanism does not apply to the Stag facility as it emits less than 100,000 tCO_2-e a year.
ALARP	The residual risk has been demonstrated to be ALARP.

6.4 Discharge of Produced Water

6.4.1 Description of Hazard

Aspect	Produced water (also referred to as produced formation water or formation water) is the wastewater that is separated from the production stream during oil and gas production operations. For oil production fields the largest constituent is typically fossil water, the water found with the oil and gas inside the geological reservoir. As the reservoir matures, fossil water may be introduced, and volumes of produced water tend to increase. The produced water is physically separated from the well fluids and then typically discharged directly to the ocean. This separation is not 100% effective, and the produced water often contains small amounts of naturally occurring contaminants including dispersed oil, dissolved organic compounds (aliphatic and aromatic hydrocarbons, organic acids and phenols), inorganic compounds and residual process chemicals. The chemical composition of produced water varies over a wide range and depends mainly on attributes of the reservoir geology. The composition may also change slightly through the production lifetime of the reservoir. Produced water from Stag is discharged from a pipe located 5 m above mean sea level. An option is being explored to discharge produced water through an alternative caisson which discharges below the surface, however feasibility studies are not yet complete.

The main contaminants of concern in discharged produced water are (Neff *et al*. 2011):

- Hydrocarbons
- Soluble inorganic chemicals
- Trace metals and nutrients
- Naturally occurring radioactive materials (NORM).

Particularly, it is the light aliphatic hydrocarbons, one-ring aromatic hydrocarbons, poly aromatic hydrocarbons (PAHs) that are the main toxicants present in most oil well produced waters (Neff *et al*. 2011).

The acceptable limits of change for Stag PW discharge are no impacts beyond the mixing zone defined from the 99% species protection concentration (Section 6.4.2.6.5). The protection of 99% of species maintains a high level of ecological protection and represents no detectable change from natural variation (ANZG 2018).

6.4.2 Impacts of Produced Water

6.4.2.1 Source and Production of Produced Water

Produced water recovered in the process separators and water recovered from the slop's tanks (which receive deck drainage and over-specification produced water) is directed to the Corrugated Plate Interceptor (CPI). Reverse emulsion breaker is continually injected into the feed water to assist in the oil/ water separation process.

Recovered oil from the CPIs is pumped back to the second stage separator to join the export oil stream. Water from the CPIs enters a Gas Flotation Unit (GFU) which aerates and coalesces the water to capture remaining oil. A continuous small bleed of produced water from the gas flotation unit is directed through an oil-in-water (OIW) monitor to provide an indication of OIW concentrations and performance of the water treatment circuit. This small bleed volume of produced water is then discharged, unless OIW concentration exceeds 30 mg/L.

If OIW concentrations exceed 30 mg/L, an alarm is activated in the central control room and overboard discharge is automatically ceased after a 10 minute time delay, to allow for manual sampling. If the manual

sample confirms OIW concentration is <30mg/l, the automatic in boarding can be reset and produced water discharge can continue, with increased frequency of laboratory sampling. If oil in water concentrations are confirmed by manual samples to exceed 30 mg/L the discharge is diverted inboard to slops tank T412 and/or T411.

The slops tanks have capacity for up to one hour of produced water at normal production levels (storage capacities of 245 m^3 and 250 m^3, respectively), during which time production upsets (e.g. hydrocarbon characteristics, chemical injection, boiler function, etc.) affecting the OIW concentration of produced water may be rectified without affecting production. If capacity of the slops tanks is reached and slops reinjection is not available, production may be shut in or slops pushed forward to a support vessel or tanker so that produced water discharges with high OIW concentrations do not occur (refer Section 6.4.5). Following return to normal operations, produced water in the slops tanks is pumped to the second stage separators for reprocessing. For maintenance and integrity purposes, the slops tanks are dosed with a biocide periodically.

Several chemicals are used during processing of the crude oil (Table 6-14). These are selected in accordance with Jadestone's Chemical Selection Evaluation and Approval Procedure as outlined in Section 2.3, which promotes the use of environmentally low risk chemicals based on ecotoxicity data and information gathered from ChemAlert. Residual drilling fluids that may also be produced in the produced water will have gone through the Chemical Selection Evaluation and Approval Procedure and approved under the relevant drilling environment plans. Last chemical trials were completed in 2024 and sampling for WET testing completed in September 2024.

Table 6-14: Indicative chemical types and purpose in the produced water discharge

Chemical	Purpose
Corrosion inhibitor	Control of corrosion
Neutralising amine	Control of corrosion
Oxygen scavenger	Reduces dissolved oxygen concentration
Emulsion breakers	Breaks oil in water emulsifiers
Scale inhibitor	Control of inorganic scale due to mixing of seawater and PW.
Biocide	Control of bacterial count
Wetting agent	Prevention of sand degradation on ESPs

Some of the injected chemicals are more soluble in oil than water, so they will partition into the oil and be exported via the offtake tanker. Others are water soluble and remain in the PW stream.

During the lifetime of this EP, chemicals may require change out. Reasons for this might be:

- To improve separation of oil and water or enhance the production process;
- Chemicals may become unavailable;
- The manufacturer changes or the chemical composition is changed.

If a change in chemical is required, chemical trials may be undertaken to understand the potential impacts on the process system and the produced water discharge.

6.4.2.2 Historic produced water discharge volumes and OIW concentrations

Discharge volumes and OIW concentrations are monitored continuously on the platform. Daily average discharge volumes over the last five years have ranged from zero (when the facility was either shut in or produced water was out of spec and had been inboarded) to 5000 kL/day (Figure 6-5). Annualised discharge rates are shown in Figure 6-5.

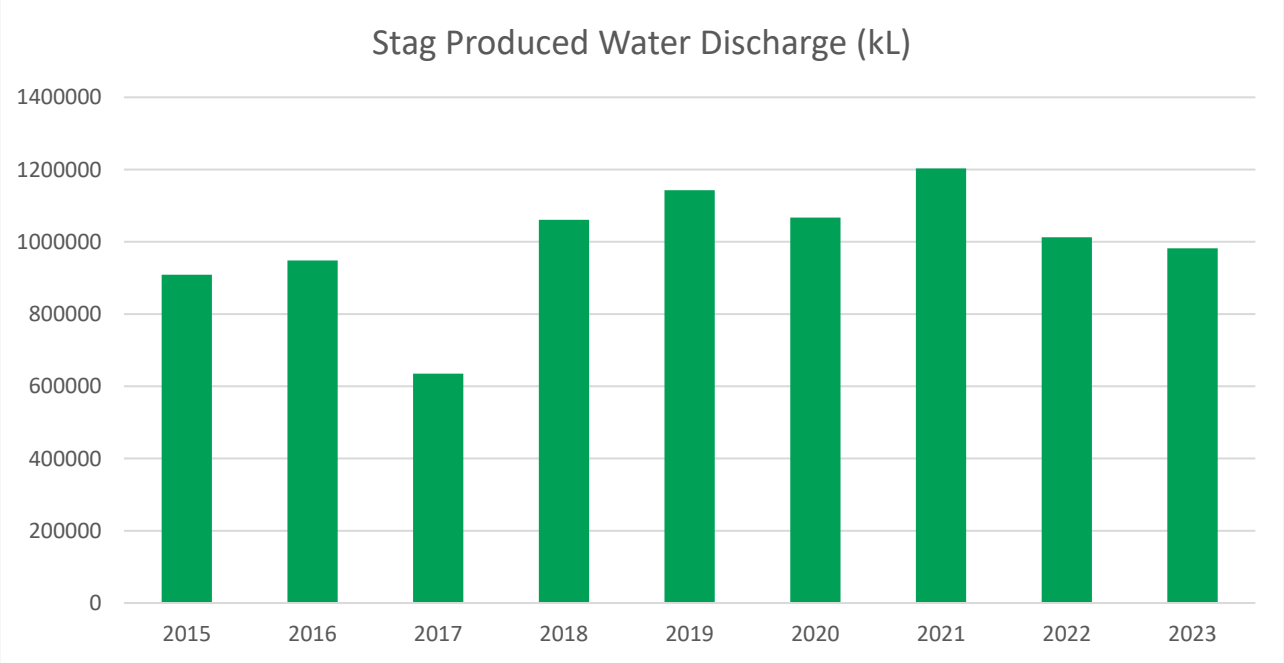


Figure 6-5: Historic produced water discharge rate (annualised)

Discharge volume is measured by a flow meter and oil in water concentration is measured by an online analyser. OIW concentration measurement is backed up by twice daily measurements in the offshore laboratory. Detailed hydrocarbon speciation is also undertaken as part of the Produced Water Monitoring and Adaptive Management program (Section6.4.4).

Results measured in the laboratory are shown in Figure 6-6. In accordance with the in-force EP (Revision 17) control to limit the discharge of oily water to the marine environment, the discharge is inboarded once the limit of 30mg/L was reached, therefore the figure only shows the maximum and average OIW concentration of that discharged to sea, not the average OIW concentration of the entire produced water stream. The volume was also limited under the in-force EP (Revision 17) to 3,816kL/day therefore further reducing the volume discharged and the average OIW concentration discharged to sea. The average shown is also a monthly average rather than daily.

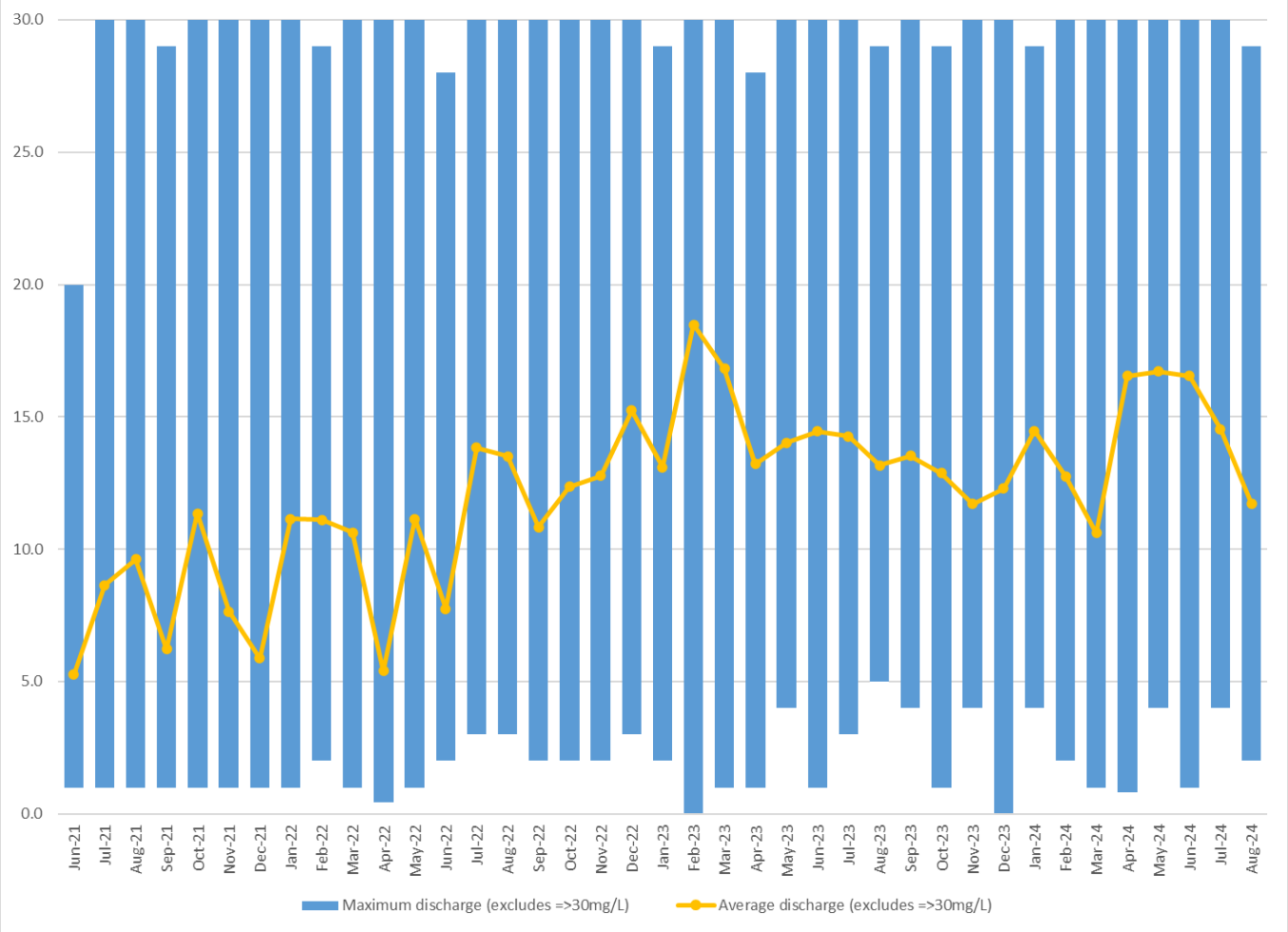


Figure 6-6: Monthly Stag Produced Water Oil in water concentrations (mg/L) discharged from the CPF 2021–2024 (from laboratory samples)

6.4.2.3 Forecast produced water discharge volumes

Produced water discharge volumes in the future are forecast level out at ~5,250 kL/day (32,800 bbl/day).

6.4.2.4 Chemical Characterisation

Chemical characterisation of Stag produced water has been undertaken biannually since 2011 (Jacobs, 2013) and has included analysis for the below. This section summarises the results:

- Physicochemical properties
- Nutrients
- Petroleum hydrocarbons (BTEX, TPHs and PAHs)
- Metals; and
- NORMs

6.4.2.4.1 Physicochemical properties

Table 6-15 presents the physicochemical properties over the last five years, including chemical oxygen demand, total dissolved solids and total suspended solids. Chemical Oxygen Demand (COD) is a measurement of the oxygen required to oxidize soluble and particulate organic matter in water. Oxygen is abundant in open marine waters so demand will be quickly met and is not an environmental concern for the tag discharge.

Over the last five years Total Suspended Solids (TSS) , which are also a measure of salinity, have remained relatively stable ranging between 38 and 40 g/L making the discharge slightly more saline than natural seawater.

Suspended solid concentrations (TSS) have fluctuated between 7 and 77 mg/L with an average of 41 mg/L. These solids are predominately fine clay and silt size particles that make it through the sand removal process. Particle sizes have historically been distributed between 0.25 and 300 microns (Figure 6-7) with a median grain size of around 5-10 microns. In the 2024 samples, over 99% were smaller than fine sands (63 microns) (Table 6-16). On release to the ocean, particles will disperse rapidly and settle slowly due to their size. Particle sorting will enhance dilution in the water column. Settling forces will be overcome by turbulence and clays and fine to moderate silts will remain suspended in the water column. Coarse silts will also be held in suspension for extended durations.

Throughout the history of Stag production, the produced sands have been progressively becoming finer (Table 6-16), resulting in an increased amount of sediment being carried into the produced water stream rather than settling within the inlet separators. This has led to recent discrepancies between the online analyser and the laboratory spectrophotometer, as any hydrocarbons attached to the sediment will not fluoresce in the online analyser.

Oil could be associated with these fine sediment particles that are passing through the inlet separators into the produced water discharge stream. Under stable conditions, hydrophobic organic contaminants (PAHs and TPHs) bind onto clays and silts strongly (adsorbed) so they are not bioavailable (NRC, 2013). If not bioavailable, they will have no effect on marine organisms (Neff, 2002).

Jadestone are currently undertaking a study to determine the potential for oil to adsorb to the sediment particles within the produced water to ensure the oil on sediment is assessed (refer Table 6-28). The sediment within the OIW varies in volume depending on the reservoir and wells online.

Table 6-15: Concentrations of TDS and TSS in CPF produced water biannual sampling (MAFRL, 2025)

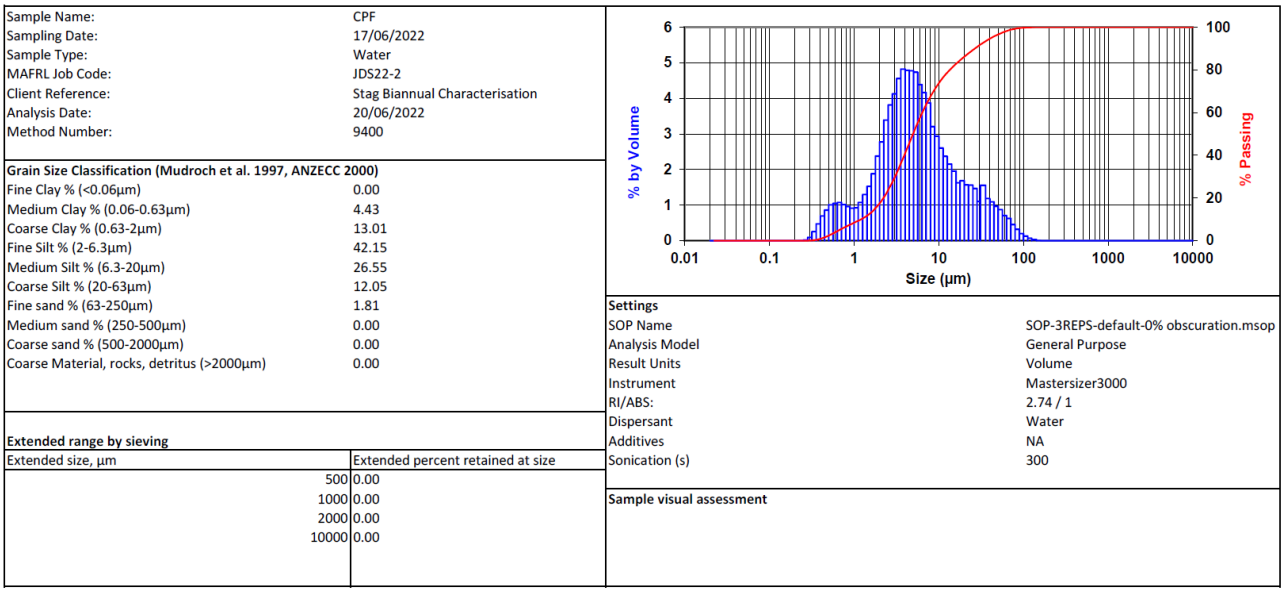
Analyte	May 2020	Sep. 2020	May 2021	Dec. 2021	Jun. 2022	Oct. 2022	Mar. 2023	Oct. 2023	Apr. 2024	Oct. 2024
Chemical Oxygen Demand (mg/L)	530	<1000*	1100	510	370	2100	1200	320	260	300
Total Dissolved Solids (g/L)	38	38	39	40	38	38	40	40	39	38
TSS (mg/L)	24	38	30	7.3	31	37	39	53	77	74

* LOR raised due to high concentration of analytes in the sample, resulting in the sample requiring dilution

Table 6-16: Stag CPF PW suspended sediment particle size distribution

PW	Size range (µm)	% smaller than 5 µm	% smaller than ≤ 63 µm
April 2019	0.25 - 80	45.2	99.9
October 2019	0.22 - 125	75.9	98.3
May 2020	0.25 - 125	38.25	97.1
September 2020	0.22 - 200	51.30	96.6
May 2021	0.22 - 317	59.6	94.7
December 2021	0.4 - 159	17.5	93.1
June 2022	0.25-125	50.48	98.81

PW	Size range (µm)	% smaller than 5 µm	% smaller than ≤ 63 µm
October 2022	0.28-159	14.64	97.97
March 2023	0.28 - 224	27.1	97.6
April 2024	0.25 - 159	12	99.0
October 2024	0.25 – 100	33	99.5



Sample Name:	CPF
Sampling Date:	17/06/2022
Sample Type:	Water
MAFRL Job Code:	JDS22-2
Client Reference:	Stag Biannual Characterisation
Analysis Date:	20/06/2022
Method Number:	9400

Grain Size Classification (Mudroch et al. 1997, ANZECC 2000)	
Fine Clay % (<0.06µm)	0.00
Medium Clay % (0.06-0.63µm)	4.43
Coarse Clay % (0.63-2µm)	13.01
Fine Silt % (2-6.3µm)	42.15
Medium Silt % (6.3-20µm)	26.55
Coarse Silt % (20-63µm)	12.05
Fine sand % (63-250µm)	1.81
Medium sand % (250-500µm)	0.00
Coarse sand % (500-2000µm)	0.00
Coarse Material, rocks, detritus (>2000µm)	0.00

Extended range by sieving

Extended size, µm	Extended percent retained at size
500	0.00
1000	0.00
2000	0.00
10000	0.00

Settings	
SOP Name	SOP-3REPS-default-0% obscuration.msop
Analysis Model	General Purpose
Result Units	Volume
Instrument	Mastersizer3000
RI/ABS:	2.74 / 1
Dispersant	Water
Additives	NA
Sonication (s)	300

Sample visual assessment

Figure 6-7: Produced Water suspended sediment particle size distribution (Jacobs, 2023)

6.4.2.4.2 Nutrients

Table 6-17 presents nutrient concentration measured in Stag produced water from 2020 to 2024. Elevated nutrient levels can lead to increased bacterial and phytoplankton production (eutrophication). This might be an issue in enclosed poorly mixed water bodies but not in open, well mixed waters such as around Stag CPF. Ammonia, total nitrogen and orthophosphate concentrations were above ANZECC/ARMCANZ (2000) and ANZG (2018) guideline values for tropical Australian offshore waters, however, minimal dilutions are required to meet them. Total nitrogen was almost entirely composed of ammonia with nitrate and nitrite mostly below the laboratory LOR. Phosphorous levels were over 3000 times background levels measured during the Stag field water quality monitoring survey (Oceania, 2015). As mentioned above this is not a concern in well mixed open waters.

6.4.2.4.3 Petroleum hydrocarbons

Detailed analysis over the last five years (Table 6-18) shows hydrocarbons speciation's distributed over the C6 to C36 range, with the largest proportion between C15 and C28. Apart from naphthalene, Benzo(b,j+k)fluoranthene, BTEX and PAH compounds were consistently below the laboratory limits of reporting. Naphthalene was detectable in 2022 (but back below in 2023 and 2024) but well below ANZG (2018) 99% species protection guideline of 50 µg/L in marine water. Benzo(b,j+k)fluoranthene was also detected in 2022 but only at 4 times the ANZG (2018) 99% species protection guideline of 50 µg/L, so not of a concern.

The lack of aromatics suggests that the hydrocarbons present are mainly straight chain aliphatics. As aqueous solubility decreases with increased chain length, the lower chain length aliphatics (C10 – C14) will exist in the dissolved phase, whilst those greater than C15 will be dispersed or may be attached to solids.

6.4.2.4.4 Phenols and organic acids

Other dissolved organic components that may be present include phenols and organic acids. Phenolic compounds are typically hydroxy derivative of benzene and a natural component of the environment. Many different phenols are synthesized by a wide variety of bacteria and fungi, plants and animals. The most abundant phenols in many crude oils are the C2 through C9 alkyl phenols. Phenol solubility decreases with increasing alkylation so produced water rarely contains detectable concentrations of the more highly alkylated phenols.

Most organic acids are short chain aliphatic monocarboxylic acids, such as acetic (C2), propionic (C3), butyric (C4) and valeric (C5) acids. Concentrations tend to decrease with molecular weight with the most abundant acid usually being acetic acid. Organic acids biodegrade rapidly in the ambient sea water and so are unlikely to be important contributors to toxicity of produced water in the ambient environment (Neff, 2002).

6.4.2.4.5 Metals

Metals are classified as alkali and alkaline earth metals (sodium, potassium, magnesium, calcium, strontium and barium) and heavy metals (arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver and zinc). The alkali and, to a lesser degree, the alkaline earth metals are very reactive. Hence, they never occur in elemental form and are found combined with halide, sulphate, carbonate or silicate ions. In this form they are not considered toxic. Heavy metals are considered toxic and, guideline trigger values are available for marine waters and sediments (ANZG, 2018).

Table 6-19 summarises the dissolved and total metal concentrations measured in biannual sampling of produced water over the last five years. Heavy metals were in concentrations at either below, or required minimal dilution to achieve, ANZG (2018) 99% species protection guideline value. The earth metals (Ba, Fe and Sr) were also mainly present in dissolved state. Ba was present at 806 times background concentrations in marine water and iron required 40 dilutions to achieve guideline values.

6.4.2.4.6 Radioisotopes

Several naturally occurring radioactive materials (NORMs) occur in produced water. The most abundant, because of their relatively long half-lives, are radium-226 and radium-228 (226Ra and 228Ra). Upon discharge of produced water to the ocean, radium is rapidly co-precipitated with barium sulphate (Neff, 2002).

Gross alpha concentrations (filtered and unfiltered) and gross beta concentrations (filtered and unfiltered) measured in Stag produced water were only slightly higher than the guideline values (Table 3-6). Radium-226 concentrations range between 0.098 to 1.04 Bq/L, which is below the Drinking Water Guidelines (WHO) value. Radium-228 concentrations range 0.106 to 1.34 Bq/L which is slightly above the guideline value.

Radium concentrations in ambient water near produced water discharges are rarely higher than background levels. Toxic concentrations are well above the saturation concentrations of radium in sulphate-rich seawater. Marine animals are highly tolerant to low-level radiation as might occur in the traces of radium isotopes in the vicinity of produced water discharges. Radium, because of its low concentrations in solution in seawater, has a low bioavailability to marine organisms. There is also no evidence that radium accumulates in sediments or marine animals (molluscs, crabs and fish) living in the vicinity of offshore produced water discharges (Neff, 2002).

Table 6-17: Nutrient concentrations in Stag CPF produced water from 2020 to 2024

	Guideline Value [a]	Maximum Dilution required	May-20	Sep-20	May-21	Dec-21	Jun-22	Oct-22	Mar-23	Oct-23	Apr-24	Oct-24
Ammonia (NH3-N µg/L) [bb]	500	82	40000	39000	41000	27000	40000	37000	33000	38000	41000	36,000
Nitrate+nitrite (µg/L)	4	5	<4	<4	<4	19	4	<2	<10	<10	<10	<10
Total nitrogen (µg/L)	140	300	42000	42000	41000	39000	40000	37000	33000	41000	42000	36,000
Orthophosphate (µg/L)	5	4	-	-	-	-	7	12	-	20	20	50
Total phosphorus (µg/L)	12 [†]	-	2600	2500	1600	**40000**	920	170	140	680	590	2,100

[a] ANZECC/ARMCANZ (2000b) tropical Australian offshore waters

[b] 99% species protection guideline value (ANZG 2018)

[†] Total phosphorus of reference site, Stag field water quality monitoring survey (Oceanica, 2015) Measurements in **bold** have exceeded the guideline to be met at end of pipe taking dilutions into account

- no measurement taken

Table 6-18: Hydrocarbon concentrations in Stag CPF produced water from 2020 to 2024

		Guideline values [a]	Maximum Dilution required	May-20	Sep-20	May-21	Dec-21	Jun-22	Oct-22	Mar-23	Oct-23	Apr-24	Oct-24
TPHs (mg/L)	Total C6-C36		-	<0.65	<4.7	<1.51	<1.49	3.86	**55.8**	12.7	18.9	**58.3**	**18.1**
BTEX (µg/L)	Benzene	500 (moderate)	<1	<1	<3*	<3*	<3	<1	<1	<1	<1	<1	<1
	Toluene	110 (unknown)	<1	<1	<3*	<3*	<3	<1	<1	<1	<1	<1	<1
	Ethylbenzene	50 (unknown)	<1	<1	<3*	<3*	<3	<1	<1	<1	<1	<1	<1
	m&p-Xylene	190 (unknown)	<1	<2	<6*	<6*	<6	<2	<2	<2	<2	<2	<2
	o-Xylene	200 (unknown)	<1	<1	<3*	<3*	<3	<1	<1	<1	<1	<1	<1
PAHs (µg/L)	Naphthalene	50 (moderate)	<1	0.2	0.3	<0.2	<0.1	<0.1	1.2	<0.1	<0.1	<1	<1
	Acenaphthylene	0.1b	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Acenaphthene	0.1 b	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Fluorene	0.1 b	<1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<1	<1
	Phenanthrene	0.6 (unknown)	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Anthracene	0.01 (unknown)	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Fluoranthene	1 (unknown)	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Pyrene	0.1 b	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Benz(a)anthracene	0.1 b	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Chrysene	0.1 b	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
	Benzo(b,j+k)fluoranthene	0.2 b	<1	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	<0.1	<0.1	<1	<1

a ANZG (2018) guideline rankings of unknown, very low, low, moderate, high and very high reliability are shown in parenthesis.
b No guideline value - laboratory limit of reporting (if background concentration below the LOR)
* LOR raised due to the presence of foam, resulting in the sample requiring dilution

Table 6-19: Dissolved and total metals/metalloid concentrations in Stag CPF produced water from 2020 to 2024

Metals (µg/L)	Guideline Value	Max Dilutions Required	May-20		Sep-20		May-21		Dec-21		Jun-22		Oct-22		Mar-23		Oct-23		Apr-24		Oct-24	
		-	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total	Diss[b]	Total
Ag	0.8 (mod)	-	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2
As	2.3 (III) (low)	38	15	28	26	27	28	28	37	38	29	30	28	28	31	33	28	32	25	27	29	34
As	4.5 (V) (low)	48	15	28	26	27	28	28	37	38	29	30	28	28	31	33	28	32	25	27	29	34
Ba	6.2[c]	806	530	5000	670	4000	680	3200	900	900	900	2800	3500	3500	2300	2400	930	3900	3500	3400	1,800	2,900
Cd	0.7 (high)	-	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2
CR	7.7 (III) (low)	1	<0.2	1.7	0.4	2.1	<0.2	0.9	0.6	0.8	0.2	1.5	0.2	1.8	0.3	4.8	<0.2	5.7	<0.2	4.7	<0.2	5.3
CR	0.14 (VI) (very high)	143	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<20
Cu	0.3 (very high)	13	0.3	0.8	0.9	1.6	0.3	0.8	3.9	4	0.4	0.8	0.8	1.9	0.9	1.8	0.7	2.3	2.8	3.9	2	4
Fe	300 (very low)	40	2900	11000	8700	10000	9200	9900	11000	11000	10000	10000	11000	12000	8900	9900	8500	11000	9000	10000	8,800	11,000
Mn	130d	2	170	170	140	130	150	150	150	150	140	140	150	150	130	130	120	130	130	130	150	150
Ni	7 (high)	3	<0.3	<0.6	14	17	0.4	0.6	3.6	3.6	0.4	1.3	1.3	8.8	3.6	24	2.7	14	3.1	12	4	7
Pb	2.2 (high)	0	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	0.1	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	0.4	<0.1	0.2	<0.1	0.4
Sr	7850c	4	29000	29000	32000	33000	30000	31000	30000	32000	30000	31000	30000	30000	31000	32000	31000	32000	29000	29000	28,000	28,000
Zn	3.3 (very high)	5	2	9	5	9	7	3	4	5	10	10	4	8	8	8	3	17	3	7	3.0	7.0
Hg	0.1 (very high)	-	<0.5	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

[a] 99% species protection guideline value (ANZECC/ARMCANZ 2000a) guideline rankings of very low, low, moderate, high and very high reliability (ANZG 2018) are shown in parenthesis.
[b] Dissolved fraction (0.45 µm).
[c] No guideline value – background concentration in marine water for barium (Bowen 1956) and strontium average value (Bernat et al 1972, Brass and Turekian 1974)
[d] Draft submission paper to the Council of Australian Government's Standing Council on Environment and Water (Stauber et al. 2008).

Table 6-20: NORM concentrations in Stag CPF produced water from 2020 to 2024

NORMs (Bq/L)	Guideline values	May-20	Sep-20	May-21	Dec-21	Jun-22	Oct-22	Mar-23	Oct-23	Apr-24
Gross Alpha total	0.5a	1.07	0.46	0.396	0.092	0.199	1.08	0.715	0.474	2.76
Gross Alpha filtered		0.54	0.27	0.604	0.165	0.084	1.14	0.775	0.433	2.4
Gross Beta total	0.5a	1.08	0.33	0.167	0.12	0.433	1.42	0.918	0.298	1.58
Gross Beta filtered		0.52	0.33	0.608	0.125	0.179	1.56	0.808	0.473	1.69
Radium 226†	1	0.45	0.23	0.136	0.098	0.27	1.04	0.57	0.194	0.766
Radium 228†	0.1	0.48	0.26	0.106	0.14	0.39	1.34	0.671	0.33	0.897

a Guideline values for drinking water NHMRC/ARMCANZ (2011).

† Guideline values for drinking water WHO (2017).

6.4.2.5 Whole of Effluent Toxicity (WET) Testing of Produced Water

WET testing on unfiltered Stag produced water was undertaken in 2008, 2018, 2020, 2023 and 2024. Table 6-21 presents the results from 2023 and 2024 (noting the 2024 data is from a preliminary report). As the WET testing is conducted on an unfiltered sample, this includes analysis of both the water and sediment particles that are present in the PW stream. Nine tests were undertaken using species from a range of taxonomic groups and trophic levels. End points were non-lethal yielding effect (or inhibiting) concentrations for 10 (EC_{10}/IC_{10}) and 50% (EC_{50}/IC_{50}) of exposed organisms, as well as NOECs and LOECs (Table 6-21).

The copepod larval development bioassay was the most sensitive with an EC_{50} value of 0.87% and an EC_{10} value of 0.53% in 2023 and an EC50 value of 4.22% and an EC10 value of 3.06% in 2024. The least sensitive species was the microalgal growth bioassay with an EC_{50} value of 62% and EC_{10} value of 42% in 2023 and an EC_{50} value of 41% and EC_{10} value of 26.5% in 2024.

Table 6-21: 2023 and 2024 WET test results of Stag CPF produced water (Jacobs, 2023a; MAFRL 2025)

Test	% of produced water (2023)				% of produced water (2024)			
	EC_{10} or IC_{10}	**EC_{50} or IC_{50}**	**NOEC**	**LOEC**	**EC_{10} or IC_{10}**	**EC_{50} or IC_{50}**	**NOEC**	**LOEC**
15 min Microtox (*Vibrio fischeri*)	1.2	10.5	0.2	0.4	14.6	54.6	12.5	25
72-hour microalgal growth (*Tisochrysis lutea*)	41.9	62.5	25	50	26.5	41.0	12.5	25
72-hour macroalgal germination success (*Ecklonia radiata*)	8.66	25.2	3.1	6.3	2.37	6.93	0.8	1.6
1-hour sea urchin fertilisation success (*Heliocidaris tuberculata*)	5.1	7.9	3.1	6.3	7.9	18.4	3.1	6.3
72-hour sea urchin larval development (*Echinometra mathaei*)	4.94	9.12	1.6	3.1	3.05	7.18	0.8	1.6
48-hour oyster larval development (*Saccostrea echinata*)	3.7	4.8	3.1	6.3	8.67	13.6	6.3	12.5
5-7 day copepod larval development (*Gladioferens imparipes*)	0.53	0.87	0.4	0.8	3.06	4.22	3.1	6.3
8-day pedal lacerate development (*Aiptasia pulchella*)	3.4	4.5	3.1	6.3	26.5	44.0	50	100
7-day fish larval development (*Seriola lalandi*)	3.74	6.58	1.6	3.1	2.29	4.24	1.6	3.1

***EC_{50}** = Median effective concentration (required to induce a 50% effect); **NOEC** = No observable effect concentration (these values were used to derive trigger values); **LOEC** = Lowest observable effect concentration; Data summarised from Hydrobiology Pty Ltd (2009)*

Distributing the 2023 values using the Burrlioz SSD fitting software yielded protective concentrations of 0.8% and 0.29% PW for 95% (PC95) and 99% (PC99) species protection, respectively. Table 6-22 compares these with the same values calculated over previous years and the most recent 2024 sample (preliminary results only). The guideline values derived from the SSD in 2024 included a concentration that is protective

of 95% of species (PC95) = 1.8% and a concentration which is protective of 99% of species (PC99) = 1.3% (Table 3 9). The corresponding safe dilution derived in 2024 to protect 99% of species was 1 in 77.

Toxicity appeared to be on an increasing trend up to 2023 with PC99 (50) values decreased from 2.9% in 2018 to 0.29% in 2023, however, the 2024 sample increased to 1.3%, which is consistent with the 2020 reading.

Table 6-22 also includes the hydrocarbon concentration for each sample. There appears to be no correlation between hydrocarbon and toxicity suggesting that oil compounds are not the source of toxicity. PC99 were the same in 2020 and 2024, however TRH in 2024 was 18 mg/L whereas in 2020 it was only 0.5 mg/L. In 2023, hydrocarbon concentrations were 12.7 mg/L but PC99 values were 0.29% compared with 1.3% in 2024 when TRH was at 18 mg/L.

The elevated toxicity in 2023 is attributed to the addition of process chemicals. Chemical usage fluctuates depending on process conditions at the time but is strictly controlled under the Chemical Selection and Approval Procedure (JS-70-PR-I-00033). To account for worst case chemical usage the 2023 value of 0.29% (1:345 dilutions) was applied in the modelling to derive the mixing zone as this represents the worst case that has been derived in the last five years.

Table 6-22: Protective Concentrations (and estimated safe dilutions) estimated for Stag produced water from 2008, 2018, 2020, 2023 and 2024 WET tests

PCx	2008	2018	2020	2023	2024
TRH concentration (mg/L)	Not available	<0.25	0.5	12.7	18
PC99 (50) – 8 chronic tests	0.31% (1 in 322)	2.9% (1 in 35)	1.3% (1 in 77)	0.29% (1 in 345)	1.3% (1 in 77)
PC95 (50) – 8 chronic tests	-	4.7% (1 in 22)	2.8% (1 in 36)	0.8% (1 in 125)	1.8 (1 in 56)

6.4.2.6 Produced Water Dispersion Modelling

6.4.2.6.1 Overview

RPS (2024) presents the latest dispersion modelling for Stag using the maximum levelled out forecast discharge volume of 5,250 kL/day discharged from a pipe located 5 m above mean sea level. An option is being explored to discharge produced water through an alternative caisson which discharges below the surface, however this decision is subject to further engineering and environmental modelling before progressing. Any changes required to the EP because of this are subject to the MoC process prior to implementation (Section 8.4.3).

6.4.2.6.2 Currents around Stag

Plume behaviour is strongly influenced by currents in the receiving waters around Stag. The regular ebbing and flooding of the tide are the dominant forcing, however, wind driven currents and regional circulation provide important contributions. Tidal currents are semidiurnal with a distinct spring – neap cycle. The tide floods towards the northeast and ebbs towards the southeast with maximum current speeds of between 0.36 and 0.4 m/s. Regional currents are more variable and achieve speeds of up to 0.3 m/s during the summer and winter seasons. Directions are variable, however, are most frequently towards the west (Appendix C).

6.4.2.6.3 Near Field Dilution

Dilution in the near field is dominated by the momentum and buoyancy of the discharge, which is dictated by discharge characteristics. For Stag PW is released through a 10- inch pipe with its orifice five metres above mean sea level (Table 6-23). The water is slightly more saline but considerably warmer than the receiving waters (Section 6.4.2.4.1).

Near field modelling predicts that for all weather conditions, the discharge plume would initially plunge due to momentum and then rise and become trapped in the upper surface layers. Depending on the current speed at the time, 10 to 30 dilutions are predicted within 10 to 12 metres of release. Far field dilution will therefore be influenced by surface currents.

Table 6-23: Summary of produced water discharge characteristics

Parameter	Value
Flow rate (kL/d)	5,250
Duration	Continuous
Outlet pipe internal diameter (m) [in]	0.254 [10]
Number of Ports	1
Outlet pipe orientation	Vertical (downwards)
Discharge Depth (m)	5 (above MSL)
Discharge salinity (ppt)	38.9
Discharge temperature (°C)	52

6.4.2.6.4 Far Field Dilution

6.4.2.6.4.1 Dispersion Model

Dispersion beyond the near-field zone was predicted using the three-dimensional discharge and plume behaviour model, MUDMAP. This predicts the transport and passive dispersion of the discharged material due to local currents and dispersive forces in the water column.

The model employs a particle-based, random walk procedure. Constituents within the discharge stream are represented by a sample of Lagrangian particles. These particles are moved in three dimensions over each subsequent time step according to prevailing local current data as well as horizontal and vertical mixing coefficients.

MUDMAP treats the Lagrangian particles as conservative tracers (i.e. they are not removed over time to account for chemical interactions, decay or precipitation). Predicted concentrations will therefore be conservative overestimates where these processes do occur. Each particle represents a proportion of the discharge, by mass, and particles are released at a given rate to represent the discharge (mass per unit time). Concentrations of constituents are predicted over time by counting the number of particles that occur within a given depth level and grid square and converting this value to mass per unit volume. Dilutions are calculated from the ratios of predicted concentrations in the receiving waters to the initial concentration of the contaminant in the discharge.

The system has been extensively validated and applied for discharge operations in Australian waters for other produced water discharges (e.g. Burns et al., 1999; King & McAllister, 1997, 1998). Field studies

(Oceanica, 2015) and a dye tracer study (RPS, 2018) verified that the model was operating satisfactorily for the Stag application, with similar predicted dilutions to that observed in the field.

Modelling of sediment in the produced water was not undertaken as seabed deposition was ruled out based on the low suspended sediment concentration (<77 mg/L) and the fact that the majority of Stag particles are distributed within the coarse clay to coarse silt range (Figure 6-10) with the highest proportion in the fine silt range (2 – 6.3 microns).

According to Stokes equation, which approximates average settling velocities for perfect spherical particles, clays (<2microns) settle at less than 1.3 cm/hr and fine silts (2 – 20 microns) less than 12.7 cm/hr. Based on these settling rates and in water depths of 49 m, clays (~18%) will take more than 160 days and fine silts (~42%) will take more than 16 days to settle. Medium and coarse silts (~26 and ~12%) are predicted to take more than 38 and 4 hours, respectively to settle.

It should be noted that the Stokes equation calculations are for still waters and therefore overestimate settling rates in the ocean. Ocean currents, waves, and turbulence will disrupt the settling process, causing particles to remain suspended longer than predicted by the Stokes equation. It is likely that most sediment particles will remain in suspension almost indefinitely with only the small proportion of coarse sediment settling. Particle size analysis of seabed sediment samples collected during the 2014 marine monitoring survey (Section 6.4.2.7) showed that sand sized particles dominated with medium sand comprising the largest fraction in each of the samples. Less than 5% of particles were below the size of coarse silt suggesting that hydrodynamic conditions around Stag are not conducive for settling of the fine sediments in PW.

6.4.2.6.4.2 Deterministic model results

Figure 6-8 shows plan views of the predicted dilution of the PW plume over an 18-hour period during calm hydrodynamic conditions when tidal forces dominate. A relatively narrow plume emanates from the source and is transported towards the northwest on the ebb and southeast on the flood tide. During prolonged periods of low current speed, the plume has a more continuous appearance, with higher-concentration patches moving as a unified group. Predicted dilutions are highly variable over time, decreasing to about 300 at slack water when currents are weakest, increasing to over 1000 at mid tide when currents are strongest.

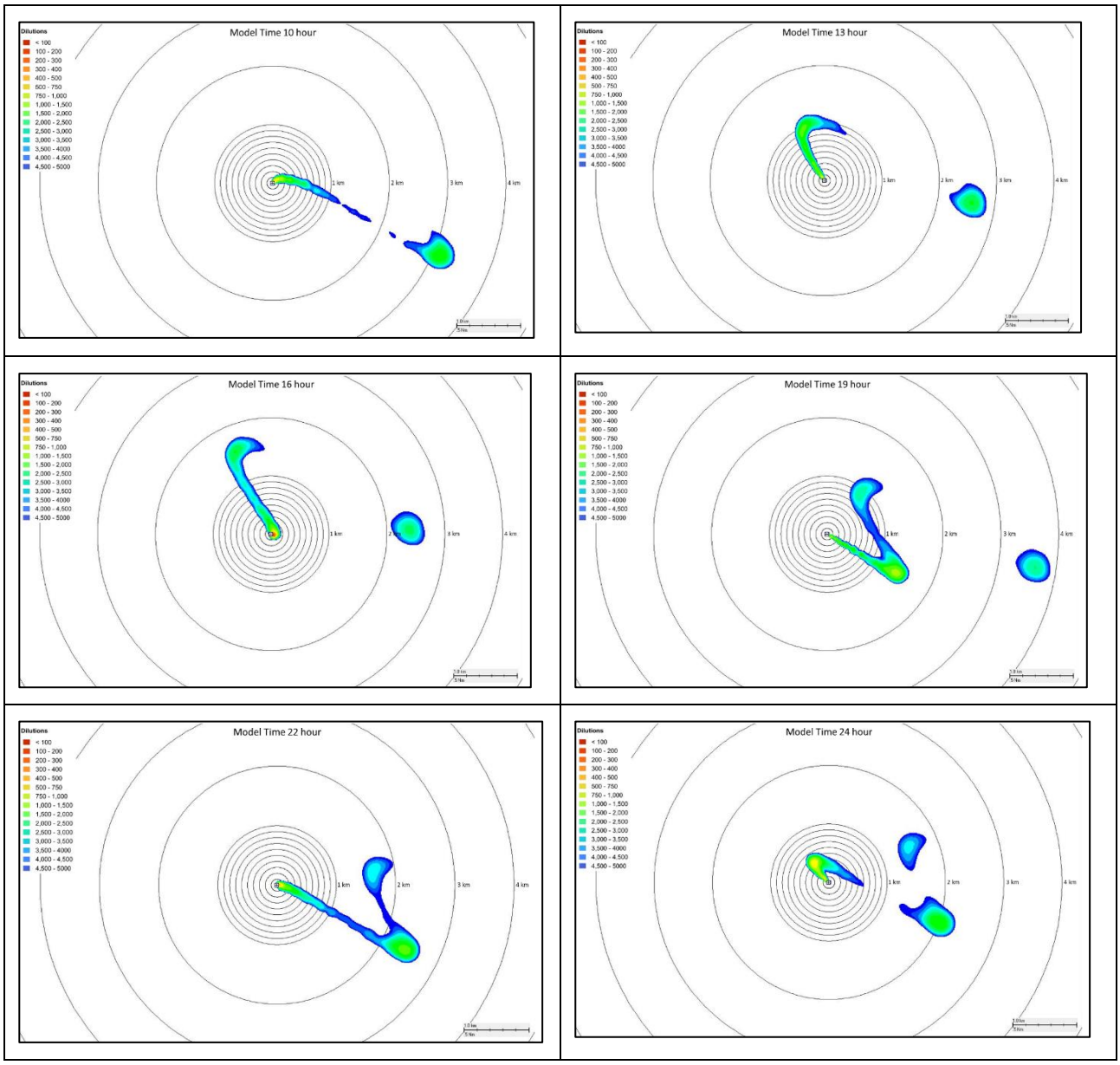


Figure 6-8: Snapshots of predicted dilution levels, at 3-hour intervals (Discharge at 5,250 kL/d flow rate).

6.4.2.6.4.3 Stochastic Model Results

A stochastic modelling procedure was applied to account for the various hydrodynamic conditions that may prevail and could affect the produced water distribution. This approach involved multiple (100) simulations of a given discharge, with each simulation representing discharge for 5 days under a different, randomly selected, sequence of current speed and direction data. These sequences were selected at random from the 10-year database of current data for the site. The initial dilution and shape of the discharge was set by the results of the near-field results described in Section 6.4.2.6.3. This methodology ensures that the calculated movement and fate of each discharge is representative of the passive dispersive forces for the range of prevailing currents that occur at the discharge location. Assumed discharge characteristics are summarised in Table 6-23.

Once the stochastic modelling is complete, all simulations were statistically analysed to map distributions of possible outcomes based on likelihood. The stochastic simulations were jointly processed annually

(100 replicate simulations). The analysis calculated the frequency of occurrence of a given dilution level, by depth and horizontal location, at surrounding locations.

Results were summarised for the average and 95th percentile dilution over time. The 95th percentile was used to set the mixing zone (Figure 6-9). This represents a dilution level that should occur at least 95% of the time (i.e. lower dilution might occur up to 5% of the time). For example, if the 95th percentile minimum dilution at a location in the model domain is predicted as a value of 100, this means that for 95% of the time the dilution level will be greater than 100 and for 5% of the time the dilution level will be less than 100. Note that the percentile figures do not represent the location of the plume at any point in time; they are a statistical and spatial summary of the percentage of time that dilution values occur across all replicate simulations and time steps.

Results showed that the release of effluent should result in rapid dispersion within the ambient environment. Threshold concentrations relating to 322 (2008 ecotoxicological result) and 345 (2023 ecotoxicological result) dilutions are predicted to be achieved within maximum distances of 45.0 m and 57 m respectively (at the 95th percentile).

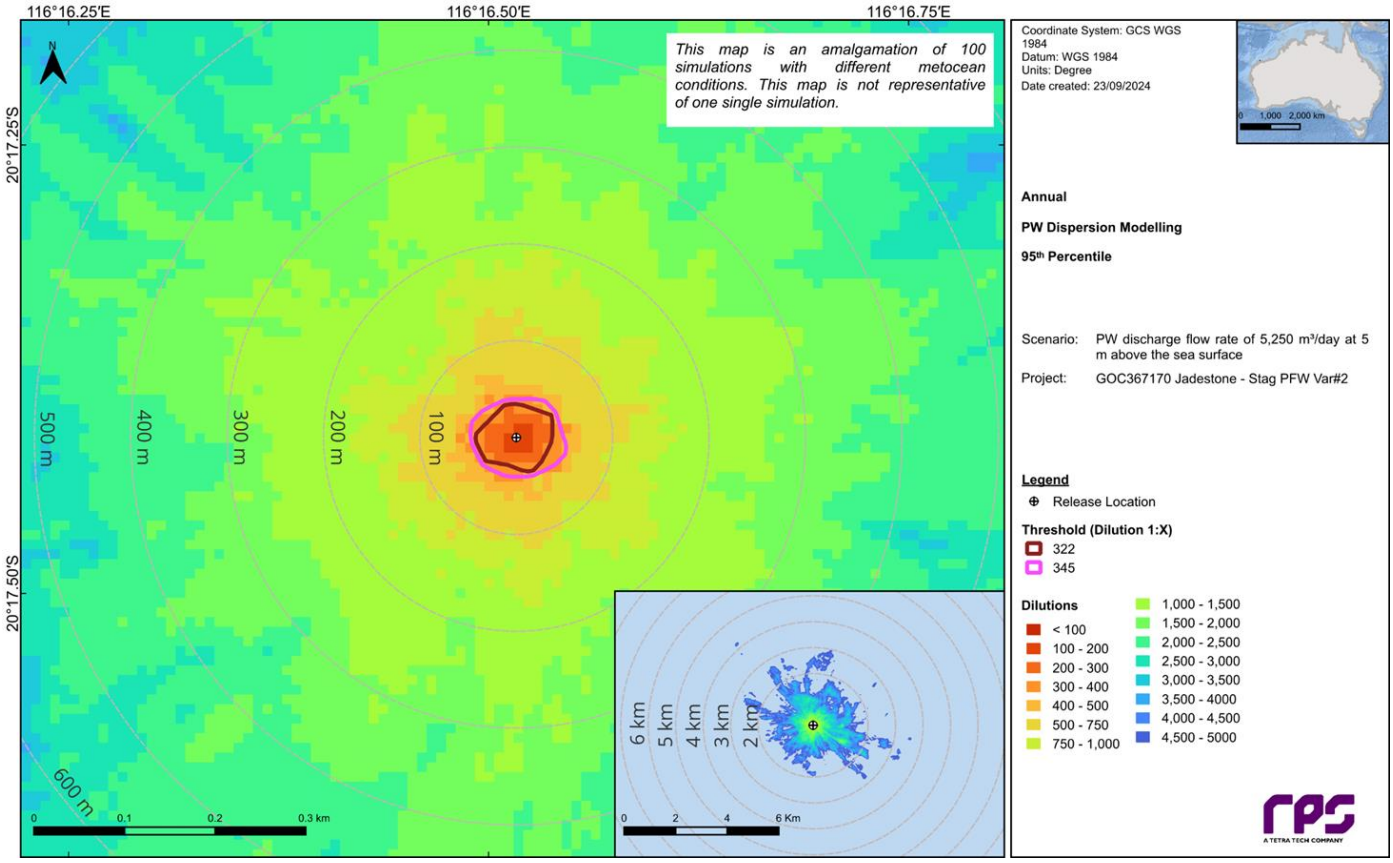


Figure 6-9: Calculation for the 95th percentile distance that may be affected by dilutions of the produced water under summer conditions

6.4.2.6.5 Mixing Zone

The mixing zone is an area around an effluent discharge where some, or all, water quality objectives may not be met. Modelling using the 95th percentile water column dilutions and the 2023 safe dilution level of 1:345 for 99% species protection (Section 6.4.2.5), gives a mixing zone of up to 57m. Although the 2024 WET testing indicates a 1:77 dilution factor, the 2023 1:345 safe dilution level derived in 2023 has been utilised to determine the mixing zone

6.4.2.7 Field Observations

Field monitoring occurred between the 2nd and 5th of November 2014 (Oceanica, 2015). This found that at a distance of ≥50 m from the discharge point, the produced water plume could not be differentiated from background based on temperature/ salinity/ dissolved oxygen/ pH characteristics. All water quality analytes were below their respective ANZECC/ARMCANZ guidelines. Slightly elevated ammonia, total phosphorus, barium and iron concentrations near the discharge point on one of four transect monitoring lines compared to the perpendicular vectors provided confidence that the sampling captured the produced water plume. Concentrations of all hydrocarbons (TPHs, BTEX, PAHs) were below the laboratory limits of reporting. Considering that these compounds could not be detected in the receiving waters suggests that they pose little risk to the environment. A dilution of 280- to 350-fold at 50–70 m from the discharge was estimated from barium levels, which is inline model predictions.

Sediments at the sampling locations were found to be of similar grain size and dominated by sand sized particles (Figure 6-10). Shells and other biota were present in the majority of samples. There was little variation in the sediment particle size distribution along the vector. Concentrations of all contaminants were below their respective ANZECC/ARMCANZ (2000) ISQG-Low and -High levels (where applicable). Zinc concentrations were elevated in the vicinity of the CPF, decreasing to background levels by 250 m from the CPF similar to previous monitoring undertaken in 2000 (IRC 2001). Lead and barium concentrations were similar to those reported in 2000, however, copper and chromium were slightly lower.

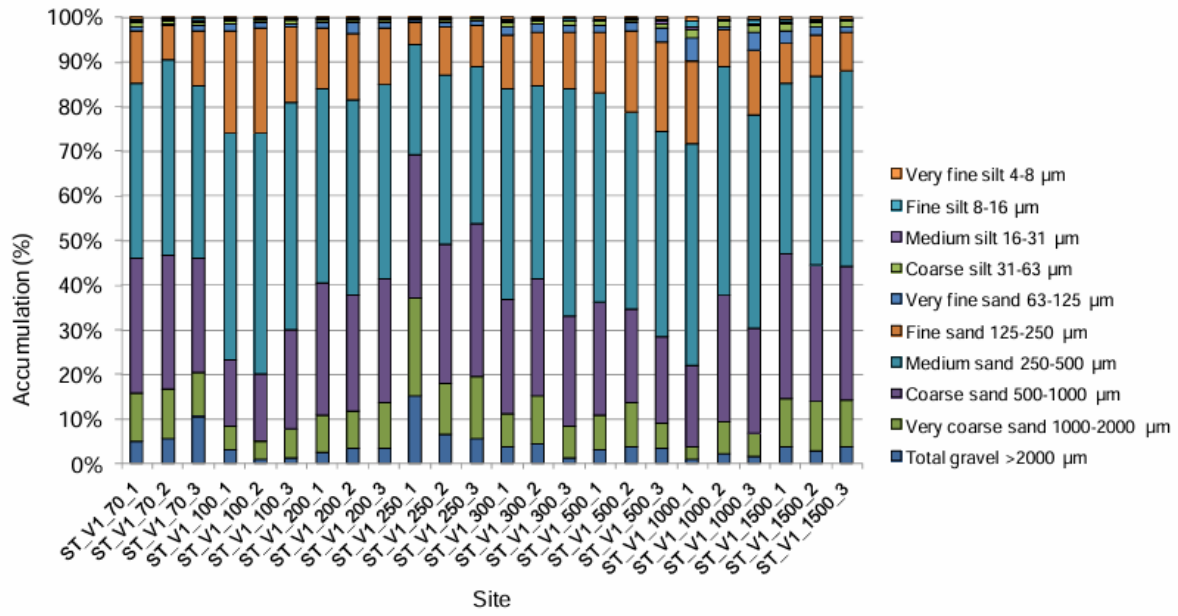


Figure 6-10: Particle size distribution of sediment collected during the 2014 marine monitoring survey (Oceanica, 2015)

The organic content of the sediments was low and at least one order of magnitude lower than recorded in 2000. All hydrocarbon concentrations were below their limits of reporting, suggesting no hydrocarbon contamination resulting from activities associated with the CPF. This is consistent with previous sediment quality monitoring at the Stag Oilfield in 2000 (IRC 2001).' Jadestone intend to undertake additional sediment sampling in 2025 to determine if there is sediment contamination above reporting limits resulting from activities associated with the CPF (refer Section 6.4.4.6).

6.4.2.8 Fate of Produced Water in the Environment

Upon discharge, contaminants in the produced water undergo a number of degradation or weathering processes, including:

- dilution;
- evaporation of volatile components;
- adsorption to particles and sedimentation;
- biodegradation; and
- photodegradation.

Collectively, these processes tend to decrease the concentration of chemicals in the produced water plume and thereby decrease its toxicity to marine organisms. Weathering is a complex process and difficult to predict with accuracy. It may produce new chemicals or result in speciation of chemicals in the mixture to forms that are more bioavailable and toxic than the original chemicals. It is acknowledged that produced water may not lose toxicity and could even increase during the weathering process (Neff, 2002). Furuholt (1996), however suggests that these transformation processes are more likely to cancel each other out for mixtures with more than five toxicants.

Biodegradation will occur over longer time scales (greater than one day) and is important for reducing possible chronic toxicity effects. A wide range of marine micro-organisms are able to utilise organic matter as an energy source in the natural environment. Low molecular weight, soluble hydrocarbons and organic acids are utilised particularly rapidly, as these classes of compounds occur ubiquitously in the environment and micro-organisms have evolved to degrade them efficiently. The importance of biodegradation in the destruction of organic chemicals in produced water plumes depends primarily on the persistence of elevated concentrations of the organic chemicals and the pre-adaptation of the local microbial community for resistance to and biodegradation of produced water chemicals (Neff, 2002). As a general rule, aliphatic hydrocarbons are more easily biodegraded than aromatic hydrocarbons (Neff, 2002).

Biodegradation experiments performed by Stromgren et al. (1995) and Roe Utvik (1996) with produced water from the North Sea showed that whilst low molecular weight aliphatic and aromatic hydrocarbons tend to evaporate rapidly from the produced water mixtures, many of the medium molecular weight aromatic hydrocarbons and phenols are biodegraded by indigenous microbiota in seawater. Higher molecular weight organic components, as well as heterocyclic compounds may be resistant to biodegradation and persistent in the plume. These compounds are lost primarily by dilution and adsorption on to suspended particles, particularly living and dead organic matter (Neff, 2002). Due to the differential rate of biodegradation the relative concentrations of the different hydrocarbons remaining in seawater after discharge will vary over time.

Experiments by Flynn et al.(1996) showed that after eight days, over 99% of phenols and PAHs were degraded, and BTEX was reduced to below detection limits. Toxicity, as measured by Microtox®, was also reduced from 8.6% PW to 100% PW, suggesting that the components responsible for the initial toxicity are readily biodegradable.

Chemical oxygen demand (COD) is a measure of the rate at which oxygen is consumed by bacterial activity in the water and thus is an indirect measure of the organic content of wastewater. COD is a measurement of the oxygen required to oxidize soluble and particulate organic matter in water. However, in the ocean where dissolved oxygen is abundant, demand is met quickly.

6.4.2.9 Produced Water Impact Mechanisms

6.4.2.9.1 Bioavailability

A contaminant can have no effect on an organism unless it is bioavailable, i.e., in a form that can move through or bind to a surface coating (e.g. skin, gill epithelium, gut lining, cell membrane) to prevent it from functioning properly. Generally, hydrocarbons in solution are most bioavailable followed by those in tissues of marine organisms or associated with liquid oil droplets (Neff, 2002). The bioavailability of hydrocarbons decreases sharply with increasing carbon chain length and molecular weight.

Metals and higher molecular weight hydrocarbons are known to adsorb onto the surface of clay and silt particles forming strong chemical and physical bonds. In this state contaminants attached to sediment are not expected to be bioavailable. Stag's PW chemical characterisation and WET testing is undertaken on unfiltered samples and the results are therefore applicable to the bioavailable fraction from all phases, including sediment.

6.4.2.9.2 Bioaccumulation

Aquatic biota does not only degrade pollutant chemicals, but they may also accumulate them. Bioaccumulation is the uptake and retention of bioavailable chemicals from any one of, or all possible external sources (water, food, substrate, air). For bioaccumulation to occur, the rate of uptake from all sources must be greater than the rate of loss of the chemical from the tissues of the organism. The bioaccumulation factor (BAF) is the ratio of the concentration of the chemical in the tissues of the organism to its concentration in all ambient environmental compartments in equilibrium with the organism.

6.4.2.9.3 Trophic Transfer

Marine animals can bioaccumulate most bioavailable forms of metals and organic contaminants from their food. Bioaccumulation of chemicals from food is called trophic transfer. Biomagnification is the process whereby a chemical, as it is passed through a food chain or food web by trophic transfer, reaches increasingly higher concentrations in the tissues of animals at each higher trophic level. The biomagnification factor (BF) can be defined as the ratio of the concentration of a contaminant in the tissues of the consumer to its concentration in the food.

6.4.2.9.4 Hydrocarbon taint

Elevated hydrocarbon levels in fish flesh have the potential to impact humans if affected fish species are targeted by fisheries. When present in foods, petroleum hydrocarbons stimulate an olfactory response in humans that causes a tainting of flavour or taste. Connell and Miller (1981) compiled a summary of studies listing the threshold concentrations at which tainting occurred for hydrocarbons. The results contained in their review indicate that tainting of fish occurs when fish are exposed to ambient concentrations of 4–300 ppm (mg/L) of hydrocarbons in the water, for durations of 24 hours or more, with response to phenols and naphthenic acids being the strongest.

6.4.2.9.5 Accumulation of contaminants in sediments

If produced water is discharged to shallow estuarine and marine waters, some metals and higher molecular weight aromatic and saturated hydrocarbons may accumulate in sediments near the produced water discharge, possibly harming benthic communities (Neff et al. 2011).

Heavy metals are known to adsorb onto clay and silt sediments through several mechanisms (National Research Council, 2003). For Stag PW, chemical characterisation has shown that dissolved and total heavy metals (which include metals attached to sediment) are present in low concentrations requiring minimal dilution to achieve guideline values.

Barium and iron were observed at slightly elevated levels compared to natural seawater. According to Neff et al. (2011), speciation occurs following the ocean discharge of produced water, in which these metals precipitate rapidly when produced water is discharged to well-oxygenated surface waters containing a high natural sulfate concentration. However, precipitation of barium and dilution of the resulting barite in the produced water plume are rapid enough that dissolved barium concentrations rarely exceed acutely toxic concentrations.

For dissolved iron, Neff et al. (2011) states that it precipitates rapidly as oxyhydroxides when the anoxic produced water plume mixes with oxygen-rich receiving waters. The extremely fine-grained iron and manganese oxides adsorb to or co-precipitate with several other metals from the produced water plume. These particulate metals tend to settle slowly out of the water column and accumulate to slightly elevated concentrations in surficial sediments over a large area around the produced water discharge.

Neff et al. (20011) goes on to state that current results from regulatory environmental effects monitoring programs generally show that natural dispersion processes appear to control the concentrations of toxic metals in the water column and sediments just slightly above natural background concentrations. Seabed sediment monitoring undertaken around Stag in both 2000 (IRCE 2000) and 2014 (Oceanica (2015) found metals to be below guideline threshold values.

Higher molecular weight aromatic and saturated hydrocarbons are also known to adsorb onto silts and clays through hydrophobic interactions and attractive, non-covalent interactions between aromatic rings (National Research Council, 2003). Phenols and organic acids can also interact with clay particles. These compounds can form hydrogen bonds with the hydroxyl groups on the clay surface, enhancing their adsorption. The presence of cations like calcium and magnesium in produced water can facilitate the adsorption of organic acids by forming cation bridges between the clay surface and the organic molecules.

Through its operational monitoring program, Jadestone has observed that the OIW concentration measured by the manual method offshore is sometimes greater than that measured by the online analyser. It is unclear whether this is due to oil adsorbed onto sediment particles or if the manual method is measuring additional organic matter not being picked up through the online spectrophotometer. Chemical characterisation indicates the presence of higher molecular weight aliphatics but no aromatics, the compounds of most concern in PW. It is possible that some of the aliphatics are attaching to the sediment. This being the case, sediment may provide a pathway to the seabed.

Clay and silt particles discharged with Stag PW are predicted to remain in suspension and dilute rapidly with the soluble plume. They will settle slowly and selectively depending on particle size. Particle sorting will further reduce water column concentrations. Only a very small proportion of the coarser sediment sediments in Stag PW are predicted to reach the seabed (refer Section 6.4.2.4.1, Figure 6-7). Distributions will be over a wide area so concentrations will be extremely low. Seabed sediment monitoring undertaken around Stag in both 2000 (IRCE 2000) and 2014 (Oceanica (2015) found no hydrocarbons in sediments. This study will be repeated in 2025 and additional work is proposed to gain further understanding and resolve any uncertainty on the impact of oil attached to sediment (see Section 6.4.4)

6.4.2.10 Impact to environmental receptors

Impacts to environmental receptors from the Stag produced water discharge are acceptable for the following reasons:

- The concentration of OIW discharged is limited to 30 mg/l.
- The volume of PW is limited to 5,250kL/day .
- Detailed analysis of the chemical composition has shown that the produced water is devoid of aromatic hydrocarbons, and heavy metals are either below reporting limits or at low concentrations (Section 6.4.2.4).
- Highly sensitive chronic ecotoxicological tests have been used to determine safe dilution levels and these show low toxicity (Section 6.4.2.5)
- The discharge is into open tidal waters with high rates of dilution. High rates of dilution will rapidly reduce the concentration of contaminants in the plume to levels well below concentrations that could possibly result in environmental harm.
- Exposure of free floating and motile organisms to the produced water plume will be low. Marine mammals and reptiles are highly mobile and can move in/out of the narrow plume so the duration of exposure to contaminants is low.

- Hydrocarbons and other organic compounds are ultimately removed from the system through bio – and photo – degradation, which reduces them to their constituent parts (mainly carbon dioxide and water).
- The receiving waters are well flushed so build-up of contaminants is not possible.
- Sediment particles in the produced water are predominately clay and silt size (refer Section 6.4.2.4.1) and. These are predicted to remain in suspension for long durations and will therefore disperse widely. The 2014 field observation found concentrations of all contaminants in sediments were below their respective guideline values.

The likely impacts on individual receptors is provided below.

6.4.2.10.1 Plankton

Plankton have patchy distributions linked to localised and seasonal productivity that produces sporadic bursts in populations (CoA, 2015c). Components of the plankton that could be impacted by produced water include micro-invertebrates; eggs; larvae of invertebrates and fish. Acute effects include lysis of single-celled organisms and narcosis of motile invertebrates leading to impaired swimming ability. There are no nearby hard coral areas that would suggest that impacts from produced water on hard coral eggs and larvae would occur during coral spawning season (peaking in March/April).

Exposure of free floating and motile plankton to the produced water plume will be low (Figure 6-9) with only organisms residing directly in the plume that could possibly be impacted. This would constitute an insignificantly small proportion of the regional population and is negligible compared to natural mortality rates.

Worst-case, a freely floating organism passing directly under the discharge would be exposed to the peak concentration. This organism would then be transported within the plume, but contaminant concentrations would be continually decreasing as the plume disperses over time. Based on a low current speed (0.16 m/s) it is conservatively estimated that the exposure period to peak concentrations would be less than one minute, an insufficient time to illicit an acute or chronic impact. Motile organisms might move in and out of the plume but exposure periods to concentrations above predicted no effect concentrations (PNEC) are brief and unlikely to be at levels which would harm the organism or result in bio – accumulation or magnification.

Impacts to plankton from produced water discharged during the activity is considered negligible.

6.4.2.10.2 Marine Mammals and Reptiles

Larger mobile pelagic species such as marine mammals and marine reptiles are expected to be subjected to very low levels of chemicals for a very short time if they swim near the discharge plume. As transient species, they are not expected to experience any chronic or acute effects. Uptake of dissolved hydrocarbons is also less likely since these animals are air breathing and do not possess gill structures that promote cellular uptake of dissolved constituents.

The bioaccumulation/ biomagnification risk to these animals or the impact pathway is through the food chain. This is unlikely as hydrocarbons or other contaminants within the produced water discharge are so low and vertebrates have the ability to metabolise and excrete the type of chemicals that contribute most to the risk.

Impacts to marine mammals and reptiles from produced water discharged during the activity is considered negligible.

6.4.2.10.3 Invertebrates

Larger pelagic invertebrates (e.g. jellyfish, squid, salps) will be present around the Stag Facility. These are expected to be mobile and while they may be exposed to produced water, effects will be short-term, and recovery will be rapid for the same reasons given above for plankton.

Bioaccumulation of hydrocarbons (e.g. PAHs) and metals is most likely to occur in sessile invertebrates attached to the CPF sub-structure close to the discharge location. These faunae experience the greatest exposure to produced water which could lead to uptake of dissolved constituents (e.g. volatile, low molecular weight hydrocarbons such as BTEX hydrocarbons) across cellular structures or ingestion (filter feeding) of higher molecular weight hydrocarbons (e.g. PAHs) or precipitated metals which may be bound to organic particulate matter. This impact would therefore be highly localised and particular to organisms attached to the CPF sub-structure within the produced water discharge plume. This is unlikely to be an issue for Stag as contaminant concentrations in produced water are low (Section 6.4.2.4) and dilution rates high (6.4.2.6).

Impacts to invertebrates from produced water discharged during the activity is considered negligible.

6.4.2.10.4 Benthic Habitat and Communities

Benthic habitats and communities include infauna within sediments such as polychaetes and other worms, molluscs and crustaceans while sessile and mobile epifauna may include crustaceans, cnidarians, molluscs associated with sediments. No sensitive or protected benthic habitat or species, including commercial invertebrate species, are present.

The produced water plume is discharged above the sea surface and is predicted to disperse rapidly within the upper water column and not interact with the seabed (refer refer Section 6.4.2.4.1). Chemical analysis of the sediment at seabed has demonstrated that higher molecular weight PAHs that are known to sorb onto clays and silts, were either below the limit of reporting, or required minimal dilution to achieve 99% species protection guideline values (ANZG, 2018). Heavy metals and radioisotopes; were also ether below the limit of reporting, or required minimal dilution to achieve 99% species protection guideline values (ANZG, 2018)

Impacts to benthic habitat and communities from produced water discharged during the activity is considered negligible.

6.4.2.10.5 Fish

Fish are commonly associated with offshore structures and therefore higher abundances are likely to occur around the CPF than in surrounding open waters, especially given the surrounding habitat of flat sediments in depths >50 m. Impacts to pelagic fish are likely to be caused by exposure to dissolved hydrocarbons or metals across gill structures, although impacts could also occur through ingestion of hydrocarbon droplets. Benthic (demersal) fish could be impacted from the ingestion of sediment particles or precipitated metals on and above sediments, although sediment sampling below the CPF did not detect the presence of hydrocarbons or metals (IRCE 2001; Oceanica 2015), leading the authors to conclude that there would be little risk to the environment.

Pelagic fish resident to the platform might move in and out of the plume (Figure 6-9) but exposure periods to concentrations above predicted no effect concentrations (PNEC) are brief and unlikely to be at levels which would harm the organism or result in bioaccumulation or biomagnification. The elimination of PAH compounds is generally very efficient in fish and other vertebrates and bioaccumulation within these taxa do not generally reflect their level of exposure (van der Oost et al. 2003).

Chemical characterisation of Stag produced water did not detect aromatic hydrocarbons and heavy metals were either below, or required minimal dilution to achieve, 99% species protection guideline value (ANZG, 2018). The infield model validation monitoring study (Oceanica 2015) found that concentrations of all hydrocarbons (TPHs, BTEX, PAHs) measured in marine waters were below the laboratory limits of reporting.

Impacts to fish from produced water discharged during the activity is considered negligible.

6.4.2.10.6 Commercial fisheries

Commercially targeted fish and shellfish have wide oceanic habitat ranges and are not harvested within 500m from the platform. For the actively fished commercial fisheries in the area, the approved fishing area is extensive and gazetted for the purposes of flexibility and boundary simplicity, rather than being a true

representation of where catch and effort is undertaken. Although the habitat within the operational area may represent suitable habitat for some of the commercial species (Table 3-6), fishing effort for these species will be focussed on areas of most suitable habitat and away from constraints such as infrastructure.

Impacts to commercial fisheries from produced water discharged during the activity is considered negligible.

6.4.2.10.7 EPBC species

A 1 km radius from the Stag Facility (double that of the 500 m restricted zone of the Facility) was used to conduct the EPBC MNES search (Appendix D). The search found 35 species (threatened and/or migratory) that may occur within the area (Table 3-1). The facility is located within Biologically Important Areas (BIAs) for the humpback whale (migration north and south), wedge tailed shearwater (breeding) and Flatback turtle (internesting buffer, Figure 3-11). The Whale Shark BIA is approximately 8 km from the 1 km search area boundary.

Flatback BIA (internesting areas)

The BIA area for flatbacks is thought to be for inter-nesting. Although there may be transient individuals (Section 3.2) most females internest close to their nesting beaches, typically in shallow (0–10 m) nearshore waters of their nesting beach (Chevron 2008) – unlike the depth of the operational area. The Stag Facility is in 49 m depth, and the nearest significant nesting beaches are 32 km away at Dampier Archipelago.

Sperling et al. (2010) concluded that flatback turtles do not feed during the inter-nesting period which greatly reduces the risk of bioaccumulation/ biomagnification. However, if individuals were likely to use this area as foraging grounds, outside of nesting season it would represent an insignificant percentage of all available nesting grounds and not significantly affect individuals or population.

'Management of oil spills and operational discharges' is identified as an action in the Turtle Recovery Plan (DoEE 2017). However, the total size of the BIA for Pilbara flatbacks is 35,758,776 km^2. The areas that may potentially be affected by produced water discharges (water quality a 57 m radial extent largely limited to the top 1 m of water column) represents less than 0.01% of the total area of the BIA.

Wedge tailed shearwater

The wedge tailed shearwater breeds on the east and west coasts of Australia on offshore islands. The species is common in the Indian Ocean. The species BIA (foraging areas) overlaps the Stag Facility and produced water discharge area (Section 3.2). However, when foraging at sea, birds are often alone or in small groups and are unlikely to be impacted by change in water quality associated with the produced water discharge plume in the surface metre of the water column. Additionally, like with the turtles BIA, the proportion of foraging area likely to be impacted by produced water discharges (a 57 m radial extent from the discharge point in the top 1 m) is minimal.

Whale Sharks

The whale shark BIA is approximately 9 km from the Operational Area (Figure 3-3). As such it is reasonable to expect individuals to pass through the area. Whale sharks spend most of their time in deeper waters, and would avoid the surface produced water plume, however it may have a small indirect effect on plankton which is a food source for whale sharks (Meekan 2008). The predicted small scale of the area of impact however suggests that exposure impacts (sub-lethal or lethal) from produced water is not likely to significantly impact whale shark food sources (as described above in impacts to fish).

The Conservation advice for the whale shark identifies habitat disruption from the resource sector as a minor threat to the species (SPRAT Whale shark, DEE 2017as). However as described above, the release of produced water 9 km from the nearest point of the whale shark BIA is not likely to have any impact on the species or habitat used by the species.

Pipefish and seahorse

Although the PMST report found sygnathid 'species or species habitats may occur in the area' – there is no record of them actually occurring. Knowledge about the distribution, abundance and ecology of both

syngnathids and solenostomids is limited (DSEWPaC 2012). Almost all syngnathids live in nearshore and inner shelf habitats, usually in shallow, coastal waters, among seagrasses, mangroves, coral reefs, macroalgae-dominated reefs, and sand or rubble habitats (Dawson 1985; Lourie et al. 1999, Lourie et al. 2004; Vincent 1996). In tropical areas species are primarily found among coral reefs (Foster & Vincent 2004; Scales 2010). Given the substrate observed in the produced water EMBA was predominately soft sediments it is considered unlikely for any of these species to be observed in the area.

As described in Section 6.4.2.9, contaminant levels from produced water discharge are not considered at a level that would impact on marine organisms such as syngnathids. This is supported by (DSEWPaC 2012) which lists oil pollution from rigs as 'of least concern' to the species.

6.4.3 Environmental Performance

Hazard		Produced Water Discharge		
Performance outcome		**No detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone).**		
ID	**Control Measure**	**Performance Standard**	**Measurement Criteria**	**Responsibility**
Monitoring of OIW concentration in produced water				
020	Discharge of produced water is monitored and recorded in spec as per Measurement, Management and Reporting of Produced Water (GA-19-PR-P-00006) to not exceed OIW concentration of 30 mg/l [1]	Produced water is treated so that the OIW concentration[10] in the overboard discharge does not exceed 30 mg/l daily	Production records (e.g. P2 Explorer or laboratory records) confirming OIW daily average limits are not exceeded	Production and Maintenance Supervisor
021		Produced water discharge shall not exceed 5,250 kLday	Production records (e.g. P2 Explorer) confirm produced water discharge limit is not exceeded.	Production and Maintenance Supervisor
022		OIW concentration is monitored via an inline analyser and verified by manual sampling[2] minimum twice daily (≥once per shift).	Laboratory records of manual sampling	Production and Maintenance Supervisor
023		If the OIW concentration exceeds 30 mg/l as measured by the inline analyser, overboard discharge is automatically ceased within 10	CCR logs recording of in-boarding events if the OIW concentration exceeds 30 mg/l	

[1] The calculation of mg/L to ppm is 1, therefore <30 mg/l is measured as <30 ppm by in line meter.

[10] This refers to the oil in water and not any oil that may be on sediment particles which is addressed separately in Section 6.4.4

[2] OIW concentrations in manual sample and inline analyser measurement at same time are compared within one hour of manual sampling results being available. Manual sampling includes analysis of sample. There is an allowance of 6mg/l deviation which accounts for +/-1 mg/l variance from the inline analyser and +/-5 mg/l on the laboratory equipment.

Hazard		Produced Water Discharge		
Performance outcome		No detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone).		
ID	Control Measure	Performance Standard	Measurement Criteria	Responsibility
		minutes of detection unless the manual sample confirms OIW concentration is <30mg/l.		
024		If the OIW concentration exceeds 30 mg/l as measured by the manual sampling, overboard discharge is ceased within 5 minutes of sampling result.	CCR logs recording of in-boarding events if the OIW concentration exceeds 30 mg/l	
025		If OIW concentration measured by manual sampling exceeds 25mg/l, then the frequency of manual sampling will be increased to every 2 hours to verify OIW concentration.	Manual sampling records (e.g. laboratory reports)	
026		If the inline analyser is not operational[11],or manual sampling reading is greater than 6 mg/l difference compared to inline analyser the frequency of manual sampling will be increased to three times per shift (every four hours) until the inline analyser is operational and sample is <6mg/l difference from manual sampling.	Manual sampling records (e.g. laboratory reports) and CCR logs	Production and Maintenance Supervisor
Measurement of Produced Water components				
027	Measurement, Management and Reporting of Produced Water (GA-19-PR-P-00006)	Produced water chemical characterisation shall be repeated at least once per year to confirm that the discharge does not exceed the marine water quality guidelines for protection of 99% of species (ANZG (2018) beyond the mixing zone.	Annual report provides characterisation of the Produced Water	Environment Lead

[11] Non operational = the analyser is offline, in fault or providing erroneous readings

Hazard		Produced Water Discharge		
Performance outcome		**No detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone).**		
ID	**Control Measure**	**Performance Standard**	**Measurement Criteria**	**Responsibility**
028		WET testing of produced water discharge shall be repeated once every two years (last undertaken in 2024) and include oil on sediment sampling. If the Safe Dilution level for 99% species protection exceeds 345 the discharge of produced water shall be reduced to a level such that the dilutions are met within the defined mixing zone. The root cause of the increase shall be determined, and corrective actions put in place.	WET Testing results Completed investigation process	Environment Lead
029		In situ marine water quality monitoring shall be undertaken once every five years (next planned 2025) to check contaminant concentrations against ANZG (2018) guideline values.	Marine water quality report	Environment Lead
030		In situ marine sediment quality monitoring shall be undertaken once every five years (next planned for 2025) to check contaminant concentrations against ANZG (2018) guidelines.	Marine sediment quality report	Environment Lead
Calibration[3] and Maintenance				
031	Equipment is successfully maintained and calibrated as	CPF laboratory spectrophotometer calibrated weekly as per Preparation of OIW Standards and Calibration of Spectrophotometer (GA-19-PR-P-	Completed calibration records Work orders for repair/replacement if required	Production and Maintenance Supervisor

[3] For noting, successful calibration for all instruments listed in this section of the performance table used for measurement of produced water discharges is assumed to be achieved if the instrument accepts the reading of the calibration standard and does not reject the standard measurement, notified by the instrument as an error. This is as per the calibration procedure provided by the vendor of the instrumentation

Hazard		Produced Water Discharge		
Performance outcome		No detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone).		
ID	Control Measure	Performance Standard	Measurement Criteria	Responsibility
	per GA-19-PR-P-00027 and GA-19-PR-P-00006	00027). If calibration unsuccessful, raise work order for repair/ independent calibration.		
032		A spare laboratory OIW analyser is available in the event that one fails, to ensure that OIW analysis can be undertaken and prevent discharges of OIW above the discharge limit	Bassnet records show backup laboratory OIW analyser maintained and available	Production and Maintenance Supervisor
033		Servicing (including calibration, inspection, testing and maintenance) of the inline analyser undertaken as per the CMMS, and approved by the relevant technical authority to ensure it maintains accurate results	Records demonstrate service completed and any work order raised for repair or replacement	Production and Maintenance Supervisor
034		Critical spares for the inline analyser identified by the manufacturer are maintained and available to Jadestone as listed in Bassnet allowing quick replacement of equipment	Bassnet records show spares maintained and available	Production and Maintenance Supervisor
035		Servicing (including calibration, inspection, testing and maintenance) of the laboratory spectrophotometer undertaken as per Jadestone's CMMS and approved by the relevant technical authority to ensure it maintains accurate results	Calibration records demonstrate calibration completed, and any work order raised for repair or replacement	Production and Maintenance Supervisor
Producing and processing				
036	Chemicals selected for discharge in produced water in accordance with the Chemical	Production chemicals to be assessed and approved for use before application according to the process detailed in the Procedure. Chemicals planned for discharge to sea are	Approval record of all production chemicals	Production Superintendent Environment Lead

Hazard		Produced Water Discharge		
Performance outcome		No detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone).		
ID	Control Measure	Performance Standard	Measurement Criteria	Responsibility
	Selection and Approval Procedure (JS-70-PR-I-00033)	• Gold/Silver/D or E rated through OCNS, or • PLONOR substances listed by OSPAR, or • have a complete risk assessment justifying the use of the chemical including (where applicable) consideration of OCNS substitution warnings, alternative chemicals, technical/process/HSE justifications, dosage rates and periodic review. If there is a potential for increased toxicity in the produced water discharge, then a chemical trial will be undertaken to determine the potential change in toxicity of the discharge and assess the significance of the change (including if the acceptable level is still achievable) Process chemicals shall be reviewed and assessed annually to determine any changes in the OCNS rating, SUB warnings or risk assessment assumptions.		
037	Chemical Dosing – Process Chemicals GA-19-PR-P-00015 Rev 0 Chemical Testing Frequency Reporting GA-19-PR-P-00001 Rev 3.01	Dosage rates of process chemicals shall not exceed the approved maximum allowable concentration or discharge rates specified in the Selection and Approval Procedure (JS-70-PR-I-00033) Daily chemical usage shall be calculated and recorded. Chemical usage shall be checked against target injection rates monthly.	Laboratory records show daily chemical usage and injection rates Monthly report shows approved maximum allowable concentration or discharge rates and actual dosage	Production Superintendent

Hazard		Produced Water Discharge		
Performance outcome		**No detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone).**		
ID	**Control Measure**	**Performance Standard**	**Measurement Criteria**	**Responsibility**
038	Adaptive management triggers (Section 6.4.4) are implemented as per the developed Produced Water Monitoring and Adaptive Management Program for Stag (Jadestone 2024).	PW management includes monitoring for changes that may trigger the adaptive management including daily and monthly laboratory reporting and review of sediment and water quality reports	Daily laboratory report shows inboarding events and discharge volumes Monthly report shows anomalies, trends and summaries Routine monitoring reports	

6.4.4 Monitoring and Adaptive Management Program

6.4.4.1 Overview

Jadestone has developed a Produced Water Monitoring and Adaptive Management Program for Stag (Jadestone 2024). This applies the Australian & New Zealand guidelines for fresh and marine water quality (ANZG, 2018) and aligns with the principles of the National Water Quality Management Strategy (CoA, 2018). Its objectives are to:

1. Provide indicators of potential impacts from produced water discharges to the marine environment.
2. Confirm through field-based monitoring of water and sediment quality that the risk from produced water is as predicted.
3. Describe the adaptive management process that will be applied should results from the monitoring exceed trigger values, including the steps that will be taken to ensure impacts and risks remain within acceptable and ALARP levels.

Figure 6-11 presents the relationship between environmental values and the monitoring studies undertaken. Environmental values refer to the critical uses or features of the environment that are important for a healthy ecosystem and require protection from the effects of pollution, waste discharges and deposits (ANZG, 2018). For Stag, the relevant values identified are ecosystem, cultural and spiritual integrity.

The key elements for maintaining ecosystem integrity are water quality, sediment quality, and ecosystem processes (EPA, 2016[12]). Limiting changes to these elements to acceptable levels will conserve ecological integrity and by extension, cultural and spiritual values will also be preserved. Primary indicators used to assess potential impacts are chemical contaminants, physio-chemical stressors and biological indicators. Trigger values have been defined for each indicator and are monitored to detect change. Trigger values serve as an early warning that potential changes beyond acceptable limits may occur.

The acceptable limits of change are no impacts from PW beyond the approved mixing zone. To determine if acceptable limits have been exceeded, routine monitoring of trigger values is undertaken. An approved mixing zone protects 99% of species, as calculated using the Warne et al. (2018) statistical distribution methodology on the results of WET Testing using sublethal chronic endpoints. The protection of 99% of species maintains a high level of ecological protection and represents no detectable change from natural variation (ANZG 2018).

The approved mixing zone boundary for Stag is 57m (Section 6.4.2.6.5). The justification for this limit of change being ‘acceptable’ is provided in the impact assessment section.

[12] In the absence of any Commonwealth guidelines, the State waters Technical Guidance: Protecting the quality of Western Australia’s marine environment (EPA, 2016) has been considered and is consistent with the principles of the National Water Quality Management Strategy.

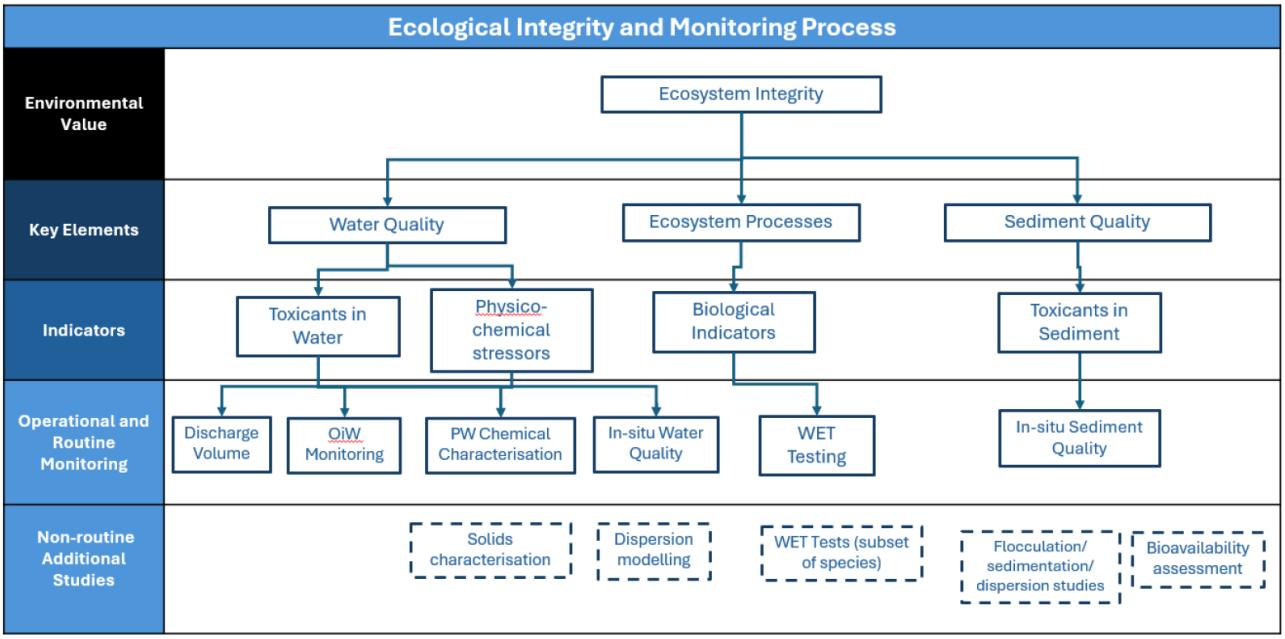


Figure 6-11: Ecosystem integrity and monitoring relationship

6.4.4.2 Operational Monitoring

Operational monitoring involves the continuous measurement of discharge volumes, oil-in-water (OIW) concentrations and chemical injection rates. Discharge volume is measured by a flow meter and oil in water concentration by an online analyser. Data are transmitted to the control system and recorded in the P2 explorer database.

If OIW concentrations exceed 30 mg/L, an alarm is activated in the central control room and overboard discharge is automatically ceased after a 10 minute time delay, to allow for manual sampling. If the manual sample confirms OIW concentration is <30mg/l, the automatic in boarding can be reset and produced water discharge can continue, with increased frequency of laboratory sampling. If oil in water concentrations are confirmed by manual samples to exceed 30 mg/L the discharge is diverted inboard to slops tank T412 and/or T411.

The control system provides real-time visibility, enabling operators to make manual or automated adjustments to the process or respond to alarms (e.g., high OIW specification). Data are accessible onshore for further analysis and trend monitoring. It should be noted that the OIW concentration refers to the oil dissolved in the water and does not account for the sediment which may have oil attached, this is measured separately (refer Table 6-28).

Continuous OIW monitoring is backed up by a minimum of twice daily manual samples analysed in the offshore laboratory using calibrated equipment). Results are stored in Stag Laboratory Routine Analysis Data Sheets for subsequent analysis. Laboratory records also store daily chemical usage and injection rates and the monthly laboratory report shows approved maximum allowable concentration or discharge rates and actual dosage.

Records are reviewed monthly and chemical usage checked against target injection rates. Reports are also reviewed monthly for anomalies that may require reporting or further investigation.

Table 6-24: Operational Monitoring

Program	Operational monitoring	
Objective	To measure OIW concentrations, discharge rate and process chemical injection rates for regulatory compliance purposes.	
Monitoring frequency	• OIW inline analyser – continuous monitoring • OIW Manual sampling and analysis – refer to the Environmental Performance Standard for frequency • Produced water discharge rate – continuous monitoring • Process chemical injection rates – routinely monitored and analysed monthly.	
Sampling location	PW manual sampling point prior to entering discharge pipe	
Parameters	OIW, discharge rate and process chemicals	
Triggers and Adaptive Management	**Triggers**	**Adaptive Management**

	Extended operation with elevated daily average OIW levels (>25mg/L) or increased frequency of in-boarding events (>2/day)	Operation modifications, including:
		• Reservoir management to identify well(s) producing high levels of emulsion
		• Adjust chemical injection strategy to optimise OIW concentrations (within the limits specified in the Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033)
		• Modify operating strategy to improve separation performance such as:
		  ○ Increase frequency of vessel sparging
		  ○ Adjust separator levels to improve residence time
		  ○ Improve heat transfer to aid OIW separation.
		  ○ Discharge additional quantity of off-spec produced water via disposal well

	Maximum forecast discharge volume approaching 5,250 kL/day (Section 6.4.3.3)	Manage reservoir production such that PW discharge rate remains below the maximum specified.
	Exceedance of chemical dosage used in the Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033)	Immediate reduction in the chemical dosage rates to those specified in the Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033). Revaluate limits in accordance with the Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033)
	Difference between OIW measured by manual sample and inline analyser greater than 6 mg/L	Conduct calibration of online analyser as per vendor recommendations Verify lab analyser is operating within specification (calibration) Mobilise OIW vendor if required to rectify discrepancy

6.4.4.3 Routine Monitoring

Routine monitoring involves:

- Chemical characterisation
- Whole of effluent toxicity testing; and
- Field water and sediment quality monitoring.

These studies will be undertaken during normal operating conditions and are summarised below. All analysis is undertaken by third party, independent, NATA accredited laboratories. Full analytical methods, thresholds and trigger values are detailed in the Produced Water Monitoring and Management Framework document (Jadestone 2024).

6.4.4.4 Chemical characterisation

Chemical characterisation is undertaken to monitor for changes in the composition of the produced water. The program is summarised in Table 6-25. Chemical characterisation of Stag produced water has been undertaken biannually since 2011 with results from the last five years presented in Section 6.4.2.4. Given the consistency of the results, this study will be undertaken annually going forward (or when deemed necessary through adaptive management response).

Table 6-25: Chemical characterisation monitoring

Program	Produced Water Chemical Characterisation	
Monitoring frequency	Annually or when determined through adaptive management response	
Sampling location	PW manual sampling point prior to entering discharge pipe	
Parameters	• Total dissolved solids (TDS); • Turbidity (NTU), pH and salinity; • Total suspended solids (TSS); • Nutrients (Ammonia, nitrate-nitrite, orthophosphate, total nitrogen and total phosphorus) • Organic carbon (total and dissolved); • Biological/Chemical oxygen demand (BOD/COD); • Filtered and unfiltered metals/metalloids (silver (Ag), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), copper (Cu), Iron (Fe), mercury (Hg), manganese (Mn), nickel (Ni), lead (Pb), strontium (Sr), and zinc (Zn); • Total recoverable hydrocarbons (TRHs); • Benzene, toluene, ethylbenzene, xylenes (meta-, para- and ortho-xylene) (BTEX); • Polycyclic aromatic hydrocarbons (PAHs); • Phenols (total and speciated); • Organic acids (volatile fatty acids); and • Naturally occurring radioactive materials (NORM) – gross alpha and beta (filtered and unfiltered) and radium 226/228	
Triggers and Adaptive Management	**Triggers**	**Adaptive Management**
	Concentrations of heavy metals, TPH, BTEX, PAHs and NORMS are significantly higher compared to results from previous three (3)	Investigate the possible causes for the trigger being exceeded and rectify through operational modifications (e.g. reduction in

	years. Results are considered significantly higher if: • they are outside the existing upper 95% confidence interval • there is an increasing trend over a 3-year period (i.e. three consecutive increases in concentration) • contaminant not previously detected are now above detection limits.	PW discharge rate to increase dilutions) or additional controls, if necessary. Validate results by through either resampling / analysis / laboratory QA/QC to confirm result accuracy. Resampling, if required, to occur within one (1) month from results being received. Undertake desktop analysis to determine whether EPS or EPOs are at risk of being breached. If EPS or EPOs are at risk of being breached: Increase monitoring frequency to 6 monthly until such time the analyte(s) of concern is (are) no longer significantly higher or it can be demonstrated through WET testing (full suite or subset of species) that safe dilution levels for 99% species protection is not exceeded at the boundary of the mixing zone.
	EPO has been breached. That is, concentration of one or more toxicants exceed the DGV 99% species protection level (ANZG, 2018), when dilution within the mixing zone is taken into account.	Until such time it can be demonstrated that safe dilution levels for 99% species protection will not be exceeded beyond the boundary of the mixing zone, investigate possible causes for the trigger being exceeded and rectify through operational modifications or additional controls (e.g. reduction in PW discharge rate to increase dilutions, reduction in process chemical injection).

6.4.4.5 Whole effluent toxicity testing

Whole Effluent Toxicity (WET) testing evaluates the combined toxic effects of all pollutants in the produced water. Instead of focusing on individual chemicals, WET tests assess the overall impact of the effluent on the survival, growth, and reproduction of test organisms. This provides a greater level of understanding of the cumulative risk as it allows for interactions between toxicants and consider toxicants that cannot readily be measured or are not known to be present in the effluent.

Testing is conducted using a non-filtered sample of PW on a diverse range of ecologically relevant taxa using established standard testing protocols. These tests primarily focus on the early life stages of organisms, which are generally more sensitive to contaminants and represent local trophic level receptors. Tropical Australian marine species are primarily selected for testing due to their ecological relevance, known sensitivity to contaminants, the availability of robust test protocols, and their reliability and sensitivity as test species. Dilution levels required to protect 95% and 99% of species are calculated using the Warne *et al*. (2018) methodology. The approved mixing zone uses the 99% species protection safe dilution level

The WET testing framework for Stag is summarised in Table 6-26. To date, four rounds of WET testing have been undertaken(Section 6.4.2.5). Going forward, WET testing will be undertaken once every two years (or when deemed necessary through adaptive management response).

Table 6-26: Ecotoxicity testing framework

Program	Produced Water WET testing	
Monitoring frequency	Once every two years or when determined through adaptive management response	
Sampling location	PW manual sampling point prior to entering discharge pipe	
Parameters	Several lethal and sublethal tests will be undertaken on a range of marine organisms covering at least five species from four different taxonomic groups as per ANZG (2018) recommendations.	
Triggers and Adaptive Management	**Triggers**	**Adaptive Management**
	Safe dilution levels for 99% species protection are significantly higher than previous years. Results are considered significantly higher if there is an increasing trend over a 3-year period.	Undertake desktop analysis to determine whether the EPOs is at risk of being breached. If the EPOs is at risk of being breached increase frequency of WET testing (full suite or subset of species) to monthly until such time the safe dilution levels for 99% species protection are no longer significantly higher or it can be demonstrated that safe dilution levels for 99% species protection will not be exceeded beyond the boundary of the defined mixing zone.
	EPO has been breached. That is, safe dilution levels exceed 99% species protection beyond the mixing zone	Until such time it can be demonstrated that safe dilution levels for 99% species protection will not be exceeded beyond the boundary of the mixing zone, investigate possible causes for the trigger being exceeded and rectify through operational modifications or additional controls (e.g. reduction in PW discharge rate to increase dilutions, reduction in process chemical injection).

6.4.4.6 In-situ field monitoring

In-situ field monitoring is undertaken to confirm that the EPO is being met. This study will be a repeat of that undertaken in 2014 (Section 6.4.3.7) with samples collected along transects in line and perpendicular to the dominant current direction. A gradient design will be adopted whereby more stations are positioned closer to the point of discharge to increase the likelihood of picking up the plume.

Graduated mobile sites will also be sampled downstream of the CPF based on water movements at the time of sampling.

Contaminant concentrations will be compared to discharge concentrations and benchmarked against default water quality guidelines (ANZG 2018) or, background levels (i.e. baseline and previous surveys) where DGV are not available.

The water quality monitoring framework is summarised in Table 6-27. The next survey is planned for 2025. Thereafter it will be undertaken every five years or when determined, through adaptive management response. This frequency is considered appropriate as the operational monitoring and the chemical characterisation and ecotoxicity studies are also being undertaken to identify threats to or breaches of the EPO and various EPSs.

Table 6-27: Water quality monitoring framework

Program	Water and sediment quality monitoring	
Monitoring frequency	Planned for 2025, once in every five-year period or when determined, through management response	
Sampling location	Laboratory analysis of water samples collected in the receiving environment following a gradient design (dose/response) from the discharge point.	
Parameters	• Total dissolved solids (TDS); • Turbidity (NTU), pH and salinity; • TSS; • Nutrients (Ammonia, nitrate-nitrite, orthophosphate; Total nitrogen and total phosphorus; Organic carbon (total and dissolved); • BOD/COD; • Metals/metalloids (Ag, As, Ba, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, S), and Zn; • TPHs; • BTEX; • PAHs; • NORM – gross alpha and beta (filtered and unfiltered) and radium 226/228	
Triggers and Adaptive Management	**Triggers**	**Adaptive Management**
	Concentrations of toxicants are greater than measured in the previous survey (s).	Undertake desktop analysis to determine whether EPS or EPOs are at risk of being breached. If EPS or EPOs are at risk of being breached rectify through operational modifications or additional controls, until such time it can be demonstrated that safe dilution levels for 99% species protection will not be exceeded beyond the boundary of the defined mixing zone (either through repeating this field study or undertaking additional chemical characterisation and/or WET testing).
	Concentrations of toxicants in samples located on the boundary of the mixing zone are greater than 99% species protection levels (ANZG 2018).	Investigate possible causes for the trigger being exceeded and rectify through operational modifications or additional controls, until such time it can be demonstrated that safe dilution levels for 99% species protection will not be exceeded beyond the boundary of the defined mixing zone (either through repeating this field study or undertaking additional chemical characterisation and/or WET testing).

6.4.4.7 Oil on solids characterisation

This study was triggered by operational monitoring that observed OIW measured by manual sampling was greater than the inline analyser. The difference is suspected to be due to oil attached to sediment

suspended in the produced water. The purpose of this study is to provide additional insight into the partitioning of oil between the dissolved, particulate and sediment phases, which will provide an additional line of evidence for impact assessment. Analysis will be undertaken by a third-party NATA-accredited laboratory.

Chemical characterisation and WET testing results collected to date use unfiltered samples so should account for any contaminants attached to solids. Chemical characterisation provides total concentrations, including that bound up in sediment, whilst WET testing considers bioavailability from all phases. Further evidence of any impact will be provided by the in-situ sediment sampling planned for 2025.

An outline of the proposed Oil on solids characterisation methodology is provided in Table 6-28, though alternative methods suggested by the NATA accredited laboratory may be selected with the objective remaining the same.

Trigger values for oil in sediment will be developed if deemed necessary. Further treatment or process review will be undertaken if results indicate there is sediment contamination above reporting limits resulting from activities associated with the CPF. Potential adaptive management could include reservoir management, filtration, or chemical treatment to reduce the impact. Noting that nothing indicates this has resulted in an impact to date (6.4.2.10.4).

The oil on solids chemical characterisation will be commenced in 2025 monthly until the in-situ sediment sampling has been completed. Thereafter, the oil on solids characterisation will be undertaken once every two years as part of the routine operational monitoring. The PW sample will also be compared with the inline OIW analyser and CPF laboratory samples taken simultaneously to compare measurements.

Table 6-28: Produced water oil on sediment characterisation

Program	Produced Water oil on sediment characterisation
Objective	1. To determine the mass of oil associated with dissolved, particulate and sediment phases in PW; and 2. to provide understanding into the mineralogy of the particles in suspension, as well as those that are conglomerated with oil droplet particles.
Monitoring frequency	Commencing Q1 2025 and then monthly until sediment sampling is completed in field Thereafter, completed once every two years when undertaking WET Testing
Sampling location	PW manual sampling point prior to entering discharge pipe
Method	800 mL of a 1L produced water sample will undergo filtration using 0.45 µm filter paper to determine the weight and percentage of suspended solids. The filter paper will be rinsed with solvent to remove any hydrocarbons. The solvent-washed filtrate will be used to determine the oil content gravimetrically. A 100 mL sub-sample will undergo laser particle size distribution analysis. A separate 100 mL sub-sample will undergo laser oil droplet size distribution analysis based on oil density. This will determine the percentage of the oil content that consists of free oil droplets versus those conglomerated with solid particles. Additionally, it will provide the sizes of the free oil droplets suspended in water. The mineral phase composition and crystalline structure of the solids will be determined through X-Ray Diffraction, scanning electron microscopy and energy dispersive X-Ray spectroscopy of the solid residue after filtration and solvent washing. Result will be compared with X-Ray Diffraction of suspended solids in the produced water.

6.4.5 ALARP Assessment

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage produced water discharges from the CPF. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Further controls considered are detailed below.

Alternative control considered	Hierarchy	Practicable	Cost effective	Justification
Limiting OIW discharge to 15 mg/L or a daily load based on 3,816 m^3/day and 15 mg/L. (57 kg/day)	Engineering	No	No	For context, Stag was designed to meet the requirement of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 in force at the time. These stipulated petroleum limits in produced formation water discharge of: (a) not greater than 50 mg/L at any time; and (b) averages less than 30mg/L during each period of 24 hours. For the majority of the time, Stag's OIW performs significantly better than 30mg/L, and upgrading the facilities for the short periods when it does not meet the current limit of 15 mg/L is not reasonably practicable given the cost for the benefit gained. Maintaining a discharge below 57kg/day results in numerous production shut-ins. Figure 6-6 indicates the OIW concentration from 2021-2024 has exceeded 15mg/l and the facility was often operating in "contingency mode" whereby an allowance of discharge up to 30mg/l was implemented. Despite this, the WET testing in field analysis did not indicate an exceedance of the EPO and indeed the mixing zone is smaller than that previously in force. Therefore allowing a higher OIW discharge limit is considered acceptable. The cost associated with these shut-ins to maintain a 15mg/l limit is disproportionate to the environmental benefit gained. Chemical characterisation has demonstrated that oil in Stag produced water is made up of mainly higher molecular weight aliphatic hydrocarbons and is devoid of the more toxic aromatics. Recent 2024 WET testing shows no correlation between toxicity and hydrocarbon concentrations. Higher molecular weight aliphatic hydrocarbons are not bioavailable so the risk to marine organism is low and in the longer term they are removed from the system through biodegradation. 30 mg/L remains an appropriate OIW limit. OIW limit aligns with other countries, including the USA, Brazil, India and those covered by OSPAR (North East Atlantic). There are no other relevant Australian environmental legislative requirements that relate specifically to the discharge of PW.

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage produced water discharges from the CPF. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Further controls considered are detailed below.				
Alternative control considered	**Hierarchy**	**Practicable**	**Cost effective**	**Justification**
				OSPAR Recommendation 2001/1 for example states a maximum allowable dispersed OIW limit of 30 mg/L based on the method of analysis in OSPAR Agreement 2005/15. In 2010, OSPAR introduced the risk based approach (RBA) for PW management. JSE has applied this RBA since 2013, including a hazard assessment estimating PW ecotoxicity using whole-effluent toxicity (WET) testing (6.4.2.5) and substance-based (SB) analysis (6.4.2.4). Considerable work has been carried out by OSPAR to demonstrate the acceptability of 30 mg/L OIW limit. Based on the above, 30 mg/L is considered a reasonable and practicable OIW limit for Stag.
Reinjection of produced water by pumping it into subsea injection wells.	Eliminate	No	No	The original Stag project design called for sea water injection into the reservoir to maintain reservoir pressure and to force water to pass through the pores in the reservoir to sweep the oil to the production wells. It was designed such that any produced water (formation and reproduced sea water) would be processed and discharged overboard. In 2008, a Compact Gas Floatation Unit (CGFU) and two new pumps were installed to allow the disposal of produced water with a high oil-in-water content back to the Stag Reservoir. This system allowed approximately 635 m^3/d to be injected back to the reservoir. This was initially moderately successful, however, in March 2009, the disposal well 18H was found to be in communication with the production wells and the practice of continuous disposing of produced water down-hole in 18H ceased though the well is currently active and may be used as a disposal well for the periodic injection of off-spec water from the process following integrity inspections. This demonstrated that continuous produced water reinjection was not a viable option as an injection fluid as it needs to be conducted at fracturing pressure to overcome the plugging of pores by contaminants in the produced water. This fracturing creates channels from the injectors towards the producers that would allow the injection water to bypass the oil contained in the reservoir matrix and result in poor sweep and oil recovery. Therefore, continuous produced water reinjection is not a feasible option given the state of the reservoir. The EP does make provision for slops to be pumped into subsea injection wells, the slops may contain off-spec produced water as described in Section 2.2.10.

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage produced water discharges from the CPF. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Further controls considered are detailed below.				
Alternative control considered	**Hierarchy**	**Practicable**	**Cost effective**	**Justification**
				Slops tanks pump out capacity limits the reinjection rate; therefore it is typically only undertaken during process upsets. The pumps used to inject slops are lower pressure than required for produced water reinjection, as the slops injection rate and volume is much less than the produced water flow rate.
Transfer of slops, including produced water, onto a support vessel for temporary storage until capacity is available on board for processing.	Eliminate	Yes (contingency)	No	During periods where slops reinjection is not available (i.e. due to blockage within the disposal well), containment of off-spec produced water (slops) offshore to allow time for reinjection to be re-established is possible but constrained by the suitable storage capacity available on a vessel and the associated additional costs of storage and post storage clean-up of the storage vessels. This is included in the EP as a contingency measure only noting that production would be restricted or shut in in this circumstance without such a contingency.
Disposal of slops, including produced water, by transfer to a support vessel or third party tanker for onshore disposal at a licensed facility	Eliminate	Yes (contingency)	No	Should slops reinjection be unavailable for extended periods that exceed available storage volumes on a vessel (e.g. due to an integrity concern with the disposal well), a further contingency is provided to allow transit and transfer of the slops to shore for treatment and disposal at a licensed waste facility. This option is significantly more expensive than offshore storage and re-processing on the CPF and attracts additional risks associated with vessel movements. Nonetheless a further contingency option for transferring slops (including off-spec produced water) to a 3rd party vessel/tanker is included in the EP to support: - Transfer to a vessel for onshore disposal; or - Pushing forward to a third-party tanker for disposal. There will be limited time for offshore storage of off-spec produced water when reinjection is not available given the small tank storage volumes before one of these options is selected. Given the associated expense, it is far more preferable to reinject slops volumes than to store and treat via third party. This is included in the EP as a contingency measure only noting that production would be restricted or shut in in this circumstance.

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage produced water discharges from the CPF. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Further controls considered are detailed below.				
Alternative control considered	**Hierarchy**	**Practicable**	**Cost effective**	**Justification**
				If the water has been pushed forward to the third-party tanker, the water will remain in the tanker while it is on location at the CALM buoy and will not be discharged in field. Any water received by the third-party tanker during push forwards will be disposed of at the cargo receiving facility. This can lead to significant costs in cleaning and disposal at the cargo receiving facility and is therefore not a preferable option, but included as contingency.
N/a	Substitute	N/a	N/a	No substitute for the discharge of produced water to the marine environment could be identified.
Process polishing	Engineering	No	No	In terms of reducing the OIW content of produced water, improvements to the current production process have reduced the OIW content of Stag CPF produced water to an average of 9.5 mg/L averaged over a 24 hour period. Other options for reducing OIW content further than current practices would include retrofitting the facilities with further processing equipment. Retrofitting additional produced water processing equipment on the CPF would require additional deck space which is limited. Reducing the OIW content of the produced water would require a sizeable storage vessel in order to facilitate the increased produced water residence time required to reduce OIW content further. Additional purchase and modification of equipment would negatively affect the commercial viability of the Facility and given that it is operating in an environment of low sensitivity (in terms of habitats and species) retrofitting is not considered a practicable option with respect to the environmental benefit it might provide.
Modification to discharge infrastructure	Engineering	No	No	Modelling to evaluate the possible modification of discharge infrastructure such that the produced water stream is discharged to the marine environment with a diffuser at the end of the discharge line has been prepared by APASA (2014). The fitting of a diffuser is intended to improve the initial dilution rate of the effluent stream in the near field mixing zone. Modelling of current discharge arrangements in which the produced water stream is released from an open hole pipe above sea level found a dilution rate of approximately 8–20 times within the near field mixing zone; variation in dilution rates was attributable to fluctuations expected in current speeds of the receiving environment.

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage produced water discharges from the CPF. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Further controls considered are detailed below.				
Alternative control considered	**Hierarchy**	**Practicable**	**Cost effective**	**Justification**
				Modelling of the discharge infrastructure with a diffuser in place found that initial dilution rates were reduced compared to current discharge dilution rates to between 1.5 and 13.4 times, the variation again due to current speeds. Similarly, the scenario of a diffuser being fitted along with mixing the produced water stream 50:50 with seawater achieved a dilution rate of 6.7–26.1 times, however the horizontal distance travelled in the near field mixing zone increased from 1 to 7.7 m predicted with the current discharge infrastructure, to 1.6–18.8 m with a diffuser and pre-mixing with ambient seawater. These modelling results indicate that the current discharge infrastructure is effective at achieving initial dilution of the effluent stream within a reasonable horizontal distance of the marine environment entry point that is cost effective in terms of installation, management and repair requirements. Given the nature of the effluent being fresh, heated and containing oil (which has a specific gravity less than water) the rise through the water column within the initial mixing zone gives an excellent dilution rate which would not be improved upon enough to justify the expense (~100K) of diffuser installation.
Discharge of produced water subsea	Engineering	No	No	The discharge outlet currently sits 5 m above mean sea level. The hydrostatic head that would need to be counted for a subsea discharge pipe would require additional pumps (increasing deck space usage), power requirements and result in additional air emissions for little environmental benefit as evidenced by the numerical modelling. This option is being explored through an alternative caisson that may provide a better environmental outcome but would require additional engineering. An ALARP assessment will be conducted following feasibility studies; it is not yet considered practicable or cost effective.
Discharge of produced water subsea through the seawater discharge caisson	Engineering	Yes	Potentially	The discharge outlet currently sits 5 m above mean sea level. An option is being explored to discharge produced water through the seawater discharge caisson which discharges below the sea surface. The mixture of the produced water and seawater prior to discharge would increase the dilution and a subsea discharge location is expected to have an equal or better dilution effect. Further engineering and environmental modelling would be required before progressing this decision.
Storage and disposal onshore	Engineering	No	No	This disposal option is not deemed practicable due to the quantity of produced water generated each day. At these volumes, the CPF does not have the capacity to store the

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage produced water discharges from the CPF. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Further controls considered are detailed below.				
Alternative control considered	**Hierarchy**	**Practicable**	**Cost effective**	**Justification**
				produced water with the current slops tanks providing for up to one hour of produced water containment only at normal production levels. Notwithstanding the lack of capacity for the CPF to store the volumes of produced water, the size and frequency of vessels removing produced water from the CPF would make the operation impractical. For example, it is estimated that it would take within 30 days to load a vessel with produced water which would then need to unload on a regular basis at a suitable port facility on the mainland. The costs and logistics make this grossly disproportionate to the production rates and economics of the Facility while introducing additional environmental risks associated with the transfer, transport and disposal of produced water.
Automatic closure of discharge	Engineering	No	No	The manumatic procedural controlled design of intent of diverting off-spec produced water has been in place since the original design of the CPF and has proven to work, where on immediate detection of higher than normal OIW, off-spec water is automatically routed to the slops tank. The slops tanks are sized at 1250 bbl combined, which has a very limited capacity of approximately 120 minutes if slop tanks are empty; before capacity is reached, production is restricted to allow troubleshooting. If not, successful production is diverted to the third-party tanker manually. To change to an additional automatic system would involve the installation of a number of new valves, modification to the control system, adding further slop tank capacity or automatic protection to shut down the plant on high volume levels in the slops tanks which actually take us to the condition of the produced water upsets, which are at their highest when starting the platform back up from a shutdown. Auto closure of discharge would lead to a greater likelihood of produced water upsets. It would additionally remove the tried and tested process of having an operator being dispatched to the slops tank to monitor the upset.

6.4.6 Acceptability Assessment

Impacts and risk associated with discharge of produced water to Commonwealth marine water are deemed acceptable based on the criteria and reasoning set out in the table below.

Acceptability Criteria	Justification
Policy compliance	JSE's Environmental Policy objectives are fully met through the content of this Environment Plan.
Management System Compliance	The implementation strategy described in Section 6.4.4 is compliant with and aligned with the JSE Management System.
Social Acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5) and no stakeholder concerns have been raised regarding potential impacts and risks from planned discharges of PW
Laws and standards	The management measures outlined in this EP align with the requirements of the OPGGS Act 2006 (Cth): Section 460(2) – a person carrying on activities in an offshore area under the permit must carry out those activities in a manner that does not interfere with the conservation of the resources of the sea and seabed to a greater extent than is necessary for the reasonable exercise of the rights and performance of the duties of the first person.
Industry best practice	Measures outlined in the EP which limit total concentration of dispersed oil are consistent with industry practices and international recommendations (i.e. OSPAR 2001/1) Treatment and monitoring of produced water discharges is consistent with industry best practice as is the assessment and selection of chemicals used in process operations.
Environmental context	Contaminants including hydrocarbon, metals and nutrient concentrations in the receiving waters meet the 99% species protection guidelines specified for toxicants in the ANZG (2018). This will ensure that there is no detectable impact from PW discharge beyond the approved mixing zone (i.e. protection of 99% of marine species shall be achieved beyond the mixing zone). The use of 99% guideline values is associated with high ecological/conservation value system having the attributes of *effectively unmodified or other highly valued ecosystems, typically (but not always) occurring in national parks and conservation reserves, or in remote and inaccessible locations (*ANZG, 2018). There are no marine parks or conservation areas within the defined mixing zone. The 99% value is considered conservative compared to the more appropriate level of protection of a 95% protection level assigned to Slightly or moderately disturbed systems which have attributes of *Ecosystems in which aquatic biological diversity may have been adversely affected to a relatively small but measurable degree by human activity. The biological communities remain in a healthy condition and ecosystem integrity is largely retained*. Section 6.4.2.4 presents the chemical characterisation for the Stag produced water. Concentrations for hydrocarbons, metals and nutrients are either below the 99% species protection guidelines for contaminants (ANZG 2018) or require minimum dilution to meet them. There is therefore

	a high level of confidence that guidelines will be achieved within the defined mixing zone. Hydrocarbon, metals and metalloid concentrations in seabed sediment, meet the default guidelines values for toxicants specified by ANZG (2018) within the boundary of the mixing zone. In situ sediment sampling in 2014 (Oceania, 2015) has demonstrated: • Metals and metalloid concentrations were below their respective ANZECC/ARMANZ (2000) ISQG low values and the default guideline values specified in ANZG (2019). • TPH, BTEX and PAH concentrations were below their limits of reporting and, therefore, below the default guideline values specified in ANZG (2018). Based on this, the risk of contaminants accumulating in the sediment due to produced water discharge is considered highly unlikely. Through the application of the control measures detailed in Section 6.4.3, and the adaptive management plan detailed herein, the discharge of produced water is acceptable as it will meet the 99% species protection guidelines specified for toxicants in the ANZG (2018). This will ensure no accumulation of persistent organic chemicals, heavy metals, or other potentially harmful chemicals in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected. Jadestone have committed to checking the composition of produced water on a regular basis and to undertake five yearly in situ water quality and seabed sediment sampling, with the next campaign planned in 2025. In the unlikely event that the composition changes significantly, or contaminants are detected in the receiving water or sediments then these will be reviewed in accordance with the Monitoring and Adaptive Management Plan.
Conservation and management advice	Produced water discharges do not contravene management objectives of fauna and habitat values as identified in bioregional plans, including recovery plans and conservation advice. Several conservation management plans have been considered in the development of this EP (Section 6.4.2.10.7). Emissions and discharges are a common threatening process identified in several conservation management documents; however, none of the recovery plans or conservation advice have specific actions relating to PW discharges. Section 6.4.2.10.7 above confirms discharging produced water will have minimal impact on EPBC protected species.
ESD Principles	The impacts and risk of discharging produced water to the marine environment align with ESD principles as: • the precautionary principle has been applied by monitoring the volume and oil in water concentration discharged, setting a discharge limit and undertaking periodic analysis to check the impact. • Undertaking additional oil on sediment sampling will support any uncertainty in the potential impact of the PW discharge

	• environmental resources within the Operational Area are not expected to be significantly impacted; and • there is no threat of serious or irreversible environmental damage.
ALARP	The residual risk has been demonstrated to be ALARP.

6.5 Liquid discharges

6.5.1 Description of Hazard

Aspect	Planned discharge of liquids (other than produced water) includes sewage, putrescible waste (food scraps), chemicals used for marine growth cleaning, deck drainage and bilge water, cooling water and potable water. During well workover activities, there is the potential for the discharge of treated seawater, milling fluid and excess cement. A summary of each waste type is provided below. All chemicals planned for discharge must be Gold/Silver/D/E or PLONOR, or risk assessed through the Jadestone Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033). **Sewage and food waste** All sewage (including grey water) generated onboard the CPF is discharged through an inline macerator to comminute solids to a diameter of less than 25 mm. The discharge estimates are based on the known number of personnel on the Facility discharging an estimated 100 l/person/d. The CPF personnel on board (POB) levels are 20–24 during normal production operations although during platform maintenance, upgrade works, or well operations the manning level of the platform can increase to the maximum of 58 POB. This loading includes sewage as well as grey water from laundry, showers and wash basins. Bleach is used as a disinfectant for the sewage discharge rather than chlorine or chloride tablets. Sewage and food waste treatment and disposal on support vessels is consistent with Marine Orders (Part 96), MARPOL Annex IV and V, *Navigation Act 2012* and *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Part IIIB). Putrescible food waste may be contained for onshore disposal or macerated on the CPF and discharged to sea. The volume is estimated at putrescible waste of 24 kg/d (based on 1 kg/person/d) with an upper estimate of 58 kg/d based on the maximum POB. **Deck drainage** The CPF has a drainage system that delivers drainage water, collected from rainwater and deck wash, work areas and machinery spaces to a slops storage tank. Deck drainage may contain minor quantities of oil, grease and detergents from machinery, fresh or waste oil drums and residual cleaning agents if present on the decks (e.g. deck wash). Fluids collected in the slops storage tank are processed through the Second Stage of the Production Separation system and treated to <30 mg/l OIW prior to discharge. Only drainage from the helicopter landing deck drains directly overboard. **Fire-fighting foam** In the event that firefighting systems are used or require testing with foam, this may be discharged to sea in small quantities. **Discharges from Maintenance** Discharges to the marine environment associated with maintenance and testing activities include: • Fluorescein and other marker dyes • Subsea control fluids • Biocides and oxygen scavengers in tanks, flowlines and equipment • Subsea de-calcification fluids (for marine growth cleaning) **Bilge water** No oily water will be discharged from the support vessels while moored to the CALM buoy. Other vessels in the operational area collect oily water from bilges which is then treated via an oil-water separator in accordance with MARPOL requirements (<15 mg/L (v) oil-in-water). Once separated, the oil and grease will be stored in suitable containers ahead of transfer ashore for recycling and the treated water discharged to ocean. **Cooling water** Seawater is used as a heat exchange medium for the cooling of the three onboard power generators. The cooling water is drawn through a segregated cooling system and is therefore not contaminated by engine oils or other liquid discharges from the process. Average discharge rates are up to 108 m^3/h for each of the generators. Discharge water is approximately 3 °C above ambient marine waters and is discharged at hull level.

	Seawater is drawn from the ocean and flows counter current through closed-circuit heat exchangers, transferring heat to the seawater. It is then discharged to the ocean via the seawater cooling caisson (i.e. a once-through system) as hot water of varying temperatures dependent upon the generators' workload. This water is drawn through a segregated piping system and is therefore not contaminated by engine oils or other liquid discharges from the process. Discharge is ~3 °C above ambient waters and is from hull level which allows air cooling. Biocides are not added to the CPF cooling water system. An industrial grade saltwater chlorinator is used to produce chlorinated water to dose the respective caisson and pumps utilising sea water to prevent the accumulation of marine growth throughout the system. Seawater is used as a heat exchange medium for the cooling of vessel engines and machinery on support vessels. **Potable Water** The freshwater system is designed to produce, store and distribute fresh and potable water throughout the CPF. During normal operations, fresh and potable water is produced via a Reverse Osmosis unit (RO) this process results in a brine discharge of about 35 m^3/d approximately 10% higher salinity than the intake seawater, with no increase in temperature. The seawater feed is taken from the main generator seawater cooling return line and forced by pump through a semipermeable membrane, and any contaminates are flushed away. Potable water is then directed to a storage tank. Potable water may also be delivered by supply vessel during extended maintenance periods. A unique hose connection is provided to prevent cross contamination by inadvertent transfer of diesel from the supply vessel. Storage is provided in a single Potable Water Tank, T960, of 215 m^3 capacity located within the west side of the hull structure. The tank is fitted with high- and low-level alarms, and trips. **Well Operations - Treated Seawater, Milling Fluid (including swarf / debris) and excess cement** During workover well operations treated seawater (biocide at 500ppm) is the primary fluid used. During the course of well operations excess treated seawater is discharged directly overboard at the sea surface. Volumes are approximately 60 m^3 per operation / workover. During non-standard workover well operations, specialty milling fluids are used for section milling operations. This milling fluid (including swarf and recovered debris) is discharged directly overboard at the sea surface. On completion of this activity the milling fluid is displaced out of the well with clean fluids (treated seawater). Volumes are approximately 50 m^3 of milling fluid per section mill (including swarf / debris), with up to two section mills per well. Cementing operations may occur during repair or abandonment of well sections. On placement of the cement surface equipment and the well above the target location are displaced to clean fluids (treated seawater) to ensure there is no excess cement that will cause blockages or future access once set. This excess cement is discharged directly overboard at the sea surface. Volumes are approximately 3 m^3 per well. **Other discharges** Blowdown from the auxiliary boiler is directed to T421 or directly overboard via an appropriately rated hose for discharge. During normal operations up to 400 L boiler water is directed to T421 during blowdown activities. Blowdown occurs once per shift. Boiler water contains oxygen scavenger and scale inhibitor. Both of which have a low risk to the environment. Discharge of minor fugitive hydrocarbons from wells and subsea equipment (e.g. seeps/weeps/bubbles)

6.5.2 Impacts

Operational discharges will be small and continuous and dependent on rainfall, the number of persons onboard and machinery activity. Operational discharges will result in a reduction in water quality of the receiving marine waters immediately nearby the discharge outlet. This will be temporary (hours), localised and limited to the surface waters (<5 m), due to the small volumes and warm/ fresh qualities of the discharge streams. The discharges will be dispersed and diluted rapidly with increasing distance from the discharge point, so that temporary changes to ambient conditions are unlikely outside the 500 m exclusion zone around the MODU. It is noted that the Operational Area overlaps with the humpback whale migration

BIA, wedge-tailed shearwater breeding BIA, and the flatback turtle internesting buffer BIA which may result in a higher number of these species in the area. Potential impacts to water quality are likely to be limited to the immediate vicinity (tens to hundred metres) of the release point and are not expected to affect overall population viability of these protected species. Specific water quality impacts are considered as follows.

All chemicals that may be discharged to sea during operational activities are subject to Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033) which reviews the risk ranking, concentrations and discharges. Chemicals may be trialled and tested before phasing out other chemicals for example due to a change in chemical supplier.

Sewage and food waste

The routine discharge of sewage and putrescible food waste is likely to result in localised increases in nutrient concentrations, levels of phytoplankton and bacterial activity, and biological oxygen demand (BOD).

In terms of BOD, the open water conditions and swift currents of the receiving environment will dilute the discharge and prevent environmentally significant reductions of oxygen levels in the water column (Somerville et al. 1987, cited in Swan et al. 1994).

Sewage and food waste discharge has the potential to contribute to the organic content of sediments under the CPF. However, sediment monitoring conducted in 2000 by IRCE (2001) did not detect elevated organic content under the CPF in comparison to locations further away. It is likely that the highly dispersive marine environment and high-water column productivity are preventing long term accumulation of organics under the Stag CPF.

As cited within NERA (2017), any potential change in phytoplankton or zooplankton abundance and composition is expected to be localised, typically returning to background conditions within tens to a few hundred metres of the discharge location (e.g. Abdellatif 1993; Axelrad et al. 1981; Parnell 2003). Some fish and oceanic seabirds may be attracted to the Stag CPF and vessels by the discharge of sewage and food waste. This attraction may be either direct, in response to increased food availability, or secondary, as a result of prey species being attracted to the area. However, given the small quantities and intermittent nature of disposal, any attraction is likely to be minor and is not expected to result in adverse impacts at an ecosystem or population level.

While marine mammals and reptiles may transit through the area there are no feeding, breeding or other aggregation areas nearby. The localised extent of any increases in BOD, nutrients, bacteria or phytoplankton and short visit times of these fauna suggest that any impacts from discharged sewage and food waste are unlikely.

Deck drainage and bilge water

Discharges from vessels may include residues of chemicals used for cleaning decks. The potential impact associated with the discharge of treated deck drainage and bilge water is chemical toxicity to marine species within the direct vicinity of the vessel. If not properly managed, the discharge of oily water has the potential to create an oil sheen on surface waters and a temporary highly localised decline in water quality and toxic effects to marine fauna. Toxicity to marine organisms would be from trace amounts of dissolved hydrocarbons in the oily water drainage after treatment. Given that oil and grease residues in oily water drainage will be in low concentrations, the potential for impact is low and would be further reduced due to the strong tidal movements experienced in the region and the naturally turbid environment.

There may be a localised and temporary (hours) reduction in water quality in the immediate vicinity of the release. Toxicity impacts to marine fauna from the release of chemicals and oily water are unlikely to eventuate because:

- strong ocean currents result in the discharge being further diluted upon release to the marine environment, so the duration of exposure of chemicals to fauna will be minimal

- deck cleaning products planned to be released to sea will meet the criteria for not being harmful to the marine environment according to MARPOL Annex V
- potential discharges will be intermittent and temporary within the operational area
- Dispersion and biodegradation of potentially contaminated oily water drainage is expected to be rapid and highly localised resulting in no long-term or adverse effects on water quality or marine ecology.

Firefighting foam

The potential for exposure of marine fauna to fire extinguishing agents is limited to individuals close to the discharge point at the time of release. The closest worst-case impact may include a biochemical oxygen demand (BOD) on the surrounding water or toxic effects or irritation from exposure to toxic compounds in local waters surrounding the point of discharge.

The potential impacts associated with fire extinguishing agent are:

- Physical contact with floating or suspended foam solids
- Potential change to ambient water quality (e.g. BOD, acute/chronic toxicity) through chemical loading within the direct vicinity of the facilities and support vessels
- Potential chemical toxicity to marine species within the vicinity of the release
- Chemical contact with the atmosphere as it may evolve toxic gases (carbon oxides, hydrocarbons) when heated to decomposition.

Bilge water

If not properly managed, the discharge of oily water has the potential to create an oil sheen on surface waters and a temporary localised decline in water quality and toxic effects to marine fauna. Toxicity to marine organisms would be from trace amounts of dissolved hydrocarbons in the oily water drainage after treatment. Given that oil and grease residues in oily water drainage will be in low concentrations, the potential for impact is low and would be further reduced due to the strong tidal movements experienced in the region and the naturally turbid environment.

Dispersion and biodegradation of potentially contaminated oily water drainage is expected to be rapid and highly localised resulting in no long-term or adverse effects on water quality or marine ecology.

Cooling water

The potential impacts arising from discharge of cooling water include:

- Thermal impacts to marine organisms
- Decline in water quality associated with lowered dissolved oxygen concentrations as a result of elevated water temperature.

When discharged to the sea surface, cooling water will initially be exposed to the atmosphere and subsequently air cooled. Upon reaching sea surface cooling water will then be subjected to turbulent mixing and some transfer of heat to surrounding waters. The plume will disperse mainly within surface waters being thermally buoyant, primarily in the direction of prevailing tidal currents (northwest–southeast).

The natural range in sea surface temperature at the Stag facilities location is between a low monthly average of 24 °C (winter and spring) and high of 27 °C (summer) (APASA 2013). Assuming that a localised area around discharge locations was raised by 2 °C (as modelled at the Van Gogh field) a range of 26–29 °C may be experienced.

Discharge of cooling water has the potential to cause changes in marine ecology through elevated temperatures, as well as the presence of anti-fouling biocides with trace chemical concentrations of copper

and aluminium ions being discharged. These small amounts of biocides will disperse rapidly on discharge to concentrations below levels of environmental concern to marine biota especially demersal fauna.

Fish and plankton are likely to be at greatest risk from cooling water discharge impacts since they are most likely to be attracted to the discharge location (fish) or entrained within the discharge plume (plankton). Fish and plankton are relatively small organisms that may experience increased body temperature and altered physiological processes (e.g. increased respiration rate and oxygen demand). However, given that the area of raised water temperature will be highly localised and within the range of temperature on the North-West Bioregion, significant impacts on a larger ecosystem or population levels to fish or plankton are not expected to occur.

Given the hydro-dynamically active open water environment surrounding the Operational Area, it is expected that the surface discharge of cooling water would rapidly disperse, cool and dilute in the surrounding waters, therefore temperature and biocides leading to changes to water quality or behavioural changes in marine species would be negligible. Only receptors in close proximity to the discharge point have the potential to be impacted with full recovery predicted within weeks.

Desalination brine

The potential impacts of desalination brine discharge on the environment include:

- Alteration of physiological processes of exposed biota
- Reduced water quality.

On discharge to the sea, desalination brine will sink and disperse in the currents. Given that discharged brine will have a salinity of ~10% greater than ambient seawater the largest increase of salinity experienced would be approximately 10% in the immediate vicinity of the discharge point. Most marine species are able to tolerate short-term fluctuations in the order of 20–30% (Walker and McComb 1990), and it is expected that exposed organisms such as plankton, pelagic invertebrates and fish would be able to tolerate short-term exposure to the slight (maximum 10%) increase in salinity caused by the discharged brine. For large marine species that may temporarily use surface waters such as marine turtles, mammals and seabirds, the effect of a slight increase in salinity is expected to be negligible.

Milling fluid (including swarf/debris) , treated seawater and cementing discharges

Environmental receptors have the potential to be impacted by milling and cementing discharges through reduction of water quality (turbidity and toxicological effects), and smothering due to sediment deposition to the benthos from particulates discharged to the water column.

When milling fluids (including any swarf and debris), treated seawater and excess cement are discharged to the ocean during well operations, any larger suspended particles form a plume that settles quickly to the seabed. Finer solids, along with a portion of the soluble components of the fluids, form a plume in the upper water column that drifts with prevailing currents away from the discharge location. Given the nature and volume of the discharged material it is likely that the material will not settle to the seabed in large volumes.

The plume of suspended fine material remaining near sea surface is diluted rapidly in receiving waters (Neff 2005). The discharge can be likened to the discharge of drilling muds where in well-mixed ocean waters, drilling muds and cuttings are diluted by 100-fold within 10 m of the discharge point and by 1,000-fold after a transport time of approximately 10 minutes at a distance of about 100 m from a MODU. Because of the rapid dilution of the discharge plume, harm to communities of water column organisms (e.g. plankton, fish) is unlikely and has never been demonstrated.

Boehm et al. (2001) concluded that drilling fluid chemicals diluted rapidly in the water column and, in all but very deep or high-energy environments, much of the drilling fluid and cuttings solids (similar to swarf and debris) settled rapidly to the bottom near the MODU site. The solids discharged during cementing

activities at Stag are much smaller volumes than those discharged from drilling of wells with a MODU, and therefore the area of potential impact is expected to be negligible.

A post drilling survey completed within days of drilling (Eni 2008) confirmed that water turbidity was low as the wellhead and seabed could be seen from several metres away and epibenthic fauna and infauna burrows were common. Dispersion modelling indicated that cuttings would settle over an area 300 m from the wellhead following disposal at the sea surface with an average thickness of 4 mm on seabed surface with the exception of some localised cuttings mounds.

Studies commissioned by Apache during the drilling of Simpson-3 in 6 m water depth and within 400 m of a coral patch reef concluded that there were no adverse impacts on nearby corals (IRCE 2004; Saunders et al. 2005). The daily monitoring of turbidity and total suspended solids did not detect differences between drilling and control monitoring sites. Arguably if light attenuation, turbidity and total suspended solids that were measured in the study were not significantly above background for prolonged periods then any impacts to other receptors such as fish and cetaceans (including the pygmy blue whale and humpback whale whose BIAs overlap the operational area) would also be minimal.

Discharge of drilling mud and cuttings at the sea surface has not demonstrated significant harm to water column flora and fauna and is highly unlikely (Neff 2005). As the chemicals selected for use in milling and cementing operations are highly rated (PLONOR, Gold/Silver or E/D OCNS) or alternatively are risk assessed through Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033) process, as environmentally acceptable, their environmental impact will be insignificant. They are not considered to be toxic to marine fauna including fish, marine reptiles, cetaceans and seabirds that may transit through the area.

Given the discharges will occur at sea surface and will disperse through a water column >50 m deep, impacts to demersal fish that live within 5–10 m of the seabed are not predicted.

Other discharges

Hydraulic fluids are used extensively in the petroleum industry in subsea production systems. Hydraulic fluids are either petroleum or water-based blends with additives. The main properties required of a hydraulic control fluid are low viscosity, low compressibility, corrosion protection, resistance to microbiological attack, and compatibility with seawater. The potential impacts of hydraulic fluid discharges near the seabed are a localised reduction in water quality and potential toxicity to benthic marine fauna associated with bare sediments or attracted/ attached to subsea infrastructure (e.g. fish, infauna and sessile filter feeding organisms).

Marker dyes, biocides, oxygen scavengers, descalers/decalcifiers, brine, subsea decalcification fluids and hydrate management fluids that will be used as part of the activities are also commonly used in the offshore oil and gas industry.

Biocides in offshore oil and gas are commonly used in the treatment of infrastructure susceptible to corrosion due to sulphate reducing bacteria. Biocides are commonly disinfectants, antiseptics and preservatives and often have the action of damaging cellular membranes and are therefore particularly toxic to unicellular organisms due to an oxidative effect. Oxygen scavengers alternatively are administered with the intent of removing oxygen from the immediate are to reduce the reducing effect of oxygen-respiring organisms (commonly microorganisms). The scavenging effect is chemical and effective as long as the active agent is free of being bound by an oxygen molecule. Thus, the effect of oxygen scavengers in the open environment is often short-lived as their effect is void once oxygen is encountered. Scale inhibitors may also be present in boiler blowdown water that may be discharged overboard in the event that slops tanks are at capacity.

Discharge of minor fugitive hydrocarbons from wells and subsea equipment (e.g. seeps/weeps/bubbles) are very low volume and dissipate rapidly within the water column. Impacts from these types of emissions are minimal due to the low volume and discharge rates with limited impact to receptors. Further discussion on the potential impacts of entrained or dissolved hydrocarbons are provided in Section 7.5.2, though the exposure thresholds are unlikely to be exceeded given the volumes that may be released.

Cumulative impact assessment

Routine discharges of these liquid streams may cause a localised reduction in water quality, including a temporary increase in nutrient concentrations, temperature and salinity.

On entering the marine environment, small volumes of chemicals, sewage, food waste and cooling water from the CPF and support vessels will be subject to rapid dilution and dispersion by the prevailing currents and waves. Like produced water discharge (refer Section 6.4), sewage and cooling water being fresh and thermally buoyant wastewater streams will disperse in surface waters primarily in the direction of prevailing tidal currents along a northwest-southeast axis.

Monthly discharges of sewage from the CPF are orders of magnitude less than monthly produced water discharge volumes and thus will be a much lower contributor of nutrients. A study into produced water discharge on water column productivity at the Harriet Alpha platform indicated only a localised effect on water column productivity despite elevated nutrients in produced water (Furnas and Mitchell 1998). It is therefore expected that nutrient impacts from Stag CPF and support vessels sewage disposal will have very localised effects on water column productivity (e.g. bacteria and phytoplankton).

Modelling of cooling water discharges from *Ningaloo Vision* FPSO at the Van Gogh field on the North-West Shelf was conducted by APASA (2010). Modelling results for the combined discharge source (~7,000 m^3/h) indicated that within 50 m from the FPSO a sea temperature increase of 2 °C is predicted to occur less than 25% of the time. The scale of impacts from the Stag facilities cooling water discharges are likely to be smaller than this given that the combined volume discharge is approximately an order of magnitude lower (1,000 m^3/h) than the volume modelled for the Van Gogh field FPSO, with the discharge coming from the CPF.

Woodside undertook brine wastewater discharge modelling (vertical, horizontal and temperature) for their Torosa South-1 appraisal well drilled near Scott Reef (Woodside 2008). Modelling indicates that a 100:1 dilution of the discharge stream occurs within approximately 50 m of the discharge point under any condition (Woodside 2008). Given that the marine environment is highly dispersive at the Stag location, a similarly localised mixing zone is expected to occur at the Stag location.

With high rates of initial mixing in the Stag field area, dilution to background conditions is expected to occur in the immediate vicinity of the discharge streams. As a result, short-term impacts to the environment and associated sensitivities due to discharge of liquids are expected but are predicted to be negligible.

6.5.3 Environmental Performance

Hazard		Discharge of liquids		
Performance outcome		No unplanned discharges of liquids to the marine environment Emissions and discharges of liquids to sea are in accordance with legislative requirements		
ID	**Management controls**	**Performance standard**	**Measurement criteria**	**Responsibility**
	Sewage and food waste			
039	Vessel Sewage Treatment Plant operated in line with MARPOL requirements (vessels >400T): Tankers	Current International Sewage Pollution Prevention Certificate for STP (or equivalent) on vessels which confirms that required measures to reduce impacts from sewage disposal are in place	Valid ISPP Certificate Garbage records maintained	Marine Superintendent
040	Maintenance of sewage and food waste macerator systems: CPF	Sewage and food waste systems (where present) maintained in accordance with the CMMS and records of discharges maintained	CMMS data indicates maintenance completed as scheduled. Garbage records maintained	Production and Maintenance Supervisor
	Deck drainage and bilge water			
041	Oily water filtering and monitoring equipment fitted and maintained: Support Vessels [13]	If required under MARPOL Annex I, support vessels have oily water filtering and monitoring equipment that is compliant (e.g. discharges oily water with OIW <15 mg/L) and surveyed/ maintained as per MARPOL Annex I and an IOPP certificate.	Maintenance records or a pre-mobilisation inspection report (e.g. OCIMF OVID, C&S Survey, PSC inspection)	Marine Superintendent
	Cooling water			
042	Water cooled equipment is certified and maintained	Water cooled equipment/ machinery and heat exchangers on the CPF maintained in accordance with the CMMS	CMMS shows maintenance has been satisfactorily completed as scheduled	Production and Maintenance Supervisor

[13] Note that tankers are subject to MARPOL Annex I whilst en route but not whilst connected in the operational area.

Hazard		Discharge of liquids		
Performance outcome		No unplanned discharges of liquids to the marine environment Emissions and discharges of liquids to sea are in accordance with legislative requirements		
ID	**Management controls**	**Performance standard**	**Measurement criteria**	**Responsibility**
	Desalination brine			
043	Potable water systems maintained	CPF potable water system maintained in accordance with the CMMS	CMMS shows when maintenance has been satisfactorily completed.	Production and Maintenance Supervisor
	Chemical Discharges			
044	Chemicals selected for discharge in accordance with Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033)	Chemicals planned for discharge to sea are: • Gold/Silver/D or E rated through OCNS, or • PLONOR substances listed by OSPAR, or • Have a complete risk assessment justifying the use of the chemical including (where applicable) consideration of OCNS substitution warnings, alternative chemicals, technical/process/HSE justifications, dosage rates and periodic review.	Completed chemical risk assessment forms for chemicals	Production superintendent

6.5.4 ALARP Assessment

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage liquid discharges from the CPF and support/ supply vessels. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated, no further controls are required. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
All wastes stored onboard CPF and transferred to shore for onshore treatment and disposal	Eliminate	No	No	Costs associated with complete re-engineering such that wastes contained onboard and disposed of onshore, onshore treatment and disposal costs and increase in fuel consumption due to multiple vessel transfers would be disproportionate to the environmental benefit gained given the rapid dilution in offshore water/ atmosphere and low potential impact from discharges/ emissions. In addition, transfers increase the risks of spills/ leaks and safety risks to personnel during transfer operations.
Reduce toxicity of discharges	Substitute	No	No	Provide for further treatment of wastes prior to discharge to sea such as decreasing the oily water concentration below MARPOL requirements, additional treatment of sewage, desalination and cooling water so the discharge is similar to the surrounding ambient sea water. This would require complete re-engineering of equipment and would be disproportionate in cost compared to the environmental benefit gained given the rapid dilution in offshore water and low potential impact from discharges.
Re-engineer equipment to retain wastes onboard	Engineering	No	No	Costs associated with complete re-engineering such that wastes contained onboard and disposed of onshore would be disproportionate to the environmental benefit gained. There is not enough space on board the facility or vessels to have storage tanks for all the waste produced prior to transferring to a vessel for onshore treatment and disposal. Substantial additional costs for re-engineering are grossly disproportionate to the benefit gained.
N/a	Isolation	N/a	N/a	The Activity is located at distance from sensitive receptors and the coastline and no significant impacts on receptors are predicted.
N/a	Administrative	N/a	N/a	Maintenance management system implemented, compliance with relevant and appropriate MARPOL requirements and certified equipment ensure discharges meet regulatory requirements.

6.5.5 Acceptability Assessment

The potential impacts of liquid discharges are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regard to impacts from liquid discharges on sensitive receptors.
Laws and standards	Liquid discharges are compliant with MARPOL and AMSA Marine Orders.
Industry best practice	The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regard to offshore production operations.
Environmental context	While there are liquid discharges to sea surface immediately around the Stag facility, the impact and risk assessment process indicates that discharges will not result in significant effects to marine fauna. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	No Management Plans identified operational discharges such as those described above as being a threat to marine fauna or habitats. Most of the plans identify pollution and habitat degradation relating to more significant (and usually unplanned) discharges to sea and therefore they were not considered relevant to these discharges which are all in accordance with legislative requirements such as MARPOL. Jadestone has had regard to the representative values of the protected areas within the RISK EMBAs, and the respective management plans and other published information. Impacts from liquid discharges will have a negligible impact on any of the social and ecological objectives and values, of any AMPs, or state MPs. This is consistent with the objectives of the protected area management plans and considered acceptable.
ALARP	The residual risk has been demonstrated to be ALARP.

6.6 Interaction with Other Users

6.6.1 Description of Hazard

Aspect	The presence of the 500 m radius Restricted Zone (the Operational Area) and 3 nm Cautionary Zone (designated by AMSA) creates a localised disturbance for other users of the area including commercial and recreational fishers, and shipping traffic.

6.6.2 Impacts

Presence of the Stag Facility and the associated restricted and cautionary zones result in the preclusion of other users including commercial and recreational fishers, and commercial shipping traffic, to use the area for their purposes.

While commercial and recreational fishing is permitted to occur in the vicinity of the Operational Area (refer to Section 3.4 for information on State and Commonwealth fisheries permitted to operate in the vicinity of the Operational Area), the placement of the 500 m restricted zone means relevant commercial and recreational fishers are unable to work the area of the restricted zone.

Despite the imposition to commercial and recreational fishers due to the restricted zone, commercial and recreational fishing effort is not anticipated within the Operational Area as the area does not represent important habitat for targeted species, such as natural seabed features (e.g. rocky outcrops or coral reef).

Consequently, waters associated with the Stag Facility do not support significant fishing activity and therefore impact to fishers is predicted to be minimal. Any impacts to commercial or recreational fishing would not be expected to have a significant effect on the catches or income of fishers. No feedback during consultation of relevant persons, including commercial fishers, was received indicating that impact to commercial fishers has or will result from operation of the Stag Facility.

The presence of the Stag CPF 500 m restricted zone, 3 nm cautionary zone, and the movement of support vessels, present obstacles for shipping traffic in the region and are potential navigational hazards and a collision risk. The Stag Facility is located 4 km northwest of the nearest designated shipping route and so it is not anticipated there will be high commercial shipping traffic in the immediate area (refer to Section 3.4 for details on commercial shipping, including designated shipping routes, and Appendix C) (AMSA 2012). Any detour by shipping traffic that may occur is considered negligible in comparison to the area available for vessels to navigate through.

Impacts to other users during the activity is considered negligible.

6.6.3 Environmental Performance

Aspect		**Interaction with other users**		
Performance outcome		**Recreational and commercial fishers, and shipping traffic, are aware of the Stag Facility Operational Area and associated activities**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
045	Stag facility maintains navigational and communication equipment in accordance with legislative requirement	The Stag facility and CALM buoy are chartered on Australian Hydrographic Service (AHS) nautical charts with gazetted PSZ	Annual audit verifies that the facility and CALM buoy are still marked on nautical charts	Marine Superintendent
046		AIS system on CPF	CMMS records show evidence of navigation and communication equipment maintenance	Production and Maintenance Supervisor
047		Continuously manned CPF CCR during normal operations	CCR log documents continuous manning	Stag OIM
048		Marine Navigation lights on the CPF shall be provided to ensure at least one light is visible upon approaching the structure from any direction	CMMS records show evidence of navigation equipment presence and maintenance	Production and Maintenance Supervisor
049		A Marine VHF Radio is located and functioning in the CPF radio room and central control room (CCR)	CMMS and assurance through daily use	Production and Maintenance Supervisor
050	Jadestone Energy Stakeholder Management Plan (JS-70-PR-I-00034) details consultation requirements to ensure other marine users are aware of the activity	Relevant persons identified according to current Regulatory requirements	Consultation records	HSE Manager
		Relevant persons provided a reasonable period of time to respond to proposed planned activities		
		If there is a potential change in the risks or impacts to relevant persons due to planned activities relevant persons are to be consulted prior to the activity commencing as required		

6.6.4 ALARP Assessment

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to reduce as far as practicable the imposition due to the physical presence of the Stag facility to activities undertaken by relevant persons in the area. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated, no further controls are required. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
Removal of facility and vessels	Eliminate	No	No	To not be physically present is not an option for the Stag facility operations. Operation of the facility would not be possible without the replenishment of supplies required for safe operations.
Store oil on CPF to remove requirement for third-party tanker and thereby reduce exclusion area to that around the CPF only	Substitute	No	No	While creating the ability to store oil on the CPF would reduce the spatial footprint of the Operational Area, the costs associated with the modifications required would be disproportionate to the benefit that would be received by other users of the area. Reducing the area of the safety restricted zone would result in minimal environmental gain, while potentially increasing the risk of vessel collision.
Re-engineer to remove requirement for topsides altogether	Engineering	No	No	Costs associated with complete re-engineering of the facility such that the need for topsides infrastructure was not required would be grossly disproportionate to the benefit that would be received by other users of the area.
N/a	Isolation	N/a	N/a	Stag operations is located outside of shipping fairways and is not positioned in highly prized fishing habitat.
Additional activity specific navigational or communications requirements	Administrative	No	No	The vessel navigational management and monitoring measures in place are industry standard and internationally accepted measures to minimise the potential for interference with, or collision between, vessels. Frequent and informative communication with relevant persons regarding activities associated with the Stag facility are undertaken. Additional procedures would provide no further benefit.

6.6.5 Acceptability Assessment

The potential impacts of the Stag facility and associated activities on other users are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of continuously reviewing and updating activities and practices at the Stag facility to reflect the requirements of relevant persons.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regards to impacts of the Stag Facility on relevant persons.
Laws and standards	The Stag facility is chartered on Australian Hydrographic Service (AHS) nautical charts, and navigation and communication equipment are in place and operable on the assets, as per AMSA's requirements.
Industry best practice	Stakeholders have been provided information on the location and operation of the facility and the infrastructure is indicated on navigational charts.
Environmental context	While the Stag facility presents a restricted zone to other users, the impact and risk assessment process indicates that the area of restriction is localised and occurs at a location that is not likely to result in significant penalties to the activities of relevant persons currently active in the area. The potential impact is considered acceptable after consideration of Principles of ecologically sustainable development (ESD).
Conservation and management advice	No management plans identified physical presence as described above as being a threat to other users. Jadestone Energy has had regard to the representative values of the protected areas within the EMBAs, and the respective management plans and other published information. Impacts from physical presence will have a negligible impact on any of the social and ecological objectives and values, of any AMPs, or state marine parks. This is consistent with the objectives of the protected area management plans and considered acceptable.
ALARP	The residual risk has been demonstrated to be ALARP.

6.7 Interaction with Fauna

6.7.1 Description of Hazard

Aspect	Physical presence of infrastructure and the movement of vessels and helicopters.

6.7.2 Impacts

Potential impacts to marine fauna and avifauna may occur as a result of:

- The physical presence of the Stag Facility; or
- Vessel and helicopter movements associated with routine operations.

Potential physical and behavioural impacts may range from temporary and localised displacement to injury or mortality from vessel strike.

Impacts associated with noise are outlined in Section 6.2.

Physical presence

Species most susceptible to impacts from physical presence include turtles, birds, and cetaceans. Migratory species such as seabirds may experience localised and short-term effects through behavioural changes;

such as roosting on platforms, or changed feeding patterns in nearby waters in response to other factors such as attraction of fish to the infrastructure (Verhejen 1985; Weise et al. 2001). This is predominantly attributed to the observation that structures in deeper water environments tend to aggregate marine life at all trophic levels, creating food sources and shelter for seabirds (Surman 2002). Behavioural changes could affect the size and composition of the seabird community in the local area.

The Stag infrastructure is within an area identified as 'species core range' for humpback whales and it is possible that these and other whale species may transit the area during migration periods. Based on evidence outlined in Appendix C, during the northern migration, individuals may be in the deeper waters while those in the southern migration tend to stay in shallower waters and so outside the Operational Area. The Operational area is not close to any identified aggregation areas such as resting or calving locations and is within a migration corridor ~200 km wide, so is not considered a restricted corridor. It is assessed that the Stag CPF and third-party tanker do not present large obstacles that would pose an issue to individuals as they will be able to easily swim around the infrastructure with minimal deviation from migratory routes.

The Operational Area is overlapped by the humpback whale migration BIA, flatback turtle internesting buffer BIA and habitat critical to the survival for flatback turtles (Table 3-3) and the foraging BIA of the whale shark is 9 km away and as such individuals may transit the area.

Slight deviations by migrating marine fauna including humpback whales and whale sharks, to avoid the Stag Facility may be required, however this impact is considered negligible given the large navigable area available and the relatively small Operational Area. Consequently, the presence of the Stag Facility and associated vessels is unlikely to disrupt important life-cycle events of marine fauna as no aggregation areas are located in the vicinity and so impacts at an individual and population level are considered minimal.

The presence of subsea structures has the potential to provide artificial habitats for marine organisms such as fish, resulting in a local increase in biological productivity and diversity and possible alteration of predator or prey refuges and visual clues for aggregation (Galloway et al. 1981). However, it is likely the artificial habitat will have either negligible adverse environmental impact or a low level of positive environmental impact through an increase in species diversity or richness in the area.

Vessel/ Helicopter strike

There is significant vessel traffic transiting from ports in the North-West and so the threat of ship strikes to whales is present throughout the region. Species most susceptible to vessel strike include cetaceans, whale sharks and turtles, and this is reflected as a threat in many of the conservation advice and recovery plans for these species (refer Appendix C). Other fauna such as birds, fish and sea snakes are more likely to avoid vessels operating in the area and so are considered at low risk of potential strike and will not be discussed further.

Cetaceans including humpback whales demonstrate a variety of behaviours in response to approaching vessels (attributed to vessel noise), including longer dive times and moving away from the vessel's path with increased speed (Baker and Herman 1989; Meike et al. 2004). These behaviours (discussed in Section 6.2) may actually contribute to reducing the likelihood of a vessel strike.

The likelihood of vessel/ whale collision being lethal is influenced by vessel speed: the greater the speed at impact, the greater the risk of mortality (Laist et al. 2001, Jensen and Silber 2003). Vanderlaan and Taggart (2007) found that the chance of lethal injury to a large whale as a result of a vessel strike increases from about 10% at 4 knots to 80% at 15 knots. Vessels within the Operational Area will travel no faster that 5 knots, and hence the chance of a vessel-whale collision resulting in lethal outcome is reduced. The US NOAA database (Jensen and Silber 2003) indicates there are only two known instances of collisions when the vessel was travelling at less than 6 knots, and both of these were from whale watching vessels that were deliberately placed amongst whales.

Although the whale shark's skin is thicker and tougher than any other shark species, the species may be more vulnerable to boat strike as they spend a significant amount of their time close to the surface of the water (DEH 2005a). DBCA developed a code of conduct for commercial vessels engaged in whale shark

watching and these measures have been used to develop minimum requirements for support and supply vessels in the Operational Area: vessels shall not approach closer than 400 m from a whale shark.

Given that marine turtles, particularly flatback turtles, who's interesting buffer BIA overlaps the Operational Area, are known to occur in the vicinity of the Stag Facility, there is a risk of potential vessel strike. Hazel et al. (2007) suggested that higher vessel speed is more likely to cause impacts particularly in shallow waters where turtles are abundant, and the success of avoidance behaviour is a factor of the response time available (i.e. visual observation distance/ vessel speed). By implementing reduced vessel speeds to <5 knots in the Operational Area, the likelihood of a strike and the severity is greatly reduced.

Given the slow operating speed of support and supply vessels as well as the low likelihood of large numbers of aggregating animals being present, the potential for vessel strike to impact significantly on a cetacean, whale shark or turtle population in the Operational Area is assessed to be low.

Helicopter movements have the potential to affect birds through direct strike, however, considering the high visibility and noise levels associated with helicopter movements, birds are expected to avoid collisions with helicopters. The number of helicopter flights required is relatively low averaging two inward/ outward flights per week. Flights also occur in the daylight and not within major roosting areas, thereby reducing potential interactions and subsequent physiological impacts. Though it is recognised that the wedge-tailed shearwater breeding BIA overlaps the operational area but is a very large area compared to the BIA and given the distance to the nearest breeding and roosting areas (i.e. land) is greater than 32 km away, it is unlikely significant numbers will overfly the location. Collisions are therefore considered unlikely.

Any interactions with fauna during the activity is considered of negligible impact.

6.7.3 Environmental Performance

Hazard		**Interaction with fauna**		
Performance outcome		**No death or injury to EPBC Act listed marine fauna due to operational activities in the Operational Area**		
ID	**Management control**	**Performance standards**	**Measurement criteria**	**Responsibility**
	See Section 6.6.3 for appropriate performance standards			
051	Vessels operate at speeds in accordance with Stag Marine Facility Operating Manual (GF-90-MN-G-00038) to reduce potential for collision with marine fauna	Vessels operating within the restricted zone must not exceed a speed of five (5) knots.	Sign off sheet completed by Vessel Master	Marine Superintendent
052	Competency and Training Management System [JS-60-PR-Q-00015] provides a process for ensuring that Contractors and Services Providers have the appropriate level of HSE capability	Online induction includes information on speed limits in the restricted zone and requirements on interacting with marine fauna	Sign off sheet completed by Vessel Master Induction Records (Vessel Contractors)	HR Manager
053	Marine fauna collisions reported to National Ship Strike Database	Any vessel collision with a whale in the operational area is submitted to the National Ship Strike Database at: https://data.marinemammals.gov.au/report/shipstrike Death or injury to EPBC Act listed marine fauna (including cetaceans or whale sharks) from vessel collision are recorded/reported to NOPSEMA and DAWE in line with regulations	Incident reports record any incidences of non-compliance with EPBC Regulations 2000 – Part 8 Division 8.1 (interacting with cetaceans)	Marine Superintendent

6.7.4 ALARP Assessment

On the basis of the ERA conducted, and the use of relevant tools appropriate to the decision type, Jadestone considers the control measures described above are appropriate to manage the risk of collision between vessels and marine fauna or negative interaction with helicopters. The residual risk ranking for this potential impact is considered Low and therefore ALARP has been demonstrated. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost Effective	Justification
Removal of vessels and helicopter use	Eliminate	No	No	Vessel and helicopter presence is required during operational activities and there are no practicable alternatives. The potential for interaction between support and supply vessels and fauna cannot be eliminated, however the risk is extremely low given the low volume of vessel activity and speed limits.
Reduce frequency or size of support and supply vessels	Substitute	No	No	Reducing the frequency or size of support and supply vessels would introduce disproportionate operational and safety risks; for example, the vessel is required to be of sufficient size and power to enable efficient and timely supply the necessities/ services to maintain effective operation of the CPF and third-party tanker and to provide support in an emergency, e.g. man overboard.
N/a	Engineering	N/a	N/a	Not relevant
Reduce or remove vessel and helicopter use during key sensitive periods	Isolation	No	No	Reducing or removing vessel and helicopter activities during known migration periods of marine fauna is not a viable option as these activities are necessary for the safe and efficient operation of the facility.
Use of Marine fauna observers on all vessels to identify fauna close to vessels	Administrative	N/a	N/a	Support and supply Vessel Masters will complete an environmental induction which includes the applicable requirements or speed limits and avoiding fauna. The introduction of a specialist marine fauna observer is unlikely to increase detection, and the additional cost is considered grossly disproportionate given the low vessel speeds and low potential for impacts on marine fauna.

6.7.5 Acceptability assessment

The potential impacts of the physical presence of infrastructure and vessels are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.

Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.
Social acceptability	Stakeholder consultation has been undertaken (Section 2.4.5), and no stakeholder concerns have been raised with regards to impacts from vessel/ helicopter operations on sensitive receptors.

Laws and standards	Aspects of the Environment Protection and Biodiversity Conservation Regulations 2000, Division 8.1 – Interacting with Cetaceans Recovery Plan for Marine Turtles in Australia, (CoA 2017a)
Industry best practice	The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regards to offshore production operations. Whale Shark Code of Conduct (DEC)
Environmental context	The Operational Area overlaps the humpback whale 'species core range', migratory BIA, the pygmy blue whale distribution BIA, is adjacent to the whale shark foraging BIA and overlaps the flatback turtle internesting buffer BIA and habitat critical to the survival of flatback turtles. However, risk to megafauna is considered low and acceptable as vessels will travel at <5 knots; minimal vessel activity in the area, and risk of mortality from a low-speed vessel strike is low. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	**Recovery Plan for Marine Turtles in Australia, (DoEE 2017).** The Recovery Plan for marine turtles in Australia (DoEE 2017) identifies the following risk - Vessel Disturbance. It requires that risk of vessel strikes is evaluated and, if required, appropriate mitigation measures are implemented. This EP and the proposed controls are consistent with this advice. **Conservation Management Plan for the Blue Whale, 2015–2025.** The Management Plan identifies the following risk – 'Vessel Disturbance". It requires that risk of vessel strikes is evaluated and, if required, appropriate mitigation measures are implemented. This EP and the proposed controls are consistent with this advice. **Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC 2015a)** The conservation advice identifies the following risk – boat strike from large vessels. It requires that transit time of large vessels in areas close to marine features likely to correlate with whale shark aggregations (Ningaloo Reef, Christmas Island and the Coral Sea) and along the northward migration route that follows the northern Western Australian coastline along the 200 m isobath are minimised. The location of the operational area is adjacent to the whale shark foraging BIA, but vessels do not frequently transit through the BIA as they are likely to mobilise from Dampier to reach the operational area. Other plans that identify vessel strike as a potential threat include the below, though these species are not expected within the operational area. • Approved Conservation Advice for Balaenoptera borealis (sei whale) (TSSC 2015b) • Approved Conservation Advice for Balaenoptera physalus (fin whale) (TSSC 2015c) • National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) (CoA 2024) • Conservation Management Plan for the Southern Right Whale 2011–2021 (DSEWPaC 2012h) Jadestone has had regard to the representative values of the protected areas within the RISK EMBAs, and the respective management plans and other published information. Interactions with fauna may have a minor impact on any of the social and ecological objectives and values, of AMPs, or state MPs. However, with controls in place to minimise the likelihood (to protect protected fauna), this is considered consistent with the objectives of the conservation advice or management plans and considered Acceptable.

ALARP	The residual risk has been demonstrated to be ALARP.

6.8 Physical Footprint

6.8.1 Description of Hazard

Aspect	Following an integrity inspection, it may be necessary to modify the seabed in the vicinity of subsea infrastructure such as the pipeline to correct for free spans (by placing grout bags under the free span) or burial (by jetting or airlifting sediments from on top of the pipeline). As part of facility maintenance, marine growth is periodically removed either using water blasting or manual ROV, divers or bespoke automatic devices.

No other discharges to the marine environment resulting in disturbance to the seabed are expected due to IMR, corrosion control and integrity, and plant modification activities. Discharges to the environment may occur as a result of work over and well intervention activities, though these discharges are limited (refer Section 6.5) as the work is carried out on wells that are accessed on the topside of the platform. Vessels used for maintenance and integrity activities in close proximity to the facility will maintain station using dynamic positioning, and will not anchor, thereby not causing impacts to the seabed.

For more information on these activities refer to Sections 2.2.5, 2.2.6, 2.2.8 and 2.2.9.

6.8.2 Impacts

Disturbance to marine habitats and the seabed may occur in the event subsea infrastructure needs to be modified or repaired. The physical presence of subsea infrastructure creates habitat for organisms that are attracted to and/ or attach to hard substrates.

Potential impacts from the presence of infrastructure over the life of the development are:

- Localised physical damage/ loss to soft sediment benthic habitats and associated biota under and nearby the subsea infrastructure footprint`
- Provision of artificial habitat for benthic and pelagic organisms.

Temporary or permanent direct loss of benthic habitat and associated biota will occur under the footprint of subsea infrastructure. The Stag CPF, CALM buoy (anchors and chains) some subsea wells and the subsea export pipeline have been in place since commissioning in 1998. In the event that the installation of additional or replacement subsea infrastructure (e.g. tie in spools, anode skids) is required, this will create further disturbance to the seabed in the immediate area of existing infrastructure.

The scale of habitat loss and seabed disturbance from the physical presence of infrastructure is small in comparison to the vast size of soft substrate habitats spanning the North-west Shelf. The impacted benthic habitats and associated biota are well represented in the region and there are no known areas of sensitive habitat (e.g. corals, seagrass) within the Stag Facility area.

The operational area is within a HCTS area for flatback turtles (as referred to in Table 6 of the 2017 National marine turtle recovery plan). However, the total size of the BIA for Pilbara flatbacks is 35,758,775 km^2. The areas that may potentially be affected by physical presence would represent a very small percentage of the total area.

The presence of subsea infrastructure has the potential to act as artificial habitat or hard substrate for the settlement of marine organisms that would not otherwise be successful in colonising the area. Over time the colonisation of subsea infrastructure can lead to the development of a ‘fouling’ community, which subsequently provides predator or prey refuges, foraging resources for pelagic fish species and artificial reefs potentially supporting fish aggregations (Gallaway et al. 1981).

The presence of seabed and floating structures may have a minor positive benefit with reef associated species such as cods and snappers preferring habitat of structural complexity. Similarly, near-surface

infrastructure can support pelagic species that are commonly attracted to fixed and drifting surface structures in areas of open-ocean (Lindquist et al. 2005).

Impacts associated with the provision of artificial habitat from Stag infrastructure are increased biological productivity and diversity, which can result in a localised influence on marine communities. Given the small scale of the artificial habitat created, the potential impacts are expected to be highly localised.

Impacts associated with the physical footprint of the facility and activity are considered negligible.

6.8.3 Environmental Performance

Hazard		**Physical presence**		
Performance outcome		No unintentional disturbance to the seabed and marine environment in the Operational Area Seabed disturbance limited to planned activities and defined locations Decommissioning is planned to ensure Jadestone are compliant with obligations under s.572 of the OPGGS Act		
ID	**Management control**	**Performance standards**	**Measurement criteria**	**Responsibility**
054	Visual seabed surveys undertaken to define activity locations	Prior to commencement or as part of integrity, maintenance or repair work on subsea infrastructure, a survey using ROV/ AUV/ diving will be undertaken which will include a visual survey of the seabed within the footprint of the work area.	Survey report	Engineering Manager
055	Decommissioning framework implemented prior to end of field life	No later than five years prior to the end of field life, Jadestone will have a decommissioning framework that details how JSE will meet the obligations under s.572 of the OPGGS Act. This will include establishment of a detailed plan for decommissioning of wells, structures, equipment and property to enable decommissioning in a timely manner. This will require detail on: • Ongoing monitoring and maintenance commitments • Baseline environmental monitoring requirements to inform decision making • Any technical studies to support options assessment • Timeframes for the planning and execution of all regulatory approval documents • Full inventory of all in-field infrastructure • Continually updated status of all in-field infrastructure • overall decommissioning concept.	Established decommissioning project by 2030 (based on current expected commercial EOFL)	Country Manager
056	Annual validation of the Stag Asset Decommissioning	Jadestone completes an external review of the facilities D&R technical basis and associated cost estimate annually with a report compiled every 3 years and EOFL date confirmed.	Cost estimate report updated annually	Country Manager

Hazard		Physical presence		
Performance outcome		No unintentional disturbance to the seabed and marine environment in the Operational Area Seabed disturbance limited to planned activities and defined locations Decommissioning is planned to ensure Jadestone are compliant with obligations under s.572 of the OPGGS Act		
ID	**Management control**	**Performance standards**	**Measurement criteria**	**Responsibility**
	and Restoration (D&R) liability			
057	Decommissioning working group	No later than six years prior to the end of field life, Jadestone will establish a dedicated working group as a focal point for planning decommissioning activities to drive the planning and execution of the strategy supported by financial and investor decisions.	Decommissioning Working Group established six years prior to end of field life.	Country Manager
058	Maintenance of inactive infrastructure in accordance with the CMMS	Jadestone will maintain in good condition and repair all active and inactive subsea structures that are, and all subsea equipment and other property that is used in connection with the Stag Operations to ensure they can meet obligations under s.572 of the OPGGS Act and will continue to seek opportunities for opportunistic decommissioning where feasible.	Inspection records in CMMS	Maintenance Team Lead
059	Inspection of subsea infrastructure completed in accordance with the Subsea Inspection Strategy (JS-16-PR-U-00001)	Jadestone will inspect subsea infrastructure in accordance with the Subsea Inspection Strategy (JS-16-PR-U-00001) for other subsea infrastructure.	Inspection records in CMMS	Operations Manager

6.8.4 ALARP Assessment

On the basis of the impact and risk assessment process completed, Jadestone considers the control measures described above are appropriate to manage the impacts to seabed and benthic habitats due to the physical footprint of the operation. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
No maintenance of subsea infrastructure	Eliminate	No	No	The facility has been on location since 1998, and therefore the physical footprint is already present. However, additional disturbance due to anchoring is eliminated as dynamic positioning (DP) used by work vessels eliminates the need for anchoring, thereby reducing the risk of impacts to the seabed. Additional disturbance for stabilisation or ROV activities is unavoidable and is required to maintain the integrity of subsea infrastructure.
N/a	Substitute	N/a	N/a	The presence of the CALM buoy minimises the need for anchoring of the third-party tanker, thereby reducing the risk of impacts to the seabed due to anchoring of the third-party tanker to ALARP. No further substitutions are therefore considered.
N/a	Engineering	N/a	N/a	The marine growth prevention systems applied on near-surface submerged structures and internal seawater intake systems, and the maintenance of these systems reduces the potential for providing a significant artificial habitat and decreases the frequency of inspection activities with the consequent cleaning of biofouling communities on external in-water surfaces which may contain remnant anti-fouling paint.
N/a	Isolation	N/a	N/a	The activities are located outside of areas supporting highly valuable benthic habitats.
N/a	Administrative	N/a	N/a	IMR activities include visual ROV surveys of seabed habitat

6.8.5 Acceptability Assessment

The potential impacts of impacts to seabed due to physical footprint are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.

Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.
Social acceptability	Stakeholder consultation has been undertaken (Section 2.4.5), and no stakeholder concerns have been raised with regards to impacts from physical footprint on sensitive receptors.
Laws and standards	No applicable laws or standards identified.
Industry best practice	The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regards to offshore production operations.

Environmental context	Disturbance is localised to immediately under or near to the footprint of Stag Facility subsea infrastructure within the Operational Area. The impacted benthic habitats and associated biota are well represented in the region. The operational area is within a HCTS for flatback turtles. However, the areas that may potentially be affected by physical presence would represent a very small percentage of the total area. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	No management plans identified physical presence as described above as being a threat to marine fauna or habitats. Jadestone Energy has had regard to the representative values of the protected areas within the EMBAs, and the respective management plans and other published information. Impacts from physical presence will have a negligible impact on any of the social and ecological objectives and values, of any AMPs, or state marine parks. This is consistent with the objectives of the protected area management plans and considered acceptable.
ALARP	The residual risk has been demonstrated to be ALARP.

6.9 Spill Response Activities

6.9.1 Description of Hazard

Aspect	In the event of a hydrocarbon spill, contingency spill response activities will be undertaken to reduce the level of impact to sensitive receptors. The OPEP describes the spill response strategies that will be employed in the event of a hydrocarbon spill from Stag Operations. Response strategies that may be used include: • Monitor and evaluate • Source control • Natural recovery • Containment and recovery • Surface chemical dispersants • Shoreline protection and deflection • Shoreline clean-up • Oiled wildlife response • Operational and scientific monitoring. While the aim of responding is to reduce impacts from the spill, there is the potential for response activities to exacerbate or create additional impacts. Poorly selected or implemented spill response activities may therefore do more environmental harm than good.

6.9.2 Impacts

The OPEP provides detail on how response strategies will be implemented.

The impacts below describe potential impacts from spill response activities to all known sensitive receptors in the EMBA. However, the only shoreline predicted to be contacted at moderate thresholds that may cause environmental impact is Montebello Islands. Other shoreline locations are included below for conservatism.

Light emissions

Spill response activities will use vessels, which are required at a minimum to display navigational lighting and have night safety lighting. Field based spill response activities will only occur in daylight hours, although as some vessels may be moored overnight there is limited potential for night light spill from vessels to impact marine and coastal fauna habitats.

Lighting may cause behavioural changes to fish, birds and marine turtles which can have a heightened consequence during sensitive life-cycle activities (refer Section 6.1.2), for example turtle nesting and hatching. Turtles and birds, which include threatened and migratory fauna (refer Section 6.1), have been identified as key fauna susceptible to lighting impacts. These species are also identified as KPIs in the protected areas within the EMBA (Table 3-2).

Spill response activities may occur on shorelines used by nesting turtles, including flatback, hawksbill, green and loggerhead turtles. Locations particularly important for seasonal turtle nesting in the EMBA include the Lowendal and Montebello Islands, Barrow Island, Dampier Archipelago and Eighty Mile Beach. The Muiron Islands and Ningaloo World Heritage area are also important for seasonal turtle nesting. Light has been identified as a key threat to turtles in the National Recovery Plan (CoA 2017a), and respective species Conservation advice. Although as shoreline spill response operations will only occur in daylight hours, there will be no impact from light.

There are 8 EPBC listed bird species whose BIA occur in the EMBA (Table 3-3). Locations particularly important for seabirds and shorebirds in the EMBA include Lowendal and Montebello Islands, Dampier Archipelago, and Eighty Mile Beach. Eighty Mile Beach is a particularly important area for seasonal aggregations of migratory shorebirds and is a listed Ramsar site. Ningaloo World Heritage Area and Clerke Reef (Rowley Shoals) are also important for seabirds and shorebirds. Light emissions are not identified as a key threat to any of the EPBC threatened species (Table 3-2).

Lighting impacts to fauna during spill response activities are unlikely to be significant enough to cause flow on impacts to reliant industries such as tourism.

Noise

Spill response activities will involve the use of aircraft and vessels which will generate noise both offshore and in proximity to sensitive receptors in coastal areas. Spill response activities will also involve the use of equipment on coastal areas during clean-up of shorelines and monitoring activities (e.g. pumps, generators and vehicles), and for accessing shoreline areas (e.g. vehicles).

Underwater noise from the use of vessels may impact marine fauna, such as fish, marine reptiles and marine mammals more likely causing behavioural changes which may impact key life-cycle process (e.g. spawning, breeding, calving). Underwater noise can also mask communication or echolocation used by cetaceans. Spill response activities using vessels generating noise have the potential to impact migratory marine fauna including species who have BIAs within the EMBA such as the whale sharks, humpback and blue whales. Section 6.2 provides further detail on these potential impacts.

Noise and vibration from terrestrial activities on shorelines has the potential to cause behavioural disturbance to coastal fauna including protected and migratory species of shorebirds and seabirds. Noise and vibration may affect bird breeding and nesting behaviours and disrupt feeding activity. This could potentially impact reproductive success and for migratory shorebirds may negatively impact the ability to

replenish energy reserves for migratory flights. However, if the shoreline is oiled, this may be beneficial by acting as a deterrent for coastal fauna and prevent oiling.

There are 8 EPBC bird species whose BIA overlaps the EMBA (Table 3-3). Locations particularly important for seabirds and shorebirds in the EMBA include Lowendal and Montebello Islands, Dampier Archipelago and Eighty Mile Beach (where birds are identified as a KPI). Eighty Mile Beach and Clerke Reef are particularly important areas for seasonal aggregations of migratory shorebirds and the former is a Ramsar site.

Noise impacts to fauna during spill response activities are unlikely to be significant enough to also cause flow on impacts to reliant industries such as tourism and commercial fishing.

Atmospheric emissions

The use of fuels to power vessel engines, generators and mobile equipment used during spill response activities will result in emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHG such as sulphur oxides (SO_x) and nitrous oxides (NO_x). Emissions will result in localised decrease in air quality. Section 6.3 provides more detail on potential impacts.

Atmospheric emissions from spill response equipment will be localised and while there is potential for fauna and flora impacts, the use of mobile equipment, vessels and vehicles is not considered to create emissions on a scale where noticeable impacts would be predicted. Emissions may occur in Protected Areas and/or areas where tourism is important however the scale of the impact relative to potential oil spill impacts is not considered great.

Operational discharges and waste

Operational discharges include those routine discharges from vessels used during spill response which may include:

- Bilge water
- Deck drainage
- Putrescible waste and sewage
- Cooling water from operation of engines.

In addition, there are specific spill response discharges and waste creation that may occur, including:

- Decanting oily water back into the marine environment from offshore containment and recovery operations
- Cleaning of oily equipment/vessels and vehicles
- Flushing water for the cleaning of shoreline habitats
- Sewage/putrescible and municipal waste at camp areas
- Creation, storage and transport of oily waste and contaminated organics.

Operational discharges from vessels may create a localised and temporary reduction in marine water quality. Effects include nutrient enrichment, toxicity, turbidity, temperature and salinity increases as detailed in Section 6.5. Discharges may impact a different set of receptors than previously described, given vessel use may occur in shallower coastal waters during spill response activities. Discharge could potentially occur adjacent to marine habitats such as corals, seagrass, macroalgae, however discharges will be very localised and temporary.

The decanting of oily water back into the marine environment during containment and recovery activities has the potential to impact marine organisms from the toxic effects from hydrocarbons, however, given the

marine environment is already contaminated with hydrocarbons there is limited potential for an increase in impact, unless the discharge spreads the contamination to a previously uncontaminated area.

Cleaning of oil contaminated equipment, vehicles and vessels, has the potential to spread oil from contaminated areas to those areas not impacted by a spill, potentially spreading the impact area and moving oil into a more sensitive environment.

Flushing of oil from shoreline habitats is a clean-up technique designed to remove oil from the receptor that has been oiled and remobilise back into the marine environment and result in further dispersion of the oil. The process of flushing has the potential to physically damage shoreline receptors such as mangroves and rocky shoreline communities, increase levels of erosion, and create an additional, and potentially higher, level of impact than if the habitat was left to bio-remediate.

Sewage, putrescible and municipal waste will be generated from onshore activities which may include toilet and washing facilities. These wastes have the potential to attract fauna, impact habitats, flora and fauna and reduce the aesthetic value the environment areas. The creation, storage and transport of oily waste and contaminated organics has the potential to spread impacts of oil to areas, habitats and fauna not previously contaminated. The risk of sewage, putrescible and municipal waste is heighted in areas supporting shorebird population where shoreline staging areas may be deployed.

Physical presence and disturbance

The movement and operation of vessels, vehicles, personnel and equipment during spill response activities has the potential to disturb the physical environment, marine/ coastal habitats and fauna, and may also impact cultural and heritage values of an area (refer Sections 6.6.2 and 6.7.2). The movement of vessels could introduce invasive marine species attached as biofouling or included within ballast water to nearshore areas, while vehicle and equipment movement could spread non-indigenous flora and fauna.

Oiled wildlife response activities may involve deliberate disturbance (hazing), capture, handling, cleaning, rehabilitation and release of wildlife, which could lead to additional impacts to species including EPBC listed species.

The use of vessels may disturb benthic habitats in coastal waters e.g. corals, seagrass and macroalgae, including those within protected areas. Potential impacts to habitats from shoreline/ nearshore activities includes the deployment of anchor/ chain and the grounding of vessels in shallow waters. Booms create a physical barrier on surface waters which can entangle or prevent the passing of marine fauna using surface waters. Vessel use in shallow coastal waters also increases the chance of contact or behavioural disturbance of marine megafauna including EPBC listed species such as turtles, dolphins, dugongs and seabirds. Increased vessel activity further offshore has the potential to disturb migrating humpback whales, whale sharks and blue whales in season. Locations at risk are Lowendal and Montebello Islands, Barrow Island, Dampier Archipelago and Eighty Mile Beach due to high density/ diversity of benthic habitats (e.g. corals, seagrass and/ or macroalgae) and high abundance of marine megafauna using these habitats (e.g. feeding turtles, dugongs and dolphins).

Vehicles, equipment and personnel used during shoreline response activities have the potential to damage coastal habitats such as dune vegetation, samphire and mangroves and habitats important to threatened and migratory fauna including nests of turtles and birds and bird roosting/ feeding areas. Shoreline clean-up may involve the physical removal of substrates that could cause impact to habitats and coastal hydrodynamics and alter erosion/ accretion rates. Aside from physical damage to important coastal habitat (e.g. mangroves) and turtle/ bird nesting areas, the operation of vehicles, equipment and personnel can create behavioural disturbance to coastal fauna, particularly birds, which may be present and abundant during daytime operations. As discussed with lighting and noise impacts, disturbance from shoreline operations may affect nesting and feeding behaviours, negatively influencing breeding participation/success or altering migratory behaviours. The disturbance to shorebird feeding may have implications on the replenishment of energy reserves and the timing and success of migratory flights. Although, if the shorelines are oiled, this may have a beneficial hazing effect.

Sensitive mangroves areas are a key feature of the Lowendal and Montebello Islands, Dampier Archipelago and Eighty Mile Beach, while locations particularly important for seabirds or shorebirds include Lowendal and Montebello Islands, Dampier Archipelago and Eighty Mile Beach.

Aside from disturbance to habitats and marine/coastal fauna, spill response activities may create disturbance to cultural values additional to the spill itself. Shorelines of Dampier Archipelago (Burrup Peninsula) have indigenous significance in terms of traditional use for food resources as well as containing symbolic sites and landscapes. Some shorelines of the Dampier Peninsula are subject to Native Title.

Oiled wildlife response may include the hazing, capture, handling, transportation, cleaning and release of wildlife susceptible to oiling such as birds and marine turtles. While oiled wildlife response is aimed at having a net benefit, poor response can potentially create additional stress and exacerbate impacts from oiling, interfering with key life-cycle processes, hampering recovery and in the worst instance increasing levels of mortality.

Impacts from invasive marine species released from vessel biofouling include out-competition, predation and interference with other ecosystem processes. The ability for a non-native species to establish is generally mitigated in deeper offshore waters where the depth, temperature, light availability and habitat diversity is not generally conducive to supporting reproduction and persistence of the invasive species. However, in shallow coastal areas, such as areas where vessel-based spill response activities may take place, conditions are likely to be more favourable. Impacts from invasive terrestrial species are similar in that the invasive species can out-compete local species (e.g. weeds) and interfere with ecosystem processes. Non-native species may be transported attached to equipment, vehicles and clothing. Such an introduction would be especially detrimental to wilderness areas or protected terrestrial reserves which have a relatively undisturbed flora and fauna community.

Disruption to other users of marine and coastal areas and townships

Spill response activities may involve the use of vessels, equipment and vehicles in areas used by the general public or industry. The mobilisation of spill response personnel into an affected area may also place increased demands on local accommodation and other businesses.

Shoreline response activities will restrict access and activities along affected shorelines which may include areas popular for tourism. Fisheries and aquaculture activities (e.g. pearl farming) may also be suspended in areas potentially affected by oil without necessarily being contacted by oil. Tourism and fisheries may be important economic drivers for the economies of local townships. Townships may also be impacted through the influx of spill responders using facilities for accommodation and forward operations areas which may negatively impact local businesses.

Chemical dispersant application

While the aim of chemical dispersants is to provide a net benefit to the environment, the use of dispersants has the potential to increase exposure to habitats under the sea surface, including coral, seagrass and macroalgae, and to marine fauna (particularly fish and invertebrates) by increasing entrained oil concentration. These receptors are generally located in shallow coastal areas of the mainland and offshore islands, away from where surface dispersants would be applied.

Increased entrained and aromatic hydrocarbon concentration can contact marine fauna, and are most likely to be encountered by plankton, benthic filter feeding invertebrates, fish and sharks. Fish and sharks include threatened/migratory species, which may ingest oil or uptake toxic compounds across gill structures. As a result of increased exposure to marine fauna and subtidal habitats, socio-economic impacts may be felt through industries such as tourism and commercial fishing.

A description of the potential impacts from entrained oil and aromatic hydrocarbons from a maximum credible worst-case spill is provided in Section 7.5.2 and Table 7-12.

Detailed assay information of Stag crude oil was provided to APASA to commission a report, the *Net Environmental Benefit Analysis for the Use of Dispersants* (APASA 2012c), to assess whether the application

of chemical dispersants reduced the probability of contact to shorelines. Key findings of this report include a reduction in the predicted probabilities for shoreline contact, and greater prediction times to sensitive locations following the application of chemical dispersant, particularly effective during the summer months. These key findings support the use of chemical dispersants on Stag crude as they have potential to reduce hydrocarbon contact to sensitive locations, and also increase the time of the hydrocarbon contact to shorelines, thus giving time for other response strategies to take effect and further reduce impacts.

Jadestone commissioned RPS to re-analyse the outcomes of a quantitative spill risk assessment for hydrocarbon spill scenarios at Stag and conduct modelling to assess the effects of hydrocarbon dispersant application for the worst-case scenario (APASA 2017).

The modelling results suggest oil loading at the closest onshore receptors, may be reduced through the surface application of chemical dispersants particularly in the summer months. The application of chemical dispersants was predicted to result in a localised increase in the concentration of entrained oil above the impact threshold of 500 ppb, particularly at the Montebello and Lowendal Islands in summer.

During a response, the area over which entrained oil will increase will be a function of the area treated with aerial dispersants. The area treated will be a function of the height at which the dispersants were dropped as well as the volume released and the speed at which the aircraft was moving at the time of release, therefore this estimated area is very much estimated and is expected to be in the order of tens to hundreds of metres. The increase in entrained oil concentration will be short term (minutes to hours) as the floating oil moves into the water column after which dispersion of the entrained oil will see concentrations decrease.

Overall Consequence assessment: Negligible

6.9.3 Environmental performance

The OPEP contains environmental performance measures for the spill response strategies.

6.9.4 ALARP Assessment

The purpose of implementing spill response activities is to reduce the severity of impacts from an oil spill to the environment. However, if the strategies do more harm than good (i.e. they are not having a net environmental benefit) then the spill response is not ALARP. The key process in determining if the strategies employed are having a net benefit is the net environmental benefit analysis (NEBA). A NEBA is conducted for each operational period during a response to ensure the best strategies are being implemented and the ALARP principle is regularly tested (refer to the OPEP for further detail).

It is best practice to ensure all possible response strategies have been evaluated and, if there is the potential to produce a net environmental benefit, to have them in the toolbox ready for implementation if determined feasible for the scenario, (IPIECA (2016) Contingency planning for oil spill on water: good practice guidelines for the development of an effective spill response capability).

For each of the environmental hazards associated with spill response strategies an ALARP evaluation was conducted as part of the hazard identification workshop (HAZID). A number of controls were identified as industry and/ or Jadestone standard controls that will be considered during a spill response while additional controls were evaluated and either accepted or rejected on the basis of the ALARP principal, i.e. a decision was based on whether the additional control would have a cost/effort disproportionate to the level of impact reduction it would provide. Results of the evaluation are reflected in Section 7.5.2.

Note that some of the potential impacts to fauna from spill response activities can be beneficial in the prevention of oiling by acting as deterrents. For example, if shoreline operations are being undertaken at a turtle nesting or bird breeding site, fauna may avoid the location as disturbed by noise or people and thereby not be oiled.

6.9.5 Acceptability Assessment

The potential impacts of spill response activities are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of continuously reviewing and updating activities and practices at the Stag facility, including spill response arrangements.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), including engagement with the State and National response agencies of DoT and AMSA, nearby operators, AMOSC, as well as commercial and recreational fishing industry bodies and fishers. No stakeholder concerns have been raised with regards to impacts of the spill response activities on relevant persons. During any spill response, a close working relationship with key regulatory bodies (e.g. DoT, DBCA, AMSA, DER) will occur and thus there will be ongoing consultation with relevant persons during response operations.
Laws and standards	Jadestone is obligated to respond to a hydrocarbon spill under the following legislative instruments: • OPGGS Act Section 572A-F – polluter pays for escape of petroleum • AMSA Marine Orders Part 91 • *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* • *Protection of the Sea (Civil Liability for Bunker Oil Pollution Damage) Act 2008*

Industry best practice	Response planning and preparedness undertaken in accordance with:
	• National Plan for Maritime Environmental Emergencies (AMSA 2020)
	• AMOSPlan (AMOSC 2021)
	• NOPSEMA Guidance Notes (e.g. Oil Pollution Risk Management Guidance Note July 2021)
	• NOPSEMA Policy Offshore oil pollution incidents January 2024.
	• DoT Offshore Petroleum Industry Guidance Note, Marine Oil Pollution: Response and Consultation Arrangement July 2020
	• DoT OSCP (2015)
	• State Hazard Plan – Maritime Environmental Emergencies (MEE), 2023)
	• Fingas, M.F. (2012) The Basics of Oil Spill Clean-up. CRC Press. Florida, United States of America.
	• ITOPF Technical Information Papers including:
	  ○ ITOPF (2014) Technical Information Paper Dispersant Use
	  ○ ITOPF (2023). ITOPF Members Handbook 2023/2024
	  ○ ITOPF (2014) Technical Information Paper Clean-up of oil from shorelines
	  ○ ITOPF (2013). Technical Information Paper Use of Booms in oil pollution response ·
	• IPIECA International Association of Oil and Gas Producers Good Practice Guide Series including:
	  ○ IPIECA-IOGP (2023) Oil spill exercises: Good practice guidelines for the development of an effective exercise programme
	  ○ IPIECA-IOGP. (2015) A Guide to Oiled Shoreline Clean-up Techniques: Good practice guidelines for incident management and emergency response personnel
	  ○ IPIECA-IOGP (2015) Oil spill preparedness and response: an introduction

	○ IPIECA-IOGP (2015) Contingency planning for oil spills on water Good practice guidelines for the development of an effective spill response capability • Oil Spill Response (OSRL) handbooks including: ○ Shoreline operations handbook ○ Containment and recovery handbook ○ Dispersant application field guide
Environmental context	The worst-case credible spill scenario for the Stag facility operating activities is as a result of loss of pipeline integrity. The area of dispersion over which the oil travels is between Eighty Mile Beach to the north, and to Ningaloo in the south. The oil is primarily floating and sensitive receptors at risk include seabirds, shorebirds, marine fauna and coastal habitats. While some response strategies (e.g. application of chemical dispersants and booming operations) may pose additional risk to sensitive receptors, to not implement response activities would likely result in greater negative impact to the receiving environment and a longer recovery period. Response activities are undertaken in accordance with controls which reduce and/or prevent additional risks. The mutual interests of responding and protecting sensitive receptors from further impact due to response activities is managed through the use of a net environmental benefit analysis during response strategy planning in preparedness arrangements as well as during a response. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	Jadestone Energy will have regard to the representative values of the reserves and other information published and endeavour to ensure that priority is given to the social and ecological objectives and values, of any AMPs, or state MPs impacted by spill response activities to ensure that the objectives of the management plans are not contravened. Noting 'Emergency response' is permitted in all AMPs and State MPs. Actions required to respond to oil pollution incidents, including environmental monitoring and remediation, in connection with activities authorised under the OPGGS Act may be conducted in all zones. The Director will be notified in the event of an oil pollution incident that occurs within, or may impact upon, an Australian MP and, so far as reasonably practicable, prior to a response action being taken within a MP. The Management Plans for EPBC protected species that identify light, noise and other risks through Section 6 and 7 apply here. The 'Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species' will be applied/used as guidance in the event of an oil spill.
ALARP	The residual risk has been demonstrated to be ALARP.

7. ASSESSMENT – UNPLANNED EVENTS

This section of the EP describes the potential risks and environmental impacts from accidental events that may arise during the operation of the Stag Facility and associated mitigation and management measures that will be implemented to reduce impacts to an acceptable level.

The environmental risk assessment process identified five accidental environmental risks. The pre-treatment and residual risk rankings are summarised in Table 7-1 and presented in detail throughout this section.

Table 7-1: Summary of the environmental risk assessment ranking for accidental events

Hazard	Consequence	Likelihood	Risk ranking
1 IMS introduction	Moderate	Very unlikely – extremely unlikely	Low
2 Unplanned release of solids	Minor	Moderate	Medium
3 Unplanned release of non-hydrocarbon liquids	Minor	Unlikely	Low
4 Unplanned release of Stag crude oil	Major	Unlikely	Medium
5 Unplanned release of diesel	Minor	Unlikely	Low

The presentation of impacts and risks identified during the assessment process for hazards associated with unplanned activities is provided as follows:

- Description of the hazard
- Impacts and risks – a discussion and assessment of the environmental impacts and risks associated with accidental events that may arise
- Environmental performance – a description of a measurable level of performance required for the management of environmental aspects to ensure that the environmental impacts and risks will be of an acceptable level; and a statement of performance required of a control measure. This includes a description of the control measures in place to reduce the impact and control the risk
- Demonstration of ALARP and Acceptability – a demonstration that the environmental impacts and risks will be reduced to ALARP and will be of an acceptable level, and the rationale for these statements.
- A review of the potential unplanned impacts was undertaken in August 2022.

7.1 Invasive Marine Species Introduction

7.1.1 Description of Hazard

Aspect	Ballast water is taken up and discharged at the Stag location by third party vessels, these vessels may be sourced from both international or domestic locations. There is the potential for support vessels or vessels used for the activity to transfer invasive marine pests (IMPs) from either international waters or Australian waters into the Operational Area and for them to establish in the local environment. There is also potential for invasive marine pests to be transferred into Australian Territory and coastal waters via support vessels when commuting to/ from State/ Territory or Commonwealth waters. This can occur through ballast water uptake and discharge, or biofouling on vessel hulls or immersible equipment.

7.1.2 Impacts and Risks

The introduction and establishment of invasive marine species (IMS) can result in a localised impact on native marine fauna and flora, including:

- Competition, predation or displacement of native species
- Alteration of natural ecological processes
- Introduction of pathogens with the potential to impact human and/or ecological health
- Reduction and/or competition with commercial fish and aquaculture species
- Increased requirement for maintenance of vessels and marine infrastructure.

Potential sources for the transfer and establishment of IMS include:

- Biofouling on vessels on external surfaces and other external niches (e.g. sea chests, propulsion units, steering gear and thruster tunnels)
- Biofouling of vessels within internal system niches (e.g. strainers, seawater pipe work, anchor cable lockers)
- Biofouling on equipment that routinely becomes immersed in water (including but not limited to equipment such as conductor casing and ROVs)
- Discharge of high-risk ballast water taken up at international or domestic sources.

There are four key steps involved for a successful IMS incursion:

- Colonisation and establishment of the marine pest on a vector (e.g. vessel) in a donor region (e.g. home port)
- Survival of the organism on the vector during the voyage from the donor to the recipient region
- Transfer from the vector to habitat in the recipient region
- Colonisation (e.g. reproduction or dislodgement) of the recipient region by the marine pest, followed by successful establishment of a viable new population (Commonwealth Government 2009).

Colonisation requires there to be suitable environmental conditions for the particular species, including aspects such as water temperature, water depth, salinity, food availability and habitat type. Marine pest species also tend to be coastal species, and as such, most exotic marine pests introduced to Australian waters have distributions restricted to shallower coastal habitats.

It is unlikely that any IMS entering the Operational Area would establish on the natural benthic habitat (soft sediments at the seabed). The depth of the Operational Area (49 m), low-nutrient open ocean conditions and lack of available light at this depth provides a very different environment to that within sheltered ports and shallow coastal areas which are the typical sources of, and which have historically been colonised by IMS. Subsequently the likelihood of a potential introduction of IMS is considered low. However, there exists a risk that the field infrastructure may harbour IMS. Should such a situation exist, this would represent a subsequent risk of transfer of IMS to vessels visiting Stag, or potentially as a reservoir for spread of invasive species to Australian coastal areas via natural processes of dispersion and range expansion.

To act as a harbour for introduced marine species, a number of links in a sequential chain of successive processes would need to be properly aligned, with these summarised as follows:

- An exotic species would need to be successfully conveyed to the Stag field, such as via vessel biofouling
- The exotic species would need to successfully transfer from its arrival vector to the field infrastructure, and establish on that new substrate
- The habitat conditions presented by the Stag field infrastructure and wider environment would need to be conducive to the enduring survival of that species.

It is to be remembered that not all exotic marine species present as ‘invasive’ or ‘pest’ species. To be considered as ‘invasive’, the introduced species must be able to survive and establish in the new location, and subsequently manifest as some form of nuisance or pest (NOPSEMA 2018). Furthermore, even if an exotic species had established on the Stag infrastructure, it would only then represent any tangible threat to Australian waters in the event that it was able to further its range, either through natural processes such as larval dispersion, or by transfer to another vector, such as by subsequent biofouling of a work vessel operating in the Stag field. Without this secondary transfer mechanism any exotic species colony which may be established at Stag would represent an isolated community of no wider significance or ecological consequence (PGM Environment 2021).

Following their establishment, eradication of marine pest populations is often impossible, limiting management options to ongoing control or impact minimisation. For this reason, increased management

requirements have been implemented by Commonwealth and State agencies via the development of Australia's National System for the Prevention and Management of Marine Pest Incursions which looks at managing biofouling and ballast water.

Ballast water

The Department of Agriculture Water and Environment (DAWE) is the lead agency for management of ballast water from vessels operating in Australian waters. DAWE introduced the Australian Ballast Water Management Requirements Version 8 (DAWE 2020) that are enforced under the *Biosecurity Act 2015*. The requirements provide guidance for vessel operators on best practice policies and apply to all vessels operating internationally and domestically in Australia.

Key points for vessels intending to discharge ballast within Australian waters, as detailed within the Australian Ballast Water Management Requirements Version 8 include:

- All vessels must carry a valid ballast water management plan
- All vessels must carry a valid International Ballast Water Management certificate
- Vessels with a ballast water management system (BWMS) must carry a Type Approval Certificate specific to the type of BWMS installed
- All vessels must maintain a complete and accurate record of all ballast water movements.

Biofouling

The central Commonwealth instrument for the control of biofouling related IMS risks is the *Biosecurity Act 2015*. The *Biosecurity Amendment (Biofouling Management) Regulations* 2021 (biofouling regulations) entered into force on 15 June 2022. This introduced requirements for operators of all vessels to provide information on biofouling management practices prior to arriving in Australia.

Australian biofouling management requirements Version 2 (DAFF, 2023) provide details of Australia's pre-arrival reporting requirements and guidance for operators of international vessels that are subject to biosecurity control while in Australian territorial seas. The requirements set out vessel operator obligations for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas to comply with the *Biosecurity Act 2015*. These requirements are also described in Jadestone's Marine Biosecurity Manual (JS-70-MN-G-00001).

The potential biofouling risk presented by vessels within the Operational Area relates to the length of time vessels are in Australian waters or operating outside Australian waters, the length of time spent at these location(s) and whether the vessels have undergone hull inspections and cleaning and the age of the antifouling coating, prior to entering Australian waters.

Any vessel or marine infrastructure destined for WA waters from interstate or overseas is also required to meet the aquatic biosecurity standards set out under the *Fisheries Resources Management Act 1994*, as administered by the DPIRD. In some circumstances, a Marine Biosecurity Inspection for the presence of known and potential IMS is required to ensure compliance with Regulation 176. No target marine species of concern to WA waters should be detected during any such inspection. In accordance with marine pest management guidelines (as enforced under the WA *Fish Resources Management Act 1994*; and Fish Resources Management Regulations 1995):

- Immersible equipment and the vessel hull, sea chests and other niches must be 'clean[14]' before any vessels enter WA waters and ports
- The suspected or confirmed presence of any marine pests or disease must be reported within 24 hours by email (biosecurity@fish.gov.au) or telephone (FishWatch tel: 1800 815 507). This includes any

[14] With 'clean' implied by DPIRD as free of listed IMS

organism listed on the WA Prevention List of Introduced Marine Pests, and any other non-indigenous organism, that demonstrates invasive characteristics.

The risk of biofouling transfer from vessels to isolated, hard anthropogenic substrates has been assessed previously (URS 2013), with the conclusion that the likelihood of such transfer was minimal for sessile species. It was considered that any such transfer is more likely for swimming and other mobile species, such as crabs. Any inherent risk of transfer from a vessel of invasive mobile and swimming species can be minimised by managing vessel hulls to have only minimal fouling, thus denying mobile species suitable habitat for their own colonisation and sustainment.

Stag Field IMS Status

As an initial IMS risk screening and management focus measure, species listed or assessed as invasive by DAWE were considered in the context of their potential to be able to establish on the Stag infrastructure, following possible transfer to the field by ships. These candidate species were primarily drawn from those considered as presenting tangible risk via the process of development of the Australian Priority Marine Pest List (ABARES 2019). This field of candidate species was further refined, based upon work by Australian Government agencies (MPSC 2020; NIMPIS 2008; Richmond et al. 2010) by dismissing those which would require habitat conditions not available in the Stag field, with subsequent concentration upon those which could theoretically establish upon Stag and present tangible risk of further spread to Australian coastal waters.

In accordance with NOPSEMA guidance (NOPSEMA 2018), video ROV footage captured during structural assessment surveys of Stag field infrastructure in February and July 2020 was reviewed as a means of detecting any invasive species which may have established (PGM Environment 2021). Notwithstanding the inherent limitations of in-water surveys, and the difficulties of detecting mobile species such as crabs, the review of ROV video footage did not detect any listed IMS nor indicate their likely presence (PGM Environment 2021). In general terms, the biofouling assemblage observed on the Stag field infrastructure was representative of that which would be expected of any structure immersed for an extended period in the waters in that region.

Should any IMS establish in the Stag field, other than being an isolated colony of note, they would only represent any specific biosecurity hazard to Australian waters if they were able to transfer from Stag to a nearby location of some ecological, social or economic significance and then establish in that latter location. Those locations exhibiting potential significance or vulnerability to invasion include nearby ports and conservation areas. The closest coastal areas to Stag are Dampier archipelago approximately 32 km away, and the nearest marine protected areas or significant regional features are the Glomar Shoals and the Montebello Islands, which are 100 km and 75 km, respectively, from Stag at their closest points. Any IMS located at Stag could only reach any of these locations following spread and dispersal by mechanisms such as currents or carriage by vessel.

Currents in the Stag field are semi-diurnal and predicted to have average speeds of approximately 0.25 knots up to 0.5 knots. The oscillating nature of the currents suggests that it would take somewhat in excess of three days, as a minimum, for floating larvae to reach the coastal locations in closest proximity to the Stag field, and somewhat longer to reach the closest conservation significant areas. Spread of IMS from the Stag field could also be conceivably accomplished by larval colonisation of vessels operating in the Stag field, or by mobile species swimming across to such a vessel, with subsequent vessel-mediated transfer to other locations. Although theoretically possible, such transfer has been reviewed and deemed to present a low likelihood of occurrence (URS 2013).

On the basis of the species risk evaluations and review of available video footage, it may be stated that the Stag field infrastructure, as at the time of the reviewed ROV surveys, presented no evidence of having been colonised by listed marine pest species of concern to DAWE, and with no indicators of likely presence. Accordingly, and within the limitations intrinsic to such surveys, it may be concluded that Stag infrastructure is unlikely to harbour IMS of concern and thus represents minimal risk as a haven or staging point for subsequent further spread of IMS (PGM Environment 2021).

It is well recognised by Australian authorities that IMS can have deleterious effects upon marine areas, including conservation areas, in a number of ways such as by:

- Out competing
- Predating upon or displacing native species
- Altering natural ecological processes
- Harbouring pathogens which can impact upon ecological or human health; or
- Degrading commercial fisheries and aquaculture enterprises.

Determination and description of the potential effects and consequences of IMS colonisation of conservation dependent areas in the vicinity of Stag would be species dependent and require considerable research and analysis for minimal, if any, substantive return or benefit to the tailoring of adopted management measures and is not a standard industry practice nor one required by the responsible Commonwealth or State/Territory regulators. However, if IMS were established it may have a 'moderate' impact – Local effect; recovery in months to a year; impact to localised community.

There are increased concerns regarding fishery impacts following the introduction of IMS into Australian waters. Should IMS be introduced, they have the potential to outcompete and displace native species which may in turn affect the local marine ecosystem, and potentially fisheries operating in the area affected. However, the Operational area does not contain any known critical areas (i.e. feeding, breeding) or highly significant habitat (i.e. coral reef, seagrass) for fish. It is also unlikely that IMS will be able to establish. However, if IMS were established it may have a 'moderate' impact – Local effect; recovery in months to a year; impact to localised community.

Overall consequence	Overall likelihood	Residual ranking
Moderate	Very unlikely – extremely unlikely	Low

7.1.3 Environmental Performance

Hazard		**IMS Introduction**		
Performance objective		**No introduction of IMS**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
060	All third-party tankers are cleaned prior to mobilising to the Stag field	All third-party tankers undergo the following prior to mobilizing to the Stag field: • hull cleaning, • clean of the chain lockers and all open spaces on deck, • chemical flushing of inboard lines • provision of Ship Sanitation certificate Once confirmed by IMS SME as cleaned, the tanker must mobilize within seven days of the cleaning activities being confirmed as completed.	IMS inspection report confirms third party tanker satisfactorily cleaned prior to mobilization by IMS SME	Marine Superintendent
061	Vessels comply with the Biosecurity Manual (JS-70-MN-G-00001*[15])	All vessels demonstrate compliance with the biosecurity manual requirements for ballast water exchange and biofouling management on vessels and immersible equipment.	Documented evidence of compliance	Marine Superintendent

[15] * The biosecurity manual applies to all marine vessel operations in Operational Areas and has as its purpose to:

- Describe the marine biosecurity management process for Jadestone Energy (Australia) Pty Ltd activities including vessels contracted to perform marine operations.
- Prevent the introduction of Invasive Marine Species (IMS) into Australian Waters and the Operational Area through translocation vectors such as marine and petroleum vessels, immersible equipment and ballast water.
- Ensure contracted vessels and vessel operators are aware of and apply the marine biosecurity requirements when chartered to execute their scope of work.
- Ensure compliance with Commonwealth and State Australian Government legislation.
- Detail the risk-based approach and mitigations used to reduce the risk of IMS being introduced to the operational area to As Low as Reasonably Practicable (ALARP).

Hazard		IMS Introduction		
Performance objective		**No introduction of IMS**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
062		For vessels designed to use ballast water, vessels must meet “D2” standard by Sept 2024 and they must have and maintain: • A valid ballast water management certificate • A ballast water management plan consistent with ballast water management convention, and approved • A ballast water record book consistent with ballast water management convention.	Approved Ballast Water Management Plan Ballast Water Management Certificate Ballast Water Record Book	Marine Superintendent

7.1.4 ALARP Assessment

On the basis of the impact and risk assessment process completed, Jadestone considers the control measures described above are appropriate to manage the risk of IMS being introduced at the Stag facility. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
No routine discharge of ballast water from vessels	Eliminate	No	No	Vessel presence is required to carry out operational activities. Ballast exchange is required for safe operation of vessels and eliminating this requirement is not possible.
All vessels to be sourced from Australian waters	Eliminate	No	No	Vessel presence is required to carry out operational activities. Delays to activities caused by delays to contracting vessel(s). Minimal benefit expected given the implemented controls ensure only low IMS risk vessel are contracted.
Follow-up marine pest inspection around 75 days after arrival if the vessel is still in WA waters	Isolation	No	No	The residual risk of IMS is considered low due to inspection and cleaning controls and follow-up inspections of vessels 75 days after arrival is not considered required. In the event that any IMS entered the Operational Area the nearest habitat is the third-party tanker hull or the benthic habitat (soft sediments at the seabed). The anti-fouling coating, depth of the Operational Area (49 m), open ocean conditions and lack of available light at this depth provides an unsuitable or incompatible habitat conditions to those within the sheltered ports and shallow coastal areas which have historically been colonised by IMS.
N/a	Substitute	N/a	N/a	Wherever possible, domestic vessels will be sourced, but this may not always be feasible. However, all vessels are subject to IMS risk assessment and must manage their ballast water in accordance with regulatory requirements.
Application of new anti-foulant coating to vessels prior to contract commencement	Engineering	No	No	Substantial additional cost, potential delay to production operation. Little benefit given recent anti-fouling treatment history for vessels and requirement to complete IMS Risk assessment. Anti-fouling coating on the in-water surfaces of vessels, and the chemical dosing of sea chests (marine growth prevention system) will occur. Anti-fouling coatings containing TBT are not considered an option as these biocides are prohibited for use in Australia.
Hull cleaning on every occasion	Engineering	No	No	Additional cost and potential delay to production operation, little benefit since hulls will be inspected and cleaned if required when using the IMS Vessel Check tool and inspected/assessed to the standard detailed in

				applicable DAWE biofouling guidelines and Biosecurity Amendment (Biofouling Management) Regulations 2021 (DAWR 2009) (as required).
Ballast water treatment (e.g. biocide or UV)	Engineering	No	No	Dependent upon vessel age and configuration, some may be fitted with a Ballast Water Treatment System (BWTS) able to treat ballast water to the standard required by DAWE. If a vessel is not fitted with a BWTS, then ballast water treatment is not a practicable management option, with alternatives required by DAWE as the regulatory authority.
Transfer of ballast water to separate vessel for discharge outside operational area	Isolation	No	No	Generally, intake and outlet of ballast water will occur at the 'same' location (within 1 nautical mile of the two points). Substantial additional cost would be incurred to go outside of the operational area each time. Potential activity downtime and increase in activity duration as operations would likely need to cease during ballast water transfer. Little benefit given lack of sensitive habitats (shallow water habitats etc.), and potential translocation vectors (static vessels) in operational area. Introduction of additional safety risks to personnel during vessel-to-vessel transfer operations
N/a	Administrative	N/a	N/a	The implementation of a Biofouling Management Plan and maintaining a Biofouling Record Book consistent with the DAWR (2009) *National Biofouling Management Guidance for the Petroleum Production and Exploration Industry and Biosecurity Amendment (Biofouling Management) Regulations 2021*. No further administrative controls were considered.

7.1.5 Acceptability assessment

The potential impacts of IMS introduction are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of continuously reviewing and updating activities and practices at the Stag facility to reflect the requirements of marine pest management in Australian waters.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised. Jadestone will continue to liaise with DPIRD on current requirements for the management of the risk of marine pest introduction in Western Australian waters.
Laws and standards	While no legislation directly regulates hull/ niche biofouling, vessels associated with the activity will adopt the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (DAWR 2009).
Industry best practice	Application of guidelines detailed in the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry DAWR, (2009), and in the IMO Guidelines

	for the Control and Management of Ships' Biofouling to Minimise the Transfer of Invasive Aquatic Species.
Environmental context	It is unlikely that any IMS entering the Operational Area will establish on the natural benthic habitat (soft sediments at the seabed). The depth of the Operational Area (49 m), open ocean conditions and lack of available light at this depth provides a very different environment to that within sheltered port and shallow coastal areas which have historically been colonised by IMS. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	Application of guidelines detailed in the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (2009), and in the IMO Guidelines for the Control and Management of Ships' Biofouling to Minimise the Transfer of Invasive Aquatic Species. Jadestone has had regard to the representative values of the protected areas within the Operational Area, and the respective management plans and other published information. Impacts from any hypothetical successful establishment of marine pests will not impact on any of the social and ecological objectives and values, of any AMPs, or state MPs. This is consistent with the objectives of the protected area management plans and considered acceptable.
ALARP	The residual risk has been demonstrated to be ALARP.

7.2 Unplanned release of solids

7.2.1 Description of hazard

Aspect	Unplanned releases of solids may occur as a result of overfull and/or uncovered bins, incorrectly disposed items or spills during transfer of waste between the CPF and support vessels. Disturbance of benthic habitats resulting from dropped objects. A non-hazardous release of solids to the environment has the potential to occur from the following activities: • CPF, or supply vessel operations • Lifting – dropped objects (refer Section 7.5) • Accidental discharge of dry bulk products • Accidental discharge of waste. Hazardous wastes, such as chemicals and chemical containers, batteries, waste oil, produced sands, medical wastes and oily wastes, will be generated from Stag operations and disposed of onshore in accordance with a Waste Management Plan. Wet blasting, if performed, will generate a sludge waste comprising blasting medium (water or garnet if used), rust and particles of old surface coatings (e.g. paint, epoxy). Similarly, the waste product from wet blasting is disposed of onshore.

7.2.2 Impacts and Risks

Non-hazardous solid wastes such as plastics have the potential to pollute marine environments and harm fauna through entanglement or ingestion. Marine turtles and seabirds are particularly at risk from entanglement. Marine turtles may mistake plastics for food; once ingested, plastics can damage internal

tissues and inhibit physiological processes, which can result in fatality. Generally, no toxic effects are expected from non-hazardous solids.

Release of hazardous solid wastes may result in the pollution of the immediate receiving environment, leading to detrimental health impacts to marine flora and fauna. Physiological damage can result through ingestion or absorption and may occur to individual fish, cetaceans, marine reptiles or seabirds. Marine fauna (including seabirds) encountered within the Operational Area are expected to be limited to small numbers of transient individuals, noting however that the area does overlap with the humpback whale and blue whale migration corridor, shearwater foraging, and the flatback turtle interesting areas which may result in a higher number of these species around the Stag Facility.

Benthic habitats have the potential to be impacted with accidental spills of solid wastes resulting in possible damage to or loss of soft sediment communities within the area affected. The potential impact may be short term to long-term depending on the waste type, its degradation rate, and the amount lost to the marine environment.

In the event of a buoyant solid waste being accidentally released to the marine environment, it may create a navigational hazard.

The benthic habitats and associated biota that would be impacted in the accidental event of a non-buoyant dropped object are well represented in the region and there are no known areas of benthic primary producer habitat (e.g. corals, seagrass), KEF habitat (nearest KEF ~70 km N) or protected area habitat within the Operational Area. This is confirmed by Kinhill (1997, 1998) and potential losses represent a very small fraction of the widespread available habitat.

The operational area is within a HCTS area for flatback. The risk to marine turtles or impact pathway is through reduction in available feeding grounds. However, the study by Sperling et al. (2010) concluded that flatback turtles do not feed during the inter-nesting period. If individuals were likely to use this area as foraging grounds, outside of nesting season it would represent an insignificant percentage of all available feeding grounds and not significantly affect individuals or population. This is confirmed by Kinhill (1997, 1998) and potential losses represent a very small fraction of the widespread available habitat.

Produced sands are generated on the Stag CPF from the Stag reservoir, consisting of fine sand and glauconite containing oil, some heavy metals and low levels of naturally occurring radioactive materials (NORM). A third-party assessment of NORM levels in Stag sands – *NORM Management Plan (JS-90-PR-F-00013)* was undertaken and found that the level of NORM within Stag sands do not put sands in the category of radioactive waste. NORM levels in Stag sands are independently assessed annually and no samples to date have exceeded any regulatory limits for safe handling, storage or disposal. Accidental loss of containment of sand into the ocean may occur from equipment failure, incorrect handling and/or transport and overfilling of sands tanks during handling of this waste.

Supply vessels generate small quantities of similar wastes; these are managed in accordance with the vessels' own waste management plans and procedures.

Overall consequence	Overall likelihood	Residual ranking
Minor	Moderate	Medium

7.2.3 Environmental Performance

Hazard		Non-hazardous and hazardous solid wastes		
Performance objective		**No release of non-hazardous or hazardous solid wastes to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
063	CPF: Waste Management Plan (JS-70-PR-I-00035) implemented to ensure correct waste handling	Solid waste materials are stored in fit for purpose storage containers and/or lifting skips, labelled and equipped with lids / covers to prevent loss of material during storage and handling.	Vessel manifest and disposal records	Stag OIM
064	Vessels: Waste management plan implemented to reduce the risk of waste released to sea, in accordance with Marine Orders	Hazardous solid wastes will be managed in accordance with Marine Orders – Part 94 (Marine Pollution Prevention – Packaged Harmful Substances), *Navigation Act 2012* and *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Part III) requirements, and Environmental Protection Regulations (controlled waste)	Garbage Record Book shall be maintained in accordance with MARPOL 73/78 Annex V Regulation 9	Marine Superintendent
065	Bagging Sand Procedure (GA-19-PR-P-00007) ensures produced sand is correctly managed and disposed of onshore	Flexible IBC bags rated to a lifting weight of 2,000 kg are used to bag produced sands. All bags are transported off the CPF and sands transported to shore for disposal at a licensed facility.	Manifest details produced sand handling	Stag OIM
066	NORM Management Plan (JS-90-PR-F-00013) ensures safe management of	The NORM Management Plan provides instruction on the regulatory requirements, roles and responsibilities of key personnel, monitoring of exposure limits for personnel, management of radioactive material including transportation, and disposal.	Chain of custody Disposal records	Operations Manager

Hazard		Non-hazardous and hazardous solid wastes		
Performance objective		**No release of non-hazardous or hazardous solid wastes to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
	NORM positive materials			
067	Personnel understand waste management requirements and undertake assessment as required by the Competency and Training Management System [JS-60-PR-Q-00015]	CPF crew and support vessel masters complete an assessment containing basic information on environmental practices	Online induction completion record	HR Manager
068	Personnel are competent in the Lifting Operations Procedure (JS-90-PR-F-00036) which details lifting requirements	All personnel involved with lifting equipment operations and maintenance are trained and competent to their level of responsibility	Competency matrix	HR Manager
069	Lifting operations managed under PTW systems as required by Stag Safety Critical Elements Performance	Lifting operations to be managed under the PTW system	PTW records	Stag OIM

Hazard		Non-hazardous and hazardous solid wastes		
Performance objective		**No release of non-hazardous or hazardous solid wastes to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
	Standards Report (GA-70-REP-F-00007): SCMS-03 Permit to Work			
070	Lifting equipment maintained in accordance with Stag Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007): PS-05 Cranes & Lifting Equipment	Annual review of Lifting equipment inspection, repair and maintenance records	Annual compliance audit	Production and Maintenance Supervisor

7.2.4 ALARP Assessment

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage the risk of unplanned solid discharges from the Stag facility. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
No use of hazardous materials or production of wastes	Eliminate	No	No	Solid wastes produced onboard are disposed of onshore and are not discharged to the marine environment, therefore there is no planned impact to the marine environment. Complete elimination of waste is not feasible; therefore, the risk of unplanned releases remains
No lifting operations conducted	Eliminate	No	N/a	Lifting operations are an unavoidable activity to ensure the Stag facility is supplied with necessary goods and equipment, to remove wastes and to enable marine inspection and intervention activities to take place and so cannot be eliminated
Substitute any hazardous chemical use with non-hazardous chemical use	Substitute	No	No	Where appropriate selection of chemicals or materials to achieve low or no environmental effect is made. Some hazardous waste is unavoidable from the use of batteries, lights etc. and produced sand, therefore there are limited opportunities for substitution.
N/a	Engineering	N/a	N/a	All waste bins have lids and wastes are segregated at the time of disposal. No other engineering controls were considered.
Increase lifting capacity of cranes to decrease number of lifts required	Engineering	No	No	It is considered that to increase the lifting capacity of the cranes, they would need to be larger which would result in an increase in deck space usage. Whilst larger cranes could result in less lifts being required, it also increases risks to personnel from increased loads, increases risks to the seabed in the event that they are dropped, and these are considered grossly disproportionate the risk of dropping objects.
N/a	Isolation	N/a	N/a	The Activity is located at distance from sensitive receptors and the coastline. Lifting areas are over top deck and landing platforms isolating subsea infrastructure including pipelines from dropped load events, therefore no further isolation controls have been identified
N/a	Administrative	N/a	N/a	Maintenance management system implemented, compliance with relevant and appropriate MARPOL and legislative requirements, certified equipment. No further controls were identified. Lifting procedures and plans and Permit to Work requirements ensures all lifts are managed and reduces risk of dropped objects.

7.2.5 Acceptability Assessment

The potential impacts of unplanned non-hazardous and hazardous solid accidental releases to the marine environment are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of continuously reviewing and updating activities and practices at the Stag facility to reflect the requirements of the *Waste Avoidance and Resource Recovery Act* and Controlled Waste Regulations.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regards to waste management practices at the Stag facility.
Laws and standards	Requirements of the *Waste Avoidance and Resource Recovery Act* and Controlled Waste Regulations have been adopted.
Industry best practice	The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regards to offshore production operations.
Environmental context	Benthic habitats have the potential to be impacted with solid wastes resulting in potential loss of soft sediment communities and harm to marine fauna. The potential impact may be short term to long-term depending on the waste type and its degradation rate. If impacted, benthic habitats and associated biota are well represented in the region The potential scale of environmental harm from accidentally discharged solid waste is small in comparison to the vast size of soft substrata habitats spanning the North-west Shelf. The operational area is overlapped by 3 species BIA. However, the areas that may potentially be affected by accidentally discharged solid waste would represent a very small percentage of the total area. The Operational Area is within a HCTS area for flatback turtles (inter-nesting buffer BIA). However, the potential scale of habitat loss and seabed disturbance from dropped objects is a very small percentage of the total area known. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD
Conservation and management advice	Marine debris is identified as a potential threat to a number of marine fauna species in relevant Recovery Plans and Conservation Advice: • National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) (CoA 2024) • Conservation management plan for the blue whale: A recovery plan under the EPBC Act 1999 2015-2025 • Conservation advice *Balaenoptera borealis* (sei whale) • Conservation advice *Balaenoptera physalus* (fin whale) • Recovery Plan for Marine Turtles in Australia • Recovery Plan for the white shark (*Carcharodon carcharias*). • Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (DoEE 2018). • Approved Conservation Advice for the Abbott's booby *Papasula abbotti* (TSSC 2020a) [specifically plastics]

	• Approved Conservation Advice on *Rostratula australis* (Australian painted snipe) (DSEWPaC 2013b) [specifically plastics] These plans identify marine debris as potential threats to marine turtles, whales and other vertebrate wildlife resulting in potential injury or death and recommend adherence to legislation for the prevention of garbage disposal to prevent impacts. With debris that could float and result in entanglement or injection by marine life, the area of impact may extend beyond the operational area to within the identified EMBA, therefore a number of bird species with marine debris identified as a threat in conservation management plans may be vulnerable to impact. The controls implemented demonstrate that the activity will be conducted in a manner that reduces marine debris and therefore the activity will be conducted in a manner that is acceptable under the relevant Recovery Plans and Approved Conservation Advice to prevent accidental release of non-hydrocarbon solids (marine debris). The limited quantities associated with this event indicate that even in a worst-case release of solid waste, fatalities would be limited to individuals and is not expected to result in a decrease of the local population size for any of the species identified.
ALARP	The residual risk has been demonstrated to be ALARP.

7.2.6 Impacts and Risks

The impacts associated with the accidental discharge of liquid hazardous materials is related to the nature of the material spilled, the volume and its behaviour in the marine environment (sink/ float/ disperse etc.).

Chemicals, for example solvents and detergents, are typically stored in small containers of 5–25 L capacity and used in areas that are bunded. Leaks and spills of non-hydrocarbon liquids are contained within the immediate storage/ use area or on board. Small spills cleaned up using spill kits as per general housekeeping requirements, or the Shipboard Oil Pollution Emergency Plan (SOPEP) (or equivalent for vessels <400 DWT). Non-hydrocarbon liquids may also enter the marine environment during transfer operations (offloading or backloading) – for example, a dropped object event. The maximum possible volume that may enter the marine environment is 1,000 L, this volume would be contained within an IBC which is assumed to be damaged during the lifting/ drop event such that the full volume is instantaneously released. Transfer of liquids such as slops (off spec water) via hose could result in approximately 5m^3 released to sea due to a break in the hose during transfer (based on pump rate, hose size and dry break couplings).

If hazardous materials are accidentally lost overboard, potential impacts will include a temporary and highly localised decline in water quality with limited potential for toxicity to marine fauna due to the temporary exposure and low toxicity resulting from the rapid dilution in the marine environment. It is noted that the Operational Area overlaps with the humpback whale migration BIA and pygmy blue whale distribution BIA, wedgetail shearwater breeding BIA, and the flatback turtle internesting buffer BIA which may result in a higher number of these species in the area. Potential impacts to water quality are likely to be limited to the immediate vicinity (tens to hundred metres) of the release point and are not expected to affect overall population viability of these protected species in the event of an unplanned release.

All production chemicals are selected in accordance with the Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033), which promotes the use of environmentally low risk chemicals based on ecotoxicity data and information gathered from ChemAlert.

Further impacts associated with the release of hydrocarbons are discussed in Sections 7.5and 7.6.

Overall consequence	Overall likelihood	Residual ranking
Minor	Unlikely	Low

7.3 Non-hydrocarbon Liquids

7.3.1 Description of Hazard

Aspect	A non-hydrocarbon liquid, in particular chemicals, may be released to the environment. The expected spill amounts are small, with the largest instantaneous volume being 1,000 L (the full contents of an IBC instantaneously released to the marine environment) of approximately 5m^3 from loss of containment during hose transfers.

There may be accidental releases/ discharges to the marine environment of a variety of potentially hazardous materials and chemicals (liquid) which are stored and utilised or produced at the CPF and/ or vessels during operations. These include:

- Bulk process chemicals including biocide, corrosion inhibitor, scale inhibitor and emulsion breakers. Chemical spills to the marine environment have the potential to occur should non-routine incidents occur during chemical transfer, handling, storage or use and in the event of equipment failure or upset conditions from topsides or subsea infrastructure
- Cleaning products, solvents and paints on support/ supply vessels
- Loss of chemicals from chemical injection lines during well intervention/ water injection well set-up and workover activities (for example, during run and pull of ESPs)
- Other non-process chemicals such as fluorescein dye, paints and thinners, laboratory chemicals and cleaning agents. As for bulk process chemicals, spills of non-process chemicals may occur from incidents with storage, handling and transport. However, these are likely to be either of very minor quantity (usually less than 50 L)
- Water foaming agents used in firefighting (aqueous film forming foams (AFFF)) may enter the sea during testing and emergencies
- Accidental release of liquid hazardous materials as a result of dropped objects during bulk material transfer to the CPF/ third-party tanker or slops due to hose break during transfer via hose.

A number of chemicals are used on the Stag CPF during the production process and within water injection and ancillary equipment. These chemicals are used to:

- Aid oil and water separation from the collected well fluids
- Treat produced water for the removal of hydrocarbons
- Control corrosion and scale
- Prevent the growth of marine organisms within the equipment
- Treat seawater prior to injection into the Stag reservoir

- Treat potable water
- Aid in leaks detection in pipelines and hoses
- Assist analytical determinations in the CPF laboratory.

For instance, scale and corrosion inhibitors are injected downhole in the wells to protect the well tubing and internal process piping integrity. Sea water is injected into the reservoir to maintain downhole pressures in the reservoir. This seawater is de-aerated (with oxygen scavenger) prior to pumping through the five dedicated wells back into the reservoir. Biocide is added to pipework and slops tanks to minimise the formation of sulphur reducing bacteria (SRB). Other water clarifiers and emulsion breakers are used in the produced water treatment circuit for the removal of oil. Similarly, a range of chemicals are added to the Reverse Osmosis Unit (RO) to assist with drinking water treatment.

Fluorescein dye sticks can be added to water when used for pressure testing pipelines and hoses, to assist in leak detection.

The production chemicals are soluble in produced water and oil to varying extents and the dissolved fractions are ultimately either retained within the crude oil or discharged with the produced water. For example, chemicals such as the demulsifiers are very hydrophobic (octanol/water partition coefficient >4 considered very hydrophobic) and stay within the oil fraction, whereas chemicals such as the biocides are very hydrophilic (octanol/water partition coefficient <1 considered hydrophilic) and stay within the produced water fraction.

7.3.2 Environmental Performance

Process chemicals are stored within bunded areas on the platform and metered to their various application points throughout the process. The bunds, in turn, drain to large capacity tanks with a design capacity exceeding the volume of the stored chemicals.

Hazard		**Non-hydrocarbon hazardous liquids**		
Performance objective		**No unplanned discharges to the marine environment.**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
071	Compliance with Hazardous Substances & Dangerous Goods Standards (JS-70-STD-I-00036) ensures appropriate bunding for hazardous liquids	Any hazardous liquid storage on deck must be designed and maintained to have at least one barrier (i.e. form of bunding) to contain and prevent deck spills entering the marine environment.	HSE monthly inspection	Stag OIM
072	Vessels are compliant with Marine Order 93 to prevent any contaminating liquids and chemicals from entering the marine environment	Chemical management is compliant with Marine Order 93: • Having a valid International Pollution Prevention Certificate • Reporting marine incidents to AMSA – An incident involving a discharge from a vessel of a mixture containing	Valid International Pollution Prevention Certificate Valid SOPEP/SMPEP	Marine Superintendent (vessels) Stag OIM

Hazard		Non-hydrocarbon hazardous liquids		
Performance objective		**No unplanned discharges to the marine environment.**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
		a liquid substance, carried as cargo or as part of cargo in bulk, must be reported to AMSA via AMSA Form 196 (Harmful Substances Report form) within 24-hours • Enacting a compliant Shipboard Marine Pollution Emergency Plan • Maintain logbooks • Washing vessel tanks in accordance with MARPOL.	Logbooks (e.g. Oil record book, deck log book, tank cleaning log)	
N/A	Refer Section 6.5.3 and 7.6.6 for additional management controls and performance standards			
073	Compliance with Hazardous Substances & Dangerous Goods Standards (JS-70-STD-I-00036) and Marine Order 94 (vessels) ensures appropriate and safe chemical handling	Safety Data Sheet (SDS) available evaluation of hazard identification and chemical management	SDS Available	Stag OIM (CPF) Marine Superintendent (vessels)
074		Chemicals managed in accordance with SDS in relation to safe handling and storage, spill-response and emergency procedures, and disposal considerations	SDS Available	Stag OIM Marine Superintendent
075	Chemicals will be risk assessed in accordance with Chemical Selection, Evaluation and Approval Procedure (JS-70-PR-I-00033)	For hazardous chemicals, the following standards apply to reduce the risk of an accidental release to sea: • Selected chemical substances comply with relevant regulatory requirements and approved activity environment plans • Selected chemical substances that are planned for discharge are subject to mandatory risk review and formal approval before procurement • Transport, storage and handling of chemicals is in accordance with relevant regulations • Least hazardous chemicals are preferentially selected for use thereby minimising and/ or eliminating potential safety and environmental impacts	Chemical approval	Stag OIM

Hazard		Non-hydrocarbon hazardous liquids		
Performance objective		**No unplanned discharges to the marine environment.**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
		• If chemicals required are classified as hazardous and/ or dangerous goods, the control measures for safe transport, storage and handling are deemed adequate • Selected chemical substances meet technical specifications and are fit for purpose.		
076	Vessel SOPEP valid and tested to ensure ability to respond to spills	Spill kits are: • Located near high-risk spill areas. • Intact, clearly labelled and contain adequate quantities of absorbent materials. • Approved SOPEP/SMPEP	Spill Exercise Reports	Marine Superintendent
077	Spill exercise conducted in accordance with Stag Incident Response Plan – Offshore component (GF-00-PR-F-00041) to ensure spill preparedness	CPF spill exercise as part of annual incident response drills.	Exercise records	Stag OIM
078	Slops transfer between Stag CPF and vessel supervised to observe for potential spills	All hoses are fitted with dry-break couplings and are buoyant or fitted with floats	Records of slops transfer times	Stag OIM
079		Visual inspection of dry break couplings and hoses prior to slops transfer	Slops transfer records	Stag OIM
080		Permit-to-work documentation is complete and signed off to ensure transfer is undertaken in accordance with the slops transfer procedure	Permit-to-work documentation complete	Stag OIM
081		Transfer of slops undertaken during daylight hours under constant supervision		Stag OIM

7.3.3 ALARP Assessment

On the basis of the impact and risk assessment process completed, Jadestone considers the control measures described above are appropriate to manage the risk of non-hydrocarbon liquid hazardous waste. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
N/a	Eliminate	N/a	N/a	Industry-standard technologies are not available to eliminate the use of chemicals or hydrocarbons on-board, therefore elimination of hazardous liquid use cannot be eliminated. Hazardous liquids produced or used onboard are disposed of onshore and are not discharged to the marine environment, therefore there is no planned impact to the marine environment. Complete elimination of waste is not feasible; therefore, the risk of unplanned releases remains
Substitute any hazardous liquid use with non-hazardous liquid use	Substitute	No	No	Where appropriate selection of chemicals or materials to achieve low or no environmental effect is made. Some hazardous waste is unavoidable from the use of chemicals and through the production process, therefore there are limited opportunities for substitution.
N/a	Engineering	N/a	N/a	Safeguards will be implemented as required, by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* and MARPOL Annex I, II and III. Such safeguards may include (but not limited to) inventory minimisation, designated storage and handling areas, correct stowage, accurate labelling and marking, SDS information, spill clean-up equipment and containment (e.g. bunds). No other potential controls were identified.
N/a	Isolation	N/a	N/a	
N/a	Administrative	N/a	N/a	Procedures are in place for the management of liquids to ensure technical performance is appropriately balanced with environmental performance. Procedures exist for the selection of production chemicals with low environmental risk by following Jadestone's Operations Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033). No additional administrative controls were identified.

7.3.4 Acceptability Assessment

The potential impacts of unplanned non-hydrocarbon liquid hazardous waste are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.

Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of meeting environmental management requirements for this activity.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), and no stakeholder concerns have been raised with regards to the risk of unplanned liquid discharges.

Laws and standards	Relevant legal and regulatory controls have been adopted
Industry best practice	The APPEA Code of Environmental Practice (CoEP) (2008) objectives are met with regards to offshore production operations.
Environmental context	While the risk of unplanned liquid discharges could occur from the Stag facility and have an impact on the waters immediately nearby, the impact and risk assessment process indicate that discharges will have a temporary and localised impact on marine waters and will not result in significant impact to marine fauna including those species BIA that overlap the area. The potential impact is considered acceptable after consideration of: • Potential impact pathways • Preservation of critical habitats • Assessment of key threats as described in species and Area Management /Recovery plans • Consideration of North-West Bioregional Plan • Principles of ecologically sustainable development ESD.
Conservation and management advice	Minimising chemical discharge is an action identified by the Recovery Plan for Marine Turtles in Australia 2017–2027. This requires that best practice industrial management is implemented to minimise impacts to marine turtle health and habitats. A marine chemical spill is unlikely to result in population effects due to the controls in place for secure storage and on-board clean-up of spills, transient nature of marine fauna and the remote open ocean environment. There are no relevant management requirements in the recovery plan to implement for this hazard.
ALARP	The residual risk has been demonstrated to be ALARP.

7.4 Unplanned Release of Hydrocarbon – Scenarios

7.4.1 Maximum Credible Worst-Case Scenarios

Unplanned events may occur during the Stag operations that could result in the release of hydrocarbons to the marine environment.

The hydrocarbon spill scenarios identified during the environmental impact and risk assessment process were modelled according to the type of hydrocarbon – diesel or Stag crude oil – and the potential point of release, sea surface and subsea. The modelling considered the release of the maximum credible worst-case scenarios described (Table 7-2 and Figure 7-1) over all seasons of the year (RPS-APASA 2020).

Table 7-2: Maximum credible worst-case oil spill scenarios for the Stag facility

Hydrocarbon	Release point	Maximum credible worst-case scenarios
Diesel	At surface	Short term (instantaneous) with total release = 250 m^3
Stag crude oil	At surface	Short-term release (30 mins) with total release volume = 17.2 m^3
	Subsea	Short-term release (30 mins) with total release volume = 86.5 m^3
	Subsea	Long-term release (12 hours) with total release volume = 120 m^3

To determine the maximum worst-case credible spill volumes for each identified spill scenario, Jadestone has based the volumes on the expected pumping rates and known inventories of infrastructure. They have also adopted the AMSA (2015) guideline: *Technical guideline for preparing contingency plans for marine and coastal facilities*. Jadestone considers that in adopting the AMSA guideline the estimated spill volumes are appropriately conservative given that for the scenarios presented there are multiple barriers/ controls in place; meaning the total volumes evaluated are much greater than what would be released in the event

of a spill. The T956 and T957 tanks used for holding crude prior to conditioning for fuel are in small bunds, but in the event of a loss of integrity could result in up to 4m^3 being released to sea. The tanks are internal to the CPF and therefore it would be only due to corrosion risk (rather than collision) that could result in a loss of integrity, as the volume is smaller than the other surface crude scenarios it is not considered further in this EP.

Tank T-921 used for crude fuel storage has a volume of 84m^3 and serves to store an untreated fuel supply for an extended period. It is situated in the hull and has a double bottom design, that means any loss of primary containment will be retained in the hull and therefore is not considered further in this EP.

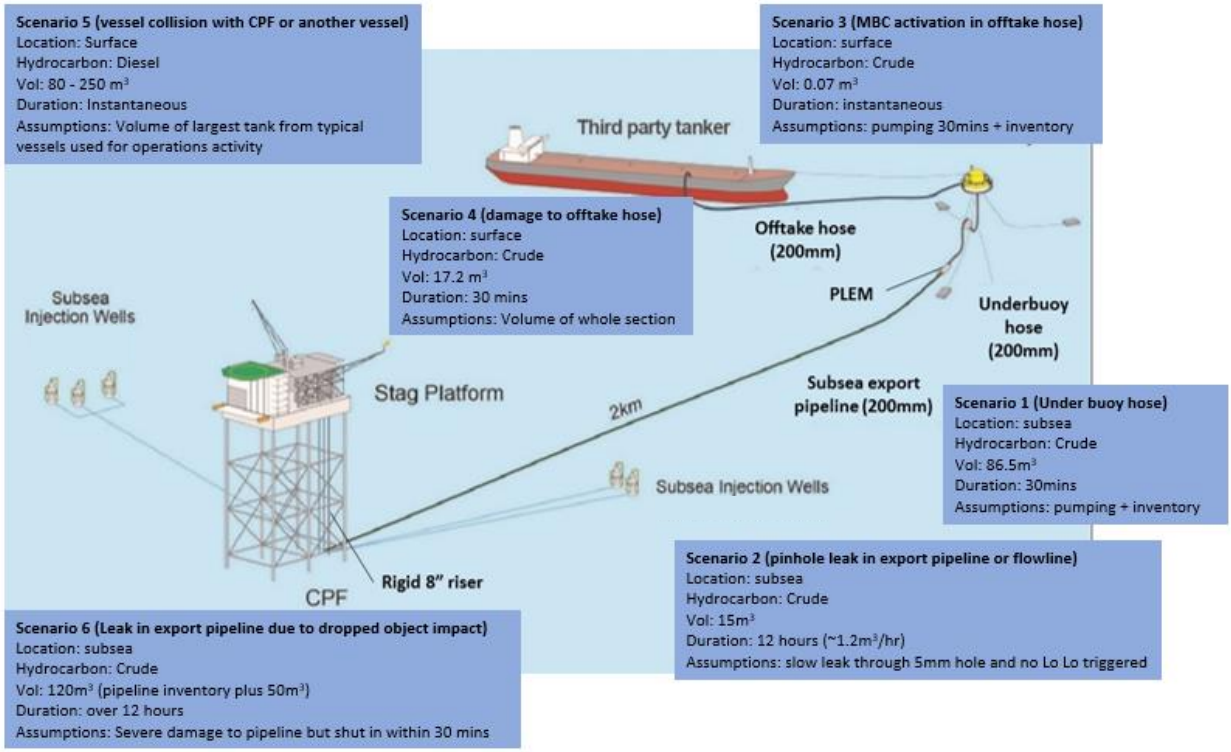


Figure 7-1: Unplanned release of hydrocarbon spill scenarios

7.4.2 Discounted Scenarios

Of the spill scenarios considered, the below were discounted as not credible:

- Release of Stag crude oil due to well blow out

  As described in the Stag Well Operations Management Plan (WOMP) (GF-50-PLN-W-00001), through review of the Stag reservoir in November 2011 (Dowling and Betts, pers. comm. 2011) it was determined that the pressure in the reservoir is not sufficient to flow oil to the surface in the event of a loss of all well barriers. As the reservoir has been produced, the pressure has declined with time such that fluids (oil and produced water) will not flow to the surface unless an Electric Submersible Pump (ESP) is running in the well. In the event of a severe loss of well integrity and corresponding shutdown of the Stag artificial lift system, the reservoir pressure will be unable to support a column of well fluids to surface where seawater will effectively kill the well. This is regularly validated through ongoing gas to surface tests conducted prior to workover.

  Some wells (currently only Stag 36H) have experienced positive surface pressures when shut in, which would indicate the wells have the capability of free-flowing limited quantities gas to surface. This is due to the wells experiencing a period of higher gas rates than previously observed. Despite the higher surface pressures, the bottom hole pressures (as measured in the wells) still preclude the ability of the wells to free flow oil and produced water to surface. To further mitigate against the

potential for these wells to free-flow, downhole tubing retrievable safety valves (TRSV) has been installed in this well.

As such a well blow-out during production activities is not deemed a credible scenario and not considered further.

- Release of diesel/ Stag crude oil due to vessel grounding

  A release of hydrocarbon due to vessel grounding and subsequent fuel tank rupture resulting from a loss of propulsion or due to navigational error resulting in a vessel running aground in shallow areas was not considered a credible scenario for the Stag operations as the facility is situated in deep water (approximately 50 m) and there are no charted reefs or islands that pose a grounding hazard. This is confirmed by seabed surveys in the operational area and surrounds.

7.4.3 Modelling approach

To determine the spatial extent of impacts from a potential hydrocarbon spill (surface and subsurface) and the dispersion characteristics of the oil over time, modelling was completed by Asia-Pacific Applied Sciences Association (RPS 2020). Oil spill modelling was undertaken using a three-dimensional oil spill trajectory and weathering model, SIMAP (Spill Impact Mapping and Analysis Program), which is designed to simulate the transport, spreading and weathering of specific oil types under the influence of changing meteorological and oceanographic forces.

Near-field subsea discharge modelling was undertaken using OILMAP, which predicts the droplet sizes that are generated by the turbulence of subsea discharges as well as the centreline velocity, buoyancy, width and trapping depth (if any) of the rising gas and oil plumes.

Spill modelling was performed using a number of simulated environmental conditions from all seasons thus providing a range of realistic spill trajectories from which to determine the spatial extent of potential impacts and receptors which might be affected by a spill.

A summary of the modelling method is described below.

Stochastic approach: stochastic modelling was carried out using an historic sample of wind and current data for the 'study area' that spanned ten years. For each season (March to August and September to February), a large number of replicate simulations (100) were modelled (i.e. 200 in total), each initialised at different, randomly selected points in time for that seasonal period and hence under a different time series of environmental conditions. This stochastic sampling approach provides an objective measure of the possible outcomes of a spill, because environmental conditions will be selected at a rate that is proportional to the frequency that these conditions occur over the study area. More simulations will tend to use the most commonly occurring conditions, while conditions that are more unusual will be represented less frequently.

Contact thresholds: Oil spill models are able to track hydrocarbon concentrations of surface oil, entrained oil and dissolved aromatic hydrocarbons below biologically significant impact levels. Consequently, threshold concentrations are specified for the model to control what contact is recorded for surface oil and subsurface locations (entrained oil and dissolved aromatic hydrocarbons) to ensure that recorded contacts are for biologically meaningful concentrations. Thus, it is important to describe the thresholds used as the boundary of the EMBA will be influenced by the thresholds set in the hydrocarbon spill modelling.

The determination of biologically meaningful impact thresholds is complex since the degree of impact will depend on the sensitivity of the biota contacted, the duration of the contact (exposure) and the toxicity of the hydrocarbon mixture making the contact. The toxicity of a hydrocarbon changes over time, due to weathering processes altering the composition of the hydrocarbon. To ensure conservatism in defining the EMBA boundary and the subsequent impact assessment, the threshold concentrations applied to the model are based on the most sensitive receptors that may be exposed, the longest likely exposure times and the more toxic hydrocarbons.

Impact pathways and impact threshold concentrations are detailed in Appendix G for floating oil, entrained oil and dissolved aromatic hydrocarbons (DAH).

Data generated: during each simulation (of which there are 100 for each season), the model recorded the location (latitude x longitude x depth) of each of the particles (representing a given mass of hydrocarbon) on or in the water column, at regular time steps.

The collective records from all simulations were then analysed by dividing the study area into a three-dimensional grid. For oil particles classified as being at the water surface, the sum of the mass in all hydrocarbon particles located within a grid cell, divided by the area of the cell provided an estimate of the concentration of oil in that grid cell, at each time step.

For entrained and dissolved hydrocarbon particles, concentrations were calculated at each time step by summing the mass of particles within a grid cell and dividing by the volume of the grid cell. The concentrations of oil calculated for each grid cell, at each time step, were then analysed to determine whether concentration estimates exceeded defined threshold concentrations. The risks were then summarised as follows:

- The probability of exposure at a location was calculated by dividing the number of spill simulations where contact occurred above a contact threshold at that location (defined as per Figure 7-2) by the total number of replicate spill simulations. For example, if contact occurred at the location (above a contact threshold) 50 out of 100 simulations, a probability of exposure of 50% is indicated
- The minimum potential time to a shoreline location was calculated by the shortest time over which oil was calculated to travel from the source to the location in any of the replicate simulations.

Probability contours: the results were presented in terms of statistical probability maps based on 100 simulations, each generated under different environmental conditions. The contours of probability are not representations of a single spill event (RPS (2020).

Completion of modelling: each of the 100 simulations was run for a period of two to three weeks allowing for the fate of dispersed hydrocarbons to be evaluated. Fate assessment stops once hydrocarbon concentrations fall below the defined contact thresholds. In this manner, the full extent of the spill scenario is assessed against the specified contact thresholds.

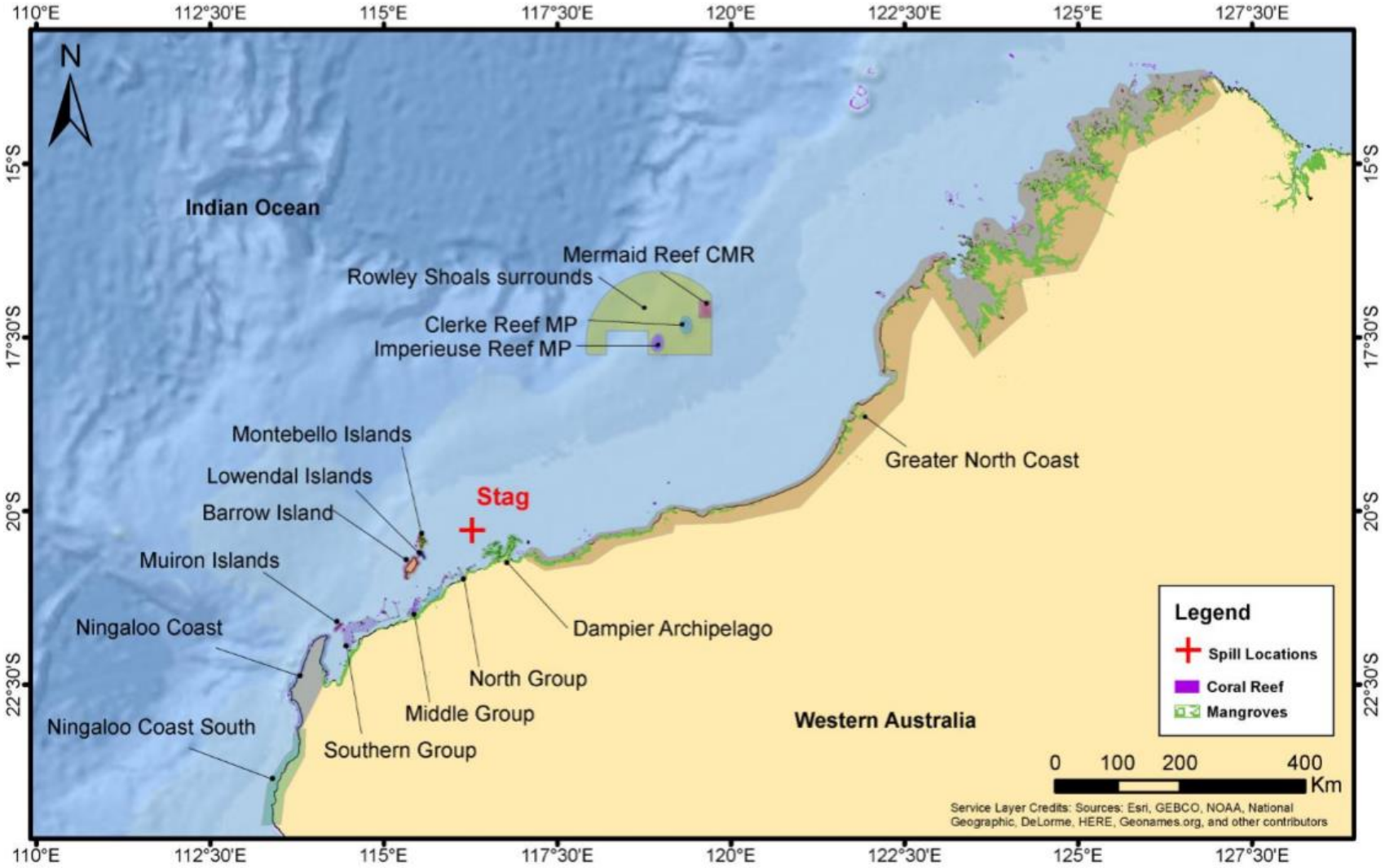


Figure 7-2: Sensitive receptor segments

Modelling Thresholds

To assess environmental effects from an unplanned hydrocarbon release, four separate hydrocarbon components that pose differing environmental risks were evaluated:

- Surface hydrocarbons – hydrocarbons that are 'on' the water surface
- Entrained hydrocarbons – hydrocarbon that is entrained 'in' the water
- Dissolved hydrocarbons – the dissolved component of hydrocarbon in' the water
- Shoreline accumulation – hydrocarbons that accumulate along shorelines.

Threshold concentrations for each of the three hydrocarbon phases were developed and applied to the modelling outputs to define the EMBA for each phase. A receptor was considered 'affected' by one of the phases as soon as the threshold for the phase at that location was exceeded (i.e. instantaneous impact approach).

The rationale for the selection of the thresholds is described in Appendix G and a summary of the contact thresholds applied is provided in Table 7-3 The EMBA (Figure 3-1) is denoted by the lowest hydrocarbon exposure thresholds to indicate all receptors that may be *contacted* by hydrocarbons of any phase from any scenario. However, for the purposes of impact assessment, higher exposure thresholds are applied, termed as 'moderate' in NOPSEMA bulletin #1, to indicate the receptors that could be *affected* (rather than just contacted) and is based on scientific knowledge to determine the potential for impact. A Risk EMBA is then drawn utilising these thresholds which lies within the overall EMBA.

Table 7-3: Summary of the contact thresholds applied in the hydrocarbon spill modelling

Threshold Level	Floating oil (g/m^2)	Shoreline loading (g/m^3)	Entrained oil (ppb)	Dissolved aromatic hydrocarbons (ppb)
Low	1	10	10	10
Moderate	10	100	-	50
High	50	>1,000	100	400

7.5 Unplanned Release of Stag Crude Oil

7.5.1 Description of hazard

Aspect	Surface release of Stag crude oil from damage to the offtake hose between the CALM buoy and third-party tanker, resulting in a maximum worst-case credible spill of 17.2 m^3 Subsea release from the underbuoy hose at the CALM buoy resulting in a maximum worst-case credible spill of 86.5 m^3 or a release of Stag Crude (120m^3) from a damaged pipeline.

7.5.1.1 Subsurface Release

Stag crude could be released to subsea due to loss of integrity, process upset, equipment failure, corrosion or damage through dropped objects. A HAZID was undertaken for the Stag Facility activities and the below credible subsea release spill scenarios were identified:

Table 7-4: Subsurface release of Stag crude oil – unplanned scenarios

Scenario	Maximum credible spill	Release duration	Credibility justification
Damage to pipeline due to dropped object	**120 m^3**	12 hours	Assumes a hole size of 20 mm due to impact from a dropped object. 20 mm is the largest non-rupture release rate that is generally considered for a subsea release. I tis considered a conservative estimate for Stag given the types of lifts that occur in field and the position of the pipeline during lifting. The scenario assumes small end profile objects (e.g. pipes) that could be dropped and 'spear' the pipeline in a weak spot to cause the hole. Release rate of 10 m^3/hr through the hole, pipeline inventory is 70 m^3, therefore assumes full inventory loss plus time to shut in pipeline
Damage to flexible underbuoy hose from loss of integrity or damage	**86.5 m^3**	30 mins	The volume lost is assumed to be 30 minutes of pumping plus the inventory released from the hose. This scenario assumed a flow rate of 173 m^3/hr over a 30-minute period through a hole size of 15 mm.
Pinhole leak in subsea export pipeline or flowline from damage or corrosion	**15 m^3**	12 hours	Assumes loss of 15 m^3 lost at a rate of approximately 1.2 m^3/hr through a 5 mm hole and assume that no Lo Lo is triggered which would result in the pipeline or flowline being shut in.

7.5.1.2 Stag Crude Oil Characteristics

Stag oil is a medium crude composed of hydrocarbons that have a wide range of boiling points and volatiles at atmospheric temperatures, and which will begin to evaporate at different rates on exposure to the atmosphere. Change in the mass balance calculated for Stag crude weathering under low (5 knots) and constant wind indicates that approximately 14% of the oil volume would evaporate within 12 hours. The remaining oil would weather at increasingly slower rate as the mixture becomes proportionally enriched by compounds with longer carbons chains, hence higher boiling points. Once all volatile compounds have evaporated, only the residual compounds will remain, and weathering rates would slow significantly. After one day approximately 40–80% is predicted to remain on the sea surface (% dependent upon wind variability). This reduces to approximately 32–68% of the crude remaining on the surface after seven days.

A summary of the physical properties of Stag crude oil is provided in Table 7-5. Further detail on Stag crude oil is provided in the OPEP.

Table 7-5: Characteristics of Stag crude oil

Hydro-carbon	Initial density (g/cm³) @ 15 °C	Viscosity (cP) @ 20 °C	Component	Volatiles (%)	Semi-volatiles (%)	Low volatility (%)	Residual (%)	Aromatics (%) of whole oil
			BP (°C)	**<180**	**180–265**	**265–380**	**>380**	**<380**
Stag crude oil	0.944	115	% of total	0.5	16.0	40.8	42.8	11.3
			% aromatics	0.2	3.0	8.1	-	-
			-	**Non-persistent**			**Persistent**	

Source: APASA (2020)

Toxicity Testing of Crude Oil

Toxicity testing using the water accommodated fraction (WAF) of Stag oil indicated that the oil would be of low acute toxicity to organisms in the water column (Battelle 1998). In 96-hour exposure tests, no acute toxicity was observed on two species of tropical fish (a clownfish: *Amphiprion clarkii*, and a silverside: *Menidia beryllina*) in an undiluted solution of the WAF (Table 7-6). Similarly, there was no acute toxicity observed on a tropical prawn (*Penaus vannamei*) after 96 hours' immersion in the undiluted WAF, while a tropical mysid shrimp (*Mysidopsis bahia*) suffered mortality after 96 hours' exposure in a high concentrations of the WAF (30% survival in undiluted WAF).

In tests on the potentially more sensitive planktonic larvae of invertebrates (using the larvae of three species of sea urchin: *Arbacia punctulata*, *Dendraster excentricus*, and *Strongylocentrotus purpuratus*), there was no reduction in the rate of normal larval development, or of survival after 60 hours' exposure to undiluted WAF.

In a final test involving relatively long-term exposure of stony corals (a five-day exposure test using *Acropora elysii*) corals survived in an undiluted solution of WAF made from fresh oil; however, growth was inhibited by two thirds. In contrast, five days' immersion in an undiluted WAF solution made from oil weathered for 0.5 to one day had no effect upon the growth of the corals.

Table 7-6: Toxicity testing results of water accommodated fraction (WAF) of Stag crude

test species	Test codes	Exposure level – Stag Crude	
		% of WAF	mg/L TPH*
Clownfish (*A. clarkii*)	$LC_{50}96hLC_{50}$	>100	>273
Silverside *(M. beryllina)*	$LC_{50}96hLC_{50}$	>100	>273
Mysid Shrimp *(M. bahia)*	$LC_{50}96hLC_{50}$	72	87
Penaid Prawn *(P. vannamei)*	$LC_{50}96hLC_{50}$	>100	>219
Sea Urchin Larvae	$EC_{50}96hEC_{50}$	>100	>219
Stony Coral *(A. elysii)*	$EC_{50}120hEC_{50}$	>50	>110

** Test Codes: 96hLC50 Concentration causing mortality to 50% of the test organisms after 96 hours (4 days) exposure; 96hEC50 concentration causing an effect on the rate of normal larval development during 60 hours (2.5 days) exposure; 120hEC Concentration causing a significant reduction in the growth rate during 120 hours (5 days) exposure*

Given the low asphaltene content of the weathered residue, Stag crude will have low adherence properties when coming into contact with environmental receptors. The degree to which impacts could occur will

depend upon the level of coating (concentration of oil and/or loading of oil on shorelines) and how fresh the oil is, with toxicity from oil contact likely to be more prevalent from 'fresh' oil closer to the Stag Facility.

The viscosity of Stag crude would increase through weathering and the uptake of water to form an oil-in-water emulsion. The maximum water uptake for Stag crude has been measured at 74–81% for fresh and weathered crude, respectively, resulting in a stable emulsion (Battelle 1998). Consequently, the volume of the slick increases over time through the uptake of water to form a viscous emulsion.

7.5.1.3 Surface Release

Stag crude could be released at the surface from the offtake hose due to damage or from the marine breakaway coupling (MBC) activation.

Table 7-7 lists the credible spill scenarios identified for the release of crude oil to the marine environment at sea surface.

Table 7-7: Credible Stag crude oil spills to the marine environment at surface

Scenario	Maximum credible spill	Release duration	Credibility justification
Damage to offtake hose between CALM buoy and third-party tanker	17.2 m^3	30 mins	The offtake hose is of 200 mm internal diameter with a double carcass construction with built-in flotation. The offtake hose is protected from failure due to over loading by a dry break coupling. The entire volume of the offtake hose could be released due to damage and loss of integrity (e.g. vessel running over the hose, damaged hose). The entire volume is assumed to be lost as a worst-case scenario with no failsafe's (such as MBC) activating. The release duration is worst case.
MBC activation during offtake activity at offtake hose	0.07 m^3	Instantaneous	The MBC activates in the event of overloading. The volume lost is assumed to be 30 minutes of pumping prior to MBC activation (worst case scenario) plus the inventory released at surface.

7.5.1.4 Results – Surface Release of 17.2 m^3

The data indicates that 57% of oil would evaporate over time scales of days to weeks if exposed to the atmosphere and approximately 43% would persist in the environment, decaying mainly through biodegradation. Approximately 11% is composed of aromatic hydrocarbons (RPS 2020). The annualised EMBA is derived from the seasonal stochastic modelling results (i.e. results from all 200 replicates), hence describes a substantially larger area than would be affected during any single spill event. The annualised EMBA is based on thresholds for floating oil (1 g/m^2 and 10 g/m^2), shoreline oil (100 g/m^2), entrained oil (100 ppb) and dissolved aromatic hydrocarbon (50 ppb) concentrations. The annualised maximum distance from the spill location to the outer edge of the annualised EMBA is calculated as approximately 295 km.

Floating Oil Results

For spills commencing in September to February, the slicks are most likely to be transported toward the north-east from the release location. Spills commencing during the March to August months are most likely to drift toward the west from the release location.

Results of the worst-case modelling (September to February) indicate that surface sheens of floating oil (>1 g/m^2 and 10 g/m^2) may pass over the following sensitive receptors, with a probability of >1% of reaching these locations, noting that floating oil will not accumulate on submerged features or at open ocean locations (Table 7-8).

Floating oil concentrations at or greater than 1 g/m^2 could travel up to 385 km from the release location (September to February), with the distances reducing to 15 km (March to August) as the contact threshold increases to 10 g/m^2.

Table 7-8: Modelling results for floating oil due to 17.2 m^3 Stag crude surface release

Receptor type	Receptor	>1 g/m^2	>10 g/m^2
Australian Marine Parks	Gascoyne MP	Y	N
	Montebello MP	Y	N
Biologically Important Areas	Marine Turtle BIA	Y	Y
	Seabirds BIA	Y	Y
	Fish and Sharks BIA	Y	Y
	Whales BIA	Y	Y
Islands	Montebello Islands	Y	N
Key Ecological Features	Ancient Coastline at 125 m Depth Contour	Y	N
	Continental Slope Demersal Fish Communities	Y	N
	Exmouth Plateau	Y	N
	Glomar Shoals	Y	N
State Marine and National Parks	Barrow Island MMA	Y	N
	Montebello Islands MP	Y	N

Entrained Oil results

Entrained oil concentrations at or greater than 100 ppb could travel up to 101 km from the release location (March to August). Results of the stochastic modelling indicated that entrained oil concentrations greater than 100 ppb were predicted to reach the following locations at greater than 1% probability during the worst case of September–March (Table 7-9). For 100 ppb the minimum arrival time is 11 hours to the Montebello Marine Park. The maximum entrained hydrocarbon concentration at any depth in the worst replicate is 408 ppb at the Montebello Islands MP.

Table 7-9: Modelling results for entrained oil due to 17.2 m^3 Stag crude surface release

Receptor type	Receptor
Australian Marine Parks	Montebello Marine Park
Biologically Important Areas	Marine Turtle BIA
	Seabirds BIA
	Sharks BIA
	Whales BIA
Islands	None
Key Ecological Features	None
State Marine and National Parks	Montebello Islands MP

Dissolved Aromatic hydrocarbons

Dissolved aromatic hydrocarbon concentrations at or greater than 50 ppb are not predicted within the modelling domain for this scenario. No receptors are predicted to receive dissolved aromatic hydrocarbon concentrations equal to or greater than 50 ppb during either season.

7.5.1.5 Results – Subsea Release of 86.5 m^3 and 120m^3 crude

Modelling of two subsea stag crude spills was undertaken in 2020:

- A 120 m^3 Stag crude spill from the subsea pipeline representing the release in the event of a loss of pipeline integrity. This scenario assumed a flow rate of 10 m^3/hr over 12 hours through a hole diameter of 20 mm.
- An 86.5 m^3 spill due to damage from a flexible underbuoy hose, riser or subsea pipeline in the Stag field. This scenario assumed a worst-case flow rate of 173 m^3/hr over a 30-minute period through a hole size of 15 mm

When comparing the two EMBAs that resulted from both modelling reports, the EMBA was larger from the 86.5m^3 spill across all phases of hydrocarbon when looking at the low exposure threshold. However, there are higher volumes of shoreline contact at some locations when looking at the 120m^3 spill. The difference in EMBA spread is likely due to the difference in flow rate and hole size between the two scenarios. The two EMBAs are shown in and an overall combined EMBA has been used throughout the EP to represent the worst-case scenario from any spill.

The annualised EMBA is derived from the seasonal stochastic modelling results (i.e. results from all 200 replicates), hence describes a substantially larger area than would be affected during any single spill event. The annualised EMBA is based on Jadestone's specifications of thresholds for floating oil (1 g/m^2 and 10 g/m^2), shoreline oil (100 g/m^2), entrained oil (100 ppb) and dissolved aromatic hydrocarbon (50 ppb) concentrations. The annualised maximum distance from the spill location to the outer edge of the annualised EMBA is calculated as approximately 703 km (Figure 7-3).

Floating Oil Results

Results of the worst-case modelling (September to February) of 86.5m^3 and 120m^3 indicate that surface sheens of floating oil (>1 g/m^2 and 10 g/m^2) may pass over the following sensitive receptors, with a probability of >1% of reaching these locations, noting that floating oil will not accumulate on submerged features or at open ocean locations (Table 7-10).

For the 86.5m^3 spill floating oil concentrations at or greater than 1 g/m^2 could travel up to 703 km from the release location (March to August), with the distances reducing to 36 km (September to February) as the contact threshold increases to 10 g/m^2 (RPS 2020). Whilst the 120m^3 spill, floating oil concentrations at or greater than 1 g/m^2 could travel up to 860 km from the release location (March to August), with the distance reducing to 19 km (March to August) as contact threshold increases to 10 g/m^2.

Table 7-10: Modelling results for floating oil due to 86.5 m^3 and 120 m^3Stag crude subsea release

Receptor Type	Receptor	86.5m^3		120 m^3	
		>1 g/m^2	>10 g/m^2	>1 g/m^2	>10 g/m^2
Australian Marine Parks	Gascoyne MP	Y	N	Y	N
	Argo-Rowley Terrace MP	Y	N	Y	N
	Dampier MP	Y	N	N	N
	Eighty Mile Beach MP	Y	N	N	N
	Montebello MP	Y	Y	Y	N

Receptor Type	Receptor	86.5m³		120 m³	
		>1 g/m²	>10 g/m²	>1 g/m²	>10 g/m²
Biologically Important Areas	Marine Turtle BIA	Y	Y	Y	Y
	Seabirds BIA	Y	Y	Y	Y
	Fish and Sharks BIA	Y	Y	Y	Y
	Whales BIA	Y	Y	Y	Y
Islands	Montebello Islands	Y	N	Y	N
	Barrow Island	Y	N	N	N
	Lowendal Islands	Y	N	Y	N
	Southern Pilbara Islands	N	N	Y	N
Key Ecological Features	Ancient Coastline at 125m Depth Contour	Y	N	Y	N
	Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula KEF	Y	N	Y	N
	Continental Slope Demersal Fish Communities	Y	N	Y	N
	Exmouth Plateau	Y	N	Y	N
	Glomar Shoals	Y	N	Y	N
State Marine and National Parks	Barrow Island MMA	Y	N	Y	N
	Barrow Islands MP	Y	N	N	N
	Montebello Islands MP	Y	N	Y	N

Shoreline Accumulation

For the 86.5m^3 spill, the potential for accumulation of oil on shorelines is predicted to be moderate, with a worst-case local accumulated concentration of 1,324 g/m^2 at the Montebello Islands in the March to August season. The minimum time to receptor for shoreline oil at 100g/m^2 is 34 hours (Montebello Islands) and 625 hours (Lowendal Islands). The probability of shoreline contact of >100g/m^2 is <1% at any shoreline.

For the 120m^3 spill, the potential for accumulation of oil on shorelines is predicted to be moderate, with a worst-case local accumulated concentration and volume of 2,634 g/m^2 and 68 m^3 (>100g/m^2) forecast at the Montebello Islands in the March to August season; and 8 m^3 (>100 g/m^2) predicted to contact Lowendal Islands. The minimum time to receptor for shoreline oil at 100g/m^2 is 28 hours (Montebello Islands) and 71 hours (Lowendal Islands). The probability of shoreline contact of >100g/m^2 is 8% at Montebello Islands and 2% at Lowendal Islands.

Entrained Oil Results

Entrained oil is most likely to drift to the east for spills commencing during summer and transition months, with drift to the west, followed by the southwest also likely for a spill commencing in the transitional seasons. For a spill commencing in winter months, entrained oil is most likely to drift to the southwest, following the offshore bathymetry of the region. Entrained oil could reach the surrounds of the Montebello Islands within days.

For the 86.5m^3 spill, entrained oil concentrations at or greater than 100 ppb could travel up to 144 km from the release location (March to August), with the distance reducing to 97 km in September to February. The maximum entrained hydrocarbon concentration at any depth at any receptor is 17,734 ppb at the Marine turtle, Seabirds and whales BIAs, and 308 ppb at the Montebello Islands marine park. For 100 ppb the minimum arrival time is 30 hours to the Montebello Marine Park. The cross-sectional transects of

maximum entrained oil concentrations in the vicinity of the release site show that concentrations above 100 ppb are not expected to exceed depths of around 30 m BMSL.

For the 120m^3 spill, entrained oil concentrations at or greater than 100 ppb could travel up to 107 km (March to August) with the distance reducing to 78 km in September to February. The maximum entrained hydrocarbon concentration at any depth at any receptor is 5,296ppb at the Marine turtle, Seabirds and whales BIAs, and 237ppb at the Montebello Islands marine park. For 100 ppb the minimum arrival time is 30 hours to the Montebello Marine Park. Maximum entrained oil concentrations in the vicinity of the release site above the 100 ppb threshold are not expected to exceed depths of around 25 m BMSL. Therefore, limiting benthic interaction below this depth

Table 7-11: Receptors with a probability of entrained oil contacting at >1% for an 86.5 m3 and 120m3 Stag crude release at >100ppb

Receptor Type	Receptor	86.5m^3	120m^3
Australian Marine Parks	Montebello Marine Park	Y	Y
Biologically Important Areas	Marine Turtle BIA	Y	Y
	Seabirds BIA	Y	Y
	Sharks BIA	Y	Y
	Whales BIA	Y	Y
Islands	Montebello Islands	Y	Y
	Lowendal Islands	N	Y
Key Ecological Features	None	N	N
State Marine and National Parks	Montebello Islands MP	Y	Y
	Barrow Island MMA	N	Y

Dissolved Aromatic Hydrocarbons

DAH concentrations at or greater than 50 ppb are not predicted within the modelling domain for the 86.5m3 spill other than the marine turtle, seabirds and whales BIAs that overlap the release location.

For the 120m3 spill scenario, the maximum concentration at any depth in the worst replicate is 60ppb (March to August) at the Montebello Islands Marine park at <1% probability of contact at 50ppb. BIAs in the immediate vicinity of the release location receive a worst-case concentration of 92 ppb.

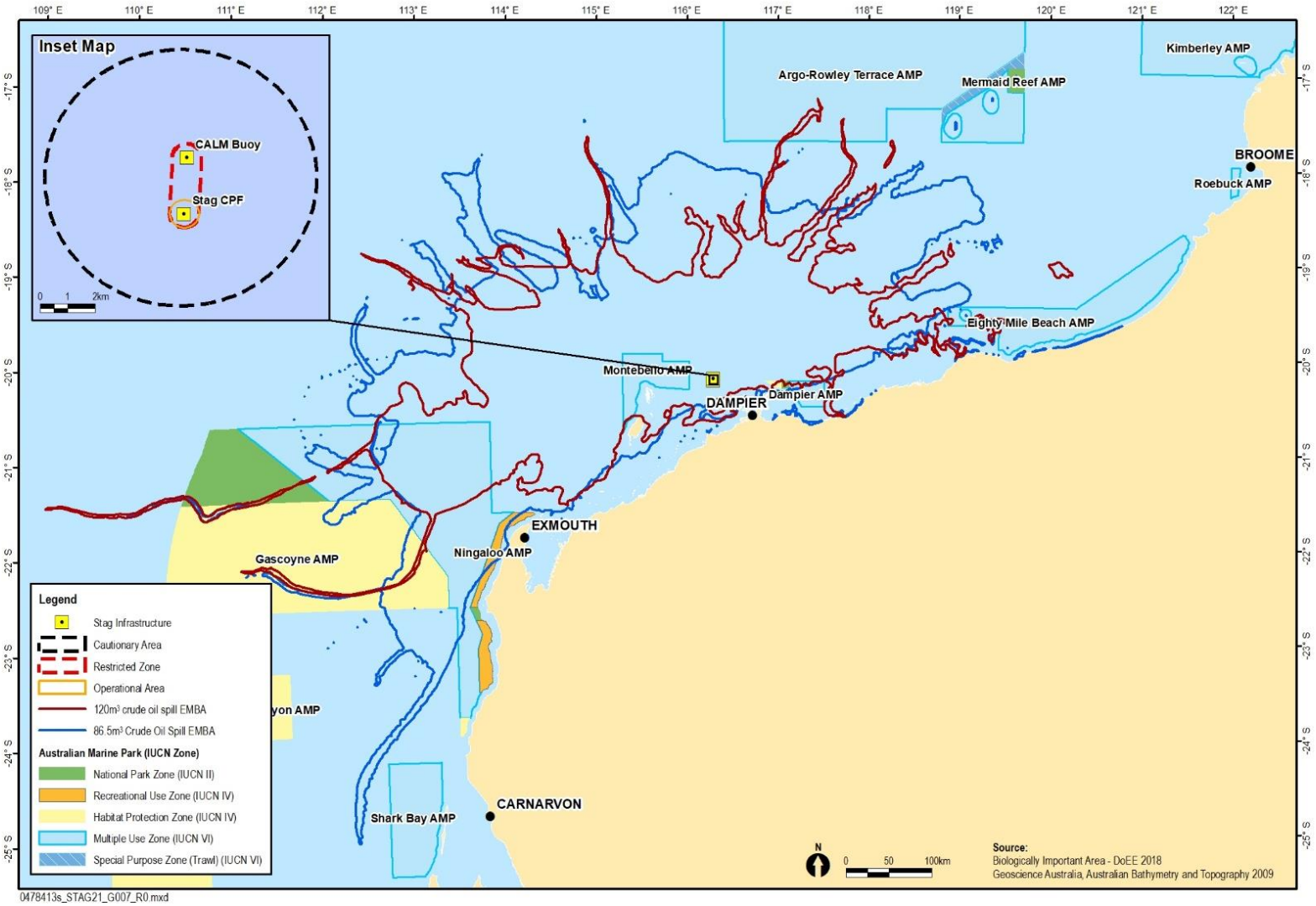


Figure 7-3: Modelled spill trajectories for all seasons for all hydrocarbon phases at low exposure thresholds resulting from release of Stag crude 86.5 m^3 and 120m^3at the Stag facility

7.5.2 Impacts and Risks

The maximum worst-case credible scenario was used to determine the nature and scale of impacts to sensitive receptors. The following sources of information were used:

- Overlaying the modelled impact from a subsurface release of 86.5 m^3 and 120m^3 oil on known benthic habitats and shorelines in the region
- A search of the EPBC Act protected matters database
- Predictions of Stag crude oil shoreline contact from RPS (2020).

Hydrocarbon spills can cause chemical (e.g. toxic) and physical (e.g. coating of emergent habitats, oiling of wildlife at sea surface and ingestion) impacts to marine species. The level of impact depends on the magnitude of the hydrocarbon spill (i.e. severity, extent, duration etc.) and sensitivity of the receptor contacted. Table 7-12 identifies the physical and chemical pathways and oil impacts to habitats, marine organisms and socio-economic receptors at locations in the EMBA.

The properties of Stag crude oil relevant to impact considerations are its persistent fraction, low likelihood of entrainment, low toxicity due to its highly weathered state, and it low adherence due to the low asphaltene content of the weathered residue.

In general, the oil floats when released on the sea surface, because it is less dense than seawater. Hence, not a big amount of a surface spill would tend to get deposited on the seabed, especially when dealing with a relatively small surface release like the one assessed in this case for the Stag operations. The modelling results show no prediction of oil deposited on the sediments.

7.5.2.1 Floating Oil

Floating oil impacts may include coating of marine flora, fauna and habitats or ingestion by marine fauna.

Shoreline habitats

Shoreline habitats which have the potential to be contacted by stranded oil include intertidal coral reefs, cays, sandy shorelines, mangroves, rocky shorelines and intertidal mud/sandflats. Fauna associated with these can be exposed to toxic effects from ingestion as fauna attempt to clean themselves (e.g. preening of feathers or licking fur), reduced mobility and inability to thermoregulate due to oil coating, contact to eyes, noses and breathing apparatus (invertebrates) from oil coating can result in irritation and/or inability to breathe or see.

Corals

Contact of floating Stag crude oil could occur with intertidal corals at low tide. The degree to which impacts such as bleaching, mortality or reduced growth could occur will depend upon the level of coating (concentration of oil and/or loading of oil on shorelines) and how fresh the oil is.

Prolonged contact of oil with corals has been observed to lead to tissue death and bleaching to exposed parts of colonies. Dosages of dissolved aromatic hydrocarbons are not predicted to reach levels where hydrocarbons dissolved under floating oil could impact intertidal or subtidal corals. Since Stag crude oil has a persistent fraction, extended contact with hard intertidal corals could occur and recovery of intertidal coral communities could be on scale of multiple years to decades, dependent upon the level of contact. A number of important coral areas could be contacted, dependent upon weather conditions and resultant spill trajectory, including Montebello/ Barrow/ Lowendal Islands and the Dampier Archipelago. Coral at these locations have been identified as a KPI in the respective marine park management plans (Appendix C).

Table 7-12: Physical and chemical pathways and oil impacts to habitats, marine organisms and socio-economic receptors

Receptor	Location in EMBA	Physical pathway	Potential impacts	Chemical pathway	Potential impacts
Rocky Shore	Barrow Island, Montebello Island, Ningaloo Coast including North-West Cape, Dampier Archipelago	Shoreline loading and attachment.	Degree of oil coating is dependent upon the energy of the shoreline area and the type of the rock formation Solid consolidated rock is likely to receive a lower degree of persistent oiling than lower energy shorelines	External contact by oil and adsorption across cellular membranes Impacts to flora and fauna as per this table	Impacts to sessile flora and fauna as per this table
Sandy Shore	Eighty Mile Beach, Muiron Islands, Imperieuse Reef, Barrow Island, Montebello Islands, Lowendal Islands, Clerke Reef MP, Dampier Archipelago, Thevenard Island, Bedout Island, Turtle Island	Shoreline loading and water movement may act to drive oil into sediments	Indirect impacts to nesting and foraging habitats for birds and turtles. Direct impacts to in-fauna	Toxicity of sediment and reduced oxygen availability within the sediments as a result of oil smothering and microbial biodegradation	Indirect impacts to nesting and foraging habitats for birds and turtles including EPBC listed species and KPIs within marine parks as per Appendix D. Direct impacts (mortality) to in-fauna through toxic effects and smothering
Intertidal flats	Eighty Mile Beach (KPI), Barrow Island, Montebello Islands, Dampier Archipelago,	Shoreline loading and attachment to fine substrates	Indirect impacts to foraging habitats for birds & turtles. Direct impacts to infauna	Muddy substrates are likely to promote sedimentation of oil and binding of sediments by oil	Indirect impacts to foraging habitats for birds. Direct impacts (mortality) to in-fauna through toxic effects and smothering including EPBC listed species and KPIs within marine parks as per Appendix D.
Mangroves	Eighty Mile Beach (KPI), Barrow Island (KPI), Montebello Islands, Lowendal Islands, Dampier Archipelago	Smothering of root system reducing air and salt exchange	Yellowing of leaves, defoliation, disease, increased predation, tree death, reduced growth,	External contact by oil and adsorption across cellular membranes	Yellowing of leaves, defoliation, disease, increased predation, tree death, reduced growth,

Receptor	Location in EMBA	Physical pathway	Potential impacts	Chemical pathway	Potential impacts
			reduced reproductive output, reduced seed viability	Uptake of dissolved aromatic hydrocarbons across cellular membranes	reduced reproductive output, reduced seed viability, growth abnormalities
Algae and seagrass	Muiron Islands, Imperieuse Reef, Barrow Island (KPI), Montebello Islands (KPI), Lowendal Islands, Clerke Reef MP, Dampier Archipelago, Barrow-Montebello Surrounds, Glomar Shoals, Montebello AMP, Dampier AMP,	Smothering of leaves/thalli reducing light availability and gas exchange	Bleaching or blackening of leaves, defoliation, reduced growth	External contact by oil and adsorption across cellular membranes Uptake of dissolved aromatic hydrocarbons across cellular membranes	Mortality, bleaching or blackening of leaves, defoliation, disease, reduced growth, reduced reproductive output, reduced seed/ propagule viability
Hard corals	Muiron Islands (KPI), Montebello Islands (KPI), Lowendal Islands, Dampier Archipelago, Barrow-Montebello Surrounds, Thevenard, Airlie and Serrurier Islands, KPI Glomar Shoals, Montebello AMP, Eighty Mile Beach AMP,	Smothering of polyps reducing light availability	Bleaching, increased mucous production, reduced growth	External contact by oil and adsorption across cellular membranes Uptake of dissolved aromatic hydrocarbons across cellular membranes	Mortality, cell damage, reduced metabolic capacity, reduced immune response, disease, reduced growth, reduced reproductive output, reduced egg/ larval success, growth abnormalities
Invertebrates	All locations including: Eighty Mile Beach, Barrow Island, Dampier Archipelago, Gascoyne AMP, Ningaloo AMP, Montebello AMP, Dampier AMP, Eighty Mile Beach AMP, Argo-Rowley Terrace AMP, Kimberley AMP	Smothering of adults, eggs and larvae - Reduced mobility and capacity for oxygen exchange	Mortality, oxygen debt, starvation, dehydration, increased predation, behavioural disruption	Ingestion and internal adsorption External contact and adsorption across exposed skin and cellular membranes Uptake of dissolved aromatic hydrocarbons across cellular membranes Indirect impact to predators through ingestion of oiled prey	Mortality, cell damage, reduced metabolic capacity, reduced immune response, disease, reduced growth, reduced reproductive output, reduced egg/ larval success, growth abnormalities, behavioural disruption
Fish and Sharks (including EPBC species	All locations including BIAs for: Dwarf Sawfish, Freshwater Sawfish, Green Sawfish; and Whale Sharks (refer Appendix C)	Smothering of adults but primarily eggs and larvae -	Mortality, oxygen debt, starvation, dehydration, increased predation, behavioural disruption	Ingestion and internal adsorption External contact and adsorption across exposed	Mortality, cell damage, flesh taint, reduced metabolic capacity, reduced immune response, disease, reduced

Receptor	Location in EMBA	Physical pathway	Potential impacts	Chemical pathway	Potential impacts
listed in Appendix C and Appendix D)	Additional locations include: Eighty Mile Beach, Muiron Islands, Barrow Island, Montebello Islands, Dampier Archipelago, Barrow-Montebello Surrounds, Glomar Shoals, Gascoyne AMP, Ningaloo AMP, Montebello AMP, Dampier AMP, Eighty Mile Beach AMP,	Reduced mobility and capacity for oxygen exchange		skin and cellular membranes Uptake of dissolved aromatic hydrocarbons across cellular membranes (e.g. gills) Indirect impact to predators through ingestion of oiled prey	growth, reduced reproductive output, reduced egg/ larval success, growth abnormalities, behavioural disruption
Birds (including EPBC species listed in Appendix C and Appendix D	BIAs for the following bird species: Wedgetail shearwater, Roseate tern, Lesser crested tern, Lesser Frigatebird, Fairy Tern, Brown booby, little tern, White-tailed tropicbird (refer Appendix C) Additional locations include: Argo-Rowley Terrace AMP, Eighty Mile Beach (including Ramsar site), Muiron Islands, Barrow Island, Montebello Islands, Lowendal Islands, Thevenard Island, Bedout Island, Clerke Reef (Bedwell Island), Dampier Archipelago Barrow-Montebello Surrounds Montebello AMP, Eighty Mile Beach AMP, Gascoyne AMP, Argo-Rowley Terrace AMP	Smothering - Feather matting and damage, reducing insulation, mobility and buoyancy Secondary smothering of eggs and hatchlings	Mortality, drowning, starvation, dehydration, increased predation, hypothermia, behavioural disruption	Ingestion (during feeding or preening) and internal adsorption External contact and adsorption across exposed skin and membranes Secondary contact and adsorption by eggs and hatchlings Indirect impact to predators through ingestion of oiled prey	Mortality, cell damage, lesions, secondary infections, reduced metabolic capacity, reduced immune response, disease, reduced growth, reduced reproductive output, reduced hatchling success, growth abnormalities, behavioural disruption
Marine reptiles	BIAs for the following turtle species: Flatback, the hawksbill, green, loggerhead and leatherback turtle Additional locations include: Eighty Mile Beach, Muiron Islands, Imperieuse Reef, Barrow Island, Montebello Islands, Lowendal Islands,	Smothering (particularly hatchlings) – reduced mobility and buoyancy	Mortality, drowning, starvation, dehydration, increased predation, behavioural disruption	Inhalation of volatile compounds Ingestion and internal adsorption External contact and adsorption across exposed skin and membranes	Mortality, cell damage, lesions, secondary infections, reduced metabolic capacity, reduced immune response, disease, reduced growth, reduced reproductive output, reduced hatchling success,

Receptor	Location in EMBA	Physical pathway	Potential impacts	Chemical pathway	Potential impacts
	Clerke Reef MP, Dampier Archipelago, Barrow-Montebello Surrounds, Glomar Shoals, Montebello AMP, Eighty Mile Beach AMP, Gascoyne AMP, Argo-Rowley Terrace AMP			Indirect impact to predators through ingestion of oiled prey	growth abnormalities, behavioural disruption
Marine mammals	BIAs for the following mammal species: the dugong, humpback whale, blue whale Other locations include: Muiron Islands, Imperieuse Reef, Broome to Roebuck, Montebello Islands, Lowendal Islands, Clerke Reef MP, Dampier Archipelago, Barrow-Montebello Surrounds, Montebello AMP, Eighty Mile Beach AMP, Dampier AMP, Kimberley AMP	Smothering – fur damage and matting, reduced mobility and buoyancy (for applicable species) Smothering of feeding apparatus in some species (i.e. baleen whales)	Mortality, drowning, starvation, dehydration, increased predation, hypothermia, behavioural disruption	Inhalation of volatile compounds Ingestion and internal adsorption External contact and adsorption across exposed skin and membranes Indirect impact to predators through ingestion of oiled prey	Mortality, cell damage, lesions, secondary infections. Reduced metabolic capacity, reduced immune response, disease, reduced growth, reduced reproductive output, reduced hatchling success, growth abnormalities, behavioural disruption
Socio-economic and heritage	Eighty Mile Beach, Muiron Islands, Imperieuse Reef, Barrow Island, Montebello Islands, Lowendal Islands, Dampier Archipelago, Barrow-Montebello Surrounds, Glomar Shoals, Montebello AMP, Eighty Mile Beach AMP,	Smothering of socio-economic/tourism amenities e.g. sandy shores. Floating oil may prevent vessels (commercial/ recreational) from utilising area Economic effect on industry due to restricted zones, impacts to values/ fishery/aquaculture (e.g. pearls, seaweed) stocks	Loss of income, restriction of access, reduction in aesthetic values leading to negative effect on tourism (both short and long term), loss of aquaculture, human health risk	Entrained oil and DAH may be ingested by fish stocks Reduction in water quality can result in impacts to aquaculture	Decrease in fishery stock levels, reduced marketability of product, tainted flesh in fish, perceived reduction in health of habitat, pearl/ seaweed industry tainted stock, loss of income

Corals at the Montebello/ Barrow/ Lowendal islands and Dampier Archipelago have the potential to be impacted by the greatest volumes and more toxic (less weathered crude oil) although it should be noted that Stag crude oil has a relatively low toxicity due to its highly weathered state.

Impacts to hard corals could be intensified if a spill was to reach shallow coral areas during the peak spawning season of March/ April since floating oil could smother intertidal corals in the process of spawning or could contact floating coral eggs and larvae following spawning events. Dependent on the level of contact, this could diminish coral recruitment, and impact longer term recovery.

Presence of surface oil can affect light qualities and the ability of macrophytes to photosynthesise. Reduced primary productivity could occur while surface oil is present.

Mangroves and salt marshes

Mangrove root systems (including pneumatophores) are sensitive to physical coating by crude oil which may persist for long periods of time given the persistent components of Stag crude oil and the tendency for mangrove root habitat to trap oil. This could have prolonged negative effects on the faunal communities within mangroves. Of the emergent habitat types, mangroves are likely to be one the most susceptible and slowest recovering habitat types with recovery potentially on a decadal scale if death of trees was to occur. Mangroves could be impacted at the Montebello, Lowendal, Barrow Islands, Dampier Archipelago and shoreline areas along Eighty Mile Beach. These mangroves are identified as KPI values within many of the respective management plans (Table 7-12).

Floating crude oil could reach salt marsh areas (Eighty Mile Beach) although the probability is extremely low (8% at <10g/m2), which are often landward of mangrove communities, on high spring tides. Salt marshes would likely trap floating crude oil to a certain degree and therefore persistent oil may remain within these areas even after tidal water has receded. This could have prolonged negative effects on the faunal communities within salt marshes. Depending upon the degree of weathering, Stag crude oil may have toxic impacts from physical coating of salt marshes potentially ranging from death to sub lethal stresses such as reduced growth rates and reduced reproductive output/ success. Such impacts would be restricted to the seaward fringes of salt marsh communities.

Fish and sharks

Near the sea surface, fish can detect and avoid contact with surface slicks meaning fish mortalities rarely occur in the event of a hydrocarbon spill in open waters (Kennish 1997; Scholz et al. 1992). As a result, wide-ranging pelagic fish species of the open ocean generally are not highly susceptible to impacts from hydrocarbon spills. This includes the EPBC listed whale shark (a foraging and high-density BIA overlaps the EMBA (Figure 3-3), great white and grey nurse shark, oil pollution is identified as a threat in their respective conservation advices. BIAs for sawfish are also within the EMBA and conservation advice identifies marine pollution as a risk for green sawfish.

Assessment of the effects on Timor Sea fish following the Montara incident indicated that fish collected initially in Phase I and II of monitoring showed evidence of exposure to petroleum hydrocarbons at sites close to the West Atlas drilling rig, with samples collected one year after (Phase III) suggesting an ongoing trend toward a return to normal biochemistry/ physiology (Gagnon and Rawson 2011).

Most reef fish are expected to be buffered from contact to floating surface slicks by the overlying water column. For example, shallow water reef habitats extend to 15–20 m depth along island coastlines allowing reef fish species to seek refuge from floating oil slicks. Reef fish in the shallowest areas are more susceptible to hydrocarbon spill impacts however, as many reef fish are site attached residents on the reef and are unlikely to move away if their territory is impacted. Impacts due to contact with floating oil may include reduced mobility and capacity for oxygen exchange, behavioural disruption or mortality.

Marine mammals

Whales, dolphins and dugongs are smooth skinned, hairless mammals so hydrocarbons tend not to stick to their skin therefore physical impacts from surface oil coating is unlikely. Pinnipeds are more susceptible to

physical coating as hydrocarbons tend to adhere to rough surfaces, hair or calluses of animals. Irritation to eyes, ears, airways and/or skin may occur from contact with surface slicks.

Physical impacts due to ingestion are applicable to surface slicks; however, the susceptibility of cetacean and pinnipeds species varies with feeding habits. Baleen whales are more likely to ingest surface slick hydrocarbon than "gulp feeders" such as toothed whales and are particularly vulnerable to hydrocarbon ingestion while feeding. Oil may stick to the baleen while the whales "filter feed" near slicks. Humpback whales, whose migration BIA overlaps the EMBA are more likely to occur in the area during the northern migration period in June/July and southern migration in Sep/Oct so a sea surface plume (>10 g/m^2) of oil might contact humpback whales as they migrate. Similarly, blue whales may encounter a sea surface plume (>10 g/m^2) as they pass through the area during their northern migration in May–August as a distribution and migration BIA also overlaps the EMBA.

Marine mammals are at risk of inhaling volatile compounds evaporating from a spill if they surface to breathe in an oil slick (Geraci and St Aubin 1990).

Marine reptiles

Marine turtles and sea snakes when surfacing to breathe may be affected from surface slick hydrocarbons through damage to their airways and eyes. Turtles and sea snakes may be affected by oil through tainted food source or by absorption through the skin. Risk of contact would likely be greatest along intertidal sections of nesting beaches or within shallow waters adjacent to nesting beaches. Contact might also occur within foraging areas, for example along the Ningaloo and Muiron Islands shorelines and Dampier AMP.

The flatback, green, hawksbill and loggerhead turtle BIAs (including foraging, interesting, nesting and mating) overlap the EMBA, and the Stag facility overlaps a suggested 60 km inter-nesting buffer from the nesting beaches on Dampier Archipelago for the flatback turtle (Figure 3-11). However, while oil may be impacted as described above, oil spills are not identified as a key threat to these species in the conservation advice (SPRAT) or in the recovery plan (EA 2003).

Seabirds

Seabirds are highly susceptible to hydrocarbon spills and oiled birds may experience hypothermia due to matted feathers and an inability to fly. These impacts are primarily attributed to oiling of birds at the surface from slicks. Oiled birds may experience decreased foraging success due to a decline in prey populations following a spill (Andres 1997, NRC 2003) or due to increased time preening to remove oil from their feathers (Burger 1997). During both winter and migration, shorebirds spend much of their time feeding and depend on nonbreeding habitats to provide the fuel necessary for migratory flight (Withers 2002).

Oil can reduce invertebrate abundance or alter the intertidal invertebrate community that provides food for nonbreeding shorebirds (Andres 1997, NRC 2003) such as at the Eighty Mile Beach Ramsar site. Reduced abundance of a preferred food may cause shorebirds to move and forage in other—potentially lower-quality—habitats. Prey switching has not been documented in shorebirds following an oil spill. However, shorebirds will feed in alternative habitats when the intertidal zone alone cannot fulfil their energy requirements.

A bird's inability to obtain adequate resources delays its pre-migratory fattening and can delay the departure for its breeding grounds. Birds arriving on their breeding grounds earlier realise higher reproductive success through increased clutch size and offspring survival (for a review, see Harrison et al. 2011). If coastal habitats are sufficiently degraded by oil that pre-migratory fattening is slowed and birds delay departure for their breeding grounds, the individual effects could carry over into the breeding season and into distant breeding habitats (Henkel et al. 2012).

The breeding BIA of several EPBC listed bird species overlap the EMBA (Figure 3-13) and may be affected by oil. The wedge tailed shearwater breeding BIA overlaps the Stag facility operational area and oil pollution is identified as a low threat to the species (SPRAT Wedge-tailed shearwater, DEE 2017a).

Socio-economic

Surface oil may impact upon socio-economic receptors including the oil and gas industry, commercial shipping, fisheries/aquaculture, recreation and tourism, resulting in an economic and social impact. Floating and stranded oil can be highly visible and have a resultant negative effect on tourism. A sheen of oil (1g/m^2) may be visible slightly further than the EMBA for biological impacts boundary and impact on the values of a marine park or tourism beach – in particular Ningaloo coast and Exmouth (Figure 3-14).

Many of the protected areas have 'wilderness' and 'seascapes' identified as a value, and these would be compromised by the presence of any oil.

Impacts on the values associated with Protected Areas may result in loss of fauna/ habitat diversity and/ or abundance, reduction in commercial/recreational/ subsistence fishing, loss of livelihood and loss of income from reduced tourism and commercial productivity.

There are no thresholds identified at which smothering or volume ashore will result in an impact, however those shorelines with the highest load, and those identified as significant threatened or migratory fauna habitat are the most susceptible to impact. Table 7-12 lists key potential impacts to sensitive receptors present in the EMBA.

Several of the AMPs, have conservation values associated with biological attributes including migratory seabirds, flatback turtles, humpback whales, freshwater, green and dwarf sawfish, Australian Snubfin, Indo-Pacific Humpback and Indo-Pacific bottlenose dolphins. A concentration of 1 mg/m^2 would not be expected to have any impact on these values but may affect tourism visitation.

7.5.2.2 Entrained Oil

Total oil in the water column has the potential to coat benthic and susceptible shoreline habitats and organisms.

Shoreline habitats

Intertidal and subtidal zones may be exposed to entrained hydrocarbons with impacts similar to coral reefs. Impacts may occur due to increased hydrocarbon levels in the nearshore waters and in sediments above the low water mark. Concentrations of hydrocarbons in nearshore waters and sediments, will fluctuate over short time scales (days to weeks), due to volatilisation, wave and tidal action, biological processes and potential arrival of more oil. Fauna associated with these habitats may experience sub-lethal effects. However, due to the expected weathering of Stag crude, the accessibility of PAHs to aquatic organisms is decreased.

Similar to benthic habitats, recovery of shoreline habitats exposed to entrained hydrocarbons and experiencing impacts would be expected within weeks to months of return to normal water quality conditions.

Benthic

The smothering of submerged benthic habitats and those within tidal zones from water column oil has only been reported where very large oil spill quantities have affected these habitats or very sticky oil slicks have encountered exposed coral surfaces or polyps. Where entrained oil reaches the shoreline habitats of intertidal zones, sub-lethal effects may occur, with mangroves and reef areas being the most sensitive.

Benthic habitats in the EMBA that may be impacted by entrained oil include soft sediments and benthic fauna, coral reef, macroalgae and seagrasses. Recovery of benthic habitats exposed to entrained hydrocarbons and experiencing impacts would be expected within weeks to months of return to normal water quality conditions. Several studies have indicated that rapid recovery rates may occur even in cases of heavy oiling (Burns et al. 1993; Dean et al. 1998).

Coral

There is a paucity of information on the long-term impacts on coral reefs of hydrocarbons entrained in the water column although NOAA (2001) indicate that some effects may be transient whilst others are long-lasting depending on the type of corals, reproduction period and health of the reef. Response to hydrocarbon exposure can include impaired feeding, fertilisation, larval settlement and metamorphosis, larval and tissue death and decreased growth rates (Villanueva et al. 2008).

Entrained hydrocarbon concentrations below parts per million (ppm) concentrations in marine waters have not been associated with any observed stress, degradation or death of corals. Macrophytes, including seagrasses and macroalgae, require light to photosynthesise. Presence of entrained hydrocarbon within the water column can affect light qualities and the ability of macrophytes to photosynthesise. Reduced primary productivity could occur while entrained hydrocarbons are present in the water column.

Waters that contain extensive fringing coral reef may experience impacts from entrained hydrocarbons as described below for benthic habitats. Reefs are often characterised by increased levels of biological productivity, which attracts commercially valuable fish species. Impacts from entrained hydrocarbons will be as described below for reef fish.

Mangroves

Mangrove communities may be impacted through the sediment/ mangrove root interface. Where entrained hydrocarbons include contaminants that may become persistent in the sediments (e.g. trace metals, PAHs), this can lead to effects on mangroves due to uptake, or effects on benthic infauna leading to reduced rates of bioturbation and subsequent oxygen stress on the plants' root systems (Lewis et al. 2011).

Fish and sharks

Reef fish with high site fidelity will experience protracted water quality conditions with entrained hydrocarbon concentrations >500 ppb within the EMBA. Hydrocarbon droplets can physically affect reef fish exposed for an extended duration (weeks to months) by coating of gills. This can lead to lethal and sub-lethal effects from reduced oxygen exchange and coating of body surfaces resulting in increased incidence of irritation and infection. Fish may also ingest hydrocarbon droplets or contaminated food leading to reduced growth (NRC 2005). Lethal effects to reef fish may be observable within days to weeks. Sub-lethal effects of coral reef fish communities will take weeks to months to become measurable.

Pelagic and demersal fish species (including sharks) exposed to entrained hydrocarbons can result in tainting and contamination of fish flesh by insoluble PAHs associated with the weathered hydrocarbon (refer below for further information on tainting).

Whale sharks feed on plankton, krill and bait fish near or on the water surface and it is possible that they may come into contact with entrained oil or ingest entrained oil if a large-scale spill occurred when they (and their prey) were present in the region (Woodside 2005).

Whale sharks are known to transit the NW coast and aggregate from late March to June in the vicinity of the Ningaloo coast, (generally peaks in April). If a spill event overlapped with this time, whale sharks may experience entrained hydrocarbon concentrations >100 ppb. While whale sharks may be exposed to entrained hydrocarbons, they could be migrating to aggregation areas beyond the impact zone, in which case exposure would be short term and confined to the EMBA and spill duration/ dispersion periods.

Marine mammals

Impacts to marine mammals from entrained hydrocarbons could result in behavioural (e.g. deviating from migratory routes or commonly frequented feeding grounds) impacts. These impacts may affect individuals within or transiting the spill area during migration.

Whales, dolphins and dugongs are smooth skinned, hairless mammals so hydrocarbons tend not to stick to their skin therefore physical impacts from entrained oil coating is unlikely. Pinnipeds are more susceptible

as hydrocarbons tend to adhere to rough surfaces, hair or calluses of animals. Irritation to eyes, ears, airways and/or skin may occur from contact with entrained oil.

Impacts from ingested hydrocarbon can be lethal or sub-lethal. However, the susceptibility of marine mammal species varies with feeding habits as with surface oil (described previously). Entrained oil attached to seagrass can also be ingested by dugongs.

Oil may foul sensory hairs around the mouth and/or contact eyes while surfacing to breathe which may cause inflammation and infections. Similar to cetaceans, inhalation of volatile compounds evaporating from a spill may also result in physiological impacts to dugongs.

Marine reptiles

Turtles and sea snakes may be affected by oil through tainted food source or by absorption through the skin. Turtle hatchlings and turtle/sea snake adults may be exposed to hydrocarbon through ingestion of entrained hydrocarbons and tainted food source. These effects may cause physiological effects such as disruption of digestion. As for other megafauna that may be exposed to entrained hydrocarbons, acute impacts due to exposure to adult turtles are not expected.

Seabirds

Seabirds may come into contact with entrained oil while searching for food (diving) below the sea surface, exposure times would be very short in this scenario limiting the opportunity for oiling of feathers. Short-term physiological effects due to ingestion of entrained oil or contaminated prey may also occur. Ingested oil can have several sublethal toxicological effects, including haemolytic anaemia, reduced reproduction, and immunosuppression.

Socio-economic

Impacts to fish may result in tainted flesh and fishery closure resulting in an economic impact on commercial and subsistence fishing. Entrained oil can also lead to impacts on aquaculture (e.g. pearls, seaweed) due to a decrease in water quality and reduced stock. Reduced marketability of products (perceived or real) could occur for target species. Tourism may be impacted by real or perceived reduction in health or mortality of habitats that support tourism activities.

Table 7-12 lists key potential impacts to sensitive receptors present in the EMBA.

7.5.2.3 Dissolved Aromatic Hydrocarbons

The moderate threshold for dissolved aromatic hydrocarbons is not reached for the crude spill scenarios; however, the detail is provided here as it is reached for the diesel spill scenario (Section7.6).

While there is some debate in the scientific literature (Barron et al. 1999), the main component of oil generally thought to be responsible for the majority of toxicity to wildlife is the Dissolved Aromatic Hydrocarbons (DAH) compounds that dissolve into the water column following a spill. Various studies indicate that the toxic effects of aromatic compounds result from the narcosis caused in biological receptors following exposure to low molecular weight aromatics including compounds from the BTEX group and 2–4 ring PAHs (French 2000).

Accumulation of petroleum hydrocarbons by marine organisms is dependent on the bioavailability of the hydrocarbons, the length of exposure, and the organism's capacity for metabolic transformations of specific compounds. Actual toxicity depends on both concentration and the duration of exposure, being a balance between acute and chronic effects.

Acute toxicity

Toxicity to wildlife increases with increased length of exposure; marine organisms can typically tolerate high concentrations of toxic hydrocarbons over short durations (French 2000; Pace et al. 1995).

DAHs have a narcotic effect on organisms, resulting from interference with cell function that occurs as hydrocarbons are absorbed across cell membranes (French-McCay 2002). The narcotic effect varies among specific hydrocarbon compounds, with these variations thought to be attributable to the lipid solubility of the compounds. Over periods of hours to a few days, the narcotic effect has been found to be additive, both in severity and the number of different soluble hydrocarbons that are present (French 2000; NRC 2005; Di Toro et al. 2007).

Because the toxicity of DAH to aquatic organisms increases with time of exposure, organisms may be unaffected by brief exposures to a given concentration but affected at long exposures to the same concentration (French-McCay 2002). This is due to the fact that the concentrations of hydrocarbons build up in the tissues of biological receptors from either long-term exposure or repeated exposure to sub-lethal concentrations.

Chronic toxicity and accumulation

There is sparse data available on the chronic effects of PAHs in the marine environment. A review of the processes controlling the uptake and persistence of PAH in marine organisms, especially under chronic exposure conditions, highlighted differential mechanisms of uptake, tissue distribution, and elimination (Meador et al. 1995). While vertebrates have a high capacity for metabolising aromatic hydrocarbons including PAHs (through cytochrome P450 1A mediated oxidation), PAHs can accumulate in the body of invertebrates (as they lack a cytochrome P450 1A mediated oxidation system). Organisms that may experience chronic effects include plankton, fish, marine mammals and marine reptiles. Table 7-12 lists key potential impacts to sensitive receptors present in the EMBA.

Pelagic fish are highly mobile and comprise species such as sharks and migratory whale sharks. The likelihood of pelagic fish being continuously exposed to DAHs for >96 hours is unlikely therefore acute/ lethal effects are not predicted (Luyeye 2005). However, chronic/ non-lethal effects may be experienced. As a chronic action of PAHs is a neurotoxic effect, chronic exposure of pelagic fish may cause delayed predatory/ avoidance response times, disorientation, swimming action/ efficiency.

Whale sharks migrate along the NW coast from late March to September. If a spill event overlapped with this time period, whale sharks may experience exposure above the DAH threshold as they migrate through the area.

Tainting by DAHs of commercially targeted pelagic fish species may occur. Tainting can have a range of effects from affecting edible quality of the fish and have economic consequences, to containing toxic levels above recommended human consumption guidelines. While tainted pelagic fish will recover naturally over time (months) once water quality conditions have returned to normal, re-opening of a fishery will require an understanding of when recovery from tainting has occurred for the target species of interest.

Marine mammals that may occur within the EMBA for DAHs include dugongs, whales and dolphins in offshore waters. According to Geraci and St Aubin (1990), inhalation of volatile compounds evaporating from a spill at sea surface is the greater risk to cetaceans when surfacing to breathe. For these marine mammals, the potential for chemical effects due to exposure is considered unlikely, particularly for highly mobile species such as dolphins because it is very unlikely that these animals will be constantly exposed to high concentrations for continuous durations (e.g. >96 hours) that would lead to toxic effects.

The majority of publicly available information detailing potential impacts to turtles and sea snakes due to exposure to hydrocarbons is based on impacts due to heavy oils. Impacts due to exposure to DAHs are less understood. One information source provides a case study detailing a spill of 440,000 gallons of aviation gasoline nearby to an island supporting approximately 1,000 green turtles that aggregate and nest at the atoll in the west Pacific Ocean annually (Yender and Mearns, n.d.). Timing of the spill was of concern as it coincided with expected peak hatchling emergence. Population comparisons with a census that had been completed just prior to the spill were undertaken to evaluate impacts; no impacts were reported during the spill response and population effects were not detected.

For marine reptiles that may be exposed to DAHs dosages that exceed the threshold, acute impacts to turtles and sea snakes are not expected. Impacts to turtle hatchlings may occur however due to the risk of them becoming entrained in a parcel of water allowing them to be continuously exposed to toxic hydrocarbons for an extended period.

Socio-economic receptors will be affected by hydrocarbon exposure in three key ways: loss of Income (e.g. reduction in catch for commercial fisheries), restriction of access and reduction in aesthetic values. Impacts to fish may result in tainted flesh and fishery closure resulting in an economic impact on commercial fishing. DAH in the water column can also lead to impacts on aquaculture (e.g. pearls, seaweed) due to a decrease in water quality and reduced stock. Reduced marketability of products (perceived or real) could occur for target species. Tourism may be impacted by real or perceived reduction in health or mortality of habitats that support tourism activities.

7.5.2.4 Receptors

Key ecological features (KEFs)

The crude spill modelling does not indicate contact with any KEFs >1% probability at moderate thresholds.

Commonwealth and State Marine Reserves

The following state and Australian Marine Parks are located within modelled spill trajectories of a crude oil release at moderate thresholds:

- Montebello Australian Marine Park
- Montebello Island Marine Park.

These parks were established to protect both habitats and species groups as described in Appendix C Many of the values are listed as KPI and are considered unique to the protected area and include habitats, fauna or ecological features. Impacts to the values may compromise the management objectives of the managed areas, which may have flow-on effects to tourism revenue of coastal communities that provide access to these marine reserves. The reserves listed above may also support nursery/ feeding/ aggregation areas for fisheries species and therefore may assist in maintaining healthy fish stocks for both commercial and recreational fisheries.

Overall consequence	Overall likelihood	Residual ranking
Major	Unlikely	Medium

7.5.2.5 Protection Priorities

Defining protection priorities helps to determine the scale and needs of the oil spill response and are used for spill response planning purposes. In a real event, the IAP, NEBA and planning process takes over; utilising real time operational data and focusing operations on locations to be contacted (which will be a subset of what is planned for). This allows for preparedness and planning for the most credible scenarios whilst retaining flexibility in response to manage an event.

Montebello Islands have been determined as a Protection Priority (refer Section 5.7.5) for spill response based on the modelling results for both crude and diesel spills. For additional information on protection prioritisation, refer to Section 5.7.5.

7.5.3 Environmental Performance

EPOs and control measures for oil spill response activity implementation are presented in Section 19 of the OPEP.

Environmental Risk		**Release of Stag crude**		
Performance Outcome		**No spill of hydrocarbon to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
	Unplanned release of Stag crude oil from CPF production equipment (including process upset)			
082	Tests and maintenance completed in accordance with Stag Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007) to ensure emergency shutdown can occur and equipment is fit for purpose	The SIS are tested according to the assurance plan which is part of GA-70-REP-F-00001, these are planned and managed using CMMS	Inspection and testing records	Stag OIM
083		Emergency Shutdown (ESD) push buttons located in the central control room and throughout the CPF, tested and fit for purpose every six months	Audit records confirm standard.	
084		ESDVs are regularly tested and fit for purpose 6 monthly as per PS-06: ESD and Blowdown – Topsides and Riser Emergency Shutdown Valves (ESDVs)	ESDV testing records	
085		CPF hydrocarbon containing equipment is regularly inspected and maintained and found fit for purpose – • Internal inspection of tanks 48 months • External inspection of tanks 24 months	Inspection and maintenance records	
086		PSVs undergo external inspection annually and internally inspected every 4 years	Inspection and testing records	
087	Permit to Work Procedure implemented	A Permit to Work (PTW) system is implemented on the CPF to assure competent personnel and implementation of relevant procedures during maintenance.	PTW Documentation demonstrates compliance	
088	Wellhead valves maintained and tested as per Stag Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007)	Wellhead Valves are maintained and tested annually and found fit for purpose as per PS-07: ESD and Blowdown: Reservoir Isolation (Including SCSSVs and wellhead valves)	Maintenance and testing records	

Environmental Risk		Release of Stag crude		
Performance Outcome		**No spill of hydrocarbon to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
089	Operational personnel competent and trained in accordance with Competency and Training Management System [JS-60-PR-Q-00015]	Position classification and skills matrix for all personnel involved in operation, maintenance and incident response on the CPF	Skills matrix and annual audit of Competency Management system.	
	Unplanned release of Stag crude oil from offtake hose (CALM buoy to third-party tanker)			
090	Monitoring of crude oil offtake hose to third-party tanker during loading in accordance with Stag Marine Tanker Handbook (GF-00-MN-H-00037)	Dedicated bow, and dedicated manifold watch, equipped with communications to the Cargo Control Room kept for the whole offtake period	Deck Logbook Maintenance log	Operations Manager Marine Superintendent
091	Hose maintenance process in accordance with OCIMF guidelines	Floating hoses maintained and managed in accordance with OCIMF *Guidelines for the handling, storage, inspection and testing of hoses in field* and includes visual inspections, pressure tests and replacement schedules.		
092	CALM Buoy Hawser Changeout occurs as per CMMS	Hawser changed out at intervals of up to 20 months Hawser visual check hourly as part of hourly checks program by tanker		
093	Marine breakaway coupling on offtake hose	Maintenance of hose undertaken in accordance with the Preventative Maintenance System and confirms presence of breakaway coupling		
094	Leak Detection	Detection of spill is by means of drop in delivery pressure monitored on the CPF. Delivery pressure monitoring at CPF is done continuously during loading operations by the Panel Operator.		

Environmental Risk		Release of Stag crude		
Performance Outcome		**No spill of hydrocarbon to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
095	Jadestone Stag Marine Tanker Handbook (GF-00-H-00037) implemented during offtake activities	Connection and disconnection of the offtake hose will be undertaken in accordance with this manual		
096		Leak test is completed prior to recommencement of slow loading once import hose is connected to incoming tanker		
097		Pilot will review the Stag Marine Facility Operating Procedures with the third-party Offtake Tanker Master before proceeding to the Berth, and confirm any special conditions imposed due to prevailing local conditions to ensure safe offtake. The manual outlines requirements for offtake to ensure prevention of spills including: • Weather limitations that determine if the terminal is open, restricted or closed for offtake • Personnel competency matrix (SIRE) and induction requirements • Communication test requirements to be conducted prior to load commencement • Leak testing once the offtake hose is in place and connected, and prior to loading commencing Location of MBC in the hose string to minimize risk of impact with third party tanker		
098	Tankers vetted in accordance with Offtake Vessel Vetting Procedure (JS-90-PR-G-00211) prior to mobilisation	Offtake tankers are vetted prior to acceptance against the following criteria as a minimum to prevent damage or other risks to, or oil pollution from, the facility's offtake equipment, during offtake: • Confirm tanker is double hull and vessel dimensions • Confirm the tanker management system complies with the requirements of ISM code • Confirm the manifold and associated equipment complies with the latest edition of OCIMF's: "Recommendations for Oil and Chemical Tanker Manifolds and Associated Equipment" • Confirm the forecastle layout/ equipment complies with OCIMF guidelines for single point moorings " Single Point Mooring Maintenance and Operations Guide"	Completed questionnaire screened and accepted	Marine Superintendent

Environmental Risk		Release of Stag crude		
Performance Outcome		**No spill of hydrocarbon to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
Subsea release of Stag crude				
099	Subsea equipment inspected in accordance with Subsea Inspection Strategy (JS-16-PR-U-00001)	Subsea equipment shall be inspected in accordance with the schedule, applicable standards, regulatory requirements and procedures described referenced in Safety Critical Elements (SCEs) performance standards reports associated with subsea inspection: Stag Safety Critical Elements Performance Standards Report, GA-70-REP-F-00007	Inspection records in CMMS	Maintenance Team Lead
100	Inspection of underbuoy hose to ensure hose integrity in accordance with Stag Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007) and Topside Riser & Wellhead conductor Inspection Procedure (GA-02-PR-S-00177)	Inspection of underbuoy hose (PLEM to CALM buoy) is performed in accordance with the maintenance schedule and OCIMF *guidelines for the handling, storage, inspection and testing of hoses in the field*.		
101	Underbuoy Hose Removal and Replacement Procedure implemented as required	If hoses must be replaced, the procedure includes: • Flush line from Stag CPF to third-party tanker until clean water being received at third-party tanker • Disconnect third-party tanker • Air blow underbuoy hose contents back to Stag CPF • Divers close PLEM valve	Close-out Reports in CMMS	
102	Stag Marine Facility Operating Manual (GF-90-MN-G-00038) details designated anchoring locations	AMSA designated anchoring locations is listed as a 3 Nm radius around facility and marked on Aus Charts	Annual audit	Stag OIM

Environmental Risk		Release of Stag crude		
Performance Outcome		**No spill of hydrocarbon to the marine environment**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
103	Emergency shutdown system tested and implemented in the event of a loss of pipeline integrity	Emergency Shutdown (ESD) push buttons located in the central control room and throughout the CPF, tested and fit for purpose every six months	Audit records confirm standard.	Stag OIM
104		ESDVs are regularly tested and fit for purpose 6 monthly	ESDV Testing records	Stag OIM
105	Emergency pipeline repair plan in place	Emergency Pipeline Repair Plan (JS-09-PLN-L-00001) is valid and approved prior to commencement of any drilling activity	Controlled document management system records	Stag OIM
106	Lifting Procedures	Lifting operations managed in accordance with MODU work instructions or procedures SIMOPS plan and permit to work procedures in place for any starboard outboard lifts (unplanned during the activity).	PTW and SIMPOS procedures in place prior to lifting	MODU OIM Stag OIM
107	MODU Safety Case	MODU Safety case includes controls for dropped objects to manage impacts to in-field infrastructure including: • Heavy lift procedures • Lifting equipment is maintained in accordance with manufacturer specifications, certified and inspected • All personnel involved in lifts are competently trained • MODU port forward crane is used for outboard lifts as there is no subsea infrastructure to the east of the MODU	NOPSEMA approved safety case implemented	Drilling Manager

**[1] The Stag Marine Tanker Handbook (GF-00-MN-H-00037) contains the pertinent information required by the nominated Tanker in preparation for arriving at anchoring location to prepare for safe arrival, embarkation of Pilot and Surveyor, and transit to the Stag Marine Facility for offtake duties. Pilot will review the Stag Marine Facility Operating Procedures with the Offtake Tanker Master before proceeding to the Berth*

7.5.4 ALARP assessment

All safety options have been considered for the Stag Operations, with no additional safety options possible it is considered that the risk of a loss of containment occurring has been reduced to ALARP. The combination of the standard controls (which reduce the likelihood of the event happening), and the spill response strategies (which reduce the consequence) together aim to reduce potential impacts from a hydrocarbon spill. An oil spill response workshop was undertaken and subsequently, a review of capability by AMOSC.

Vessel Collision Control

Vessel activities are required to maintain the functioning of the facility and cannot be eliminated. The Stag facilities are marked on Australian Hydrographic Service Nautical Charts which identifies the location of the CPF berthing activities to other sea users. Collision prevention equipment (i.e. navigation and radio equipment) and seagoing qualifications used on vessels/ CPF comply with applicable AMSA Marine Orders which enact the International Convention of the Safety of Life at Sea (SOLAS) 1974 through the *Navigation Act 2012*. These requirements reduce the risk of errant vessel collisions and the potential for crude oil release from these vessels.

For vessels engaged in operational activities, the procedures outlined in the Stag Marine Facility Operating Manual (GF-90-MN-G-00038) provide controls to reduce the risk of collision. Communication is established between third party vessels and the CPF well before they enter the Operational Area to ensure proposed activities are safe to proceed and to reduce the potential for vessel collision during simultaneous operations.

Controls are in place (refer Section 7.5.3) which reduce the likelihood of spill events. There are no further controls that are considered to provide a net benefit in reducing the likelihood or consequence of a release of Stag crude to the marine environment and thus, the controls are considered ALARP.

Topside production system controls

Crude oil processing equipment (e.g. vessels, valves, piping and pumps) is inspected, tested and maintained as per operational performance standards and the CMMS which ensure the correct functioning of equipment and systems that are critical in ensuring hydrocarbon containment and safety of crew. Safety systems are utilised on the hydrocarbon processing equipment which reduce the likelihood of loss of integrity and/or release of crude oil. These include pressure safety valves (PSVs), emergency blowdown systems and emergency shutdown (ESD) systems.

Load alarms on cranes provide warning of excessive crane loads and reduce likelihood of dropped objects. Lifting procedures, lifting equipment testing, equipment protection, competency requirements and the permit to work (PTW) system reduce the risk of dropped/swinging loads impacting process equipment. The competency of personnel working on production equipment is assessed through a competency-based assessment framework and assurance that tasks are scheduled and completed safely is provided through the PTW system. Controls are in place (refer Section 7.5.3) which reduce the likelihood of spill events. There are no further controls that are considered to provide a net benefit in reducing the likelihood or consequence of a release of Stag crude to the marine environment and thus the controls are considered ALARP.

Subsea Controls

The integrity of the subsea export pipeline, PLEM and underbuoy hose is monitored through the Subsea Inspection Strategy (JS-16-PR-U-00001). The pipeline inspection and maintenance activities conducted by Jadestone are managed via the CMMS.

The pipeline was subject to a design life extension studies in 2013 and 2023, extending the service life by 20 years to 2033, subject to ongoing inspection programs. Further integrity reviews will continue to assess remnant life on an ongoing basis.

The identified causes of pipeline, PLEM or underbuoy hose rupture from external factors is through dropped objects, vessel collision and anchor drag. The threat of dropped objects from support/supply vessel loading/unloading is mitigated by the CPF lift zone being located away from the subsea export pipeline. The rigid riser section of the pipeline is also protected by a frame and runs inside the jacket leg footprint providing additional protection from swinging loads and vessel impacts.

Controls are in place (refer Section 7.5.3) which reduce the likelihood of spill events. There are no further controls that are considered to provide a net benefit in reducing the likelihood or consequence of a release of Stag crude to the marine environment and thus the controls are considered ALARP.

Spill Response Controls

For a Level 1 crude oil spill, containment and clean-up is assisted through the bunding system provided around process equipment and the regular inspection program. Spills are responded to as per incident and spill response procedures which are practised through regular spill/ incident response drills on the CPF and vessels. Spill kits are located near high-risk areas and maintenance of spill equipment is assured through regular inspections. In the event that diesel or crude oil is not contained through the barriers and procedures, the Stag Field Operations OPEP (GF-70-PLN-I-00001) which outlines the detailed response and logistical requirements necessary to combat a maximum credible crude oil release, will be implemented to reduce the impacts of a crude oil spill to ALARP.

Where a spill of crude oil reaches the marine environment, spill response activities will be implemented in accordance with the OPEP. A Net Environmental Benefit Analysis (NEBA) will be used to determine which spill response strategies are appropriate for a given spill scenario and is an integral part of the IAP process.

In the case of any spill to the marine environment, source control and operational monitoring activities will be implemented.

The spill response strategies have undergone a robust evaluation and environmental risk assessment process (refer OPEP). The applicability of the control to the spill scenario and establishing requirements for each control to ensure its effectiveness in meeting the EPO has also been undertaken.

The assumption was that existing controls were ineffective (i.e. 100% probability of vessel collision) and each control would be exposed to the full volume of oil under the maximum credible worst-case scenario with the shortest time to contact. This approach promoted a level of conservatism in the proposed control strategies, and, in particular, the measures for determining the effectiveness of controls and the requirements to achieve the level of effectiveness.

The ALARP assessment for the level of resourcing required for each of the spill response strategies adopted is provided in Table 7-13 and Table 7-14, based on the capability described in the OPEP. This considers the incremental benefit of increasing resourcing levels for each spill response strategy and the associated upfront costs. The effectiveness of each of these response strategies has been increased to a point where further sacrifice made would result in a disproportionately small reduction in environmental risk/impact managed.

It is considered that through the resourcing arrangements outlined within the OPEP (including spill response equipment and personnel from internal and external sources including via the AMOS Plan, AMSA, other operators and other national suppliers) the spill response strategies and control measures reduce spill risk to ALARP. As a member of an industry-wide oil spill response organisation (AMOSC) as a party to a Master Services Contract (MSC) with AMOSC for services for training purposes or in response to a threatened or actual oil spill (Mutual Aid resources, the AMOSC Core Group, access to AMSA resources) and a Service Level Agreement with OSRL for access to trained personnel and equipment Jadestone has access to sufficient response capability to reduce the environmental risk to ALARP.

Table 7-13: Summary of spill response controls

Spill response control	Yes/No
Source control	
Refuelling watch alert	Y
Secure cargo/trimming	Y
Pipeline isolation and repair	Y
Bunded areas around machinery and engines	Y
Operational monitoring	
Vessel Surveillance	Y
Aerial Surveillance	Y
Tracking Buoys	Y
Oil Spill Modelling	Y
Remote Sensing/Satellite Imagery	Y
UAVs	Y
Chemical dispersant	
Existing dispersant stockpiles and transport arrangements	Y
Additional Jadestone dispersant stockpiling	N
Dispersant application aircraft	Y
Dispersant application vessels	Y
Containment and recovery	
Targeted C&R operations	Y
Pre-deployed at site	N
C&R Planning	Y
Protection and deflection	
Targeted protection	Y
Pre-deployed at site	N
Protection Planning	Y
Shoreline clean-up	
Targeted clean-up operations	Y
Pre-deployed at site	N
Shoreline Clean-up Planning	Y
Oiled wildlife response (OWR)	
Targeted OWR activities	Y
Pre-set up staging site	N

Spill response control	Yes/No
Waste management	
Waste Management Planning	Y
Emergency management system	
IMT process (including IAP, NEBA processes)	Y
Operational and Scientific monitoring	
Operational and Scientific Monitoring Planning	Y

Table 7-14: ALARP assessment for the level of resourcing available for spill response strategies from those described in the OPEP

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
Source Control Section 12 of OPEP	Reduce volume or speed of spill entering marine environment	Vessel has the response capability as described in the SOPEP and geared towards a Level 1 incident. The SOPEP is to provide shipboard notification and response procedures for stopping or minimizing the unexpected discharge of oil from a ship without compromising the safety of the crew, the vessel or the environment. Unexpected discharge includes the discharge of oil during vessel operations, or vessel casualty. Significant cost would be incurred for Jadestone to alter the contractual arrangements with the third-party tanker operator to increase capability with consideration for equipment, storage, maintenance, crew training and safety of crew when deploying gear.	It is consistent with the National Plan that vessels have a level 1 capability. For Jadestone to increase the vessel response capability to a Level 3 would be a disproportionate benefit for the effort. In addition, the worst-case spill results from a vessel collision and the priority of the vessel master is to safeguard the crew and remove all non-essential personnel. Therefore, there is no value in supplementing the vessel SOPEP capability, and therefore the arrangements described in the OPEP are considered ALARP.
Aerial surveillance Section 11 of OPEP	The two passes per day separated by six hours' philosophy allows coverage of oil movement. The spill is a defined volume and not amenable to entrainment. The morning pass will validate the current IAP, and the second afternoon pass will inform the development of the next IAP operational period. This will be	Additional charter costs would be incurred by Jadestone to increase from two passes per day. There may be a need for additional resources if determined through the IMT based on the amount of available information and potential data gaps. These can be arranged without need for further upfront costs or planning.	Aerial surveillance is not the only dedicated surveillance tactic. Opportunity for surveillance will also occur from satellite surveillance, vessel surveillance and responder movements and opportunistic aerial surveillance through the shared use of aircraft deployed for other purposes e.g. aerial dispersant spraying, C&R and shoreline strategies). The spatial extent of the spill is more dependent on tidal influences than the wind. Tides are twice per day and are best captured by twice daily aerial flights.

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
	used along with the other surveillance tactics and validate these (e.g. trajectory modelling and vessel surveillance). Therefore, there is considered no environmental benefit for resourcing an overpass frequency of greater than two passes per day.		The two dedicated passes are sufficient to validate and inform the IAP process to ensure overall response is commensurate with nature and scale of incident. Therefore, there is no value in increasing dedicated overpasses and therefore the arrangements described in the OPEP are considered ALARP.
Vessel surveillance Section 11 of OPEP	One dedicated resource within 48 hours is considered ALARP. There would be no environmental benefit for additional dedicated resources given the need is met through vessel sharing and surveillance will also be conducted through a number of complementary operational monitoring strategies (aerial surveillance, tracker buoys).	In the event that additional dedicated vessels are required due to data gaps, resources are available. The cost of the additional vessels will be added to the cost of the response.	There is no benefit in having additional dedicated surveillance vessels given surveillance can be performed from any vessel and these duties will be shared amongst spill response vessels. Aerial surveillance, tracker buoys and UAVs are more efficient and effective at determining extent of oil movement, vessel surveillance is a secondary tactic. Therefore, there is no value in increasing dedicated vessel numbers and therefore the arrangements described in the OPEP are considered ALARP.
Tracking buoys Section 11 of OPEP	One buoy will be deployed within one hour of being notified of the spill with an additional buoy available at the Stag Facility (if required). If additional buoys (beyond the two) are required, they are able to be transported to the Facility and deployed within 24 hours. As the spill is instantaneous and of a defined volume, there is no additional	Additional buoys are available through AMSA and AMOSC within days. There is no additional upfront cost for accessing these secondary buoys.	Tracking buoys are one tactic in the operational monitoring strategy. The number of buoys immediately available is sufficient to cover tracking of oil given the worst-case spill is a defined volume and timeframe. Placing a tracker buoy on the support vessel would have no additional benefit than from the CPF as the distance between the support vessel (when in field) and CPF is small and subject to same tidal influences. Also, tracker buoys require maintenance which can be scheduled from the CPF as part of the spill response equipment. Therefore, there is no value in increasing tracker buoy numbers and therefore the arrangements in the OPEP are considered ALARP.

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
	benefit to increasing tracker buoys.		
UAVs Section 11 of OPEP	UAVs can monitor in difficult to access areas and prevent unnecessary intrusion by responders. Information is real time and utilised in the IAP for targeted response. UAVs allow more data captured quicker than by deploying responders alone. There is no environmental benefit from increasing the number of UAVs.	There would be additional cost in obtaining more than the four UAVs outlined in the OPEP, also for additional vessels and personnel to interpret data.	The resourcing provides UAV capability for monitoring Montebello Islands as the main predicted protection priority. Additional UAVs will not provide additional benefit (except for redundancy). The UAVs are considered a secondary aid in locating oil in difficult terrain. Additional UAVs can be sourced as needed after a spill event given their high availability. The number outlined in the OPEP is for pre-deployment planning purposes only. Given the use of UAVs is a secondary strategy and not critical to reducing environmental impact the existing arrangements described in the OPEP are considered ALARP.
Chemical dispersant application Section 15 of OPEP	Application of additional chemical dispersants within the timeframe planned and implementing a faster application timeframe. These have the potential for further reduction of floating oil and shoreline loading (reducing/eliminating further environmental impacts – clean-up and protection and deflection intrusions, oiled wildlife) and an increased ability of the environment to biodegrade the oil more rapidly to below threshold levels; thus, reducing the severity and duration of the spill and subsequent economic and social impacts.	Additional resources include: • Dispersant costs of $10,000 per m^3. The maximum volume of dispersant that can be applied within the activity timeframe has been calculated to be 258 m^3. • FWADC aircraft $15,000 per aircraft per day. • Vessels $15,000 per day plus fuel costs of $1,600 per day. • Additional expert personnel. • Chemical dispersant operations are to be conducted in daylight hours only. Indicative costs:	The worst-case spill scenario where chemical dispersant is recommended is a subsea spill from a loss of pipeline integrity (120m^3 Stag Crude), with a finite volume of oil and defined timeframe. The estimated Window of Opportunity (WoO) for chemical dispersant application diminishes after 72 hours. Jadestone has evaluated that the chemical dispersant operations are likely to commence (worst-case, taking into account the restriction of flying in daylight hours) on day 2 ((refer Section 15 of OPEP). This would enable some dispersant application to oil within the WoO and does not compromise the effectiveness of other strategies. Jadestone undertook an evaluation to determine the most effective resource requirements to reduce the environmental risk from a worst-case spill event to ALARP. Aspects considered were volume of floating oil, timeframe and spread of spill, best case target area (i.e. thickness of oil), location of sensitive receptors, location and type of dispersant stocks, volume of dispersant required, number of vessels and aircraft and ancillary resources. The results of the best-case capability evaluation for dispersant application are described in Section 15 of the OPEP and demonstrates that environmental risk will be reduced to ALARP.

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
	A negative consequence is the further increase in localised entrained and dissolved oil concentrations with subsequent risk of additional environmental impacts to organisms in the water column (refer Table 7-12). This could have negative flow-on social and economic consequences e.g. recreational and commercial fishing, diving.	• Cost of suitable aircraft (e.g. crop duster) USD$350,000 • Standby for Jadestone specialist personnel $150,000 p.a. • Purchasing dispersant stock and maintenance in Karratha $400,000 p.a. • Purchasing dispersant vessel and application equipment $300,000. OSRL resources: • Hercules aircraft (excluding fuel) USD$17,000 per hour • Access to dispersant stocks UK2500 and additional 15% on invoiced stocks. Chemical dispersant stocks charged at replacement purchase price plus all invoiced costs. • Dispersant efficacy testing using MacKay Apparatus approx. $5,000 per dispersant tested	Due to the small volume of dispersant required, Jadestone has identified the AMOSC Exmouth and AMSA Dampier dispersant stocks more than sufficient to meet the required volume (10.5 m^3). Laboratory tests for dispersant efficacy are sometimes carried out to rank the effectiveness of one dispersant relative to another for a particular oil. However, caution is advised (ITOPF 2011) when extrapolating these results as accurate replication of the conditions at sea is difficult in a laboratory environment. Effectiveness tests are conducted in closed systems and may not be representative of actual performance expected at sea. SQT testing for dispersants on Stag crude was undertaken and identified that the AMSA National Plan stock and AMOSC stock (namely Slickgone NS and Corexit 9500) is on average 40% effective (refer OPEP Section 15.5). Jadestone considered conducting another dispersant efficacy test on Stag crude using the MacKay Apparatus test; however, this was rejected due to caution advised in expecting laboratory tests to describe what may occur in the real environment, the lack of change in dispersant stock, the availability of the tested dispersants in the market and the lack of change in Stag crude properties since the Quadrant tests. Jadestone considers that it is best practice and ALARP to utilise this information for planning and exercise purposes and conduct real-time field testing in the event of a spill as described in the OPEP (Section 15 of the OPEP). Controls placed on chemical dispersant application (Table 15-10 of the OPEP) are in place to ensure environmental risk is reduced to ALARP. An analysis was undertaken to determine the most effective mix of aircraft and vessels applying dispersant. Comparisons made between 1, 2 and 3 FWADC aircraft and different vessel numbers indicated that 1 FWADC and 1 vessels was the optimum capability within the WoO, beyond which the rate of benefit from application effort diminished (OPEP Section 15). Although Aerotech 1st Response is capable of dispatching up to 2 FWADC aircraft at Karratha airport within 18 hours of activation and another 2 aircraft at Karratha within 48 hours of activation it would be unnecessary as one aircraft can meet the dispersant demand for the available oil (OPEP

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
			Section 15). Additional FWADC will not be an efficient use of resources, and would result in overspray, increasing the concentrations of oil in the water column unnecessarily, which is not an environmental benefit. Vessel dispersant application is a supporting option to FWADC to target breakaway slicks that are not within the application area of the aircraft. Time constraints presented by the WoO, sourcing and steaming time to target location discount the benefit of additional vessel-based application. Jadestone Energy has evaluated the options and consider that it has access to what is required for ALARP via existing arrangements. As a member of an industry-wide oil spill response organisation (AMOSC) for oil spill response. Jadestone has access to sufficient response capability to reduce the environmental risk associated with the worst credible spill to ALARP. Real-time planning for where the spill is going is undertaken as part of the Incident Action Planning process and provides a better operational picture for efficient and effective chemical dispersant application. The arrangements for incident management described in the OPEP reduce the environmental risks associated with chemical dispersant applications and are considered ALARP.
Containment and recovery Section 14 of OPEP	By increasing the recovery of oil off the water, less is able to contact shorelines thereby reducing potential environmental impacts. Additionally, shoreline waste volumes and associated environmental impacts on shorelines is reduced.	Approximate costs: Vessels $15,000 each per day plus $1,600 per day for fuel Boom hire $12,000 per day for 6 teams. 6 skimmers $6,000. Additional personnel $1,500 per day	Containment and recovery operations will be focussed on the trajectory of the spill. Operations will focus on the Protection Priority of the Montebello Islands and the need is met by the access to resources as described in the OPEP. Jadestone undertook an evaluation to determine the most effective resource capability to reduce the environmental risk from a worst-case spill event (refer Section 14 of OPEP). It was found that 2 containment and recovery teams (4 vessels, 2 skimmers, 800 m boom) are estimated to contain and recover up to 84.6 m^3 of oil per day. This is more than sufficient to recover the oil available from weathering from the worst-case spill. Jadestone could mobilise additional containment and recovery teams to the spill site, however this is likely to be ineffective, given that containment and

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
			recovery is not an efficient strategy (usually limited to between 5% and 10% of the initial spilled volume (IPIECA-IOPG 2015)). Jadestone could purchase and maintain suitable vessels and equipment to be on standby 24/7/365, however this is cost prohibitive and disproportionate to the risk. In addition, it is not feasible to pre-deploy containment and recovery equipment as modelling identifies different potential shoreline contact locations (depending on the season) which are, largely remote and uninhabited. Even when the Protection Priorities are focussed on (as being the most commonly contacted locations across all modelled scenarios), the intrusion caused by equipment deployment and maintenance (considering the continuing operational aspect of Stag (24/7/365) would result in unnecessary additional impact to these locations and potential safety risks. In addition, the cost of doing this is disproportionate to the benefit. The current level of resources meets for the need as it allows flexibility in response operations as not all locations will be contacted in a single spill event. Containment and recovery arrangements described in the OPEP are considered ALARP.
Protection and Deflection Section 16 of the OPEP	Additional Protection and Deflection resources reduces shoreline contact and accumulation of oil, and subsequent impacts to shorelines. However, additional resources on shorelines will increase potential environmental contact and intrusion opportunities and increase safety risks of responders.	Boom hire costs are variable depending on the configuration and type used however they are estimated to be approximately $5,000 per day. The cost of additional resources is not considered the limiting factor; the limiting factor is considered to be the availability to use resources at the physical location. If required, additional equipment will be sourced, and the additional cost borne by Jadestone.	Protection and deflection has limited application for some locations due to tidal influences and lack of anchoring points for booms. Jadestone undertook an evaluation to determine the most effective resource capability to reduce the environmental risk from a worst-case spill event (refer OPEP Section 16). For Jadestone to purchase equipment and store and maintain is cost prohibitive when access via AMOSC will meet the need, and the limiting factor is people (who are accessed from outside Dampier). It is cost prohibitive and disproportional to the risk for Jadestone to purchase and maintain equipment to be on standby 24/7/365 when access to vessels

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
			and equipment is possible through contracts and AMSOC. Vessels and people will be utilised as determined through the IAP and NEBA. Given the remoteness of the locations with shoreline contact modelled and continuing operational aspect of Stag (24/7/365) there is considered limited benefit for pre-deployment of resources as this would create unnecessary long-term environmental disturbance (both for placement of resources and continuing maintenance) and unnecessary safety risks. In addition, the cost of doing this is disproportionate to the benefit. The current level of resources meets for the need as it allows flexibility in response operations as not all locations will be contacted in a single spill event. Therefore, the arrangements described in the OPEP are considered ALARP.
Shoreline Clean-up Section 17 of the OPEP	While oil is arriving there is limited benefit from additional resources that might remove oil more quickly and any additional resources may be counterproductive in that additional impacts may outweigh benefits. After the oil has finished arriving, there may be an additional benefit in having increased resources at particular locations dependent upon environmental considerations. For example, a turtle nesting beach during the nesting/hatching season may benefit in having additional resources deployed to clean the	The cost of additional resources is not considered the limiting factor; the limiting factor is considered to be the ability to use resources at the physical location. If required, additional personnel and machinery will be sourced, and the additional cost borne by Jadestone.	Jadestone undertook an evaluation to determine the most effective resource capability to reduce the environmental risk from a worst-case spill event (refer OPEP Section 17). Intrusive shoreline clean-up techniques (e.g. mechanical and manual removal) have the potential to damage sensitive shorelines. Given that the majority of protection priorities predicted to be contacted have mangroves and species sensitive to shoreline clean-up activities (e.g. nesting birds) the appropriateness of clean-up will be determined via NEBA (as opposed to natural attenuation). It is therefore the opportunity for use rather than the availability of machinery and personnel which is considered the limiting factor to increase shoreline clean-up capability. In addition, volumes predicted ashore from spill modelling indicate 68 m^3 above 100g/m^2 accumulated oil on Montebello Islands (the single Protection priority) in the worst replicate. Using a bulking factor of 10, that equates to 680 m3 over the duration of the spill (some of which would degrade). Each clean-up team would be able to remove up to 10 m3 waste per day, with the OPEP estimating up to 4 teams could be positioned on the Montebello Islands. Although additional teams could be positioned on the Montebello Islands to clean up the oiled waste quicker, having additional teams

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
	beach before nesting/hatching events. There may be benefit in deploying additional machinery in the event of greater opportunities for use, given machinery has the capacity to remove far greater volumes of bulk oil in the right circumstances. The numerous factors and consideration in determining the best approach for shoreline clean-up, the benefit of additional resources will be determined for each Operational Period. However, additional resources on shorelines will increase potential environmental contact and intrusion opportunities, increase safety risks of responders, cause physical damage and could be a negative impact.		positioned there would potentially result in additional impacts to sensitive habitats, such as mangroves and intertidal platforms. For Jadestone to purchase equipment, store and maintain it is cost prohibitive when access via AMOSC Mutual Aid and mainstream suppliers will meet this need, and the limiting factor is people (who have to be accessed from outside Dampier), health and safety issues for shoreline work and suitable vessels. Given the remoteness of the locations with shoreline contact modelled and continuing operational aspect of Stag (24/7/365) there is considered no benefit for pre-deployment of resources as this would create unnecessary environmental disturbance (both for placement of resources and continuing maintenance) and unnecessary safety risks. In addition, the cost of doing this is grossly disproportionate to the benefit. The current level of resources meets for the need as it allows flexibility in response operations as not all locations will be contacted in a single spill event. The arrangements described in the OPEP are considered ALARP.
Waste Management Section 19 of OPEP	Additional resources for waste management would have a benefit for reducing secondary contamination. However, additional resources in waste zones will increase potential environmental contact and intrusion opportunities, increase safety risks of responders, cause physical	Additional cost would be incurred for additional laydown zones, decontamination areas, receptacles, PPE, people, transport and access to facilities.	Jadestone undertook an evaluation to determine the most effective resource capability to reduce the environmental risk from a worst-case spill event (refer OPEP). Additional resources can be sourced through existing arrangements with NWA if during a response it becomes apparent that additional resources are required. Planned resources are considered to match worst-case modelled waste requirements. Increased resources will have additional stressors and potential negative impact to the environment and operational areas.

Strategy tasks and resources arrangements	Environmental/social/economic consequences of additional resources from those described in the OPEP	Practicality of additional resources from those described in the OPEP	ALARP assessment
	damage and could be a negative impact.		The arrangements described in the OPEP are considered ALARP.
OWR Section 18 of the OPEP	The OWR level is a Level 3 (refer WAOWRP and POWRP) as Eighty Mile Beach has been identified as a Protection Priority. OWR aims to prevent/reduce the impact to marine fauna (in particular birds and turtles) and any long-term effects.	Significant additional cost would be incurred if Level of response increase to Level 4 or above in particular around the people and facility aspect. Significant additional cost would be incurred if Jadestone provided its own oiled wildlife response (personnel, experts, facilities, plans etc).	Jadestone undertook an evaluation to determine the most effective resource capability to reduce the environmental risk from a worst-case spill event (refer OPEP). Additional strategies that have been considered include: • Additional arrangements to improve mobilisation times of international OWR resources (e.g. additional contracts/arrangements with OWR organisations or pre-mobilisation of international OWR personnel) • Additional training of Australian based OWR personnel to increase numbers of competent OWR personnel Given the local (AMOSC and DBCA) and global (OSRL/Sea Alarm) response capability through existing arrangements could be mobilised within required timeframes, the response arrangements are considered ALARP as these plans are contextualised for the Pilbara. The WAOWRP and the POWRP were developed by the State environmental agency in conjunction with industry, Perth Zoo and academia. Therefore, represents the best-oiled wildlife response plans that WA and Jadestone can utilise. The level of oiled wildlife response required for a worst-case impact event was considered to be potentially a Level 3 based on worst-case population density and distribution of shorebirds and an examination of applicable case studies of similar characteristics (i.e. Macondo). The arrangements of OWR outlined within the OPEP are considered sufficient for a controlled escalation of response prior to the worst-case minimum contact times for oil at the sites of highest abundance and sensitivity (i.e. Eighty Mile Beach) Stag crude is not toxic and has low adherence properties, but it is persistent. The arrangements described in the OPEP are considered ALARP.

7.5.5 Acceptability Assessment

The potential impacts due to an unplanned release of Stag crude oil are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below.	
Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of continuously reviewing and updating activities and practices at the Stag facility, including spill response arrangements.
Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), including engagement with the State and National response agencies of DoT and AMSA, AMOSC, nearby operators, as well as commercial and recreational fishing industry bodies and fishers. No stakeholder concerns have been raised with regards to impacts of the spill response activities on relevant persons. During any spill response, a close working relationship with key regulatory bodies (e.g. DoT, DBCA, AMSA, DER) will occur and thus there will be ongoing consultation with relevant persons during response operations.
Laws and standards	Jadestone is obligated to respond to a hydrocarbon spill under the following legislative instruments: • OPGGS Act Section 572A-F – polluter pays for escape of petroleum) • AMSA Marine Orders Part 91 • *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* • *Protection of the Sea (Civil Liability for Bunker Oil Pollution Damage) Act 2008*

Industry best practice	Response planning and preparedness undertaken in accordance with:
	• NatPlan (AMSA 2020)
	• AMOSPlan (AMOSC 2017)
	• NOPSEMA Guidance Notes (e.g. Oil Pollution Risk Management Guidance Note July 2021)
	• DoT Offshore Petroleum Industry Guidance Note, Marine Oil Pollution: Response and Consultation Arrangement July 2020
	• DoT OSCP (2015)
	• State Hazard Plan – Maritime Environmental Emergencies (MEE), 2023)
	• Fingas, M.F. (2012) The Basics of Oil Spill Clean-up. CRC Press. Florida, United States of America.
	• ITOPF Technical Information Papers including:
	  ○ ITOPF (2014) Technical Information Paper Dispersant Use
	  ○ ITOPF (2023). ITOPF Members Handbook 2023/2024
	  ○ ITOPF (2014) Technical Information Paper Clean-up of oil from shorelines
	  ○ ITOPF (2013). Technical Information Paper Use of Booms in oil pollution response ·
	• IPIECA International Association of Oil and Gas Producers Good Practice Guide Series including:
	  ○ IPIECA-IOGP. (2023) Oil spill exercises: Good practice guidelines for the development of an effective exercise programme
	  ○ IPIECA-IOGP (2015) A Guide to Oiled Shoreline Clean-up Techniques: Good practice guidelines for incident management and emergency response personnel
	  ○ IPIECA-IOGP (2015) Oil spill preparedness and response: an introduction
	  ○ IPIECA-IOGP (2015) Contingency planning for oil spills on water good practice guidelines for the development of an effective spill response capability
	• Oil Spill Response (OSRL) handbooks including:

	○ Shoreline operations handbook ○ Containment and recovery handbook ○ Dispersant application field guide
Environmental context	The worst-case credible Stag crude spill scenario for the Stag facility operating activities is as a result of damage to the underbuoy hose at the CALM buoy. The worst-case release of oil occurs over 30 minutes and the area of dispersion over which the oil travels is between Eighty Mile beach to the north and Ningaloo in the south. The oil is primarily floating and sensitive receptors at risk include seabirds, shorebirds, marine fauna and coastal habitats. While some response strategies (e.g. application of chemical dispersants and booming operations) pose risk to sensitive receptors, to not implement response activities would likely result in greater negative impact to the receiving environment and a longer recovery period. The mutual interests of responding and protecting sensitive receptors from further impact due to response activities is managed through the use of the net environmental benefit analysis during response strategy planning in preparedness arrangements as well as during a response.
Conservation and management advice	Jadestone will have regard to the representative values of the reserves and other conservation advice published and endeavour to ensure that priority is given to the social and ecological objectives and values, of any AMPs, or state marine parks impacted by unplanned crude release to ensure that the objectives of the management plans are not contravened. Noting 'Emergency response' is permitted in all AMPs and state marine parks. Actions required to respond to oil pollution incidents, including environmental monitoring and remediation, in connection with activities authorized under the OPGGS Act may be conducted in all zones. The Director will be notified in the event of an oil pollution incident that occurs within, or may impact upon, an Australian Marine Park and, so far as reasonably practicable, prior to a response action being taken within a marine park. Protected areas within the RISK EMBA predicted to potentially be impacted by crude above threshold levels have been identified as protection priorities (Section 5.7.5. The 'Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species' will be applied/used as guidance in the event of an oil spill. A number of conservation advice, threat abatement plans and management plans identify marine pollution and/or habitat degradation or modification as a threat. The plans require appropriate mitigation measures to be implemented to prevent impacts to the fauna. These plans are listed Appendix C and include: • Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE 2014a) • Recovery plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a) • Approved Conservation Advice on *Pristis lavate* (dwarf sawfish) (DEWHA 2009) • Sawfish and River Sharks Multispecies Recovery Plan (DoE 2015a) • Approved Conservation Advice for *Pristis pristis* (largetooth sawfish) (DoE 2014b) • Approved Conservation Advice for *Pristis zijsron* (green sawfish) (DEWHA 2008c) • Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC 2015a) • Approved Conservation Advice for *Milyeringa veritas* (blind gudgeon) (DEWHA 2008d) • Approved Conservation Advice for *Ophisternon candidum* (Blind Cave Eel) (DEWHA 2008e) • Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC 2015b) • Blue Whale Conservation Management Plan 2015–2025 (DoE 2015b) • Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC 2015c) • Conservation Management Plan for the Southern Right Whale 2011–2021 (DSEWPaC 2012h)

	• Approved Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed seasnake) (DSEWPaC 2011a) • Approved Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled seasnake) (DSEWPaC 2011b) • Recovery plan for marine turtles in Australia 2017–2027 (DoEE 2017) • Approved Conservation Advice on *Dermochelys coriacea* (DEWHA 2008f) • Wildlife Conservation Plan for Seabirds (CoA 2020) • Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015) • Approved Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DoE 2015c) • Approved Conservation Advice for *Charadrius mo*ngolus (Lesser sand plover) (TSSC 2016d) • National recovery plan for threatened albatrosses and giant petrels 2011–2016 (DSEWPaC 2011c) • Approved Conservation Advice for *Numenius madagascariensis* (eastern curlew) (DoE 2015d) • Approved Conservation Advice for the Abbott's booby *Papasula ab*botti (TSSC 2020a) • Approved Conservation Advice on *Rostratula au*stralis (Australian painted snipe) (DSEWPaC 2013b) • Approved Conservation Advice on *Sternula nereis nereis* (fairy tern) (TSSC 2011) • Conservation Advice *Thalassarche cauta* Shy Albatross (TSSC 2020b) • Approved Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW, 2024a) • Approved Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW, 2024b) • Approved Conservation Advice for *Calidris canutus* (Red knot) (DCCEEW, 2024c) • Approved Conservation Advice for Calidris ferruginea (Curlew Sandpiper) (DCCEEW, 2023a) • Approved Conservation Advice for *Calidris tenuirostriss* (Great knot) (DCCEEW, 2024d) • Approved Conservation Advice for *Limnodromus semipalmatus* (Asian dowitcher) (DCCEEW, 2024e) • Approved Conservation Advice for *Charadrius leschenaultii* (Greater sand plover) (DCCEEW, 2023b) • Approved Conservation Advice for *Limosa lapponica menzbieri* (Bar-tailed godwit (northern Siberian) (DCCEEW, 2024f) • Approved Conservation Advice for *Limosa limosa* (black-tailed godwit) (DCCEEW, 2024g) • Approved Conservation Advice for *Pluvialis squatarola* (grey plover) (DCCEEW, 2024h) • Approved Conservation Advice for *Tringa nebularia* (common greenshank) (DCCEEW, 2024i)
Australian Marine Parks	Australian Marine Parks are established by proclamation under the EPBC Act for the purpose of protecting and maintaining biological diversity in the parks. Environment plan (EP) must be consistent with the Australian Marine Park Management plans. There are 12 AMPs within the RISK EMBA. In all cases where an activity has potential to impact or present risk to AMPs, regardless of whether the activity is inside or outside a park, the EP should evaluate how these impacts and risks will be of an acceptable level and reduced to as low as reasonably practicable (ALARP). Actions required to respond to oil pollution incidents, including environmental monitoring and remediation, in connection with mining operations authorised under the OPGGS Act

	may be conducted in all zones. The requirement is that The Director should be notified in the event of an oil pollution incident that occurs within, or may impact upon, an Australian Marine Park and, so far as reasonably practicable, prior to a response action being taken within a marine park. Consultation to notify the Director of Parks when the proposed response activities is completed as part of the Consultation process (Section 4). The Director notification in the event of a spill that would impact one of the AMPs is included in the OPEP. As such this EP is consistent with the Australian Marine Park Management plans.
ALARP	The residual risk has been demonstrated to be ALARP.

7.6 Unplanned Release of Diesel

7.6.1 Description of Hazard

Aspect	Release of diesel may occur from a support vessel due to platform/vessel collision within the Operational Area or from a dropped object event. Alternatively, diesel may be released to the marine environment due to a leak or rupture of the bunkering hose. The maximum worst-case credible spill volume of diesel has been calculated as 250 m^3 based on a typical maintenance support vessel used at Stag.

Diesel is stored on the CPF and is the main fuel source for support vessels. The CPF uses Stag crude oil as its primary fuel source.

A HAZID was undertaken for the Stag Field activities and the below credible scenarios resulting in a diesel spill were identified (Table 7-15).

Table 7-15: Credible diesel releases to the marine environment

Scenario	Maximum credible spill	Credibility justification
Release of diesel from support vessel due to CPF/ vessel collision or from dropped object	Based on AMSA (2015) 'other vessel collision' – volume of largest fuel tank = **80 m^3** (based on a typical operations support vessel) **250 m^3** (based on a typical maintenance support vessel)	AMSA (2015) Indicative maximum credible spill volumes table is directly applicable for determining the volume that may be released in a vessel collision scenario. An operations support or supply vessel would typically carry a total fuel capacity of 250 m^3 in a single tank.
Leak or rupture of bunkering hose during support vessel to CPF diesel transfer	Based on AMSA (2015) 'Production platform refuelling – continuous supervision' Transfer rate x 15 minutes (continuous supervision) = 20 m^3/hr for 15 minutes = **5 m^3**	AMSA (2015) Indicative maximum credible spill volumes table is directly applicable for production platform refuelling. Continuous supervision is the appropriate credible level of supervision given that transfers are of short duration and refuelling procedures stipulate continuous supervision.
Dropped object damaging vessel hull and internal tanks	**250 m^3** (based on a typical maintenance support vessel)	The volumes determined for the collision scenarios have also been used to estimate the volume that may be released due to a dropped object damaging the support vessel hull (and internal tanks).

The HAZID identified scenarios where the event leading to a diesel release would not occur, or, where due to the small volumes or inherent barriers in the facility design did not result in the diesel being released into the marine environment. These include:

- Release diesel to the marine environment from a leak or rupture to the bunkering hose during diesel transfer from vessel to vessel – this is considered not credible for vessel-to-vessel transfers, as no diesel bunkering occurs for support vessels. Note that fuel transfers to the CPF do occur, see above.
- Release of diesel to the marine environment from the CPF bulk diesel storage tank from a collision with a vessel (errant vessel) – the CPF bulk storage tank (inventory of 65 m^3) is enclosed within the hull structure of the CPF which is raised off the sea surface by ~50 m. The CPF is designed to withstand a 2,000-t vessel impacting at 0.5 m/s (typical support vessel at required low manoeuvring speed) so it is not considered credible that the bulk storage tank would be damaged resulting in a release to the marine environment.
- Release of diesel to the marine environment from the CPF bulk diesel storage tank or ancillary pipework/diesel conditioning unit – the CPF bulk storage tank (inventory of 65 m^3) is enclosed within the hull structure of the CPF and therefore corrosion or loss of integrity would not lead to diesel released to the marine environment. The diesel is intermittently treated by a conditioning system on the main deck. Loss of diesel from pipework associated with the diesel storage tank and the conditioning system due to loss of integrity/ corrosion would be contained within barriers (e.g. bunding, hull structure).
- Release of diesel to the marine environment from day tanks – small quantities of diesel could be spilt when manually filling day tanks or from leaks in day tanks and associated hoses/ pipework (e.g. CPF Hydraulic Workover Unit diesel day tank – 3 m^3, CPF firewater pump day tanks – 8 m^3, CPF emergency generator day tank – 3 m^3). These potential small spill volumes would be restricted to within barriers of the CPF, third-party tanker or support vessels (e.g. within the hull or within bunded areas on the topside deck).

Spill volume

The volume of diesel that could be released to the marine environment from vessel collision and subsequent rupture of fuel tank is largely dependent upon fuel tank position on the vessel, and the degree and location of tank damage. The AMSA (2015) guideline: *Technical guidelines for preparing contingency plans for marine and coastal* facilities has been used in determining the potential release volume of the credible scenarios. These calculations provide a spill volume of 250 m^3 for maintenance support vessels, and 5 m^3 during transfer of diesel between a support vessel and CPF storage tank. For the purpose of determining potential impacts, the larger volume of 250 m^3 has been used as it is considered to be representative of a typical maintenance vessel and subsumes the 5 m^3 scenario outlined above.

7.6.2 Diesel characteristics

Characteristics for marine diesel were extracted from the ASA oil database for similar operational temperatures (Table 7-16). The MDO has a density of 890.0 kg/m3 (API of 24.0) and a low pour point of -14°C. The low viscosity (14 cP) indicates that this oil will spread quickly when released and will form a thin to low thickness film on the sea surface, increasing the rate of evaporation.

Generally, about 40% of the MDO mass should evaporate within the first 12 hours (Boiling point (BP) < 180°C); a further 32.0% should evaporate within the first 24 hours (180°C < BP < 265°C); and an additional 54.0% should evaporate over several days (265°C < BP < 380°C). Approximately 10% (by mass) of MDO will not evaporate, though will decay slowly over time.

The oil is categorised as a group II oil (light-persistent) according to the International Tankers Owners Pollution Federation (ITOPF, 2020) and US EPA/USCG classifications. The classification is based on the specific gravity of hydrocarbons in combination with relevant boiling point ranges.

It is important to note that some heavy components contained within the MDO will have a strong tendency to physically entrain into the upper water column in the presence of moderate winds (i.e. >12 knots) and breaking waves but can re-float to the surface if these energies abate.

Table 7-16: Characteristics of diesel

Initial Density @ 25°C (g/cm³)	Dynamic Viscosity @ 25°C (cP)	Component	Volatiles (%)	Semi-volatiles (%)	Low volatility (%)	Residual (%)
0.890	14	Boiling Points (°C)	<180 C4 to C10	180-265 C11 to C15	265-380 C16 to C20	>380 >C20
			Non-Persistent			Persistent
		% of total	4	32	54	10

Source: RPS (2020)

The BP are dictated by the length of the carbon chains, with the longer and more complex compounds having a higher boiling point, and therefore lower volatility and evaporation rate.

Typical evaporation times once the hydrocarbons reach the surface and are exposed to the atmosphere are:

- Up to 12 hours for the C4 to C10 compounds (or <180°C BP).
- Up to 24 hours for the C11 to C15 compounds (180–265°C BP).
- Several days for the C16 to C20 compounds (265–380°C BP).
- Not applicable for the residual compounds (BP >380°C), which will resist evaporation, persist in the marine environment for longer periods, and be subject to relatively slow degradation.

In the marine environment diesel will behave as follows:

- Diesel will spread rapidly in the direction of the prevailing wind and waves
- Evaporation is the dominant process contributing to the fate of spilled diesel from the sea surface
- Diesel will entrain under the water surface particularly when wind speed and resultant wave action increase; and
- The evaporation rate of diesel will increase in warmer air and sea temperatures such as those at the Stag Operations location.

7.6.3 Modelling Results

To determine the spatial extent that may be affected by a 250 m^3 diesel spill released instantaneously, modelling was conducted by RPS (2023).

A summary of the modelling methods used to evaluate the weathering and distribution of a 250 m^3 diesel spill within the Stag permit area are as per those described in Section 7.4.3. Stochastic modelling was carried out with a total of 200 spill simulations run (i.e., 100 spills per season) and tracked for 30 days at the CPF location.

APASA (2023) modelled the weathering profiles of marine diesel to illustrate the potential behaviour of the fuels when exposed to idealised and representative environmental conditions.

A series of model weather tests were conducted to illustrate the potential behaviour of the MDO when exposed to idealised and representative environmental conditions:

- Instantaneous release onto the water surface at a discharge rate of 50 m3/hr under calm wind conditions (constant 5 knots), assuming low seasonal water temperature (27°C) and average air temperature (25°C). Slick also subject to ambient tidal and drift currents.
- Instantaneous release onto the water surface at a discharge rate of 50 m3/hr under variable wind conditions (up to 24 knots, drawn from representative data files), assuming low seasonal water

temperature (27°C) and average air temperature (25°C). Slick also subject to ambient tidal and drift currents.

The first case is indicative of cumulative weathering rates under calm conditions that would not generate entrainment, while the second case may represent conditions that could cause a minor degree of entrainment. Both scenarios provide examples of potential behaviour during periods of a spill event once the oil reaches the surface.

The mass balance for the MDO under the constant-wind case shows that 34.4% of the oil is predicted to evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to the MDO being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case, where the winds are of greater strength on average, entrainment of MDO into the water column is predicted to increase. Approximately 24 hours after the spill, 83.0% of the oil mass is forecast to have entrained and a further 11.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (~1.3%).

The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 3.1% per day with or ~21.9% after 7 days, compared to <0.4% per day and a total of 2.6% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

7.6.4 Results – Surface release of 250 m^3 diesel

Floating Oil – The maximum distance from the release location to the low (1–10 g/ m2), moderate (10–50 g/ m2) and high (> 50g/ m2) exposure zones was 30 km (west), 14 km (west) and 2 km (east), all during winter conditions respectively. No contact at any threshold for floating oil was predicted at any receptors.

Shoreline accumulation - The probability of accumulation to the Montebello Islands (the only shoreline contacted), at the low level (10 g/m2) threshold was 1% during summer conditions and 9% during winter conditions. The minimum time before oil accumulation at, or above, the low threshold was 2 days during summer conditions, and 3 days during winter conditions. The maximum volume ashore for a single spill trajectory during the summer and winter conditions was 7 m3 and 6 m3, respectively, whilst the maximum length of shoreline accumulation at the low threshold was 12 km and 9 km, respectively. For the moderate threshold (100 g/m2), the maximum length of shoreline accumulation was 1 km and 2 km during summer and winter, respectively. No shoreline accumulation at the high threshold (1,000 g/m2) was predicted.

Entrained Oil – In winter conditions the Montebello MP revealed the highest probability of low entrained hydrocarbon exposure (65%) with a maximum entrained hydrocarbon exposure of 371ppb in summer and 282 ppb in winter. No other receptors were predicted to be contacted by hydrocarbons at the low, moderate or high thresholds except for Montebello shoals (20ppb in summer with a 1% probability and 31ppb in winter with an 8% probability).

Dissolved Aromatic Hydrocarbons – Dissolved hydrocarbons are predicted at the Montebello Islands marine park with a maximum dissolved hydrocarbon exposure of 2ppb in summer and 11ppb in winter. No other receptors are identified.

The extent of impact from floating, entrained and dissolved oil from a 250 m3 marine diesel release is predicted to be smaller than for the WCS Stag crude spill. This is due to the different properties of Stag crude and marine diesel. Stag crude is persistent in the environment and marine diesel is highly evaporative, easily entrained and dissipated. Therefore, the Stag crude release is the maximum worst case scenario.

7.6.5 Impacts and Risks

Marine diesel oil is a highly volatile hydrocarbon with a high proportion of toxic monocyclic aromatic hydrocarbons (MAHs) that are harmful in varying degrees to marine fauna. Diesel contains some heavy components (or low volatility components) that have a strong tendency to physically entrain into the upper water column in the presence of moderate winds (i.e. >12 knots) and breaking waves and can resurface if these energies abate.

In the event of a substantial diesel spill, the heavier components of diesel can remain entrained or at sea surface for an extended period. Given the properties of diesel, it is expected that marine fauna, marine habitats, protected and significant areas and socio-economic receptors, have the potential to be impacted by surface and entrained thresholds.

See Appendix G and Table 7-12 for more detail on the physical and chemical pathways and oil impacts to habitats, marine organisms and socio-economic receptors within the risk EMBA. A summary is also provided in 7.6.5.1 and 7.6.5.2 .

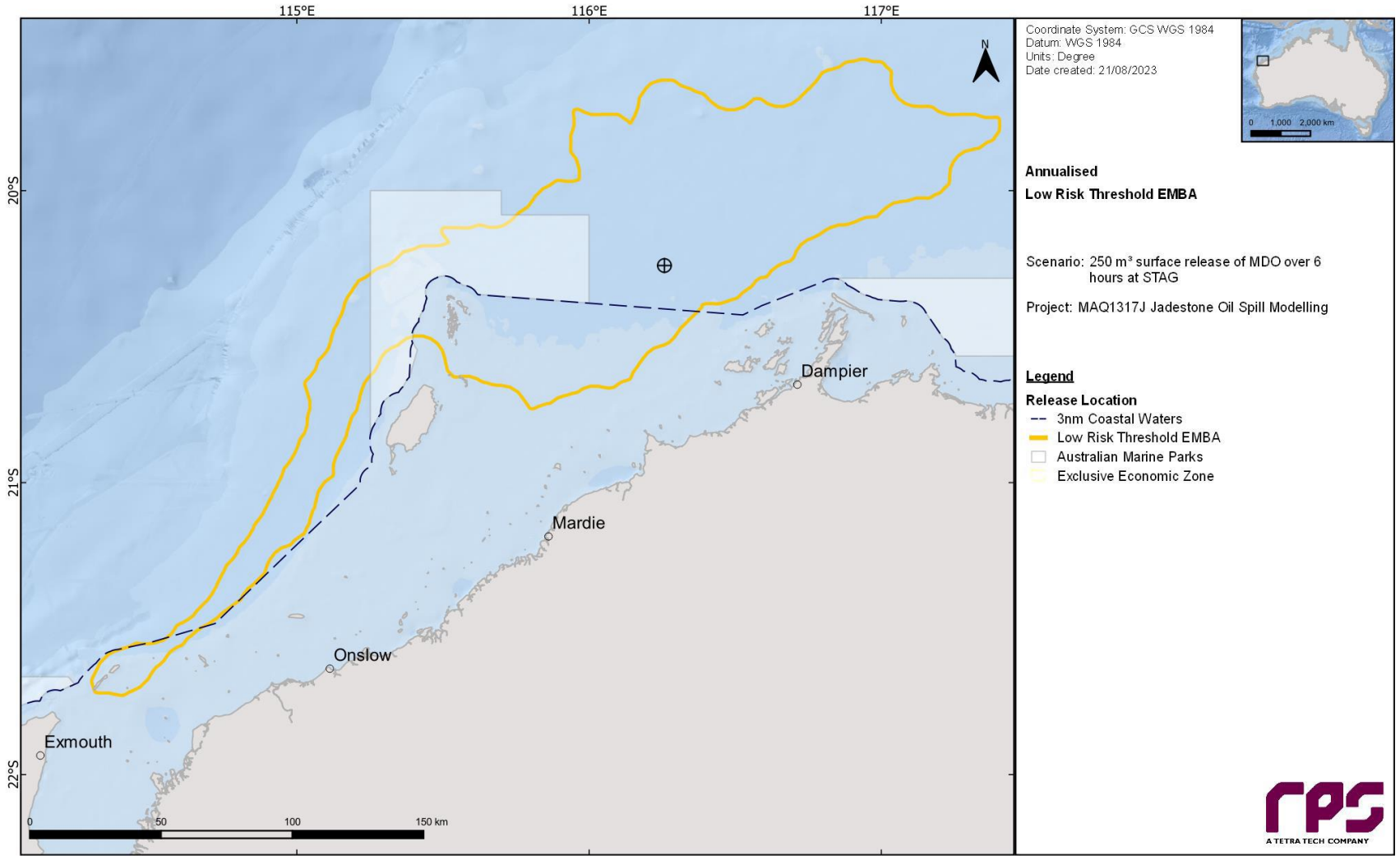


Figure 7-4: Modelled spill trajectories for all seasons for floating and entrained diesel resulting from surface release of 250 m³ diesel.

7.6.5.1 Surface Exposures

Estimates for the minimum oil thickness that will harm seabirds (through ingestion from preening of contaminated feathers or loss of thermal protection of their feathers) are considered to be 10 g/m^2. These hydrocarbon thresholds are also considered appropriate for consequence assessment of turtles, sea snakes and marine mammals (NRDAMCME, 1997) as the exposure pathways and effects are similar (i.e. ingestion and skin irritation) (Appendix G).

The BIA of several EPBC listed species occurs within the EMBA for marine diesel (Section 3.2) which may result in higher numbers of individuals occurring in the area of effect. Habitats that may be contacted by floating oil include sandy shores at the Montebello Islands. The Montebello Islands make up a protected area and have a management plan that identifies key receptors (refer Appendix C). Impacts to these receptors from physical contact may include toxic response, such as mortality, reduced growth or reproductive success.

Contact of these receptors may have an indirect effect on socio-economic receptors including fishing and nature-based tourism.

Shoreline habitats – Shoreline habitats which have the potential to be contacted by stranded oil include intertidal coral reefs, cays, sandy shorelines, mangroves, rocky shorelines and intertidal mud/sandflats. Fauna associated with these can be exposed to toxic effects from ingestion as fauna attempt to clean themselves (e.g. preening of feathers or licking fur), reduced mobility and inability to thermoregulate due to oil coating, contact to eyes, noses and breathing apparatus (invertebrates) from oil coating can result in irritation and/or inability to breathe or see.

Corals – Contact of floating or entrained marine diesel could occur with intertidal corals at low tide. The degree to which impacts such as bleaching, mortality or reduced growth could occur will depend upon the level of coating (concentration of oil and/or loading of oil on shorelines) and how fresh the oil is.

Prolonged contact of oil with corals has been observed to lead to tissue death and bleaching to exposed parts of colonies. Dosages of entrained aromatic hydrocarbons are not predicted to reach levels where hydrocarbons dissolved under floating oil could impact intertidal or subtidal corals. Since marine diesel is a highly volatile and easily dispersed hydrocarbon, contact with hard intertidal corals is temporary and recovery of intertidal coral communities is expected to be quick. A number of important coral areas could be contacted, dependent upon weather conditions and resultant spill trajectory, including Montebello/ Barrow/ Lowendal Islands and Dampier Archipelago. Coral at these locations have been identified as a KPI in the respective marine park management plans (Appendix C).

Corals at the Montebello islands have the potential to be contacted by the greatest volumes. Impacts to hard corals could be intensified if a spill was to reach shallow coral areas during the peak spawning season of March/ April since floating oil could coat intertidal corals in the process of spawning or could contact floating coral eggs and larvae following spawning events. Dependent on the level of contact, this could diminish coral recruitment, and impact longer term recovery.

Presence of surface oil can affect light qualities and the ability of macrophytes to photosynthesise. Reduced primary productivity could occur while surface oil is present.

Mangroves – Mangrove root systems (including pneumatophores) are sensitive to physical coating by hydrocarbons and there is a tendency for mangrove root habitat to trap oil. This could have prolonged negative effects on the faunal communities within mangroves. Of the emergent habitat types, mangroves are likely to be one the most susceptible and slowest recovering habitat types with recovery potentially on a decadal scale if death of trees was to occur. Mangroves could be impacted at the Montebello, Islands. These mangroves are identified as KPI values within many of the respective management plans (Appendix C).

Fish and sharks – Near the sea surface, fish can detect and avoid contact with surface slicks meaning fish mortalities rarely occur in the event of a hydrocarbon spill in open waters (Kennish, 1997; Scholz et al.,

1992). As a result, wide-ranging pelagic fish species of the open ocean generally are not highly susceptible to impacts from hydrocarbon spills. This includes the EPBC listed whale shark whose foraging and high-density foraging BIA are adjacent to the diesel EMBA, oil pollution is identified as a threat in their respective conservation advice (SPRAT whale shark, great white shark and grey nurse shark, DEE 2017a).

Assessment of the effects on Timor Sea fish following the Montara incident indicated that fish collected initially in Phase I and II of monitoring showed evidence of exposure to petroleum hydrocarbons at sites close to the West Atlas drilling rig, with samples collected one year after (Phase III) suggesting an ongoing trend toward a return to normal biochemistry/ physiology (Gagnon and Rawson, 2011).

Most reef fish are expected to be buffered from contact to floating surface slicks by the overlying water column. Reef fish in the shallowest areas are more susceptible to hydrocarbon spill impacts however, as many reef fish are site attached residents on the reef and are unlikely to move away if their territory is impacted. Impacts due to contact with floating oil may include reduced mobility and capacity for oxygen exchange, behavioural disruption or mortality.

Marine mammals – Whales and dolphins are smooth skinned, hairless mammals so hydrocarbons tend not to stick to their skin therefore physical impacts from surface oil coating is unlikely. Irritation to eyes, ears, airways and/or skin may occur from contact with surface slicks. However, marine diesel has very low adherence properties and is unlikely to coat skin.

Physical impacts due to ingestion are applicable to surface slicks; however, the susceptibility of cetacean

species varies with feeding habits. Baleen whales are more likely to ingest surface slick hydrocarbon than "gulp feeders" such as toothed whales and are particularly vulnerable to hydrocarbon ingestion while feeding. Humpback whales, whose migration BIA overlaps the diesel EMBA are more likely to occur in the area during the northern migration period in June/July and southern migration in Sep/Oct so a sea surface plume (>10 g/m2) of oil might contact humpback whales as they migrate. Similarly, blue whales may encounter a sea surface plume (>10 g/m2) as they pass through the area during their northern migration in May–August.

Marine mammals are at risk of inhaling volatile compounds evaporating from a spill if they surface to breathe in an oil slick (Geraci and St Aubin, 1990).

Marine reptiles – Marine turtles and sea snakes when surfacing to breathe may be affected from surface slick hydrocarbons through damage to their airways and eyes. Turtles and sea snakes may be affected by oil through tainted food source or by absorption through the skin. Risk of contact would likely be greatest along intertidal sections of nesting beaches, foraging areas or within shallow waters adjacent to nesting beaches.

The flatback turtle BIAs overlap the EMBA, and the Stag facility overlaps a suggested 60 km inter-nesting buffer BIA from the nesting beaches on Dampier Archipelago. However, while oil may be impacted as described above, oil spills are not identified as a key threat to the species in the conservation advice (SPRAT) or in the recovery plan (EA 2003).

Seabirds – Seabirds are highly susceptible to hydrocarbon spills and oiled birds may experience hypothermia due to matted feathers and an inability to fly. These impacts are primarily attributed to oiling of birds at the surface from slicks. Oiled birds may experience decreased foraging success due to a decline in prey populations following a spill (Andres 1997, NRC 2003) or due to increased time preening to remove oil from their feathers (Burger 1997). During both winter and migration, shorebirds spend much of their time feeding and depend on nonbreeding habitats to provide the fuel necessary for migratory flight (Withers, 2002).

Oil can reduce invertebrate abundance or alter the intertidal invertebrate community that provides food for nonbreeding shorebirds (Andres 1997, NRC 2003). Reduced abundance of a preferred food may cause shorebirds to move and forage in other—potentially lower- quality—habitats. Prey switching has not been

documented in shorebirds following an oil spill. However, shorebirds will feed in alternative habitats when the intertidal zone alone cannot fulfil their energy requirements.

A bird's inability to obtain adequate resources delays its pre-migratory fattening and can delay the departure for its breeding grounds. Birds arriving on their breeding grounds earlier realise higher reproductive success through increased clutch size and offspring survival (for a review, see Harrison et al. 2011). If coastal habitats are sufficiently degraded by oil that pre-migratory fattening is slowed and birds delay departure for their breeding grounds, the individual effects could carry over into the breeding season and into distant breeding habitats (Henkel et al. 2012).

The BIA of several EPBC listed bird species overlap the EMBA (Appendix C) and may be affected by oil. The wedge tailed shearwater breeding BIA overlaps the Stag drilling operational area and oil pollution is identified as a low threat to the species (SPRAT Wedge-tailed shearwater, DEE 2017as).

Socio-economic – Surface oil may impact upon socio-economic receptors including the oil and gas industry, commercial shipping, fisheries/aquaculture, recreation and tourism, resulting in an economic and social impact. Floating and stranded oil can be highly visible and have a resultant negative effect on tourism.

Impacts on the values associated with Protected Areas may result in loss of fauna/ habitat diversity and/ or abundance, reduction in commercial/recreational/ subsistence fishing, loss of livelihood and loss of income from reduced tourism and commercial productivity.

Of the AMPs that may be affected, the parks have conservation values associated with biological attributes including migratory seabirds, flatback turtles, humpback whales, freshwater, green and dwarf sawfish, Australian Snubfin, Indo-Pacific Humpback and Indo-Pacific bottlenose dolphins. A surface sheen would not be expected to have any impact on these values

7.6.5.2 Entrained Exposures

A review of the concentrations of entrained hydrocarbons at which toxic effects have been demonstrated in laboratory studies show wide variation depending on the test organism, duration of exposure, oil type and the initial oil mixture (i.e. nominal loading rates of hydrocarbon versus measured concentrations) (Clark et al., 2001; NOAA, 2001; Gulec and Holdway, 2000; Gulec et al., 1997; Barron et al., 2004). According to a review by IRC (2011) of Group II (MGO) hydrocarbons toxicity to the marine environment, a contact threshold of 500 ppb was found to be highly conservative for a range of species including crustaceans, molluscs, echinoderms and fish.

Potential impacts to marine fauna due to exposure to >500 ppb entrained oil include:

- Harm to internal anatomy if ingested;
- Irritation or damage to sensitive external features such as eyes and skin;
- Damage to feathers of marine birds;
- Damage to respiratory processes of air breathing marine fauna if significant inhalation of volatile fumes occurs at the surface; and
- Toxicological effects to invertebrates, including corals, sponges and ascidians.

Owing to the properties of marine diesel, significant oiling of most hairless/ featherless fauna is unlikely to occur. Marine diesel that reaches shorelines will percolate through sandy beach and cobble profiles, and subsequently biodegrade or continue to evaporate over a short timeframe with small volumes of persistent components taking longer to degrade.

Sensitive shoreline habitats such as mangroves and intertidal reef and seagrass areas may be impacted through exposure to the toxic components of marine diesel, although exposure times will unlikely be significant given the weathering properties of marine diesel. Due to their location on the eastern side of Barrow Island, it is unlikely the small pocket of mangroves will be impacted. Contact to these receptors may

have an indirect effect on socio-economic receptors such as fishing and nature-based tourism. Section 7.5.2 of this EP describes entrained oil impacts on the marine environment

Overall consequence	Overall likelihood	Residual ranking
Minor	Unlikely	Low

7.6.6 Environmental Performance

Environmental Risk		**Unplanned release of diesel**		
Performance Outcome		**No spill of hydrocarbon to the marine environment.**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
108	Compliance with Stag Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007) ensures risks of spills during refuelling are reduced	All hoses are fitted with dry-break couplings and are buoyant or fitted with floats	Bunkering checklist for fuel	Stag OIM
109		Visual inspection of dry break couplings and hoses prior to diesel transfer		
110		Permit-to-work documentation is complete and signed off to ensure refuelling is undertaken in accordance with the refuelling procedure		
111		Bunding, sumps and drains are inspected monthly	CMMS shows maintenance has been satisfactorily completed as scheduled	Stag OIM
112		Bunding/ drip trays under all skids and potential leak sources on CPF are inspected monthly as per PS-14: Bunding and Drains	CMMS shows maintenance has been satisfactorily completed as scheduled	Stag OIM
113	Compliance with Pressure Vessel Inspection Procedure (JS-90-PR-P-00181) to ensure CPF storage tanks are maintained and fit for purpose	CPF bulk diesel storage tank inspected (internal and external) as per procedure and deemed fit for purpose.	CMMS shows maintenance has been satisfactorily completed as scheduled	Stag OIM
114	Compliance with Diesel Fuel Bunkering Procedure (GA-19-PR-P-00026) to ensure diesel bunkering equipment is maintained and fit for purpose	Diesel transfer hose is pressure tested at least annually and deemed fit for purpose	CMMS shows maintenance has been satisfactorily completed as scheduled	Stag OIM
115	Vessel crew are trained in accordance with Competency and Training Management System [JS-60-PR-Q-00015] to	Vessel crew qualified in accordance with International Convention of Standards of Training, Certification and Watch-keeping for Seafarers (STCW95)	Records of crew certificates or third-party inspection document	Supply Chain Manager (initial Contract) Marine Superintendent

Environmental Risk		Unplanned release of diesel		
Performance Outcome		**No spill of hydrocarbon to the marine environment.**		
ID	**Management controls**	**Performance standards**	**Measurement criteria**	**Responsibility**
	ensure competent personnel undertake the activity			Contract Owner (Contract Execution)
N/A	Refer Section 7.5.3 for additional controls and performance standards.			

7.6.7 ALARP Assessment

The use of diesel at the Stag Facility is necessary for the operation of various equipment (including emergency equipment) on CPF, and as the main fuel supply on vessels. Vessel presence is implicit in the operation of the facility to transfer supplies/ equipment, offload equipment and waste, perform inspection and maintenance and assist in offtake berthing and crude oil transfer. Therefore, vessels and the risk of a diesel release cannot be completely eliminated from the Operational Area. The use of diesel by support vessels is standard industry practice. Diesel is considered a more environmentally friendly fuel than heavier fuel oils which have a greater persistence in the marine environment should a spill occur.

A number of controls are in place which reduce the likelihood of spill events. No further controls have been identified that could provide a net benefit in reducing the likelihood or consequence of a diesel release to the marine environment and thus the risk and impacts are considered to have been reduced to ALARP.

On the basis of the impact and risk assessment completed, Jadestone considers the control measures described above are appropriate to manage the risk of an unplanned release of diesel to the marine environment. The residual risk ranking for this potential impact is considered Low, and therefore ALARP has been demonstrated. Additional controls considered but rejected are detailed below.

Rejected control	Hierarchy	Practicable	Cost effective	Justification
N/a	Eliminate	N/a	N/a	The use of diesel for fuel for vessels and machinery cannot be eliminated, vessels and machinery are required for the operations and diesel is therefore required. Other energy sources are not readily available to power all equipment and vessels.
Substitute diesel for another hydrocarbon type	Substitute	No	No	The substitute for diesel is bunker fuel oil or Stag crude, both of which would have a higher environmental impact than diesel. No fuel source has been identified that is more environmentally friendly than diesel
N/a	Engineering	N/a	N/a	Machinery is designed for using diesel as the fuel oil which reduces the potential impact from an unplanned release to as low as possible. As no other hydrocarbon has been identified that is more environmentally friendly that could still fulfil the equipment requirements, no engineering controls have been identified.
N/a	Isolation	N/a	N/a	The Activity is located at distance from sensitive receptors and the coastline.
N/a	Administrative	N/a	N/a	Through the application of specific controls and procedures, and maintenance of machinery, no further administrative controls were identified.

7.6.8 Acceptability Assessment

The potential impacts of an unplanned diesel release to the marine environment are considered 'Broadly Acceptable' in accordance with the Environment Regulations, based on the acceptability criteria outlined below. The control measures proposed are consistent with relevant legislation, standards and codes.

Policy compliance	Jadestone's HSE Policy objectives are met.
Management system compliance	Section 7 demonstrates that Jadestone's HSE Management System is capable of continuously reviewing and updating activities and practices at the Stag facility, including spill response arrangements.

Social acceptability	Stakeholder consultation has been undertaken (see Section 2.4.5), including engagement with the State and National response agencies of DoT and AMSA, commercial and recreational fishing industry bodies and fishers. No concerns have been raised with regards to impacts of a diesel spill by relevant persons. During any spill response, a close working relationship with key regulatory bodies (e.g. DoT, DBCA, AMSA, DER) will occur and thus there will be ongoing consultation with relevant persons during response operations.
Laws and standards	Jadestone is obligated to respond to a hydrocarbon spill under the following legislative instruments: • OPGGS Act Section 572A-F – polluter pays for escape of petroleum) • AMSA Marine Orders Part 91 • *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* • *Protection of the Sea (Civil Liability for Bunker Oil Pollution Damage) Act 2008*
Industry best practice	Response planning and preparedness undertaken in accordance with: • NatPlan (AMSA 2020) • AMOSPlan (AMOSC 2021) • ITOPF Technical Information Paper 7 (TIP 7) Clean-up of oil from shorelines IPIECA-IOGP. (2023) Oil spill Exercises: Good practice guidelines for the development of an effective exercise programme • IPIECA (2008) Oil Spill Preparedness and Response Report Series • IPIECA (2015) A Guide to Shoreline Clean-up Techniques • IPIECA (2015) Contingency planning for oil spill on water: Good practice guidelines for the development of an effective spill response capability
Environmental context	The worst-case credible diesel spill scenario for the Stag facility operating activities is a result of a vessel collision within the Operational Area, a dropped object or a transfer pipe rupture or leak. The release of oil occurs over five hours and floating oil is not predicted to contact any shorelines. Entrained oil is predicted to reach the waters surrounding the Montebello Islands in the worst-case scenario. The sensitive receptors at risk include seabirds, shorebirds, marine fauna and habitats including EPBC listed species, or matters protected under Part 3 and KPIs within respective protected area management plans. Jadestone will have regard to the representative values of the reserves and other information published and endeavour to ensure that priority is given to the social and ecological values, of any AMPs, or state marine parks impacted by a release of marine diesel. The 'Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species' will be applied/used as guidance in the event of an oil spill.
Conservation and management advice	Jadestone will have regard to the representative values of the reserves and other conservation advice published and endeavour to ensure that priority is given to the social and ecological objectives and values, of any AMPs, or state marine parks impacted by unplanned crude release to ensure that the objectives of the management plans are not contravened. Noting 'Emergency response' is permitted in all AMPs and state marine parks. Actions required to respond to oil pollution incidents, including environmental monitoring and remediation, in connection with activities authorized under the OPGGS Act may be conducted in all zones. The Director will be notified in the event of an oil pollution incident that occurs within, or may impact upon, an Australian Marine Park and, so far as reasonably practicable, prior to a response action being taken within a marine park. Protected areas within the RISK EMBA predicted to potentially be impacted by crude above threshold levels have been identified as protection priorities (Section 5.7.5).

The 'Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species' will be applied/used as guidance in the event of an oil spill.

A number of conservation advice, threat abatement plans and management plans identify marine pollution and/or habitat degradation or modification as a threat. The plans require appropriate mitigation measures to be implemented to prevent impacts to the fauna. These plans are listed in Appendix C and include:

- Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (DoE 2014a)
- Recovery plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC 2013a)
- Approved Conservation Advice on *Pristis lavate* (dwarf sawfish) (DEWHA 2009)
- Sawfish and River Sharks Multispecies Recovery Plan (DoE 2015a)
- Approved Conservation Advice for *Pristis pristis* (largetooth sawfish) (DoE 2014b)
- Approved Conservation Advice for *Pristis zijsron* (green sawfish) (DEWHA 2008c)
- Approved Conservation Advice for *Rhincodon typus* (whale shark) (TSSC 2015a)
- Approved Conservation Advice for *Milyeringa veritas* (blind gudgeon) (DEWHA 2008d)
- Approved Conservation Advice for *Ophisternon candidum* (Blind Cave Eel) (DEWHA 2008e)
- Approved Conservation Advice for *Balaenoptera borealis* (sei whale) (TSSC 2015b)
- Blue Whale Conservation Management Plan 2015–2025 (DoE 2015b)
- Approved Conservation Advice for *Balaenoptera physalus* (fin whale) (TSSC 2015c)
- National Recovery Plan for the Southern Right Whale (*Eubalaena australis*) (CoA 2024)Conservation Management Plan for the Southern Right Whale 2011–2021 (DSEWPaC 2012h)
- Approved Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed seasnake) (DSEWPaC 2011a)
- Approved Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled seasnake) (DSEWPaC 2011b)
- Recovery plan for marine turtles in Australia 2017–2027 (DoEE 2017)
- Approved Conservation Advice on *Dermochelys coriacea* (DEWHA 2008f)
- Wildlife Conservation Plan for Seabirds (CoA 2020)
- Wildlife Conservation Plan for Migratory Shorebirds (CoA 2015)
-
- Approved Conservation Advice for *Charadrius mo*ngolus (Lesser sand plover) (TSSC 2016d)
- National recovery plan for albatrosses and giant petrels 2022 (DCCEEW 2022)
- Approved Conservation Advice for *Numenius madagascariensis* (eastern curlew) (DoE 2015d)
- Approved Conservation Advice for the Abbott's booby *Papasula ab*botti (TSSC 2020a)
- Approved Conservation Advice on *Rostratula au*stralis (Australian painted snipe) (DSEWPaC 2013b)
- Approved Conservation Advice on *Sternula nereis nereis* (fairy tern) (TSSC 2011)
- Conservation Advice *Thalassarche cauta* Shy Albatross (TSSC 2020b)
- Approved Conservation Advice for Arenaria interpres (ruddy turnstone) (DCCEEW, 2024a)
- Approved Conservation Advice for Calidris acuminata (sharp-tailed sandpiper) (DCCEEW, 2024b)
- Approved Conservation Advice for Calidris canutus (Red knot) (DCCEEW, 2024c)
- Approved Conservation Advice for Calidris ferruginea (Curlew Sandpiper) (DCCEEW, 2023a)

	• Approved Conservation Advice for Calidris tenuirostriss (Great knot) (DCCEEW, 2024d) • Approved Conservation Advice for Limnodromus semipalmatus (Asian dowitcher) (DCCEEW, 2024e) • Approved Conservation Advice for Charadrius leschenaultii (Greater sand plover) (DCCEEW, 2023b) • Approved Conservation Advice for Limosa lapponica menzbieri (Bar-tailed godwit (northern Siberian) (DCCEEW, 2024f) • Approved Conservation Advice for Limosa limosa (black-tailed godwit) (DCCEEW, 2024g) • Approved Conservation Advice for Pluvialis squatarola (grey plover) (DCCEEW, 2024h) • Approved Conservation Advice for Tringa nebularia (common greenshank) (DCCEEW, 2024i)
Australian Marine Parks	Australian Marine Parks are established by proclamation under the EPBC Act for the purpose of protecting and maintaining biological diversity in the parks. Environment plan (EP) must be consistent with the Australian Marine Park Management plans. There are 7 AMPs within the RISK EMBAs. In all cases where an activity has potential to impact or present risk to AMPs, regardless of whether the activity is inside or outside a park, the EP should evaluate how these impacts and risks will be of an acceptable level and reduced to as low as reasonably practicable (ALARP). Actions required to respond to oil pollution incidents, including environmental monitoring and remediation, in connection with mining operations authorised under the OPGGS Act may be conducted in all zones. The requirement is that The Director should be notified in the event of an oil pollution incident that occurs within, or may impact upon, an Australian Marine Park and, so far as reasonably practicable, prior to a response action being taken within a marine park. Consultation to notify the Director of Parks when the proposed response activities is completed as part of the Consultation process (Section 4). The Director notification in the event of a spill that would impact one of the AMPs is included in the OPEP. As such this EP is consistent with the Australian Marine Park Management plans.
ALARP	The residual risk has been demonstrated to be ALARP.

8. IMPLEMENTATION STRATEGY

As required under Regulation 22(1) of the OPGGS 2023 (Environment) Regulations, Jadestone must provide an implementation strategy that will ensure:

- All environmental impacts and risks of the activity will be continually identified and reduced to a level that is ALARP
- Control measures identified in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and acceptable levels
- That environmental performance outcomes and environmental performance standards are met
- Arrangements are in place to respond to, and monitor impacts of, oil pollution emergencies
- Stakeholder consultation is maintained through the activity as appropriate.
- To meet these requirements the implementation strategy outlined in this EP includes the following:
- Details on the systems, practices and procedures to be implemented (Section 8.1)
- Key roles and responsibilities (Section 8.2)
- Training, competencies and ongoing awareness (Section 8.2.3)
- Monitoring, auditing, management of non-conformance and review (Sections 8.3 and 8.4)
- Incident response including Oil Pollution Emergency Plan (Section 8.5 and OPEP)
- Record keeping (Section 8.4.4)
- Stakeholder consultation (Section 2.4.5).

Jadestone is responsible for ensuring that activities within the Operational Area are managed in accordance with the EP, the implementation strategy and the Jadestone Health, Safety and Environment Policy and Business Management System. To ensure Jadestone's environmental management standards and performance outcomes are achieved, all personnel will be required to comply with all relevant requirements of Jadestone's systems and, policies and standards.

8.1 Jadestone Business Management System

Jadestone applies an integrated Business Management System that is aligned with ISO 55001:2014 Asset Management and ISO 55002:2019 Management System Guidelines for application of ISO 5001. This covers all activities and includes provision for the systematic management of environment and safety and all other business functions. The Jadestone Business Management System ensures alignment between company objectives and the activities associated with operation of the Stag facility in a structure that is illustrated by Figure 8-1.

The management system sets a structured framework that provides governance across company processes for all organisational activities, with defined accountabilities and performance requirements for employees and contractors to deliver activities aligned to the vision and requirements of Jadestone Energy, including those identified in this EP.

At the highest level, environmental performance expectations are communicated by the Value Plan for the asset, and by the Jadestone HSE Policy and HSE Plan.

The structure of the management system is organised to describe the business activities by objective functions (Figure 8-2).

Figure 8-1: Business management system structure

Figure 8-2: Business activities and objective functions

The objective functions are organised into 'Lead', 'Core' and 'Help', which describe how the intent of the business is delivered. The Lead functions are the activities that provide direction to the Core functions, which represent the life cycle of oil and gas activities. The purpose of the Lead functions is to enact and inform strategy and to guide the Core functions in the delivery of their activities.

Delivery of HSE management and performance is fully integrated (including implementation of the EP) throughout the objective functions relevant to operation of the Stag facility. The relevant functions are:

- Operational excellence
- Value discipline

- People
- Stakeholder management
- Risk management
- Develop
- Produce
- Provide goods and services.

Below is a summary of the mechanisms by which these functional areas contribute to HSE management and performance at the Stag facility.

8.1.1 Operational Excellence

'Operational Excellence' provides the systems, tools and processes which ensure that all learning experiences that have the potential to improve operational safety, integrity and efficiency, and reduce negative impacts to the environment, to be captured, evaluated and disseminated for future implementation.

The Operational Excellence function is a continuous process and is summarised in Figure 8-3.

The Operational Excellence function addresses the key points of:

- Capturing of lessons learnt
- Review of lessons learnt
- Incorporation of knowledge in future work.

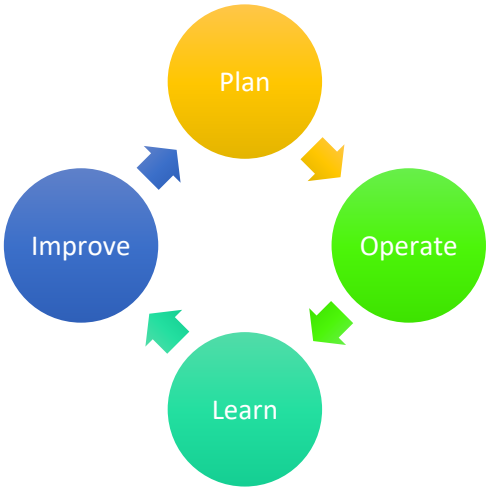


Figure 8-3: Operational excellence business function

Knowledge and best practices can be captured from many sources including internal and external, such as:

- Audits and inspections
- Emergency response drills
- Incident reviews
- Technical papers, legislation and journals
- Prior experience.

Processes, procedures and systems are improved based on the historical lessons learnt and applied in subsequent phases. Any actions arising from the assessment of information are incorporated into CMMS.

8.1.2 Value Discipline

The 'Value discipline' function represents the processes – including annual budgeting, capital funding – that ensure value and capital requirements are met and support the management system functions delivering their business objectives including HSE performance. Commonly HSE performance is a proxy for business performance and therefore HSE management is of interest to the Value discipline function of the management system.

8.1.3 People

The Jadestone Energy Competency Assurance Framework provides the formal systems, tools and processes which ensure that personnel are appropriately trained and competent to complete assigned tasks to an expected standard. Competency assurance is a necessary component of any approach to reduce safety, integrity and environmental risks to a level that is ALARP.

The Competency Assurance Framework addresses the key points of:

- Competency requirements (qualification, experience and training) are maintained for all Jadestone Energy positions where the incumbent is required to undertake, supervise, review or verify critical tasks or where the incumbent has the technical authority to approve critical documents
- Competent persons are members of the workforce who meet the competency requirements for the respective positions to perform critical tasks without direct supervision
- Candidates being considered for appointment in a critical position are assessed against the applicable competency requirements before being formally appointed
- Incumbents must be reassessed against the competency requirements as per the required frequency stipulated in the competency matrix
- All contractors with personnel in the field are prequalified in accordance with the Contractor Management Framework.

Jadestone Energy personnel are subject to the provisions of the Jadestone Competency Assurance Framework which outlines the training, development and assessment requirements necessary to ensure that all employees have the relevant knowledge and skills required to conduct their activities in a safe and environmentally responsible manner.

A training and skills matrix has been developed for all positions which identifies responsibilities, training and competency requirements. Personnel will complete relevant training and hold qualifications and certificates for their specific role (e.g. well control certificates, rigging and crane operator certificates etc.). Training records will be retained.

8.1.4 Stakeholder Management

Sub regulation 25 (3) of the Environment Regulations provides that:

The Implementation strategy of the environment plan must provide for appropriate consultation with:

a) Relevant authorities of the Commonwealth, a State or Territory

b) Other relevant interested persons or organisations

Ongoing consultation activities build upon Jadestone's consultation for the Stag EP as detailed in Section 2.4.5 outlines the processes that will be followed to ensure a standard approach to interacting with relevant persons during the life of the EP, including revision of relevant persons' list and process for dealing with feedback during this period. Risk Management

Jadestone has an integrated approach to risk management to cover all its business activities.

The Risk Management function provides a view of risk that is independent of production delivery. This includes strategic, commercial, and control and compliance risks. In addition, it manages Health Safety and Environment activities, including the preparation and approval of regulatory approvals (including this EP) and the management of change process, which addresses all change activities regardless of type – technical, organisational, software or procedural. Further information on the management of change process is provided in Section 8.4.3.

At the activity level, the risk management function includes all the planned activities and accidental events. Risk identification and assessment is a continuous process that identifies all the physical control measures necessary to manage the risks. Control measures are subjected to regular assurance activities. In a similar way, audits of the management system are conducted according to review cycle with timing agreed in the annual planning process. Findings from assurance activities, audits and ongoing review of performance are considered in the Operational Excellence process, which considers opportunities for continuous improvement (refer Section 8.1.1).

The Risk Management function is accountable for approval of facility level risk assessments and risk reduction measures; and by so doing, providing a view of risk that is independent from production delivery.

8.1.5 Produce

The Produce function delivers safe and reliable operations as well as environmental performance.

The Produce function works closely with the Operational Excellence and Risk Management functions to evaluate operational performance, including environmental performance, and reduce risk through delivery of continuous improvement activities. Produce is responsible for asset optimisation, reliability, integrity and maintaining compliance. It thus interacts with most functions.

The Produce function delivers environmental management at the activity level via the Computerised Maintenance Management System (CMMS) including detailed work instructions and tasks allowing the activity to meet the environmental performance requirements of this EP. These instructions and tasks are monitored and reviewed to ensure appropriate close out of tasks is achieved as well as ensuring the required outcomes/ performance have been achieved.

8.1.6 Provide Goods and Services

HSE performance in all activities associated with operation of the Stag Facility is achieved either through management of personnel involved, or via management of contracted works.

The Jadestone Competency Management Framework provides personnel with a systematic and uniform approach for managing and improving Health, Safety and Environmental (HSE) performance throughout the life cycle of an individual's appointment, from their selection through to post-completion performance evaluation. The Personnel Management Framework addresses the key points of selection, competency, development requirements and management.

HSE performance is also achieved through Jadestone's Contractor Management Framework. The contract management life cycle follows four steps: pre-qualification; selection; engagement; and contract completion review process. Through each of these steps Jadestone and service provider/ supplier is evaluated for previous HSE performance and engaged in the mechanisms by which HSE performance will be achieved in the contract to be established.

8.2 Key Roles and Responsibilities

As per Regulations 22(3) and 22(4), a clear chain of command setting out the roles and responsibilities of personnel involved in operation of the Stag Facility, is required as well as detail on what measures are in place to ensure personnel are aware of their role requirements and how Jadestone evaluates their

competency and training needs in these roles. In response to these regulatory requirements, provided in this sub-section is information on:

- Section 8.2.1: Organisational Chart: outlines the key roles involved in operation of the Stag facility
- Section 8.2.1: Role responsibilities: summarises the responsibilities of each key role involved in operation of Stag facility
- Section 8.2.2: Communication requirements: outlines how personnel fulfilling key roles are made aware of their responsibilities as described in the EP
- Section 8.2.3: Assessment of Competency and Training: outlines how Jadestone assesses and evaluate the competencies and training requirements of personnel responsible for achieving the commitments with this EP.

8.2.1 Organisational Structure and Responsibilities

The Stag Facility is governed by the hierarchy of positions on the CPF. The organisational structure is presented in Figure 8-4. Organisation charts showing the reporting relationships including the hierarchy for safety responsibility will be maintained.

Each position has a position description outlining their HSE role and responsibilities, accountabilities and reporting lines (Table 8-1). It is the responsibility of all Jadestone personnel to ensure that the requirements of the HSE Policy are applied in their area of responsibility and that personnel are suitably trained and competent in their respective roles. Mandatory training requirements are mapped out in a competency matrix. Further information is provided in the Competency and Training Management System [JS-60-PR-Q-00015].

It is the responsibility of all Jadestone personnel to ensure that they have read and understood the requirements of the HSE Policy. All personnel are suitably trained and competent in their respective roles.

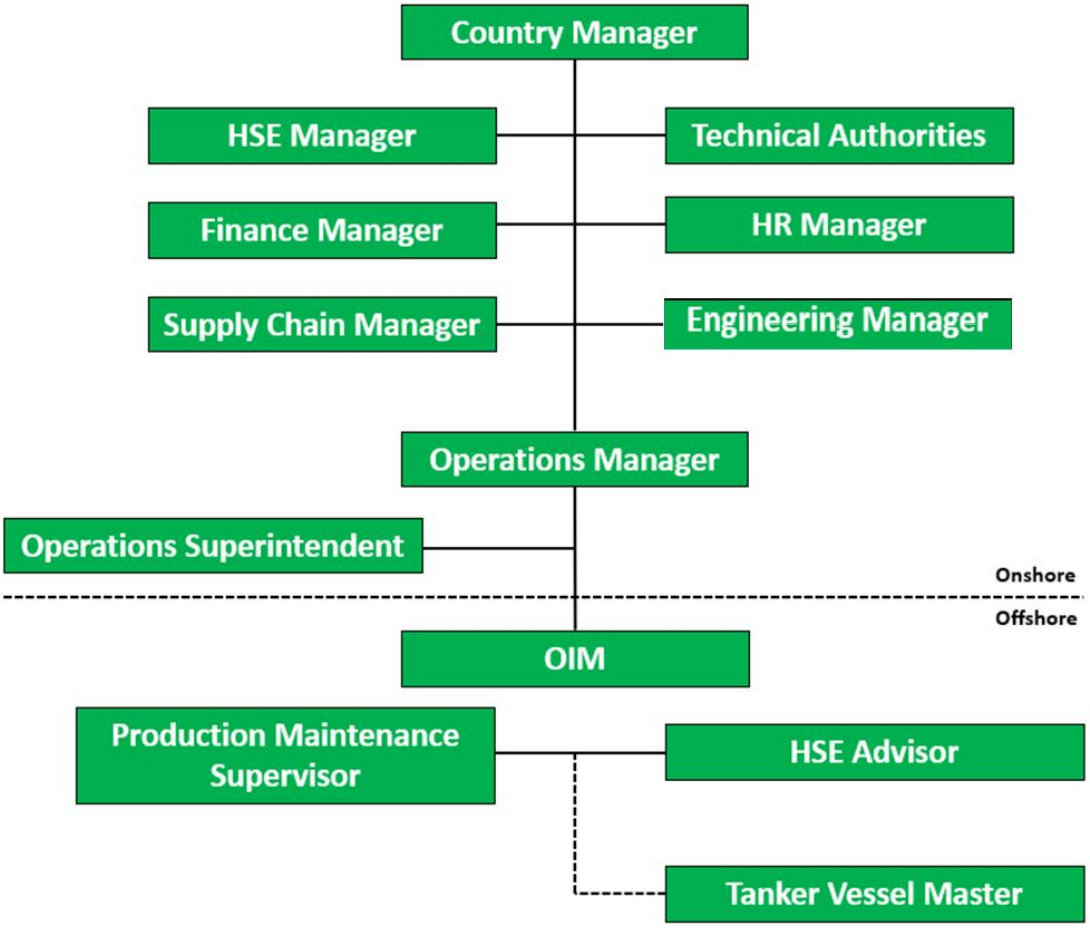


Figure 8-4: Stag Operations organisation chart

Table 8-1: Responsibilities of key roles

Role	Key responsibilities
Country Manager	• Ensures that activities are conducted in accordance with the Jadestone's HSE Policy. • Primary responsibility for Jadestone Australia operations and for meeting or exceeding corporate targets for all aspects of performance, including conducting activities in accordance with Jadestone's HSE Policy and this Environment Plan. • Responsible for providing adequate resources for environmental management. • Accountable for Operational Excellence. • Ensures the incident response strategy is implemented in the case of an incident. • Responsible for compliance with the BMS. • Maintains communication with company personnel, government agencies and the media, where appropriate.
Operations Manager	• Primary responsibility for offshore operations and for meeting environmental performance and compliance requirements, including provision of adequate operations resources for delivery of EP commitments. • Liaises with regulatory authorities as required. • Responsible for ensuring that audits and reviews of the Environment Plan are conducted.
Engineering Manager	• Responsible for coordinating all maintenance and integrity works and maintaining the technical integrity of the Stag Facility.

Role	Key responsibilities
	• Manage HSE hazards and risks related to maintenance activities by ensuring procedures and risk reduction processes have been employed for all activities under their control. • Ensure that regular planned maintenance is carried out to meet the requirements embodied within the Computerised Maintenance Management System (CMMS). • Ensures maintenance personnel are competent in their respective tasks.
Supply Chain Manager	• Overall responsibility for implementation of the contractor management framework, including communication of EP requirements to contractors at the appropriate stages of contract management cycle.
Offshore Installation Manager (OIM)	• Responsible for day-to-day operations on the Stag Facility. • Ensures completion of routine performance reporting for the Stag Facility. • Responsibility for the implementation and compliance with the requirements of the Environment Plan and the Jadestone's HSE Policy at the facility. • Ensures that risk management processes are employed to manage HSE hazards and risks at the facility. • Communicates the importance of appropriate levels of training, competency and environmental awareness to all personnel. • Ensures the importance of appropriate levels of training, competency and environmental awareness are communicated to facility personnel and that the training matrix is fully implemented. • Ensures all personnel undertake appropriate Stag inductions and are aware of their HSE responsibilities. • Ensures sufficient resources are made available for offshore environmental management to meet the requirements of the Environment Plan. • Ensures all relevant HSE incidents are reported in accordance with internal incident reporting and investigation procedures. • Conducts regular workplace inspections. • Implements corrective and preventative actions arising environmental inspections, audits, incidents and hazard reports. • Overall responsibility for HSE and emergency response management at the Facility. • Ensure that adequate skills are maintained for effective incident response. • Ensure regular drills and exercises are conducted and all personnel actively participate. • Ensure Facility HSE meetings are conducted as required by the BMS. • Communicates HSE hazards and risks to the workforce and the importance of following good work practices.
Production Maintenance Supervisor (PMS)	• Manage HSE hazards and risks related to maintenance activities by ensuring procedures and risk reduction processes have been employed for all activities under their control. • Authorises work permits in accordance with BMS and PTW procedures. • Ensures persons appointed to roles in PTW have undergone the required training. • Identify risks associated with maintenance tasks and ensure control measures are established and implemented. • During an incident forms part of the Incident Response Team.
HSE Manager	• Ensures review of daily, weekly and monthly reporting, as applicable, from the CPF, third-party tanker and support vessels.

Role	Key responsibilities
	• Ensures environmental department liaison with the OIM and third-party tanker operator to deliver compliance with all aspects of this EP. • Plans and schedules environmental compliance assurance activities (including audits) of the CPF, third-party tanker and support vessels. • Ensures regulatory documents are prepared and meet regulatory requirements. • Ensures emergency response plans are in place. • Develops and participates in oil spill response activities. • Ensures reporting of all relevant environmental incidents to NOPSEMA within the required timeframes. • Ensure environmental incident reporting meets regulatory requirements (as outlined in the EP) and AEL's internal incident reporting and investigation procedure. • Ensures that proposed changes to environmental management activities are subject to Management of Change and approved prior to application.
HSE Advisor	• Works with the HSE Manager and OIM to support environmental management and delivery of EP commitments. • Contributes to inspections, audits and reviews of the Environment Plan.
Tanker Operator	• Ensures completion of daily and monthly reporting from the third-party tanker. • Monitors daily activities on the third-party tanker to ensure that the relevant environmental legislative requirements, EP commitments and operational procedures are being followed. • Reports all incidents and potential hazards to the OIM to ensure required reporting timeframes are achieved. • Ensures the importance of appropriate levels of training, competency and environmental awareness are communicated amongst third-party tanker personnel. • Implements corrective and preventative actions arising environmental audits, incidents and hazard reports. • Communicates hazards and risks to the workforce and the importance of following good work practices. • Ensures third-party tanker personnel comply with environmental requirements. • Monitors the performance of the third-party tanker maintenance management system. • Conducts regular workplace inspections. • Maintains their vessel in a state of preparedness for emergency response. • Reports environmental incidents to OIM and ensures follow-up actions are carried out.
Facility personnel and contractors	• Adhere to work systems and procedures defined for the activities being undertaken. • Follow good housekeeping work practices. • Report HSE incidents, hazards or non-conformances to supervisors in a timely manner. • Identify HSE improvement opportunities wherever possible.

8.2.2 Communication of Responsibilities

All personnel (contractors and employees) are required to complete an online induction that contains environmental components prior to arrival at the facility. Travel to the facility cannot be booked until

personnel have completed the relevant mandatory inductions. Inductions are updated to account for site-specific factors or activities, or EP management improvements. Induction attendance records for all personnel are maintained. At a minimum, inductions include:

- The Jadestone HSE Policy
- Description of the environmental sensitivities within the operational area and surrounding waters
- Identification of environmental risks and mitigation measures
- Permit to work
- Procedures for reporting of any environmental incidents or hazards
- Waste management requirements
- Overview of incident response and spill management procedures, including roles and responsibilities
- Roles and environmental responsibilities of key personnel aboard the survey vessel
- Direction on where to find copies of the EP and OPEP.

An additional HSE induction for vessels is mandatory for all personnel on board a vessel travelling out to the Stag field which includes vessel specific HSE requirements relating to the EP

Personnel working onshore but not visiting the facility are required to complete mandatory inductions which cover the Jadestone Business Management System.

The primary mechanism for ensuring all personnel involved in the operation of the Stag facilities are aware of the environmental commitments as listed in this EP are via:

- provision of environmental performance commitments lists via the CMMS (for those with identified responsibilities in the EP);
- document familiarisation checklist;
- management of service providers and suppliers; and
- online induction prior to attending the Stag field where applicable.

8.2.3 Competencies and Training

Competency assurance is a critical aspect of risk management in the offshore petroleum industry. Competency assurance processes, when implemented, contribute to the management of safety and environmental risk. Furthermore, a competent workforce is a necessary component of any approach to reduce occupational health and safety and environmental risks to a level that is ALARP.

Jadestone's Training and Competency Management policy (JS-60-PR-Q-00015) provides a process for ensuring all company personnel are trained and competent for the role they fulfil. The policy ensures that Jadestone has valid and reliable controls in place to ensure all people are competent to function in their respective roles. The Competency Assurance and Management (CAM) process detailed in the policy enables Jadestone to verify that its facilities are operated by a workforce who have the required competence to safely perform in their positions and any assigned roles.

Jadestone Energy's Contractor Management Framework [JS-90-PR-G-00002] provides a process for ensuring that Contractors and Services Providers have the appropriate level of HSE capability. The assessment of Contractors and Service Providers competency provides a sound level of assurance that all key third-party personnel involved in Stag operations have the necessary skills, knowledge, experience, and ability to perform their work in accordance with their company's training and competency systems.

Contractors and service personnel are assessed against their company's criteria and any additional criteria required by Jadestone Energy. Records of competent people are maintained in the CMMS.

Competencies and training arrangements for personnel involved in oil pollution response are detailed in the OPEP and records maintained in the CMMS. Personnel will also be provided annual training through drills and/or exercises as per the Incident Management Team Response Plan (JS-70-PLN-F-00008).

To ensure workforce competence is maintained during the life of the facilities, Jadestone will ensure that all required training and inductions are completed in a timely manner and tracked using a learning management system.

Jadestone has a series of inductions and E-learning modules that must be completed by staff, contractors and visitors as detailed in Company Competency Matrices.

8.3 Monitoring, Auditing, Management of Non-conformance and Review

As required under sub regulation 22(5), Jadestone must provide for sufficient monitoring, recording, audits, management of non-conformance and review of Jadestone's environmental performance and implementation strategy to ensure that environmental performance outcomes and standards in the EP are being met and continue to minimise impacts to the environment.

Environmental performance outcomes and standards as well as management controls as detailed in this EP and the OPEP are monitored and recorded as described. Ongoing monitoring activities to determine if environmental commitments as required in this EP are being met include the CMMS, inspection program, auditing and exercising of response arrangements. In particular, routine commitments in the EP have been loaded into the CMMS that directs work activities for onshore and offshore personnel. Work activities include review of monitoring checklists, audits, inspections, maintenance and continuous improvement reviews, allowing environmental performance of the activity to be monitored. Non-conformances of EP commitments are reported, tracked and closed-out in accordance with Section 8.3.2.

The collection of data from environmental performance monitoring activities forms the basis of demonstration that the commitments as listed are being met, that specified mitigation measures are in place to manage environmental risks, and that they remain working, and contribute to continually reducing risks and impacts to ALARP and acceptable levels.

8.3.1 Routine Monitoring

The purpose of monitoring and inspections is to record performance data and routinely check conformance with environmental performance standards and achievement of environmental performance outcomes defined by the EP. Routine inspection activities are scheduled and records kept in a format and for a period that meets the regulatory requirements.

Emissions and discharges to the environment as a result of operations are monitored to assess the environmental performance of the Stag facility on an ongoing basis. Table 8-2 details the quantitative records that are maintained for all emissions and discharges during routine or emergencies within the Operational Area as per Regulation 22(6) of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023*.

Table 8-2: Summary of routine monitoring of emissions, discharge and waste

Measurement	Frequency	Monitoring strategy	Record
CPF produced water [OIW] (in mg/L)	A minimum of 2 samples analysed every 24h for [OIW]	Manual sampling as outlined within Measurement, management and reporting of produced water (GA-19-PR-P-00006)	CMMS Stag Laboratory Routine Analysis Data Sheet
CPF continuous OIW monitor calibration	Every 3 months	CPF continuous OIW monitor is calibrated every 3 months	Calibration report
CPF spectrophotometer calibration and OIW standards	Biannual	Independent chemist calibrates CPF spectrophotometer OIW measurement annually and checks OIW standards used during manual analysis as outlined in *Measurement, management and reporting of produced water* (GA-19-PR-P-00006)	Independent laboratory report
Characterisation of CPF PW finds contaminant concentrations (inc. NORM) meet 99% species protection concentration after applying a dilution rate of 1:345 (Jacobs, 2023a)	Annual	Independent chemist samples produced water which is analysed by an independent laboratory for a detailed range of parameters.	Independent laboratory report
Volume of chemical used	Monthly	Volumes used determined from change in inventory	Monthly report
Production chemical concentration within production equipment	Monthly	Routine analysis of chemical concentrations within process equipment determines correct dosage of chemicals	Stag Laboratory Daily Result Sheet
Quantity Gas emissions	Continuous	Metering on the Stag CPF	P2 Greenhouse Gas reporting (NGER and NPI) Stag CPF daily report
GHG and pollutant emissions	Continuous	Calculated from fuel use, flaring on CPF Fugitive emissions as identified through annual emissions survey Venting volumes monitored monthly	P2 Greenhouse Gas reporting (NGER and NPI) Stag CPF daily report

Measurement	Frequency	Monitoring strategy	Record
GHG and pollutant emissions	Estimated	Vessel and helicopter fuel usage to inform Scope 3 emissions calculations	Vessel and helicopter fuel use records
Oily water	Intermittently – discharge events recorded as they occur	Discharges determined from oil record book (or equivalent)	Oil record book
Garbage (food scraps)	Intermittently – discharge events recorded as they occur	Discharges determined from garbage record book (or equivalent)	Garbage record book or equivalent
Sewage	Intermittently – discharge events recorded as they occur	Discharges determined from sewage record book (or equivalent)	Sewage record book
Unplanned discharges of solid objects, hazardous liquids or hydrocarbons	In the event of an incident	Incident only	Incident log
Volumes of the following waste types are recorded: • General and putrescible waste • Hazardous waste • Timber/ wood • Recyclables • Cardboard/ paper • Scrap metal • Metal drums & containers • Batteries (lead acid) • Plastic drums and containers	Logged on Stag Facility when transferred via vessel to shore then to licensed waste facility. This is done approximately every two to four weeks (supply run).	CPF manifests Waste disposal log	Monthly waste reports generated from service provider (tied to invoicing) Waste Record Log Annual EP compliance report

8.3.2 Audits

An audit is a systematic examination and evaluation against defined criteria and performance indicators to determine whether activities/ processes and related results conform to planned arrangements, whether these arrangements are implemented effectively, and if they are suitable to achieve Jadestone's performance outcomes and requirements.

Environmental audits provide assurance that the systems and processes in place to deliver the EP (i.e. the implementation strategy) are suitable and effective. The Jadestone Audit Manual (JS-90-PR-G-00003) describes the planning and conduct of audit activities. External parties may be invited to participate as team members on audits.

The annual review process for Jadestone occurs in the third quarter of the calendar year with the outcome being preparation of an Annual Plan (Jadestone Planning Procedure JS-90-PR-G-00205). An important component of the Annual Plan is the audit program. As stated in the Audit Manual (JS-90-PR-G-00003), Jadestone's Annual Plan and audit program, including frequency and scope of audits, are developed to reflect the risk profile of Jadestone's activities for the forecasted period. As well as regular, planned audits of the management system including assessing compliance against Environmental Performance Outcomes and Standards, extraordinary audits undertaken by the Country Manager and reactive audits (e.g. triggered by incidents or non-conformances) may also be added to the audit program. Checklist templates (i.e. scopes) for environmental audits that may be undertaken are provided in the Audit Manual (JS-90-PR-G-00003), including for quality (in line with ISO 9001:2015 requirements) and the environmental management system (in line with ISO 14001:2015 requirements), which makes provision for deeper dives on the EP.

Along with monitoring, records, inspections and management of non-conformance, audit results are a key input to the quarterly review of environmental performance which considers the overall effectiveness of the EP implementation strategy / BMS (Section 8.4.1). Jadestone's auditing schedule is outlined in Table 8-3.

Table 8-3: Annual audit schedule

Type	Scope	Minimum per year
Planned	Compliance with EPOs and EPSs	Two
	Drill down on close-out of corrective actions and/or areas of compliance focus (e.g. produced water, oil spill response)	Two
	Contractor management	One
	Independent audit by third-party (Independent Competent Person, ICP)	One

8.3.3 Non-compliances and Corrective Actions

Non-conformances from audits, inspections, regular monitoring or response testing are communicated immediately to the OIM and tracked and monitored by the Country Manager until closed.

Opportunities for improvement and corrective actions from reviews, audits, inspections, monitoring and testing activities are documented and tracked to closure.

8.3.4 Reporting

Table 8-4 details the approach to routine environmental performance reporting to the Regulator. Reporting activities relating to reportable and recordable incidents will be as per Regulations 47, 48, 49 and 50.

8.4 Continuous Improvement (Operational Excellence)

8.4.1 Review of environmental performance

The owner of the Operational Excellence business function, with input from other business functions with responsibilities relating to the EP (e.g. operations, maintenance, supply chain), conducts an annual review of environmental performance and the effectiveness of the EP implementation strategy (i.e. BMS). This includes a review of the effectiveness of control measures in reducing impacts and risks to ALARP and acceptable levels, and may result in improvements being identified, evaluated and implemented.

The annual review process occurs in the third quarter of the calendar year with the preparation of an Annual Plan, as per Jadestone's Planning Procedure (JS-90-PR-G-00205). Once the Annual Plan has been established, quarterly reviews allowing continuous improvement to be achieved are undertaken .

Outcomes of the Annual Performance Review are recorded and contribute to the EP Annual Performance Report (Section 9.1).

The Annual Review is also an opportunity to ensure new information is incorporated into the EP and will consider the following:

- Existing information in relation to any component of the receiving environment described in this EP including, but not limited to, biologically important areas, KEFs, and threatened species
- Available scientific literature
- New issues raised by stakeholders
- Relevance of existing and identification of new stakeholders
- Australian Marine Park status (including any changes in status) and relevant IUCN principles
- Lessons learned from Annual Performance Reports and audits
- Outcomes from NOPSEMA Inspection Findings
- Review of the existing activity description to ensure it still reflects current practice, this will involve members of the onshore and offshore team to ensure accuracy.
- Consider suggested improvements identified in monitoring reports.
- Review trends e.g. emissions, produced water discharge to ensure forecasting is still accurate and that acceptable levels and EPOs are not at risk of being breached.

The results of the review and any identified improvements or recommendations will be incorporated into processes and procedures used to operate the Stag facility, or the EP, to facilitate continuous improvement in environmental performance.

If new information (audits, inspections, reviews etc.) suggests risks and impacts are no longer reduced to acceptable levels, or controls are no longer effective in reducing the risks and impacts to ALARP and acceptable levels, then the process for identifying further controls through a risk assessment will follow that of the risk assessment methodology for this EP (refer Section 4.12). Any opportunities for improvements identified through the risk assessment (i.e. new controls adopted) will be evaluated via a Management of Change process prior to the EP, procedures or processes being modified (Section 8.4.3).

8.4.2 GHG reporting and Disclosures

We commit to transparency on our Net Zero target performance as well as climate risk and business resiliency. This means that:

- We align climate change-related disclosures with the Task Force on Climate-related Financial Disclosures ("TCFD") principles.

- We continuously improve and expand on the Group's GHG Scope 1 and 2 reporting, in line with the leading standards and methodologies such as the Greenhouse Gas Protocol. With time, we will increase our understanding of Scope 3 indirect value chain emissions and seek opportunities to reduce them where the Company has direct control and/or influence.

Table 8-4: Summary of reporting requirements

Regulation	Requirement	Required information	Timing	Type	Recipient
Before the activity					
Regulation 54(1) & 55 – Notifications	NOPSEMA must be notified that the Activity is to commence.	Complete NOPSEMA's Regulation 29 Start or End of Activity Notification form for both notifications.	At least 10 days before the Activity commences	Written	NOPSEMA
During the activity					
Regulation 44(c), 47 & 48 – Reportable Incident	NOPSEMA must be notified of any reportable incidents For the purposes of Regulation 24(c), a reportable incident is defined as: • An incident relating to the Activity that has caused, or has the potential to cause, moderate to significant environmental damage • Types of reportable incidents are described in Table 9-1.	The oral notification must contain: • All material facts and circumstances concerning the reportable incident known or by reasonable search or enquiry could be found out • Any action taken to avoid or mitigate an adverse environmental impact due to the reportable incident • The corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident.	As soon as practicable, and in any case not later than 2 hours after the first occurrence of a reportable incident, or if the incident was not detected at the time of the first occurrence, at the time of becoming aware of the reportable incident	Verbal	NOPSEMA
		A written record of the verbal notification must be submitted. The written record is not required to include anything that was not included in the verbal notification	As soon as practicable after the verbal notification	Written	NOPSEMA
		A written report must contain: • All material facts and circumstances concerning the reportable incident known or by reasonable search or enquiry could be found out • Any action taken to avoid or mitigate adverse environmental impact due to the reportable incident • The corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident	Must be submitted as soon as practicable, and in any case not later than 3 days after the first occurrence of the reportable incident unless NOPSEMA specifies otherwise. A copy of the written report must be provided to NOPTA and DMIRS	Written	NOPSEMA NOPTA DMIRS

Regulation	Requirement	Required information	Timing	Type	Recipient
		• The action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future.	within 7 days of providing it to NOPSEMA		
Regulation50 – Recordable Incidents	NOPSEMA must be notified of a breach of an EPO or EPS, in the environment plan that applies to the Activity that is not a reportable incident	Complete NOPSEMA's Recordable Environmental Incident Monthly Report form via submissions@nopsema.gov.au	The report must be submitted as soon as practicable after the end of the calendar month, and in any case, not later than 15 days after the end of the calendar month. If no recordable environmental incidents have occurred during a particular month, a Nil Incident report must be submitted	Written	NOPSEMA
Regulation 22(7) Regulation 51 Environmental Performance	Regulation 22(7) requires that "*the titleholder report to the Regulator in relation to the titleholder's environmental performance for the activity and provide that the interval between reports will not be more than one (1) year*". This is known as the Annual Report. Regulation 51 requires "*a titleholder undertaking an activity must submit a report to the Regulator in relation to the titleholder's environmental performance for the activity, at intervals provided for in the environment plan.*"	Annual reports will contain sufficient information to determine whether or not environmental performance outcomes and standards in the EP have been met. The annual report shall be submitted to satisfy the requirement of Regulation 51.	The annual reporting period for the activity is a 12 month period commencing on the 1st July 1 to June 30 of each calendar year to align with other reporting timeframes (e.g. NGERs). Jadestone will submit annual performance reports within 4-months of the end of the reporting period.	Written	NOPSEMA

Regulation	Requirement	Required information	Timing	Type	Recipient
End of activity					
Regulation 54(2) – Notifications	NOPSEMA must be notified that the Activity is completed	Complete NOPSEMA's Regulation 54 Start or End of Activity Notification form for both notifications	Within 10 days after finishing	Written	NOPSEMA
Regulation 22 (7) & 51 – Environmental Performance	NOPSEMA must be notified of the environmental performance of the Activity	Report must contain sufficient information to determine whether or not environmental performance outcomes and standards in the EP have been met	Annual report submitted within 3 months after the anniversary of the reporting period, with the period commencing on the dated Regulation 54 notification form	Written	NOPSEMA
Regulation 46 Plan ends when titleholder notifies completion	NOSPEMA must be notified that the Activity has ended, and all EP obligations have been completed	Notification advising NOPSEMA of end of the Activity	Within ten days of the final Regulation 54 (2) notification	Written	NOPSEMA

8.4.3 Management of Change and Revisions of the Environment Plan

Regulation 39 of the *Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2023* makes clear the following requirements in respect of a number of circumstances that may lead to the deviation of an activity from the EP, or a new activity requiring an EP.

17 Revision because of a change, or proposed change, of circumstances or operations	
New activity	
38	A titleholder may, with the Regulator's approval, submit to the Regulator a proposed revision of an environment plan before the commencement of a new activity.
Significant modification or new stage of an activity	
39(1)	A titleholder must submit to the Regulator a proposed revision of the environment plan for an activity before the commencement of any significant modification or new stage of the activity that is not provided for in the environment plan as currently in force.
New or increased environmental impact or risk	
39(2)	A titleholder must submit a proposed revision of the environment plan for an activity before, or as soon as practicable after:
(a)	The occurrence of any significant new environmental impact or risk, or significant increase in an existing environmental impact or risk, not provided for in the environment plan in force for an activity; or
(b)	The occurrence of a series of new environmental impacts or risks, or a series of increases in existing environmental impacts or risks, which, taken together, amount to the occurrence of:
(i)	A significant new environmental impact or risk of the activity; or
(ii)	A significant increase in an existing environmental impact or risk of the activity;
	that is not provided for in the environment in force for the activity.

Jadestone's Management of Change process will determine whether a proposed change to activities triggers the requirements of Regulation 38, which may result in a revision and resubmission of an EP to NOPSEMA. This process is described in the Jadestone's Management of Change Procedure (MOC) [JS-90-PR-G-00017]. The procedure describes a system for identifying, tracking, responding, progressing and closing out change requests or queries raised by any party involved in Jadestone Energy activities.

The Change Management Procedure also directs and instructs activity owners on external drivers of change including environmental regulatory and stakeholder requirements, including (but not limited to):

- Changes to legislation
- Provision of new or now relevant technical/ scientific information
- Changes in the management arrangements/ plans for protected areas or species; or
- Receipt of new information from relevant persons relating to a proposed or existing activity.

The Change Management procedure provides for proper consideration of temporary or permanent changes to activities, including an impact and risk assessment, approved and communicated to all appropriate stakeholders together with providing a record of the change. In particular, the system ensures the following:

- All changes required to critical outputs will be identified, recorded, risk assessed and approved – internally and externally as required – before being implemented
- Processes and procedures are in place to ensure requirements for change are identified and unauthorised changes are prevented

- All changes must be assessed to determine if the change introduces a new risk or impact or increases an existing impact or risk, as required by Regulation 39
- The MOC is prepared internally by Jadestone personnel which includes consultation with relevant parties as necessary such as technical/ subject matter experts and external stakeholders as required
- Only authorised and competent members of the workforce can approve changes, including relevant Technical Authorities. Technical Authorities are deemed as authorised and competent via the Technical Authority Framework (JS-60-STD-Q-00001)
- Approval of a change internal to Jadestone requires confirmation that impacts and risks have been assessed and appropriate reduction measures implemented (if required) to manage risk to ALARP and impacts to acceptable levels
- All approved changes that affect the Environment Plan are properly documented and communicated to all relevant internal and external members of the workforce, e.g. via toolbox talk or HSE meetings and JSA
- An audit trail is kept of all changes and documents and drawing are updated accordingly.

MOC must be designed to meet the particular requirements of the type of change required and will include:

- Risk assessment to assess potential impacts to the receiving environment as detailed in this EP, including matters of NES and those protected under the EPBC Act
- Strategies and actions to mitigate any adverse effects; identify opportunities offered by the change; and determine how impacted interfaces shall be managed
- Timeframes for implementation
- Documents (e.g. drawing, plan, program, procedure) against which change is monitored
- Outline drawings or controlled documents affected
- Responsibilities for execution, review and approval of the:
    - Justification for the change,
    - Assessment of the impact and risk to environment,
    - Detailed implementation requirements,
    - Dissemination of the change, training personnel and updating of documentation.

All alterations and updates to controlled documents, including regulatory approvals, procedures or drawings must be in accordance with Document Control requirements. If the change meets any of the criteria detailed above, a revision/resubmission of the EP will occur, and the proposed change to the activity will not commence until the revised EP has been accepted by NOPSEMA.

Maintenance work, which covers the replacement of parts or equipment with identical (or equivalent specification) parts or equipment, and with no change to operating arrangements, is not subject to change control.

8.4.4 Record Keeping

This section of the EP meets Regulation 52 by detailing a systematic, auditable record of the results of monitoring and auditing of the environmental performance of the Stag Operations. The records retained are linked to the performance outcomes, standards and measurement criteria, and monitoring and reporting requirements.

As a minimum, Jadestone will store and maintain the records for five years, where records include:

- Written reports including monitoring, audit and review regarding environmental performance or the business management system
- Environmental performance reports and associated documentation
- Documentation generated through stakeholder consultation
- Records of emissions and discharges
- Records of calibration and maintenance
- Reportable and recordable incident reports.

8.5 Emergency Preparedness and Response

Under the Environment Regulations 22(8) the Implementation Strategy must contain an oil pollution emergency plan and provide for the updating of the plan containing adequate arrangements for responding to and monitoring oil pollution. These details are contained within the OPEP which is part of this EP and details incident response arrangements in the event of an oil spill and should be referred to for all details.

Emergency response procedures and manuals are in place to describe how controls and consequences are mitigated. These documents are available on the Stag facility, vessels and are made accessible to all personnel. The relevant incident response procedures and manuals are detailed in the OPEP.

The Stag Incident Response Plan (GF-00-PR-F-00041), Incident Management Team Response Plan (JS-70-PLN-F-00008) and associated manuals are regularly updated with the revised contact details of relevant organisations and individuals included. They are also frequently tested to determine where they can be improved. The Incident Management Team Response Plan (IMTRP) sets out the structure, organisation and activation, or trigger processes for responding to an incident as well as detailing the schedule for exercising and testing the major hazard incidents and OPEP response and preparedness.

The Incident Management Exercise & Testing Program (JS-70-PR-F-00001) provides more information on planning and testing cycles. As a minimum, Jadestone conducts quarterly IMT drills, an annual major oil spill exercise, six-monthly oil spill response functional workshops, as well as ad-hoc exercises to coincide with specific project campaigns. The HSE (Emergency Response) Lead maintains an IMT exercise program.

Wherever practical, the IMT exercises, including oil spill responses, may involve support from other agencies, contractors and oil & gas operators as part of resource sharing initiatives. Records of emergency exercises, including OPEP commitments are assessed against measurement criteria and recorded in Jadestone's CMMS.

The Contractor Management Framework (JS-90-PR-G-00002) describes the process whereby Jadestone ensures that a Contractor HSE Plan conforms with Jadestone HSE policy and procedures, addresses response arrangements, addresses communications systems and protocols in normal and emergency scenarios, includes roles and responsibilities in both normal and emergency situations, identifies how a Contractor shall comply with legislative requirements, has an adequate process for addressing risk, identifies compliance mechanisms with its HSE obligations, includes an inspection/ audit schedule, and provides for competent workers when required. The Framework also outlines a Capability Assessment Process to ensure contractors are screened for technical, HSE and quality management.

In addition, assurance actions to meet OPEP requirements such as review of Scientific Monitoring capabilities, Waste Contractors compliance and availability of oil spill response vessels and aircraft are scheduled in CMMS or contractual obligations.

Emergency response, including oil spill arrangements, as part of the implementation strategy are reviewed every 12 months. The scope of the review will be determined by the associated trigger for review. The triggers for the review are:

- document control notification

- any significant change in the OPEP
- any change in the risk assessment
- significant findings or any requirements from after-action review of drills or incidents.

9. REPORTING

9.1 Routine Reporting

Table 9-1 details the approach to routine environmental performance reporting to the regulator. Reports will be of sufficient detail to demonstrate whether specific environmental performance objectives and standards have been met.

9.2 Incident Reporting

Table 9-1 defines the differences between a reportable and recordable incident. It also defines reporting protocols for initial notification of a reportable incident, written reportable incident reporting and monthly recordable incident reporting. The Incident and Hazard Reporting Procedure (JS-60-PR-F-00016) which incorporates reporting timeframes for incidents depending on their environmental impacts is provided to the Stag Facility and reviewed on an annual basis.

Table 9-1: Routine and incident reporting requirements

Requirements	Timing
Routine reporting	
Annual Environmental Performance Report The Annual Performance Report for Stag Facility Operations will assess compliance with the EP performance objectives, standards and procedures and performance criteria and will include: • An overview of the operations and activities undertaken at the Facility • Summary of environmental incidents • Summary of any Management of Change (MOC), if applicable • Summary of audits conducted.	Annual Performance report is to be submitted to NOPSEMA within 3 months of end of annual reporting period.
Annual Review of Environment Plan The review will include an assessment of: • Environmental performance (adequacy of environmental management tools against number of reportable and/or recordable incidents) • Continued relevance of performance objectives and performance standards • Review of existing performance standards and measurement criteria (giving consideration to updated or new standards) • Inspection and checklist approaches • Monitoring data and trends and updates to results presented in the EP (e.g. GHG actual emissions, PW monitoring results) • Any additional consultation required • Lesson learnt • Results of audits • Adequacy of auditing and monitoring • A senior management team engagement review to ensure any trends, business level changes and future activities are reviewed	Annual review of the Environment Plan triggered by the annual environment performance report process. If the Environment Plan needs revising, Jadestone's Management of Change process will determine whether a proposed change triggers the requirements of Regulation 38, which may result in a revision and resubmission of an EP to NOPSEMA.

Requirements	Timing
Recordable Environmental Incident Monthly Report A written report will be provided to NOPSEMA of any breaches of a performance objective or performance standard identified in the EP and is not classed as a reportable incident (refer above). The monthly report will include the following: • Circumstances and material facts concerning the incident • Actions taken to avoid or mitigate any adverse environmental impacts • Corrective action taken to prevent recurrence.	Not later than 15 days after the end of each calendar month.
Reportable incidents: Notifications	

NOPSEMA
NOPSEMA will be notified of reportable environmental incidents: i.e. any unplanned event identified as having caused or having the potential to cause moderate to significant environmental damage.
The following is a list of reportable environmental incidents that could occur:
• Uncontrolled release of hazardous chemicals or hydrocarbons more than 80 L to the marine environment
• Gaseous releases of more than 300 kg (~255 m^3 at Standard Ambient Temperature and Pressure)
• Death or injury to EPBC Act listed marine fauna due to activities in the Operational Area
• Any unforeseen event that has caused or has the potential to cause an impact with moderate or greater environmental consequence as outlined within this EP which includes:
  ○ Marine pest introduction (moderate consequence)
  ○ Unplanned release of stag crude (Major consequence)
	Verbal report to NOPSEMA as soon as practicable but not later than two (2) hours of incident having been identified.
	As soon as practicable a written record of the verbal notification will be provided to NOPSEMA.
	Notifications to other regulators are described in Oil Spill Response Arrangements in the OPEP (GF-70-PLN-I-00001).

DPIRD Notification of potential detection of IMS in WA waters is made to DPIRD and Jadestone will follow subsequent advice provided by Aquatic Biosecurity	Within 24 via Fishwatch (ph 1800 815 507) or by email to Aquatic.Biosecurity@dpird.wa.gov.au

Director of National Parks
DNP should be made aware of oil/gas pollution incidences which occur with a marine park or are likely to impact on a marine park as soon as possible. Notification should include:
  ○ Titleholder details
  ○ Time and location of the incident (including name of marine park likely to be affected)
  ○ Proposed response arrangements and locations as per the Oil Pollution Emergency Plan
  ○ Confirmation of providing access to relevant monitoring and evaluation reports when available, and
  ○ Contact details for the response coordinator.
	As soon as possible to the 24-hour Marine Compliance Duty Officer on 0419 293 465

AMSA Oil pollution incidents in Commonwealth waters must be reported to AMSA.	Within 2 hours of incident having been identified: Tel: 1800-641-792
Department of Agriculture, Water and Environment (DAWE) DAWE will be notified of the following incidents:	Within 2 hours of incident having been identified:

Requirements	Timing
• Harm or mortality to Commonwealth EPBC Act Listed Marine Fauna (attributable to the operations activity) • Spills of hydrocarbons or environmentally hazardous chemicals more than 80 L to the marine environment • Any unplanned event identified as having caused or having the potential to cause moderate to significant impact to a matter of NES.	Tel: 1800-110-395 Tel: 02-6274-1372 compliance@environment.gov.au
Reportable incidents: Written reports	
NOPSEMA A written report of a reportable environmental incident will be provided to NOPSEMA and will contain: • Immediate action taken to prevent further environmental damage and contain the source of the release • Arrangements for internal investigation • All material facts and circumstances concerning the reportable incident that the operator knows or is able, by reasonable search or enquiry, to find out • Immediate cause analysis • Corrective actions taken or proposed to prevent recurrence of similar incidents with responsible party and completion date.	Written report (Part 1) to NOPSEMA is required within three (3) days. Within 7 days of submitting the written report (Part 1) to NOPSEMA, a copy of the written report will be provided to NOPTA and DMIRS.

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NOPSEMA (2024c) Petroleum Activity (N-04750-GN1343 A336223, January 2024)

NOPSEMA (2024d) Notification and Reporting of Environmental Incidents (N-03000-GN0926, January 2024)

NOPSEMA (2024e) Notification and Reporting of Environmental Incidents (N-03000-GN0926, January 2024)

NOPSEMA (2024f) Offshore project proposal content requirements (N-04750-GN1663, January 2024)

NOPSEMA (2024g) Petroleum activities and Australian Marine Parks (N-04750-GN1785, January 2024)

NOPSEMA (2024h) Responding to public comment on environment plans (N-04750-GN1847, January 2024)

NOPSEMA (2024i) Consultation with Commonwealth agencies with responsibilities in the marine area (N-04750-GL1887), January 2024

NOPSEMA (2024j) Environment Plan Decision Making (N-04750-GL1721, January 2024

NOPSEMA (2024k) End of an operation of an environment plan- Regulation 46 (N-04750-GL1691, January 2024

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APPENDIX A JADESTONE HSE POLICY

Health, Safety and Environmental Policy

JADESTONE ENERGY PLC

Controlled Document

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Document Number : JSE014/2021

JADESTONE ENERGY PLC ("COMPANY")
HEALTH, SAFETY AND ENVIRONMENTAL POLICY
("POLICY")

High quality performance is essential to the success of our business. To achieve this, we are committed to comply with all regulatory requirements and continuously improve our performance. Health, safety end environmental incidents, including near misses, can be prevented, and in a way that does not damage the environment.

The Chief Executive Officer is responsible for the implementation of this Policy and will make the necessary resources available to realise our corporate responsibilities. The responsibility for our performance against this policy rests with all employees throughout the Company.

The Company's policy is:

- No incidents.
- No injury to personnel.
- No damage to the environment.
- No damage to equipment.

To achieve this, the Company shall:

- Maintain a healthy, safe and environmentally friendly workplace.
- Use its operational experience to improve health, safety and environmental performance.
- Actively access all operational and business risks to ensure that mitigations are implemented that reduce risks to a level that is as low as reasonably practical.
- Require all contractors to have a management system that either equals or exceeds the Company's.
- Maintain high standards in design & work practice and audit operations for compliance with high standards and work practice in a formal and structured manner.
- Put health, safety and environmental considerations into every operational decision.
- Continually review industry and government codes, guidelines, rules and regulations.
- Minimise discharges, emissions and waste and their environmental effects.
- Take all necessary actions to prevent incidents and have response procedures in place for any incidents that may occur.
- Set performance targets to achieve our aims and communicate to all relevant bodies.
- Openly monitor, evaluate and report HSE performance.
- Continuously improve training programmes.
- Make this policy available to all relevant bodies.

HSE Policy

All employees and contractors of the Company are expected to:

- Be proactive in the identification of, and acting upon, potential risks.
- Where HSE concerns are an issue, undertake a safe and controlled shutting down of operations concern.
- Respect and cooperate with all safeguards to the health, safety and security of themselves and others.
- Take all necessary precautions to protect themselves, their colleagues and the environment.
- Immediately act upon and report any HSE concerns they may have.
- Provide comments and feedback on HSE process and systems.

A. Paul Blakeley

Director, President and Chief Executive Officer

APPENDIX B RELEVANT LEGISLATION

Guideline/legislation	Description
International Legislation	
Bilateral Agreements on the Protection of Migratory Birds	Australia has negotiated bilateral agreements with Japan (Japan-Australia Migratory Birds Agreement [JAMBA] 1974), China (China-Australia Migratory Birds Agreement [CAMBA] 1986) and the Republic of Korea (Republic of Korea – Australia Migratory Birds Agreement [ROKAMBA] 2007) to protect species of migratory birds with international ranges. In November 2006, the East Asian-Australasian Flyway Partnership (Flyway Partnership) was launched in order to recognise and conserve migratory waterbirds in the East Asian – Australasian Flyway for the benefit of people and biodiversity.
Convention on Biological Diversity (1992)	The objectives of the convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.
Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1979)	This Convention was concluded in 1979 and came into force on 1 November 1983. The Convention arose from a recommendation of the United Nations Conference on the Human Environment (Stockholm 1972), and aims to conserve terrestrial, marine and avian species over the whole of their migratory range. It commits “Range States” to take action to conserve migratory species, especially those under threat. It is an umbrella agreement under which subsidiary regional agreements are established.
Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGS)	The COLREGS include 41 rules divided into six sections that aim to prevent vessel collisions at sea. The 1972 Convention was designed to update and replace the Collision Regulations of 1960. One of the most important innovations in the 1972 COLREG was the recognition given to traffic separation schemes.
International Convention for the Control and Management of Ships’ Ballast Water and Sediments (Ballast Water Convention) 2004	The International Convention for the Control and Management of Ships Ballast Water and Sediment entered into force on 8th September 2017 (IMO Briefing 22 2016). It aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Ballast Water Management systems must be approved by the Administration in accordance with this IMO Guidelines.
International Convention for the Prevention of Pollution from Ships 1973/1978 (MARPOL 73/78)	This convention is designed to reduce pollution of the seas, including dumping, oil and exhaust pollution. MARPOL 73/78 currently includes six technical annexes. Special areas with strict controls on operational discharges are included in most annexes. The legislation giving effect to MARPOL in Australia is the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, the *Navigation Act 2012* and several Parts of Marine Orders made under this legislation.

Guideline/legislation	Description
International Convention for the Safety of Life at Sea (SOLAS) 1974	In the event of an offshore emergency event that endangers the life of personnel, the International Convention for the Safety of Life at Sea (SOLAS) 1974 may take precedence over environmental management.
International Convention on Civil Liability for Oil Pollution Damage (1969) and Protocol (1973)	The convention and the associated International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1971 set up a system of compulsory insurance and strict liability up to a certain figure for damages suffered as the result of an oil spill accident.
International Convention on Oil Pollution Preparedness, Response and Co-operation (1990) and Protocol (2000)	This convention sets up a system of oil pollution contingency plans and cooperation in fighting oil spills.
International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (1978)	STCW establishes minimum training requirements for all personnel serving onboard ships. These standards cover personal survival techniques; fire prevention and firefighting; medical first aid; maritime security awareness; communication; leadership; teamwork & human behaviour.
International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS) (2001)	The convention prohibits the use of harmful organotins in anti-fouling paints used on ships and establishes a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.
International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (1969) and Protocol (1973)	The convention gives States Parties powers to intervene on ships on the high seas when their coastlines are threatened by an oil spill from that ship.
London (Dumping) Convention (1972)	Dumping at sea is regulated by the convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter 1972 (the 'London Convention'). Article 4 provides a general prohibition on dumping of wastes except as specified in the Convention. The convention has annexed to it two lists of substances, the 'blacklist' of substances which may not be dumped at all, and the 'grey list' of substances which may only be dumped under a specific permit.
Paris Agreement	The primary purpose of the Paris Agreement is to strengthen the global response toward climate change. Specifically, the Agreement seeks to substantially reduce GHG emissions to limit the global temperature increase in this century to 2oC, while pursuing efforts to limit the increase even further to 1.5°C (UNFCCC 2020). The Paris Agreement is legally binding, and signatories are reviewed every five years with the submission of an updated national climate action plan, known as Nationally Determined Contribution (NDC). Australia has ratified the Paris Agreement and has adopted NDCs that can be monitored and reported on as part of the 5-year stocktake. The current (2023) NDC for Australia is increasing the ambition of its 2030 target, committing to reduce greenhouse gas emissions 43% below 2005 levels by 2030.
Ramsar Convention on Wetlands	A 'declared Ramsar wetland' is a wetland area of international importance that has been designated under Article 2 of the Ramsar Convention or declared by the Minister to be a declared Ramsar wetland under Section 16 of the EPBC Act. There is one declared Ramsar site within the EMBA: Eighty-mile Beach.
United Nations Convention on the Law of the Sea (UNCLOS) (1982)	Part XII of the convention sets up a general legal framework for marine environment protection. The convention imposes obligations on State Parties to prevent, reduce and control marine pollution from the various major pollution sources, including pollution from land, from the atmosphere, from vessels and from dumping (Articles 207 to 212). Subsequent articles provide a regime for the enforcement of national marine

Guideline/legislation	Description
	pollution laws in the many different situations that can arise. Australia signed the agreement relating to the implementation of Part XI of the Convention in 1982, and UNCLOS in 1994.
United Nations Framework Convention on Climate Change (1992)	The objective of the convention is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system. Australia ratified the convention in December 1992, and it came into force on 21 December 1993.
Vienna Convention on the Protection of the Ozone Layer (1985) and the Montreal Protocol; on Substances that Deplete the Ozone Layer (1987)	The Convention (ratified by Australia in 1987) and the Protocol (ratified in 1989) concern the phasing out of ozone depleting substances.
Commonwealth Legislation	
Australian Maritime Safety Authority Act 1990	This Act specifies that the Australian Maritime Safety Authority's (AMSA) role includes protection of the marine environment from pollution from ships and other environmental damage caused by shipping. AMSA is responsible for administering the Marine Orders in Commonwealth waters.
Biosecurity Act 2015 Biosecurity Regulations 2016 Biosecurity Amendment (Ballast Water and Other Measures) Bill 2017 and Quarantine Regulations 2000 Biosecurity Amendment (Biofouling Management) Regulations 2021	*The Biosecurity Act 2015* (Biosecurity Act) came into effect on 16 June 2016 and replaces the *Quarantine Act 1908*. The key legislative change between the two acts is the jurisdictional shift of the Department of Agriculture and Water Resources from 200 nautical miles (nm) to 12 nm (i.e. Australian territory). In the context of the oil and gas industry, this shifts the regulatory compliance responsibility from offshore facilities located outside Australian territory to the domestic conveyances that service/support them. The *Australian Ballast Water Requirements, Version 8* include legislative obligations under this Act with regards to the management of ballast waterand ballast tank sediment when operating within Australian seas. *National Biofouling Management Guidance for the Petroleum Production and Exploration Industry* (voluntary to adhere to) and *Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species* provide guidance on management of biofouling for vessels, infrastructure and immersible equipment, which is considered to be good oilfield practice to prevent introduction of IMS. The Biosecurity Amendment and Quarantine Regulations are designed to prevent the introduction, establishment, and/or spread within Australia, of human, animal or plant pests and diseases. The Biosecurity Amendment (Biofouling Management) Regulations 2021 entered into force in June 2022 and requires operators of all vessels to provide information on biofouling management practices prior to arriving in Australia. As of September 2023, a section has been added to the Biosecurity Act – Section 6A Preventative Biosecurity Measures. This section includes purposes of preventing a specific behaviour or practice that causes or contributes to the entry into or the emergence, establishment or spread into Australian territory that is to be noted.

Guideline/legislation	Description
Climate Change Act 2022	The Climate Act commenced in September 2022. The Climate Act sets out Australia's net-zero commitments and codifies Australia's net 2030 and 2050 GHG emissions reductions targets under the Paris Agreement.
Environment Protection and Biodiversity Conservation Act (EPBC Act) 1999	While the Environment Regulations under the OPGGS Act (see below) manage day to day petroleum activities and apply to any activity that may have an impact on the environment, the EPBC Act (Chapter 4) regulates assessment and approval of proposed actions that are likely to have a significant impact on a matter of National Environmental Significance (NES). Actions that are likely to have a significant impact on a matter of NES require approval by the Commonwealth Environment Minister; the assessment process is administered by the Department of the Environment and Energy. The EPBC Act does not replace the need for an Environment Plan to be approved under the OPGGS (Environment) Regulations before an action can proceed. This Act came into force in July 2000 replacing five existing Commonwealth Acts (*Environmental Protection (Impact of Proposals) Act 1974*, *World Heritage Properties Conservation Act 1983*, *National Parks and Wildlife Conservation Act 1975*, *Whale Protection Act 1980*; and *Endangered Species Protection Act 1992*). The EPBC Act provides for the protection of the environment, especially those aspects of the environment that are matters of National Environmental Significance (NES); and promotes ecologically sustainable development through the conservation and ecologically sustainable use of natural resources. Under this legislation all activities that will, or have the potential to, affect matters of NES are prohibited except; when undertaken in accordance with approval by the Minister for Environment, or when approved through a Bilateral Agreement with a State or Territory, or when approved through a process accredited by the Minister. Matters of "National Environmental Significance" are: World Heritage Properties; National Heritage Places; Wetlands of International Importance; Listed Threatened Species and Communities; Listed Migratory Species; Nuclear Actions; Commonwealth Marine Areas; and Great Barrier Reef Marine Park
Environment Protection (Sea Dumping) Act 1981	This Act relates to the waters surrounding Australia's coastlines are protected from wastes and pollution dumped at sea by the Environment Protection (Sea Dumping) Act 1981 (the Sea Dumping Act). The Sea Dumping Act regulates the loading and dumping of waste at sea. The Act fulfils Australia's international obligations under the London Protocol to prevent marine pollution by dumping of wastes and other matter.
Maritime Legislation Amendment Act 2022	The Maritime Legislation Amendment Bill 2022 (the Bill) amends the Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (POTS Act) and the Protection of the Sea (Harmful Anti-fouling Systems) Act 2006 (HAFS Act) to implement amendments by the International Maritime Organization (IMO) to international Conventions concerning pollution from ships and the use of certain anti-fouling systems. The Bill contains four Schedules: • Schedule 1 amends the POTS Act to implement requirements in relation to the discharge of persistent floaters

Guideline/legislation	Description
	• Schedule 2 amends the POTS Act to implement a prohibition on the use of heavy fuel oil (HFO) in Arctic waters • Schedule 3 amends the HAFS Act to implement a prohibition on the use of cybutryne in anti-fouling systems on ships Schedule 4 makes minor amendments to the POTS Act and HAFS Act to provide a consistent definition of 'Marine Orders' across relevant legislation.
Maritime Legislation Amendment (Prevention of Air Pollution from Ships) Act 2007	This Act implements the requirements of MARPOL 73/78 Annex VI for shipping in Commonwealth waters.
National Greenhouse and Energy Reporting Act 2007 National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 Safeguard Mechanism (Crediting) Amendment Act 2023	The Act provides a single, national framework for the reporting and distribution of information related to greenhouse gas (GHG) emissions, GHG projects, energy production and energy consumption by corporations in Australia. Several legislative instruments sit under the NGER Act, providing greater detail about corporations' obligations. The Act includes National Greenhouse and Energy Reporting (NGER) requirements and the Safeguard Mechanism requirements. Jadestone has obligations to report their emissions under the NGER scheme. The Safeguard Mechanism (Crediting) Amendment Act 2023 amends legislation relating to emissions reductions. The second object of this Act is to contribute to the achievement of Australia's greenhouse gas emissions reduction targets by ensuring that each of the following outcomes (the safeguard outcomes) are achieved: a) net covered emissions of greenhouse gases from the operation of a designated large facility do not exceed the baseline applicable to the facility; b) total net safeguard emissions for all of the financial years between 1 July 2020 and 30 June 2030 do not exceed a total of 1,233 million tonnes of carbon dioxide equivalence; c) net safeguard emissions decline to: i. no more than 100 million tonnes of carbon dioxide equivalence for the financial year beginning on 1 July 2029; and ii. zero for any financial year to begin after 30 June 2049; d) the 5-year rolling average safeguard emissions for each financial year that begins after 30 June 2024 are lower than the past 5-year rolling average safeguard emissions for that financial year; e) the responsible emitter for each designated large facility has a material incentive to invest in reducing covered emissions from the operation of the facility; f) the competitiveness of trade-exposed industries is appropriately supported as Australia and its regions seize the opportunities of the move to a global net zero economy.

Guideline/legislation	Description
Navigation Act 2012	Legislation which covers international ship and seafarer safety, protect the marine environment where it relates to shipping, and the actions of seafarers in Australian waters. Under the Commonwealth Administrative Arrangements Order, the *Navigation Act 2012* is administered by the Minister for and the Department of Infrastructure, Regional Development and Cities. The Navigation Act gives effect to international conventions for maritime issues where Australia is signatory and provides the legislative power for Australia to implement treaties including the International Convention for the Prevention of Pollution from Ships (MARPOL) developed by the International Maritime Organisation. IMO MARPOL requirements for the discharge of pollution are implemented by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*. The Australian Maritime Safety Authority (AMSA) is a statutory authority established under the *Australian Maritime Safety Act 1990*. AMSA is Australia's national agency responsible for maritime safety, protection of the marine environment, and maritime aviation search and rescue. Thus, the legislative requirements of environmental management of the maritime operation, which includes operation of the offtake tanker and its receipt of cargo from the Stag CPF, falls under these Acts and AMSA's statutory authority. Administrative management of commercial vessels, which includes evidencing compliance with environmental requirements under AMSA's jurisdiction, is addressed through vessel vetting processes completed by third party independent agents.
OPGGS Act	The OPGGSA 2006 (OPGGSA) entered into force in 2008, superseding and repealing the previous offshore petroleum legislation – the *Offshore Petroleum Act 2006* (OPA) and the *Petroleum (Submerged Lands) Act 1967* (PSLA). Facilities located entirely in Commonwealth offshore waters are controlled by the Commonwealth OPGGSA and its regulations, including but not limited to the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS (E) Regulations). The Act, and its regulations, is currently administered by the Joint Authority, which consists of the commonwealth minister for Resources and Water and the WA State Minister for Mines and Petroleum. The commonwealth minister for Energy and Resources is advised by the Commonwealth Department of Industry, Science, Energy and Resources (DISER).
OPGGS (E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS (E) Regulations) Under the OPGGS (E) Regulations an EP is required for proposals under Commonwealth jurisdiction, comprising a description of the environmental effects and risks of the project, and proposed mitigation measures to reduce these risks.

Guideline/legislation	Description
	The EP must be submitted to and accepted by the Designated Authority (DA). The DA for Commonwealth waters adjacent to WA state waters and out to the Australian Economic Exclusion Zone (EEZ) at 200 nm is NOPSEMA, who administers the regulations. The current OPGGS (E) Regulations 2009 have been remade into the 2023 Environment Regulations in essentially the same form with no substantive changes to policy. The revisions are limited to minor amendments to provide consistency with current drafting practices, simplify language, and restructuring and renumbering of regulatory provisions for ease of navigation.
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989	This Act regulates the import, export and manufacture of ozone depleting substances (ODS) such as firefighting equipment and refrigerants.
Ozone protection and Synthetic Greenhouse Gas Management Reform (closing the Hole in the Ozone Layer) Act 2022	This act amends the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 in relation to the Ozone Protection and Synthetic Greenhouse Gas Program by: imposing controls that are currently imposed through licence conditions, such as the ban on import of bulk gas in non-refillable containers; clarifying licence and exemptions requirements; increasing the time allowed for submitting reports and payment levies; adopting the standard provisions of the Regulatory Powers (Standard Provisions) Act 2014, including certain minor modifications; updating the offence and civil penalty provisions; introducing information gathering powers including the ability to issue a notice to produce; providing the option of licence suspension as an alternative to immediate cancellation of financial penalties; providing for an internal review mechanism for reviewable decisions; and allowing the use or disclosure of certain information.
Protection of the Sea (Harmful Anti-fouling Systems) Act 2006	This Act implements Australia's obligations for the prevention of accidental and operational marine environment pollution from shipping under the International Convention on the Control of Harmful Anti-Fouling Systems on Ships. It prohibits the use of harmful organotins in anti-fouling paints used on ships.
Protection of the Sea (Prevention of Pollution from Ships) Act 1983	This Act gives effect to the International Convention for the Prevention of Pollution from Ships 1973/78 (MARPOL 73/78/97 and Annexes). It provides for penalties for not complying with the MARPOL. Marine Orders are a body of delegated legislation made pursuant to the *Navigation Act 2012* and the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*
Radiation Protection Act 2004	The Act ensures the health and safety of people by protecting them from harmful effects of radiation; and protecting the environment from harmful effects of radiation. This Act addresses protective measures for transportation and storage of radioactive material including NORMS.
Underwater Cultural Heritage Act 2018	This Act implements Australia's obligations for the prevention of accidental and operational marine environment pollution from shipping under the International Convention on the Control of Harmful Anti-Fouling Systems on Ships. It prohibits the use of harmful organotins in anti-fouling paints used on ships. The Act gives clarity to the present and ongoing jurisdictional arrangements for protecting and managing Australia's underwater cultural heritage in line with the 2010 Australian Underwater Cultural Heritage Intergovernmental Agreement.

Guideline/legislation	Description
	The Act ensures Australia's underwater cultural inheritance is protected for future generations. It is aligned with the UNESCO 2001 Convention, facilitating Australia to be part of the global community's response to illegal salvaging, looting and trafficking of underwater cultural heritage.
State Legislation	
Aboriginal Heritage Legislation Amendment and Repeal Act 2023	An act to repeal the Aboriginal Cultural Heritage Act 2021 and regulations made under that Act; and to amend the Aboriginal Heritage Act 1972 and to make consequential and related amendments to other written laws.
Marine Safety (Domestic Commercial Vessel National Law Application) Act 2023	The purpose of this Act is to adopt in the State a national approach to the regulation of marine safety in relation to domestic commercial vessels.
Petroleum Royalty Act 2023	The purpose of this Act is to provide for a royalty payable on petroleum produced from a project area.
Waste Management and Pollution Control Act 1998	An Act to provide for the protection of the environment through encouragement of effective waste management and pollution prevention and control practices and for related purposes.
Western Australian Marine (Transitional Provisions) Regulations 2023	Transitional provisions for Marine Safety (Domestic Commercial Vessel National Law Application) Act 2023 section 99 comes into operation.
Guidelines/Other	
Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018	These guidelines provide a Water Quality Management Framework which includes limits for common contaminants and water quality parameters in marine and fresh water.
Australian Ballast Water Requirements 2020	These guidelines state the mandatory ballast water requirements and provide information on ballast pump tests, ballast water reporting and ballast water exchange to reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ballast water from international vessels. These requirements are enforceable under the *Biosecurity Act 2015*.
Australian Biofouling Management Requirements, Version 2 2023.	The Australian biofouling management requirements set out vessel operator obligations for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas. These requirements apply to all operators of vessels subject to biosecurity control and provide guidance for vessel operators on best practice biofouling management. The department's powers to manage biosecurity risk associated with biofouling are contained in the Biosecurity Act 2015 and associated legislation.
Australian Marine Parks (AMP)	Australian Marine Parks (AMP) are established by proclamation under the EPBC Act for the purpose of protecting and maintaining biological diversity in the parks. An environment plan (EP) must be consistent with the Australian Marine Park Management plans. In all cases where an activity has potential to impact or present risk to AMPs, regardless of whether the activity is inside or outside a park, the EP should evaluate how these impacts and risks will be of an acceptable level and reduced to ALARP.

Guideline/legislation	Description
Bonn Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil and other harmful substances (Bonn Agreement)	The Bonn Agreement is the mechanism by which the North Sea states, and the European Union (the Contracting Parties), work together to help each other in combating pollution in the North Sea area from maritime disasters and chronic pollution from ships and offshore installations; and to carry out surveillance as an aid to detecting and combating pollution at sea. The Bonn Agreement Oil Appearance Code (BAOAC) may be used during spill response activities.
Circular for reporting and using contingency measures for ships installed with Ballast Water Management Systems	This circular is to inform the industry of Australia's requirements regarding the use of contingency measures for ships utilising a Ballast Water Management Systems.
EPBC Act-related guidelines	Relevant guidelines/policies and marine bioregional plans are considered in the management of impacts and risks. NOPSEMA is the sole assessor for offshore petroleum activities in Commonwealth water (as of 28 February 2014). Under the new arrangements, environmental protection will be met through NOPSEMA's decision-making processes. This Act is the Australian Government's key piece of environmental legislation. The Act focuses on the protection of matters of national environmental significance (MNES). Australian Marine Park Management Plans were also developed under this Act.
Guidelines for Exhaust Gas Cleaning Systems (IMO) 2021 (MEPC.340 (77))	MARPOL Annex VI requires ships to use fuel oil with a sulphur content not exceeding that stipulated in regulations 14.1 or 14.4. These Guidelines have been developed to allow for the testing, survey, certification, and approval of Exhaust Gas Cleaning Systems (EGCSs) in accordance with Regulation 4.3 of MARPOL Annex VI.
Guidelines for the Control and Management of Ship's Biofouling to Minimise the Transfer of Invasive Aquatic Species (IMO 2023c)	The Guidelines are intended to provide useful recommendations for measures to minimize biofouling for all types of ships. The objective of these Guidelines is pursued by providing a globally consistent approach to stakeholders on the control and management of biofouling, which will contribute to minimizing the risk of transferring invasive aquatic species from biofouling on ships
Marine Bioregional Plans	Marine bioregional plans are identified and considered in Appendix C. Key Ecological Features (KEF) 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. Seven KEFs intersect with the EMBA: • Ancient coastline at 125 m depth contour • Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula • Commonwealth Waters adjacent to Ningaloo Reef • Continental Slope Demersal Fish Communities • Exmouth Plateau

Guideline/legislation	Description
	• Glomar Shoals Mermaid Reef and Commonwealth waters surrounding Rowley Shoals.
MOU between AMSA and NOPSEMA	In March 2019, a Memorandum of Understanding was established between AMSA and NOPSEMA to guide cooperation and mutual assistance between AMSA and NOPSEMA in relation to carrying out their respective statutory functions for safety and environmental management in the offshore petroleum sector, including how the parties will respond to the interaction between vessels and offshore petroleum facilities. Section 5.2 of the MOU provides the following: > In the context of this MOU the above legislation [*Navigation Act 2012* and *Marine Safety (Domestic Commercial Vessel) National Law Act 2012*] will generally apply to the transfer of goods and persons between a vessel and an offshore facility, noting there may be areas of joint interest where some transfers are managed from the offshore facility. Jadestone interprets 'joint interest' to include an offtake activity in which a tanker is transferred cargo from an offshore facility. The transfer of cargo from the Stag CPF to the offtake tanker is an activity that occurs under legislative instruments for which AMSA is the statutory authority, and this activity is not a petroleum activity as defined by the OPGGS Act nor therefore an activity for which NOPSEMA is considered the statutory authority. The interface therefore of the offtake activity within the context of a petroleum activity and a maritime operation is that the transfer of hydrocarbon through the offtake hose is a petroleum activity to the point in the hose that connects at the offtake tanker (the manifold), and once the hydrocarbon cargo has passed the manifold to the tanker, this is now associated with the maritime operation for which AMSA is the recognised statutory authority.
National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (Commonwealth of Australia 2009)	A voluntary biofouling management guidance document developed under the National System for the Prevention and management of Marine Pest Incursions. Its purpose is to provide tools to operators to minimise the amount of biofouling accumulating on their vessels, infrastructure and submersible equipment and thereby to minimise the risk of spreading marine pests.
NOPSEMA OPGGS Act-related guidelines	NOPSEMA guidelines applicable to Montara operations include: • NOPSEMA Guidance: Ageing assets and life extension (N-04300-GN1975 A783718, July 2021) • NOPSEMA Guidance: ALARP (N04300-GN0166, August 2022) • NOPSEMA Guidance: Change to titleholder with operational control of activities (N-04000-GN1746, January 2024) • NOPSEMA Guidance: Environment plan content requirements (N04750-GN1344, January 2024) • NOPSEMA Guidance: Petroleum Activity (N-04750-GN1343 A336223, January 2024) • NOPSEMA Guidance: Oil pollution risk management (N-04750-GN1488, July 2021)

Guideline/legislation	Description
	• NOPSEMA Guidance: Notification and Reporting of Environmental Incidents (N-03000-GN0926, January 2024) • NOPSEMA Guidance: Notification and Reporting of Environmental Incidents (N-03000-GN0926, January 2024) • NOPSEMA Guidance: Notification and reporting of accidents and dangerous occurrences (N-03000-GN0099, September 2023) • NOPSEMA Guidance: Notification, reporting and recording requirements for well-related incidences (N-03300-GN1636, November 2023) • NOPSEMA Guidance: Offshore project proposal content requirements (N-04750-GN1663, January 2024) • NOPSEMA Guidance: Petroleum activities and Australian Marine Parks (N-04750-GN1785, January 2024) • NOPSEMA Guidance: Responding to public comment on environment plans (N-04750-GN1847, January 2024) • NOPSEMA Guideline: Consultation in the course of preparing an environment plan (N-04750-GL2086, May 2024) • NOPSEMA Guideline: Consultation with Commonwealth agencies with responsibilities in the marine area (N-04750-GL1887), January 2024 • NOPSEMA Guideline: Environment Plan Decision Making (N-04750-GL1721, January 2024 • NOPSEMA Guideline: End of an operation of an environment plan- Regulation 46 (N-04750-GL1691, January 2024 • NOPSEMA Guideline: Making submissions to NOPSEMA (N-04000-GLO225 July 2022) • NOPSEMA Guideline: Offshore project proposal decision making (N-04790-GL1816, January 2024) • NOPSEMA Guideline: When to submit a proposed revision of an EP (N-04750-GL1705, January 2024) • NOPSEMA Policy: Environment plan assessment (N-04750-PL1347, January 2024) • NOPSEMA Policy: Financial assurance for petroleum titles (N-04730-GN1381, January 2024) • NOPSEMA Policy: Offshore project proposal assessment (N-04790-PL1650, January 2024 • NOPSEMA Policy: Offshore oil pollution incidents (N-00500-PL1922, January 2024) • NOPSEMA Information Paper: Australian dispersant acceptance processes (N-04750-IP1597, January 2024)

Guideline/legislation	Description
	• NOPSEMA Information Paper: Acoustic impact evaluation and management information paper (N-04750-IP1765, January 2024) • NOPSEMA Information Paper: Operational and Scientific Monitoring Programs (N-04750-IP1349, January 2024) • NOPSEMA Information Paper: Planning for proactive decommissioning (N-00500-IP2002, January 2024) • NOPSEMA Information Paper: Source control planning and procedures (N-04750-IP1979, January 2024) • National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (Commonwealth of Australia 2009) • Australian Ballast Water Management Requirements (Version 8, Department of Agriculture, Water and the Environment 2020) • Australian biofouling management requirements (Version 2, Department of Agriculture, Fisheries and Forestry 2023) • Australian and New Zealand guidelines for fresh and marine water quality (ANZECC/ARMCANZ 2018) • The Australian Petroleum Production and Exploration Association (APPEA) Code of Environmental Practice (APPEA 2008). • NOPSEMA bulletin: Oil Spill modelling (Bulletin #1, April 2019) • APPEA Joint Industry Operational and Scientific Monitoring Plan Framework (APPEA 2021). Relevant guidelines/ policies are considered in the management of impacts and risks.
Plans of management for: • World Heritage properties, • Commonwealth/National Heritage places	Sites accepted to the World Heritage listing are only inscribed if considered to represent the best examples of the world's cultural and natural heritage. There are no World Heritage properties that intersect with the operational areas. The Commonwealth Heritage List is a list of natural, Indigenous and historic heritage places owned or controlled by the Australian Government. There are no Commonwealth Heritage places that intersect with the operational areas. The National Heritage list is Australia's list of natural, historic and Indigenous places of outstanding significance to the nation. There are no National Heritage properties that intersect with the operational areas.
Species Profile and Threats Database https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl	This database has been used as a source of information on environmental receptors. Information accessed has included species details such as habitat, movements, feeding, reproduction and taxonomic comments. Noting that profiles are not available for all species and ecological communities. Results of searching this database are found within **Appendix C – Existing Environment**.

Guideline/legislation	Description
The Australian Petroleum Production and Exploration Association (APPEA) Code of Environmental Practice (APPEA 2008)	In Australia, the petroleum exploration and production industry operate within an industry code of practice developed by the Australian Petroleum Production and Exploration Association (APPEA) now Australian Energy Producers; the APPEA Code of Environmental Practice (2008). This code provides guidelines for activities that are not formally regulated and have evolved from the collective knowledge and experience of the oil and gas industry, both nationally and internationally. The APPEA Code of Practice covers general environmental objectives for the industry, including planning and design, assessment of environmental risks, emergency response planning, training and inductions, auditing and consultation and communication. As an AEP member, Jadestone Energy adheres to this Code of Environmental Practice when undertaking offshore activities.
The Conservation Values Atlas (DoEE 2021 https://www.environment.gov.au/topics/marine/marine-bioregional-plans/conservation-values-atlas)	The Conservation Values Atlas has been developed by the Commonwealth Government. This is used for the identification of Biologically Important Areas (BIA), KEFs etc. which have been presented in Section 3 and considered in the assessment of impacts and risks in Sections 6 and 7. BIAs are identified by the Commonwealth government, 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.

OTHER APPLICABLE STANDARDS, CODES AND GUIDELINES

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018: These guidelines provide a Water Quality Management Framework which includes limits for common contaminants and water quality parameters in marine and fresh water.
- Australian Ballast Water Management Requirements (DAWE 2020): These guidelines state the mandatory ballast water requirements and provide information on ballast pump tests, ballast water reporting and ballast water exchange calculations.
- National Light Pollution Guidelines for Wildlife (DCCEEW (2023): These guidelines provide a framework for how to manage the light pollution impacts on protected wildlife particularly marine turtles, seabirds and migratory shorebirds.
- Australian biofouling management requirements Version 2 (DAFF) 2023: The requirements set out vessel operator obligations for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas.
- Interim Recovery Plan for the Threatened Migratory Shorebirds visiting Western Australia (2015): This Wildlife Conservation Plan for Migratory Shorebirds provides a framework to guide the conservation of migratory shorebirds and their habitat in Australia and, in recognition of their migratory habits, outlines national activities to support their appreciation and conservation throughout the East Asian-Australasian Flyway (EAAF).

- National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (2018): A guidance document issued by the Marine Pest Sectoral Committee which provides generic approach to a biofouling risk assessment and practical information on managing biofouling on hulls and niche areas.
- Safe Work Australia (SWA) Classifying Hazardous Chemicals – National Guide (2023): Provides the mandatory criteria for determining whether a substance is hazardous based on its health effects, and optional criteria for determining whether a substance is hazardous based on its ecotoxicological and physicochemical properties.

APPENDIX C EXISTING ENVIRONMENT DESCRIPTION

CONTENTS

TABLES

FIGURES

1. INTRODUCTION

Jadestone Energy (Australia) Pty Ltd ('Jadestone') is the operator and titleholder of the Stag Field Production and Export Facility (Stag Facility). The facility is located in permit area WA-15-L, approximately 60 km northwest of Dampier in approximately 49 m water depth.

Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023, Regulation 21(2) requires the proponent to:

> *'(a) describe the existing environment that may be affected by the activity; and*
>
> *(b) include details of the relevant values and sensitivities (if any) of that environment.'*

This document describes the combined existing environment that may be affected (EMBA) by the Stag operations petroleum activities and includes details of the relevant values and sensitivities of that environment. The EMBA is based on the low-level exposure of hydrocarbons on and in, the water and represents the largest extent of an oil spill due to the worst-case scenario as per NOPSEMA Bulletin #1.

A number of spill scenarios have been modelled and the EMBA represents the worst case for all of the spills rather than the worst case of a single spill. Within the EMBA is a smaller RISK EMBA which is represented by higher thresholds (termed as 'moderate' in NOPSEMA bulletin #1), this represents the environment within which receptors could be affected (rather than just contacted) and is based on scientific knowledge to determine the potential for impact.

It should be noted that several species identified in the PMST search of the EMBA as listed threatened species have not been presented as they are either terrestrial fauna or bird species that are typically found in habitats distributed on the coastal fringes of Australia, but are unlikely to be present on shorelines. Therefore, these species are not considered relevant to this EP and not discussed further.

1.1 Defining the area

To assist in the impact assessment, four sub-categories of EMBA were defined:

1. Surface hydrocarbons EMBA– hydrocarbons that are 'on' the water surface (1 g/m^2);
2. Entrained hydrocarbons EMBA– hydrocarbon that is entrained 'in' the water; (>10 ppb)
3. Dissolved hydrocarbons EMBA– the dissolved component of hydrocarbon in' the water (>10 ppb)
4. Shoreline loading EMBA - hydrocarbons that have accumulated on shorelines (10 g/m^2)

Collectively the total area of impact they intersect with is referred to as the "EMBAs".

Refer to the EP for more detail on how the thresholds were defined and the modelling underpinning the EMBAs delineation.

This description of the environment within the EMBAs addresses OPGGS(E) Regulation 21(2), which requires an Environment Plan to include a description of the environment that may be affected by the petroleum activity (EMBA) and to detail relevant values and sensitivities of that EMBA. This document together with the *Montara Environmental Plan* addresses this requirement.

Specific to this EP, the DCCEEW PMST associated with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was used to determine potential receptors such as Matters of National Environmental Significance (MNES) within the operational area and the EMBA. The results of these searches are provided in at the end of this document.

2. MARINE REGIONAL SETTING

Australia's offshore waters have been divided into six marine regions in order to facilitate their management by the Australian Government under the EPBC Act. The operational area and EMBA lie entirely within the North West Marine Region (NWMR). The objectives of the North-west Marine Parks Management Plan 2018 are to provide for:

a. the protection and conservation of biodiversity and other natural, cultural and heritage values of marine parks in the North-west Network

b. ecologically sustainable use and enjoyment of the natural resources within marine parks in the Northwest Network, where this is consistent with objective (a).

The values are broadly defined as:

- Natural values — habitats, species and ecological communities within marine parks, and the processes that support their connectivity, productivity and function
- Cultural values — living and cultural heritage recognising Indigenous beliefs, practices and obligations for country, places of cultural significance and cultural heritage sites
- Heritage values — non-Indigenous heritage that has aesthetic, historic, scientific or social significance
- Socio-economic values — the benefit of marine parks for people, businesses and the economy. A summary of each region is provided below.

The Operational Area and EMBA lie entirely within the Commonwealth waters of the North-west Marine Region (the region) and adjacent state waters between Ningaloo and Eighty Mile Beach. The region is distinguished by its predominantly wide continental shelf, very high tidal regimes (especially in the north), high cyclone incidence, unique current systems and warm, low-nutrient surface waters.

The region supports high species-richness of tropical Indo-west Pacific biota, but low levels of endemism (DSEWPaC 2012c). The offshore islands, coastline and waters within the region provide vital habitat to an extensive range of marine species including turtles, cetaceans, whale sharks and seabirds and has high fish biodiversity and consequently, is of value to commercial fish, prawn and crab fisheries.

Within the NWMR the is further divided into provincial bioregions. The Operational Area lies within the North West Shelf Province while the EMBA also overlaps the North West Province, the Central Western Transition, Central Western Shelf Transition and the Northwest Transition (Figure 2-1).

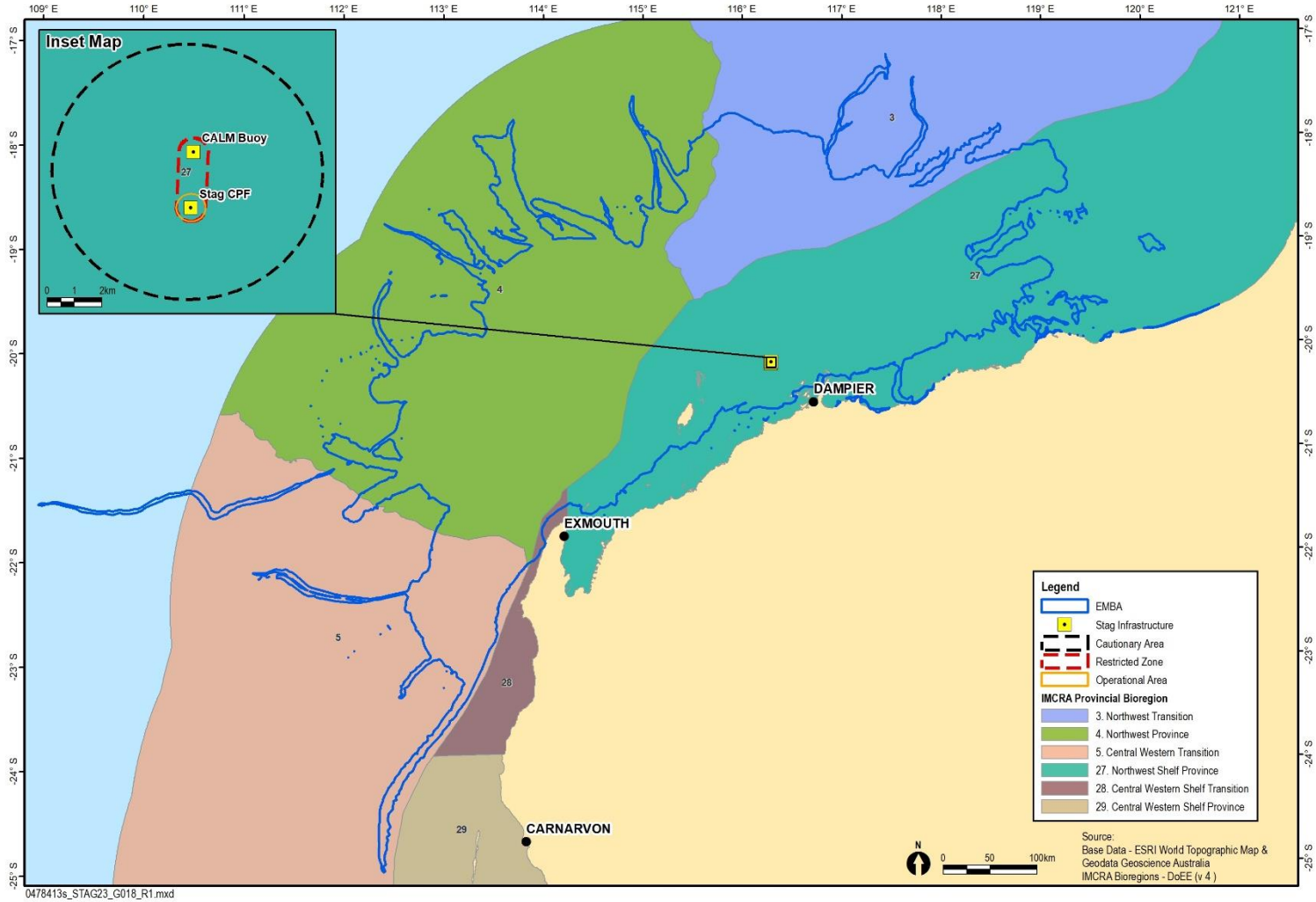

Figure 2-1: Provincial bioregions relevant to the OA and EMBA

3. PHYSICAL ENVIRONMENT

3.1 Climate

The region lies in the arid tropics experiencing high summer temperatures and periodic cyclones. Rainfall in the region is low with evaporation generally exceeding rainfall throughout the year although intense rainfall may occur during the passage of summer tropical cyclones and thunderstorms (Condie et al. 2006). Mean air temperatures over the neighbouring ocean area range from a minimum of 11 °C in winter to a maximum of 37 °C in summer. Due to the arid climate, daytime visibility in the area is generally greater than 5 nm (SSE 1991).

The summer and winter seasons fall into the periods September–March and May–July, respectively. Winters are characterised by clear skies, fine weather, predominantly strong east to south-east winds and infrequent rain. Summer winds are more variable, with strong south-westerlies dominating. Three to four cyclones per year are typical, with the official cyclone season being November through to April (BoM 2013).

3.2 Seawater Temperature and Salinity

Salinity is relatively uniform at 34–35 ppt throughout the water column and across the NWS. Due to the low rainfall, there is little freshwater run-off from the adjacent mainland (Blaber et al. 1985). NWS waters are usually thermally stratified, with a marked change in water density at approximately 20 m (SSE 1993). Surface temperatures vary annually, being warmest in March (32 °C) and coolest in August (19 °C). Vertical gradients are correlated to sea surface temperatures and are greatest during the warm-water season (SSE 1991). Near bottom water temperature is approximately 23 °C with no discernible seasonal variation.

Changes in water temperature and salinity characteristics can result from changes in local heating and evaporation following the southward movement of warmer water due to southward-moving cyclones and can have flow-on effects to primary and secondary productivity (McKinnon et al. 2003).

3.3 Wind

Non-cyclonic wind conditions are predicted for the Stag Field based on four years of continuous wind measurements at a nearby site (Wandoo platform; WNI 1995). Wind patterns are monsoonal with a marked seasonal pattern; wind shear on surface waters generates local-scale drift currents that can persist for extended periods (hours to days). During October–March, the prevailing non-storm winds are from the south-west, west and north-west at an average speed of less than 10 knots, peak average speeds of 15–25 knots, and maximum speeds of 30 knots. Winds from the south-east to north-east quadrant are experienced at a frequency of less than 10% over these seasons. In June–August, winds are generally lighter and more variable in direction than in spring and summer. Non-storm winds prevail from north-east through to south-east at average speeds of 5–6 knots, peak average speeds of 10–15 knots, and maximum speeds of 20 knots. Transitional wind periods, during which either seasonal wind pattern may predominate, can be experienced in April–May and September of each year.

Extreme wind conditions in the area may be generated by tropical cyclones, strong easterly pressure gradients, squalls, tornados and waterspouts. Tropical cyclones generate the most significant storm conditions on the NWS (SSE 1993). These clockwise-spiralling storms have generated wind speeds 50–120 knots within the region (SSE 1991). Tropical cyclones develop in the eastern Indian Ocean, and the Timor and Arafura Seas during the summer months of November to April. Since recordings began in 1960/61, tropical cyclones have approached from the northwest through to east, with the most frequent directions being from the north (34%) and east (36%). Due to the circular wind patterns involved however, winds can approach from any direction during the passage of the storm.

3.4 Waves

The wave climate is composed of locally generated wind waves (seas) and swells that are propagated from distant areas (WNI 1995). Sea directions run roughly parallel to prevailing wind directions. Hence, in summer, seas typically approach from the west and south-west, while in winter, seas typically approach from the south and east. Mean sea wave heights of less than 1 m with peak heights of less than 2 m are experienced in all months of the year (WNI 1995). Mean swell heights are low at around 0.4–0.6 m in all months. Due to the proximity of the mainland, the greatest exposure to swells is from the west (SSE 1993). Tropical cyclones have generated significant swell heights of up to 5 m in this area, although the predicted frequency of swells exceeding 2 m is less than 5% (WNI 1996). In the open ocean, sustained winds result in wind-forced currents of approximately 3% of the wind speed (Holloway and Nye 1985).

3.5 Tides and Currents

Sea surface currents over the NWS are generated by several components such as tidal forcing, local wind forcing and residual drift. Of these, tidal and wind forcing are the dominant contributions to local sea surface currents. The orientation and degree of drop-off of the continental shelf slope also influences the oceanography of the area. The tides of the NWS have a strong semi-diurnal signal with four tide changes per day (Holloway and Nye 1985; CMAR 2007). Peak tidal flows are from the north-northwest on the ebb, and to the south-southeast on the flood (Holloway and Nye 1985; SSE 1993; King 1994). Mid-shelf tidal currents are predicted to have average speeds of approximately 0.25 knots during neap tides and up to 0.5 knots during spring tides (NSR 1995; WNI 1995).

The dominant offshore sea surface current (typically seaward of the 200 m isobath) is the Leeuwin Current (Figure 3-1), which carries warm tropical water south along the edge of WA's continental shelf, reaching its peak strength in winter and becoming weaker and more variable in summer (CMAR 2007; Condie et al. 2006). The current is described as a surface current, extending in depth to 150 m (BHPB 2005; Woodside 2005). From September to mid-April the nearshore Ningaloo Current flows northwards, opposite to the Leeuwin Current, along the outside of the Ningaloo Reef and across the inner shelf (BHPB 2005; Woodside 2005). The Indonesian Throughflow is the other important current influencing the upper 200 m of the outer NWS (Woodside 2005; CMAR 2007). This current brings warm and relatively fresh water to the region from the western Pacific via the Indonesian Archipelago. Modelling undertaken by Woodside and CMAR indicates that significant east-west flows occur across the NWS to the north of the North-West Cape, possibly linking water masses in the area (Woodside 2005; Condie et al. 2006).

Offshore drift currents are represented as a series of interconnected eddies and connecting flows that can generate relatively fast (1–2 knots) and complex water movement. These offshore drift currents also tend to persist longer (days to weeks) than tidal current flows (hours between reversals). Therefore, in the event of an accidental oil spill, offshore drift currents have a greater influence than tidal currents on oil dispersion over timescales exceeding a few hours (APASA 2020).

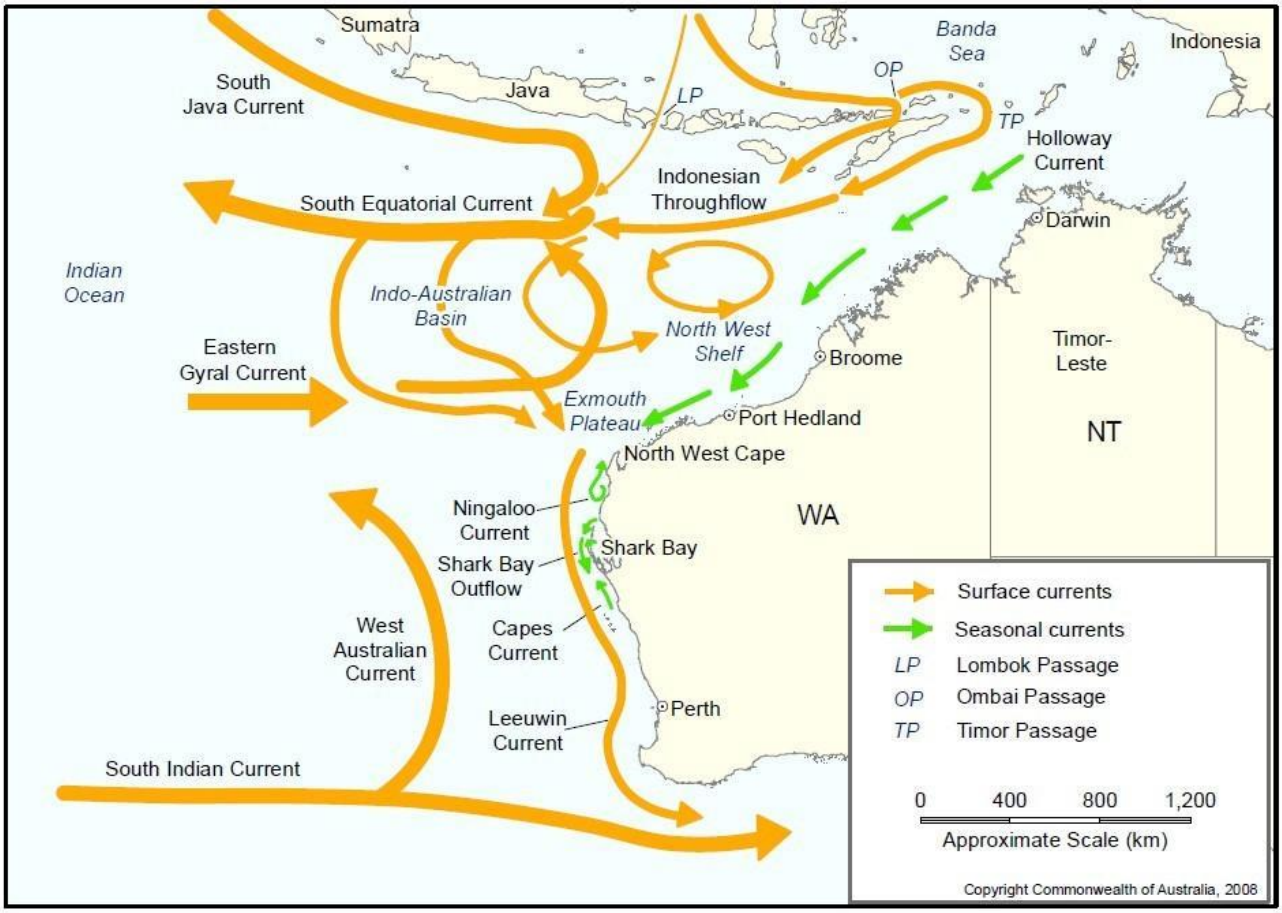

Figure 3-1: Surface currents of the North- West Marine Region

3.6 Sedimentology

The Operational Area is characterised by a thick sequence of carbonate rock that is overlain by thin layers of unconsolidated fine to medium grained, carbonate sediments with occasional shell or gravel patches (Racal 1994; Dames and Moore 1995). Surveys conducted over the NWS indicate that a similar seafloor occurs extensively over this geographic region, but with spatial variation in the grain size and origin of the surface sediments (McLoughlin and Young 1985; Woodside 1990). Surface seabed sediments in the area are predominantly composed of skeletal remains of marine fauna, with lenses of weathered sands (McLoughlin and Young 1985).

A debris seabed survey around the Stag Platform was undertaken as part of the Stag Apache Site Survey Campaign 2011 (Neptune Geomatics 2011). The survey confirmed that the surrounding seabed is free from debris. Two seabed types have been classified throughout the Operational area:

- Type A: Low relief unconsolidated calcareous fine to medium sand
- Type B: Low relief unconsolidated calcareous gravelly medium to coarse sand.

4. BIOLOGICAL ENVIRONMENT

4.1 Subtidal Benthic Habitats

Benthic habitats are defined as those subtidal habitats lying below the lowest astronomical tide (LAT). The benthic habitats within the EMBA range from those at LAT to more than 6,000 m at the canyons linking the Cuvier Abyssal Plain and Cape Range Peninsula.

Benthic habitats are partially driven by light availability. Primary producers (photosynthetic corals, seagrass and macroalgae) are limited to the photic zone, whereas benthic invertebrates including filter feeding communities may be found in deeper waters. The depth of the photic zone varies spatially and temporally is predominantly dependent on the volumes of the suspended material in the water column. The photic zone in the offshore Pilbara approximately 70 m whereas in oceanic waters, the photic zone may extend to 120 m (DEWHA 2008a).

4.1.1 Operational Area

4.1.1.1 Baseline Conditions

Apache Energy Ltd conducted sampling of the infauna and sediment characteristics within the Operational Area prior to development drilling as a baseline for comparison to the post-development (Kinhill 1997; 1998). This study confirmed that the benthic biota within the vicinity of Stag is comparable to that found over similar substratum and at similar depths over the wider region (Ward and Rainer 1988; Woodside 1988; Rainer 1991). The unconsolidated sediments in this habitat were found to support a diverse infauna, consisting predominantly of mobile burrowing species, which include molluscs; crustaceans (crabs, shrimps and smaller related species); polychaete, sipunculid and platyhelminth worms; asteroids (sea stars); echinoids (sea urchins), and other small infaunal animals.

Sediment and water quality data within the Operational Area was collected and analysed initially as a baseline study by Kinhill in 1997. The following characteristics were described:

- Water quality: temperature 29.6 –30.7°C at surface and 29.3–29.6°C seabed
- Salinity 33.3–33.9 ppt
- Oxygen 4.49–6.2 mg/L
- Organic content 40% sediment
- Sediment particle size was spatially (and temporally) variable
- No hydrocarbons in marine sediments
- Metals (barium, cadmium, chromium, copper, lead and zinc were low (below detection limits)
- Infauna 67.8 individuals/kg.

4.1.1.2 Post Drilling Conditions

There have been a number of studies undertaken after drilling has commenced (including Kinhill 1997, Kinhill 1998, CSIRO 2001, IRC 2001, and Oceanica 2015). Whilst for the most part there has been no changes to some aspects of the sediment and benthic habitat a few trends have been noted.

The sediments within the area of the Stag Facility are dominated by sand sized particles, with medium sand comprising the largest fraction. There were no clear trends in particle size distribution (PSD) with increasing distance from the CPF in sediment samples collected by Oceanica (2015). Most sediment was grey in colour and contains shells and other biota present. The majority of samples taken by Oceanica (2015) had no vegetation present and no obvious odour. This is consistent with results from a survey by CSIRO in 2001 (IRC 2001) who reported unconsolidated fine-medium and medium-coarse sands with patches of coral

rubble (CSIRO 2001). Grain size characteristics were compared from sites 50 m and 200 m from the Stag platform against control sites. No differences were detected (IRC 2001). The total abundance of benthic invertebrates declined considerably between baseline and post- drilling surveys, the decline was similar among all stations including controls irrespective of distance from well (Kinhill 1999).

There is small spatial variability in the infaunal assemblages (e.g. crustaceans, molluscs, ostracods, bivalves, polychaete worms and amphipods) surrounding the Stag Facility and this is typical of soft sediments in the surrounding areas (IRC 2001, Oceanica 2015). Total infaunal abundance ranged between sites closest and further away from the platform (131 + 39 individuals m^{-2} and 417 + 23 m^{-2} respectively). Polychaete worms and crustaceans were the most dominant infauna (IRC 2001). Any differences in infaunal group abundances were of similar magnitude with control locations. Similar results were obtained in a more contemporary study by Oceanica (2015), who reported prawns, polychaetes, tube polychaetes, amphipods and bryozoans in sediment samples collected.

While there are no significant benthic primary producers (benthic photosynthetic organisms) associated with the soft sediment habitat within the Operational Area, some small patches of algae were found by Oceanica (2015). The subsea infrastructure such as the CPF platform, CALM buoy mooring and MODU spud cans and legs (when drilling), are likely to provide attachment points with sufficient light availability for algae as well as other filter feeding organisms (e.g. hydroids, bryozoans and molluscs). ROV footage from July 2020 indicated that the biofouling assemblage observed on the Stag field infrastructure was representative of that which would be expected of any structure immersed for an extended period in the waters in that region (PGM Environment 2021).

Pipelines have been shown to have a high abundance of commercially important fish, including snapper and grouper, as well as the presence of thousands of larval fish and juveniles suggesting the pipelines may actually enhance fish stocks (McLean et al. 2017). Although little is known about the habitat preference of syngnathids and pipefish, it is unlikely that they would occur in the operational area, with research showing a preference for coral reefs in tropical areas (Foster & Vincent 2004; Scales 2010).

4.1.1.3 Sediment contamination

- Studies completed in 2000 (IRC 2001) and 2015 (Oceanica 2015) measured levels of contaminants in sediments at sites close to the Stag CPF and further away. Both these studies reported that concentrations of hydrocarbons were below detection limits at all sites and depths. This is consistent with the pre and post drilling surveys (Kinhill 1997, Kinhill 1998 and Kinhill 1999) earlier.
- Unlike hydrocarbons, some trace metals were above detection limits and some were elevated. Barium concentrations increased between baseline and post- drilling surveys (Kinhill 1999). During the IRC study in 2001:
- Barium concentrations were higher within 50 m of the Stag platform and ranged from 76–189 ppm. Other locations away from the platform ranged between 10.5 ppm and 45.5 ppm while the control locations had a range of 10.5–23 ppm.
- Trace metal concentrations for chromium, copper, lead, and zinc were elevated within 50 m of the platform when compared to locations further from the platform and the controls (IRC 2001).
- Cadmium concentrations were below detection limit of 0.2 ppm, while Chromium concentrations ranged from 14 ppm at 500 m southwest of the Stag platform to 26.5 ppm at a control site.
- Copper concentrations were generally similar across all locations with values ranging from 4–6.5 ppm.
- Lead concentrations were generally below detection (<2 ppm) with the exception of 4.5 ppm and 5.0 ppm recorded 50 m northwest of the Stag platform. (IRC 2001).
- Zinc concentrations were highest at 50 m northwest of the stag platform with 23 ppm and 15.5 ppm and 17.0 ppm at two control locations.

- A more comprehensive study was undertaken in 2015 (Oceanica 2015) to assess sediment quality and demonstrate that 95% species protection trigger values and sediment ISQG values are met at the boundary of the area of impact. TPH, BTEX and PAH in sediment samples were all below the laboratory LoRs. While there are no ANZECC/ARMCANZ guideline values for TPH and BTEX, PAH concentrations were all below their ANZECC/ARMCANZ ISQG-Low and -High values.
- Metal concentrations for all sediment samples were below their respective ANZECC/ARMCANZ ISQG-Low and High values (where available). There were no ANZECC/ARMCANZ guidelines for barium, iron, manganese and strontium but the concentrations away from the produced water discharge point were not substantially different to those further away. Highest concentrations in any one sample for these metals are 370, 10,000, 110 and 4500 mg/kg respectively (Oceanica 2015). Zinc concentrations were elevated in the vicinity of the Stag platform (highest reading 41 mg/kg at 70 m away) but decreased to background levels at 250 m from the Stag platform (5.3 mg/kg). This is similar to previous monitoring in 2000 (IRC 2001). Lead and barium concentrations results were similar to those reported in 2000; however, the copper and chromium results were slightly lower than those in 2000.

EMBA

A wide range of benthic habitats occur within the EMBA including benthic primary producer habitats (i.e. photosynthetic organisms) such as macroalgal beds, seagrass meadows and hard corals which are distributed in shallow subtidal and intertidal waters, as well as intertidal water/ shoreline distributed habitats such as mangroves and salt marshes. Benthic primary producers are important components of ecosystems as they provide the source of energy driving food webs and provide shelter for a diverse array of organisms.

Other subtidal habitats within the EMBA include unconsolidated sediment, which is the most common subtidal habitat on the NWS, and rocky substrate (e.g. outcropping limestone pavement). Subtidal rocky substrate typically supports a mosaic benthic community which may comprise benthic primary producers such as macroalgae and hard corals in the photic zone. In deeper waters and/or where light is limited, hard substrate may have a community dominated by habitat-forming filter feeding organisms such as various soft corals, sponges and hydroids.

Other intertidal and shoreline habitats in the EMBA include intertidal sand/mud flats, intertidal rocky reefs, rocky shorelines and sandy beaches. Intertidal mud/sand flats are particularly extensive along the more northerly mainland shorelines of the EMBA, where the tidal range is greatest, and comprise large areas of exposed mud and sand at low tide. These are important foraging habitats for shorebirds, including important migratory species, which consume benthic organisms living in and on these flats. Protected sand/mud flat habitats within the EMBA include the Eighty-Mile Beach Ramsar site (also a proposed Marine Park; refer Section 6.2.7). There are numerous sandy beaches within the EMBA, on both offshore islands and the mainland, that are important nesting sites for a number of protected marine turtle species (refer Section 6.1.3).

Habitat diversity is highest in shallower waters where light availability promotes the occurrence of benthic primary producers, and in areas where hard substrate provides attachment points for a greater diversity of habitat forming organisms. Within the EMBA benthic habitat diversity is therefore highest within waters along the Ningaloo coastline, coastal waters between the Dampier Archipelago and Eighty Mile Beach, shallow waters around offshore islands extending from North-West Cape to Eighty Mile Beach (including Muiron, Thevenard, Montebello/ Barrow/ Lowendal, Dampier Archipelago and Turtle islands) and offshore shoals (e.g. Rowley shoals).

A more detailed description of benthic primary producers within the EMBA is provided in the sections below.

Coral Reef and Communities

Across the NWS, corals tend to occur in relatively shallow areas with strong currents where water movement provides a constant supply of nutrients and particulate food. Corals occur as extensive reefs, patch reefs, isolated bomboras or in scattered colonies across the limestone pavement that dominates the shallow water areas of the region. They contain photosynthetic unicellular algae called zooxanthellae and are therefore reliant on sunlight for their survival

Corals can be grouped into the following categories:

- Sceleractinian corals (hard corals) – reef-building corals
- Non-sceleractinian corals (sometimes referred to as calcified soft corals) – generally not considered to be reef-building
- Soft corals belonging to the order Alcyonacea – non reef-building.

Coral spawning usually occurs during the months of March and April in two concentrated events each of three to four days' duration, occurring on nocturnal, neap and ebb tides 7–10 nights following the full moon. In addition to this main spawning period in autumn, coral recruitment occurs throughout the year, with brooding species implicated. There have also been recent observations inferring broadcast spawning of corals along the NWS in October to November, although this appears to be a minor event relative to the March/April spawning.

Regionally, cyclone damage to corals may be significant (WAM 1993; LDM 1996) through physical disturbance and sedimentation (Heinsohn and Spain 1974; Van Woesik et al. 1991; Stejskal 1992). Bleaching of corals surrounding coastal islands was part of a worldwide phenomenon that has been linked to global warming (Hoegh-Guldberg 1999). Other natural events, such as sedimentation and predation may also contribute to temporal variability of live coral cover. Coral predators such as the crown-of-thorns seastars, *Acanthaster planci*, and the corallivorous gastropods, *Drupella cornus* and *D. rugosa*, have been recorded in the NWS region.

Communities subject to frequent natural perturbation are likely to be either resilient or transient and highly dynamic in terms of cover and distribution (WAM 1993). The ability of such species to recolonise after large- scale natural or human disturbance is also likely to be high, although there is interspecific variation in rate of recovery. Fast-growing Acropora species, for example, can recover from severe damage in a few years whereas slow-growing massive species may take up to 30 years to recover from major damage (WAM 1993).

Dampier Archipelago

The closest coral reefs to the Stag facility are those around the Dampier Archipelago, 32 km southeast of the location (Figure 4-1). Coral communities occur throughout the reserves and together, the shallow intertidal and subtidal reef communities comprise 8% (approximately 18,300 ha) of the major marine habitats. The most diverse coral areas in the proposed reserves are found on the seaward slopes of Delambre Island, Hamersley Shoal, Sailfish Reef, Kendrew Island and north-west Enderby Island. Live coral cover can vary greatly from reef to reef, as indicated by contrasting covers of 10–60% on Sailfish Reef and Hamersley Shoal, respectively. The reserves have a high diversity of hard corals, with at least 229 species recorded from Western Australian Museum (WAM) surveys (CALM 2005b).

Montebello/Barrow/Lowendal Islands

Coral reefs surround the Barrow/Lowendal/Montebello Island complex (Figure 4-2), 75–96 km southwest of the Stag Facility. Approximately 6% of the Montebello/Barrow Islands Marine Parks are comprised of shallow intertidal and subtidal reef communities. The best developed of these communities are in the relatively clear water and high energy conditions of the fringing reefs to the west and south-west of the Montebello Islands, at Biggada Reef on the west side of Barrow Island. Coral 'bommies' and patch reefs

occur in the more turbid and lower energy waters along the eastern edge of the Montebello Islands and the south-eastern edge of Barrow Island (CALM 2004).

Corals occur on submerged limestone reefs and submarine slopes as fringing reefs and patch reefs in the shallow waters (5–10 m) to the south, east and north of the Lowendal Islands. Corals are also present in slightly deeper waters (up to 20 m) on exposed limestone pavement running north towards the Montebello Islands (LeProvost Semeniuk Chalmers 1986; LDM 1994). This habitat extends south along the eastern edge of the Barrow Island Shoals.

Corals are abundant around Barrow Island, growing as high profile reefs and on pavement on the west and east coasts. The most significant coral reefs around Barrow Island are Biggada Reef on the west coast, Dugong Reef and Batman Reef off the south-east coast, and those along the edge of the Lowendal Shelf on the east side of Barrow Island (Chevron 2008).

Quantitative sampling of seven sites around the Lowendal Islands showed a range of 34–63 species or taxa per site, with massive forms such as Favites and Porites, and tubular and digitate species of Acropora dominating the assemblages (LDM 1994). No corals were present in the channel between the Lowendal Islands and the northern tip of Barrow Island. A small submerged fringing reef lies in shallow water on the northeast side of Barrow Island. A total of 235 species comprising 60 coral genera have been recorded from the Montebello Islands during surveys carried out by the WA Museum (WAM 1993).

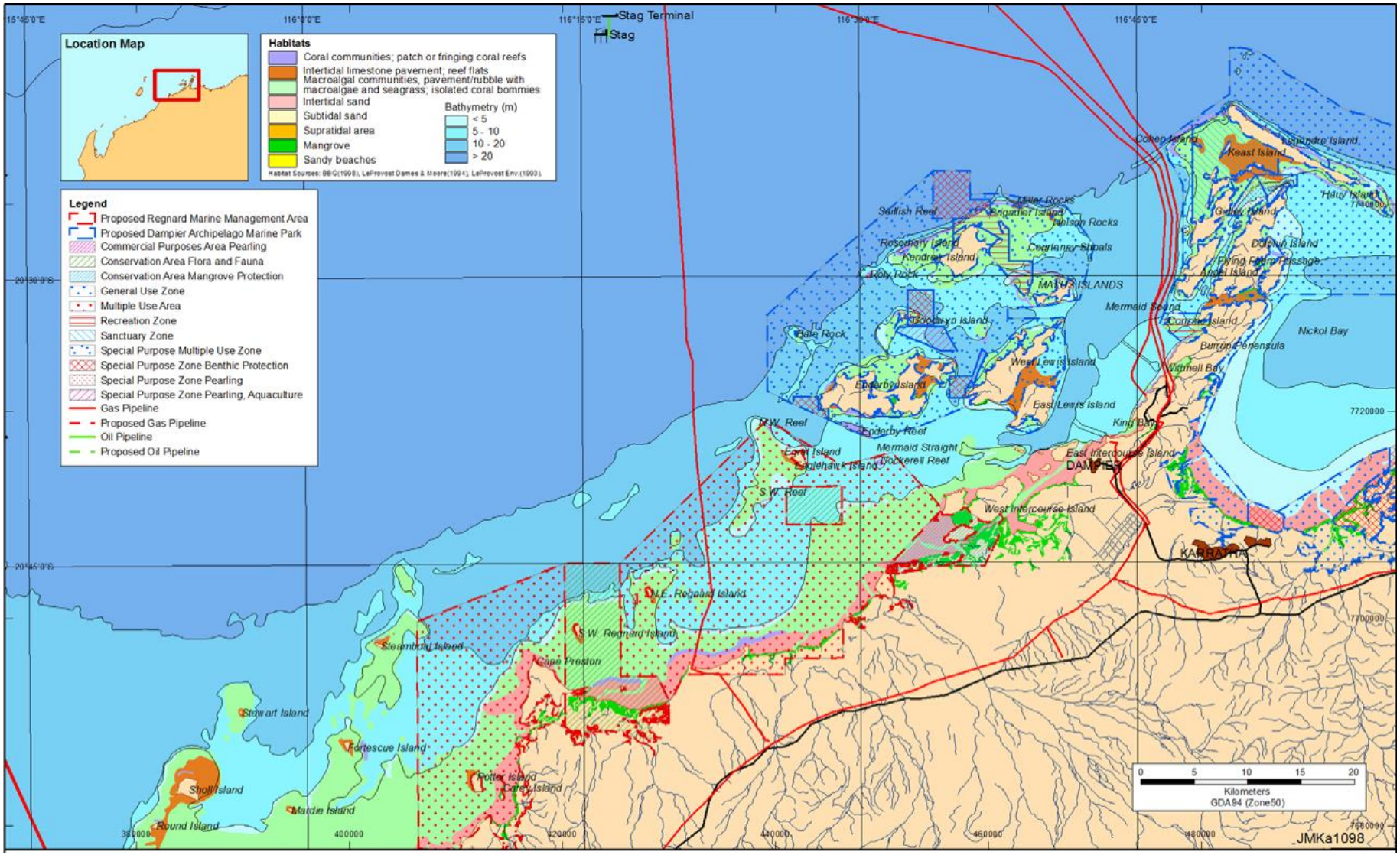

Figure 4-1: Marine habitats surrounding the Dampier Archipelago

Offshore Islands between North-West Cape and Dampier Archipelago

Hard corals occur as components of shallow intertidal and subtidal habitats around numerous small offshore islands within this region (including Muiron, Thevenard, Airlie and Serrurier islands) associated with limestone pavement create fringing intertidal reefs, patch reefs or represent isolated coral bomboras. Corals around Muiron Islands are contained within the State managed Muiron Island Marine Management Area.

Ningaloo Reef

Ningaloo Reef is the largest fringing barrier coral reef, and the second largest coral reef system in Australia. The most diverse coral communities along this coastline are in the relatively clear water, high energy environment of the fringing barrier reef and low energy lagoonal areas to the west of North-West Cape. The diversity of hard corals along this coastline is high with at least 217 species representing 54 genera of hermatypic (reef building) corals recorded to date (Veron and Marsh 1988). All 15 families of hermatypic corals are represented, however species diversity and community structure vary with environmental conditions such as exposure to wave action, currents, depth and water clarity. Figure 4-3 provides an overview of habitats, including coral communities. The Ningaloo Reef is protected within the Ningaloo Coast World Heritage Area (Section 6.2.1) and Ningaloo Marine Park (Commonwealth and State waters (Sections 6.2.3 and 6.2.8).

Coastline between Dampier Archipelago and Eighty Mile Beach

The coastline in this region is subject to high tidal currents and infrequent cyclonic events, and shallow coastal waters are typically very turbid due to suspension of fine sediments driven by these currents. Coral communities along this stretch of coastline typically have lower diversity and density than shorelines further south (e.g. Dampier Archipelago and Ningaloo Reef) and are associated with outcropping limestone subtidal pavement or intertidal rocky shorelines. Corals further offshore typically exhibit greater diversity and density where sediments are coarser and water conditions are less turbid. A total of 51 species of coral from 19 genera have been identified from areas offshore from Port Hedland which is lower than the 120 coral species from 43 genera recorded in Dampier Port and inner Mermaid Sound (Blakeway and Radford 2005). Along this stretch of coastline, corals are less likely to form biogenic reefs and more likely to be present as components of mosaic communities with other benthic organisms.

Rankin Bank and Glomar Shoals

Rankin Bank (19° 46' 44.184" S, 115° 36' 59.220" E) and Glomar Shoals (19° 36' 41.846" S, 116° 44' 4.472" E) are shoals located, over 35nm each way from the Montebellos and approximately 150 km north of Dampier. Glomar Shoal and Rankin Bank are the only large, complex, bathymetrical features on the outer western shelf of the West Pilbara (AIMS 2014). Species of major recreational interest found on these shoals include saddletail snapper, red emperor, cods, coral and coronation trout, sharks, trevally, tuskfish, tunas, mackerels and billfish (Fletcher and Santoro 2012).

The Glomar Shoals have been identified as a Key Ecological Feature (KEF) of the North-west Marine Bioregion (Falkner et al. 2009). The area is known to be an important for many commercial and recreational fish species such as Rankin cod, brown striped snapper, red emperor, crimson snapper, bream and yellow-spotted triggerfish (Falkner et al. 2009; Fletcher and Santoro 2012). Catch rates at the Glomar Shoals are high, indicating that it is an area of high productivity.

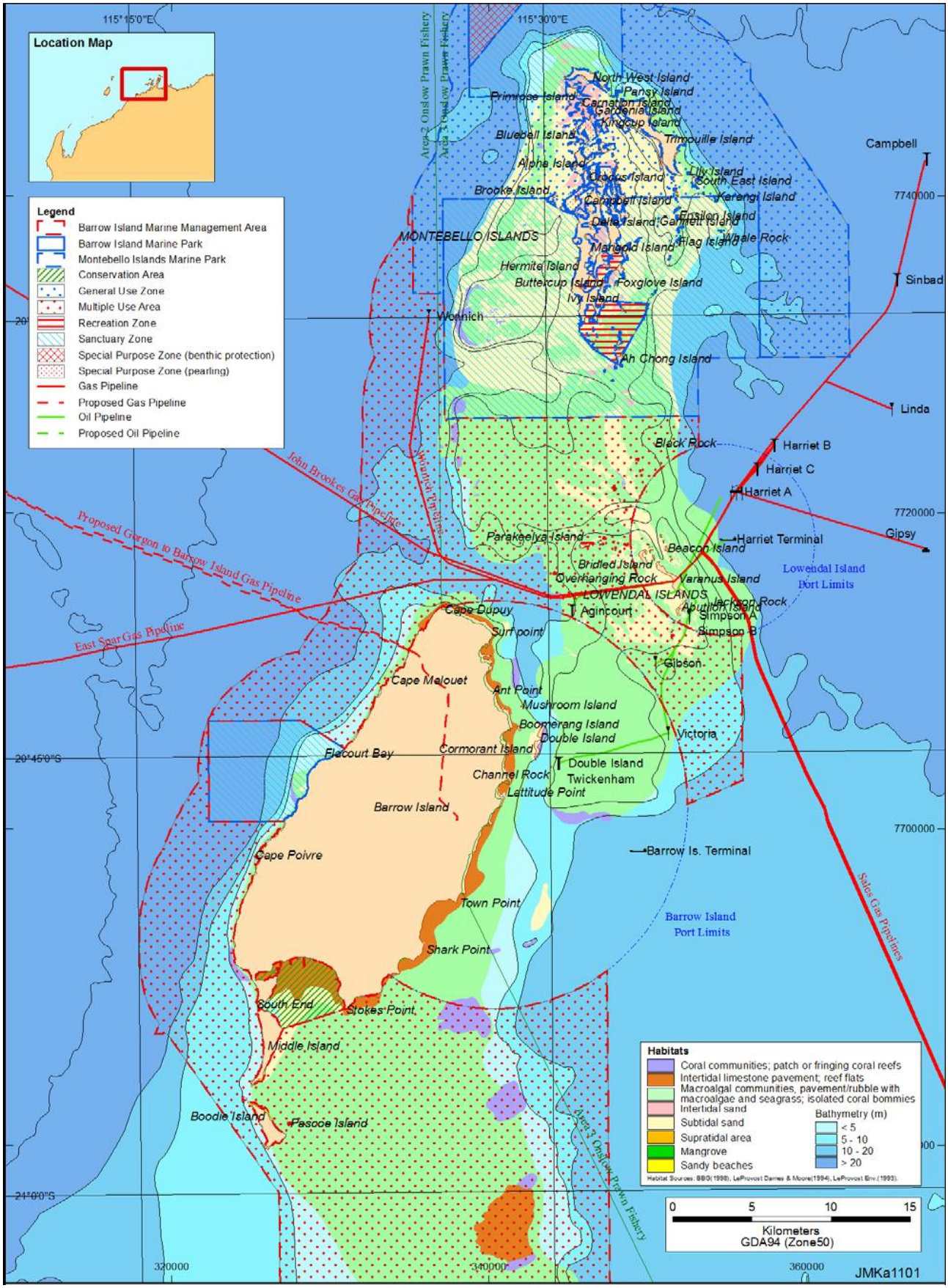

Figure 4-2: Marine habitats surrounding the Montebello, Lowendal and Barrow Islands

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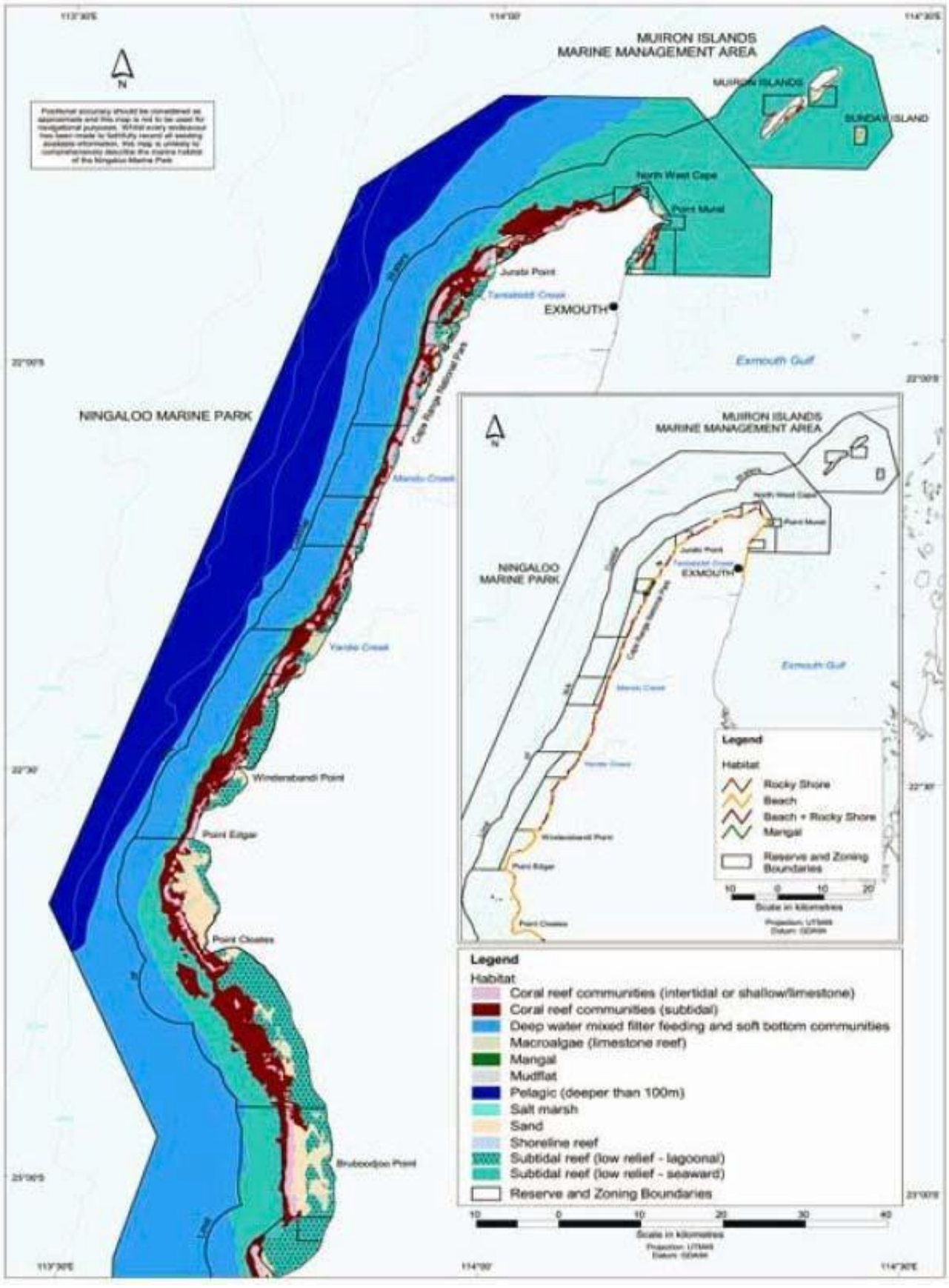

Figure 4-3: Marine habitats surrounding the Ningaloo Marine Park north of Point Cloates

Macroalgae and Seagrasses

Macroalgae are most prolific over the shallow pavement limestone reefs adjacent to the offshore islands in the region, including those of the Dampier Archipelago 32 km southeast of the Stag Facility location. Seagrasses form extensive meadows over some of the shallow water sandflats (down to approximately 15 m water depth). In deeper waters, macroalgae and seagrasses are less abundant due to lower light levels reaching the benthos.

Macroalgae and seagrasses are important primary producers in tropical inshore waters. Seagrasses are directly grazed by dugongs (Prince 1986) and both seagrasses and macroalgae are grazed by green turtles. Few fish species graze directly on seagrass or macroalgae but both vegetation types support a diverse and abundant invertebrate fauna that are the principal food source for many inshore fish species (Blaber and Blaber 1980). Small crustaceans, such as amphipods, copepods and isopods, emerge from macroalgae and seagrasses at night and are fed upon by planktivorous fish such as herring, sardine and anchovy (Robertson and Watson 1978). Dense schools of these fish are in turn fed upon by both predatory fish, such as tuna and mackerel, and diving birds, such as shearwater and terns. Beds of seagrasses and macroalgae may support the juvenile stages of prawn species that are commercially important in the region (Loneragan et al. 2003).

Dampier Archipelago

Macroalgae dominate submerged limestone reefs and also grow on stable rubble and boulder surfaces in the Dampier Archipelago/Cape Preston region (Figure 4-1). These communities are most commonly found on shallow limestone pavement in depths less than 10 m. Low relief limestone reefs, which are dominated by macroalgae, account for 17% (~ 35,460 ha) of the major marine habitats within the Dampier Australian Marine Park. Brown algae are the most abundant group of algae in the region, with Sargassum sp., Dictyopteris sp. and Padina sp. being the dominant species. The most common green algae are the articulate coralline Halimeda sp, while prominent red algal species include crustose corallines, non-corallines and algal turf. Seagrass occurs in the larger bays and sheltered flats of the region. Six species of seagrass are present on the subtidal soft sediment habitats, these being *Cymodocea angustata, Halophila ovalis, Halophila spinulosa, Halodule uninervis, Thalassia hemprichii* and *Syringodium isoetifolium*. Seagrasses do not form extensive meadows within the proposed reserves, but rather form interspersed seagrass/macroalgae beds. The most significant areas of seagrass are found between Keast and Legendre islands and between West Intercourse Island and Cape Preston (CALM 2005b). Macroalgae and seagrasses are important primary producers, trapping light energy from the sun and making it available to the ecosystem. They also provide important habitats for molluscs, sea urchins, sea stars, sea cucumbers, crabs and fishes. Marine turtles feed on algae and seagrass, and the ephemeral seagrass typically found in the area is likely to be the preferred food source for the resident dugong population.

Montebello/ Barrow/ Lowendal Islands

Macroalgae are the dominant macrophyte in the Montebello/Lowendal/Barrow Island region, occupying approximately 40% of the benthic habitat area of the region (CALM 2004) (Figure 4-2). At least 132 macroalgal taxa occur in marine habitats around Barrow Island with most thought to be widely distributed in the tropical Indo-Pacific region (Dr J. Huisman, pers. comm. in Chevron 2005). Macroalgae generally attach to hard substrates such as rock, although species such Caulerpa, Halimeda, Udotea and Penicillus can anchor in soft sediments or attach to shell fragments or rubble.

The most numerically abundant macroalgae are of the Sargassum genus, which cover the shallow subtidal rock platforms around the islands. Seasonally, Sargassum grows large foliose fronds bearing reproductive structures and then senesce each winter. Consequently, the biomass of the macroalgal beds varies greatly with this seasonal cycle of growth and senescence. Other abundant taxa in the Montebello/Lowendal/Barrow Island region include Halimeda, Caulerpa, Dictyopteris, Dictyota, Cystoseira, Padina, Codium and Laurencia (Chevron 2008).

On the east coast of Barrow Island, macroalgal diversity is highest in the rock pools and toward the deeper edge of the intertidal zone (Chevron 2008). The dominant macroalgae on the east coast platforms are *Cystoseira trinodis*, Sargassum spp., Caulerpa spp. and Halimeda spp. Macroalgal turfs are widespread on the intertidal pavement reef and comprise red algae such as Laurencia, Chondria, Ceramium, Centroceras clavulatum, Gelidiopsis and Hypnea (Chevron 2005; 2008).

Seagrasses in the Montebello/Lowendal/Barrow Island region are sparsely interspersed between macroalgae and do not form extensive meadows. Six species have *been* recorded to date: *Cymodocea angustata*, *Halophila ovalis*, *Halophila spinulosa*, *Halodule uninervis*, *Thalassia hemprichii* and *Syringodium isoetifolium* (CALM 2004). Most of these are small, ephemeral species that grow on subtidal sands and in intertidal pools and have a seed bank in the surficial sediments that allows them to recolonise quickly following disturbance. The most common species are *Halophila ovalis* on the deeper subtidal sand and *Syringodium isoetifolium* and *Halodule uninervis* in the rock pools (Chevron 2005, 2008).

Offshore Islands between North-West Cape and Dampier Archipelago

Macroalgae and seagrass occur around the numerous small offshore islands within this region (including Muiron Islands, Thevenard Island, Airlie Island and Serrurier Island) associated with limestone pavement and protected areas of soft sediments. Dominant species are consistent with those described for the Dampier Archipelago and the Ningaloo Coastline.

Ningaloo Coastline

Macroalgal meadows along the Ningaloo coastline are generally found on the shallow limestone lagoonal platforms and occupy about 2,200 ha of the Ningaloo Marine Park and Muiron Islands MMA (CALM 2005a) (Figure 4-3**)**. Macroalgal communities within the Park have been broadly described (Bancroft and Davidson 2001). The dominant genera are Sargassum, Padina, Dictyota and Hydroclathrus (McCook et al. 1995). Seagrass species are generally patchily distributed and are not a major component or a major primary producer on the reef (CALM 2005a). The biogeography of several species such as *Cymodocea angustrata*, *Cymodocea serrulate*, *Halodule uninervis*, *Haliphola ovalis*, *Haliphola spinulosa*, *Syringodium isoetifolium*, and *Thalassodendron ciliatum* suggest that these species are likely to occur in the reserves. It is also highly likely that some temperate species have their northernmost limit in the reserves.

Exmouth gulf

Exmouth Gulf is a rich marine environment. It is a resting ground for humpback whales, and important area for dugong and turtles. The mangrove systems on the eastern margins are areas of high primary productivity feeding and are a nursery for fish both within the Gulf and the nearby Ningaloo Reef (Section 6.2.7.7).

The mangroves along the eastern side of the gulf stretch for nearly 50 km. They have been identified by BirdLife International as a 420 km^2 Important Bird Area (IBA) because they support over 1% of the world populations of pied oystercatchers and grey-tailed tattlers, as well as being an important site for the restricted-range dusky gerygone. Another IBA is 11 ha Sunday Island, lying in the north of the Gulf near the Muiron Islands, which is an important nesting site for roseate terns.

Coastline between Dampier Archipelago and Eighty Mile Beach

Tropical macroalgae and seagrass species occur in the shallow waters along this stretch of coastline and are typically associated with areas of outcropping hard substrate and protected soft sediments, respectively. Abundance and biomass typically exhibit strong seasonal trends. Common algae species in the Port Hedland region include tropical genera such as Sargassum, Caulerpa and Halimeda with seagrass including ephemeral Halophila spp (BHPB 2011).

4.2 Intertidal Shoreline Habitats

4.3 Mangroves

Mangroves are recognised as significant as they are productive coastal forest systems, providing habitat and shelter for infauna, epifauna, gastropods, crustaceans, fish and other marine species. Mangroves are important nursery areas for fish, lobster and prawn species, some of which are targeted by recreational and commercial fishers. Mangroves may also provide shelter for other species such as juvenile turtles. Ospreys (*Pandion haliaetus*) and white-bellied sea eagles (*Haliaeetus leucogaster*) roost in mangroves, while a range of smaller birds' nest in them (DEC 2007a). Mangroves are also recognised for their capacity to protect coastal areas from erosion due to storms and storm surge. In WA, mangroves are generally of high conservation significance and are protected throughout under the *Environment Protection and Biodiversity Act 1999* (EPBC Act).

The regional mangroves of mainland and islands from Exmouth to Eighty Mile Beach represent Australia's only 'tropical-arid' mangroves. Within the NWS region, mangroves are present on the Montebello and Lowendal Islands, along the south eastern and southern shores of Barrow Island, in sheltered pockets on the offshore islands of the Dampier Archipelago, along the western side of the Cape Range Peninsula, on the eastern shore of Exmouth Gulf, and in extensive stretches along many creeks and watercourses on the mainland coast. WA does not support any unusual endemic or restricted mangrove species. All mangrove species within WA are common and widespread elsewhere, either in northern Australia, or in the Indo-pacific region proximal to northern Australia.

Dampier Archipelago

Six species of mangrove are found within the Dampier Archipelago/Cape Preston region, these being the white mangrove (*Avicennia marina*), red mangrove (*Rhizophora stylosa*), club mangrove (*Aegialitis annulata*), ribbed fruit orange mangrove (*Brugiera exaristrata*), yellow leaf spurred mangrove (*Ceriops tagal*) and river mangrove (*Aegiceras cornculatum*). Mangrove communities (mangals) account for 3% (~5,950 ha) of the Dampier Archipelago Marine Park and Cape Preston MMA (Figure 4-1). Most of these communities are along the mainland coast on the tidal flats at Regnard Bay, the Maitland River mouth, King Bay and Nickol Bay. Well-developed communities also occur in some of the sheltered bays on the islands, for example at West Intercourse Island, in Searipple Passage and the southern shores of West Lewis and East Lewis islands (CALM 2005b). The mangrove communities at the Fortescue River delta, Cape Preston area, West Intercourse Island, Enderby Island, Searipple Passage/Conzinc Bay and Dixon Island have been assessed by Semeniuk (1997) as having international significance from a biodiversity and ecological basis.

Montebello/ Barrow/ Lowendal Islands

The mangroves of the Montebello Islands (Figure 4-2) are globally significant because they are the world's only mangroves growing in lagoons of offshore islands (Semeniuk 1997). Six species of mangrove are found on the islands: *Avicennia marina*, *Bruguiera exaristata*, *Ceriops tagal*, *Rhizophora stylosa*, *Aegialitis annulata* and *Aegiceras corniculatum*. Mangroves on the Montebello islands occur as isolated trees through to patches of continuous forest, the largest being a 15 ha stand in Stephenson Channel (DEC 2007a).

Within the Lowendal Island group, three species of mangroves are found on Varanus, Abutilon and Bridled Islands. Mangrove distribution within the Lowendals is very restricted, being largely determined by local geomorphology, substrate type, and soil water and groundwater salinity (VCSRG 1988).

On Barrow Island, mangroves are restricted to a few small areas on the east and southern coast at Mattress Point, south of Chevron camp, near the airstrip, at Stokes Point and near Pelican Island on the western side of Bandicoot Bay (Chevron 2008). *Avicennia marina* is the most common species, although *Rhizophora stylosa* is also present. These mangroves are generally poorly developed in comparison to their mainland counterparts and generally occur as a narrow band of stunted trees. Nevertheless, mangroves on Barrow Island are important habitat for many avifauna species, including ospreys and white-bellied sea eagles, and for red fiddler crabs (Uca sp.) at Square Bay (RPS BBG 2005).

Ningaloo Coastline

Three species of mangroves have been identified within Ningaloo Marine Park. The dominant species is the white mangrove (*Avicennia marina*), with the red mangrove (*Rhizophora stylosa*) and the ribbed-orange fruit mangrove (*Bruguiera exaristata*) existing in limited numbers (May et al. 1983). The largest mangrove community (~31 ha), found within Mangrove Bay, is characterised by established trees to 5 m in height. Established mangrove stands can also be found associated with tidal creek systems including a well-developed mangal within Yardie Creek.

Coastline between Dampier Archipelago and Eighty Mile Beach

Mangroves are a common habitat within sheltered areas such as estuaries, tidal creeks and sheltered bays, along the mainland between Dampier Archipelago and Eighty Mile Beach. Seven species of mangrove have been recorded within the Port Hedland Industrial Area, with *Avicennia marina* and *Rhizophora stylosa* being the most abundant (BHPB 2011). *Avicennia marina* is the dominant mangrove within mangrove stands at Eighty Mile Beach.

4.4 Coastal Salt Marsh

Coastal salt marsh is a transitional habitat between land and salty or brackish water (e.g. in bays and estuaries). It is dominated by halophytic (salt tolerant) herbaceous plants (e.g. samphires). In the Port Hedland Industrial Management Unit and surrounding areas, salt marsh habitat commonly replaces mangrove stands with increasing distance from the water line where sediments are drier and more saline (BHPB 2011). Salt marshes are also a feature of the landscape further north, at Eighty Mile Beach. Salt marshes may be inundated by spring high tides and therefore may be exposed to oil spills on spring high tides.

4.5 Sandy Beaches

Sandy beaches are those areas within the intertidal zone in which unconsolidated sediment has been deposited by wave and tidal action. Sandy beaches can vary from low to high energy zones which will influence their profile through varying rates of erosion and accretion. Sandy shorelines are generally interspersed among areas of hard substrate (e.g. sandstone) that form intertidal platforms and rocky outcrops. Sandy beaches provide habitat to a variety of burrowing invertebrates and subsequently provide foraging grounds for shorebirds as well as important habitat for nesting turtles.

Sandy beaches are found throughout the bioregion on both the mainland at Eighty Mile beach, Dampier and Onslow, as well as on many of the numerous islands throughout including Barrow Island, Murion Islands, Thevenard, Serrurier, Dampier Archipelago, Bedout Island, North Turtle Island, and the chain of nearshore islands covered under the Great Sandy Island Nature Reserves. Eighty Mile Beach Marine Park is one of the Australia's largest uninterrupted sandy beaches (stretching 220 km) and is an important feeding ground for small wading birds that migrate to the area each summer, travelling from countries thousands of kilometres away (DEC 2011). It is also a listed Ramsar wetland (see Section 6.2.4).

4.6 Mud Flats

Intertidal mudflats form when fine sediment carried by rivers and the ocean is deposited in a low energy environment. Tidal mudflats are highly productive components of shelf ecosystems responsible for recycling organic matter and nutrients through microbial activity. This microbial activity helps stabilise organic fluxes by reducing seasonal variation in primary productivity which ensures a more constant food supply (Robertson 1988). Intertidal sand and mudflats support a wide range of benthic infauna and epifauna which graze on microscopic algae and microbenthos, such as bivalves, molluscs, polychaete worms and crustaceans (Zell 2007).

The high abundance of invertebrates found in intertidal sand and mudflats provides an important food source for finfish and shellfish which swim over the area at high tide. Mudflats have also been shown to be

significant nursery areas for flatfish. During low tide, these intertidal areas are also important foraging areas for indigenous and migratory shorebirds. Mudflats also play a vital role in protecting shorelines from erosion (Wade and Hickey 2008).

Eighty Mile beach has significant intertidal mudflats that are used by birds in spring and summer including species listed as threatened under the EPBC Act or listed on the IUCN Red List of Threatened Species (2017). The sediments that dominate these flats are generally of terrigenous origin (Wilson 2013).

4.7 Rocky Shorelines

Intertidal platforms are areas of hard bedrock and/or limestone with or without a sediment veneer of varying thickness. These platforms can vary from low to high relief and provide a habitat for a diverse range of intertidal organisms (Morton and Britton in Jones 2004 and Hanley and Morrison 2012) and some species of shore birds (Garnet and Crowley 2000). They are common within each of the coastal bioregions within the area of interest.

Intertidal rock pavement and rocky shores are typically associated with high stress environments, with periods of desiccation, predation and sometimes strong wave energies. The higher tidal ranges and less severe wave action in the north mean that smooth intertidal slopes are not common. Intertidal rock pavement is a significant part of the marine landscape, due to the high biological productivity, and their sediments on the coast through erosion and biological production of material such as shell fragments. Some platforms protect nearshore waters, such as Ningaloo and North-West Cape, which is separated from the coast by shallow water lagoons.

Rocky coasts occur where there is a lack of sandy sediment or where erosion has exposed the underlying rock. Rocky shores can include pebble/cobble, boulders, and rocky limestone cliffs (often at the landward edge of reef platforms). Rocky shorelines are an important foraging area for seabirds and habitat for invertebrates found in the intertidal splash zone (Morton and Britton in Jones 2004). For example, oyster catchers and ruddy turnstones feed along beaches and rocky shorelines.

Rocky shores dominate on most of the Barrow and Montebello islands and provide habitat for a variety of intertidal organisms. CALM (2004) estimated the linear extent of rocky shore habitat in the zone as approximately 63% of the coastline, and a further 11% was categorised as beach interspersed with rocky shore. Rocky shores provide food for shorebirds and are also common within the Dampier Archipelago, notably King and Conzinc Bays, and Angel, Gidley, Enderby and the Lewis Islands.

4.8 Summary of Habitats within the Operational Area and EMBA

Table 4-1 summarises the habitats that may be affected by routine events at the Stag Facility within the Operational Area as well as unplanned events that may arise within a larger EMBA.

Table 4-1: Environmental values and sensitivities for habitats within the Operational Area

Habitats	Environmental value	Sensitivities within the Operational Area	Sensitivities within the EMBA
Subtidal Benthic Habitats			
Soft sediments and benthic fauna	Support a diverse infauna consisting predominantly of mobile burrowing species that include molluscs, crustaceans (crabs, Shrimps and smaller related species), polychaetes, sipunculid and platyhelminth worms,	**Yes –** Soft sediment is the dominant habitat.	**Yes –** Soft sediment is the dominant subtidal habitat throughout the EMBA.

Habitats	Environmental value	Sensitivities within the Operational Area	Sensitivities within the EMBA
	asteroids (sea stars), echinoids (sea urchins) and other small animals. Biological activity occurs throughout the year.		
Hard Coral habitat	Food source for some fish species; Integral source of carbonate sediments; large component of primary productivity and habitat to regional marine ecology Peak coral spawning occurs March–April Coral spawning also occurs October–November.	**No**	**Yes –** Important coral localities: Dampier Archipelago, Ningaloo Reef, Muiron Islands Barrow/ Montebello/Lowendal Island group and Rowley Shoals.
Macroalgae beds	Primary producers; dugong and turtle feeding habitat; support a diverse and abundant fauna of small invertebrates that are the principal food source for many inshore tropical fish species Produce reproductive structures and then senesce each winter (May–September).	**No**	**Yes –** Macroalgal habitat prevalent within shallow waters (photic zone) associated with primarily rocky substrate along the mainland coast and associated with offshore islands.
Seagrasses meadows	Primary producer; dugong feeding habitat Throughout the year they are growing or shedding fronds.	**No**	**Yes –** Seagrasses occur within the photic zone along the Dampier Archipelago, Ningaloo Reef, Muiron Islands Barrow/ Montebello/ Lowendal Island group.
Hard substrates and epiflora/ fauna	Support higher diversity of Epifauna than soft sediment habitats and provide surfaces for attachment of fauna (e.g. hard coral, soft corals, sponges) and macroalgae.	**No**	**Yes –** Hard substrates occur throughout the EMBA. Filter feeding epifauna can occur across a range of depths. Benthic primary production associated with hard substrate restricted to shallow photic zone.
Intertidal Shoreline Habitats			
Mangroves	An important primary producer habitat along shorelines of the Pilbara mainland and islands. Important habitat for birds, molluscs, crustaceans, juvenile fish; bird watching hide. Important for shoreline stabilisation and nutrient recycling.	**No**	**Yes –** Along mainland coastline between Ningaloo coast to Broome; Montebello and Lowendal Islands south eastern and southern shores of Barrow Island and in sheltered pockets on the offshore islands of the Dampier Archipelago and Exmouth Gulf.
Salt marsh	Primary producer habitat commonly occurring landward of mangrove stands. Salt marshes stabilise	**No.**	**Yes –** Can be distributed landward of mangrove habitat in brackish environment. Known

Habitats	Environmental value	Sensitivities within the Operational Area	Sensitivities within the EMBA
	sediments, recycle nutrients and provide habitat for coastal fauna.		occurrence between Port Hedland and Eighty Mile Beach.
Sandy beaches	Shorebird foraging/ breeding habitat; turtle nesting habitat. Crested tern nesting post-wet season; turtle nesting October to February; hatchling emergence November to April.	**No**	**Yes –** Sandy beaches occur throughout the region. Important sites occur on Eighty Mile beach, Dampier and Onslow, as well as on many of the numerous islands including Barrow Island, Murion Islands, Thevenard, Serrurier, Dampier Archipelago, Bedout Island, North Turtle Island.
Mud/sand flats	Support a diverse assemblage of vertebrates and invertebrates, macroalgae and seagrass. Biological activity occurs throughout the year.	**No**	**Yes –** Found throughout the EMBA. Important site is Eighty-Mile Beach which is a Ramsar site important for migratory shorebirds.
Rocky shorelines	Foraging area for shorebirds. Invertebrates found in the vertical splash zone; roosting areas for seabirds. Biological activity occurs throughout the year.	**No**	**Yes –** Found throughout the EMBA including Ningaloo Coast, Muiron Islands, Montebello/ Barrow/ Lowendal Islands and Dampier Archipelago.

5. MARINE FAUNA

Fauna that may be present within the EMBA for the activity include plankton, invertebrates, fish, marine mammals, marine reptiles and seabirds.

5.1 Plankton

Plankton is divided into two categories: phytoplankton and zooplankton. Phytoplanktonic algae are important primary producers and range in size from 0.2–200 mm. Zooplankton are small, mostly microscopic animals that drift with the ocean currents, and it has been estimated that 80% of the zooplankton in waters off Australian continental shelf and shelf margin are the larval stages of fauna that normally live on the seabed (Raymont 1983). A common feature of plankton populations is the high degree of temporal and spatial variability. Phytoplankton in tropical regions have marked seasonal cycles with higher concentrations occurring during the winter months (June–August) and low in summer months (December–March) (Hayes et al. 2005; Schroeder et al. 2009). Zooplankton rely on phytoplankton as food and are subject to similar seasonality.

5.2 Invertebrates

Pelagic invertebrates other than zooplankton include mobile cnidarians (jellyfish), salps and squid. Larger marine fauna such as leatherback turtles may consume jellyfish, whereas fish and large mammals such as dolphins and whales generally consume squid.

The mostly sandy substrates within the North-west Marine Bioregion are thought to support low densities of benthic communities, such as bryozoans, molluscs and echinoids (DEWHA 2008a). In areas of harder substrates, sponge communities are sparsely distributed.

Apache sampled the biota surrounding the location of the Stag Facility and loadout location prior to development drilling of this Facility, to provide a baseline for comparison to the post-development and post-commissioning situation (Kinhill 1997, 1998). Sampling confirmed that the benthic biota within the vicinity of Stag Field was comparable to that found over similar substratum and at similar depths over the wider region (Ward and Rainer 1988; Woodside 1988; Rainer 1991). The unconsolidated sediments in this habitat support a diverse infauna, consisting predominantly of mobile burrowing species such as crustaceans (crabs, shrimps and smaller related species), polychaete, sipunculid and platyhelminth worms, asteroids (sea stars), echinoids (sea urchins), and other small infaunal animals.

The abundance and composition of this infauna is variable over both space and time (Ward and Rainer 1988; Rainer 1991; Kinhill 1997). Differences between locations are related to such factors as depth and seafloor texture while changes over time within a location may be related to changes in the physical environment, such as water temperature or wave-induced currents. Ward and Rainer (1988) reported a seasonal pattern in the abundance of small species of decapod crustaceans in this region. However, because they only sampled at two times, it is not clear if this pattern was related to season or to other factors, such as storm events, which operate at much shorter time scales. By comparison to the infauna, the diversity and abundance of large encrusting animal species (epibenthic fauna) in this region is relatively low (Ward and Rainer 1988; Woodside 1988; Kinhill 1997). This is probably due to instability of the sediment and the lack of exposed and colonisable reef.

5.3 Fish

The NWMR supports large populations of cartilaginous fishes (such as sharks and rays), that are typically higher-order predators and perform an important ecological role through the regulation of prey species. The NWMR contains 157 chondrichthyan species (sharks, skates and rays), 18 of which are endemic. This includes 94 shark species, many of which are found in other parts of Australia, and which represent approximately 19% of the world's shark species (Heupel and McAuley 2007). Sharks, skates and rays occupy a broad range of habitats, from shallow to deep-water, with some species being pelagic.

Large pelagic fish such as tuna, mackerel, swordfish, sailfish and marlin are another important component of the ecosystem and are found mainly in oceanic waters and occasionally on the continental shelf (Brewer et al. 2007). Both juvenile and adult phases of the large pelagic species are highly mobile and have wide geographic distributions, although the juveniles more frequently inhabit warmer or coastal waters (DEWHA 2008a).

The demersal habitat of the NWS hosts a diverse assemblage of fish of tropical Indo-west Pacific affinity, with up to 1,400 species known to occur – many in shallow coastal waters (Allen et al. 1988). Last et al. (2005) described the North-west Shelf Province as being characterised by a high level of endemism and species diversity. Many of these fish species are commercially exploited by trawl and trap fisheries, for example the genera Lethrinus (emperor) and Lutjanus (snapper) (Sainsbury et al. 1985).

Within the southern portion of the North-west Shelf Province, small pelagic fish (e.g. lantern fishes) comprise a third of the total fish biomass (Bulman 2006), and play an important ecological role, not only for this particular area but for the entire NWMR. They inhabit a range of marine environments, including inshore and continental shelf waters and form a vital link within and between many of the region's trophic systems, feeding on pelagic phytoplankton and zooplankton and providing a food source for a wide variety of predators including large pelagic fish, sharks, seabirds and marine mammals (Mackie et al. 2007).

The shallow waters (<30 m) of the Dampier Archipelago support a characteristic and rich fish fauna of 650 species from a variety of habitats including coral and rocky reefs, mangroves, sand and silty bottoms and sponge gardens (Hutchins 2004). The majority of these species were found over hard substrate, but significant numbers were also found from soft bottom and mangrove areas. The outer islands of the Archipelago are inhabited predominantly by coral reef fishes whereas inner areas close to the mainland are occupied by mangrove and silty-bottom dwellers. The inter-island passages have a relatively rich soft bottom fauna. The fish fauna of the archipelago is less diverse that the islands of the West Pilbara to the south but are closely related to the fauna at the offshore Montebello Islands (Hutchins 2004). EPBC Act protected fish species within the Dampier Archipelago include the dwarf sawfish (*Pristis clavata*).

The Glomar Shoals, approximately 70 km north-east of the Stag Facility (Section 6.2.6), have been identified as a Key Ecological Feature (KEF) of the North-west Marine Bioregion (Falkner et al. 2009). The area is known to be an important for a number of commercial and recreational fish species such as rankin cod, brown striped snapper, red emperor, crimson snapper, bream and yellow-spotted triggerfish (Brewer et al. 2007; Falkner et al. 2009; Fletcher and Santoro 2012). Catch rates at the Glomar Shoals are high, indicating that it is an area of high productivity.

Continental Slope Demersal Fish Communities have also been identified as a KEF within the Stag Facility EMBA (Section 6.2.6) which are located 110 km NW of the Stag Facility. This KEF represents the continental slope between North-West Cape and the Montebello Trough, which supports more than 500 fish species, 76 of which are endemic, making it the most diverse slope bioregion in Australia. The slope of the Timor Province and the Northwest Transition also contains more than 500 species of demersal fish, of which 64 are considered to be endemic, and is the second richest area for demersal fish species across the entire Australian continental slope.

Similar to that of the Stag Facility and surrounds, the fish fauna of Barrow/Lowendal/Montebello Islands are widespread throughout the Indo-west Pacific region, but also include species protected by legislation. Protected species within the Barrow/Lowendal/Montebello Islands include the whale shark (Rhincodon typus), great white shark (Carcharodon carcharias) and grey nurse shark (Carcharias taurus).

The warm waters of the NWS are thought to be the location of spawning for some fish species. Some fish species are likely to be more susceptible than others to impact due to their physical characteristics (e.g. size, ability to move quickly) and behaviours (e.g. schooling, spawning aggregations). The life stage (i.e. egg, larvae, juvenile, adult) of a fish is also likely to influence its susceptibility to impacts. A summary of key species likely to spawn in the EMBA (provided in previous correspondence with DoF 2013) can be found in Table 5-1.

Table 5-1: Spawning dates for key fish species

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Blacktip shark (*Carcharhinus tilstoni* and *C. limbatus*)											■	■
Goldband snapper (*Pristipomoides multidens*)	■	■	■	■								
Rankin cod (*Epinephelus multiinotatus*)								■	■	■		
Red Emperor (*Lutjanus sebae*)	■		■							■		
Sandbar shark (*Carcharhinus plumbeus*)	■									■	■	■
Spanish mackerel (*Scomberomorus commerson*)								■	■	■	■	
Pink snapper (*Pagrus auratus*)					■	■	■	■				
Baldchin groper (*Choerodon rubescens*)	■								■	■	■	■
Crystal (snow) crab (*Chaceon* spp.) Gascoyne	■	■	■	■	■	■	■	■	■	■	■	■
Champagne (spiny) crab (*Hypothalassia acerba*)			■	■	■							

5.4 Crustaceans

The NWMR is thought to contain a high diversity of crustaceans across a range of habitats, from intertidal sites to the deeper waters of the slope and the abyss. Dominant species groups include copepods, prawns, scampi and crabs. These groups display a strong biogeographic affinity with the Indo-west Pacific, with few endemic species present. As well as being preyed upon by large pelagic fish, crustaceans are also a significant food for cephalopods (squid and octopus species; DEWHA 2008a). The North-West Slope Trawl Fishery (NWSTF) targets scampi in the NWMR. Data from the fishery suggests that muddy sediments support significant populations of crustaceans (AFMA 2023).

5.5 Cephalopods

Approximately 81 different species of cephalopod are believed to occur in the NWMR, five of which may be endemic as they have only been recorded from one location or are thought to have a very restricted distribution (DEWHA 2008a). The area between Kalbarri and the Dampier Archipelago appears to be particularly significant for octopus, dumpling squids and several species of cuttlefish (DEWHA 2008a). Squid are an important food item for a number of species in the NWMR. Sperm whales, for example, feed exclusively on the Japanese flying squid (*Todarodes pacificus*) and sharpear enope squid (*Ancistrocheirus lesueurii*), while seabirds (such as black noddies and red-footed boobies) feed on the purple back flying squid (*Sthenoteuthis oualaniensis*; DEWHA 2008a).

Information on species listed under the EPBC Act such as sharks, turtles, cetaceans and avifauna are covered in Section 6.1. Table 6-1 and Table 6-5 summarises the fauna that may be affected by routine events at the Stag Facility within the Operational Area as well as unplanned events that may arise within a larger EMBA.

6. CONSERVATION VALUES AND SENSITIVITIES

Conservation values and sensitivities listed and protected under the EPBC Act include Matters of Environmental Significance (MNES) and Other Protected Matters. MNES occurring, or potentially occurring, in the EMBAs are described below in Sections 6.1 and 6.2. The full EPBC Act Protected Matters report is provided at the end of this document.

6.1 Protected Species

The EPBC Act lists both threatened and migratory species that are protected under Commonwealth legislation and various international conventions and treaties.

A search of the DCCEEW, Protected Matters Search Tool (PMST) was undertaken in August 2024 (at the end of this document) identified 65 threatened species (endangered, vulnerable, and critically endangered) as occurring or having habitat within the EMBA (Table 6-1). Fifteen of these threatened species are terrestrial and have been excluded as it is unlikely that they would be impacted from an oil spill associated with the activity.

The relevant sections of this document discuss the likelihood of these species and their biologically important areas occurring within the Operational Area and EMBA. Those species that have been identified as likely to be present in the Operational Area and EMBA are summarised in Table 6-1 and further detailed below.

The PMST and the Australian Marine Spatial Information System (AMSIS) (Geoscience Australia (2023)) provide data on BIAs located in the OA and EMBA. BIAs such as an aggregation, resting, nesting or feeding areas or known migratory routes for these species are shown in Table 6-2 and Figure 6-1 to Figure 6-11.

The requirements of the species recovery plans and conservation advices are considered to identify any requirements that may be applicable to the risk assessment. Recovery plans, conservation advice, management plans and threat abatement plans relevant to species that occur or may occur within the Operational Area and EMBA are detailed in the EP.

No listed threatened ecological communities were identified within the EMBA. Further detail on species identified as threatened or migratory is presented in the following sections. A full PMST search that includes additional listed species that are not classified as threatened or migratory under the EPBC Act but are considered ‘Other matters protected by the EPBC Act’ is provided at the end of the document. This list comprises additional cetaceans, birds, fish (pipefish, pipehorses and seahorses) and reptiles (sea snakes).

Table 6-1: Marine fauna and management considerations in the Operational Area and EMBA

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
Fish and Sharks	Grey nurse shark (west coast population)	*Carcharias taurus*	V	No	Yes	Marine debris[1]	Not relevant to EMBA	Yes	Yes	**Planned Events:** Light Emissions Noise Emissions Operational Discharges Drilling Discharges Physical disturbance Spill Response Activities **Unplanned Events (all)**
	Great white shark	*Carcharodon carcharias*	V; M	No	Yes	No	Not relevant to EMBA	Yes	Yes	
	Dwarf sawfish	*Pristis clavata*	V; M	Yes	Yes	No	EMBA	Yes	Yes	
	Freshwater/ Largetooth sawfish	*Pristis pristis*	V; M	Yes	Yes	No	EMBA	Yes	Yes	
	Green sawfish	*Pristis zijsron*	V; M	Yes	Yes	No	EMBA	Yes	Yes	
	Whale shark	*Rhincodon typus*	V; M	Yes	No	No	EMBA	Yes	Yes	
	Scalloped Hammerhead	*Sphyrna lewini*	CD	No	No	No	None	Yes	Yes	
	Little Gulper Shark	*Centrophorus uyato*	CD	No	No	No	None	No	Yes	
	Blind Gudgeon	*Milyeringa veritas*	V	Yes	No	No	None	No	Yes	
	Blind Cave Eel	*Ophisternon candidum*	V	Yes	No	No	None	No	Yes	
	Narrow sawfish	*Anoxypristis cuspidata*	M	No	No	No	None	Yes	Yes	

[1] Threat abatement plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (DoEE 2018)

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Oceanic Whitetip Shark	*Carcharhinus longimanus*	M	No	No	No	None	Yes	Yes	
	Reef Manta Ray	*Manta alfredi*	M	No	No	No	None	Yes	Yes	
	Giant Manta Ray	*Manta birostris*	M	No	No	No	None	Yes	Yes	
	Shortfin mako	*Isurus oxyrinchus*	M	No	No	No	None	No	Yes	
	Longfin mako	*Isurus paucus*	M	No	No	No	None	No	Yes	
	Porbeagle mackerel shark	*Lamna nasus*	M	No	No	No	None	No	Yes	
Marine mammals	Blue whale	*Balaenoptera musculus*	E; M	No	Yes	Marine debris	EMBA	Yes	Yes	**Planned Events:** Light Emissions Noise Emissions Operational Discharges Drilling Discharges Physical disturbance Spill Response Activities **Unplanned Events (all)**
	Bryde's whale	*Balaenoptera edeni*	M	No	No	Marine debris	None	Yes	Yes	
	Humpback whale	*Megaptera novaeangliae*	M	No	No	Marine debris	OA and EMBA	Yes	Yes	
	Australian Snubfin Dolphin	*Orcaella heinsohni*	M	No	No	No	Not relevant to EMBA	Yes	Yes	
	Killer whale	*Orcinus orca*	M	No	No	Marine debris	None	Yes	Yes	
	Australian Humpback Dolphin (also known as *Sousa chinensis)*	*Sousa sahulensis*	M	No	No	No	Not relevant to EMBA	Yes	Yes	
	Spotted bottlenose dolphin (Arafura/Timor Sea populations)	*Tursiops aduncus*	M	No	No	Marine debris	Not relevant to EMBA	Yes	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Sei whale	*Balaenoptera borealis*	V; M	Yes	No	Marine debris	None	No	Yes	**Unplanned Events:** Unplanned release of Stag crude Oil Unplanned release of marine diesel
	Fin whale	*Balaenoptera physalus*	V; M	Yes	No	Marine debris	None	No	Yes	
	Southern right whale	*Eubalaena australis*	E; M	No	Yes	Marine debris	EMBA	No	Yes	
	Antarctic minke whale	*Balaenoptera bonaerensis*	M	No	No	Marine debris	None	No	Yes	
	Dugong	*Dugong dugon*	M	No	No	Marine debris	EMBA	No	Yes	
	Sperm whale	*Physeter macrocephalus*	M	No	No	No	Not relevant to EMBA	No	Yes	
Marine reptiles	Loggerhead turtle	*Caretta caretta*	E; M	No	Yes	Marine debris	EMBA	Yes	Yes	**Planned Events:** Light Emissions Noise Emissions Operational Discharges Drilling Discharges Physical disturbance Spill Response Activities **Unplanned Events (all)**
	Green turtle	*Chelonia mydas*	V; M	No	Yes	Marine debris	EMBA	Yes	Yes	
	Leatherback turtle	*Dermochelys coriacea*	E; M	Yes	Yes	Marine debris	Not relevant to EMBA	Yes	Yes	
	Hawksbill turtle	*Eretmochelys imbricata*	V; M	No	Yes	Marine debris	EMBA	Yes	Yes	
	Flatback turtle	*Natator depressus*	V; M	No	Yes	Marine debris	OA and EMBA	Yes	Yes	
	Short-nosed seasnake	*Aipysurus apraefrontalis*	CE	Yes	No	No	None	No	Yes	**Unplanned Events:**

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Leaf- scaled seasnake	*Aipysurus foliosquama*	CE	Yes	No	No	None	No	Yes	Unplanned release of Stag crude Oil Unplanned release of marine diesel
	Salt-water crocodile	*Crocodylus porosus*	M	No	No	No	None	Yes	Yes	
Birds	Curlew Sandpiper	*Calidris ferruginea*	CE; Mw	Yes	No	No	None	Yes	Yes	**Planned Events:** Light Emissions Atmospheric emissions Operational Discharges Drilling Discharges Physical disturbance Spill Response Activities **Unplanned Events (all)**
	Eastern Curlew	*Numenius madagascariensis*	CE; Mw	Yes	No	No	None	Yes	Yes	
	Red Knot	*Calidris canutus*	V; Mw	Yes	No	No	None	Yes	Yes	
	Southern giant-petrel	*Macronectes giganteus*	E; M	No	Yes	Marine Debris Bycatch	Not relevant to EMBA	Yes	Yes	
	Christmas Island White- tailed tropicbird	*Phaethon lepturus fulvus*	E	Yes	No	No	None	Yes	Yes	
	Red-tailed tropicbird	*Phaethon rubricauda westralis*	E	No	No	No	Not relevant to EMBA	Yes	Yes	
	Australian fairy tern	*Sternula nereis nereis*	V	Yes	No	No	EMBA	Yes	Yes	
	Common sandpiper	*Actitis hypoleucos*	Mw	No	No	No	None	Yes	Yes	
	Common noddy	*Anous stolidus*	M	No	No	No	Not relevant to EMBA	Yes	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Sharp-tailed sandpiper	*Calidris acuminata*	V; Mw	Yes	No	No	None	Yes	Yes	
	Pectoral Sandpiper	*Calidris melanotos*	Mw	No	No	No	None	Yes	Yes	
	Streaked shearwater	*Calonectris leucomelas*	M	No	No	No	None	Yes	Yes	
	Lesser frigatebird	*Fregata ariel*	M	No	No	No	EMBA	Yes	Yes	
	White-tailed tropicbird	*Phaethon lepturus*	M	No	No	No	EMBA	Yes	Yes	
	Ruddy turnstone	*Arenaria interpres*	V; Mw	Yes	No	No	None	No	Yes	
	Great Knot	*Calidris tenuirostris*	V; Mw	Yes	No	No	None	No	Yes	**Unplanned Events:** Unplanned release of Stag crude Oil Unplanned release of marine diesel
	Greater Sand Plover	*Charadrius leschenaultii*	V; Mw	Yes	No	No	None	No	Yes	
	Lesser Sand Plover	*Charadrius mongolus*	E; Mw	Yes	No	No	None	No	Yes	
	Red Goshawk	*Erythrotriorchis radiatus*	E	Yes	Yes	No	None	No	Yes	
	Northern Siberian Bar-tailed Godwit (menzbieri)	*Limosa lapponica menzbieri*	E	Yes	No	No	None	No	Yes	
	Black-tailed godwit	*Limosa limosa*	E; Mw	Yes	No	No	None	No	Yes	
	Asian Dowitcher	*Limnodromus semipalmatus*	V; Mw	Yes	No	No	None	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Northern Giant Petrel	*Macronectes halli*	V; M	No	Yes	Marine Debris Bycatch	Not relevant to EMBA	No	Yes	
	White- winged Fairy wren	*Malurus leucopterus edouardi*	V	Yes	No	No	No	No	Yes	
	Abbott's Booby	*Papasula abbotti*	E	Yes	No	No	None	No	Yes	
	Soft-plumaged petrel	*Pterodroma mollis*	V	Yes	No	No	Not relevant to EMBA	No	Yes	
	Grey Plover	*Pluvialis squatarola*	V; Mw	Yes	No	No	None	No	Yes	
	Australian painted snipe	*Rostratula australis*	E	Yes	No	No	None	No	Yes	
	Roseate tern	Sterna dougallii	M	No	No	No	EMBA	No	Yes	
	Indian Yellow-nosed Albatross	*Thalassarche carteri*	V; M	No	Yes	Marine Debris Bycatch	Not relevant to EMBA	No	Yes	
	Shy Albatross	*Thalassarche cauta*	E; M	Yes	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	
	Campbell Albatross	*Thalassarche impavida*	V; M	No	Yes	Bycatch	Not relevant to EMBA	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Black-browed Albatross	*Thalassarche melanophris*	V; M	No	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	
	Common Greenshank	*Tringa nebularia*	E; Mw	Yes	No	No	None	No	Yes	
	Terek Sandpiper	*Xenus cinereus*	V; Mw	Yes	No	No	None	No	Yes	
	Fork-tailed swift	*Apus pacificus*	M	No	No	No	None	No	Yes	
	White-capped Albatross	*Thalassarche steadi*	V; M	No	Yes	Bycatch Marine Debris	Not relevant to EMBA	No	Yes	
	Flesh-footed Shearwater	*Ardenna carneipes*	M	No	No	Marine debris Bycatch	Not relevant to EMBA	No	Yes	
	Wedge-tailed shearwater	*Ardenna pacifica*	M	No	No	Marine debris Bycatch	OA and EMBA	No	Yes	
	Great frigatebird	*Fregata minor*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Caspian tern	*Hydroprogne caspia*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Bridled tern	*Onychoprion anaethetus*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Little tern	*Sternula albifrons*	M	No	No	No	EMBA	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Masked booby	*Sula dactylatra*	M	No	No	No	Not relevant to EMBA	No	Yes	
	Brown booby	*Sula leucogaster*	M	No	No	Marine debris	EMBA	No	Yes	
	Sanderling	*Calidris alba*	Mw	No	No	No	None	No	Yes	
	Red-necked Stint	*Calidris ruficollis*	Mw	No	No	No	None	No	Yes	
	Oriental Plover	*Charadrius veredus*	Mw	No	No	No	None	No	Yes	
	Swinhoe's snipe	*Gallinago megala*	Mw	No	No	No	None	No	Yes	
	Pin-tailed snipe	*Gallinago stenura*	Mw	No	No	No	None	No	Yes	
	Oriental Pratincole	*Glareola maldivarum*	Mw	No	No	No	None	No	Yes	
	Broad-billed Sandpiper	*Limicola falcinellus*	Mw	No	No	No	None	No	Yes	
	Bar-Tailed Godwit	*Limosa lapponica*	Mw	No	No	No	None	No	Yes	
	Little Curlew	*Numenius minutus*	Mw	No	No	No	None	No	Yes	
	Whimbrel	*Numenius phaeopus*	Mw	No	No	No	None	No	Yes	
	Osprey	*Pandion haliaetus*	Mw	No	No	No	None	No	Yes	
	Ruff	*Philomachus pugnax*	Mw	No	No	No	None	No	Yes	
	Pacific Golden Plover	*Pluvialis fulva*	Mw	No	No	No	None	No	Yes	
	Greater Crested Tern	*Thalasseus bergii*	Mw	No	No	No	None	No	Yes	

Class	Common name	Scientific name	EPBC Act status	Cons Advice	Recovery Plan	Relevant Threat Abatement Plan	BIA	Operational Area presence	EMBA presence	Relevant hazard
	Lesser Crested Tern[2]	*Thalasseus bengalensis*	M	No	No	No	EMBA	No	Yes	
	Grey- tailed Tattler	*Tringa brevipes*	Mw	No	No	No	None	No	Yes	
	Marsh Sandpiper	*Tringa stagnatilis*	Mw	No	No	No	None	No	Yes	
	Common Redshank	*Tringa totanus*	Mw	No	No	No	None	No	Yes	

Key EPBC Act; V = vulnerable; OPF = Other Protected Fauna; CE = Critically Endangered; P1 = Priority Flora and Fauna List; M = Migratory marine; Mw = Migratory wetland; S = Schedule; LC = Least concern ; CD = Conservation Dependant

[2] Lesser Crested Tern did not show up in the PMST search for Migratory species. It does, however, have a Breeding BIA located within the EMBA so it is assumed to be present in the EMBA.

Table 6-2: BIAs located within the EMBA

Class	Common name	Scientific name	BIA Area	Overlaps Operational Area	Overlaps EMBA
Sharks and Fish	Dwarf sawfish	*Pristis clavata*	Foraging	✗	✓
			Nursing	✗	✓
			Pupping	✗	✓
	Green sawfish	*Pristis zijsron*	Foraging	✗	✓
			Nursing	✗	✓
			Pupping	✗	✓
	Freshwater/ Largetooth sawfish	*Pristis pristis*	Foraging	✗	✓
			Pupping	✗	✓
	Whale shark	*Rhincodon typus*	Foraging	✗	✓
			Foraging (High Density)	✗	✓
Marine mammals	Pygmy Blue whale	*Balaenoptera musculus brevicauda*			
			Foraging	✗	✓
			Migration	✗	✓
	Humpback whale	*Megaptera novaeangliae*	Migration (north and south)	✓	✓
	Dugong	*Dugong dugon*	Breeding	✗	✓
			Calving	✗	✓
			High Density foraging (seagrass beds)	✗	✓
			Nursing	✗	✓
	Southern Right Whale	*Eubalena australis*	Reproduction (May to September)	✗	✓
			Migration (April to October	✗	✓
			Habitat critical to the survival	✗	✓
Turtles	Loggerhead turtle	*Caretta caretta*	Foraging	✗	✓
			Internesting Buffer	✗	✓
			Nesting	✗	✓

Class	Common name	Scientific name	BIA Area	Overlaps Operational Area	Overlaps EMBA
			Habitat critical to the survival (nesting)	✗	✓
	Green turtle	*Chelonia mydas*	Aggregation	✗	✓
			Basking	✗	✓
			Foraging	✗	✓
			Internesting	✗	✓
			Internesting Buffer	✗	✓
			Mating	✗	✓
			Migration Corridor	✗	✓
			Nesting	✗	✓
			Habitat critical to the survival (nesting)	✗	✓
	Hawksbill turtle	*Eretmochelys imbricata*	Foraging	✗	✓
			Internesting	✗	✓
			Internesting buffer	✗	✓
			Mating	✗	✓
			Migration corridor	✗	✓
			Nesting	✗	✓
			Habitat critical to the survival (nesting)	✗	✓
	Flatback turtle	*Natator depressus*	Aggregation	✗	✓
			Foraging	✗	✓
			Internesting	✗	✓
			Internesting Buffer	✓	✓
			Mating	✗	✓
			Migration corridor	✗	✓
			Nesting	✗	✓

Class	Common name	Scientific name	BIA Area	Overlaps Operational Area	Overlaps EMBA
			Habitat critical to the survival (nesting)	✓	✓
Seabirds	Wedge-tailed shearwater	*Ardenna pacificus*	Breeding	✓	✓
	Lesser frigatebird	*Fregata ariel*	Breeding	✗	✓
	White-tailed tropicbird	*Phaethon lepturus*	Breeding	✗	✓
	Roseate tern	*Sterna dougallii*	Breeding	✗	✓
	Fairy tern	*Sternula nereis*	Breeding	✗	✓
	Brown booby	*Sula leucogaster*	Breeding	✗	✓
	Lesser Crested Tern	*Thalasseus bengalensis*	Breeding	✗	✓
	Little Tern	*Sterna albifrons*	Breeding	✗	✓

6.1.1 Fish, Sharks and Rays

Seventeen species of EPBC listed fish, shark and rays have been identified as potentially occurring within the EMBA. Of these, four species have a BIA that overlaps with the EMBA including the whale shark, green, dwarf and freshwater sawfishes (Figure 6-1 and Table 6-2).

Grey Nurse Shark

The Grey nurse shark (*Carcharias taurus*) is listed as vulnerable under the EPBC Act. In Australia, the grey nurse shark has an inshore coastal distribution primarily in sub-tropical to cool temperate waters on the continental shelf. There are two separate, genetically distinct grey nurse shark populations in Australian waters—one on the east coast and one on the west coast (Stow et al. 2006 as cited in CoA 2014). The range of the west coast population is not well known; however, records indicate that the species is widely distributed from the NWS (including coastal waters in Exmouth Gulf), south to the Great Australian Bight (CoA 2014).

It is thought that individuals have a high degree of site fidelity, although some studies have suggested that the species exhibits some migratory characteristics moving between different habitats and localities (McAuley 2004).

Grey Nurse Sharks are often observed aggregating above the seabed (at depths 10–40 m) near deep sandy-bottomed gutters or rocky caves in the vicinity of inshore rocky reefs and islands (CoA 2014). Grey nurse sharks have also been recorded in the surf zone, around coral reefs, and to depths of around 200 m on the continental shelf (Pollard et al. 1996). No key aggregation sites have been identified in WA waters.

As outlined in the Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) 2014 (DoE 2014a), the principal current threats to the grey nurse shark in Australia are:

- Mortality related to incidental capture by commercial and recreational fisheries
- Mortality related to shark control activities such as beach meshing or drum lining.

Although individuals may be present in the EMBA, based on their distribution it is likely limited to individuals only.

Great White Shark

The great white shark (Carcharodon carcharias) is listed as vulnerable under the EPBC Act and may occur within the spill trajectory area as they are known to prey on humpback whales and have been recorded in NWS waters during humpback migrations. Study into great white shark populations is difficult (Cailliet 1996) given the uncertainty about their movements, emigration, immigration and difficulty in estimating the rates of natural or fishing mortality. In Australia, great white sharks have been recorded from central Queensland around the south coast to north-west WA but may occur further north on both coasts (Last and Stevens 2009). They are widely but not evenly distributed in Australian waters and is considered uncommon to rare compared to most other large sharks (CITES 2004). Great white sharks can be found from close inshore around rocky reefs, surf beaches and shallow coastal bays to outer continental shelf and slope areas (Pogonoski et al. 2002). They also make open ocean excursions and can cross ocean basins (for instance from South Africa to the western coast of Australia and from the eastern coast of Australia to New Zealand). Great white sharks are often found in regions with high prey density, such as pinniped colonies (DEWHA 2009).

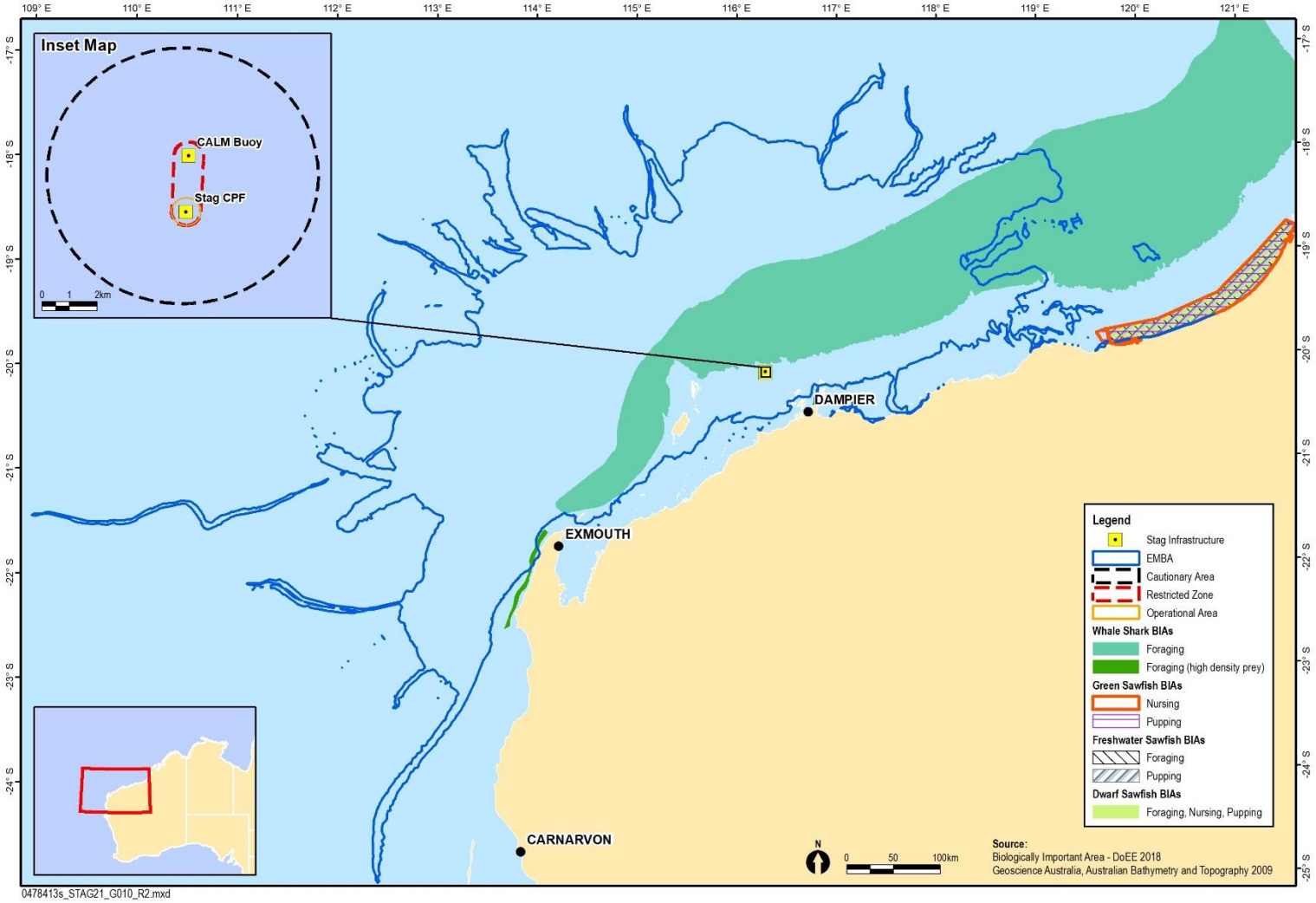

Figure 6-1: BIAs for sharks and fish within the EMBA

Dwarf Sawfish

The dwarf sawfish (Pristis clavata) is listed as vulnerable under the EPBC Act. The Australian distribution of the dwarf sawfish is considered to extend across northern Australia and along the Kimberley and Pilbara coasts (Last and Stevens 2009). The majority of records of dwarf sawfish in WA have come from shallow estuarine waters of the Kimberley region which are believed to be nursery areas, with immature juveniles remaining in these areas up until three years of age (Thorburn et al. 2004). Sawfish regularly use the tidal creeks and mangrove areas of Roebuck Bay, within the EMBA, for breeding and refuge (Bennelongia 2009). The updated sawfish recovery plan (DoE 2015a) indicates where pupping is known and likely to occur along the Pilbara coastline, with main areas within the EMBA being along Eighty Mile Beach. A foraging, pupping and nursing BIA overlaps the EMBA (Figure 6-1 and Table 6-2). Similarly, the Recovery Plan indicates that adults are known to occur along the coast north of Exmouth and within the EMBA and operational area.

Freshwater and Green Sawfish

In Australian waters, green sawfish have historically been recorded in the coastal waters off Broome, Western Australia, around northern Australia and down the east coast as far as Jervis Bay, NSW (Stevens et al. 2005). Important areas for freshwater sawfishes include King Sound, and the Fitzroy, Durack, Robinson and Ord rivers. Both species are wider ranging than the dwarf sawfish.

Sawfishes generally inhabit inshore coastal, estuarine and riverine environments. The freshwater sawfish has been recorded in north-west Australia from rivers (including isolated water holes), estuaries and marine environments (Stevens et al. 2005). Newborns and juveniles primarily occur in the freshwater reaches of rivers and in estuaries, while most adult freshwater sawfish have been recorded in marine and estuarine environments (Peverell 2005, Thorburn et al. 2007). It is believed that mature freshwater sawfish enter less saline waters during the wet season to give birth (Peverell 2005) and freshwater river reaches play an important role as nursery areas (DoE 2015a).

The green sawfish inhabits muddy bottom habitats and enters estuaries (Allen 1997; Stead 1963). It has been recorded in inshore marine waters, estuaries, river mouths, embankments and along sandy and muddy beaches (Peverell et al. 2004; Stevens et al. 2005; Thorburn et al. 2004). Stead (1963) reported that this species was frequently found in shallow water. Green sawfish have been recorded in very shallow water (<1 m) to offshore trawl grounds in over 70 m of water (Stevens et al. 2005).

Smaller specimens (<2.5 m in length) are more common in foreshore and offshore coastal waters (Thorburn et al. 2004), as well as estuaries and river mouths at slightly reduced salinities, but do not venture into freshwater. Larger individuals (>2.5 m in length) are found in both inshore and offshore waters.

The updated sawfish recovery plan (DoE 2015a) indicates where pupping is known and likely to occur along the Pilbara coastline, with main areas within the EMBA being along Eighty Mile Beach. There is an identified foraging, nursing and pupping BIA for the Green Sawfish and a foraging and pupping BIA for the Freshwater Sawfish (Figure 6-1 and Table 6-2). Similarly, the Recovery Plan indicates that adults are known to occur along the coast north of Exmouth within the EMBA and operational area.

Principal threats to sawfish species are fishing activities (by-catch, traditional or illegal fishing) and habitat degradations or modification.

Whale Shark

The whale shark (*Rhincodon typus*) is listed as Vulnerable under the EPBC Act and is an oceanic and coastal, pelagic fish, generally found in tropical areas where the surface temperature is 21–25 °C. It is a filter feeder and, commonly ranges in size from 4–10 m (Colman 1997). This species was listed as Vulnerable under the EPBC Act in 2001 and is also classified as Vulnerable on the World Conservation Union's Red List of Threatened Species (IUCN 2012). In WA, whale sharks are protected under the *Environment Protection and Biodiversity Protection Act 1999,* the *Conservation and Land Management Act 1984* and the *Fish Resources Management Act 1994*.

There is a general lack of knowledge on many aspects of whale shark biology, including definitive migration patterns. They are normally oceanic and cosmopolitan in their distribution and are known to aggregate in the reef front waters adjacent to the Ningaloo Reef between March to June (Colman 1997; Wilson et al. 2006) with the highest frequency of sightings occurring in April (Wilson et al. 2001). However, the season is variable and individual whale sharks have been recorded at other times of the year. The EMBA overlaps a foraging and high density foraging BIA (Figure 6-1 and Table 6-2), While the species spends the majority of its time in deeper water, it is also encountered close to or at the surface.

Whale shark presence coincides with the coral mass spawning period, when there is an abundance of food (krill, planktonic larvae and schools of small fish) in the waters adjacent to the reef. Estimates of the size of the population participating in the Ningaloo aggregation are between 300 and 500 individuals (Meekan et al. 2006).

Preliminary research on the migration patterns of whale sharks in the western Indian Ocean, and isolated and infrequent observations of individuals, indicate that a small number of the WA population migrate through the NWMR. Wilson et al. (2006) tagged 19 whale sharks in 2003 and 2004, with long-term movements patterns successfully recorded from six individuals. All travelled north-east into the Indian Ocean after departing Ningaloo Reef, with one tracked to Ashmore Reef and another to Scott Reef.

The most significant threat to whale sharks is intentional and unintentional mortality from fishing outside of Australian waters. In Australian waters, threats to the recovery of the species include boat strike from large vessels and habitat disruption from mineral exploration, production and transportation. Other lesser threats include disturbance from domestic tourism operations, marine debris and climate change.

Ongoing threats to whale sharks, together with life history characteristics; including slow growth, late maturation and extended longevity (Colman 1997); means the whale shark remains susceptible to declines across its international range.

Manta Rays

The giant and reef manta rays can be found throughout the waters of WA. They are listed as migratory and may be found in locations such as Ningaloo. The giant manta ray appears to be a seasonal visitor to coastal or offshore sites. Giant manta rays are often seen aggregating in large numbers to feed, mate, or clean. Sightings of these giant rays are often seasonal or sporadic but in a few locations their presence is a more common occurrence. This species is not regularly encountered in large numbers and, unlike some other rays do not often appear in large schools (>30 individuals) when feeding. Overall, they are encountered with far less frequency than the smaller manta species, despite having a larger distribution across the globe (IUCN 2022).

Narrow sawfish

The narrow sawfish (*Anoxypristis cuspidate*) is listed as Migratory under the EPBC Act. It is a marine or marginal (brackish water) species found from inshore waters to a depth of 40 m (Compagno et al. 2006). Though details of its ecology are not precisely known, it probably spends most of its time on or near the bottom in shallow coastal waters and estuaries. A study showed the narrow sawfish to be the most abundant amongst the sawfish sampled in the Gulf of Carpentaria (Peverell 2005) which holds some consistency with the offshore distribution of the species as shown by a study of Northern Prawn Fishery by-catch. Peverell (2005) also used catch data of offshore surface net fisheries to conclude that narrow sawfish also inhabit the mid-water column and can thus be described as a benthopelagic animal. The narrow sawfish is known to form aggregations of mature females during the months of October to November. Its Australian distribution is unclear though it is most common in the Gulf of Carpentaria with southward ranges extending to Broad Sound in Queensland and the Pilbara Coast (circa 116°E), Western Australia (Last & Stevens 2009).

Oceanic White-tip Shark

The oceanic whitetip shark (*Carcharhinus longimanus*) is listed as migratory under the EPBC Act. The oceanic whitetip shark is widespread throughout tropical and subtropical waters of the world (30° N to 35° S) (IUCN 2020). They are an oceanic and pelagic species that regularly occurs in waters of 18–28 °C, usually >20 °C (IUCN 2020). Within Australian waters, they are found from Cape Leeuwin (Western Australia) through parts of the Northern Territory, down the east coast of Queensland and New South Wales to Sydney (Last and Stevens 2009). They are usually found in surface waters, though can reach depths of >180 m (Castro et al. 1999). They have occasionally been recorded inshore but are more typically found offshore or around oceanic islands and areas with narrow continental shelves (Fourmanoir 1961, Last and Stevens 1994).

Blind Gudgeon and Blind Cave Eel

Both the blind gudgeon (*Milyeringa veritas*) and blind cave eel (*Ophisternon candidum*) are listed as Vulnerable under the EPBC Act and are known to occur on the Cape Range Peninsula (in the Central Western Shelf Transition) (Humphreys and Feinberg 1995), and a related species of the genus *Milyeringa*, the Barrow cave gudgeon (*Milyeringa justitia*) has also been noted at Barrow Island (Humphreys 2001). They have been recorded in waters ranging from fresh to seawater at depths of up to 33 m in caves and 50 m in wells and bores. Both species are restricted to either caves or groundwater (Humphreys and Blyth 1994) and are the only two vertebrate animals known from Australia for this.

Shortfin and Longfin Mako Shark

The shortfin mako and longfin mako sharks are listed as Migratory under the EPBC Act. The longfin mako is a widely distributed but rarely encountered oceanic shark that ranges from Geraldton around the north coast to at least Port Stephens in New South Wales (DSEWPaC 2012d). The shortfin mako is an oceanic and pelagic species, although they are occasionally seen inshore. They are found throughout temperate seas but are rarely found in waters colder than 16 °C.

Porbeagle Mackerel Shark

The Porbeagle is wide-ranging and inhabits temperate, subarctic and subantarctic waters of the North Atlantic and Southern Hemisphere (Francis et al. 2002). In Australia, the species occurs in waters from southern Queensland to south-west Australia (Last and Stevens 2009). Animals typically occur in oceanic waters off the continental shelf, although they occasionally enter coastal waters (Francis et al. 2002).

The Porbeagle primarily inhabits oceanic waters and areas around the edge of the continental shelf although they occasionally move into coastal waters, but these movements are temporary (Campana and Joyce 2004; Francis et al. 2002). Individuals are known to undertake seasonal migrations, possibly in search of food, although the timing and details of these migratory movements are not well-understood (Saunders et al. 2011).

Little Gulper Shark

The species (Centrophorus zeehaani) is a gulper shark, also commonly known as southern dogfish and is listed as Conservation Dependant under the EPBC Act. Southern dogfish are endemic to Australia in habitats on the upper-slope between 180 m to 900 m (Williams et al. 2012) of the southern continental shelf.

Scalloped Hammerhead

The scalloped hammerhead (*Sphyrna lewini*) is listed as Conservation Dependant under the EPBC Act and has a circum-global distribution in tropical and sub-tropical waters. Within Australian waters the scalloped hammerhead extends from New South Wales (approximately from Wollongong, where it is less abundant), around the north of the continent and then south into Western Australia to approximately Geographe Bay, though it is rarely recorded south of the Houtman Abrolhos Islands. (TSSC 2018)

Pipefish and seahorse (Syngnathidae)

Other EPBC Act protected marine species that may occur within the EMBA include various species of pipefishes and seahorses (Family Syngnathidae). Knowledge about the distribution, abundance and ecology of both syngnathids and solenostomids is limited (DSEWPaC 2012c). In tropical areas such as the EMBA, species are primarily found among coral reefs (Foster & Vincent 2004; Scales 2010).

6.1.2 Marine Mammals

Marine mammals occur in the waters of the Stag Facility, some being seasonal visitors while others occur at low densities year- round. Marine mammals that may occur in the region include cetaceans (whales, porpoises and dolphins) and dugongs. A search of the EPBC Act protected matters database (at the end of this document) revealed 32 cetaceans that may occur within the EMBA. The search identified four threatened marine mammal species that may occur within the EMBA, including two species listed as vulnerable, the sei whale (*Balaenoptera borealis*) and fin whale (*Balaenoptera physalus*), and two species listed as endangered, the blue whale (*Balaenoptera musculus*) and southern right whale (*Eubalaena australis*). As of February 2022, humpback whales were removed from the Vulnerable list as it was determined that the species is no longer eligible for inclusion in any category of the list. It is however still listed as migratory under the EPBC Act. An additional nine marine mammals were identified as migratory including the humpback whale.

The blue whale, humpback whale, southern right whale and dugong have identified BIAs that overlap the EMBA. Further information on relevant BIAs for these species is provided in Figure 6-2 to Figure 6-5 and Table 6-2.

Blue Whale

Blue whales are found in all oceans of the world. They are the largest living animal and can grow to a length of over 30 m and weigh an average of 100–120 t. There are two recognised subspecies in Australia: the 'true' blue whale (Balaenoptera musculus intermedia) and the ‘pygmy' blue whale (*Balaenoptera musculus brevicauda*) (DSEWPaC 2012e). Both of these species are covered by the Blue Whale Conservation Management Plan 2015 (DoE 2015b). In general, the southern blue whale is found south of 60° S and pygmy blue whales are found north of 55° S (DEWHA 2008a, b). As southern blue whales feed predominantly in polar waters it has been suggested that all blue whales sighted in Australian waters are pygmy blue whales (DEH 2005). During summer–autumn true blue whales feed mainly in the Antarctic, mostly on krill, while pygmy blue whales are thought to feed in productive regions in temperate latitudes (Branch et al. 2007).

The Perth Canyon is the only area so far identified off the WA coast where pygmy blue whales aggregate with some predictability. The area represents a significant feeding ground for pygmy blue whales between January and April, with aerial surveys between 1999 and 2004 recording an average of 30 individuals at the peak of the season (March–May) (Jenner et al.2002; McCauley et al. 2004). Acoustic detections suggest that true blue whales also over-winter around the Perth Canyon and head south in mid-October (McCauley et al. 2004).

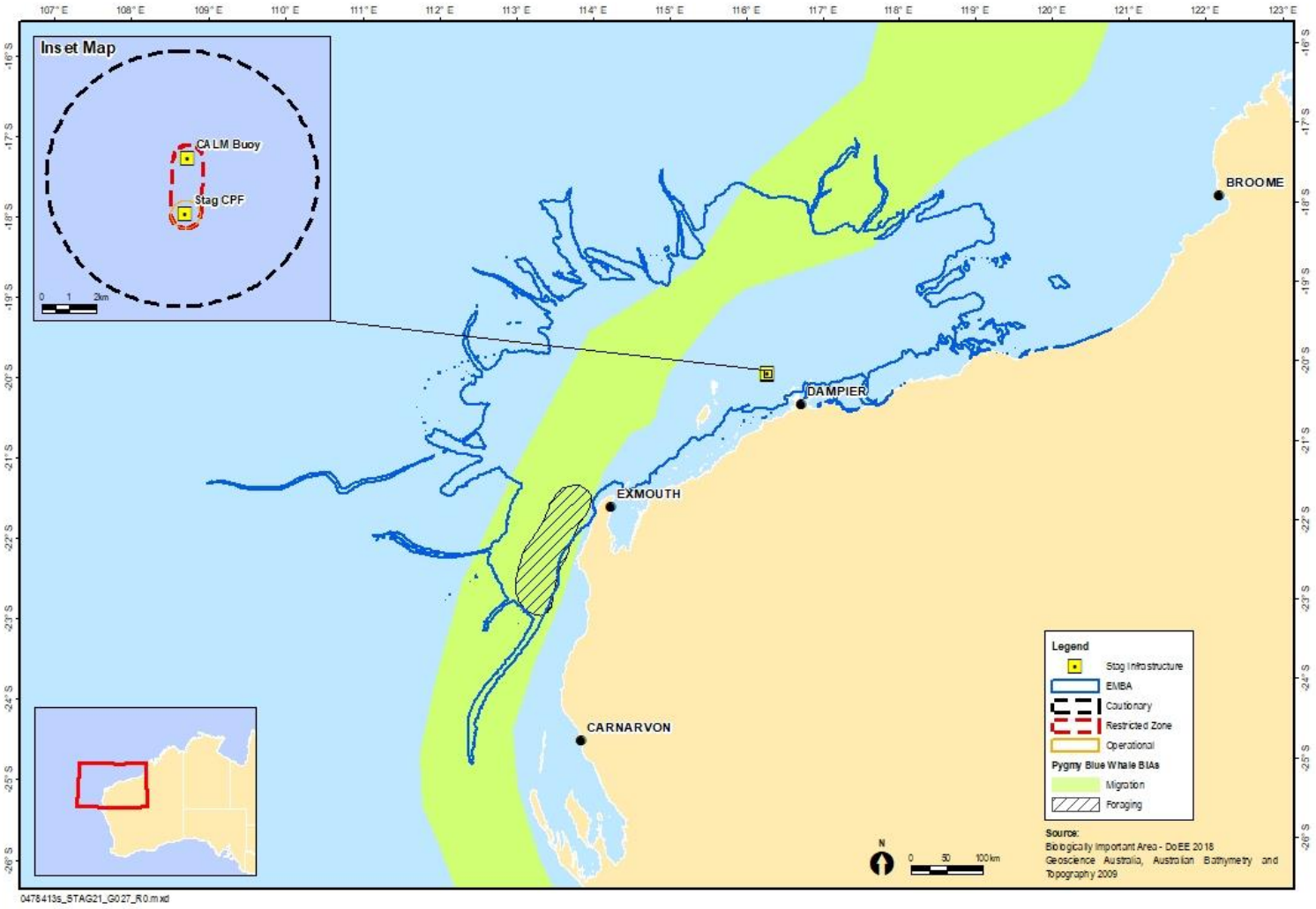

Figure 6-2 BIAs for Pygmy Blue Whale within the EMBA

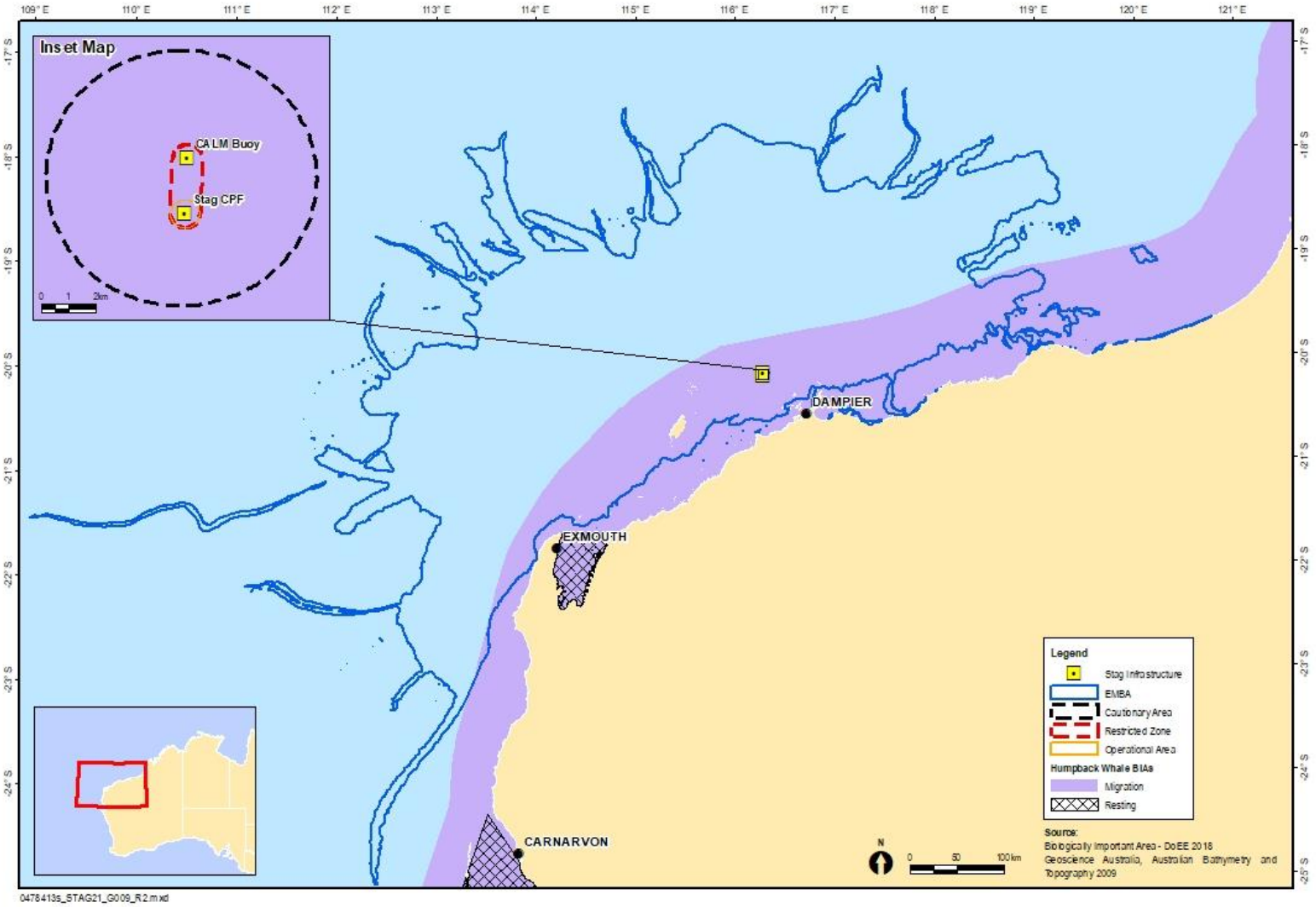

Figure 6-3 BIAs for Humpback whale within the EMBA

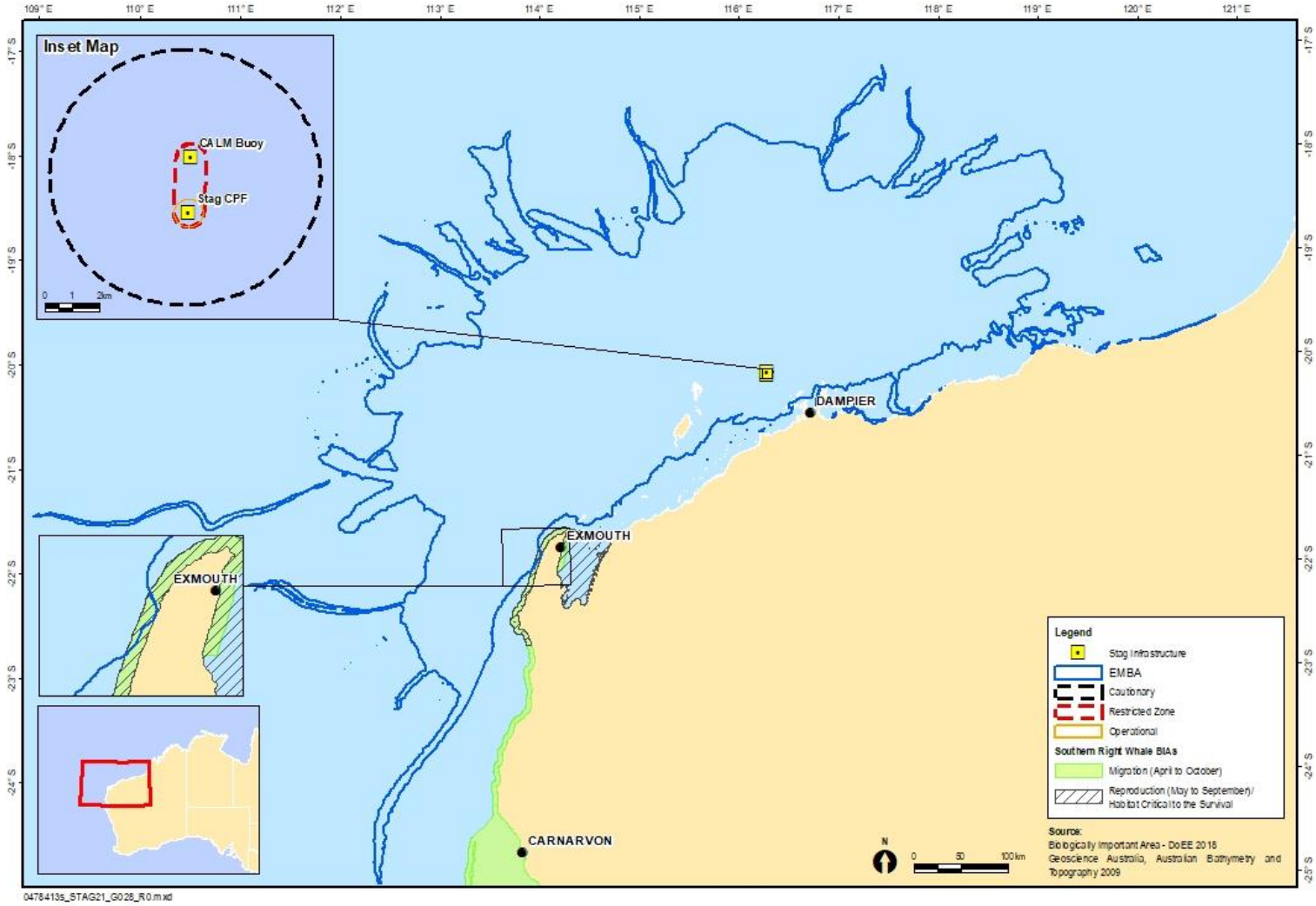

Figure 6-4 BIAs for Southern right whale within the EMBA

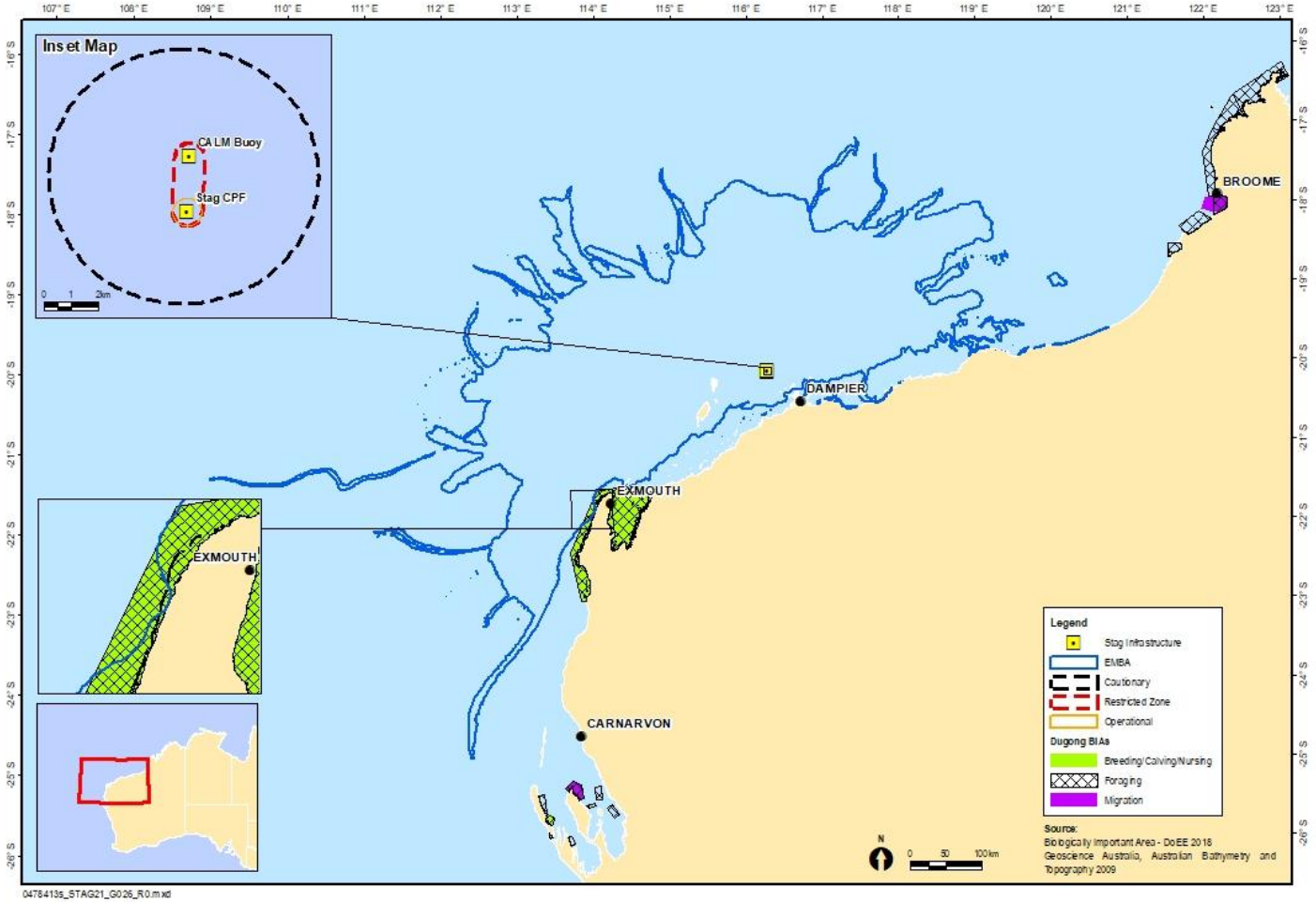

Figure 6-5 BIAs for Dugong within the EMBA

The pygmy blue whale has two identified BIAs: a foraging and migration BIA overlaps the EMBA (Figure 6-2 and Table 6-2). However, Blue whale migration is thought to follow deep oceanic routes, although little is known about their precise migration routes (DSEWPaC 2012e). The blue whale is rarely present in large numbers outside recognised aggregation areas. Chevron's Wheatstone project cetacean monitoring studies indicated that during their southern migration blue whales were recorded between the 750 m and the 850 m isobaths and between the 300 m and the 350 m isobaths (RPS 2010). These data also showed a seasonal migration pattern further west from May to August (moving northwards), with a southwards migration occurring between November and December (RPS 2010). These findings are supported by acoustic detections undertaken off the Montebello Islands which showed a northerly pulse from late March to early August with peak migration in June and July, and a pulse of southerly transiting whales from early October to late November, with a peak migration period occurring from early November to early December (McCauley and Jenner 2010).

Tagging surveys have shown pygmy blue whales migrating northward relatively near to the Australian coastline (100 km) until reaching North-West Cape after which they travelled offshore (240 km) to Indonesia. Passive acoustic data documented pygmy blue whales migrating along the Western Australian shelf break (Woodside 2012). The National Conservation Values Atlas has identified the pygmy whale migration pathway on the continental shelf edge at depth of 500–1,000 m (**Error! Reference source not found.**) (McCauley & Jenner 2010).

Humpback Whale

Humpback whales are moderately large baleen whales that occur throughout Australian waters and are the most commonly sighted whale in the NWMR (DSEWPaC 2012e).

The WA humpback whale population (known as the Group IV population) is genetically distinct from the eastern Australian population and was severely depleted by whaling activities. The population was estimated at 12,000–16,000 individuals in 1934 and continued to decline to an estimated 800 individuals prior to the moratorium on whaling in the southern hemisphere in 1962 (Chittleborough 1965). More recent population estimates have suggested whale numbers have increased to ~ 28,830 in 2008 (Hedley et al. 2011). Numbers have increased further in recent years and the Action Plan for Australian Mammals 2012 by Woinarski et al. 2014, and a recent paper from Bejder et al. 2015 recommend that humpback whales no longer meet any criteria for listing as threatened under the EPBC Act. As of February 2022, humpback whales were removed from the Vulnerable list as it was determined that the species is no longer eligible for inclusion in any category of the list. Despite removal from the threatened species list, it will remain a Migratory species under the EPBC Act and BIAs are still recognised for the species.

Humpback whales migrate annually between summer feeding grounds in Antarctica and breeding aggregation areas in Southern Kimberley between Broome and the northern end of Camden Sound. There is an identified migratory BIA that overlap both the EMBA and operational area (Figure 6-3 and Table 6-2).

The humpback whale migration pathway is within the continental shelf boundary or 200 m bathymetry along the WA coastline (Figure 6-3). However actual sightings recorded by Jenner et al (2001) and Double et al. (2010 and 2012) indicate that the route is actually much closer to shore, particularly along the Pilbara coast, with migrating whales tending to travel within 50 km of the coast between North-West Cape and Camden Sound.

Humpback whales pass north along the waters west of Barrow Island to the Montebello Islands during their annual winter migration from the Antarctic. Once past the Montebello Islands their migration route heads east towards their breeding grounds in the Kimberley. The northward migration past Montebello and Barrow Islands generally occurs from mid-July with the peak in late July, though this can vary by up to three weeks. Unlike the northern migration, which tends to follow the deeper water of the continental shelf, the southward migration concentrates whales closer to the mainland with a peak Aug–mid-Sep.

Major calving areas have been identified in the Kimberley region and particularly between Lacepede Islands (16°8S) and Camden Sound (15°38S) (Jenner et al. 2001) which are more than 900 km from the Stag Operational Area.

Whales may travel through the operational area on a seasonal basis as part of their migratory movements. The Stag Platform is more than 900 km from core calving grounds and more than 250 km from identified resting areas at Exmouth Gulf and southern Kimberley. As such, whales may be present in the area as part of the season migration.

Australian Humpback dolphin

The Australian humpback dolphin is typically found in water less than 20 m deep but has been recorded in water up to 40 m deep. This species is generally found in association with river mouths, mangroves, tidal channels and inshore reefs (DCCEEW 2023b). This species of dolphin is known to have resident groups that forage, feed, breed and calve in the state waters of Roebuck Bay and areas further north (DCCEEW 2023b).

No BIA for the Indo-pacific humpback dolphin is located within the EMBA or Operational Area, although a foraging and breeding BIA is located in the shallower waters off Broome.

Spotted Bottlenose dolphin

The Indo-Pacific bottlenose dolphin (Tursiops aduncus) (Arafura / Timor Sea populations) is generally considered to be a warm water subspecies of the spotted bottlenose dolphin, occurring in shallow (often <10 m deep) inshore waters (Bannister et al. 1996; Hale et al. 2000). The known distribution of the Indo-Pacific bottlenose dolphin extends from Shark Bay north to the western edge of the Gulf of Carpentaria in Australia (DoEE 2018).

No BIA for the spotted bottlenose dolphin is located within the EMBA or Operational Area, although a foraging BIA is located in the shallower waters off Broome.

Sei Whale

Sei whales have been infrequently recorded in Australian waters (Bannister et al. 1996) which could be due to the similarity in appearance of sei whales and Bryde's whales leading to incorrect recordings. There are no known mating or calving locations in Australian waters (Parker 1978). The species is migratory, moving between Australian waters and Antarctic feeding areas but their movements are unpredictable and not well documented. They have been sighted inshore (in the proximity of the Bonney upwelling, Victoria) as well as in deeper offshore waters and have only been sighted in summer and autumn.

Fin Whale

Fin whales are listed as vulnerable and migratory under the EPBC Act. The fin whale is the second largest species after the blue whale. Fin whale distribution in Australia is known primarily from stranding events and whaling records and the whales are thought to be present along the western coast of Australia to NSW. The Australian Antarctic waters are important feeding grounds for fin whales but there are no known mating or calving locations in Australian waters (Morrice et al. 2004). The migration routes and location of winter breeding grounds are uncertain, but presence has been detected in summer and autumn months.

Southern Right whale

Southern right whales are medium to large black (or less commonly grey-brown) baleen whales. They are recognisable by the lack of a dorsal fin, rotund body shape, and whitish callosities (patches of keratinised skin colonised by cyamids - small crustaceans) on the head. They reach a maximum length of approximately 16 m and a weight of around 40 tonnes, with mature females slightly larger than males (DCCEEW, 2024k).

The National Recovery Plan for the Southern Right Whale 2024 (DCCEEW, 2024k) indicates that the core coastal range for southern right whale extends north to Hervey Bay in Qld. (23°S, 150°E) on the east coast and Exmouth/Ningaloo Reef (21°S, 114°E) off the WA coast (Bannister 1986, Smith et al. 2024).

Southern right whales occur seasonally in all state coastal waters, with sightings ranging from Hervey Bay in Queensland on the east coast, along the entire southern coastline and including Tasmania, to Exmouth Gulf in Western Australia (Smith et al. 2024). There are two populations that occur in Australian coast: the western and eastern populations. This delineation of populations is based on genetic differentiation (Carroll et al. 2011, Carroll et al. 2015).

The southern right whale is typically distributed between 20°S and 65°S in the southern hemisphere and in Australian waters predominantly occur in aggregations in coastal water reproductive areas where they calve and nurse their young from May to October, primarily occupying shallow waters (< 10m depth) within 1 km of the coastline (Charlton et al. 2019, Smith et al. 2022).

The foraging ecology of southern right whales is poorly understood, and observations of feeding whales are rare. Southern right whales from Australian populations probably forage between about 40°S and 60°S, generally south of Australia. In the region of the Sub-Tropical Front (41–44°S) they mainly consume copepods, while at higher latitudes (south of 50°S) krill is the main prey item. The species feeds in the Southern Ocean in summer, moving close to shore in winter. Right whales feed by surface skimming or shallow dives, trapping plankton on fine baleen fibres. The migratory paths between calving and feeding areas are not well understood (DCCEEW, 2024k).

There is an identified migration (April to October) BIA, a reproduction (May to September) BIA and habitat critical to the survival that overlap the EMBA (Figure 6-4 and Table 6-2).

Given that major calving areas and aggregations occur in proximity to the Great Australian Bight, southern right whales are unlikely to be present in high numbers within the operational area or EMBA, and any occurrence would be infrequent and limited to transiting individuals as evidenced by the presence of the BIA.

Australian Snubfin Dolphin

The snubfin dolphin (*Orcaella heinsohni*) is known to occur within the waters off northern Australia, extending north from Broome in Western Australia to the Brisbane River in Queensland (Parra et al. 2002). Surveys have indicated that the species is typically found in protected shallow nearshore waters, generally less than 20 m deep, adjacent to river and creek mouths close to seagrass beds (Parra et al. 2002). The snubfin dolphin was not recorded during any of the aerial surveys undertaken along the Dampier Peninsula coastline in the vicinity of James Price Point but were observed in Roebuck Bay from vessels on several occasions (RPS 2010). Based on the extensive survey effort and amenable conditions within the James Price Point coastal area during the survey, it is concluded that this species is seldom found outside of shallow and sheltered bays and inlets (DSD 2010). No BIA for the Australian snubnose dolphin is located within the Operational Area EMBA, although a foraging BIA is located in the shallower waters off Broome.

Dugong

Dugongs are listed as a Migratory species under the EPBC Act. They are also listed on the Appendix 1 of the Convention of International Trade in Endangered Species (CITES) and on Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals 1979. Dugongs (Dugong dugon) are large herbivorous marine mammals (up to 3 m) that feed off seagrass and generally inhabit coastal areas in shallow waters (less than 5 m).

Dugong distribution and movement is based on the abundance, size and species of seagrass meadow. Key populations along the WA coast are principally located at: Shark Bay (the largest resident population in Australia), Ningaloo Marine Park, the Pilbara coast and offshore areas including Montebello/Barrow/Lowendal Islands, and further north at Eighty Mile Beach and off the Kimberley Coast, particularly Roebuck Bay and Dampier Peninsula (Marsh et al. 2002; DSEWPaC 2012c).

A high density foraging BIA (seagrass beds) and a Breeding/ Calving / Nursing BIA is located in the waters around Ningaloo Reef and Exmouth Gulf which is located within the EMBA (Figure 6-5). A foraging and migration BIA, is also located in Roebuck Bay, this is located outside the EMBA however.

Sperm Whale

Sperm whales typically occur in deep waters (greater than 200 m) off the continental shelf along the southern coastline between Cape Leeuwin and Esperance (Bannister et al. 1996). Although there is a lack of detailed information on migration timings, sperm whales are known to migrate northwards in winter and southwards in summer. Sperm whales have been recorded in deep water off the North-west Cape on the west coast of Western Australia (RPS 2010), and appear to occasionally venture into shallower waters in other areas (RPS 2010). No BIAs have been identified in the waters surrounding the Operational Area or the EMBA.

Given that major foraging areas occur off Perth and in proximity to the Great Australian Bight, sperm whales are unlikely to be present in high numbers within the operational area or EMBA, and any occurrence would be infrequent and limited to transiting individuals.

Other whale species

Other cetacean species whose broad distributions overlap with the operational area and EMBA include whales that are infrequently observed and usually restricted to cooler or deep waters such as Bryde's whales, Antarctic minke and killer whales. As no BIA for these species are known in the region, and they are generally restricted to deeper waters, it is unlikely they will be encountered in significant numbers.

6.1.3 Marine Reptiles

Marine turtles, salt-water crocodile and sea snakes have been identified as potentially occurring within the EMBA.

6.1.3.1 Marine Turtles

Five species of threatened marine turtles may occur within the EMBA, three of these species are classed as threatened-vulnerable under the EPBC Act, the hawksbill (*Eretmochelys imbricata*), flatback (*Natator depressus)* and green turtles (*Chelonia mydas*) with two species, the loggerhead (*Caretta caretta*) and leatherback turtle (*Dermochelys coriacia*), classed as threatened-endangered. Green, flatback, hawksbill, and loggerhead turtles nest on the sandy beaches of offshore islands and the mainland within the Stag Facility EMBA. The leatherback turtle may also visit the open waters of the region.

These species are all identified within the Recovery Plan for Marine Turtles in Australia (DoEE 2017). The Operational Area overlaps with nesting and internesting areas identified as habitat critical to the survival of the Flatback Turtles, while Green, Loggerhead and Hawksbill turtles have critical nesting habitat areas located within the EMBA.

The nearest turtle nesting sites to the operational area are ~ 35 km south-east at Dampier Archipelago and ~ 60 km south-west at Barrow, Montebello and Lowendal Islands. Table 6-3 outlines turtle activity within the Operational Area and EMBA and the figures below show BIAs specific to turtle species.

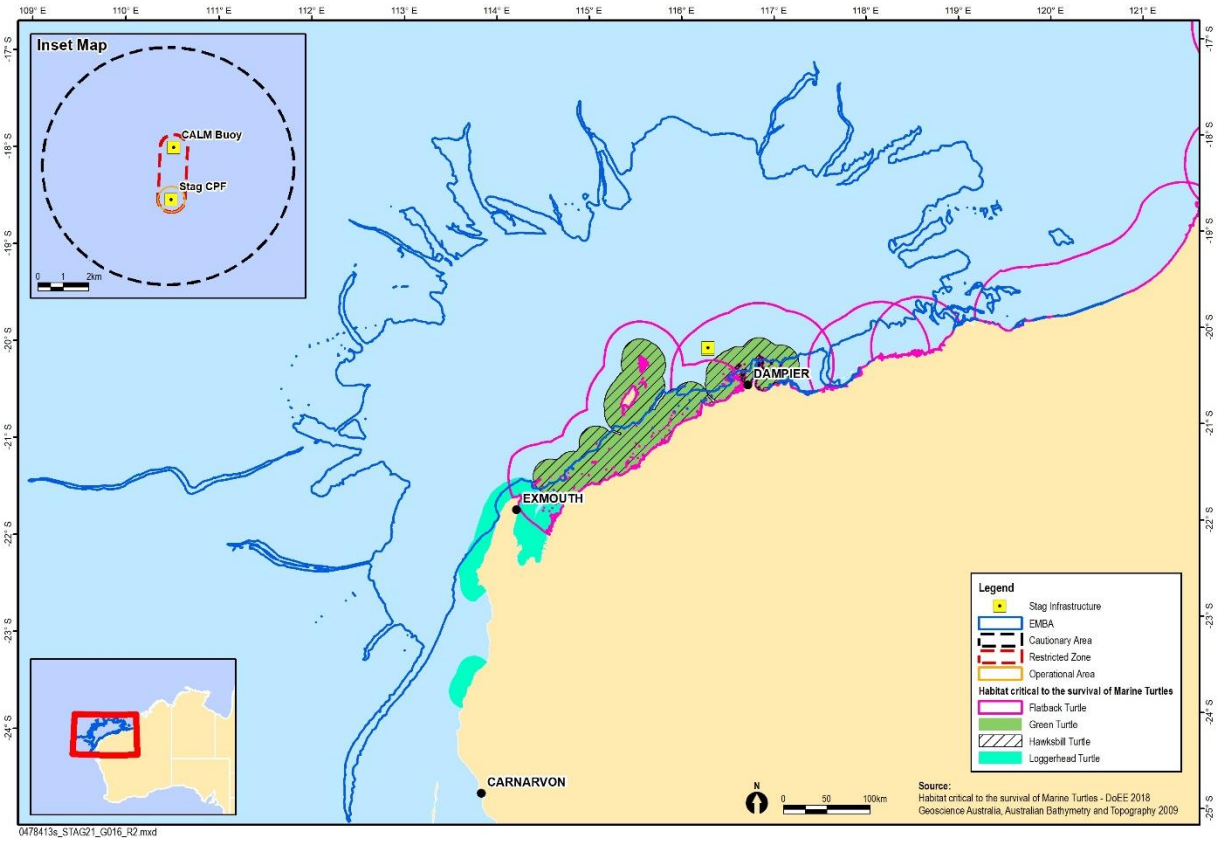

Figure 6-6: Habitat critical to the survival of marine turtles

Loggerhead turtles

WA supports one genetic stock of loggerhead turtles with nesting encompassing Muiron Islands, Ningaloo Coast south to about Carnarvon and islands near Shark Bay, including Dirk Hartog Island (Limpus 2008b), with occasional nesting recorded from Varanus and Rosemary Islands (DSEWPaC 2012g). One nesting loggerhead has been tagged on Varanus Island since 1986 (Apache 1999). Low numbers of loggerheads have also been observed on Barrow Island (Chevron 2008). The annual nesting population in the region is thought to be in the several thousand (Limpus 2008b). Foraging, internesting buffer and nesting BIAs have been identified and overlap the EMBA (Figure 6-7). The closest known breeding/nesting grounds to the Stag Facility are Rosemary Island (Dampier Archipelago) and Barrow and Varanus Islands. Loggerhead Turtles regularly use Roebuck Bay as a seasonal feeding and transit area on migration (Bennelongia 2009). The Turtle Recovery Plan (DoEE 2017) identified Dirk Hartog Island, Muiron Islands, Gnarloo Bay and the Ningaloo coast as nesting locations.

Aerial surveys conducted in 2000 and 2001 in the Exmouth region recorded only 12 sightings in Commonwealth waters and these turtles were most likely loggerheads (BHPB 2005). Within the Ningaloo Marine Park, loggerhead turtles tend to nest in higher proportions in the southern areas of the reserves (CALM 2005a).

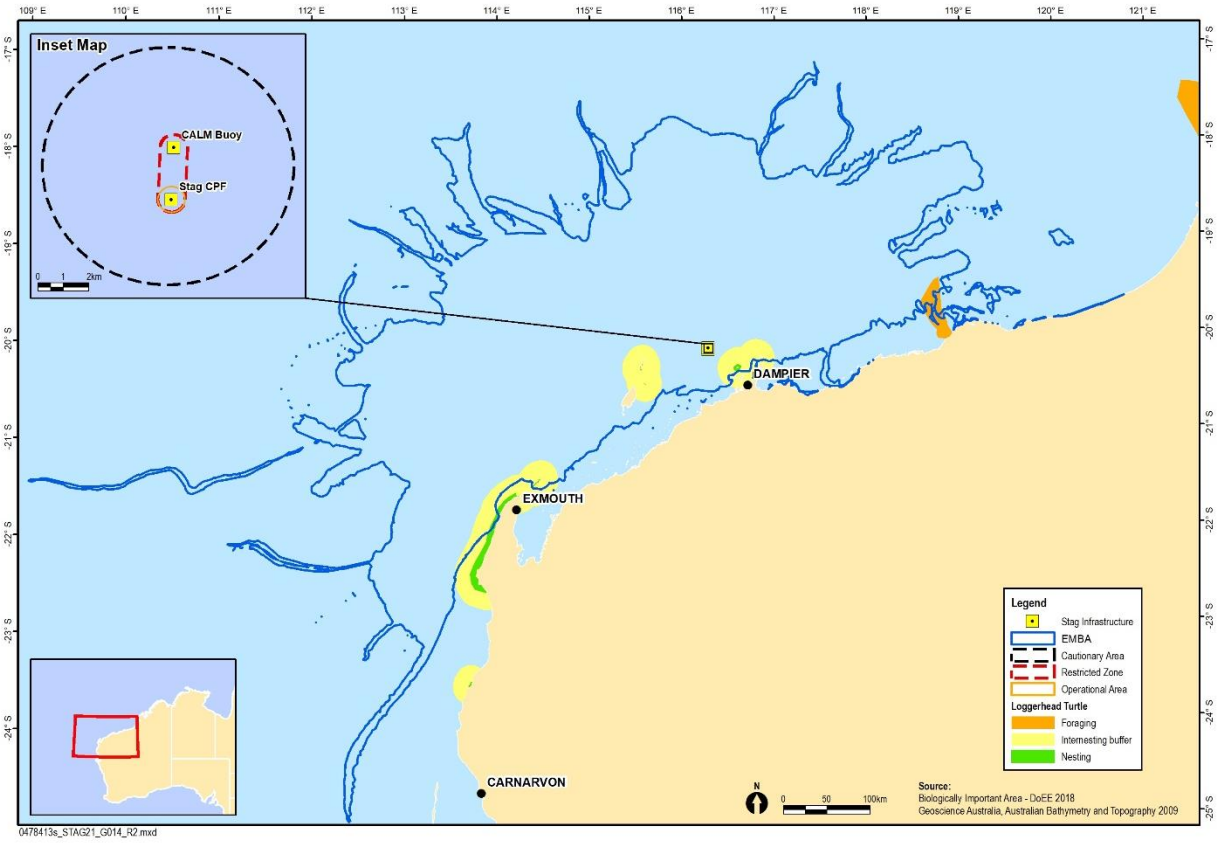

Figure 6-7: BIAs for the loggerhead turtle

Green turtles

Green turtles are the most widespread and abundant turtle species in WA waters, nesting from the Ningaloo coast to the Lacepede Islands and out to Scott and Ashmore Reefs (Prince 1994; Limpus 2008a; DSEWPaC 2012g), with three distinct breeding stocks: the NWS stock, the Scott Reef stock and the Ashmore Stock (Dethmers et al. 2006; Limpus 2008a). The NWS population is one of the largest in the world and the most significant rookery is the western side of Barrow Island (Prince 1994; Limpus 2008a). Other principal rookeries include the Lacepede Islands, Montebello Islands, North-West Cape and Browse Island (Prince 1994; Limpus 2008a). Numerous other small rookeries also occur in WA. The green turtle is also known to breed in large numbers in the dunes above the extensive beaches found on Serrurier Island, with counts indicating the island supports the second largest rookery in the Pilbara (Oliver 1990). Low numbers of green turtles have also been observed nesting on Airlie Island and Varanus Island (Pendoley Environmental 2011). The closest known breeding/nesting grounds to the Stag Facility are Barrow, Montebello and Varanus Islands.

Green turtle nesting abundance fluctuates significantly from year to year, depending on environmental variables and food availability at feeding sites. In an aerial survey of Pilbara waters in April 2000, Prince (2001) estimated a mixed species population of 57,000 turtles of which most were green turtles. Several BIAs (aggregation, basking, foraging, internesting, internesting buffer, mating, migration corridor and nesting) have been identified that overlap the EMBA (Table 6-2, and Figure 6-8). No BIAs overlap the Operational Area.

Chevron (2005, 2008) reported that green turtles nest predominantly on the sandy west coast beaches of Barrow Island. In addition to nesting, green turtles mate and forage close to Barrow Island during the summer breeding season. Aggregations of green turtles have been reported from the shallow areas along the west coast of Barrow Island, with turtles foraging on and around nearshore reefs. Green turtles have also been observed to the south and south-east of Barrow Island, around dugong Reef and over the Barrow

Shoals (Chevron 2005, 2008). The Recovery Plan for Marine Turtles in Australia (DoEE 2017) identifies Barrow Island and all waters within a 20 km radius of the island as critical habitat to the survival of the green turtles.

Nesting of green turtles has been recorded from August to March on Serrurier Island from December to March along coast adjacent to Ningaloo (CALM 2005a) and from October to February on Varanus Island (Pendoley Environmental 2011). On Barrow Island, mating aggregations may commence from October with peak nesting from December to January and hatchlings emerging through summer and early autumn, although nesting does occur year-round (Chevron 2005, 2008; Pendoley 2005). The Turtle Recovery Plan (DoEE 2017) identifies the nesting period the NWS stock as November to March with peaks in January and February.

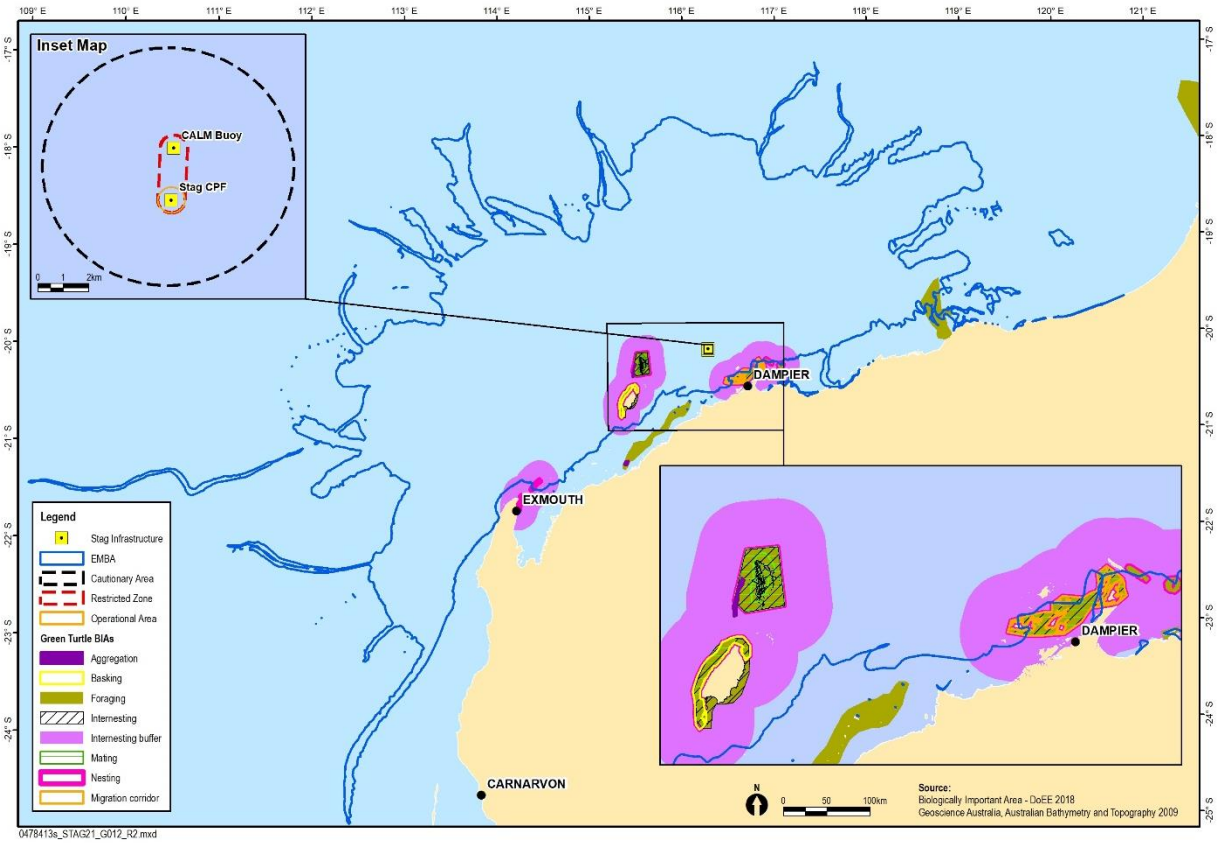

Figure 6-8: BIAs for the green turtle

Leatherback turtles

The leatherback turtle (Dermochelys coriacea) is a pelagic feeder, found in tropical, subtropical and temperate waters, but is uncommon throughout their Australian range (DSEWPaC 2012g). No major leatherback turtle nesting areas have been recorded in Australia, although scattered isolated nesting (1–3 nests per annum) occurs in southern Queensland and Northern Territory (Limpus and McLachlan 1994). At least two nesting attempts have been reported in WA (Limpus 2009b). There are no listed BIAs that overlap the EMBA or operational area.

Leatherback turtles feed mainly on pelagic, soft-bodied marine organisms such as jellyfish, which occur in greatest concentrations in areas of upwelling or convergence (DSEWPaC 2012g). The leatherback turtle is a highly pelagic species with adults only going ashore to breed. Individuals may be encountered within the Stag Operational Area but are unlikely to be encountered in significant numbers given that no confirmed breeding occurs in WA and that leatherbacks in WA are most commonly sighted feeding in the southwest region (DEWHA 2008f).

Hawksbill Turtles

WA supports one genetic stock of hawksbill turtles with nesting centred on the Dampier Archipelago. The WA stock is the largest in the Indian Ocean and is one of the largest hawksbill turtle populations remaining in the world (Limpus 2009a). Several BIAs (foraging, internesting, internesting buffer, mating, migration corridor and nesting) have been identified that overlap the EMBA (Table 6-2, Figure 6-9, and Figure 6-9). No BIAs overlap the Operational Area.

In WA, their nesting range is relatively small and extends from the Muiron Islands to the Dampier Archipelago, a distance of ~ 400 km. The most significant breeding areas are within the Dampier Archipelago, Montebello Islands, Lowendal Islands and Barrow Island supporting hundreds of nesting females annually (Pendoley 2005; Limpus 2009a). Rosemary Island within the Dampier Archipelago may support in the order of 1,000 nesting females annually and may be the largest remaining hawksbill nesting population globally.

Low density nesting is also known from Airlie Island, Muiron Islands and Cape Range (Limpus 2009a). The closest known breeding/ nesting grounds to the Stag Facility are Rosemary Island (Dampier Archipelago), Montebello and Lowendal Islands.

On Varanus Island, hawksbills tend to nest in greater numbers on the eastern beaches (Pipeline Beach, Harriet Beach, and Andersons Beach). Between 1986 and 1999, approximately 350 individual hawksbills were tagged on Varanus Island (Apache 1999). Apache used these data to predict that up to 260 hawksbills may visit Varanus Island each year, although a maximum number of nests at 180 per year have been recorded. The 2010 turtle tagging program on Varanus Island in the breeding season reported 70 turtles coming ashore. Of these 70 turtles, 27 were hawksbills and eight were newly tagged. Pipeline Beach was the most frequented beach on Varanus Island (Pendoley Environmental 2011).

Hawksbill turtles also nest along the North-West Cape/ Ningaloo coast, Muiron Islands, and the Montebello Islands. Rosemary Island is probably the largest hawksbill rookery, with numbers at the other sites comparable to those found on Varanus Island. This suggests a total annual hawksbill turtle stock in WA of approximately 1,000–1,500 animals. With an interbreeding period of 2–4 years, 2,000–4,500 hawksbill turtles probably nest in WA waters (Morris 2004).

On Barrow Island, nesting occurs at low densities on the beaches of both the west and east coasts, however, Barrow Island is not considered a regionally important nesting site for hawksbill turtles (Chevron 2008).

Although hawksbills are known to nest year-round, the Turtle Recovery Plan (DoEE 2017) indicates that peak nesting periods are October to February. The location of feeding areas and biology of the species within this region is largely undocumented (Limpus 2009a) but it is thought that individuals may migrate up to 2,400 km between their nesting and foraging grounds (DSEWPaC 2012g).

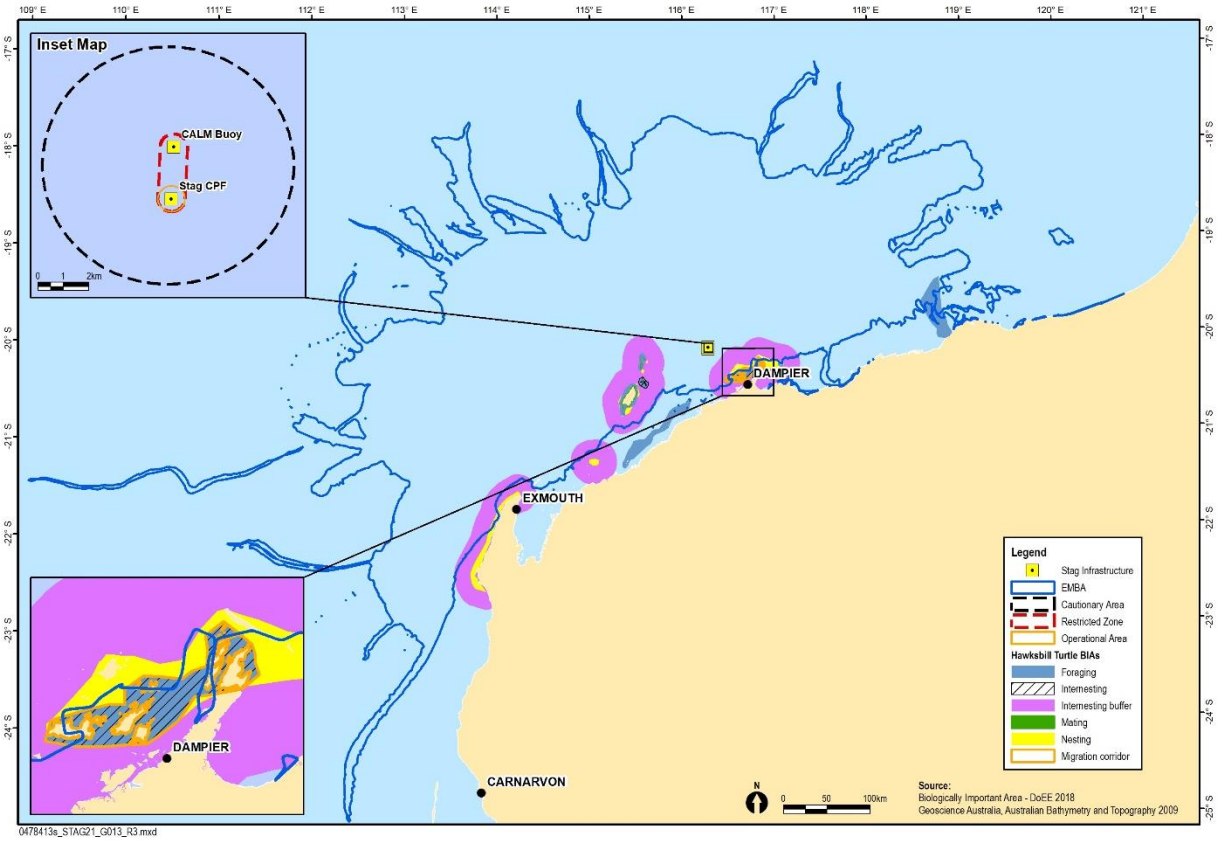

Figure 6-9: BIAs for the hawksbill turtle

Flatback Turtles

The flatback turtle is endemic to the northern Australian continental shelf and all nesting occurs in Australia with approximately one third of the total breeding for the species occurring in WA. WA supports two genetic stocks of flatback turtles: the Pilbara Stock characterised by summer nesting and Southwest Kimberley stock which breeds year-round with a winter peak (Limpus 2007). Several BIAs (aggregation, foraging, internesting, internesting buffer, mating, migration corridor and nesting) have been identified that overlap the EMBA (Table 6-2 and Figure 6-10). An internesting buffer BIAs overlap the Operational Area

Nesting locations for both stocks are outlined in Table 6-3. The closest known breeding/ nesting grounds to the Stag Facility are Dampier Archipelago, Barrow, Montebello, Varanus and Lowendal Islands. The Turtle Recovery Plan (DoEE 2017) has proposed a 60 km inter-nesting buffer for the flatback turtle which overlaps the Stag Operational Area (Figure 6-10).

Pendoley (2005) focussed on documenting the activity of flatback turtles on Barrow Island, Lowendal Islands and Montebello Islands and identified that the east coast of Barrow Island supports an important rookery for flatbacks. A turtle tagging program over three nesting seasons from 2005–2008 tagged a total of 2,979 flatbacks at Barrow Island and 1,060 flatbacks at Mundabullangana (Chevron 2008). Tagging shows that flatback turtle nesting on Barrow Island is focused on central east coast beaches, which include Mushroom, Bivalve, Terminal, and Yacht Club North and South beaches. Peak of nesting occurs during the December– January periods (Pendoley 2005; Chevron 2008).

Post-nesting females commonly sleep on the intertidal platform off the east coast rookery of Barrow Island at low tide. Satellite tracking of adult (female) flatback turtles shows they use a variety of inshore and offshore marine areas off the east and west coasts of Barrow Island. Females inter-nest close to their nesting beaches, typically in 0–10 m of water (Chevron 2008). However, flatback turtles also travel approximately 70 km and inter-nest in shallow nearshore water off the adjacent mainland coast, before

returning to Barrow Island to lay another clutch of eggs. The average inter-nesting period is 13–16 days. There have been occasional records of nesting by flatback turtles on the Jurabi Coast and Muiron Islands (CALM 2005a).

From long-term tagging studies on Varanus Island and Pendoley's observations, the nesting season for flatback turtles peak in December and January with subsequent peak hatchling emergence in February and March. Flatbacks have been observed to nest on Varanus Island between November and February (Pendoley Environmental 2011).

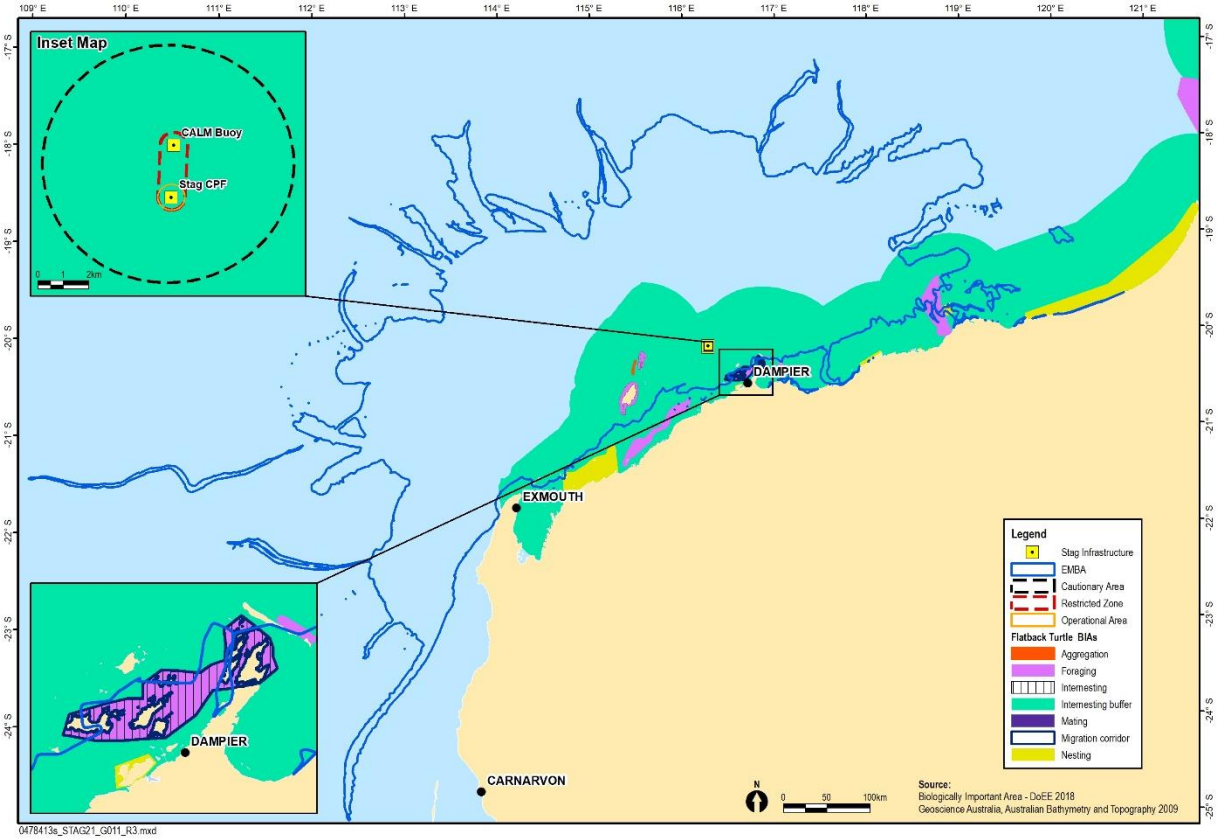

Figure 6-10: BIAs for the flatback turtle

6.1.3.2 Sea snakes

A search of EPBC Act protected matters revealed 19 listed seasnakes that may occur within the EMBA. Of these species, two are considered threatened (critically endangered), the short-nosed sea snake (*Aipysurus apraefrontalis*) and the leaf-scaled sea snake (*Aipysurus foliosquama*). There are no listed BIAs for any sea snakes.

Storr et al. (1986) estimate nine genera and 22 species of sea snakes and kraits occur in WA waters. However, little is known of the distribution of individual species, population sizes or aspects of their ecology. Sea snakes are essentially tropical in distribution, and habitats reflect influences of factors such as water depth, nature of seabed, turbidity and season (Heatwole and Cogger 1993). Sea snakes and kraits are widespread throughout waters of the NWS in offshore and nearshore habitats. They can be highly mobile and cover large distances or they may be restricted to relatively shallow waters and some species must return to land to eat and rest.

The short-nosed sea snake is listed as critically endangered under the EPBC Act. However, most specimens have been collected from Ashmore and Hibernia Reefs (Minton and Heatwole 1975) which are not within the EMBA. This species is believed to show strong site fidelity to shallow coral reef habitats in <10 m of water.

6.1.3.3 Salt-water crocodile

The Salt-water Crocodile is the largest species of crocodile and the largest living reptile in the world. Adult males can reach lengths of over 5 meters and weigh more than 450 kg, making them the largest reptiles on Earth. In contrast, females are significantly smaller, typically around 3 meters and weighing up to 150 kg (Cogger 1996).

The Salt-water Crocodile is found in Australian coastal waters, estuaries, lakes, inland swamps and marshes (Webb et al. 1987). Despite the species' common name, the Salt-water Crocodile can persist in freshwater bodies. The species' distribution ranges from Rockhampton in Queensland (Miller 1993; Taplin 1987) throughout coastal Northern Territory (McNamara & Wyre 1993; Webb et al. 1987) to King Sound (near Broome) in Western Australia (Burbidge 1987; McNamara & Wyre 1993).

In Western Australia the species is found in most major river systems of the Kimberley. There have also been isolated records in rivers of the Pilbara region, around Derby near Broome and as far south as Carnarvon on the mid-west coast (DEC 2009a).

Table 6-3: Marine turtle activity

Species	Hawksbill turtle	Flatback turtle		Green turtle	Loggerhead turtle	Leatherback turtle
Stock	WA Stock	**Pilbara Stock**	**Southwest Kimberley**	NWS Stock	WA Stock	Australia
Nesting period	Year Round	Oct–Mar	Year Round	Nov–Mar	Nov–Mar	Dec–Jan
Nesting peak	Oct–Feb	Nov–Jan	Dec–Jan	Jan–Feb	Jan	-
Internesting buffer	20 km	60 km	60 km	20 km	20 km	-
Important rookeries	**Nesting location:** Dampier Archipelago (including Rosemary Island, Delambre Island), Montebello Islands (including Ah Chong Island, South East Island and Trimouille Island), Lowendal Islands (including Varanus Island, Beacon Island, Bridled Island), Sholl Island	**Nesting location:** Montebello Islands, Mundabullangana Beach, Barrow Island, Thevenard Island, Cemetery Beach, Dampier Archipelago (including Delambre Island and Hauy Island), coastal islands from Cape Preston to Locker Island	**Nesting location:** Eighty Mile Beach, Eco Beach, Lacepede Islands	**Nesting locations:** Adele Island, Maret Island, Cassini Island, Lacepede Islands, Barrow Island, Montebello Islands (all with sandy beaches), Serrurier Island, Dampier Archipelago, Thevenard Island, Northwest Cape, Ningaloo coast.	**Nesting location:** South Muiron Island, North-West Cape, Gnaraloo Bay.	There are no confirmed leatherback turtle nesting sites in Western Australia. Scattered nesting occurs in southern Queensland and Northern Territory such as Coburg Peninsula (outside operational area)
Generalised diet	Omnivorous, feeding on algae, sponges, soft corals and other soft-bodied invertebrates	Primarily carnivorous, feeding on soft-bodied invertebrates. Juveniles eat gastropod molluscs, squid, siphonophores. Limited data indicate that cuttlefish, hydroids, soft corals, crinoids, molluscs and jellyfish are also eaten (SPRAT, DoEE website and DoEE 2016a).		Primarily herbivorous, foraging on algae, seagrass and mangroves. In their pelagic juvenile stage, they feed on algae, pelagic crustaceans and molluscs	Carnivorous, feeding predominantly on benthic invertebrates in habitats ranging from near shore to 55 m. During their post-hatchling stage, they feed on algae, pelagic crustaceans and molluscs	Oceanic and Therefore, remain planktivorous throughout their life, feeding on jellyfish and large planktonic ascidians (e.g. sea squirts) in the water column

6.1.4 Birds

Marine waters and coastal habitat in the EMBA contain habitats that are important to birds, including offshore islands, sandy beaches, tidal flats, mangroves and coastal and pelagic waters. These habitats support a variety of birds which utilise the area in different ways and at different times of the year (DSEWPaC 2012a). Birds can be broadly grouped according to their preferred foraging habitat as coastal/ terrestrial birds, seabirds and shorebirds.

Coastal or terrestrial species inhabit the offshore islands and coastal areas of the mainland throughout the year and are either primarily terrestrial or they may forage in coastal waters. Resident coastal and terrestrial species include species such as the osprey (*Pandion haliaetus*) (DEWHA 2008a).

Shorebirds, including waders and wetland birds, inhabit the intertidal zone and adjacent areas. Some shorebird species are resident while others are migratory and include species that utilise the East Asian–Australasian Flyway. Shorebirds that regularly migrate through the area include the Scolopacidae (curlews, sandpipers etc.) and Charadriidae (plovers and lapwings) families.

Seabirds include those species whose primary habitat and food source is derived from pelagic waters and spend the majority of their lives at sea, ranging over large distances to forage over the open ocean. Seabirds present in the area include terns, petrels, shearwaters, tropicbirds, frigatebirds, boobies and albatrosses (DEWHA 2008a).

A search of the PMST in August 2024, revealed 63 listed bird species, 29 of which are classified as threatened and may occur within the EMBA. Further information on these species is provided below. The protected matters search also identified numerous migratory marine bird species and migratory wetland bird species that may occur within the EMBA. There have been eight birds identified that have BIAs within the EMBA (Table 6-2). Figure 6-11 shows the location of the BIAs within the EMBA and operational area.

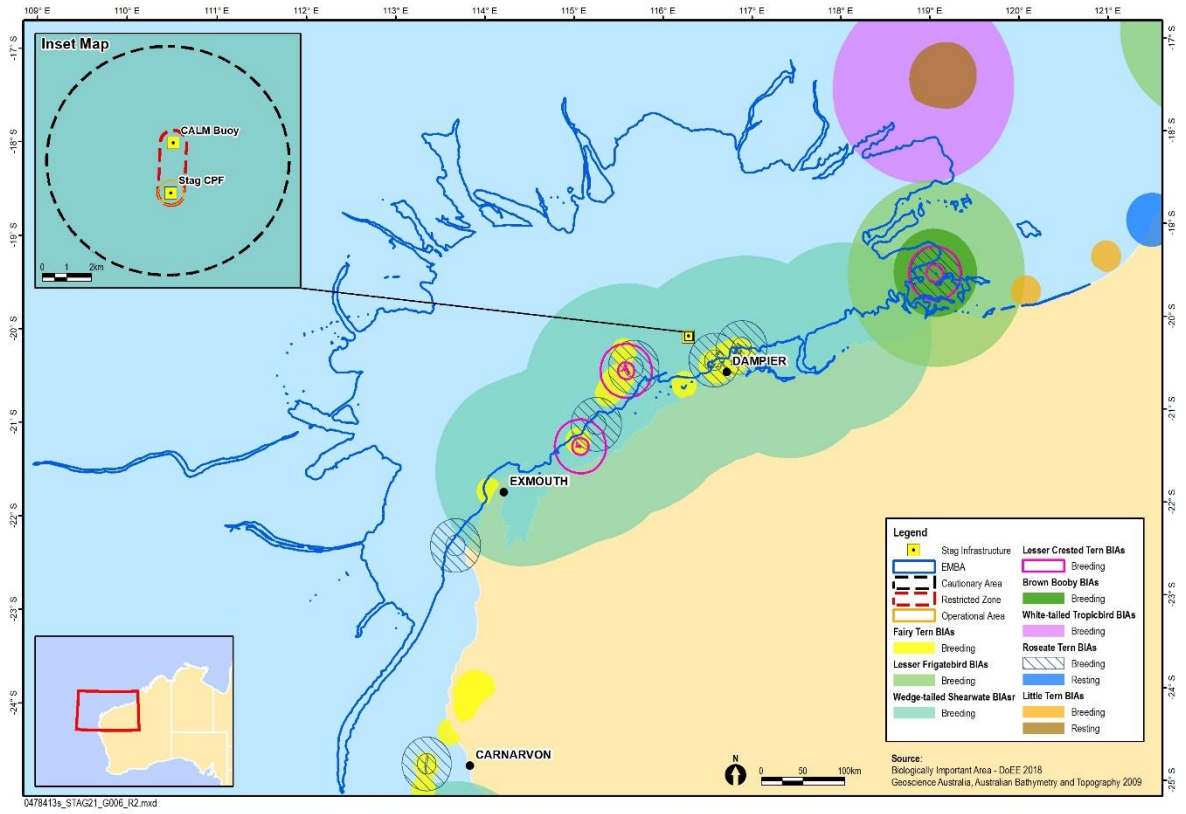

Figure 6-11: BIAs for seabirds within the EMBA

6.1.4.1 Shorebirds

Ruddy Turnstone

Ruddy turnstones are a migratory bird, breeding in the northern hemisphere and flying south for the boreal winter (Marchant & Higgins 1993).The ruddy turnstone is widespread within Australia during its non-breeding period of the year.

Ruddy turnstones typically roost along platforms and shelves of rock, shingle, or gravel beaches, often with shallow tidal pools nearby. They can also be found roosting along sand, coral, or shell beaches, and along shoals, cays, and dry ridges of sand or coral beaches. Ruddy turnstones have occasionally been sighted roosting in estuaries, harbours, bays, and coastal lagoons among low saltmarsh, or on exposed beds of seagrass, around sewage ponds and on mudflats. In north Australia, they are known to occur in a wide variety of habitats and may prefer wide mudflats. In southern Australia, the ruddy turnstone prefers rockier coastlines and are less numerous on large embayments with extensive mudflats.

Sharp-tailed sandpiper

They are widespread from Cape Arid to Carnarvon, around coastal and subcoastal plains of Pilbara Region to south-west and east Kimberley Division (Higgins & Davies 1996). Internationally important sites include Eighty Mile Beach (25 000 individuals); Port Hedland Saltworks (20 000 individuals) Lake Gregory (10 000 individuals) and Peel-Harvey system (4 030 individuals).

In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (Higgins & Davies 1996)

Red knot

The red knot is a migratory shorebird and the species includes five subspecies, including two found in Australia, *Calidris canutus piersmai* and *Calidris canutus rogersi*. The red knot breeds in Siberia and spends the non-breeding season in Australia and New Zealand. Non-breeding season is spent on tidal mudflats or sandflats where they feed on intertidal invertebrates, especially shellfish (Garnett et al. 2011).

Curlew sandpiper

This species is a migratory shorebird that breeds in north Siberia and spends the non-breeding season from western Africa to Australia (Bamford et al. 2008). The curlew sandpiper occurs around coastal Australia and preferred habitats include coastal brackish lagoons, tidal mud and sand flats, estuaries, saltmarshes and less often inland. Their diet is mainly comprised of polychaete worms, molluscs and crustaceans (Higgins & Davies 1996 in Garnett et al. 2011).

Great knot

The great knot is a migratory shorebird with a global distribution, breeding in north-east Siberia and spending the non-breeding season along coasts from Arabia to Australia. Non-breeding birds migrate to inlets, bays, harbours, estuaries and lagoons with large intertidal mud and sand flats where they feed on bivalves, gastropods, crustaceans and other invertebrates (Higgins & Davies 1996 in Garnett et al. 2011).

Greater and Lesser sand plover

The greater sand plover (Mongolian) and lesser sand plover are cogeners that breed in China, Mongolia and Russia. The greater sand plover spends the non-breeding season along coasts from Japan through southeast Asia to Australasia, while the lesser sand plover spends the non-breeding season along coasts from Taiwan to Australasia (Bamford et al. 2008). Non-breeding birds occur along all Australian coasts, especially in the north for the greater sand plover (CoA 2015) and in the east for the lesser sand plover (CoA 2015).

Non-breeding birds forage on beaches, saltmarshes, coastal bays and estuaries, and feed on marine invertebrates including molluscs, worms, crustaceans and insects (Marchant & Higgins 1993 in Garnett et al. 2011).

Red Goshawk (Endangered)

Red goshawks are currently known to breed from the Kimberley, east to Cape York Peninsula, and on the Tiwi Islands (MacColl et al. 2021). They may still breed at very low densities in the Wet Tropics and Einasleigh Uplands though record data are scarce (MacColl et al. 2021). The species inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests (Marchant & Higgins 1993).

Asian Dowitcher

The Asian dowitcher is a regular visitor to the north-west between Port Hedland and Broome. Elsewhere they are sporadic and rare. In the NT, the Asian dowitcher is found in Darwin and Arnhem Land. In WA, the species has been recorded at Albany, Lake McLarty, Lake McLeod, north-east Pilbara and the south-west Kimberley division. It has also been recorded at the Port Hedland Saltworks, Roebuck Bay, Ashmore Reed and Eighty Mile Beach. The Australian population is approximately 500 (Bamford et al. 2008).

Bar-tailed godwit (Northern Siberian)

Two subspecies of the bar-tailed godwit exist, as determined by their breeding locations in Siberia and Alaska (Bamford et al. 2008). Non-breeding birds migrate to the coasts of Australia. The western Alaskan subspecies occurs especially on the north and east coasts of Australia whilst the northern Siberian subspecies occurs especially along the coasts of North-Western Australia (CoA 2015).

Non-breeding birds are found on muddy coastlines, estuaries, inlets, mangrove-fringed lagoons and sheltered bays, feeding on annelids, bivalves and crustaceans (Higgins and Davies 1996 in Garnett et al. 2011).

White winged fairy wren

The White-winged Fairy-wren (*Malurus leucopterus edouardi*) (Barrow Island) is endemic to Australia. It is only found on Barrow Island (Garnett & Crowley 2000; Schodde & Mason 1999), which lies off the coast of Western Australia.

The White-winged Fairy-wren (Barrow Island) occurs in grasslands and low shrublands. These habitats consist of a dense ground cover comprised of species of *Triodia* (such as *T. wiseana* and *T. angusta*), usually more than 400 mm in height, with patches of bare ground, and often with scattered clumps of shrubs (especially *Acacia bivenosa*, *A. coriacea* and *Melaleuca cardiophylla*) that are used for shelter and for foraging, nesting and roosting (Bamford & Bamford 2005, Bamford & Wilcox 2005; Pruett-Jones & Tarvin 2001; Sedgwick 1978; Storr 1984b; Whitlock 1918; Wooller & Calver 1981).

The White-winged Fairy-wren (Barrow Island) is most common in *Triodia*-dominated habitats on shallow soil on limestone ridges and rises, but it also occurs on sand dunes in coastal and inland areas (including on sand-loam soils in valleys and on plains), and occasionally on clay pans (Ambrose & Murphy 1994; Bamford & Bamford 2005; Pruett-Jones & Tarvin 2001; Sedgwick 1978; Whitlock 1918).

Eastern curlew

The Eastern Curlew is a migratory shorebird that breeds in Siberia, Kamchatka and Mongolia and migrates to coastal East Asia and Australia. The South Korean Yellow Sea is an important staging post for this species. Non-breeding birds occur around coastal Australia, are more common in the north and have disappeared or become much rarer at many sites along the south coast (Garnett et al. 2011).

Non-breeding birds are present at estuaries, mangroves, saltmarshes and intertidal flats, particularly those with extensive seagrass (Zosteraceae), where they feed on marine invertebrates, especially crabs and small molluscs (Higgins & Davies 1996 in Garnett et al. 2011).

Grey Plover

The grey plover is a migratory shorebird, breeding in the northern hemisphere and flying south for the boreal winter (Dement'ev & Gladkov 1951; Bent 1962; Cramp & Simmons 1983; Urban et al. 1986; Lane

1987; Marchant & Higgins 1993). During the austral summer non-breeding season, the grey plover is a regular migrant to Australia. The species has been recorded throughout all states around Australia but is primarily found along the west and south coasts. The largest populations are found between the Coorong and western beaches of the Eyre Peninsula in South Australia, and along the coast of Western Australia between Albany and the northern Kimberley (Blakers et al. 1984; Lane 1987; Barrett et al. 2003). Western Australian sites support about 38 percent of the species' Australian population (Weller et al. 2019), of which only four percent of individuals can be traced to Wrangel Island (i.e., P. s. tomkovichi).

Roosting habitat occurs almost entirely in sheltered embayments, estuaries, and lagoons with sandy areas such as on unvegetated sandbanks or sand-spits (Pegler 1983; Jaensch et al. 1988). Individuals are also often seen roosting in small numbers on mangrove mudflats. They occasionally occur on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. Grey plovers also occur around terrestrial wetlands such as near-coastal lakes and swamps, salt-lakes, or claypans two km from the sea (Marchant & Higgins 1993; Collins et al. 2001).

Common greenshank

The common greenshank occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west. In the Kimberley region, it is recorded in the south-west and the north-east, with isolated records from the Bonaparte Archipelago. WA has three sites of international importance for the common greenshank which include Eighty Mile Beach (2,240 individuals); Wilson Inlet (568 individuals); and Roebuck Bay (560 individuals). The Common Greenshank does not breed in Australia, however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia (Higgins & Davies 1996).

Terek Sandpiper

The main breeding range of terek sandpiper is in northern Russia. In Australia, the terek sandpiper has a primarily coastal distribution, with occasional inland records. The species is more widespread and common in northern and eastern Australia than southern Australia. In Western Australia (WA), the terek sandpiper is rarely seen on the south coast: occasionally around Eyre and several records around Albany. On Swan River plain, it has been recorded between Bunbury and the mouth of the Moore River. The species is widespread in the Pilbara region and Kimberley Division, from Dampier to Wyndham, with occasional records around Shark Bay (DCCEEW 2024j). Internationally important sites include Eighty Mile Beach (8,000 individuals); and Roebuck Bay (1,840 individuals).

6.1.4.2 Seabirds

Wedge-tailed Shearwater (Migratory)

The Wedge-tailed Shearwater breeds on the east and west coasts of Australia and on off-shore islands. The species is common in the Indian Ocean, the Coral Sea and the Tasman Sea. Areas where breeding within Western Australia occurs include offshore islands and Cocos-Keeling Islands (Lindsey 1986).

In 2016/17, areas of potential wedge-tailed shearwater nesting habitat were recorded on Varanus Island (5.53 ha) and Airlie Island (12.47 ha) and surrounding islands of Bridled (2.94 ha), Serrurier (130.89 ha), Abutilon (2.02 ha) and Parakeelya (1.66 ha) (Astron 2017b). The number of wedge-tailed shearwater breeding pairs was also estimated for each of Varanus (1,492 +/- 702), Airlie (600 +/- 124), Bridled (1,039 +/- 342), Serrurier (23,240 +/- 4,341), Abutilon (317 +/- 210) and Parakeelya (172 +/- 138) islands (Astron 2017b).

The Wedge-tailed Shearwater (*Ardenna pacifica*) has a breeding BIA that overlaps the OA and the EMBA (Figure 6-11).

Lesser Frigatebird

The lesser frigatebird (*Fregata ariel*) is considered the most common and widespread frigatebird over Australian seas (Lindsey 1986). They are commonly found in tropical seas, breeding on remote islands (Marchant and Higgins 1990). A BIA has been identified for this species at Ashmore Reef and Cartier Island

to highlight breeding and foraging behaviours in the area (DoEE 2017b). The Operational area does not overlap with this BIA, however the BIA overlaps with the wider EMBA (Figure 6-11). Breeding is known to occur between March and September.

Southern giant petrel

The southern giant petrel is listed as endangered and migratory under the EPBC Act and is a highly migratory bird which have a large natural range. This species occurs from Antarctic to subtropical waters, so while this species may over-fly the Stag Facility from time-to-time in transit or for foraging, they do not use the area for breeding (August and September) or resting as there are no critical nesting (eggs hatch between October and November) or feeding areas within the EMBA.

Northern giant petrel

The northern giant petrel occupies the Antarctic Polar Front. In summer, it occurs predominantly in sub-Antarctic to Antarctic waters, usually between 40 and 64°. The northern giant-petrel breeds on sub-Antarctic islands. Its breeding range extends into the Antarctic zone at South Georgia. It nests in coastal areas where vegetation or broken terrain offers shelter, on sea-facing slopes, headlands, in the lee of banks, under or against vegetation clumps, below cliffs or overhanging rocks, or in hollows. On Campbell Island, it nests on the edge of the coastal plateau. Tussock-grass is widespread at many breeding sites. Its nests are built in secluded, coastal sites, sheltered by heavy vegetation. On Antipodes Island, it nests under Senecio antipoda (Marchant & Higgins 1990).

The AMSIS (Geoscience 2023) does not identify any BIAs for this species in the EMBA.

Abbott's booby

Currently, Abbott's booby is only known to breed on Christmas Island and to forage in the waters surrounding the island and south-east Asia (TSSC 2020a). Abbott's Booby is a marine species. It spends much of its time at sea but needs to come ashore to breed. It is thought that they may travel up to 400 km to feeding grounds when they are breeding (Becking 1976). Within Christmas Island, most nests are found in the tall plateau forest on the central and western areas of the island, and in the upper terrace forest of the northern coast. The National Conservation Values Atlas does not identify any BIAs for this species in the EMBA.

Christmas Island white-tailed tropicbird

The Christmas Island white-tailed tropicbird is endemic to Christmas Island and leaves the island to forage in the warm waters of the Indian Ocean (Garnett et al. 2011). The white-tailed tropicbird roots at sea; only incubating or brooding adults remain on nests on the island at night (Stokes 1988).

White-tailed Tropicbird

The white-tailed tropicbird (*Phaethon lepturus*) is primarily oceanic in tropical waters, rarely inshore, and only is near land when breeding. Nests are located on islands and atolls utilising a variety of habitats from closed canopy rainforest to bare sandy ground and rugged rocky terrain (Marchant & Higgins 1990).

The White-tailed tropicbird has a breeding BIA that overlaps the EMBA only (Figure 6-11).

Red-tailed Tropicbird

The Red-tailed Tropicbird breeds in tropical and subtropical areas of the Indian and Pacific Ocean (Schreiber and Schreiber 2020). It typically breeds on islands, but can also be found on the south-west coast of Australia. This species feeds mostly on fish, especially flying-fish, large quantities of squid and occasionally crustaceans. Prey is caught by plunge-diving, but flying-fish can be taken in flight. Breeding occurs seasonally in loose colonies on small, remote oceanic islands mostly on inaccessible cliffs. No regular migrations are known; adults can be found in the vicinity of colonies all year round (del Hoyo et al. 1992).

Soft-plumaged petrel

The soft-plumaged petrel is listed as vulnerable under the EPBC Act. As a mainly sub-Antarctic species they are usually seen in cooler seas but have been noted off southeast Australia between 9.8–21°C (Reid et al. 2002) and are widespread during winter and summer. As with the southern giant petrel, this species may occur foraging or flying over Operational Area waters, but there are no critical nesting or feeding areas known within the EMBA.

Australian painted snipe

The Australian Painted Snipe is a wading bird that has been recorded at wetlands in all states of Australia (Barrett et al. 2003; Blakers et al. 1984; Hall 1910). It is most common in eastern Australia but has been recorded less frequently in Western Australia (Barrett et al. 2003; Blakers et al. 1984; Marchant and Higgins 1993; Rogers et al. 2005).

The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (Melaleuca). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (Marchant and Higgins 1993). Within the EMBA, the most likely habitat for this species, and therefore likelihood of occurrence, is the wetlands of Eighty Mile Beach and Roebuck Bay (Bennelongia 2009; Hale and Butcher 2009).

Little Tern

The species is widespread in Australia, with breeding sites widely distributed from north-western Western Australia, around the northern and eastern Australian coasts to south-eastern Australia. In a summary of known Australian breeding sites, Garnett and Crowley (2000) indicate: several colonies exist in Western Australia and at least 37 colonies in the Northern Territory (possibly as many as 62+). In Australia, Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches.

The Little Tern (*Sternula albifrons*) has a breeding BIA that overlaps the EMBA only (Figure 6-11).

Roseate Tern

The Roseate tern occurs in both coastal and marine subtropical/tropical areas. The species inhabits rocky and sandy beaches, coral reefs, sand cays and offshore islands (DAWE 2021). In Western Australia, the Roseate terns are regularly recorded north from Mandurah to Eighty Mile Beach, in the Pilbara Region (DAWE 2021). Around the Kimberley coastline, the species occurs at scattered sites, north to the Bonaparte Archipelago and potentially further (DAWE 2021). The movements of the Roseate tern are poorly known. Breeding in Western Australia occurs in two quite distinct periods, with peak months for laying April to November. At some sites including the Montebello Islands breeding occurs during both late spring-summer and late autumn-winter (DAWE 2021).

The Roseate Tern (*Sterna dougalii*) has a breeding BIA that overlaps the EMBA (Figure 6-11).

Australian fairy tern

Within Australia, the fairy tern occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia, occurring as far north as the Dampier Archipelago near Karratha. The fairy tern nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (Higgins and Davies 1996; Lindsey 1986). The bird roosts on beaches at night (Higgins and Davies 1996). The fairy tern predates on small bait-sized fish (Van de Kam et al. 2004) by diving in shallow waters.

A breeding BIA has been identified that overlaps the EMBA (Figure 6-11).

Many of the islands and rocks in the Dampier Archipelago/Cape Preston region are known breeding grounds for a variety of seabirds, including wedge-tailed shearwaters (*Puffinus pacificus*), caspian terns (*Sterna caspia*), bridled terns (*Sterna anaethetus*) and roseate terns (*Sterna dougallii*). The small islands and islets such as Goodwyn Island, Keast Island and Nelson Rocks provide important, undisturbed nesting and refuge sites (CALM 2005b).

One-third of the 144 bird species recorded on North-West Cape are seabirds, shorebirds and waders (resident and migratory). There are approximately 33 species of seabirds found in the Ningaloo Marine Park with the main rookeries at Mangrove Bay, Mangrove Point, Point Maud, the Mildura wreck site and Fraser Island. In addition, the Muiron and Sunday islands provide isolated rookeries (CALM 2005a).

Brown Booby

The Brown booby occurs in, but is not restricted to, tropical waters of all major oceans. They often stay close to their breeding islands. The species is also known to be present along coastal waters, harbours and estuaries; however, they seldom fly over land. The Brown booby generally feeds in inshore water, in both shallow and deep waters (DoEE 2019). The Brown booby nests on rugged rocky terrain such as cliffs and steep slopes, on larger islands, beaches, coral rubble and guano flats on cays (DoEE 2019). The species is known to be resident and partly nomadic (i.e. birds dispersing widely between breeding seasons). Breeding occurs on Ashmore Reef, Adele Island, White Island, Lacepede Islands and Bedout Island.

The Brown Booby (*Sula leucogaster*) has a breeding BIA that overlaps the EMBA only (Figure 6-11).

Albatross

A protected matters search of the waters in the area of interest identified four albatross species (Campbell, shy, black-browed, Indian yellow nosed and white-capped) that may occur in the area. All of the identified species predominantly occur in subantarctic to subtropical waters and breed on islands in the southern oceans (CoA 2015).

The AMSIS (Geoscience Australia 2023) and the National Recovery Plan for albatrosses and petrels (2022) (CoA 2022) do not identify any BIA for albatrosses within the EMBA.

Table 6-4: Seabird BIAs that overlap the EMBA

Species	BIA Location	Peak times
Australian Fairy Tern	Breeding: Pilbara coast incl. Dampier Archipelago and Barrow Island.	July to late September
Lesser Frigatebird	Breeding and 100 km foraging buffer: Bedout Island	March to September
White-tailed tropicbird	Breeding and foraging with 100 km buffer: Rowley Shoals	May to Oct
Wedge tailed shearwater	Foraging and breeding with 100 km buffer along Pilbara coastline and islands including: Dampier Archipelago, Passage Island, Montebello Islands, Lowendal Islands off Barrow Island and islands off Onslow	Mid Aug to April
Little tern	Breeding: Pilbara coastline along Eighty Mile Beach Resting: Rowley Shoals	June- July and Oct
Roseate tern	Breeding: Islands off Pilbara coast including Dampier Archipelago, Lowendal Is, Frazer I, Bedout Island and around Montebello Islands Resting: North Eighty Mile Beach	Mid-March to July
Brown booby	Breeding and foraging: Bedout Island	Feb to Oct, but mainly Autumn

Species	BIA Location	Peak times
Lesser Crested Tern	Breeding: islands off north and west Kimberley also Bedout Island, Lowendal Islands, Thevenard Island. This species is listed marine but is not identified as threatened or migratory.	March to June

Eighty Mile Beach is particularly significant for migrating shorebird species and is considered one of the most significant sites in Australia for migratory shorebirds (Hale and Butcher 2009) as well as supporting a high diversity and abundance of wetland birds. Although many birds may then move further on their journey, many others remain at the site for the non-breeding period. Eighty Mile Beach is considered the most significant site (in terms of numbers of birds) in the South-East Asian Flyway for nine international migratory species; Bar-tailed Godwit; Terek Sandpiper, Grey-tailed Tattler, Great Knot, Red Knot, Curlew Sandpiper; Greater Sand Plover, Oriental Plover and Oriental Pratincole (Hale and Butcher 2009). Further information on Eighty Mile Beach Ramsar Site is in Section 6.2.

Table 6-5: Summary of environmental sensitivities for marine fauna within the Operational Area and EMBA

Marine fauna		Operational Area	EMBA
Plankton	Plankton	Yes - Phytoplankton and zooplankton present within the operational area. Higher concentrations occurring during the winter months (Jun–Aug) during the activity and lower in summer months (Dec–Mar).	Yes - Phytoplankton and zooplankton present within the EMBA. Higher concentrations occurring during the winter months (Jun–Aug) and lower in summer months (Dec–Mar).
Invertebrates	Benthic	Yes – primarily infaunal species	Yes – will contain both mobile and sessile epifauna and infaunal
	Pelagic	Yes – includes squid, salps and jellyfish	Yes – includes squid, salps and jellyfish
Fish	Demersal and/or pelagic fish	Yes – Both demersal and pelagic fish species present. Stag Facility infrastructure likely attracts a greater diversity and abundance of fishes than would naturally occur on the soft sediments within the Operational Area. Offshore soft sediment habitat generally supports a lower diversity than other benthic habitats that provide greater structure and feeding opportunities (e.g. rocky and coral reef, seagrass and macroalgae, mangroves)	Yes - Diverse assemblage of demersal and pelagic species distributed throughout the EMBA. Three KEFs within the EMBA likely to support high fish diversity and abundance: Glomar Shoals, Continental Slope Demersal Fish Communities. Shallow water primary producer habitats close to mainland shorelines and offshore islands within the EMBA (e.g. seagrass, macroalgae, hard coral and mangroves) support high abundance and diversity of fishes.
	Grey nurse shark	Yes - Could occur as the Operational Area is within depth range (<200 m) but presence is unlikely since there is lack of natural structured habitat in the Operational Area. Operational area is flat bare sand.	Yes – Likely occurs as residents in some areas where habitat favourable (e.g. near inshore rocky and coral reefs between depths of 10–45 m)
	Great white shark	Yes - Could transit through the Operational Area although unlikely to be present for extended durations since white sharks are highly mobile species that follow seasonal feeding opportunities (e.g. whale migrations, pinniped colonies) in primarily coastal waters.	Yes – Likely to transit through and feed within the EMBA where feeding opportunities present (e.g. whale migrations, pinniped colonies) in primarily coastal waters.
	Whale shark	Yes - Could transit through the operational area, particularly around the time of aggregation at Ningaloo Reef (late March to June)	Yes - Will transit through and aggregate within the EMBA. Main period of the whale shark aggregation off Ningaloo Reef is late March to June, with the largest numbers generally recorded in April
	Sawfish	No - Given their preference for shallower estuarine and coastal waters, they are unlikely to be encountered within the Operational Area.	Yes - Could occur in estuaries and nearby coastal mangrove areas and shallow waters particularly the northern mainland coastline of the EMBA.

Marine fauna		Operational Area	EMBA
	Other shark/ ray species	Yes - Could transit through the operational area.	Yes - Could transit through the EMBA.
Marine mammals	Pygmy Blue whale	Yes - Northern migration in April-August and southern migration Oct–Dec. May transit through the Operational Area although migration routes believed to occur in deeper waters	Yes - EMBA overlaps migration routes in water depths of 500–1,000 m.
	Humpback whale	Yes - Peak northern migration around July. Peak southern migration around Aug/September. Greater likelihood of individuals during northern as opposed to southern migration May transit through the Operational Area as within depth range of migration routes	Yes - EMBA overlaps known migration routes and presence is reliable during migration season.
	Southern right whale	No -	Yes – EMBA overlaps migration routes
	Dugongs	No – Given their preference for shallower waters near seagrass meadows dugongs are unlikely to be encountered within the Operational Area	Yes-Dugongs occur within the EMBA associated with seagrass meadow habitat in coastal waters of the mainland or offshore islands.
	Cetacean – various whales and dolphins	Yes – A number of whale and dolphin species may transit the Operational Area. Whales are likely to be transiting during migrations while dolphins may be part of resident coastal populations.	Yes - Could occur transiting through the EMBA but not expected in large numbers as they are either infrequently recorded in Australian waters or primarily migrating through deeper waters. Dolphins may be feeding/ aggregating in shallow coastal waters of the mainland or offshore islands.
Marine Reptiles	Marine Turtles	Yes - May transit through the Operational Area although unlikely to be encountered in large numbers (with the exception of the flatback turtle, activity location is outside inter-nesting areas, ~35 km from nearest nesting beach at Dampier Archipelago)	Yes - For all species except Leatherback turtle nesting beaches and breeding/feeding areas occur within the EMBA either on the mainland coastline or offshore islands
	Sea snakes and kraits	No – Not likely to be encountered given the water depth and distance from shore	Yes - May be encountered in shallow waters habitats of EMBA where feeding habitat is found.
Avifauna	Wetland/ Shorebirds	No – Given the distance offshore, shorebirds or wetland birds are unlikely to be present within the Operational Area	Yes – May occur within the EMBA along shorelines and wetlands feeding or nesting. Areas of particular importance are the Ramsar

Marine fauna		Operational Area	EMBA
			wetland sites at Eighty- mile Beach. Shorebirds also use Montebello/ Lowendal/Barrow Islands.
	Seabirds	Yes – May use the waters of the Operational Area for feeding and may be attracted to the Stag Facility by increased abundance of pelagic fish or as resting habitat.	Yes – May occur within the EMBA, either feeding, migrating or utilising coastal islands or mainland shores as nesting habitat.

6.2 Protected Areas

A search of the EPBC Act Protected Matters Database in August 2024 listed a number of areas that are considered matters of National Environmental Significance (NES) as well as other matters protected under the Act. Those with marine elements or potentially contacted in the event of a crude spill are outlined in Figure 6-12 and Table 6-6.

and discussed in more detail in the following section; terrestrial protected areas or elements that are already included within existing protected areas (such as within a marine park) are not singled out. Section 6.2.8 addresses other sensitivities such as State Reserves.

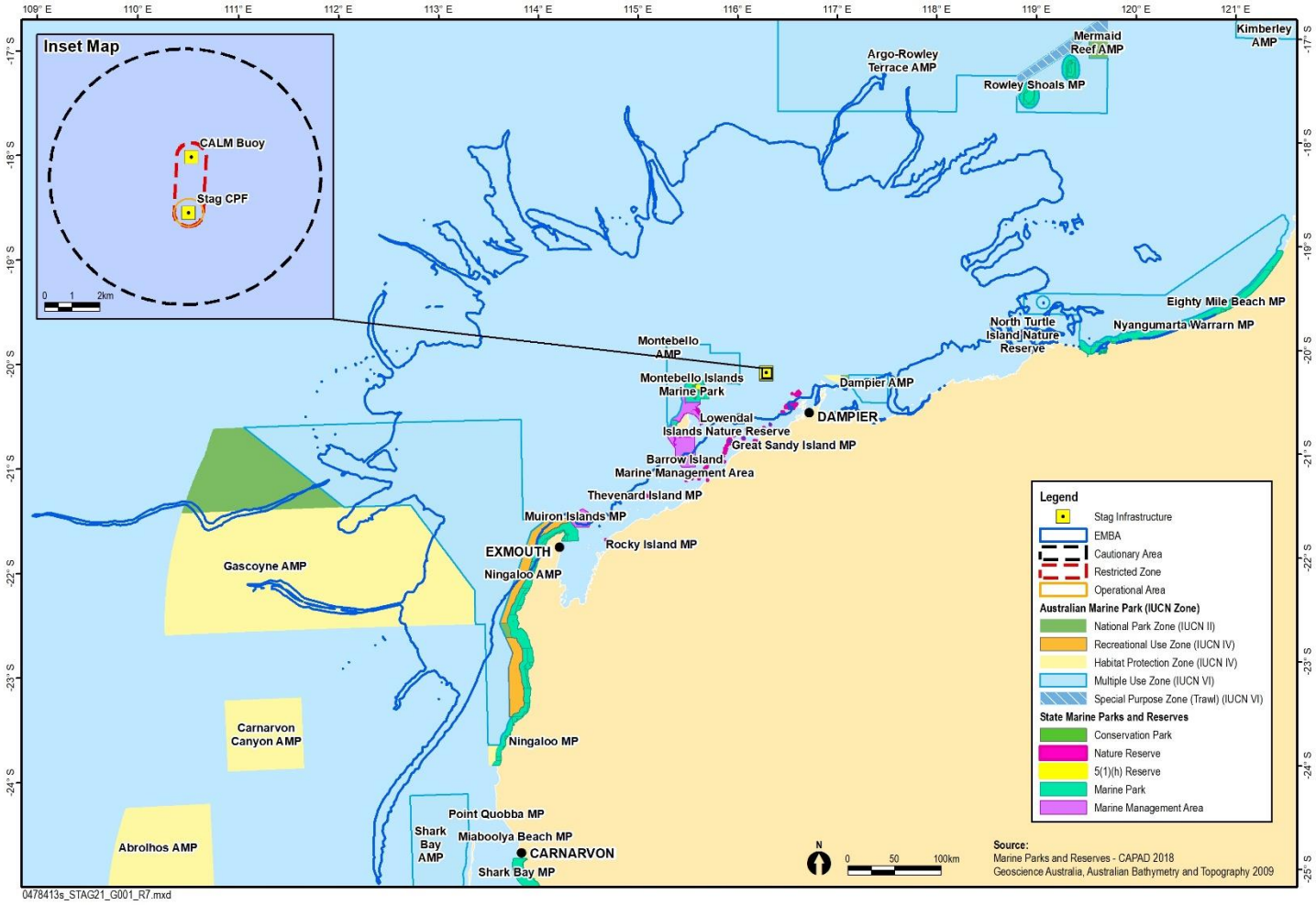

Figure 6-12: Protected areas within the EMBA

Table 6-6: Summary of protected areas (marine) within the EMBA

Area type	Title
World Heritage Area	The Ningaloo Coast
National Heritage Properties	The Ningaloo Coast
	Dampier Archipelago (including Burrup Peninsula)
Commonwealth Heritage Place	Ningaloo Marine Area - Commonwealth Waters
Wetland of International Importance (Ramsar)	Eighty Mile Beach
Wetlands of National Significance	Eighty Mile Beach System
Australian Marine Parks (AMP)	Argo-Rowley Terrace AMP
	Dampier AMP
	Eighty Mile Beach AMP
	Gascoyne AMP
	Montebello AMP
	Ningaloo AMP
Key Ecological Features (KEF)	Ancient coastline at 125 m depth contour
	Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula
	Commonwealth Waters adjacent to Ningaloo Reef
	Continental Slope Demersal Fish Communities
	Exmouth Plateau
	Glomar Shoals
Threatened Ecological Communities	None Identified
State Marine Reserves	Barrow Island Marine Park
	Barrow Island Marine Management Area
	Eighty Mile Beach Marine Park
	Great Sandy Island Nature Reserve
	Montebello Islands Marine Park
	Montebello Islands Conservation Park
	Muiron Island Marine Management Area
	Ningaloo Marine Park
	Nyangumarta Warrarn Indigenous Protection Area

6.2.1 World Heritage Properties

One World Heritage Property, The Ningaloo Coast, overlaps the EMBA. The Ningaloo Coast was granted World Heritage Status in June 2011. The World Heritage Area (WHA) encompasses an area of 7,050 km2, including State and Commonwealth waters, extending 25 km offshore. The WHA is primarily comprised of the Ningaloo Marine Park (State waters and the adjoining Commonwealth waters section). Also included

are the Muiron Islands MMA and Nature Reserve, the Bundegi and Jurabi coastal parks and the Cape Range National Park, plus crown, leasehold and freehold land. The Area is managed under the Ningaloo Coast Strategic Management Framework agreed by State and Commonwealth governments. Both state and commonwealth marine parks and reserves are managed on a day to day basis by the Department of Biodiversity, Conservation and Attractions (DBCA) on behalf of the respective authorities.

The Marine Parks and Reserves protect most of the Ningaloo Reefs, which stretch 290 km from North-West Cape south to Red Bluff comprising the 200 km long Ningaloo Barrier Reef enclosing a lagoon that varies in width from 200 m to 7 km, and extensive fringing reefs to the north and south of the barrier (Westera et al. 2003). Gaps that regularly intercept the main reef line provide channels for water exchange with deeper, cooler waters (CALM 2005a). The Ningaloo Coast WHA forms the backbone of the nature-based tourism industry in the Exmouth region.

Key features that supported the WHA listing of the Ningaloo Coast (UNESCO 2013; Commonwealth of Australia 2010) include:

- Landscapes and seascapes of the property are comprised of mostly intact and large-scale marine, coastal and terrestrial environments
- Over 300 species of coral
- Over 650 species of mollusc (clams, oysters, octopus, cuttlefish, snails)
- More than 1,000 species of fish including over 700 species of reef fish
- 600 species of crustacean
- 155 species of sponges
- A high diversity of echinoderms (sea stars, sea urchins, sea cucumbers) including 25 new species
- Habitat for iconic species, including whales, dugong, whale sharks and turtles.

The Parks and Reserves included in the WHA are also important habitat for migratory seabirds and waders, including migratory wading birds listed in the CAMBA and JAMBA agreements (CALM 2005a).

6.2.2 National Heritage Properties

There are two National Heritage Properties that overlap with the EMBA:

- Ningaloo Coast
- Damper Archipelago (including Burrup Peninsula)

Dampier Archipelago was included on the National Heritage List in July 2007. Approximately 36,860 ha at Dampier were listed; comprising parts of the Burrup Peninsula and surrounding islands (Figure 6-13). Reefs, shoals and islands of the Dampier Archipelago provide important habitat for many native plant and animals. The Burrup Peninsula has been nominated for UNESCO World Heritage listing (in June 2018) and includes Aboriginal rock art where engravings provide an outstanding visual record of Australia's history. The area contains one of the densest concentrations of rock engravings in Australia with some sites containing thousands or tens of thousands of images. There is a high density of stone arrangements on the Burrup Peninsula including standing stones, stone pits and more complex circular stone arrangements (CoA 2007).

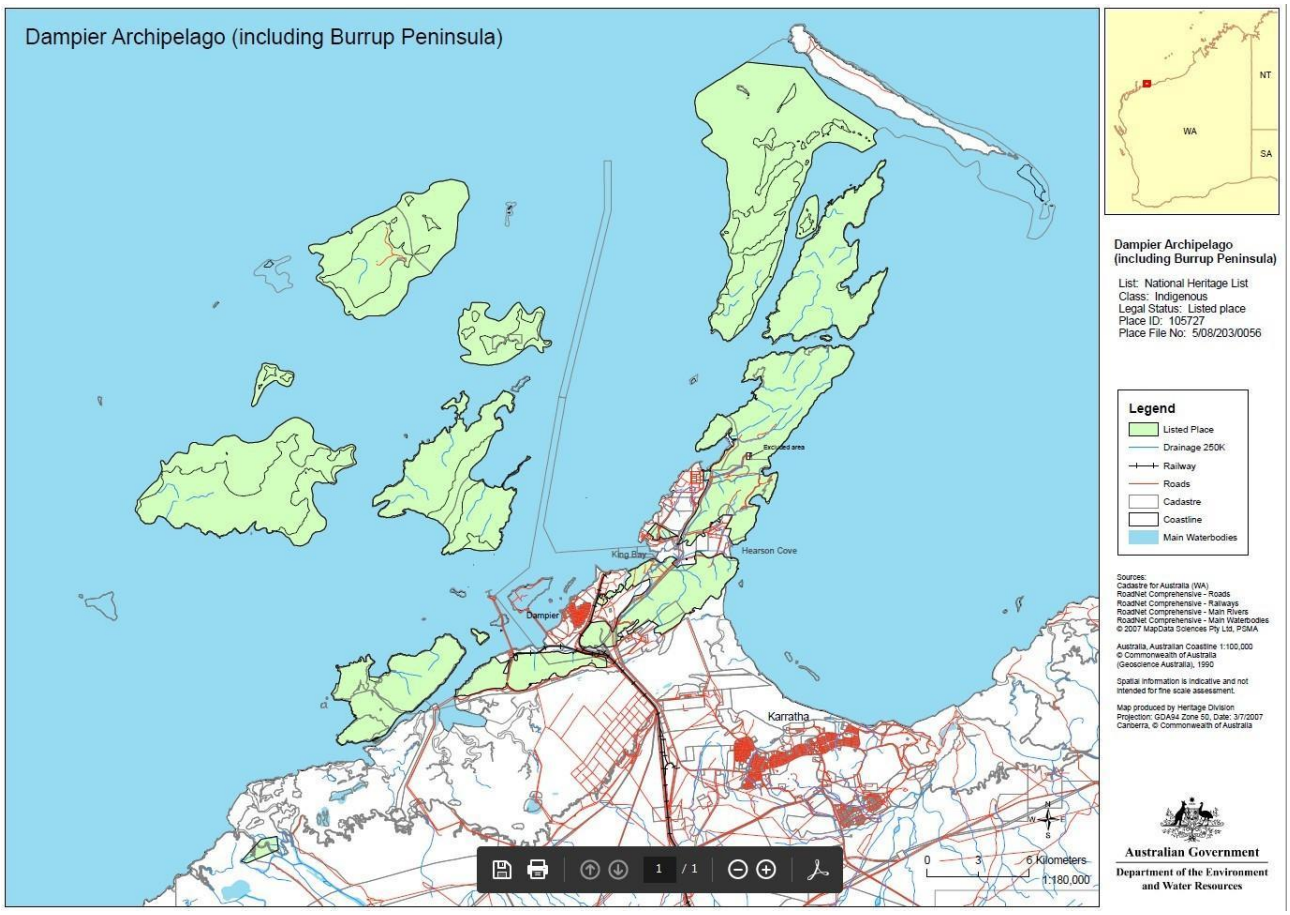

Figure 6-13: National Heritage features of the Dampier Archipelago

6.2.3 Commonwealth Heritage Places

One Commonwealth Natural Heritage Places was identified from the EPBC Act protected matters search of the EMBA area; the Ningaloo Marine Area – Commonwealth Waters. Ningaloo Reef Area has been described in Section 6.2.7.7 ('The Ningaloo Coast').

6.2.4 Ramsar Wetland Sites

A 'declared Ramsar wetland' is a wetland area of international importance that has been designated under Article 2 of the Ramsar Convention or declared by the Minister to be a declared Ramsar wetland under Section 16 of the EPBC Act. There is one declared Ramsar site within the EMBA: Eighty- mile Beach. Roebuck Bay Ramsar site is not overlapped by the EMBA and will not be affected by an unplanned hydrocarbon spill, and so is not discussed further.

Eighty Mile Beach

The Eighty Mile Beach Ramsar site comprises a 220 km beach between Port Hedland and Broome with extensive intertidal mudflats and Mandora Salt Marsh, located 40 km east (Hale and Butcher 2009) totalling 175,487 ha. Eighty Mile Beach is characterised by extensive mudflats supporting an abundance of macroinvertebrates which provide food for large numbers of shorebirds.

Eighty Mile Beach is one of the most important sites for migratory shorebirds in the East Asian Australasian Flyway, with 42 migratory shorebird species recorded at this location. It is estimated that 500,000 shorebirds use Eighty Mile Beach as a migration terminus annually (Hale and Butcher 2009), and more than 472,000 migratory waders have been counted on the mudflats during the September to November period. The location of Eighty Mile Beach makes it a primary staging area for many migratory shorebirds on their

way to and from Alaska and eastern Siberia (Hale and Butcher 2009). Although many birds move further on their journey, others remain at the site for the non-breeding period.

Eighty-mile Beach supports more than one per cent of the flyway population (or one per cent of the Australian population for resident species) of 21 waterbirds, including 17 migratory species and four Australian residents. It is one of the most important sites in the world for the migration of Great Knot.

Eighty Mile Beach also supports a high diversity and abundance of wetland birds. A total of 97 wetland bird species have been recorded within the beach portion of the Ramsar site (Hale & Butcher 2009). This includes 42 species that are listed under international migratory agreements CAMBA (38), JAMBA (38) and ROKAMBA (32) as well as an additional 22 Australian species that are listed under the EPBC Act. In addition, there is a single record for Nordmann's Greenshank (*Tringa guttifer*) from the beach, which is listed as endangered under the IUCN Red List.

The Mandora Salt Marsh area contains an important and rare group of wetlands (Lake Walyarta and East Lake), including raised peat bogs, a series of small permanent mound springs and the most inland occurrence of mangroves in WA (Hale and Butcher 2009). A small number of tidal creeks dissect the beach, including Salt Creek which is fed partly from groundwater and has permanent surface water. The Mandora Salt Marsh lakes fill predominantly from rainfall and runoff in the wet season then dry back to clay beds. The mound springs likely come from water deep within the Broome sandstone aquifer rising through fractures in the rock and resulting in permanent mostly freshwater surface water. Flatback turtles (*Natator depressus*), listed as vulnerable under the EPBC Act, regularly nest at scattered locations along Eighty Mile Beach.

Eighty Mile Beach is used for beach-based recreation, including four-wheel driving, motorcycling, fishing and shell collecting. Mandora Salt Marsh is mainly used for cattle grazing. The site is traditionally part of Karajarri Country in the north, Nyangumarta Country in the south and Ngarla Country in the southern end of Eighty Mile Beach. The site has artefacts such as middens, pinka (large baler shells used to scoop and carry water for drinking), wilura (used for sharpening spear heads), axes, and flakes, and kurtanyanu and jungari (grinding stones).

6.2.5 Nationally Important Wetlands

The PMST search highlighted one Nationally Important Wetlands within the EMBA:

- Eighty Mile Beach System

Eighty Mile Beach System

The site comprises Eighty Mile Beach between Cape Missiessy and Cape Keraudren and adjoining tidal mudflats; also, coastal plain with distinct swamps, immediately inland of the beach, mainly near Anna Plains Homestead. Eighty Mile Beach is a megascale (220 km) linear sand-coast; the beach is 100 m wide and includes several muddy, microscale irregular embayments. Adjoining tidal mudflats are 0.5-1 km wide.

The site is one of the most important migration stop-over areas for shorebirds in East Asia–Australasia, supporting more than 300,000 birds. Open-shrubland (mangrove) at the small embayments in periform arrangement; open-tussock grassland in latiform arrangement on the coastal plain, and open-scrub in periform arrangement at the swamps. An outstanding example of a major beach with associated inter-tidal flats and coastal floodplain, located in the arid tropics.

More information on Eighty Mile Beach is presented above in Section 6.2.4.

6.2.6 Key Ecological Features

Six marine key ecological features (KEFs) of the NWMR overlap the EMBA (refer Figure 6-14). These KEFs are considered to be of regional importance for either the region's biodiversity or ecosystem function and integrity. Table 6-7 lists the KEFs together with their distance from the Stag Facility. Details on these KEFs are provided below.

Table 6-7: Distances from Stag facility to key ecological features within the EMBA

Key ecological feature (KEF)	Distance from Stag Facility
Ancient coastline at 125 m depth contour	~70 km
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	~215 km
Commonwealth Waters adjacent to Ningaloo Reef	~260 km
Continental Slope Demersal Fish Communities	~110 km
Exmouth Plateau	~210 km
Glomar Shoals	~70 km

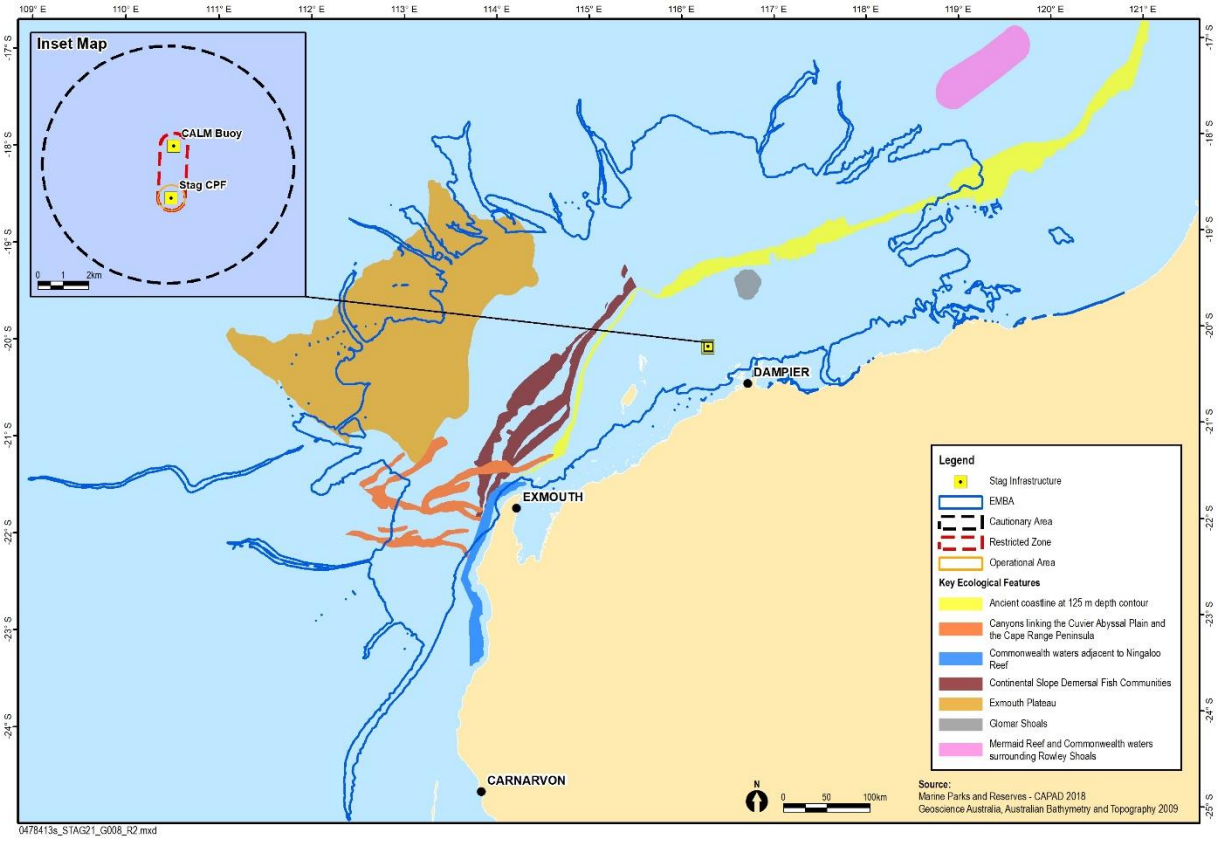

Figure 6-14: Key ecological features

Ancient coastline at 125 m depth contour

The shelf of the NWMR contains several terraces and steps, which reflect the gradual increase in sea level across the shelf that occurred during the Holocene. The most prominent of these occurs episodically as an escarpment through the Northwest Shelf Province and Northwest Shelf Transition, at a depth of approximately 125 m. Where the ancient submerged coastline provides areas of hard substrate it may contribute to higher diversity and enhanced species richness relative to soft sediment habitat.

The escarpment may facilitate increased availability of nutrients in particular locations off the Pilbara coast by disrupting internal waves thereby facilitating enhanced vertical mixing of water layers. Enhanced productivity may attract opportunistic feeding by larger marine life including humpback whales, whale sharks and large pelagic fish.

A study of the ancient coastline conducted in early 2023 reported that 98% of the seabed surveyed was comprised of unconsolidated soft sediment habitat (mud/sand/silt) supporting negligible epibenthic biota (Wakeford et al. 2023). Within surveyed areas, the biological coverage varied between 0.02% and 1.07%. Species composition along the ancient coastline is predominantly made up of filter-feeding organisms (including gorgonians, sponges, and whip corals) whose distribution was notably linked to regions of consolidated hard substrate. The distinct ancient coastline is now largely buried and as such does not provide a unique hard substrate habitat (Wakeford et al. 2023).

Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula

The canyons on the slope between the Cuvier Abyssal Plain and the Cape Range Peninsula include the Cape Range Canyon and the Cloates Canyon. They are believed to be associated with upwelling as they channel deep water from the Argo Abyssal Plain up onto the slope, where it mixes with the overlying water layers at the canyon heads. The upwelling zones at the canyon heads are sites of species aggregations such as sweetlip emperor fish. The soft bottom habitats within the canyons themselves are likely to support important assemblages of epibenthic species. The canyons are thought to be significant contributors to the biodiversity of the adjacent Ningaloo Reef, as they channel deep water nutrients up to the reef, stimulating primary productivity.

Commonwealth waters adjacent to Ningaloo Reef

Ningaloo Reef is globally significant as the only extensive coral reef in the world that fringes the west coast of a continent and as a seasonal aggregation site for whale sharks. The Australian Commonwealth waters adjacent to Ningaloo Reef and associated canyons and plateau are interconnected and support the high productivity and species richness of Ningaloo Reef.

Refer Ningaloo AMP (Section 6.2.7.7) for further details on the values and sensitivities of the KEF.

Continental Slope Demersal Fish Communities

Demersal slope fish assemblages in the Timor Province, the Northwest Transition and the Northwest Province are characterised by high endemism and species diversity. The level of endemism of demersal fish species in these bioregions is high compared to anywhere else along the Australian continental slope. The Northwest Province, specifically the continental slope between North-West Cape and the Montebello Trough, has more than 500 fish species, 76 of which are endemic, making it the most diverse slope bioregion in Australia. The slope of the Timor Province and the Northwest Transition also contains more than 500 species of demersal fish, of which 64 are considered to be endemic, and is the second richest area for demersal fish species across the entire Australian continental slope.

Exmouth Plateau

The Exmouth Plateau covers an area of approximately 50,000 km^2 and consists of a generally rough and undulating surface at water depths of approximately 500 m to more than 5,000 m. The plateau is thought to be dotted with numerous pinnacles. It is an important geomorphic feature that modifies the flow of deep waters and has been identified as a site where internal waves are generated by internal tides. The plateau also receives settling detritus and other matter from the pelagic environment.

Glomar Shoals

The Glomar Shoals are regionally important for their high biological diversity and high localised productivity. The Glomar Shoals are in water depths of 26–70 m and are distinguished by highly fractured molluscan debris, coralline rubble and coarse carbonate sand (Baker et al. 2008). They are an important seafloor feature in Commonwealth waters as they are a raised feature on a relatively featureless continental shelf. They are characterised as a high-energy environment because of current action, thereby resulting in local enhancements in productivity (DSEWPaC 2012c). Enhanced biological productivity supports significant populations of a number of commercially important fish species such as Rankin cod, brownstripe snapper, red emperor, crimson snapper and frypan bream.

6.2.7 Australian Marine Parks

Six Australian Marine Parks (AMPs) overlap the EMBA (Figure 6-15) as outlined in Table 6-8.

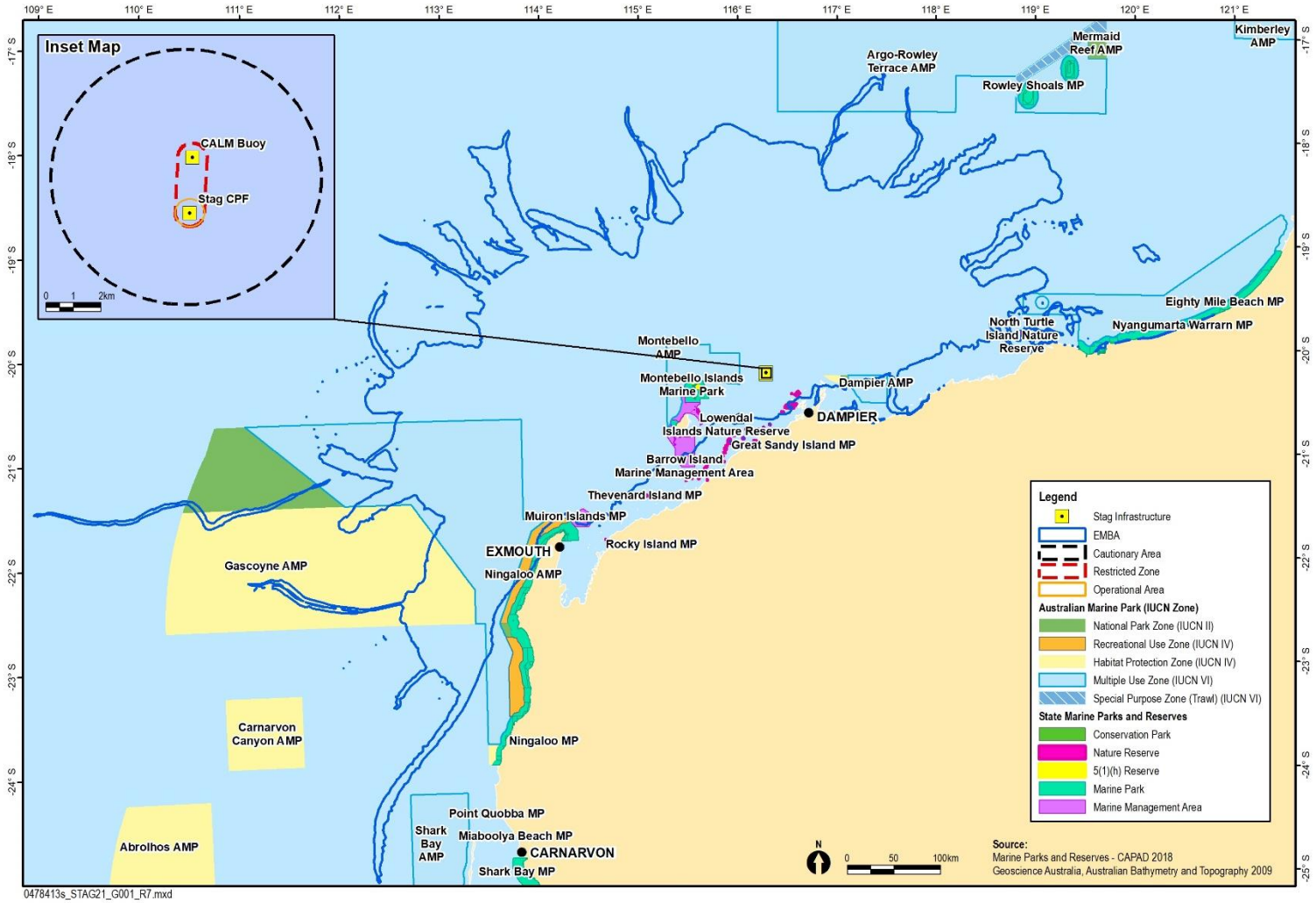

Figure 6-15: Australian Marine Parks and State Marine Reserves

Table 6-8: Australian Marine Parks within the EMBA

Australian Marine Parks	Distance from Stag Facility	IUCN Categories overlapped
Argo-Rowley Terrace AMP	290 km	Marine National Park Zone (IUCN II) Multiple Use Zone (IUCN VI)
Dampier AMP	60 km	Habitat Protection Zone (IUCN IV) Special Purpose Zone (ports) - IUCN Category VI Marine National Park Zone - IUCN Category II
Eighty Mile Beach AMP	280 km	Multiple Use Zone (IUCN VI)
Gascoyne AMP	270 km	Multiple Use Zone (IUCN VI) Marine National Park Zone (IUCN II) Habitat Protection Zone (IUCN IV)
Montebello AMP	30 km	Multiple Use Zone - IUCN Category VI
Ningaloo AMP	260 km	Recreational Use Zone (IUCN IV)

The following descriptions of the major conservation values for each AMP are taken from the Department of the Environment and Energy website.

6.2.7.1 IUCN Principles

Existing and proposed AMPs are subject to the Australian IUCN reserve management principles as presented in Schedule 8 of the EPBC Regulations. Until management plans come into effect for any new proposed AMP in the NWMR, transitional arrangements apply, and there are no changes on the water for users of the new proposed reserves).

6.2.7.2 Argo-Rowley Terrace Marine Park

Based on modelling of the worst-case spill scenario, the EMBA overlaps the Argo Rowley Terrace Marine Park Multiple Use Zone IUCN VI. The AMP has the following major conservation values:

- Important foraging areas for migratory seabirds and the endangered loggerhead turtle
- Important area for sharks, which are found in abundance around the Rowley Shoals relative to other areas in the region
- The park provides protection for the communities and habitats of the deeper offshore waters of the region in depth ranges from 220 m to over 5,000 m
- The park provides protection for many seafloor features including aprons and fans, canyons, continental rise, knolls/abyssal hills and the terrace and continental slope
- Examples of the communities and seafloor habitats of the Northwest Transition and Timor Province provincial bioregions
- The park provides connectivity between the existing Mermaid Reef Marine National Nature Reserve and reefs of the Western Australian Rowley Shoals Marine Park and the deeper waters of the region

Two key ecological features (KEFs) are included in the reserve:

- The canyons linking the Argo Abyssal Plain with the Scott Plateau (unique seafloor feature with enhanced productivity and feeding aggregations of species)
- Mermaid Reef and the Commonwealth waters surrounding Rowley Shoals (an area of high biodiversity with enhanced productivity and feeding and breeding aggregations).

6.2.7.3 Dampier Marine Park

The Dampier Marine Park (Marine National Park IUCN II and Habitat Protection Zone IV) is located ~60 km east of the Stag Facility and overlaps the EMBA. The AMP has the following major conservation values:

- Foraging areas adjacent to important breeding areas for migratory seabirds
- Foraging areas adjacent to important nesting sites for marine turtles
- Includes part of the migratory pathway of the humpback whale
- The park provides a high level of protection for offshore shelf habitats adjacent to the Dampier Archipelago
- The park provides high level protection for the shallow shelf with depths ranging from 15–70 m
- Examples of the communities and seafloor habitats of the Northwest Shelf Province provincial bioregion as well as the Pilbara (nearshore) and Pilbara (offshore) meso-scale bioregions.

6.2.7.4 Eighty Mile Beach Marine Park

The Eighty Mile Beach Marine Park (Multiple Use Zone IUCN VI) overlaps the EMBA and is located 280 km east of the Stag Facility. The AMP has the following major conservation values:

- Foraging areas adjacent to important breeding areas for migratory seabirds
- Foraging areas adjacent to important nesting sites for marine turtles
- Includes part of the migratory pathway of the protected humpback whale
- Adjacent to important foraging, nursing and pupping areas for freshwater, green and dwarf sawfish
- The park provides protection for the shelf, including terrace and banks and shoal habitats, with depths ranging from 15–70 m
- Examples of the communities and seafloor habitats of the Northwest Shelf Province provincial bioregion and the Canning, Northwest Shelf, Pilbara (nearshore), Pilbara (offshore) and Eighty Mile Beach meso- scale bioregions.

6.2.7.5 Gascoyne Marine Park

The EMBA overlaps all IUCN categories of the Gascoyne AMP which ranges in depth from ~15–6,000 m. The Gascoyne AMP has the following major conservation values:

- Important foraging areas for:
  - Migratory seabirds,
  - The threatened and migratory hawksbills and flatback turtles,
  - The vulnerable and migratory whale shark.
- The park provides a continuous connectivity corridor from shallow depths around 15 m out to deep offshore waters on the abyssal plain at over 5,000 m in depth
- The park provides protection to many seafloor features including canyon, terrace, ridge, knolls, deep hole/valley and continental rise. It also provides protection for sponge gardens in the south of the reserve adjacent to Western Australian coastal waters
- Examples of the ecosystems of the Central Western Shelf Transition, the Central Western Transition and the Northwest province provincial bioregions as well as the Ningaloo meso-scale bioregion
- Three key ecological features for the region:

  - Canyons on the slope between the Cuvier Abyssal Plain and the Cape Range Peninsula (enhanced productivity, aggregations of marine life and unique sea-floor feature.
  - Exmouth Plateau (unique sea-floor feature associated with internal wave generation),
  - Continental slope demersal fish communities (high species diversity and endemism - the most diverse slope bioregion in Australia with over 500 species found with over 64 of those species occurring nowhere else)
- The canyons are believed to be associated with the movement of nutrients from deep water over the Cuvier Abyssal Plain onto the slope where mixing with overlying water layers occurs at the canyon heads. These canyon heads, including that of Cloates Canyon, are sites of species aggregation and are thought to play a significant role in maintaining the ecosystems and biodiversity associated with the adjacent Ningaloo Reef
- The park therefore provides connectivity between the inshore waters of the existing Ningaloo Marine Park and the deeper waters of the area.

6.2.7.6 Montebello Marine Park

The Montebello Marine Park (Multiple Use Zone, IUCN Category VI) overlaps the EMBA and is located approximately 30 km west of the Stag Facility. The park has the following conservation values:

- Foraging areas adjacent to important breeding areas for migratory seabirds
- Foraging areas for vulnerable and migratory whale sharks
- Foraging areas adjacent to important nesting sites for marine turtles
- Part of the migratory pathway of the humpback whale
- Shallow shelf environments with depths ranging from 15–150 m, including shelf and slope habitats, as well as pinnacle and terrace seafloor features.
- Examples of the seafloor habitats and communities of the Northwest Shelf Province, as well as the Pilbara (offshore) meso-scale bioregion
- One key ecological feature for the region being the Ancient Coastline (a unique seafloor feature that provides areas of enhanced biological productivity).

6.2.7.7 Ningaloo Marine Park

The EMBA overlaps the Ningaloo Marine Park (recreational use zone) located ~260 km southwest of the Stag Facility. Together with the Ningaloo Marine Park and Muiron Islands Management Area, both in State waters, the Ningaloo Marine Park forms the Ningaloo Coast World Heritage Area. The Ningaloo Marine Park has the following conservation values:

- Foraging areas for vulnerable and migratory whale sharks
- Foraging areas and adjacent to important nesting sites for marine turtles
- Includes part of the migratory pathway of the protected humpback whale
- The park includes shallow shelf environments and provides protection for shelf and slope habitats, as well as pinnacle and terrace seafloor features
- Examples of the seafloor habitats and communities of the Central Western Shelf Transition.

6.2.7.8 Summary of Values and Sensitivities for EPBC Act Protected Matters within the Operational Area and EMBA

Table 6-9 summarises the habitats that may be affected by routine events at the Stag Facility within the Operational Area as well as accidental events that may arise within a larger EMBA.

Table 6-9: Summary of environmental values and sensitivities

Protected matter	Environmental value	Sensitivities overlapped	
		Operational Area	EMBA
World Heritage Areas			
The Ningaloo Coast	Extensive fringing reef and lagoonal system. Supports high diversity of corals, molluscs, fish, crustaceans and sponges. Important habitat for protected and iconic turtles (foraging and nesting), whales (migrating and resting) and whale sharks (feeding aggregations).	**No**	**Yes –** oil could potentially reach and coat shoreline habitats and coastal waters at this site.
National Heritage Properties			
The Ningaloo Coast	See WHA	**No**	**Yes**
Dampier Archipelago (including Burrup Peninsula)	Important site for indigenous rock painting and stone arrangements.	**No**	**No –** sites above high water mark and would not be impacted from any oil spill scenarios.
Commonwealth Heritage Place			
Ningaloo Marine Area - Commonwealth Waters	See Ningaloo Coast WHA and AMP	**No**	**Yes**
Ramsar sites			
Eighty Mile Beach	This site comprises beach, extensive mudflats and wetlands for feeding/roosting of shorebird/wetland bird species and is an internationally important site for migratory shorebirds.	**No**	**Yes –** oil could potentially reach and coat shorelines and mudflats of this site.
Wetlands of National Significance			
Eighty Mile Beach System	See Ramsar Sites	**No**	**Yes**
Commonwealth Marine Parks			
Argo-Rowley Terrace AMP	Important foraging areas for migratory seabirds and the endangered loggerhead turtle. Important area for sharks. The reserve provides protection for many seafloor features including aprons and fans, canyons, continental rise, knolls/abyssal hills and the terrace and continental slope and provides connectivity between the existing Mermaid Reef Marine National Nature Reserve and reefs of the	**No**	**Yes –** sensitivity is for species (e.g. whales, turtles, seabirds and whale sharks) that use Surface waters within the reserve and therefore susceptible to oiling.

Protected matter	Environmental value	Sensitivities overlapped	
		Operational Area	EMBA
	WA Rowley Shoals Marine Park and the deeper waters of the region.		
Dampier AMP	Contains foraging areas adjacent to important breeding/nesting areas for migratory seabirds and turtles and foraging areas for migratory whale sharks. Part of the migratory pathway of the humpback whale.	**No**	**Yes –** sensitivity is for species (e.g. whales, turtles and whale sharks) that use surface waters within the reserve and therefore susceptible to oiling.
Eighty Mile Beach AMP	Contains foraging areas adjacent to Important breeding/nesting areas for migratory seabirds and turtles and foraging areas for migratory whale sharks. Part of the migratory pathway of the humpback whale. Adjacent to important foraging, nursing and pupping areas for freshwater, green and dwarf sawfish.	**No**	**Yes – s**ensitivity is for species (e.g. whales, turtles and whale sharks) that use surface waters within the reserve and therefore susceptible to oiling.
Gascoyne AMP	Contains important foraging areas for seabirds, hawksbill and flatback turtles and whale sharks. Includes seafloor features including canyon, terrace, ridge, knolls, deep hole/valley and continental rise and provides protection for sponge gardens in southwest of the reserve.	**No**	**Yes –** sensitivity is only for species (hawksbill and flatback turtles and whale sharks) that use surface waters within the reserve and therefore susceptible to oiling.
Montebello AMP	Contains foraging areas adjacent to important breeding/nesting areas for migratory seabirds and turtles and foraging areas for migratory whale sharks. Part of the migratory pathway of the humpback whale.	**No**	**Yes –** sensitivity is for species (e.g. whales, turtles and whale sharks) that use surface waters within the reserve and therefore susceptible to oiling.
Ningaloo AMP	Values in Commonwealth waters are around feeding, migrating and aggregating areas for turtles, whales and whale sharks as well as diverse subtidal benthic habitats.	**No**	**Yes –** sensitivity is for species (e.g. whales, turtles and whale sharks) that use surface waters within the reserve and therefore susceptible to oiling.
Key Ecological Features			
Ancient coastline at 125 m depth contour	Where the ancient submerged coastline provides areas of hard substrate it may contribute to higher diversity and enhanced species richness relative to soft sediment habitat. May facilitate increased availability of nutrients in particular locations off the Pilbara coast. This enhanced productivity may attract opportunistic feeding by larger marine life including humpback whales, whale sharks and large pelagic fish.	**No.**	**Yes –** sensitivity is for species (e.g. whales, turtles, seabirds and whale sharks) that may be in high abundance above feature and therefore susceptible to oiling.
Canyons linking the Cuvier Abyssal Plain	Believed to be associated with upwelling. The upwelling zones at the canyon heads are sites of species aggregations such as	**No.**	**Yes –** Oil interacting with increased species in upwelled

Protected matter	Environmental value	Sensitivities overlapped	
		Operational Area	EMBA
and the Cape Range Peninsula	sweetlip emperor fish. The soft bottom habitats within the canyons themselves are likely to support important assemblages of epibenthic species.		surface waters (e.g. plankton, fish, whale sharks).
Commonwealth waters adjacent to Ningaloo Reef	Sensitivities as for Ningaloo AMP	**No.**	**Yes –** As per Ningaloo Marine Reserve
Continental Slope Demersal Fish Communities	High endemism and diversity of demersal fish species	**No**	**Yes –** oil will not directly impact demersal fish species although may interact with demersal fish larvae and eggs over a larger area.
Exmouth Plateau	Plateau is thought to be dotted with numerous pinnacles. It is an important geomorphic feature that modifies the flow of deep waters.	**No**	**No –** oil will not directly impact this feature or increased benthic diversity associated with this feature.
Glomar Shoals	Regionally important for their high biological diversity and high localised productivity. Enhanced biological productivity supports significant populations of a number of commercially important fish species such as Rankin cod, brownstripe snapper, red emperor, crimson snapper and frypan bream.	**No**	**Yes –** oil could interact with increased productivity within surface waters (e.g. plankton, fish, whale sharks)

6.2.8 State Marine Reserves

Seven State marine reserves have been identified within the EMBA as outlined in Figure 6-15 and Table 6-10.

Table 6-10: Distances from Stag facility to State Marine Reserves within the EMBA

State Marine Reserve	Distance from Stag Facility
Barrow Island Marine Park	~110 km
Barrow Island Marine Management Area	~75 km
Great Sandy Islands Nature Reserve	~120 km
Eighty Mile Beach Marine Park	~340 km
Montebello Islands Marine Park	~65 km
Muiron Island Marine Management Area	~240 km
Ningaloo Marine Park	~260 km
Nyangumarta Warrarn	~340 km

Further detail on these reserves is provided below.

6.2.8.1 Barrow Island Marine Park

The Barrow Island Marine Park covers 4,169 ha, all of which is zoned as sanctuary zone (the Western Barrow Island Sanctuary Zone) (DEC 2007a). It includes Biggada Reef, an ecologically significant fringing reef, and Turtle Bay, an important turtle aggregation and breeding area (DEC 2007a). Representative areas of seagrass, macroalgal and deep water habitat are also represented within the marine park (DEC 2007a). Passive recreational activities (such as snorkelling, diving and boating) are permitted but extractive activities such as fishing and hunting are not.

6.2.8.2 Barrow Island Marine Management Area

The Barrow Island MMA is the largest reserve within the Montebello/Barrow Islands marine conservation reserves, covering 114,693 ha (DEC 2007a). The MMA includes most of the waters around Barrow Island, the Lowendal Islands and the Barrow Island Marine Park, with the exclusion of the port areas of Barrow Island and Varanus Island.

The MMA is not zoned apart from one specific management zone: Bandicoot Bay Conservation Area. This conservation area is on the southern coast of Barrow Island and has been created to protect benthic fauna and seabirds. It includes the largest intertidal sand/mudflat community in the reserves, is known to be high in invertebrate diversity and is an important feeding area for migratory birds.

As for the other reserves in the Montebello/Barrow Islands marine conservation reserves, the Barrow Island MMA includes significant breeding and nesting areas for marine turtles and the waters support a diversity of tropical marine fauna, important coral reefs and unique mangrove communities (DEC 2007a). Green, hawksbill and flatback turtles regularly use the island's beaches for breeding, and loggerhead turtles are also occasionally sighted. The KPIs for the marine park are summarised in Table 6-11.

6.2.8.3 Great Sandy Islands Nature Reserve

The Great Sandy Island Nature Reserve is a B reserve class with 1a IUCN listing and is located in the Pilbara, northwest Western Australia. The nature reserved was gazetted in 1976 and is 4,202 km^2 in area. The nature reserve contains 29 islands and is set aside to primarily for conservation of flora and fauna. The draft management plan for *Pilbara inshore islands nature reserves and proposed additions September 2020* includes proposed management of the Great Sandy Islands Nature Reserve. It includes proposed management objectives to protect cultural heritage and environment values. Some listed marine and coastal fauna values are as follows:

- Important shorebirds and waders in Internationally significant numbers
- Sandy beaches on islands are important to four species of marine turtles (green, hawksbill, loggerhead and flatback)
- Dolphins such as Australian humpback dolphins (*Sousa chinensis*) and Indo-Pacific bottlenose dolphin (*Tursiops aduncus)* and dugong (*Dugong dugon*) that utilise the shallow intertidal waters around the islands.

6.2.8.4 Eighty Mile Beach Marine Park

The Eighty Mile Beach Marine Park covers an area of ~ 200,000 ha stretching for some 220 km from Cape Missiessy to Cape Keraudren, and includes sanctuary, recreation, general use and special purpose zones. The park is managed under the Eighty Mile Beach Marine Park Management Plan 2014-20124 (DBCA 2014).

The listed ecological values of the Eighty Mile Beach Marine Park include the high sediment and water quality, the juxtaposition of the beach, coastal topography and seabed and the diverse and ecologically important habitats and marine/coastal flora and fauna. The listed values of the marine park are as follows:

- The intertidal sand and mudflat communities supporting a high abundance and diversity of invertebrate life and providing a valuable food source for shorebirds (including migratory species) and other fauna
- The diverse subtidal filter-feeding communities
- Macroalgal and seagrass communities providing habitat and feeding opportunities for fish, invertebrates and dugongs
- High diversity intertidal and subtidal coral reef communities
- Mangrove communities and adjacent saltmarshes provide nutrients to the surrounding waters and habitat for fish and invertebrates.

The listed marine and coastal fauna values are as follows:

- A high diversity and abundance of nationally and internationally important shorebirds and waders (including migratory species) are found in the marine park
- Flatback turtles are endemic to northern Australia and nest at Eighty Mile Beach
- Dugongs and several whale and dolphin species inhabit or migrate through the marine park
- A highly diverse marine invertebrate fauna provides an important food source for a variety of animals, including birds, fish and turtles, along with recreational and commercial fishing opportunities
- A diversity of fish species provide recreational and commercial fishing opportunities
- A diversity of sharks and rays, including several protected species, are found in the park.

In addition to these natural values, the marine park contains land and sea important to traditional indigenous owners through identity and place, family networks, spiritual practice and resource gathering. The marine park also has a history of European activity including exploration, pastoralism and commercial fishing (e.g. the pearl oyster fishery). The park contains a historical WWII plane wreck (Dornier Do-24 X-36) and shipwrecks (two pearl luggers). The marine park provides tourism opportunity and recreational value through its remoteness, diversity and abundance of habitats and marine fauna and the pristine nature of the marine and coastal environment.

The marine park contains vast intertidal sand and mudflats that extend up to 4 km wide at low tide and provide a rich source of food for many species. Eighty Mile Beach Marine Park is one of the world's most important feeding grounds for small wading birds that migrate to the area each summer, travelling from countries thousands of kilometres away (DBCA 2014).

Further information on management zoning, cultural, ecological, social and economic values of the marine park are available in the Management Plan (DBCA 2014). The KPI for the marine park are summarised in Table 6-11.

6.2.8.5 Montebello/ Barrow Islands Marine Conservation Reserves

Montebello/Barrow Islands Marine Conservation Reserves encompasses three separate reserves: Barrow Island Marine Management Area; Barrow Island Marine Park; and Montebello Islands Marine Park.

As outlined in the Management Plan for the Montebello/Barrow Islands Marine Conservation Reserve 2007–2017 (DEC 2007a), the strategic conservation objectives for Reserve are to:

- Maintain and enhance the marine biodiversity of the reserves
- Maintain the ecological integrity (i.e. ecosystem structure and function).

While macroalgae-dominated limestone reef and subtidal reef platform/sand mosaic are the main marine habitat types in the Montebello/Barrow islands region, coral reef, mangroves and subtidal sand and soft-

bottom habitats are also common. Macroalgal communities, which are the major primary producer for the area, mainly comprise species of brown algae, particularly of the genera Sargassum, Turbinaria and Pandina, while green algae from the genera Caulerpa and Cladophora are also abundant. A wide range of invertebrate life is associated with this habitat. The subtidal coral reef communities in the reserves have a high diversity of invertebrates, with at least 150 species of hard corals recorded from fringing and patch coral reef areas. Sand habitats are generally unvegetated but may have seasonal vegetation or permanent patches of seagrass or macroalgae and a significant invertebrate fauna. Rocky shores are typically undercut, unvegetated, low limestone cliffs, which support a variety of mollusc species and other invertebrates. The six species of mangroves that occur in the reserves represent the unique offshore mangrove communities of the Pilbara, and are considered to be globally significant (Semeniuk 1997 as cited in EPA 2001). Mangrove communities support a range of invertebrate fauna and provide nursery habitat for fishes and crustaceans. The benthic and shoreline habitats in the reserves are shown in Figure 4-2.

Five of the six species of marine turtle found in WA have been recorded in the reserves. Of these, green, hawksbill and flatback turtles regularly nest on the sandy beaches in the reserves, while occasional nesting by loggerheads has also been recorded on Barrow Island. The WA hawksbill turtle population is the only large population of this species remaining in the Indian Ocean. The nesting populations of green and flatback turtles in the reserves are large and significant. The northernmost breeding limit for loggerheads in WA is within the reserves.

Seven species of toothed whale and three species of baleen whale have been recorded from the Montebello/Barrow islands region. Humpback whales use the reserves as a resting area, and some whale migration paths pass through the reserves. Dugongs are found in the vicinity of the Montebello Islands, Lowendal Islands and Barrow Shoals, where they feed on seagrass and algae. The Montebello/Barrow islands region is a significant rookery for at least 15 seabird species, with the largest breeding colony of roseate terns in Western Australia found on the Montebello Islands.

The KPI for the marine park are summarised in Table 6-11.

6.2.8.6 Montebello Islands Marine Park

The Montebello Islands Marine Park (MP) is an 'A' Class reserve (DEC 2007a) and covers an area of ~ 58,300 ha (DEC 2007a). Zoning within the Montebello Islands MP is a combination of sanctuary, recreation, special purpose (benthic protection), special purpose (pearling) and general use (DEC 2007a).

The Montebello Islands comprise over 100 islands, the majority of which are rocky outcrops. The rocky shore accounts for 81% of shoreline habitat (DEC 2007a). Other marine habitats within the marine park include coral reefs, mangroves, intertidal flats, extensive sheltered lagoonal waters and shallow algal and seagrass reef platforms extending to the south of the Montebello Islands to the Rowley Shelf. The complex seabed and island topography create a unique environment in which these diverse habitats occur in close proximity to each other.

Ecologically, the marine park's values include important turtle nesting sites, feeding and resting areas for migrating shorebirds, seabird nesting areas, dugong foraging areas, globally unique mangrove communities and highly diverse fish and invertebrate assemblages (DEC 2007a). Also, the sediment and water quality of the marine park are considered pristine (DEC 2007a) and are essential to the maintenance of the marine ecosystems and associated biota. The KPI for the marine park are summarised in Table 6-5.

Economic values within the Montebello Islands MP include commercial pearl culture, commercial line and trap fishing and an increasing recreational usage. Special purpose zones for pearling are established for the existing leaseholder to allow pearling to be the priority use of these areas (DEC 2007a). Commercial fishing includes a trap fishery for reef fishes, mainly in water depths of 30–100 m, and wet lining for reef fish and mackerel. Fish trawling also occurs in the waters near to the Montebello Islands. A tourist houseboat operates out of Claret Bay, at the southern end of Hermite Island, during the winter months. The Montebello Islands are becoming more frequently used by recreational boaters for camping, fishing and diving activities.

6.2.8.7 Muiron Island Marine Management Area

The Marine Management Area for the Muiron Islands is located immediately adjacent to the northern end of the Ningaloo Marine Park. This is managed as an integrated area together with the Ningaloo Marine Park under the Management Plan for the Ningaloo Marine Park and Muiron Islands Marine Management Area 2005–2015 (CALM 2005a).

Muiron Islands located 15 km northeast of North-West Cape (NWC) and comprise the North and South Muiron Islands and cover an area of 1,400 ha (AHC 2006). They are low limestone islands (maximum height of 18 m above sea level (ASL)) with some areas of sandy beaches, macroalgae and seagrass beds in the shallow waters (particularly on the eastern sides) and coral reef up to depths of 5 m, which surrounds both sides of South Muiron Island and the eastern side of North Muiron Island. The Muiron Islands Marine Management Area (MMA) was WA's first marine management area, gazetted in November 2004. It covers an area of 28,616 ha and occurs entirely within state waters (CALM 2005a).

6.2.8.8 Ningaloo Marine Park

The Ningaloo Marine Park was declared in May 1987 under the Commonwealth *National Parks and Wildlife Conservation Act 1975*. The Ningaloo Coast, incorporating both key marine and terrestrial values was later granted World Heritage Status in June 2011. In November 2012, the Ningaloo Marine Park (Commonwealth Waters) was renamed to be incorporated in the North-west Australian Marine Park Network (5.7.6). The park covers an area of 263,343 km^2, including both State and Commonwealth waters, extending 25 km offshore. It is vested in the Marine Parks and Reserves Authority (MPRA) and managed by the WA Department of Biodiversity, Conservation and Attractions (DBCA) on behalf of the Commonwealth.

The park protects a large portion of Ningaloo Reef, which stretches over 300 km from North-West Cape south to Red Bluff. It is the largest fringing coral reef in Australia, forming a discontinuous barrier that encloses a lagoon that varies in width from 200 m to 7 km. Gaps that regularly intercept the main reef line provide channels for water exchange with deeper, cooler waters (CALM 2005a). The Ningaloo Marine Park forms the backbone of the nature-based tourism industry, and recreational activities in the Exmouth region. Seasonal aggregations of whale sharks, manta rays, sea turtles and whales, as well as the annual mass spawning of coral attract large numbers of visitors to Ningaloo each year (CALM 2005a).

The reef is composed of partially dissected basement platform of Pleistocene marine or Aeolian sediments or tertiary limestone, covered by a thin layer of living or dead coral or macroalgae. Key features that characterise the Ningaloo Reef include (CALM 2005a):

- Over 217 species of coral (representing 54 genera)
- Over 600 species of mollusc (clams, oysters, octopus, cuttlefish, snails)
- Over 460 species of fish
- Ninety-seven species of echinoderms (sea stars, sea urchins, sea cucumbers)
- Habitat for numerous threatened species, including whales, dugong, whale sharks and turtles
- Habitat for over 25 species of migratory wading birds listed in CAMBA and JAMBA.

The strategic conservation objectives for Ningaloo Marine Park and the Muiron Islands Marine Management Area are:

- Maintain the marine biodiversity of the reserves
- Maintain ecological processes and life support systems (i.e. key ecosystem structure and function).

To attain these objectives, some of the social and ecological values are monitored as Key Performance Indicators (KPI) including, coral reef communities, water quality, coastal biological communities, finfish, mangrove communities, turtles, Intertidal sand and mudflat communities, Seascapes and Wilderness (Table 6-11).

6.2.8.9 Nyangumarta Warrarn Indigenous Protected Area

Nyangumarta Warrarn Country is in Western Australia's northwest Pilbara and southwest Kimberly region. It encompasses over 100 km of Eighty Mile Beach and runs inland into the southern portion of the Great Sandy Desert.

The Nyangumarta Warrarn IPA was declared in 2015 and includes the following areas:

- *Pirra* Country
    - The Great Sandy Desert area, covering about 26,561 km² (exclusive possession Native Title).
    - *Walyarta* Conservation Park
- Jurrar Country
    - Kujungurru Warrarn Conservation Park
    - *Kujungurru Warrarn* Nature Reserve
    - Eighty Mile Beach Marine Park Intertidal Area

Nyangumarta are the Traditional Owners and Native Title Holders of the land and waters within and surrounding the Nyangumarta Indigenous Protection Area (IPA), and their relationship to Country is rich and complex. For Nyangumarta, Country has cultural significance (including the songs, stories and dances).

Nyangumarta determined their IPA in accordance with IUCN Category 6, namely, to promote biodiversity and to promote and protect cultural values, beliefs and practices. This area is managed under the *Nyangumarta Warrarn Indigenous Protected Area Management Plan 2022-2032*. The Nyangumarta also have a joint management arrangement with the State Government of Western Australia through the Department of Biodiversity, Conservation and Attractions (DBCA). *Parks and Reserves of the South-West Kimberley and North-West Pilbara Joint Management Plan 2019;* and *Eighty Mile Beach Marine Park Management Plan 2014-2024*. These management plans detail the management aspirations and related strategies of Nyangumarta people for these areas. These values are described above in Section 6.2.7.4 and 6.2.8.3 (Eighty Mile Beach).

6.2.8.10 Summary of Values and Sensitivities for State Marine Reserves within the Operational Area and EMBA

Table 6-11: Summary of environmental values and sensitivities for State Marine Reserves within the Operational Area and EMBA

State Marine Reserves	Environmental value	KPIs	Sensitivities within the Operational Area	Sensitivities within the EMBA
Barrow Island Marine Park	Includes Biggada Reef, an ecologically significant fringing reef, and Turtle Bay, an important turtle aggregation and breeding area. Includes representative areas of seagrass, macroalgal and deepwater habitat.	Coral reef communities Mangrove communities Macroalgae and seagrass Turtles Fin fish Water quality	**No**	**Yes –** oil could potentially reach and coat shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles)
Barrow Island Marine Management Area	Includes most of the waters around Barrow Island, the Lowendal Islands and the Barrow Island Marine Park. Includes Bandicoot Bay Conservation Area on the southern coast of Barrow Island created to protect benthic fauna and seabirds. It includes the largest intertidal sand/mudflat community in the reserves and is an important feeding area for migratory birds. Includes significant breeding and nesting areas for marine turtles, important coral reefs and unique mangrove communities.	Coral reef communities Mangrove communities Macroalgae and seagrass Turtles Fin fish Water quality	**No**	**Yes –** oil could potentially reach and coat shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles and migratory shorebirds)
Eighty-mile Beach Marine Park (including Nyangumarta Warrarn Indigenous Protected Area)	Contains Ramsar site and one of the world's most important feeding grounds for migratory shorebirds and wetland birds. Also supports dugongs, inshore dolphins, sharks, rays, tropical fish, sponges, coral reefs and several threatened turtle species. Significant nesting population of flatback turtles within the park. For Nyangumarta, Country has cultural significance (including the songs, stories and dances).	Intertidal sand and mudflat communities Mangrove communities and salt marshes Waterbirds including migratory species Marine turtles (also see species info on other tab)	**No**	**Yes –** oil could potentially reach and coat shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles, dugongs, dolphins and migratory shorebirds).

State Marine Reserves	Environmental value	KPIs	Sensitivities within the Operational Area	Sensitivities within the EMBA
	Important burial sites, and places for hunting and gathering for medicine, bush tucker and making boomerangs	Scalefish Remote seascapes		
Montebello Island Marine Park	Comprise over 100 islands, with habitats including rocky shorelines, coral reefs, mangroves, intertidal flats, extensive sheltered lagunal waters, and shallow algal and seagrass reef platform. Contains important nesting/breeding and foraging sites for turtles, nesting and resting areas for migrating shorebirds, seabird nesting areas, dugong foraging areas, globally unique mangrove communities, and highly diverse fish and invertebrate assemblages.	Coral reef communities Mangrove communities Macroalgae and seagrass Turtles Fin fish Water quality	**No**	**Yes –** oil could potentially reach shoreline, intertidal and shallow subtidal habitats as well as Marine species using these habitats (e.g. turtles, seabirds, shorebirds, dugongs)
Muiron Island Marine Management Area	Adjacent to Ningaloo Marine Park around Muiron Island. Regionally significant loggerhead turtle nesting beaches. Contains coral reef and macroalgae habitat.	Coral reef communities Water quality Coastal biological communities Finfish Mangrove communities Turtles Seascapes Wilderness	**No**	**Yes –** oil could potentially reach and coat shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles) or aggregating/migrating offshore from these habitats (whale sharks and whales)
Ningaloo Marine Park	Extensive fringing reef and lagoonal system. Supports high diversity of corals, molluscs, fish, crustaceans and sponges. Important habitat for protected and iconic turtles (foraging and nesting), whales (migrating and resting) and whale sharks (feeding aggregations) as well as sea and shorebirds.	Coral reef communities Water quality Coastal biological communities Finfish Mangrove communities Turtles	**No**	**Yes –** oil could potentially reach and coat shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles and migratory shorebirds) or aggregating/migrating offshore from these habitats (whale sharks and whales)

State Marine Reserves	Environmental value	KPIs	Sensitivities within the Operational Area	Sensitivities within the EMBA
		Seascapes Wilderness		

7. SOCIO-ECONOMIC ENVIRONMENT

The Stag Field is approximately 60 km offshore from the Port of Dampier. Smaller coastal fishing and tourism settlements occur at Onslow, approximately 200 km to the south, and Point Samson, some 100 km to the southeast.

Dampier, Karratha and Port Hedland are the main service and population centres for the region. Although initially developed for the iron ore industry, these towns have expanded to service the oil and gas industry located on the NWS.

7.1 Commercial Fisheries and Aquaculture

Offshore and coastal waters in the NWS region support a valuable and diverse commercial fishing industry, dominated by Pilbara fisheries. The major fisheries in the Pilbara region target tropical finfish, large pelagic fish species, crustaceans (prawns and scampi) and pearl oysters (AFMA 2011; Fletcher and Santoro 2013). A summary of fisheries resources is provided in Table 7-1.

Commonwealth Fisheries

Commonwealth fisheries are those within the 200-nautical mile Australian Fishing Zone (AFZ) managed by Australian Fisheries Management Authority (AFMA) and are, on the high seas, and, in some cases, by agreement with the States and Territory, to the low water mark. Commonwealth managed fisheries are permitted to operate within Stag Operational area (not including restricted zone) and EMBA, but effective fishing effort is either non-existent or of very limited nature (Table 7-1).

The North-West Slope Trawl Fishery (NWSTF) fishery is limited to waters deeper than 200 m isobath and so does not overlap the operational area, although it did have active fishing in 2014/2015 within the EMBA. It must be noted that only one vessel was active (AFMA 2023).

The boundary of the Western Deepwater Trawl Fishery (WDTF) management area is more than 100 km from the operational area but is overlapped by the EMBA. However, no fishing was undertaken in the 14/15 season, and prior to that, effort was south off Shark Bay and limited to only three vessels (AFMA 2023).

Other Commonwealth fisheries, such as the Western Tuna and Billfish Fishery (WTBF), Southern Bluefin Tuna Fishery (SBFTF) and the Skipjack Tuna Fishery (Western; WSTF), although licenced to fish in the region, have had no historical fishing effort reported near the Operational Area or within the EMBA (AFMA 2023).

A summary of Commonwealth managed fisheries operating in the vicinity of the Stag Facility is provided in Table 7-1 and Figure 7-1.

State Fisheries

State fisheries are managed by the WA Department of Primary Industries and Regional Development (DPIRD) with specific management plans, regulations and a variety of subsidiary regulatory instruments under the *Fish Resources Management Act 1994* (WA). The information provided on State managed fisheries has been derived from the State of Fisheries Report 2021/22 (Newman et al, 2023)). Commercial fishery zones that have boundaries that overlap the Stag Facility Operational Area are listed below, presented in Figure 7-2 and summarised in Table 7-1.

North Coast Bioregion

- Onslow Prawn Managed Fishery (OPMF)
- Mackerel Managed Fishery (all areas) (MF)
- Pilbara Demersal Scalefish Fishery (Line, Trap and Trawl)
- Pearl Oyster Managed Fishery

- Pilbara Developing Crab Fishery.

Whole of State Fisheries

- Beche-de-mer Fishery
- Marine Aquarium Fish Fishery
- Specimen Shell Managed Fishery.

While some fisheries have permitted fishing zones that overlap the Operational Area (Figure 7-2), not all have significant fishing effort in this (Table 7-1). The Stag location is too deep for any dive based fisheries (i.e. Pearl Oyster, Roe's Abalone, Beche-de-Mer, Marine Aquarium Fish, Specimen Shell Fishery), is too far offshore for the prawn Fisheries and does not contain seabed features or reef that attract target species within the Mackerel Fishery or Pilbara Trap Fishery. The Operational Area also represents a 500 m restricted zone around Stag Facility infrastructure where fishing is prohibited.

Fisheries that do not overlap the operational area but are overlapped by the EMBA include:

North Coast Bioregion

- Nickol Bay Prawn Managed Fishery (NBMF)
- Broome Prawn Managed Fishery (BMF)
- The Kimberley Gillnet and Barramundi Managed Fishery (KGBF)
- Northern Demersal Scalefish Managed Fishery (NDSF)
- WA North Coast Shark Fishery
- Pilbara Developing crab Fishery.

Gascoyne Coast Bioregion

- Exmouth Gulf Prawn Fishery
- Gascoyne Demersal Scalefish Fishery.

West Coast Bioregion

- Roe's Abalone Fishery
- West Coast Rock Lobster Managed Fishery.

Whole of State Fisheries

- West Coast Deep Sea Crab (Interim) Managed Fishery.

Aquaculture

The only aquaculture activity within the EMBA is pearl farming of pearl oysters (*Pinctada maxima*) in protected waters (Newman et al., 2023). Pearl farm locations within the EMBA are at the Montebello Islands.

There is growing interest in the area generally and at the Abrolhos Islands in the production of seaweed for extraction of highvalue products including pharmaceuticals, nutraceuticals and, for Asparagopsis species, the extraction of bromophores for use in ruminant feed for methane reduction. The Department has established a Mid-West Aquaculture Development Zone which aims to provide a platform to stimulate aquaculture investment and development in the Bioregion. A small-scale project growing yellowtail kingfish near Geraldton has ceased temporarily and there remains interest in offshore production of the species in the Aquaculture Zone. The Government supports the establishment of a marine finfish nursery at Geraldton to underpin growth of that sector.

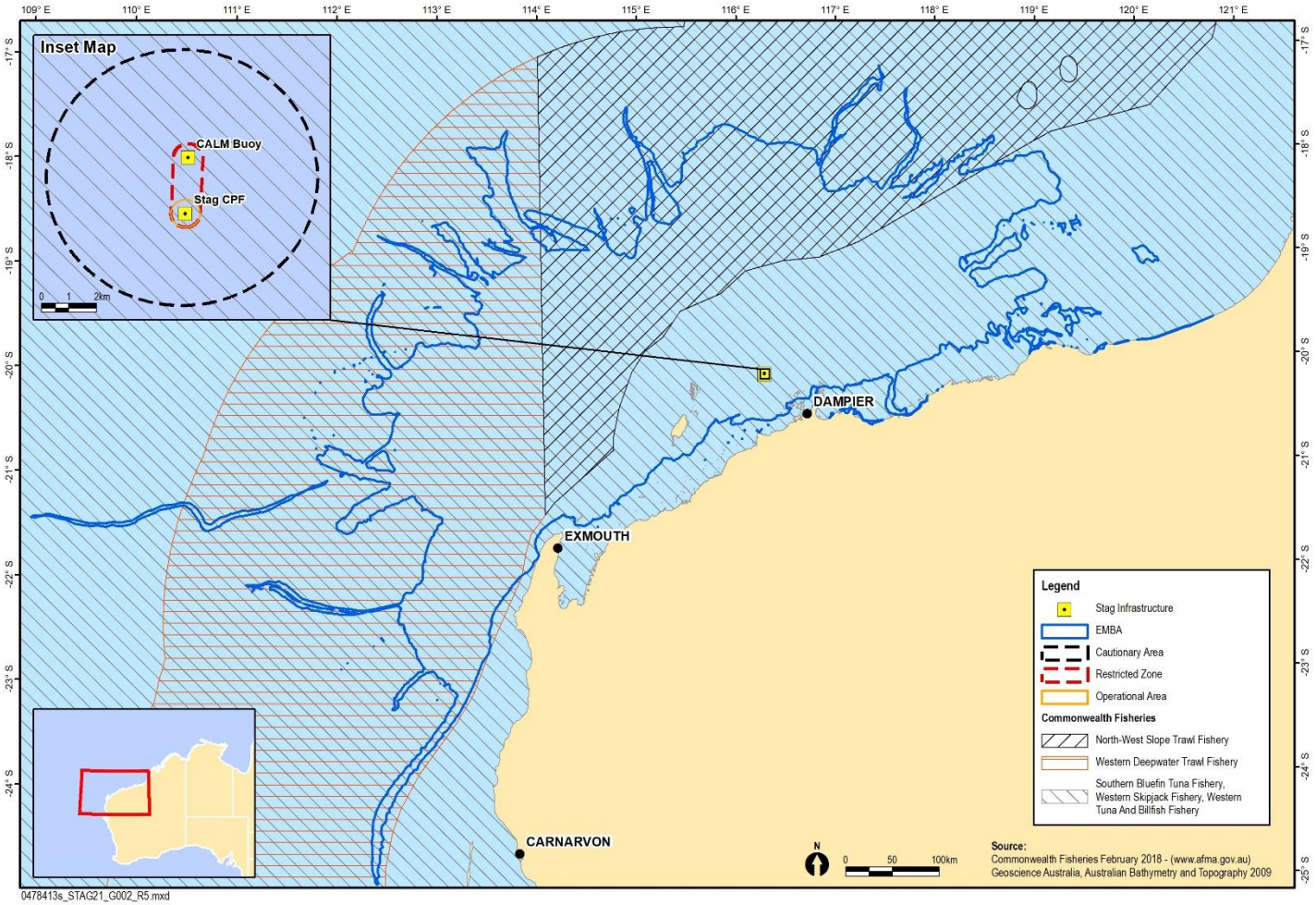

Figure 7-1: Commonwealth Commercial Fishing Zones in the vicinity of the Stag facility

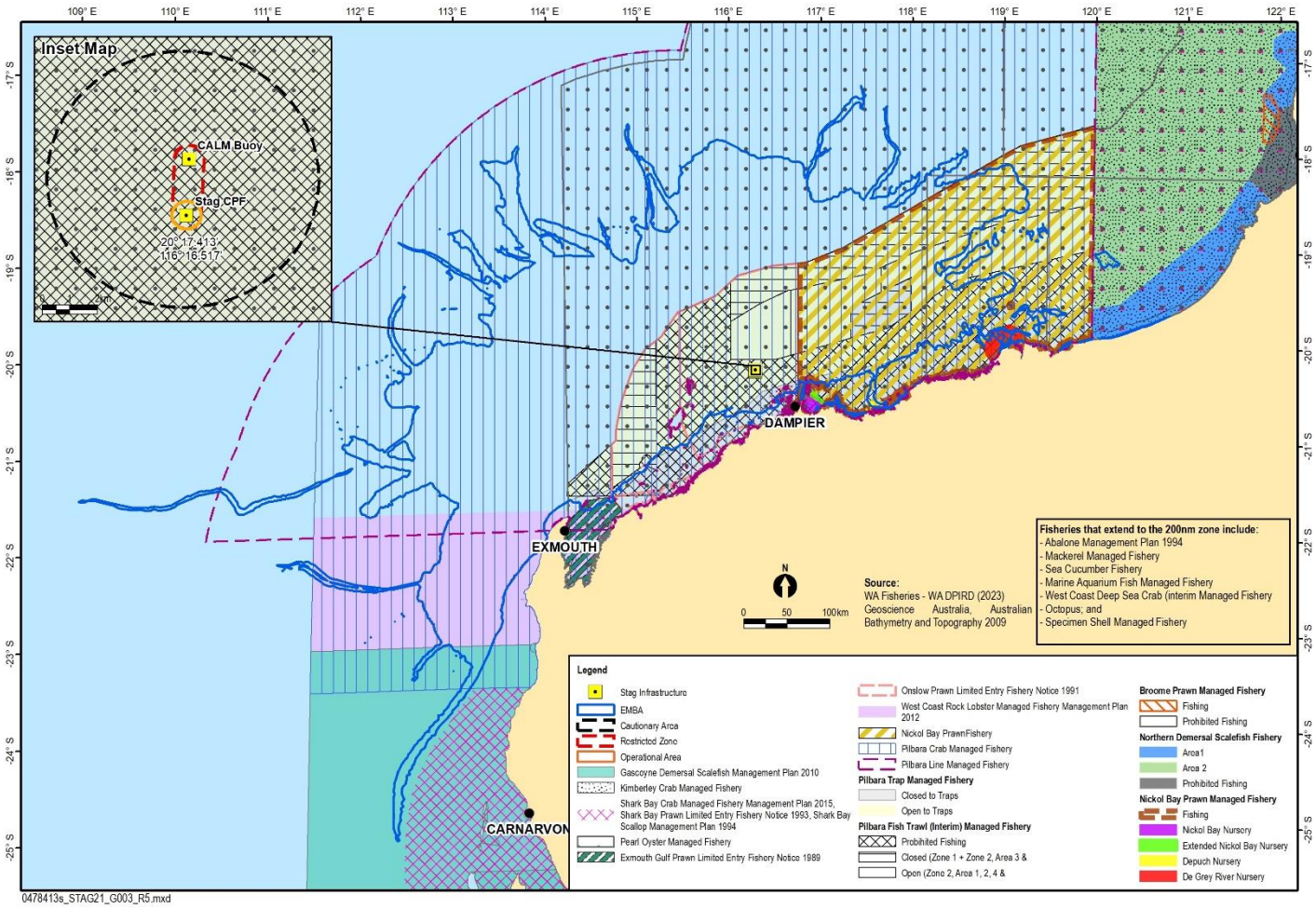

Figure 7-2: State commercial fishing zones in the vicinity of the Stag facility

Table 7-1: Summary of commercial fisheries licences to fish in the vicinity of the Stag facility Operational Area or EMBA

Fishery	Target species	Fishing method and area
Commonwealth-managed Fisheries		
North-West Slope Trawl	Scampi (crayfish): primarily Australian (*Metanephrops australiensis*), with smaller quantities of velvet scampi (*M. velutinus*) and Boschmas scampi (*M. boschmai*). A quantity of prawns (Giant scarlet, red carid, red, red-striped and royal red prawns) is harvested each season, and squids are becoming an increasingly significant component of the catch. Mixed snappers (Lutjanidae) and redspot emperor (*Lethrinus lentjan*) have also been important components of the catch historically.	Demersal trawl operates in north-western Australia from 114°E to 125°E, seaward of the 200 m isobath, but no current effort in vicinity of the operational area and limited effort within EMBA. 3 vessels operated in 2010-21 season (4 in 2020-2021).
Western Deepwater Trawl	Deepwater bugs (*Ibacus* spp). and ruby snapper (*Etelis* sp) usually dominating catches historically. No catch of deepwater bugs has been reported in 2020-21 or 2021-2022.	Demersal trawl seaward of the 200 m isobath, and west of North-West Cape – does not overlap operational area, but small overlap of EMBA. Effort in recent years has been localized in the area offshore and slightly south of Shark Bay and limited to only two vessels in 2021-22.
Western Skipjack	Skipjack tuna (*Katsuwonus pelamis*) is the only target species. Landings of species other than skipjack (may include bigeye (*Thunnus obesus*), and yellowfin tuna (*T. albacares*).	Purse seine November to June. A small amount of pole and line effort is also used. Historically fishing limited to waters off SA and not WA. No fishing effort since 2008-2009 (DAFF 2023)
Western Tuna and Billfish	Bigeye tuna (*Thunnus obesus*), yellowfin tuna (*T. albacares*), albacore (*T. alalunga*) and swordfish (*Xiphias gladius*). Striped marlin (*Kajikia audax*) is a minor component of the catch but remains an important species for management due to historically higher catches.	Pelagic longline year-round with low-levels of minor-line fishing. In recent years, fishing effort has concentrated off south-west Western Australia, with occasional activity off South Australia. No current effort on the NWS.
Southern Bluefin Tuna	Southern bluefin tuna (*Thunnus maccoyii*).	Most of the Australian catch is taken by purse-seine vessels in the Great Australian Bight. No current effort on the NWS.
State-managed Fisheries		
Onslow Prawn Managed Fishery	Western king prawn (*Penaeus latisulcatus*), brown tiger prawns (*Penaeus esculentus*) and endeavour prawns (*Metapenaeus* spp.)	Low-opening otter trawls used within the boundaries of the OPMF being 'all the Western Australian waters between the Exmouth Prawn Fishery and the Nickol Bay prawn fishery between 114º39.9' east and 116º45' on the landward side of the 200 m depth isobath. The total landings in 2021 were less than the target catch (60 t) with 37 days of fishing taking place by one boat in 2021.

Fishery	Target species	Fishing method and area
Nickol Bay Prawn Managed Fishery	Primarily targets banana prawns (*Penaeus merguiensis*)	High opening otter trawls used within the boundaries of the NBPMF being 'all the waters of the Indian Ocean and Nickol Bay between 115°26' east longitude and 120° east longitude on the landward side of the 200 m isobath. 9 vessels fished intermittently in 2021 as per DPIRD catch data.
Broome Prawn Managed Fishery	Western king prawns (*Penaeus latisulcatus*) and coral prawns (a combined category of small penaeid species)	Low opening otter trawls used within the boundaries of the BPF being all Western Australian waters of the Indian Ocean lying east of 120° east longitude and west of 123°45' east longitude on the landward side of the 200 m isobath. Extremely low fishing effort occurred as three boats undertook trial fishing activities in 2021 to investigate whether catch rates were sufficient for commercial fishing. This resulted in negligible landings of western king prawns.
The Kimberley Gillnet and Barramundi Managed Fishery (KGBF)	Primarily Barramundi (*Lates calcarifer*), king threadfin (*Polydactylus macrochir*) and blue threadfin (*Eleutheronema tetradactylum*). Small quantities of Elasmobranchs (sharks and rays), black jewfish (*Protonibea diacanthus*) and tripletail (*Lobotes surinamensis*) are also landed.	It encompasses the taking of any fish by gillnet in inshore waters and the taking of barramundi (*Lates calcarifer*) by any means. Operates in the nearshore and estuarine zones of the North Coast Bioregion from the WA/NT border (129ºE) to the top end of Eighty Mile Beach, south of Broome (19ºS). Access to the KGBF is limited to four licences. Commercial fishing is now prohibited between the southern boundary of the fishery (19ºS to north of Willie Creek (17º44′ S) and in King Sound South as well as within three nautical miles of the high water mark and around major town sites and recreationally important fishing locations, southern King Sound, encompassing Derby and the Fitzroy River, and all its creeks and tributaries south of 17º27′ S, and the lower Ord River upstream of Adolphus Island. 4 vessels fished in the KGBF in 2021 season (February to November).
Northern Demersal Scalefish Managed Fishery (NDSF)	The main species landed by this fishery are red emperor and goldband snapper and saddletail snapper.	Demersal traps are used within waters off the north coast of Western Australia east of longitude 120°E. These waters extend out to the edge of the Australian Fishing Zone. Seven vessels fished in the 2021 fishing season.
Mackerel Managed Fishery	Spanish *(Scomberomorus commerson*) and grey mackerel (*S. semifasciatus*).	Trolling or handline year-round in all waters to the 200-nautical mile AFZ between 114º E to 121º. Catch data was requested from DPRID for the last 5 years (2016-2021) for the 10x10nM reporting grid (block 201161) in which the operational area sits. During this time less than 3 vessels in the

Fishery	Target species	Fishing method and area
		Mackerel Managed Fishery were active in this grid (catch not able to be reported due to the low numbers).
Pilbara Demersal Scalefish Fishery (Line, Trawl and Trap)	Variety of demersal scalefish landed including goldband snapper (*Pristipomoides multidens*), red emperor (*Lutjanus sebae*) and bluespotted emperor (*Lethrinus punctulatus*) and rankin cod (*Epinephelus multinotatus*).	Fishing within waters off the north coast of Western Australia west of longitude 120°E. Across the whole of PDSF the commercial catches for 2019 were demersal trawl (72%), trap (23%) and line (5%). This fishery operates across various zones and year-round. The trawl sector of the fishery is closed within operational area, but trap fishing is permitted. Although 5 vessels operated within the 10x10nM block in the PDSF trawl fishery (total catch 50,599 kg over 5 years), as the operational area is part of a closed area for this fishery (the closure boundary runs through the middle of this block) it is known that this catch was not from the area of the proposed activity. In the broader 60x60nM block 3 vessels were active in the Trap Fishery (241,412 kg catch over 5 years); and 6 vessels in the line fishery (19,748 kg catch over 5 years).
Pearl Oyster Managed Fishery	Silver-lipped pearl oyster (*Pinctada maxima*)	Drift diving restricted to shallow divable depths generally less than 35 m In 2021, catch was taken in Zones 2 and 3 only with no fishing in Zone 1. Total effort was 8,175 dive hours. Pearl oyster fishing vessels operate from the Lacepede Islands north of Broome to Exmouth Gulf in the south. 3 vessels fished in 2021.
WA North Coast Shark Fishery	Sandbar (Carcharhinus plumbeus), blacktip (Carcharhinus spp.), tiger (Galeocerdo cuvier) and lemon (Negaprion acutidens) sharks	Area between North-West Cape and a line of longitude at 120° E and all waters south of latitude 18° S has been closed indefinitely to protect shark stocks.
Pilbara Crab Managed Fishery	Blue swimmer crab (*Portunus armatus*)	Hourglass traps used in inshore waters from Onslow through to Port Hedland with most commercial and activity occurring in and around Nickol Bay. 3 vessels were used in 2020. During 2021, two people were employed as skippers and crew on vessels fishing for blue swimmer crabs along the Pilbara coast, although minimal fishing effort occured.
Exmouth Gulf Prawn Fishery	Target western king prawns (*Penaeus latisulcatus*), brown tiger prawns (*Penaeus esculentus*), blue endeavour prawns (*Metapenaeus endeavouri*) and banana prawns (*Penaeus merguiensis*).	Otter trawls used within Exmouth Gulf. In 2020, 6 boats trawled.

Fishery	Target species	Fishing method and area
Gascoyne Demersal Scalefish Managed Fishery	A range of demersal species including pink snapper (*Pagrus auratus*), goldband snapper (*Pristipomoides* spp., mainly *P. multidens*), red emperor (*Lutjanus sebae*), emperors (Lethrinidae, includes spangled emperor, *Lethrinus nebulosus*, and redthroat emperor, *L. miniatus*), cods (Serranidae), ruby snapper (*Etelis carbunculus*), pearl perch (*Glaucosoma burgeri*), mulloway (*Argyrosomus japonicus*), amberjack (*Seriola dumerili*) and trevallies (Carangidae).	The GDSMF licensed vessels fish throughout the year with mechanised handlines in the waters of the Indian Ocean and Shark Bay between latitudes 23°07'30"S and 26°30'S. Peak fishing period for pink snapper is June-July when the oceanic stock aggregates to spawn. In 2021, 9 vessels actively fished, 7 of which fished for more than 10 days during the traditional (pink snapper) season.
West Coast Rock Lobster Managed Fishery	Western rock lobster (*Panulirus cygnus*)	Baited pots fished along the west coast of Australia. between Latitudes 21°44´ to 34°24´ S
Beche-de-mer (Sea Cucumber) Managed Fishery	Sandfish (*Holothuria scabra*) and deepwater redfish (*Actinopyga echinites*).	Hand-harvest fishery, animals caught principally by diving (restricted to diving depths) and a smaller amount by wading. Fishing occurs mostly in the northern half of the State from Exmouth Gulf to the Northern Territory border, and Shark Bay was fished for the second time in 2021. In 2021, 31.5 t of sandfish (Holothuria scabra), 8.8 t of deepwater redfish (*Actinopyga echinites*) and 0.8 t of black teatfish (*Holothuria whitmaei*). Sandfish was taken from the Kimberley only, which was last fished in 2017. Both deepwater redfish and black teatfish were taken from Shark Bay, under an exemption licence granted to Aboriginal native title holders, and it is the second time this stock has been fished. The commercial industry have adopted a rotational fishing strategy for the main species (sandfish – *H. scabra*), and redfish (*A. echinites*). 3 vessels operated in 2021 as per DPIRD catch data.
Marine Aquarium Fish Managed Fishery	Fish, coral, algae, live rock	Dive based fishery operating all year throughout WA waters, but restricted by diving depths. The fishery is typically more active in waters south of Broome with higher levels of effort around the Capes region, Perth, Geraldton, Exmouth, Dampier and Broome. 7 vessels operated in 2021 as per DPIRD catch data.
Specimen Shell Managed Fishery	Shells (cowries, cones)	Dive based fishery operating all year throughout WA waters, but restricted by diving depths or in 2021 there was an exemption for the trial of use of remotely operated vehicles. 3 vessels operated in 2021 as per DPIRD catch data.

Fishery	Target species	Fishing method and area
West Coast Deep Sea Crustacean Managed Fishery	Crystal (Snow) crabs (*Chaceon albus*), Giant (King) crabs (*Pseudocarcinus gigas*) and Champagne (Spiny) crabs (*Hypothalassia acerba*)	Baited pots in waters lying north of latitude 34° 24' S (Cape Leeuwin) and west of the Northern Territory border on the seaward side of the 150 m isobath out to the extent of the Australian Fishing Zone, mostly in 500–800 m of water. Year round. 4 Vessels operated in 2019.

Notes:

Data for Commonwealth- managed fisheries was taken from 2021 Fisheries Status Reports where possible.

Data for State managed fisheries was taken from the most recent Fisheries Status Reports or where available, catch data was requested from DPRID for the last 5 years (2016-2021) in a 10x10nM reporting grid (block 201161) in which the operational area sits. Some fisheries such as the PDSF (non-trawl sectors) only report against the larger 60 x 60nM grid in this area (block 20160) so the DPIRD FishCube data was also examined for this.

7.2 Recreational Fisheries

Recreational fisheries and charter boat operators are managed by the DPIRD; the area covered by the EMBA of this EP falls primarily within the North Coast Bioregion (Fletcher and Santoro 2012). Within the North Coast Bioregion, recreational fishing is experiencing significant growth, with a distinct seasonal peak in winter when the local population increases significantly from tourists visiting the Exmouth/Onslow area and Dampier Archipelago (Fletcher and Santoro 2012). Increased recreational fishing has also been attributed to those involved in the construction or operation of developments within the region. Offshore islands, coral reefs and continental shelf provide species of major recreational interest including saddletail snapper, red emperor, cods, coral and coronation trout, sharks, trevally, tuskfish, tunas, mackerels and billfish (Fletcher and Santoro 2012). Advice received from DPIRD (pers. com. C. Telfer, in 2012) indicates that charter boat fishing effort in permit area WA-15-L has been recorded. Offshore shoals, such as Glomar Shoals and Rankin Bank attract occasional recreational and charter boat visitations, however these trips are generally of a short duration and sporadic. The distance of these destinations offshore means that only a limited number recreational fishing trips can be expected each year.

Within the Operational Area there are no known natural seabed features that would aggregate fishes and which are typically targeted by recreational fishers. However, the Stag CPF, pipeline, CALM buoy and associated vessels are likely to attract pelagic fish and therefore could also attract recreational fishers target pelagic species. Nevertheless, fishing in the immediate vicinity of the Stag facilities is not permitted since a 500 m Restricted Zone is in place. This could have an impact on requiring extra distance travelled when traversing the region, how this would be small compared to total distance travelled in any trip given the remoteness of the location.

7.3 Tourism

Aquatic recreation such as boating, diving and fishing occurs near the coast and islands off the Pilbara and Ningaloo coast and to a lesser extent the Rowley Shoals. These activities are concentrated in the vicinity of the population centres such as Exmouth, Dampier and Onslow.

Water-based tourism activities undertaken across NWS include:

- Whale watching
- Recreational boating
- Charter fishing
- Snorkelling/diving
- Surfing
- Recreational fishing.

In the waters immediately surrounding the Stag Facility, tourism activities are limited due to its distance from the mainland and island shorelines.

7.4 Oil and Gas Industry

The surrounding waters are also used for petroleum exploration and development. The nearest production activities (Figure 7-3) to the Stag Facility include:

- Wandoo Production Platforms located in Exploration Permit WA-14-L, ~ 20 km northeast
- Gas pipelines run from the Reindeer platform (~ 29 km north) to the mainland (north to south). To the east (~ 6 km), another gas pipeline runs east to west, ~ 10 km north of the Stag Facility.

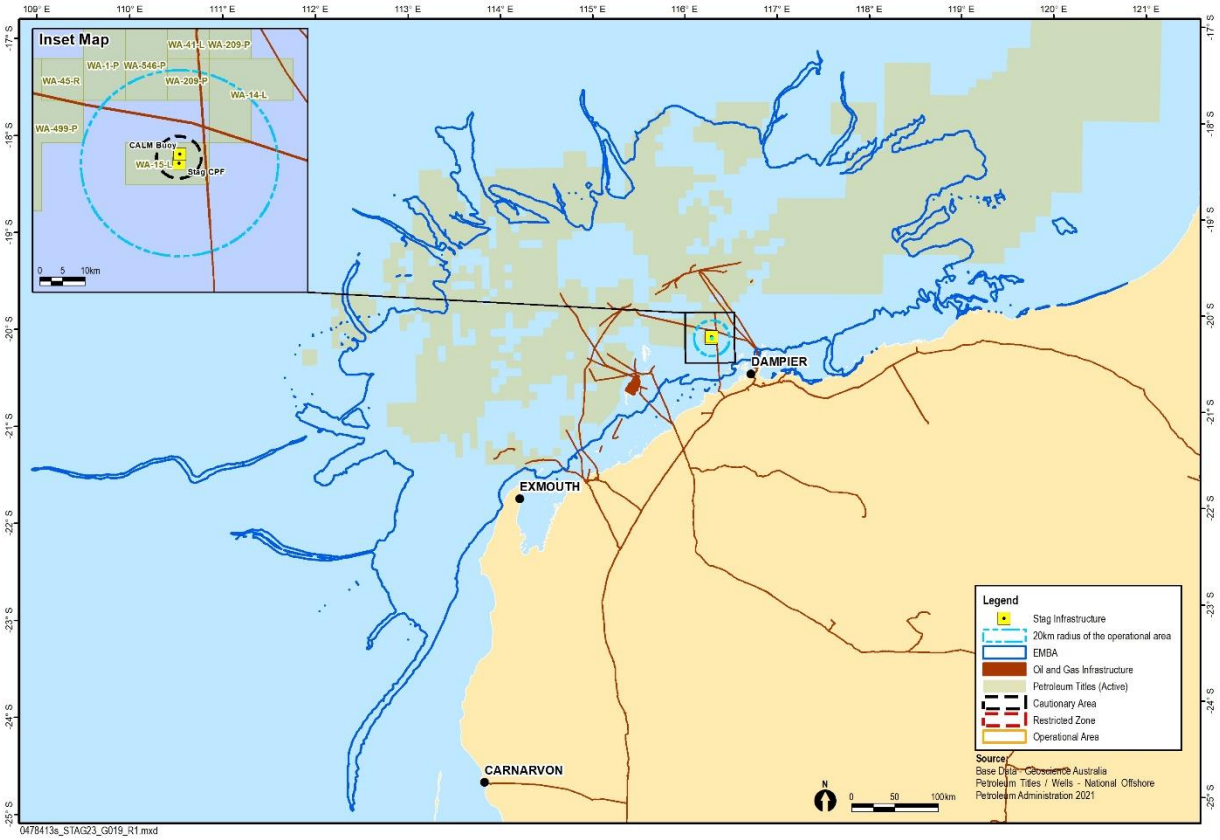

Figure 7-3: Petroleum infrastructure in the region

7.5 Commercial Shipping

Commercial shipping moves through the offshore waters en route to or from the marine terminals at Thevenard, Barrow and Varanus Islands. Shipping using NWS waters includes iron ore carriers, third-party tankers and other vessels proceeding to or from the ports of Dampier, Cape Preston, Port Walcott and Port Hedland; however, these are predominantly heading north from these ports. Large cargo vessels carrying freight bound or departing from Fremantle, transit along the WA coastline heading north and south in deeper waters. Shipping activities in relation to the Stag Operational Area are illustrated in Figure 7-4. The Stag platform is located 3.1 nautical miles (5.7 km) north-west of a shipping fairway that experiences heavy concentrations of commercial traffic as vessels transit into and out of Cape Preston and Barrow Island.

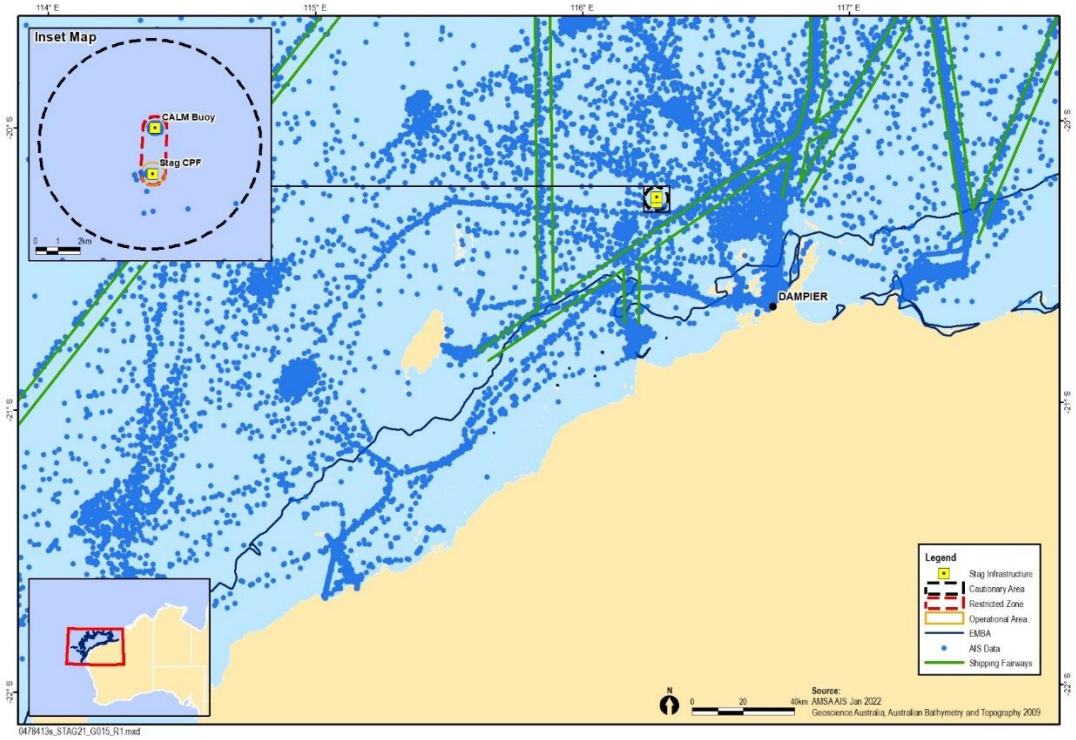

Figure 7-4: AMSA shipping records and designated shipping routes in the vicinity of the Operational Area

7.6 Defence

The two closest defence training areas to the Operations Area are approximately 88 km to the west of the operational area and the Curtin Air-to-Air Weapons Range near Derby (approximately 587 km north northeast (Figure 7-5)).

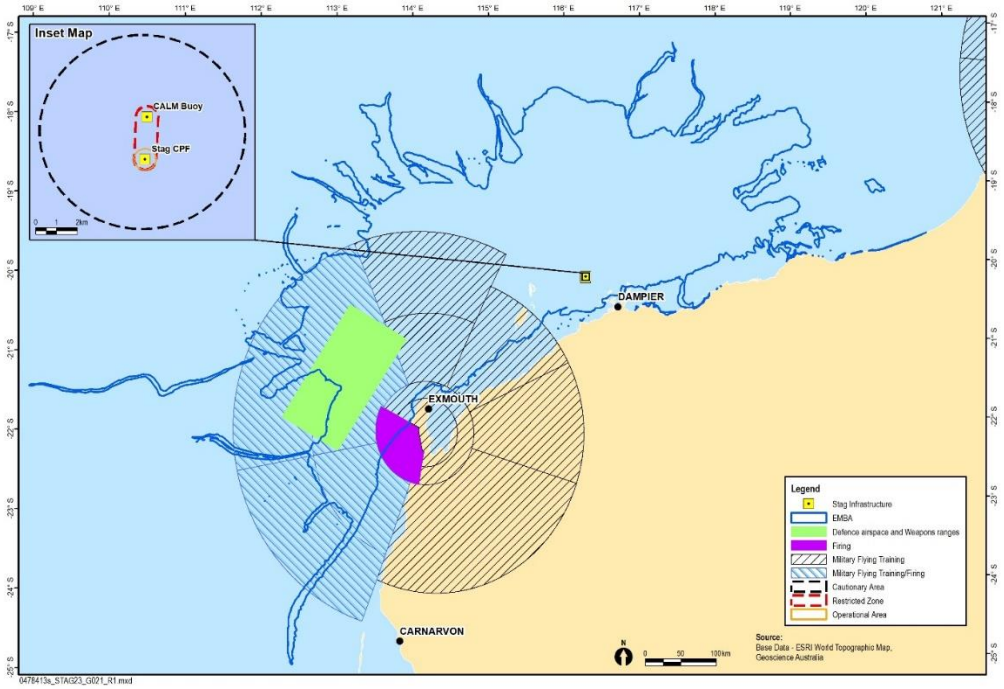

Figure 7-5: Defence locations near or within the EMBA

7.7 Native Title

Aboriginal peoples continuing connection to country is recognised in Australia under both State/ Territory and Commonwealth legislation. The *Native Title Act 1993* (Commonwealth) is legislation passed by the Australian Parliament that recognises the rights and interests of Aboriginal and Torres Strait Islander people in land and waters according to their traditional laws and customs (CoA 2023). Within the EMBA any sheen or impact on environmental values may impact the associated cultural values or use. Within the EMBA the following have been identified (NTT 2017):

- Schedule of Native Title Determination Applications
- Register of Native Title Claims
- Native Title Determinations
- Register of Indigenous Land Use Agreements
- Notified Indigenous Land Use Agreements.

Native title determinations within the EMBA are summarised in Table 7-2 and displayed in Figure 7-6.

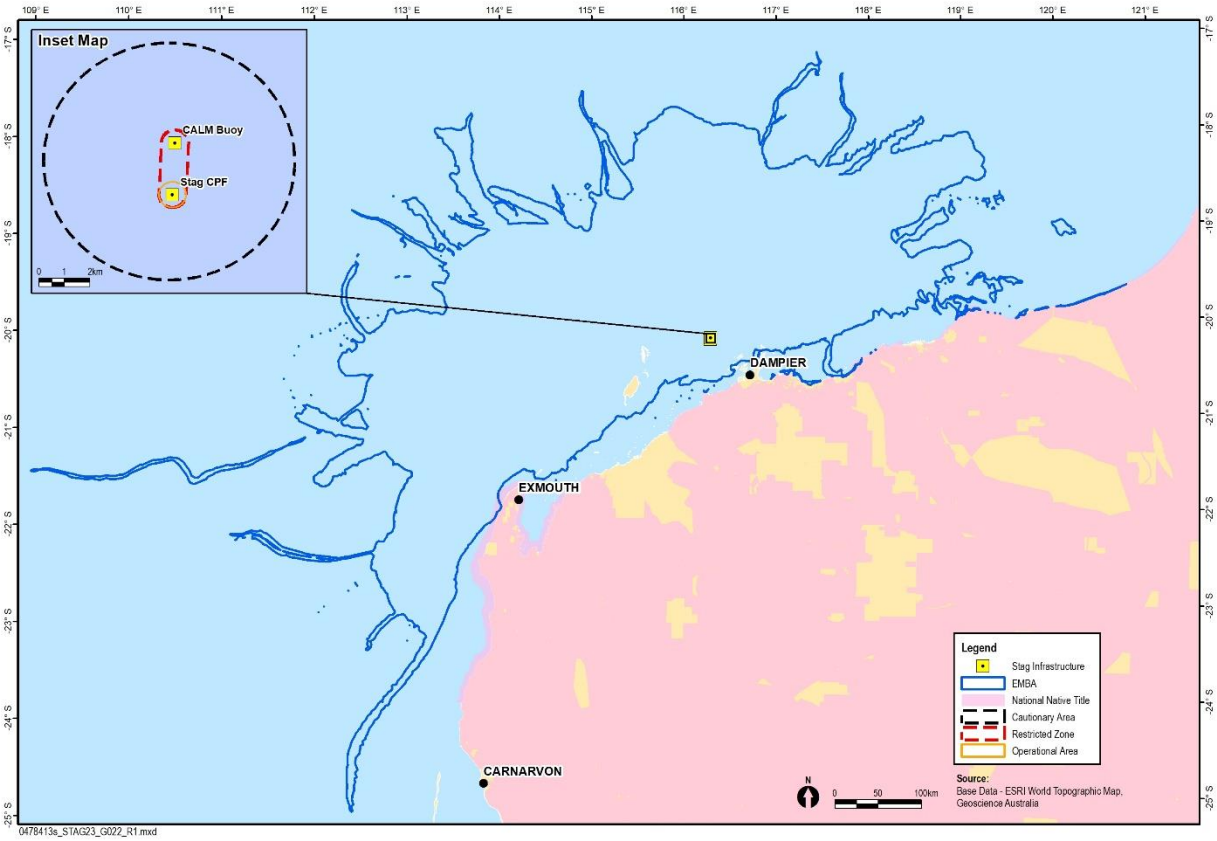

Figure 7-6: Native Title within vicinity of EMBA

Table 7-2: Native title determinations

Native Title Determinations	
Karajarri People (Area A)	Native title exists (exclusive)
Karajarri People (Area B)	Native title exists (non-exclusive)
Ngarluma/Yindjibarndi	Native title exists (non-exclusive)
Rubibi Community	Native title exists (non-exclusive)
Ngarla and Ngarla #2 (Determination Area A)	Native title exists (non-exclusive)
Registered Native Title Claims	
Yaburara & Mardudhunera People	Accepted for registration
Gnulli	Accepted for registration
Kariyarra People	Accepted for registration
Jabirr Jabirr	Accepted for registration
Goolarabooloo People	Accepted for registration
Bindunbur	Accepted for registration
Indigenous Land Use Agreements	
Yawuru Prescribed Body Corporate ILUA – Broome	ILUA registered
Yawuru Area Agreement ILUA	ILUA registered
RTIO Ngarluma Indigenous Land Use Agreement (Body Corporate Agreement)	ILUA registered
Kuruma Marthudunera and Yaburara and Coastal Mardudhunera Indigenous Land Use Agreement	ILUA registered
Anketell Port, Infrastructure Corridor and Industrial Estates Agreement	ILUA registered
Cape Preston Project Deed (YM Mardie ILUA)	ILUA registered
Yawuru Nagulagun / Roebuck Bay Marine Park ILUA	ILUA registered
FMG – Kariyarra Land Access ILUA	ILUA accepted for notification

7.8 Cultural Heritage

7.8.1 Underwater Cultural Heritage

Underwater cultural heritage sites are recognised as a part of the marine environment ecosystem. Under the *Underwater Cultural Heritage Act 2018* (Cwlth) any shipwrecks, sunken aircraft or other types of cultural heritage over 75 years old are automatically afforded protection. Under this Act, there is also a provision to provide protection zones, that can range from 200 m to 3,200 m radius, surrounding the wrecks. These zones are in place to limit disturbance of the cultural heritage and also the surrounding environment.

There are no recorded historic shipwrecks or shipwreck protection zones within the Operational Area. The *Tanami* and *Trial* are the closest known shipwrecks located approximately 95 and 94km respectively west of the operational area (see Figure 7-7).

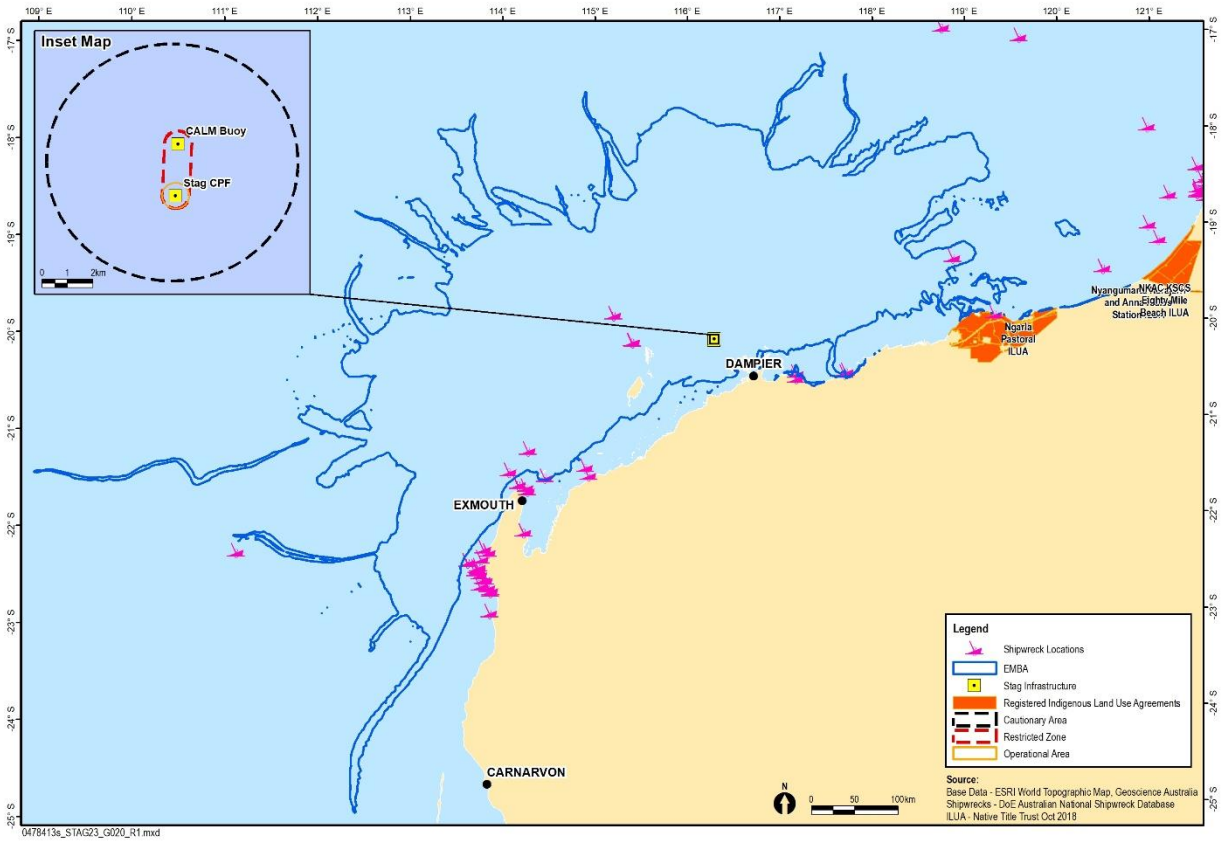

Figure 7-7: Cultural heritage sites within the EMBA

7.8.2 Cultural Heritage

Australian Aboriginal and Torres Strait Islander heritage is recognised as the oldest continuing culture in the world and is central to Australia's national heritage (DCCEEW 2023).

A search of the DPLH database indicates there are 180 Registered Aboriginal Cultural Heritage sites, 85 Heritage surveys within the EMBA. None of these sites or places fall within the operational area. They are predominantly located along the coastline or on islands. Through ongoing engagement with First Nations people, Jadestone continues to seek further information on relevant cultural values for this activity. In the absence of specific details from the First Nations People, Jadestone have completed their own research into potential areas of importance. This is delineated by each group identified as intersecting with the EMBA.

Eleven registered native title bodies corporate (RNTBC) hold, protect and manage determined native title for many of the islands and the coastal country located in the vicinity of the Stag EMBA.

Buurabalayji Thalanyji Aboriginal Corporation RNTBC

BTAC represents, protects and supports the interests of the Thalanyji People. The Ashburton River is central to Thalanyji culture. Many detailed dreaming stories describe the creation of the river and imbue it with sacred significance. No heritage sites are listed as intersecting the RNTBC and EMBA. The protection and management of cultural heritage is important to BTAC and Thalanyji people. Thalanyji values, interests and activities – and those of BTAC – extend beyond cultural heritage and include, for example, fishing and collection of traditional foods and other materials and use of islands within the EMBA including Montebello Islands, Barrow Island, Weld Island, Karratha, North and South Islands, Mary Anne Group and islands within 150km of the Ashburton River.

Kariyarra Aboriginal Corporation RNTBC

The Kariyarra Aboriginal Corporation represents, protects and supports the interests of the Kariyarra People. The EMBA overlaps the Cowerie Well which is a registered, culturally sensitive heritage site for the Kariyarra people. Land and sea countries are important to them and dugongs, turtles and whale sharks belong to them (INPEX, 2023).

Malgana Aboriginal Corporation RNTBC

The Malgana Aboriginal Corporation represents, protects and supports the interests of the Malgana People. The RNTBC area encompasses Shark Bay and extends to cover Dirk Hartog Island. No heritage sites are listed as intersecting the RNTBC and EMBA.

Nanda Aboriginal Corporation RNTBC

The Nanda Aboriginal Corporation represents, protects and supports the interests of the Nanda People. The Nanda People are the traditional owners of the coastal land from southern Shark Bay down to Kalbarri. No heritage sites are listed as intersecting the RNTBC and EMBA.

Nganhurra Thanardi Garrbu Aboriginal Corporation RNTBC

The NTGAC represents, protects and supports the interests of the Baiyungu, Thalanyji and Yinggarda People. They have strong connection to sea country relying on marine resources including turtle, egg, fish and shellfish. The EMBA overlaps one culturally sensitive heritage site within the RNTBC area (Warnangura (Cape Range) Cultural Precinct).

Ngarluma Aboriginal Corporation RNTBC

The Ngarluma Aboriginal Corporation works to create a sustainable future for Ngarluma People. This RNTBC area includes Karratha, Roebourne, Port Samson and surrounds. The Ngarluma People have several culturally significant “totem species” that may have been identified in the PMST search. Their animal totems include dugong, turtle, dolphin, hammerhead shark and manta ray. The EMBA overlaps 55 heritage sites within the Ngarluma Aboriginal Corporation RNTBC. 25 of these are registered sites and three sites are culturally sensitive.

Nyangumarta Karajarri Aboriginal Corporation

The Nyangumarta Karajarri Aboriginal Corporation represents, protects and supports the interests of the Nyangumarta and Karajarri people. The Nyangumarta and Karajarri people have native title across 2,000 square kilometres of land and sea country across Anna Plains Station, a portion of Mandora Station and 80 Mile Beach, in the East Pilbara and West Kimberley regions of WA.

Nyangumarta Warrarn Aboriginal Corporation RNTBC

The Nyangumarta Warrarn Aboriginal Corporation represents, supports and protects the interests of the Nyangumarta People. They are the traditional custodians of the land to the east of Port Hedland. No heritage sites are listed as intersecting the RNTBC and EMBA.

Wanparta Aboriginal Corporation RNTBC

The Wanparta Aboriginal Corporation represents, supports and protects the interests of the Ngarla People. They are the traditional owners of an area of land east of Port Hedland that covers the DeGrey and Pardoo pastoral station. The Ngarla People allocate particular importance to their totem species – the octopus, stingray, spiny bream fish and kestrel. The spiritual connection to sea country and the protection and management of marine life plays a significant role in the practice of lore, culture and customs for the Ngarla people (Inpex, 2023).

The EMBA overlaps five heritage sites within the Wanparta Aboriginal Corporation RNTBC. Four of these are registered sites, two of which are culturally sensitive (Warra Murranga Talu and Baalyinnye).

Wirrawandi Aboriginal Corporation RNTBC

The Wirrawandi Aboriginal Corporation holds and manages the native title rights and interests for the Mardudhunera and Yaburara People. These groups are the traditional owners of the coastal land west of

Dampier. The EMBA overlaps three heritage sites within the Wirrawandi Aboriginal Corporation RNTBC. One site is a culturally sensitive ceremonial ground containing engravings.

Yinggarda Aboriginal Corporation RNTBC

The Yinggarda Aboriginal Corporation represents, supports and protects the interests of the Yinggarda People. They are the traditional owners of an area of land surrounding Carnarvon. No heritage sites are listed as intersecting the RNTBC and EMBA.

7.8.3 Sea Country

Jadestone understands that First Nations peoples have deep connections to, and concerns about the protection of Sea Country, also referred to as Saltwater Country, and is viewed the same way they view their onshore Country, without separation.

Sea Country is an important part of First Nations peoples culture and whilst the many coastal and island First Nations groups around Australia have different languages and their own unique belief systems, ceremonies and relationships with Country, they all regard the estuaries, beaches, bays and marine areas, or Sea Country, as essential parts of their traditional estates.

First Nations groups who reside along the coasts or on islands believe that Sea Country contains the evidence of creation stories, about animals, plants and people, as well as the creation of landscape features such as islands and reefs. Coastal and island communities held cultural responsibilities to ensure Sea Country is cared for and Sea Country was managed very carefully, and they are playing an increasingly important role in the management of their Sea Country, through formalised roles and programs that work alongside various State and Commonwealth government structures.

Values and sensitivities regarding Sea Country may include different features such as:

- Historic and contemporary cultural harvesting of marine fauna and flora
- Sea and landscape features that hold dreamtime and creation stories, such as offshore islands
- Different marine and avian species that hold deep connections to lore and represent spiritual emblems.
- Within Australian waters and coastline that may be affected in the broader EMBAs, there are many values of cultural significance, with numerous shipwrecks and heritage sites (Figure 7-7). No historical shipwrecks are recorded in the Operations Area also (DoEE 2018).

It is recognised that spiritual corridors extend from terrestrial areas into nearshore and offshore waters, a number of marine animals are totems for indigenous people, and that songlines pass through marine areas. Aboriginal totems are symbols taken from nature, such as a plant or animal, that are inherited by members of a community as their spiritual emblem. Marine species described as totems therefore possess significant cultural importance to Aboriginal Australians.

7.8.4 Indigenous Protected Area (IPA)

Indigenous Protected Area (IPAs) are areas of land and sea that Traditional Owners have agreed to manage for biodiversity conservation. IPAs deliver environmental, cultural, social and economic benefits through implementation of agreed management plans. This includes Sea country IPAs to protect areas with unique marine and coastal environments. There is one Sea Country IPA that is located just outside the EMBA, *Tukujana pa Karajarri Kura Jurrar* and it expands the existing Karajarri IPA into the sea off the south-west Kimberley coast. The area includes a network of coastal habitats, such as intertidal and subtidal reefs, mangrove systems, lagoons and tidal creeks and will connect the Ramsar sites of Roebuck Bay and 80-mile beach. The area is an important dugong sanctuary and provides habitat for around 450,000 birds. Nyangumarta Warrarn Indigenous Protected Area is located within the EMBA and more information is provided in Section 6.2.8.9 above.

7.9 Summary of Values and Sensitivities of the Socio-Economic Environment within Operational Area and EMBA

Table 7-3 outlines those socioeconomic values that may be affected by routine events at the Stag Facility within the Operational Area as well as unplanned events that may arise within a potentially larger area (EMBA).

Table 7-3: Summary of socio-economic values and sensitivities

Socio-economic value		Sensitivities within Operational Area	Sensitivities within EMBA
Commonwealth fisheries	North-West Slope Trawl	No – Not within Operational Area, restricted to depths >200 m	Yes – Limited effort within EMBA seaward of 200 m isobaths. Oil could disrupt fishing activity and potentially contact eggs and larvae of target species although no direct contact with target species.
	Western Deepwater Trawl Fishery	No – Not within Operational Area, restricted to depths >200 m and south of Operational Area	Yes – Limited effort within EMBA seaward of 200 m isobaths, unlikely that area of EMBA would be fished. Oil could disrupt fishing activity and potentially contact eggs and larvae of target species although no direct contact with target species.
	Western Skipjack	No - No effort on the NWS	No - No effort on the NWS
	Western Tuna and Billfish	No - No effort on the NWS	No - No effort on the NWS
	Southern Bluefin Tuna	No - No effort on the NWS	No - No effort on the NWS
State fisheries	Onslow Prawn Managed Fishery	No - Effort within coastal areas	Yes – oil may reach shallow coastal waters and shorelines (most likely in Area 3 of fishery) affecting fishery habitat and fishing activity
	Nickol Bay Prawn Managed Fishery	No - Effort within coastal areas	Yes – oil may reach shallow coastal waters and shorelines affecting fishery habitat and fishing activity
	Broome Prawn Managed Fishery	No - Effort within coastal areas	Yes – oil may reach shallow coastal waters and shorelines affecting fishery habitat and fishing activity
	The Kimberley Gillnet and Barramundi Managed Fishery	No - Effort within coastal areas	Yes – oil may reach shallow coastal waters and shorelines affecting fishery habitat and fishing activity
	Northern Demersal Scalefish Managed Fishery	No – No overlap with fishing zones	Yes – Oil may enter Area 1 and 2 of the fishery. Oil may interact with demersal fish, eggs and larvae within the plankton assemblage. Oil may interfere with fishing activities.

Socio-economic value		Sensitivities within Operational Area	Sensitivities within EMBA
	Mackerel Managed Fishery	Yes - Area 2 overlaps Operational Area but interaction unlikely as fishery targets coastal reefs and headlands <40 m and 500 m restricted zone exists around Stag Facility.	Yes – Areas 1, 2 and 3 may be impacted by oil. Adult fish unlikely to be impacted due to depth of their habitat but eggs and larvae within plankton assemblage and shallow coastal juvenile fish habitat may be contacted by oil.
	Pilbara Demersal Scalefish Fishery (Line, Trap and Trawl)	Yes – Trap fishing zone only overlaps Operational Area but interaction unlikely as fishery targets reef areas (no reef areas exist near Operational Area) and 500 m restricted zone exists around Stag Facility.	Yes – Trawl, Trap and Line fishing activities may be disrupted by an oil spill. Adult demersal fish unlikely to be impacted due to depth of their habitat but eggs and larvae within plankton assemblage and shallow coastal juvenile fish habitat may be contacted by oil.
	Pearl Oyster Managed Fishery	No – Zone 1 overlaps Operational Area but collection of pearl oysters is performed by diving and Operational Area is beyond dive- able depths for the fishery. A 500 m restricted zone also exists around Stag Facility.	Yes – Fishing activity in Zones 1, 2 and 3 could be disrupted by an oil spill. Shallow water habitats and pearls could be directly impacted by oil but most likely would remain underneath floating oil.
	WA North Coast Shark Fishery	No – Shark fishery closed in vicinity of the Operational Area	No – fishery has been closed since 2009.
	Pilbara Developing Crab Fishery.	No – Fishing occurs in coastal waters inshore of the Operational Area	Yes - Fishing activity between Onslow and Port Hedland could be disrupted by an oil spill and oil could contact the shallow coastal habitats used by blue swimmer crabs.
	Exmouth Gulf Prawn Fishery	No – Fishing occurs within Exmouth Gulf only	Yes – EMBA boundaries indicate small degree of overlap only possible with the fishery. Fishing activity could be disrupted by an oil spill and oil could contact prawn eggs and larvae in upper water column.
	Gascoyne Demersal Scale Fishery	No – Restricted to Gascoyne waters and so permitted fishery management area does not overlap operational area.	Yes – EMBA boundaries indicate small degree of overlap possible with the fishery. Fishing activity could be disrupted by an oil spill and oil could contact demersal fish eggs and larvae in upper water column although no direct contact with target species.
	West Coast Rock Lobster Fishery	No – Restricted south of North-West Cape	Yes – EMBA boundaries indicate small degree of overlap possible with the fishery if fishing occurs off Ningaloo coastline. Fishing activity could be disrupted by an oil spill and oil could contact lobster eggs and larvae in upper water column although benthic juveniles and adults are unlikely to be contacted.
	Beche-de-mer Managed Fishery	No – Restricted to shallow diveable depths or wading depths	Yes - Fishing activity between could be disrupted by an oil spill and oil could contact the shallow coastal habitats used

Socio-economic value		Sensitivities within Operational Area	Sensitivities within EMBA
	Marine Aquarium Fish Managed Fishery		by beche-de-mer, marine aquarium fish and specimen shell species.
	Specimen Shell Fishery		
	West Coast Deep Sea Crustacean Managed Fishery	No – Fishery extends from 150 m contour therefore no overlap with Operational Area.	Yes – Fishing activities may be disrupted by an oil spill. Adult crabs unlikely to be impacted due to depth of their habitat but eggs and larvae within plankton assemblage may be contacted by oil.
Recreational fishery		No – Usually closer to land	Yes - Fishing activities may be disrupted by an oil spill. Target species and habitat or target species may be directly impacted by oil. Eggs and larvae of target species within the plankton community may also be contacted by oil.
Aquaculture		No - None within Operational Area	Yes – Pearl farming occurs within the EMBA at Montebello Islands. Oil could interfere with the production process or impact on pearl oysters directly through reduced water quality.
Oil and Gas		No - None within Operational Area	Yes - oil and gas activities within the EMBA could be disrupted by an oil spill.
Shipping		Yes - No designated shipping route within operational area with nearest located ~ 5 km northwest, other vessels may wish to transit the area although shipping traffic excluded from the Operational Area	Yes - Shipping routes are located within the EMBA. Shipping activities could be disrupted by an oil spill.
Tourism		No - None within operational area.	Yes - Tourist activities within coastal areas of EMBA could be disrupted and long term impact to tourism could occur if tourist areas (e.g. coral reefs, beaches) are impacted by oil.
Cultural Heritage		No - None within or near the Operational Area	Yes – oil entrained oil could potentially contact the subsea *Tryal* shipwreck at Trial Rocks NW of the Montebello islands
Aboriginal Heritage		No- No DPLH sites within or near the operational area.	Yes- entrained oil could potentially contact Aboriginal Heritage sites listed by DPLH

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APPENDIX D EPBC MATTERS SEARCH REPORTS

- Operational Area
- Operational area with 20 km buffer (light and noise)
- EMBA
- DPLH Reports

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Aug-2024

Operational Area

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	25
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	70
Whales and Other Cetaceans:	16
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	3

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	10
Key Ecological Features (Marine):	None
Biologically Important Areas:	9
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Phaethon rubricauda westralis](#) Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat likely to occur within area
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
MAMMAL		
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
REPTILE		
[Aipysurus apraefrontalis](#) Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
[Aipysurus foliosquama](#) Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area

Scientific Name	Threatened Category	Presence Text
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area
SHARK		
Carcharias taurus (west coast population)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Pristis clavata		
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
Pristis zijsron		
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sphyrna lewini		
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Sterna dougallii Roseate Tern [817]		Breeding likely to occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat may occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area
Sterna dougallii Roseate Tern [817]		Breeding likely to occur within area
Fish		
Acentronura larsonae Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
Choeroichthys latispinosus Muiron Island Pipefish [66196]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Doryrhamphus dactyliophorus Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Micrognathus micronotopterus		
Tidepool Pipefish [66255]		Species or species habitat may occur within area
Phoxocampus belcheri		
Black Rock Pipefish [66719]		Species or species habitat may occur within area
Solegnathus hardwickii		
Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis		
Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus		
Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Syngnathoides biaculeatus		
Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus		
Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris		
Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammal		
Dugong dugon		
Dugong [28]		Species or species habitat known to occur within area
Reptile		
Aipysurus apraefrontalis		
Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Aipysurus duboisii		
Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Aipysurus foliosquama](#) Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
[Aipysurus laevis](#) Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area
[Aipysurus mosaicus as Aipysurus eydouxii](#) Mosaic Sea Snake [87261]		Species or species habitat may occur within area
[Aipysurus tenuis](#) Brown-lined Sea Snake, Mjoberg's Sea Snake [1121]		Species or species habitat may occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
[Emydocephalus annulatus](#) Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area
[Ephalophis greyae as Ephalophis greyi](#) Mangrove Sea Snake [93738]		Species or species habitat may occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area

Scientific Name	Threatened Category	Presence Text
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence

Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Sousa sahulensis Australian Humpback Dolphin [87942]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Habitat Critical to the Survival of Marine Turtles		[Resource Information]
Scientific Name	Behaviour	Presence
Aug - Sep		
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur
Dec - Jan		
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur
Nov - May		
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Construct and operate LNG & domestic gas plant including onshore and offshore facilities - Wheatston	2008/4469	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Not controlled action			
Drilling of an exploration well Gats-1 in Permit Area WA-261-P	2004/1701	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Tourmaline' 2D marine seismic survey, permit areas WA-323-P, WA-330-P and WA-32	2005/2282	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2005/2146	Not Controlled Action (Particular Manner)	Post-Approval
DAVROS MC 3D marine seismic survey northwaet of Dampier, WA	2013/7092	Not Controlled Action (Particular Manner)	Post-Approval
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260	Not Controlled Action (Particular Manner)	Post-Approval
Reindeer gas reservior development, Devil Creek, Carnarvon Basin - WA	2007/3917	Not Controlled Action (Particular Manner)	Post-Approval
Stag 4D & Reindeer MAZ Marine Seismic Surveys, WA	2013/7080	Not Controlled Action (Particular Manner)	Post-Approval
Stag Off-bottom Cable Seismic Survey	2007/3696	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a 3D marine seismic survey	2010/5695	Not Controlled Action (Particular Manner)	Post-Approval

Biologically Important Areas		[Resource Information]
Scientific Name	Behaviour	Presence
Marine Turtles		
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur

Scientific Name	Behaviour	Presence
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Breeding	Known to occur
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur
Sharks		
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur
Whales		
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 10-Sep-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	25
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	75
Whales and Other Cetaceans:	16
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1
Habitat Critical to the Survival of Marine Turtles:	3

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	17
Key Ecological Features (Marine):	None
Biologically Important Areas:	9
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In feature area
Commonwealth Marine Areas (EPBC Act)	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Phaethon rubricauda westralis](#) Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat likely to occur within area	In feature area
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area	In feature area
MAMMAL			
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Species or species habitat may occur within area	In feature area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
[Aipysurus apraefrontalis](#) Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Aipysurus foliosquama](#) Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
SHARK			
Carcharias taurus (west coast population)			
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis clavata			
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron			
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Sterna dougallii Roseate Tern [817]		Breeding likely to occur within area	In feature area
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In feature area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat may occur within area	In feature area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area	In feature area

Migratory Wetlands Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat likely to occur within area	In feature area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
[Fregata minor](#) Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
[Phaethon lepturus fulvus](#) Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Sterna dougallii](#) Roseate Tern [817]		Breeding likely to occur within area	In feature area
Fish			
[Acentronura larsonae](#) Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area	In feature area
[Bulbonaricus brauni](#) Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area	In feature area
[Campichthys tricarinatus](#) Three-keel Pipefish [66192]		Species or species habitat may occur within area	In feature area
[Choeroichthys brachysoma](#) Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area
[Choeroichthys latispinosus](#) Muiron Island Pipefish [66196]		Species or species habitat may occur within area	In feature area
[Choeroichthys suillus](#) Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area
[Corythoichthys flavofasciatus](#) Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In buffer area only
[Cosmocampus banneri](#) Roughridge Pipefish [66206]		Species or species habitat may occur within area	In buffer area only
[Doryrhamphus dactyliophorus](#) Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area	In feature area
[Doryrhamphus excisus](#) Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In feature area
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area	In feature area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area	In feature area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area	In feature area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In feature area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area	In feature area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In feature area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area	In buffer area only
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area	In feature area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area	In feature area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area	In feature area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Syngnathoides biaculeatus](#) Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
[Trachyrhamphus bicoarctatus](#) Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
[Trachyrhamphus longirostris](#) Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In feature area
Mammal			
[Dugong dugon](#) Dugong [28]		Species or species habitat known to occur within area	In feature area
Reptile			
[Aipysurus apraefrontalis](#) Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Aipysurus duboisii](#) Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In feature area
[Aipysurus foliosquama](#) Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Aipysurus laevis](#) Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In feature area
[Aipysurus mosaicus as Aipysurus eydouxii](#) Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In feature area
[Aipysurus tenuis](#) Brown-lined Sea Snake, Mjoberg's Sea Snake [1121]		Species or species habitat may occur within area	In feature area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In feature area
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area	In feature area
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93738]		Species or species habitat may occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Congregation or aggregation known to occur within area	In feature area
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area	In feature area
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area	In feature area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In feature area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In feature area
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In feature area
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In feature area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In feature area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In feature area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area	In feature area
Sousa sahulensis Australian Humpback Dolphin [87942]		Species or species habitat may occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Tursiops truncatus s. str.			
Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Australian Marine Parks [Resource Information]

Park Name	Zone & IUCN Categories	Buffer Status
Montebello	Multiple Use Zone (IUCN VI)	In buffer area only

Habitat Critical to the Survival of Marine Turtles [Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Aug - Sep			
Natator depressus			
Flatback Turtle [59257]	Nesting	Known to occur	In feature area
Dec - Jan			
Chelonia mydas			
Green Turtle [1765]	Nesting	Known to occur	In feature area
Nov - May			
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Nesting	Known to occur	In feature area

Extra Information

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Construct and operate LNG & domestic gas plant including onshore and offshore facilities - Wheatston	2008/4469	Controlled Action	Post-Approval	In feature area
Not controlled action				
Drilling of an exploration well Gats-1 in Permit Area WA-261-P	2004/1701	Not Controlled Action	Completed	In feature area
Telstra North Rankin Spur Fibre Optic Cable	2016/7836	Not Controlled Action	Completed	In buffer area only
To construct and operate an offshore submarine fibre optic cable, WA	2014/7373	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
'Tourmaline' 2D marine seismic survey, permit areas WA-323-P,	2005/2282	Not Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
WA-330-P and WA-32		(Particular Manner)		
2D Seismic Survey	2005/2146	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
3D Marine Seismic Survey in WA 457-P & WA 458-P, North West Shelf, offshore WA	2013/6862	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
DAVROS MC 3D marine seismic survey northwaet of Dampier, WA	2013/7092	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Demeter 3D Seismic Survey, off Dampier, WA	2002/900	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Moosehead 2D seismic survey within permit WA-192-P	2005/2167	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Reindeer gas reservior development, Devil Creek, Carnarvon Basin - WA	2007/3917	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Santos Winchester three dimensional seismic survey - WA-323-P & WA-330-P		Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Stag 4D & Reindeer MAZ Marine Seismic Surveys, WA	2013/7080	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Stag Off-bottom Cable Seismic Survey	2007/3696	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Undertake a 3D marine seismic survey	2010/5695	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
West Panaeus 3D seismic survey	2006/3141	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Biologically Important Areas

[Resource Information]

Scientific Name	Behaviour	Presence	Buffer Status
Marine Turtles			
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur	In feature area
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur	In feature area
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur	In feature area
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In feature area
Sterna dougallii Roseate Tern [817]	Breeding	Known to occur	In feature area
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur	In feature area
Sharks			
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur	In feature area
Whales			
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Australian Government

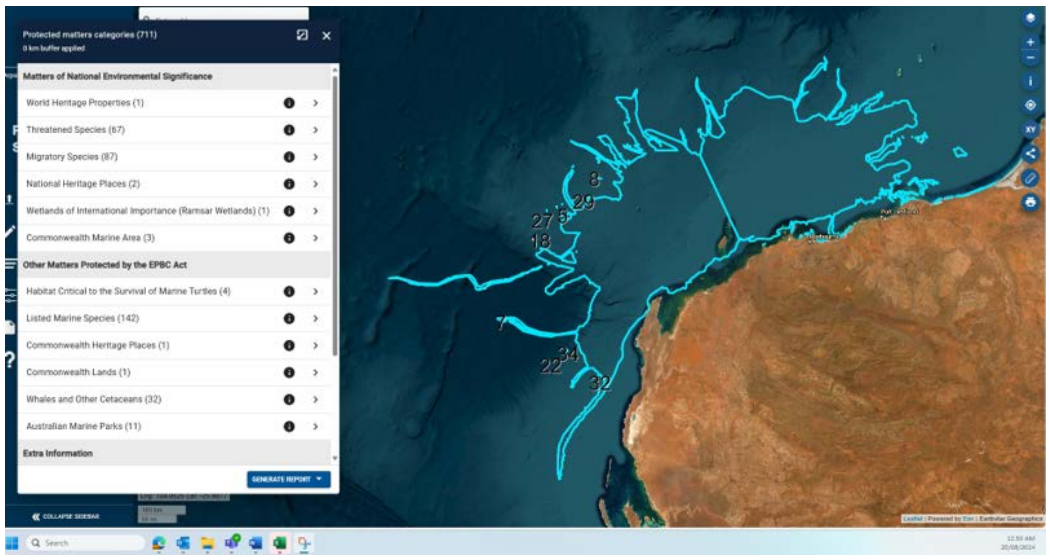
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

STAG EMBA

Report created: 20-Aug-2024



Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	2
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	3
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	67
Listed Migratory Species:	87

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	1
Listed Marine Species:	142
Whales and Other Cetaceans:	32
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	11
Habitat Critical to the Survival of Marine Turtles:	4

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	39
Regional Forest Agreements:	None
Nationally Important Wetlands:	2
EPBC Act Referrals:	261
Key Ecological Features (Marine):	6
Biologically Important Areas:	51
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status
The Ningaloo Coast	WA	Declared property

National Heritage Places [Resource Information]

Name	State	Legal Status
Indigenous		
Dampier Archipelago (including Burrup Peninsula)	WA	Listed place
Natural		
The Ningaloo Coast	WA	Listed place

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Eighty-mile beach	Within Ramsar site

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)
Commonwealth Marine Areas (EPBC Act)

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Arenaria interpres		
Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Endangered	Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Malurus leucopterus edouardi White-winged Fairy-wren (Barrow Island), Barrow Island Black-and-white Fairy-wren [26194]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area
Phaethon rubricauda westralis Red-tailed Tropicbird (Indian Ocean), Indian Ocean Red-tailed Tropicbird [91824]	Endangered	Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area
FISH		
Milyeringa veritas Cape Range Cave Gudgeon, Blind Gudgeon [66676]	Vulnerable	Species or species habitat known to occur within area
Ophisternon candidum Blind Cave Eel [66678]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area

Scientific Name	Threatened Category	Presence Text
Balaenoptera physalus		
Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Bettongia lesueur Barrow and Boodie Islands subspecies		
Boodie, Burrowing Bettong (Barrow and Boodie Islands) [88021]	Vulnerable	Species or species habitat known to occur within area
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isoodon auratus barrowensis		
Golden Bandicoot (Barrow Island) [66666]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes conspicillatus conspicillatus		
Spectacled Hare-wallaby (Barrow Island) [66661]	Vulnerable	Species or species habitat known to occur within area
Lagorchestes hirsutus Central Australian subspecies		
Mala, Rufous Hare-Wallaby (Central Australia) [88019]	Endangered	Translocated population known to occur within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Species or species habitat known to occur within area
Macrotis lagotis		
Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
Osphranter robustus isabellinus		
Barrow Island Wallaroo, Barrow Island Euro [89262]	Vulnerable	Species or species habitat likely to occur within area
Petrogale lateralis lateralis		
Black-flanked Rock-wallaby, Moororong, Black-footed Rock Wallaby [66647]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Rhinonicteris aurantia (Pilbara form)		
Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat known to occur within area
REPTILE		
Aipysurus apraefrontalis		
Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus foliosquama		
Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Ctenotus zastictus		
Hamelin Ctenotus [25570]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Lerista nevinae		
Nevin's Slider [85296]	Endangered	Species or species habitat known to occur within area
Liasis olivaceus barroni		
Pilbara Olive Python [66699]	Vulnerable	Species or species habitat known to occur within area
Liopholis kintorei		
Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
SHARK		

Scientific Name	Threatened Category	Presence Text
Carcharias taurus (west coast population)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Centrophorus uyato		
Little Gulper Shark [68446]	Conservation Dependent	Species or species habitat likely to occur within area
Pristis clavata		
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron		
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sphyrna lewini		
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Sula dactylatra Masked Booby [1021]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat known to occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Breeding known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Unknown	

Commonwealth Land Name	State
Commonwealth Land - [51939]	WA

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Ningaloo Marine Area - Commonwealth Waters	WA	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Roosting known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat likely to occur within area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area overfly marine area
Limnodromus semipalmatus Asian Dowitcher [843]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat may occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area
Phaethon lepturus fulvus Christmas Island White-tailed Tropicbird, Golden Bosunbird [26021]	Endangered	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sterna dougallii		
Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons as Sterna albifrons		
Little Tern [82849]		Breeding known to occur within area
Sternula nereis as Sterna nereis		
Fairy Tern [82949]		Breeding known to occur within area
Stiltia isabella		
Australian Pratincole [818]		Roosting known to occur within area overfly marine area
Sula dactylatra		
Masked Booby [1021]		Breeding known to occur within area
Sula leucogaster		
Brown Booby [1022]		Breeding known to occur within area
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalasseus bengalensis as Sterna bengalensis		
Lesser Crested Tern [66546]		Breeding known to occur within area
Thalasseus bergii as Sterna bergii		
Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes as Heteroscelus brevipes		
Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
Tringa totanus		
Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area
Xenus cinereus		
Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area
Fish		
Acentronura larsonae		
Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area
Bhanotia fasciolata		
Corrugated Pipefish, Barbed Pipefish [66188]		Species or species habitat may occur within area
Bulbonaricus brauni		
Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
Campichthys galei		
Gale's Pipefish [66191]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
Choeroichthys latispinosus Muiron Island Pipefish [66196]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area
Corythoichthys intestinalis Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area
Cosmocampus banneri Roughridge Pipefish [66206]		Species or species habitat may occur within area
Doryrhamphus dactyliophorus Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammal		
Dugong dugon Dugong [28]		Breeding known to occur within area
Reptile		
Aipysurus apraefrontalis Short-nosed Sea Snake, Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area
Aipysurus foliosquama Leaf-scaled Sea Snake, Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area
Aipysurus pooleorum Shark Bay Sea Snake [66061]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Sea Snake, Mjoberg's Sea Snake [1121]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Emydocephalus annulatus Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area
Ephalophis greyae as Ephalophis greyi Mangrove Sea Snake [93738]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Hydrelaps darwiniensis Port Darwin Sea Snake, Black-ringed Mangrove Sea Snake [1100]		Species or species habitat may occur within area
Hydrophis czeblukovi Fine-spined Sea Snake [59233]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area

Current Scientific Name	Status	Type of Presence
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Indopacetus pacificus Longman's Beaked Whale [72]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Kogia sima Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Breeding known to occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Gingko-toothed Beaked Whale, Gingko-toothed Whale, Gingko Beaked Whale [59564]		Species or species habitat may occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Sousa sahulensis Australian Humpback Dolphin [87942]		Species or species habitat known to occur within area

Current Scientific Name	Status	Type of Presence
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks	[Resource Information]
Park Name	Zone & IUCN Categories
Dampier	Habitat Protection Zone (IUCN IV)
Gascoyne	Habitat Protection Zone (IUCN IV)
Argo-Rowley Terrace	Multiple Use Zone (IUCN VI)
Dampier	Multiple Use Zone (IUCN VI)
Eighty Mile Beach	Multiple Use Zone (IUCN VI)

Park Name	Zone & IUCN Categories
Gascoyne	Multiple Use Zone (IUCN VI)
Montebello	Multiple Use Zone (IUCN VI)
Shark Bay	Multiple Use Zone (IUCN VI)
Dampier	National Park Zone (IUCN II)
Gascoyne	National Park Zone (IUCN II)
Ningaloo	Recreational Use Zone (IUCN IV)

Habitat Critical to the Survival of Marine Turtles		[Resource Information]
Scientific Name	Behaviour	Presence
Aug - Sep		
Natator depressus		
Flatback Turtle [59257]	Nesting	Known to occur
Dec - Jan		
Chelonia mydas		
Green Turtle [1765]	Nesting	Known to occur
Nov-Feb		
Caretta caretta		
Loggerhead Turtle [1763]	Nesting	Known to occur
Nov - May		
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Nesting	Known to occur

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Barrow Island	Nature Reserve	WA
Barrow Island	Marine Management Area	WA
Barrow Island	Marine Park	WA
Bedout Island	Nature Reserve	WA
Bessieres Island	Nature Reserve	WA
Boodie, Double Middle Islands	Nature Reserve	WA

Protected Area Name	Reserve Type	State
Cape Range	National Park	WA
Eighty Mile Beach	Marine Park	WA
Great Sandy Island	Nature Reserve	WA
Jarrkunpungu	Nature Reserve	WA
Jurabi Coastal Park	5(1)(h) Reserve	WA
Kujungurru Warrarn	Conservation Park	WA
Kujungurru Warrarn	Nature Reserve	WA
Lowendal Islands	Nature Reserve	WA
Montebello Islands	Conservation Park	WA
Montebello Islands	Marine Park	WA
Montebello Islands	Conservation Park	WA
Muiron Islands	Nature Reserve	WA
Muiron Islands	Marine Management Area	WA
Murujuga	5(1)(h) Reserve	WA
Murujuga	National Park	WA
Ningaloo	Marine Park	WA
North Sandy Island	Nature Reserve	WA
North Turtle Island	Nature Reserve	WA
Nyangumarta Warrarn	Indigenous Protected Area	WA
Nyangumarta Warrarn	Indigenous Protected Area	WA
Round Island	Nature Reserve	WA
Serrurier Island	Nature Reserve	WA
Unnamed WA36909	5(1)(h) Reserve	WA
Unnamed WA36910	5(1)(h) Reserve	WA
Unnamed WA36913	Nature Reserve	WA

Protected Area Name	Reserve Type	State
Unnamed WA36915	Nature Reserve	WA
Unnamed WA40828	5(1)(h) Reserve	WA
Unnamed WA40877	5(1)(h) Reserve	WA
Unnamed WA41080	5(1)(h) Reserve	WA
Unnamed WA44665	5(1)(h) Reserve	WA
Unnamed WA44667	5(1)(h) Reserve	WA
Unnamed WA44672	5(1)(h) Reserve	WA
Unnamed WA52366	Nature Reserve	WA

Nationally Important Wetlands

[Resource Information]

Wetland Name	State
Cape Range Subterranean Waterways	WA
Eighty Mile Beach System	WA

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Balla Balla Export Facilities ? Design Variation	2022/09254		Assessment
Browse to North West Shelf Development, Indian Ocean, WA	2018/8319		Approval
Burrup Common User Transmission Infrastructure	2022/09407		Assessment
Burrup Peninsula Seawater Supply Scheme Upgrade	2023/09698		Completed
Dampier Seawater Desalination Plant	2022/09395		Completed
Gorgon Gas Development	2003/1294		Post-Approval
North West Shelf Project Extension, Carnarvon Basin, WA	2018/8335		Approval
Project Highclere Cable Lay and Operation	2022/09203		Completed
Ridley Magnetite Project	2023/09477		Referral Decision
Winu Copper and Gold Mine (Winu Project)	2024/09804		Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Action clearly unacceptable			
Asian Renewable Energy Hub Revised Proposal, WA	2021/8891	Action Clearly Unacceptable	Completed
Highlands 3D Marine Seismic Survey	2012/6680	Action Clearly Unacceptable	Completed
Controlled action			
'Van Gogh' Petroleum Field Development	2007/3213	Controlled Action	Post-Approval
Ammonium Nitrate Project	2010/5423	Controlled Action	Completed
Anketell Point Iron Ore Processing & Export Port	2009/5120	Controlled Action	Post-Approval
Asian Renewable Energy Hub, 220 km east of Port Hedland, Western Australia	2017/8112	Controlled Action	Post-Approval
Balmoral South Iron Ore Mine	2008/4236	Controlled Action	Post-Approval
Binowee Iron Ore Project	2001/366	Controlled Action	Proposed Decision
Cape Lambert Port B Development	2008/4032	Controlled Action	Post-Approval
Construct and operate LNG & domestic gas plant including onshore and offshore facilities - Wheatston	2008/4469	Controlled Action	Post-Approval
Develop Jansz-Io deepwater gas field in Permit Areas WA-18-R, WA-25-R and WA-26-	2005/2184	Controlled Action	Post-Approval
Development of Angel gas and condensate field, North West Shelf	2004/1805	Controlled Action	Post-Approval
Development of an iron ore mine and associated infrastructure	2010/5630	Controlled Action	Assessment Approach
Development of Browse Basin Gas Fields (Upstream)	2008/4111	Controlled Action	Completed
Development of Coniston/Novara fields within the Exmouth Sub-basin	2011/5995	Controlled Action	Post-Approval
Development of Stybarrow petroleum field incl drilling and facility installation	2004/1469	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Echo-Yodel Production Wells	2000/11	Controlled Action	Post-Approval
Enfield full field development	2001/257	Controlled Action	Post-Approval
Equus Gas Fields Development Project, Carnarvon Basin	2012/6301	Controlled Action	Completed
Eramurra Industrial Salt Project	2021/9027	Controlled Action	Assessment Approach
Eramurra Industrial Salt Project, near Karratha, WA	2019/8448	Controlled Action	Completed
Gorgon Gas Development 4th Train Proposal	2011/5942	Controlled Action	Post-Approval
Gorgon Gas Revised Development	2008/4178	Controlled Action	Post-Approval
Greater Enfield (Vincent) Development	2005/2110	Controlled Action	Post-Approval
Greater Gorgon Development - Optical Fibre Cable, Mainland to Barrow Island	2005/2141	Controlled Action	Completed
Great Northern Pipeline - 630 km buried gas pipeline	2009/5257	Controlled Action	Completed
Light Crude Oil Production	2001/365	Controlled Action	Post-Approval
Mardie Project, 80 km south west of Karratha, WA	2018/8236	Controlled Action	Post-Approval
Nava-1 Cable System	2001/510	Controlled Action	Completed
North West Shelf Gas Venture Phase VI Expansion	2007/3436	Controlled Action	Referral Decision
Perdaman Urea Project, near Karratha, WA	2018/8383	Controlled Action	Post-Approval
Pluto Gas Project	2005/2258	Controlled Action	Completed
Pluto Gas Project Including Site B	2006/2968	Controlled Action	Post-Approval
Port Hedland Outer Harbour Development and associated marine and terrestrial in	2008/4159	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Proposed technical ammonium nitrate production facility	2008/4546	Controlled Action	Post-Approval
Proposed West Pilbara Iron Ore Project	2009/4706	Controlled Action	Post-Approval
Pyrenees Oil Fields Development	2005/2034	Controlled Action	Post-Approval
Simpson Development	2000/59	Controlled Action	Completed
Simpson Oil Field Development	2001/227	Controlled Action	Post-Approval
site preparations	2005/2391	Controlled Action	Post-Approval
The Scarborough Project - FLNG & assoc subsea infrastructure, Carnarvon Basin	2013/6811	Controlled Action	Post-Approval
Vincent Appraisal Well	2000/22	Controlled Action	Post-Approval
Widening and resurfacing two principal roads servicing the Dampier Port Authori	2010/5677	Controlled Action	Completed
Not controlled action			
'Goodwyn A' Low Pressure Train Project	2003/914	Not Controlled Action	Completed
'Van Gogh' Oil Appraisal Drilling Program, Exploration Permit Area WA-155-P(1)	2006/3148	Not Controlled Action	Completed
Ammonia Plant	2001/199	Not Controlled Action	Completed
APX-West Fibre-optic telecommunications cable system, WA to Singapore	2013/7102	Not Controlled Action	Completed
Barrow Island 2D Seismic survey	2006/2667	Not Controlled Action	Completed
Bollinger 2D Seismic Survey 200km North of North West Cape WA	2004/1868	Not Controlled Action	Completed
Bultaco-2, Laverda-2, Laverda-3 and Montesa-2 Appraisal Wells	2000/103	Not Controlled Action	Completed
Cape Lambert Port A Marine Structures Refurbishment Project	2018/8370	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Carnarvon 3D Marine Seismic Survey	2004/1890	Not Controlled Action	Completed
Cazadores 2D seismic survey	2004/1720	Not Controlled Action	Completed
Construction and operation of an unmanned sea platform and connecting pipeline to Varanus Island for	2004/1703	Not Controlled Action	Completed
Construction of Loadout Facility and Laydown Area	2002/598	Not Controlled Action	Completed
Controlled Source Electromagnetic Survey	2007/3262	Not Controlled Action	Completed
Deep Gorge Boardwalk, Murujuga National Park, WA	2018/8283	Not Controlled Action	Completed
Development of Halyard Field off the west coast of WA	2010/5611	Not Controlled Action	Completed
Development of Industrial Land, Port of Dampier	2003/1293	Not Controlled Action	Completed
Development of iron ore facilities	2013/7013	Not Controlled Action	Completed
Development of Mutineer and Exeter petroleum fields for oil production, Permit	2003/1033	Not Controlled Action	Completed
Dimethyl ether plant	2001/509	Not Controlled Action	Completed
Drilling of an exploration well Gats-1 in Permit Area WA-261-P	2004/1701	Not Controlled Action	Completed
Eagle-1 Exploration Drilling, North West Shelf, WA	2019/8578	Not Controlled Action	Completed
Echo A Development WA-23-L, WA-24-L	2005/2042	Not Controlled Action	Completed
Expansion of the Sino Iron Ore Mine and export facilities, Cape Preston, WA	2017/7862	Not Controlled Action	Completed
Expansion Proposal, Mineralogy Cape Preston Iron Ore Project, Cape Preston, WA	2009/5010	Not Controlled Action	Completed
Exploration drilling well WA-155-P(1)	2003/971	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Exploration of appraisal wells	2006/3065	Not Controlled Action	Completed
Exploration Well (Taunton-2)	2002/731	Not Controlled Action	Completed
Exploration Well in Permit Area WA-155-P(1)	2002/759	Not Controlled Action	Completed
Exploratory drilling in permit area WA-225-P	2001/490	Not Controlled Action	Completed
Extension of Simpson Oil Platforms & Wells	2002/685	Not Controlled Action	Completed
HCA05X Macedon Experimental Survey	2004/1926	Not Controlled Action	Completed
Hess Exploration Drilling Programme	2007/3566	Not Controlled Action	Completed
Huascaran-1 exploration well (WA-292-P)	2001/539	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO West Submarine Telecommunications Cable, WA	2017/8126	Not Controlled Action	Completed
Infill Production Well (Griffin-9)	2001/417	Not Controlled Action	Completed
Jansz-2 and 3 Appraisal Wells	2002/754	Not Controlled Action	Completed
King Bay East Rock Quarry & Industrial Estate Development	2003/1150	Not Controlled Action	Completed
Klammer 2D Seismic Survey	2002/868	Not Controlled Action	Completed
Maia-Gaea Exploration wells	2000/17	Not Controlled Action	Completed
Manaslu - 1 and Huascaran - 1 Offshore Exploration Wells	2001/235	Not Controlled Action	Completed
Mermaid Marine Australia Desalination Project	2011/5916	Not Controlled Action	Completed
Methanol manufacturing	2001/528	Not Controlled Action	Completed
Methanol plant	2001/521	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Montesa-1 and Bultaco-1 Exploration Wells	2000/102	Not Controlled Action	Completed
Murujuga archaeological excavation, collection and sampling, Dampier Archipelago, WA	2014/7160	Not Controlled Action	Completed
North Rankin B gas compression facility	2005/2500	Not Controlled Action	Completed
Pipeline System Modifications Project	2000/3	Not Controlled Action	Completed
Pluto-North West Shelf Interconnector, Burrup Peninsula, WA	2018/8353	Not Controlled Action	Completed
Port Expansion and Dredging	2003/1265	Not Controlled Action	Completed
Port Hedland Channel Risk and Optimisation Project, WA	2017/7915	Not Controlled Action	Completed
Project Highclere Geophysical Survey	2021/9023	Not Controlled Action	Completed
Searipple gas and condensate field development	2000/89	Not Controlled Action	Completed
Spool Base Facility	2001/263	Not Controlled Action	Completed
Stages 1 & 2 Port of Dampier Security Upgrade & Associated Works	2004/1751	Not Controlled Action	Completed
Subsea Gas Pipeline From Stybarrow Field to Griffin Venture Gas Export Pipeline	2005/2033	Not Controlled Action	Completed
sub-sea tieback of Perseus field wells	2004/1326	Not Controlled Action	Completed
Telstra North Rankin Spur Fibre Optic Cable	2016/7836	Not Controlled Action	Completed
Thevenard Island Retirement Project	2015/7423	Not Controlled Action	Completed
To construct and operate an offshore submarine fibre optic cable, WA	2014/7373	Not Controlled Action	Completed
WA-295-P Kerr-McGee Exploration Wells	2001/152	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Wanda Offshore Research Project, 80 km north-east of Exmouth, WA	2018/8293	Not Controlled Action	Completed
Western Flank Gas Development	2005/2464	Not Controlled Action	Completed
Wheatstone 3D seismic survey, 70km north of Barrow Island	2004/1761	Not Controlled Action	Completed
Widening of MOF Road	2005/2305	Not Controlled Action	Completed
Woodside Project Facilities Increase	2006/3191	Not Controlled Action	Completed
Not controlled action (particular manner)			
'Kate' 3D marine seismic survey, exploration permits WA-320-P and WA-345-P, 60km	2005/2037	Not Controlled Action (Particular Manner)	Post-Approval
'Tourmaline' 2D marine seismic survey, permit areas WA-323-P, WA-330-P and WA-32	2005/2282	Not Controlled Action (Particular Manner)	Post-Approval
"Leanne" offshore 3D seismic exploration, WA-356-P	2005/1938	Not Controlled Action (Particular Manner)	Post-Approval
2D and 3D seismic surveys	2005/2151	Not Controlled Action (Particular Manner)	Post-Approval
2D marine seismic survey	2012/6296	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey	2008/4493	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey	2005/2146	Not Controlled Action (Particular Manner)	Post-Approval
2D Seismic Survey Permit Area WA-352-P	2008/4628	Not Controlled Action (Particular Manner)	Post-Approval
2D seismic survey within permit WA-291	2007/3265	Not Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		(Particular Manner)	
3D marine seismic survey	2008/4281	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey (WA-482-P, WA-363-P), WA	2013/6761	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey in Permit Areas WA-15-R, WA-18-R, WA-205-P, WA-253-P, WA-267-P and WA-268-P	2003/1271	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Survey in WA 457-P & WA 458-P, North West Shelf, offshore WA	2013/6862	Not Controlled Action (Particular Manner)	Post-Approval
3D marine seismic survey over petroleum title WA-268-P	2007/3458	Not Controlled Action (Particular Manner)	Post-Approval
3D Marine Seismic Surveys - Contos CT-13 & Supertubes CT-13, offshore WA	2013/6901	Not Controlled Action (Particular Manner)	Post-Approval
3D seismic survey	2006/2715	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey, WA	2008/4428	Not Controlled Action (Particular Manner)	Post-Approval
3D Seismic Survey in the Carnarvon Bsin on the North West Shelf	2002/778	Not Controlled Action (Particular Manner)	Post-Approval
3D sesmic survey	2006/2781	Not Controlled Action (Particular Manner)	Post-Approval
Acheron Non-Exclusive 2D Seismic Survey	2009/4968	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Acheron Non-Exclusive 2D Seismic Survey	2008/4565	Not Controlled Action (Particular Manner)	Post-Approval
Agrippina 3D Seismic Marine Survey	2009/5212	Not Controlled Action (Particular Manner)	Post-Approval
Ammonia Plant, Murujuga Burrup Peninsula - Renewable Hydrogen Project	2020/8739	Not Controlled Action (Particular Manner)	Post-Approval
Apache Northwest Shelf Van Gogh Field Appraisal Drilling Program	2007/3495	Not Controlled Action (Particular Manner)	Post-Approval
Aperio 3D Marine Seismic Survey, WA	2012/6648	Not Controlled Action (Particular Manner)	Post-Approval
Artemis-1 Drilling Program (WA-360-P)	2010/5432	Not Controlled Action (Particular Manner)	Post-Approval
Australia to Singapore Fibre Optic Submarine Cable System	2011/6127	Not Controlled Action (Particular Manner)	Post-Approval
Babylon 3D Marine Seismic Survey, Commonwealth Waters, nr Exmouth WA	2013/7081	Not Controlled Action (Particular Manner)	Post-Approval
Balnaves Condensate Field Development	2011/6188	Not Controlled Action (Particular Manner)	Post-Approval
Bonaventure 3D seismic survey	2006/2514	Not Controlled Action (Particular Manner)	Post-Approval
Cable Seismic Exploration Permit areas WA-323-P and WA-330-P	2008/4227	Not Controlled Action (Particular Manner)	Post-Approval
Cape Preston East - Iron Ore Export Facilities, Pilbara, WA	2013/6844	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Cerberus exploration drilling campaign, Carnarvon Basin, WA	2016/7645	Not Controlled Action (Particular Manner)	Post-Approval
CGGVERITAS 2010 2D Seismic Survey	2010/5714	Not Controlled Action (Particular Manner)	Post-Approval
Charon 3D Marine Seismic Survey	2007/3477	Not Controlled Action (Particular Manner)	Post-Approval
Consturction & operation of the Varanus Island kitchen & mess cyclone refuge building, compression p	2013/6952	Not Controlled Action (Particular Manner)	Post-Approval
Coverack Marine Seismic Survey	2001/399	Not Controlled Action (Particular Manner)	Post-Approval
Cue Seismic Survey within WA-359-P, WA-361-P and WA-360-P	2007/3647	Not Controlled Action (Particular Manner)	Post-Approval
CVG 3D Marine Seismic Survey	2012/6654	Not Controlled Action (Particular Manner)	Post-Approval
Dampier Marine Services Facility including 300m Wharf and Dredging Works	2009/5108	Not Controlled Action (Particular Manner)	Post-Approval
DAVROS MC 3D marine seismic survey northwaet of Dampier, WA	2013/7092	Not Controlled Action (Particular Manner)	Post-Approval
Decommissioning of the Legendre facilities	2010/5681	Not Controlled Action (Particular Manner)	Post-Approval
Deep Water Drilling Program	2010/5532	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Deep Water Northwest Shelf 2D Seismic Survey	2007/3260	Not Controlled Action (Particular Manner)	Post-Approval
Demeter 3D Seismic Survey, off Dampier, WA	2002/900	Not Controlled Action (Particular Manner)	Post-Approval
Diesel Fuel Bunker Operation	2012/6289	Not Controlled Action (Particular Manner)	Post-Approval
Draeck 3D Marine Seismic Survey, WA-205-P	2006/3067	Not Controlled Action (Particular Manner)	Post-Approval
Drilling 35-40 offshore exploration wells in deep water	2008/4461	Not Controlled Action (Particular Manner)	Post-Approval
Earthworks for kitchen/mess, cyclone refuge building & Compression Plant, Varanus Island	2013/6900	Not Controlled Action (Particular Manner)	Post-Approval
Eendracht Multi-Client 3D Marine Seismic Survey	2009/4749	Not Controlled Action (Particular Manner)	Post-Approval
Effect of marine seismic sounds to demersal fish and pearl oysters, north-west WA	2018/8169	Not Controlled Action (Particular Manner)	Post-Approval
Enfield M3 & Vincent 4D Marine Seismic Surveys	2008/3981	Not Controlled Action (Particular Manner)	Completed
Enfield M3 4D, Vincent 4D & 4D Line Test Marine Seismic Surveys	2008/4122	Not Controlled Action (Particular Manner)	Post-Approval
Enfield M4 4D Marine Seismic Survey	2008/4558	Not Controlled Action (Particular Manner)	Post-Approval
Enfield oilfield 3D Seismic Survey	2006/3132	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Exmouth West 2D Marine Seismic Survey	2008/4132	Not Controlled Action (Particular Manner)	Post-Approval
Exploration drilling of Zeus-1 well	2008/4351	Not Controlled Action (Particular Manner)	Post-Approval
Fletcher-Finucane Development, WA26-L and WA191-P	2011/6123	Not Controlled Action (Particular Manner)	Post-Approval
Foxhound 3D Non-Exclusive Marine Seismic Survey	2009/4703	Not Controlled Action (Particular Manner)	Post-Approval
Gazelle 3D Marine Seismic Survey in WA-399-P and WA-42-L	2010/5570	Not Controlled Action (Particular Manner)	Post-Approval
Geco Eagle 3D Marine Seismic Survey	2008/3958	Not Controlled Action (Particular Manner)	Post-Approval
Glencoe 3D Marine Seismic Survey WA-390-P	2007/3684	Not Controlled Action (Particular Manner)	Post-Approval
Greater Western Flank Phase 1 gas Development	2011/5980	Not Controlled Action (Particular Manner)	Post-Approval
Grimalkin 3D Seismic Survey	2008/4523	Not Controlled Action (Particular Manner)	Post-Approval
Guacamole 2D Marine Seismic Survey	2008/4381	Not Controlled Action (Particular Manner)	Post-Approval
Harmony 3D Marine Seismic Survey	2012/6699	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Harpy 1 exploration well	2001/183	Not Controlled Action (Particular Manner)	Post-Approval
Honeycombs MC3D Marine Seismic Survey	2012/6368	Not Controlled Action (Particular Manner)	Post-Approval
Huzzas MC3D Marine Seismic Survey (HZ-13) Carnarvon Basin, offshore WA	2013/7003	Not Controlled Action (Particular Manner)	Post-Approval
Huzzas phase 2 marine seismic survey, Exmouth Plateau, Northern Carnarvon Basin, WA	2013/7093	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
John Ross & Rosella Off Bottom Cable Seismic Exploration Program	2008/3966	Not Controlled Action (Particular Manner)	Post-Approval
Judo Marine 3D Seismic Survey within and adjacent to WA-412-P	2009/4801	Not Controlled Action (Particular Manner)	Post-Approval
Judo Marine 3D Seismic Survey within and adjacent to WA-412-P	2008/4630	Not Controlled Action (Particular Manner)	Post-Approval
Julimar Brunello Gas Development Project	2011/5936	Not Controlled Action (Particular Manner)	Post-Approval
Klimt 2D Marine Seismic Survey	2007/3856	Not Controlled Action (Particular Manner)	Post-Approval
Laverda 3D Marine Seismic Survey and Vincent M1 4D Marine Seismic Survey	2010/5415	Not Controlled Action (Particular Manner)	Post-Approval
Laying a submarine optical fibre telecommunications cable, Perth to Singapore and Jakarta	2014/7332	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Leopard 2D marine seismic survey	2005/2290	Not Controlled Action (Particular Manner)	Post-Approval
Lion 2D Marine Seismic Survey	2007/3777	Not Controlled Action (Particular Manner)	Post-Approval
Macedon Gas Field Development	2008/4605	Not Controlled Action (Particular Manner)	Post-Approval
Marine Geotechnical Drilling Program	2008/4012	Not Controlled Action (Particular Manner)	Post-Approval
Marine reconnaissance survey	2008/4466	Not Controlled Action (Particular Manner)	Post-Approval
Millstream 20GL Pipeline, Bungaroo, Borefield Integration	2012/6379	Not Controlled Action (Particular Manner)	Post-Approval
MOF Road Widening and Resurfacing Works	2011/5843	Not Controlled Action (Particular Manner)	Post-Approval
Moosehead 2D seismic survey within permit WA-192-P	2005/2167	Not Controlled Action (Particular Manner)	Post-Approval
Munmorah 2D seismic survey within permits WA-308/9-P	2003/970	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Program, WA-264-P	2007/3844	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Survey	2005/2017	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Offshore Canning Multi Client 2D Marine Seismic Survey	2010/5393	Not Controlled Action (Particular Manner)	Post-Approval
Offshore Drilling Campaign	2011/5830	Not Controlled Action (Particular Manner)	Post-Approval
Offshore Fibre Optic Cable Network Construction & Operation, Port Hedland WA to Darwin NT	2014/7223	Not Controlled Action (Particular Manner)	Post-Approval
Orcus 3D Marine Seismic Survey in WA-450-P	2010/5723	Not Controlled Action (Particular Manner)	Post-Approval
Osprey and Dionysus Marine Seismic Survey	2011/6215	Not Controlled Action (Particular Manner)	Post-Approval
Palta-1 exploration well in Petroleum Permit Area WA-384-P	2011/5871	Not Controlled Action (Particular Manner)	Post-Approval
Phoenix 3D Seismic Survey, Bedout Sub-Basin	2010/5360	Not Controlled Action (Particular Manner)	Post-Approval
Pomodoro 3D Marine Seismic Survey in WA-426-P and WA-427-P	2010/5472	Not Controlled Action (Particular Manner)	Post-Approval
Port Headland Outer Harbour Pre-construction Pilling program	2012/6341	Not Controlled Action (Particular Manner)	Post-Approval
Port of Port Hedland channel marker replacement project, WA	2017/8010	Not Controlled Action (Particular Manner)	Post-Approval
Port Walcott upgrade, dredging & spoil disposal, & channel realignment	2006/2806	Not Controlled Action (Particular Manner)	Post-Approval
Pyrenees 4D Marine Seismic Monitor Survey, HCA12A	2012/6579	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Pyrenees-Macedon 3D marine seismic survey	2005/2325	Not Controlled Action (Particular Manner)	Post-Approval
Quiberon 2D Seismic Survey, permit area WA-385P, offshore of Carnarvon	2009/5077	Not Controlled Action (Particular Manner)	Post-Approval
Reindeer gas reservior development, Devil Creek, Carnarvon Basin - WA	2007/3917	Not Controlled Action (Particular Manner)	Post-Approval
Repsol 3d & 2D Marine Seismic Survey	2012/6658	Not Controlled Action (Particular Manner)	Post-Approval
Rose 3D Seismic Program	2008/4239	Not Controlled Action (Particular Manner)	Post-Approval
Rydal-1 Petroleum Exploration Well, WA	2012/6522	Not Controlled Action (Particular Manner)	Post-Approval
Salsa 3D Marine Seismic Survey	2010/5629	Not Controlled Action (Particular Manner)	Post-Approval
Santos Winchester three dimensional seismic survey - WA-323-P & WA-330-P	2011/6107	Not Controlled Action (Particular Manner)	Post-Approval
Scarborough Development nearshore component, NWS, WA	2018/8362	Not Controlled Action (Particular Manner)	Post-Approval
Skorpion Marine Seismic Survey WA	2001/416	Not Controlled Action (Particular Manner)	Post-Approval
Sovereign 3D Marine Seismic Survey	2011/5861	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Stag 4D & Reindeer MAZ Marine Seismic Surveys, WA	2013/7080	Not Controlled Action (Particular Manner)	Post-Approval
Stag Off-bottom Cable Seismic Survey	2007/3696	Not Controlled Action (Particular Manner)	Post-Approval
Stybarrow 4D Marine Seismic Survey	2011/5810	Not Controlled Action (Particular Manner)	Post-Approval
Stybarrow Baseline 4D marine seismic survey	2008/4530	Not Controlled Action (Particular Manner)	Post-Approval
The Dampier Heavy Load Out Facility Berth and Swing Basin Expansion	2012/6271	Not Controlled Action (Particular Manner)	Post-Approval
Tidepole Maz 3D Seismic Survey Campaign	2007/3706	Not Controlled Action (Particular Manner)	Post-Approval
Tortilla 2D Seismic Survey, WA	2011/6110	Not Controlled Action (Particular Manner)	Post-Approval
Triton 3D Marine Seismic Survey, WA-2-R and WA-3-R	2006/2609	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a 3D marine seismic survey	2010/5695	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5679	Not Controlled Action (Particular Manner)	Post-Approval
Undertake a three dimensional marine seismic survey	2010/5715	Not Controlled Action (Particular Manner)	Post-Approval
Vincent M1 and Enfield M5 4D Marine Seismic Survey	2010/5720	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Warramunga Non-Inclusive 3D Seismic Survey	2008/4553	Not Controlled Action (Particular Manner)	Post-Approval
West Anchor 3D Marine Seismic Survey	2008/4507	Not Controlled Action (Particular Manner)	Post-Approval
West Panaeus 3D seismic survey	2006/3141	Not Controlled Action (Particular Manner)	Post-Approval
Westralia SPAN Marine Seismic Survey, WA & NT	2012/6463	Not Controlled Action (Particular Manner)	Post-Approval
Wheatstone 3D MAZ Marine Seismic Survey	2011/6058	Not Controlled Action (Particular Manner)	Post-Approval
Wheatstone Iago Appraisal Well Drilling	2008/4134	Not Controlled Action (Particular Manner)	Post-Approval
Wheatstone Iago Appraisal Well Drilling	2007/3941	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
3D Marine Seismic Survey in the offshore northwest Carnarvon Basin	2011/6175	Referral Decision	Completed
3D Seismic Survey	2008/4219	Referral Decision	Completed
Bianchi 3D Marine Seismic Survey, Carnavon Basin, WA	2013/7078	Referral Decision	Completed
construction of a new loadout facility and associated laydown area south of the	2002/579	Referral Decision	Completed
CVG 3D Marine Seismic Survey	2012/6270	Referral Decision	Completed
Enfield 4D Marine Seismic Surveys, Production Permit WA-28-L	2005/2370	Referral Decision	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Outer Harbour Development and associated marine and terrestial infrastructure	2008/4148	Referral Decision	Completed
Rose 3D Seismic acquisition survey	2008/4220	Referral Decision	Completed
Stybarrow Baseline 4D Marine Seismic Survey (Permit Areas WA-255-P, WA-32-L, WA-	2008/4165	Referral Decision	Completed
Two Dimensional Transition Zone Seismic Survey - TP/7 (R1)	2010/5507	Referral Decision	Completed
Varanus Island Compression Project	2012/6698	Referral Decision	Completed

Key Ecological Features [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Ancient coastline at 125 m depth contour	North-west
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	North-west
Commonwealth waters adjacent to Ningaloo Reef	North-west
Continental Slope Demersal Fish Communities	North-west
Exmouth Plateau	North-west
Glomar Shoals	North-west

Biologically Important Areas [Resource Information]

Scientific Name	Behaviour	Presence
Dugong		
Dugong dugon Dugong [28]	Breeding	Known to occur
Dugong dugon Dugong [28]	Calving	Known to occur
Dugong dugon Dugong [28]	Foraging (high density seagrass beds)	Known to occur

Scientific Name	Behaviour	Presence
Dugong dugon Dugong [28]	Nursing	Known to occur
Marine Turtles		
Caretta caretta Loggerhead Turtle [1763]	Foraging	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Internesting buffer	Known to occur
Caretta caretta Loggerhead Turtle [1763]	Nesting	Known to occur
Chelonia mydas Green Turtle [1765]	Aggregation	Known to occur
Chelonia mydas Green Turtle [1765]	Basking	Known to occur
Chelonia mydas Green Turtle [1765]	Foraging	Known to occur
Chelonia mydas Green Turtle [1765]	Foraging	Likely to occur
Chelonia mydas Green Turtle [1765]	Internesting	Known to occur
Chelonia mydas Green Turtle [1765]	Internesting buffer	Known to occur
Chelonia mydas Green Turtle [1765]	Mating	Known to occur
Chelonia mydas Green Turtle [1765]	Migration corridor	Known to occur
Chelonia mydas Green Turtle [1765]	Nesting	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Foraging	Likely to occur

Scientific Name	Behaviour	Presence
Eretmochelys imbricata Hawksbill Turtle [1766]	Foraging	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Internesting buffer	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Mating	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Migration corridor	Known to occur
Eretmochelys imbricata Hawksbill Turtle [1766]	Nesting	Known to occur
Natator depressus Flatback Turtle [59257]	Aggregation	Known to occur
Natator depressus Flatback Turtle [59257]	Foraging	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting	Known to occur
Natator depressus Flatback Turtle [59257]	Internesting buffer	Known to occur
Natator depressus Flatback Turtle [59257]	Mating	Known to occur
Natator depressus Flatback Turtle [59257]	Migration corridor	Known to occur
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur
River shark		
Pristis clavata Dwarf Sawfish [68447]	Foraging	Known to occur

Scientific Name	Behaviour	Presence
Pristis clavata Dwarf Sawfish [68447]	Nursing	Known to occur
Pristis clavata Dwarf Sawfish [68447]	Pupping	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Foraging	Known to occur
Pristis pristis Largetooth Sawfish [60756]	Pupping	Likely to occur
Pristis zijsron Green Sawfish [68442]	Foraging	Known to occur
Pristis zijsron Green Sawfish [68442]	Nursing	Known to occur
Pristis zijsron Green Sawfish [68442]	Pupping	Known to occur
Seabirds		
Ardenna pacifica Wedge-tailed Shearwater [84292]	Breeding	Known to occur
Fregata ariel Lesser Frigatebird [1012]	Breeding	Known to occur
Phaethon lepturus White-tailed Tropicbird [1014]	Breeding	Known to occur
Sterna dougallii Roseate Tern [817]	Breeding	Known to occur
Sternula albifrons sinensis Little Tern [82850]	Breeding	Known to occur
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur
Sula leucogaster Brown Booby [1022]	Breeding	Known to occur

Scientific Name	Behaviour	Presence
Thalasseus bengalensis Lesser Crested Tern [66546]	Breeding	Known to occur
Sharks		
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur
Rhincodon typus Whale Shark [66680]	Foraging (high density prey)	Known to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Foraging	Known to occur
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Pending

Search Criteria

No Aboriginal Cultural Heritage (ACH) Pending in Shapefile - EMBA_Part_1_(GDA94), EMBA_Part_2_(GDA94)

Disclaimer

The Aboriginal Cultural Heritage Act 2021 (Act) recognises, protects, conserves, and preserves Aboriginal cultural heritage (ACH), and recognises the fundamental importance of ACH to Aboriginal people and its role in Aboriginal communities past, present and future. The Act recognises the value of ACH to Aboriginal people as well as to the wider Western Australian community.

Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported to the ACH Council or exists on the Directory.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at AboriginalHeritage@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

Copyright

Coordinates

Map coordinates are based on the GDA 94 Datum.

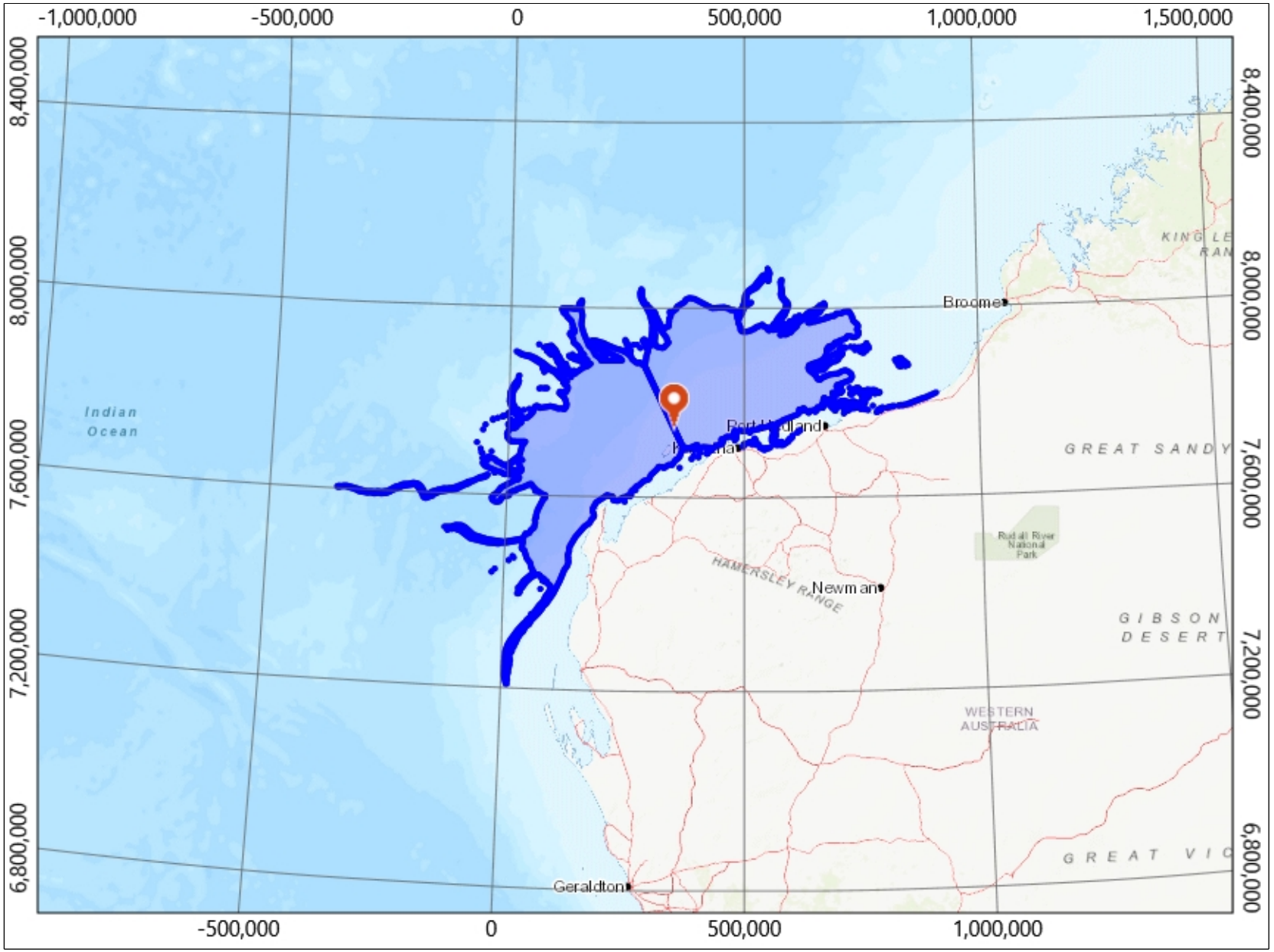
Basemap Copyright

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Pending

For further important information on using this information please see the Department of Planning, Lands and Heritage's Disclaimer statement at https://www.wa.gov.au/disclaimer



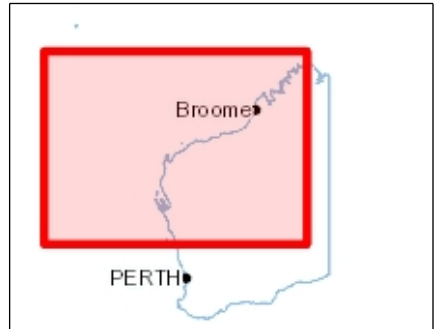
Legend

- Aboriginal Cultural Heritage (ACH) Pending
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

431.22 kilometres

Map Scale 1 : 13,070,000

MGA Zone 50 (GDA94)



Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

Search Criteria

No Aboriginal Cultural Heritage (ACH) Directory in Shapefile - Stag_500mBuffer

Disclaimer

The Aboriginal Cultural Heritage Act 2021 (Act) recognises, protects, conserves, and preserves Aboriginal cultural heritage (ACH), and recognises the fundamental importance of ACH to Aboriginal people and its role in Aboriginal communities past, present and future. The Act recognises the value of ACH to Aboriginal people as well as to the wider Western Australian community.

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Copyright

Coordinates

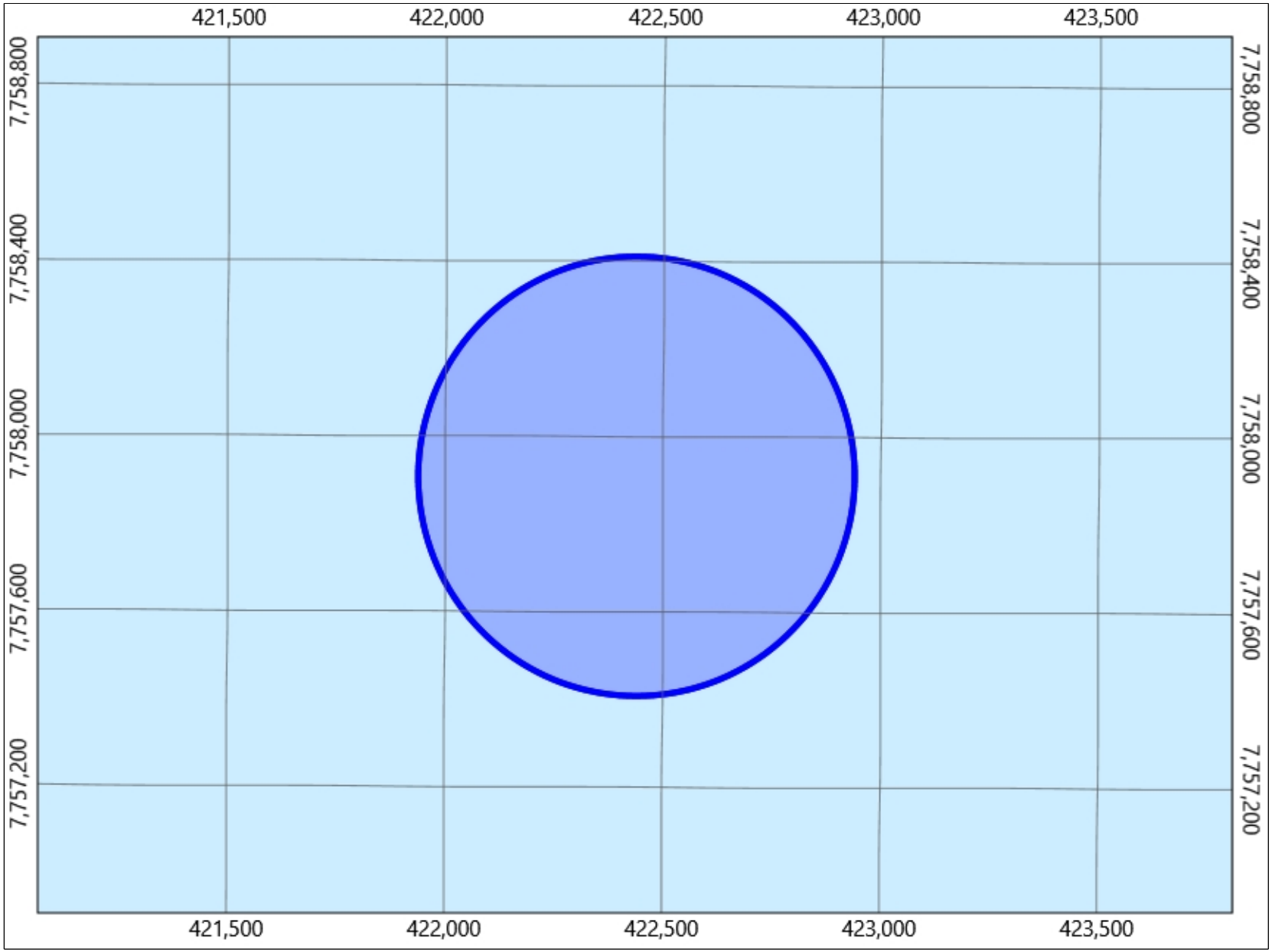
Map coordinates are based on the GDA 94 Datum.

Basemap Copyright

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Directory



Legend

- Aboriginal Cultural Heritage (ACH) Directory
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

0.47 kilometres

Map Scale 1 : 14,100

MGA Zone 50 (GDA94)

Aboriginal Cultural Heritage Inquiry System

List of Heritage Surveys

Search Criteria

85 Heritage Surveys containing 89 Survey Areas in Shapefile - EMBA_Part_1_(GDA94), EMBA_Part_2_(GDA94)

Disclaimer

Heritage Surveys have been mapped using information from the reports and / or other relevant data sources. Heritage Surveys consisting of small discrete areas may not be visible except at large scales. Reports shown may not be held at the Department of Planning, Lands and Heritage (DPLH). Please consult report holder for more information. Refer to https://www.wa.gov.au/organisation/department-of-planning-lands-and-heritage/aboriginal-heritage for information on requesting reports held by DPLH.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at AboriginalHeritage@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

Copyright

Access

Some reports are restricted.

Spatial Accuracy

The following legend strictly applies to the spatial accuracy of heritage survey boundaries as captured by DPLH.

Very Good	Boundaries captured from surveyed titles, GPS (2001 onwards) submitted maps georeferenced to within 20m accuracy.
Good / Moderate	Boundaries captured from GPS (pre 2001) submitted maps georeferenced to within 250m accuracy.
Unreliable	Boundaries captured from submitted maps georeferenced to an accuracy exceeding 250m.
Indeterminate	Surveys submitted with insufficient information to allow boundary capture.

Basemap Copyright

Aboriginal Cultural Heritage Inquiry System

List of Heritage Surveys

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
17474	14786	A Survey for Aboriginal Sites: Deepdale-Cape Lambert.	Clarke, C.	Archaeological/ Ethnographic	Survey Area 5 - Cape Lambert, the stockpile and railway areas at Cape Lambert and proposed extensions to Wickham township	Indeterminate	Field and Desktop
17485	17180	A preliminary report on archaeological survey being carried out in requested areas on Burrup Peninsu	Western Australian Museum.	Archaeological	Four areas: a) on the western flank of the Burrup Peninsula, between the LNG plant site and Phillip point. b) corridor of approximately 150m in width along the Woodside access road route - only the area above 7721000mN was surveyed. c) proposed corridor r	Good	Field and Desktop
17574	12131	Report on an Investigation of Disturbance to the Cape Lambert Burial Site (P5009). March 1991. [OWE]	Green, N.	Archaeological/ Ethnographic	The survey area consists of DIA site 7859. Site location and extent are as per the AHMS.	Moderate	Field and Desktop
17576	12304	Cultural responses to the Flandrian Transgression on the Montebello Islands, Northwest Australia	Manne, Tiina Helena	Archaeological	The survey area consists of the Noala Cave site (873), located in the Montebello archipelago. Survey area location and extent are as per the AHMS.	Unreliable	Field and Desktop
17814	16455	The Report of an Aboriginal Heritage Survey (Survey 3) for the Australian United Steel Industry Pty Ltd. Cape Lambert Dr/Hb1 Project, Western Australia.	Robinson, Michael	Archaeological/ Ethnographic	Cape Lambert Dr/Hb1 Project. Port facilites and Conveyor Corridor 150m wide and approximately 3km long as shown in map. 1	Very Good	Field and Desktop
17950	13434	Report of the Ethnographic and Archaeological Survey of Cape Keraudren & Adjacent Areas of Pardoo Station, W.A.	O'Connor, R	Ethnographic	The survey area consists of Cape Keraudren and its vicinity, as shown in Map 4.	Good	Field and Desktop
17950	13326	Report of the Ethnographic and Archaeological Survey of Cape Keraudren & Adjacent Areas of Pardoo Station, W.A.	O'Connor, R	Archaeological/ Ethnographic	The survey area consists of the area around Cape Keroudren, the access tracks to the Cape and parts of Firewood Creek, as shown in Map 4.	Good	Field and Desktop
18026	19419	Dampier Archipelago Liquefied Natural Gas Project: A Survey for Aboriginal Sites.	Wright, B.	Archaeological/ Ethnographic	Construction Camp, Shore Base and LNG Plant. Areas around Withnell Bay, Noname Point and the Searipple Passage Area, Dampier.		Field and Desktop
20099	12926	Report on an archaeological survey programme Barrow Island	Quartermaine G	Archaeological	The survey area encompasses the whole of Barrow Island, which is situated at a point off the Pilbara coast, 85km north of Onslow and 135km west of Dampier. Survey area and location is as per Figure 1.	Good	Field and Desktop
21593	16200	Report on an archaeological survey for Aboriginal sites Mt Anketel Project, Wickham	Quartermaine, Gary.	Archaeological	Mt Anketel Project, Wickham. Encompassing approximately 20 sq km, a series of gridded drill holes on lines at 400m intervals and associated access tracks as shown in Figure 3	Unreliable	Field and Desktop

Aboriginal Cultural Heritage Inquiry System

List of Heritage Surveys

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
21670	15771	Report on an ethnographic survey of proposed developments at Cape Lambert and Wickham with the Wong-Goo-TT-OO Group	O'Connor, R	Ethnographic	Proposed developments at Cape Lambert and Wickham. Two proposed firebreaks near Wickham, an extension to the existing Cape Lambert rock quarry and a construction camp site and access road at Cape Lambert as shown in figs. 1-3	Good	Field and Desktop
21671	15312	Report on an ethnographic survey of the proposed Rock quarry, Construction Camp and Access Track and Firebreak Projects at Cape Lambert and Wickham, Western Australia	Australian Interaction Consultants	Ethnographic	Proposed Rock quarry, Construction Camp and Access Track and Firebreak Projects at Cape Lambert and Wickham as shown in figs. 2 - 4	Moderate	Field and Desktop
21672	15943	Advice of a preliminary archaeological Inspection for Aboriginal Sites in the Wickham and Cape Lambert Regions	Deacon, Joel	Archaeological	Wickham and Cape Lambert Regions. Two proposed fire-breaks on the outskirts of Wickham town-site; a proposed quarry at Cape Lambert; and a proposed construction camp and access road at Cape Lambert as shown in figs. 1-3	Moderate	Field and Desktop
21975	20032	Variation amongst glass artefact assemblages at Cossack, Western Australia [Thesis]	Wilson, Moss Alexander	Archaeological/ Ethnographic	Cossack, Western Australia [Thesis]		Field only
21993	19482	Draft :environmental impact statement / environmental review and management programme for the proposed Gorgon Development : executive summary	Gorgan Australian Gas	Archaeological/ Ethnographic	Gorgon Development	Unreliable	Field and Desktop
21994	19488	Draft :environmental impact statement / environmental review and management programme for the proposed Gorgon Development : main report volume i	Gorgan Australian Gas	Archaeological/ Ethnographic	Gorgon Development	Unreliable	Field and Desktop
21995	19497	Draft :environmental impact statement / environmental review and management programme for the proposed Gorgon Development : main report volume ii	Gorgan Australian Gas	Archaeological/ Ethnographic	Gorgon Development	Unreliable	Field and Desktop
21996	19504	Draft :environmental impact statement / environmental review and management programme for the proposed Gorgon Development : Technical appendices E1 - E3 social environment assessments	Gorgan Australian Gas	Archaeological/ Ethnographic	Gorgon Development :	Unreliable	Field and Desktop
22019	19546	Desktop assessment of scientific values for Indigenous Cultural Heritage on the Dampier Archipelago, Western Australia	McDonald, Jo	Archaeological/ Ethnographic	Desktop assessment of scientific values for Indigenous Cultural Heritage on the Dampier Archipelago, Western Australia	Moderate	Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
22049	17335	Site avoidance survey : a report of an archaeological and ethnographic survey of tenement E47/1439, Western Australia	Australian Interaction Consultants	Archaeological/ Ethnographic	Tenement E47/1349 is located 8km east of Roebourne, WA.	Very Good	Field and Desktop
22421	20288	Woodside Energy Limited North West Shelf Joint Venture Aboriginal Sites Audit	Draper, Neale	Archaeological	WEL NWS JV Lease area, Burrup Peninsula, WA		Field and Desktop
22954	19778	Report on a site identification survey for the Gorgon Project Pipeline & Construction Footprint on Barrow Island under the Aboriginal Heritage Act 1972 of the proposed Gorgon Project at Barrow Island, Western Australia	Australian Interaction Consultants	Archaeological/ Ethnographic	Pipeline Corridor, an LNG Plant, a Construction Village, Administration site, a Utilities site, and two Re-injection Drill Centres facilities on Barrow Island.		Field and Desktop
23084	17256	Kuruma Marthudunera Cultural Values in Relation to Licence Applications: L08 34, L08 35 & L08 36	Stevens, Robin	Archaeological/ Ethnographic	The study area lies within the Kuruma Marthudunera native title claim boundaries (WAG6090/98; WC99/012)	Moderate	Field and Desktop
23208	19212	Kuruma Marthudunera Ethnographic Survey 11-14 July 2008 Proposed Infrastructure Corridor and Port Area Citic Pacific Iron Ore Project Cape Preston	Kruse, Bill	Ethnographic	Proposed Infrastructure Corridor and Port Area Citic Pacific Iron Ore Project Cape Preston	Moderate	Field and Desktop
23239	16686	The Report on Aboriginal Sites Subject to a Notice under Section 18 of the Aboriginal Heritage Act 1972 Within Port Areas 1 & 2 Cape Preston, Pilbara Region, Western Australia	Gavin Jackson Pty Ltd	Archaeological	Cape Preston is located approximately 100 km south-west of Karratha.	Moderate	Field only
23242	20004	Ethnographic Section 18 Consultation Report of the Port (Priority Areas 1 & 2) and Infrastructure Corridor Mainland at Cape Preston, Western Australia	Lyneham, Alexandra	Ethnographic	Port and Infrastructure corridor, Cape Preston, approx. 63km W of Karratha		Field and Desktop
23268	18469	Report on the Wong-Goo-Tt-Oo Heritage Survey of areas A, B, C and D Cape Preston	R & E O'Connor Pty Ltd	Archaeological	Existing survey boundary was modified and used to create this survey boundary.	Good	Field and Desktop
23299	19644	The report on Aboriginal sites subject to a notice under section 18 of the Aboriginal Heritage Act 1972 within Port areas 3 & 4 Cape Preston, Pilbara Region, Western Australia	Gavin Jackson Pty Ltd	Archaeological	Within mining tenement G08/52 at Cape Preston, approximately 100km SW of Karratha		Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
23300	18934	Ethnographic Section 18 Consultation Report of the Port (priority areas 3 & 4) and South - East Waste Dump (including Crusher) at Cape Preston, Western Australia	Lyneham, Alexandra	Ethnographic	GPS coordinates of survey areas contained in the report.	Good	Field and Desktop
23363	16401	The Report of a Site Verification Survey Under Section 18 Of The Aboriginal Heritage Act 1972 Within Port Areas 1, 2, 3 & 4 Cape Preston, Pilbara Region, Western Australia	Gavin Jackson Pty Ltd	Archaeological	Survey areas are within Port priority areas 1,2,3 and 4 Cape Preston, Pilbara region, WA.	Very Good	Field and Desktop
23416	15845	The Report of an Aboriginal Heritage Survey of the Proposed Johns Creek Boat Harbour, Parking and Drainage Upgrade, Point Samson, West Pilbara Region, Western Australia	Anthropos Australis	Archaeological/ Ethnographic	Johns Creek Boat Harbour, Point Samson, West Pilbara Region, Western Australia	Very Good	Field and Desktop
23441	16781	The Report on Aboriginal Sites Subject to a Notice Under Section 18 of the Aboriginal Heritage Act 1972 Within Port Priority Area 5 Cape Preston, Pilbara Region, Western Australia	Gavin Jackson Pty Ltd	Archaeological	The proposed Port Infrastructure will cover approximately 7.48 square kilometres on Cape Preston proper, which is located approximately 100km south-west of Karratha.	Good	Field and Desktop
23453	19304	CP Mining Priority Area 5 s18 Consult with Kuruma Marthudunera 11-12/03/2009	Nalder, Sandra	Archaeological/ Ethnographic	CP Mining Priority Area 5 s18 Consult with Kuruma Marthudunera 11-12/03/2009		Field only
23454	18581	Report on the Wong-Goo-Tt -Oo Heritage Survey of Port Priority Area 5 on Cape Preston : March 2009.	R & E O'Connor Pty Ltd	Archaeological/ Ethnographic	The survey area is located in Port Priority Area 5 on Cape Preston	Good	Field and Desktop
23455	17446	Ethnographic Section 18 Consultation Report of Priority Area 5 at Cape Preston, Western Australia.	Lafrentz, Damien	Ethnographic	The survey area is located within Priority Area 5 of previous CPMM Section18 application.	Good	Field and Desktop
23556	16201	Archaeological Survey Report, Preston Island, Pilbara Region, WA	Czerwinski, Phil	Archaeological/ Ethnographic	Preston Island was surveyed on 11th June 2009.	Good	Field and Desktop
23571	19321	Section 18 Consultation Report with Yaburara & Mardudhunera People regarding Preston Island at Cape Preston, Western Australia : June 2009.	Lyneham, Alexandra	Ethnographic	Preston Island, Cape Preston, Western Australia		Field and Desktop
23714	19018	A Report of an Ethnographic Site Identification Heritage Survey and S18 Consultation: Priority Area 7 at Cape Preston in Tenement G08 052	Morgan, Stephen	Ethnographic	Tenement G08 052	Moderate	Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
24231	18633	Murujuga : Dynamics of Dreaming : Section 16 Research PLan	McDonald, Jo	Archaeological/ Ethnographic	The project is on the Pilbara coast of WA. Several sites were surveyed.	Indeterminate	Field and Desktop
27180	18617	The Report of an Aboriginal Site Recording and the Cultural Significance Assessment of Aboriginal Sites in the Cape Lambert Port Facilities and Railway Infrastructure Project Area, West Pilbara Region, Western Australia	Anthropos Australis Pty Ltd	Archaeological/ Ethnographic	Survey area map was used to digitize survey boundaries. Survey area map was originally produced using GPS data.	Moderate	Field and Desktop
27224	17602	Aboriginal Archaeological Assessment Proposed Barrow Island Infill Drilling Project - Conditional Section 18 Preliminary Archaeological Assessment - Barrow Island, Western Australia	RPS Group	Archaeological	Southern central position of the oilfield on Barrow Island, located approximately 95.0 km north-east of Onslow, Western Australia.	Good	Field and Desktop
27609	17316	Cape Lambert Protected Area : Site P0528 Report	Campbell, E	Archaeological	The site P0528 is located at the northeast end of Cape Lambert loading facilities, adjacent (west) to the power station and immediately south of the tug boat pens.	Moderate	Field and Desktop
28286	19123	Report on an ethnographic survey of proposed developments at Cape Lambert and Wickham with the Wong-Goo-Tt-Oo Group	O'Connor, R	Ethnographic	Survey area map was used to digitize survey boundaries. Survey area map is of poor quality/readability thus the reliability is 'Moderate'.	Moderate	Field and Desktop
28288	18550	Cape Lambert Port and Rail Upgrade Archaeological Site Identification Survey	John Cecchi Heritage Management Consultancy	Archaeological	Cape Lambert Port and Rail Upgrade Archaeological Site Identification Survey	Good	Field and Desktop
28289	18567	Report on an ethnographic survey of Cape Lambert Upgrade Project with the Wong-Goo-Tt-Oo Group	R & E O'Connor Pty Ltd	Ethnographic	Cape Lambert Upgrade Project	Good	Field and Desktop
28538	18558	Preliminary Advice of an Aboriginal Heritage Survey of the Proposed Exploration Drilling Program at the Cape Lambert Magnetite Project, West Pilbara Region, Western Australia	Context Anthropology Pty Ltd	Archaeological/ Ethnographic	Exploration Leases EL47 / 1462, as well as parts of EL47 / 1272, EL47 / 1233 and EL47 / 1248 (the Project Area).	Moderate	Field and Desktop
101849	12556	The West Pilbara Site Documentation Project. A Report Prepared for the Wahc, Ahc, Calm & Det. Mar 1989.	Reynolds, R.	Ethnographic	The survey area consists of DIA sites 420, 7043-7046, 7048-7050, 7052-7055, 7080-7089, 7091, 7092, 7137, 7155, 7847-7852, 7855-7857, 12034. The survey area location and extent are as per the AHMS.	Unreliable	Field and Desktop
101854	12080	Report of Archaeological Salvage/Research Programme at Site P04665, Cape Lambert.	Veth, P. & Quartermaine, G. & O'Brien.	Archaeological	The survey area consists of DIA site 8014 (P04665), Cape Lambert Midden 07. The site location and extent are as per the AHMS.	Moderate	Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
102128	14758	Murujuga - A Spatial Analysis of the Engraved Rock Art of Withnell Bay.	Turner, J.	Archaeological	Murujuga - A Spatial Analysis of the Engraved Rock Art of Withnell Bay. Site of a natural gas refinery located on the Burrup Peninsula, at the South Head of Withnell Bay as shown in fig. 3	Good	Field and Desktop
102133	11655	Report on Preliminary Ethnographic Investigations for the Area Encompassed by the Proposed Ningaloo Marine Park.	Turner, J.	Ethnographic	The survey area consists of the Ningaloo Marine Park, as per figure 1.	Very Good	Field and Desktop
102134	11612	Photographs from the Ningaloo Marine Park Survey for Places of Aboriginal Significance. Mar 1985.	Turner, J.	Ethnographic	The survey area consists of the Ningaloo Marine Park, as per figure 1.	Very Good	Field and Desktop
102203	12277	Inquiry Regarding the Skeletal Material Located at Sam's Creek Midden (P06118) Point Samson, which Occupies Part of the Able Plant Hire & Constructuion Sand Quarry (Ml47/113): Includes Advice for Dealing with Future Incidents... July 1997.	Randolph, P.	Archaeological/ Ethnographic	The survey area consists of site 6813. Site area location and extent is as per the AHMS.	Unreliable	Field and Desktop
102220	11340	A Preliminary Survey for Aboriginal Archaeological Sites in the Karratha/ Cape Lambert Region.	Veth, P.	Archaeological/ Ethnographic	The survey area consists of a 56.5km road alignment from Cajuput Well to the north of Cape Lambert, as per figure 1. Alternate routes for the pipeline route were surveyed between 0 to 5km and 20 to 30km. The total width of the survey corridor is 50 metres	Good	Field and Desktop
102251	17248	Dampier Archaeological Project: Survey and Salvage ...Burrup Peninsula-Catchment Areas,Geomorphic Zones & Tabulns : 1984	Dept of Aboriginal Sites.	Archaeological	The survey area consists of the southern half of the Burrup Peninsula (p.9)	Moderate	Field and Desktop
102260	18330	Report on Field Work on Depuch Island 1959.	Day, A	Archaeological/ Ethnographic	The survey area consists of parts of Depuch Island, as depicted in fig 1. The survey area is indeterminate from the map.	Indeterminate	Field and Desktop
102390	11984	Report of an Ethnographic Survey of the Proposed Dampier to Cape Lambert Gas Pipeline Route.	O'Connor, R	Ethnographic	The survey area consists of a pipeline corridor from Cajeput Well, near Dampier; to Cape Lambert.	Good	Field and Desktop
102406	16190	Activity Plan Project: Northern Region: He2: Calm Pilbara Island - Depuch Island. (Recording and Monitoring of Sites). Nov. 1993.	MacCallum, D.	Archaeological	Depuch Island as shown in Figure 2.	Very Good	Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
102465	12968	The Report of an Aboriginal Heritage Survey (Survey 1) For the Australian United Steel Industry Pty Ltd Cape Lambert Dr/Hb1 Project, Western Australia.	Anthropos.	Archaeological/ Ethnographic	The survey area consists of three 500m x 500m quadrats and one larger quadrat, surveyed as a sample of a larger area intended for use as a Plant Site, located within the Cape Lambert DR/HBI Project Area. The survey area locations and extents are as per Fi	Good	Field and Desktop
102466	12144	The Report of an Aboriginal Heritage Survey (Survey 2) For the Australian United Steel Industry Pty Ltd Cape Lambert Dr/Hb1 Project, Western Australia.	Anthropos.	Archaeological/ Ethnographic	The survey area consists of the proposed Overland Conveyor Corridor fom the main plant to the northern tip of Cape Lambert. The area measured approximately 13.5km in length, with 50m either side of the centreline also being surveyed. Survey area location	Good	Field and Desktop
102496	12406	Report of an Archaeological Survey of Proposed Development Areas in the Cape Range National Park, North West Cape, W.A. Apr 1987.	Morse, K.	Archaeological	The survey area consists of new camping areas and access tracks and parts of the Yardie road realignment, Cape Range National Park. The survey area boundaries could not be delineated. The survey area is approximate only.	Indeterminate	Field and Desktop
102497	11661	Preliminary Report of a Survey for Aboriginal Archaeological Sites in the Cape Range National Park, North West Cape, W.A.	Morse, K.	Archaeological	The survey area consists of the Ningaloo Marine Park project area, as shown in figure 1, with the exception of areas 2 and 3.	Very Good	Field and Desktop
102497	11692	Preliminary Report of a Survey for Aboriginal Archaeological Sites in the Cape Range National Park, North West Cape, W.A.	Morse, K.	Archaeological	The survey area consists of the reef-beach-dune system between Mangrove Bay and Yardie Creek.	Good	Field and Desktop
102540	12130	Report on a Survey for Archaeological Sites at the Proposed 132kv Powerline Route, Cape Lambert to Pannawonica. June 1988.	Quartermaine G	Archaeological	The survey area consists of a powerline route from Cape Lambert to Pannawonica. The survey corridor (buffer zone) was 100m either side of the centreline of the proposed route. See figures 1-3.	Good	Field and Desktop
102606	12630	Supplementary Report of an Aboriginal Heritage Survey of Extensions to Proposed Ausi Cape Lambert Dr1/Hbi Project Infrastructure. April 1996.	Bradshaw, E., O'Reilley, S., Robinson, M.	Archaeological/ Ethnographic	The survey area consists of changes to the plant site and conveyor route (previously surveyed), and additions to principle access, power and potable water corridors (also previously surveyed). Survey area location and extent are as per Figures 1 & 2.	Very Good	Field and Desktop
102607	12930	A Report on Archaeological Work in the Coastal Pilbara, Western Australia. Final Report 1994.	Bradshaw, E.	Archaeological/ Ethnographic	The survey area consists of the coastal strip from the Maitland River to Balla Balla, including the Abydos and Onslow Coastal Plains, and the Dampier Archipelago. The exact extent of the survey area is unknown, but numerous sites have been registered: 900	Unreliable	Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
102937	16542	An Archaeological Survey of Gidley Island in the Dampier Archipelago. Oct 1974.	Bevacqua, R.	Archaeological	The survey area consists two areas on Gidley Island; a coastal strip between Ngarluma Point and Mors Hill and between Last Encounter Bay, Mangrove Island. Survey extent/location is indeterminate from map/text.	Unreliable	Field and Desktop
103074	11921	Report of an Ethnographic Survey of the Proposed Dampier to Cape Lambert Gas Pipeline Route.	O'Connor, R	Ethnographic	The survey area consists of a pipeline corridor from Cajeput Well, near Dampier; to Cape Lambert.	Good	Field and Desktop
103077	17834	Burrup Peninsula Aboriginal Heritage Project. A Report to the Department of Conservation and Land Management 1993.	Veth, P. & Bradshaw, E. & Gara, T. Et Al.	Archaeological/ Ethnographic	The northern section of the Burrup Peninsula. See fig. 1.1.	Good	Field and Desktop
103078	12327	The Aboriginal Occupation of the Montebello Islands,Northwest Australia.	Veth, P.	Archaeological	The survey area consists of several islands of the Montebello archipelago, including Ah Chong, Alpha, Bluebell, Campbell, Delta, Hermite, North West, Primrose, South East and Trimouille. See Figure 1.	Good	Field and Desktop
103078	12362	The Aboriginal Occupation of the Montebello Islands,Northwest Australia.	Veth, P.	Archaeological	The survey area comprises of other islands in the Montebello archipelago, not including those in Survey Area 1 (SID1303).	Good	Field and Desktop
103185	16829	Dampier Archaeological Project. Resource Document of the Survey and Salvage of Aboriginal Sites, Burrup Peninsula, Western Australia. [Typescript of Report 89/133]. 1986.	Vinnicombe, P.	Archaeological	The survey area consists of the southern half of the Burrup Peninsula (p.9)	Moderate	Field and Desktop
103188	12896	A Report on Archaeological Work in the Coastal Pilbara, Western Australia. Community Resource Document 1994.	Bradshaw, E.	Archaeological/ Ethnographic	The survey area consists of the coastal strip from the Maitland River to Balla Balla, including the Abydos and Onslow Coastal Plains, and the Dampier Archipelago. The exact extent of the survey area is unknown, but numerous sites have been registered: 900	Unreliable	Field and Desktop
103570	13149	Final Report to the Australian Heritage Commission, April 1979 to September 1980.	Brown, S.	Archaeological	The following site ID's were surveyed: 14850, 14855, 14857,14858, 11625, 20588-20589, 5762, 5744, 3268, 3485, 9925, 9818, 11659, 11635, 5455, 5457, 2642-2646, 2655, 11995-11996, 11216-11217, 10853-10855, 14909, 12189, 14578-14579, 12204, 14132, 14184, 141	Moderate	Field and Desktop
103976	17051	Dampier Archaeological Project: Resource Document, Survey and Salvage of Aboriginal Sites, Burrup Peninsula, Western Australia. 1987.	Vinnicombe, P.	Archaeological	The survey area consists of the southern half of the Burrup Peninsula (p.9)	Moderate	Field and Desktop

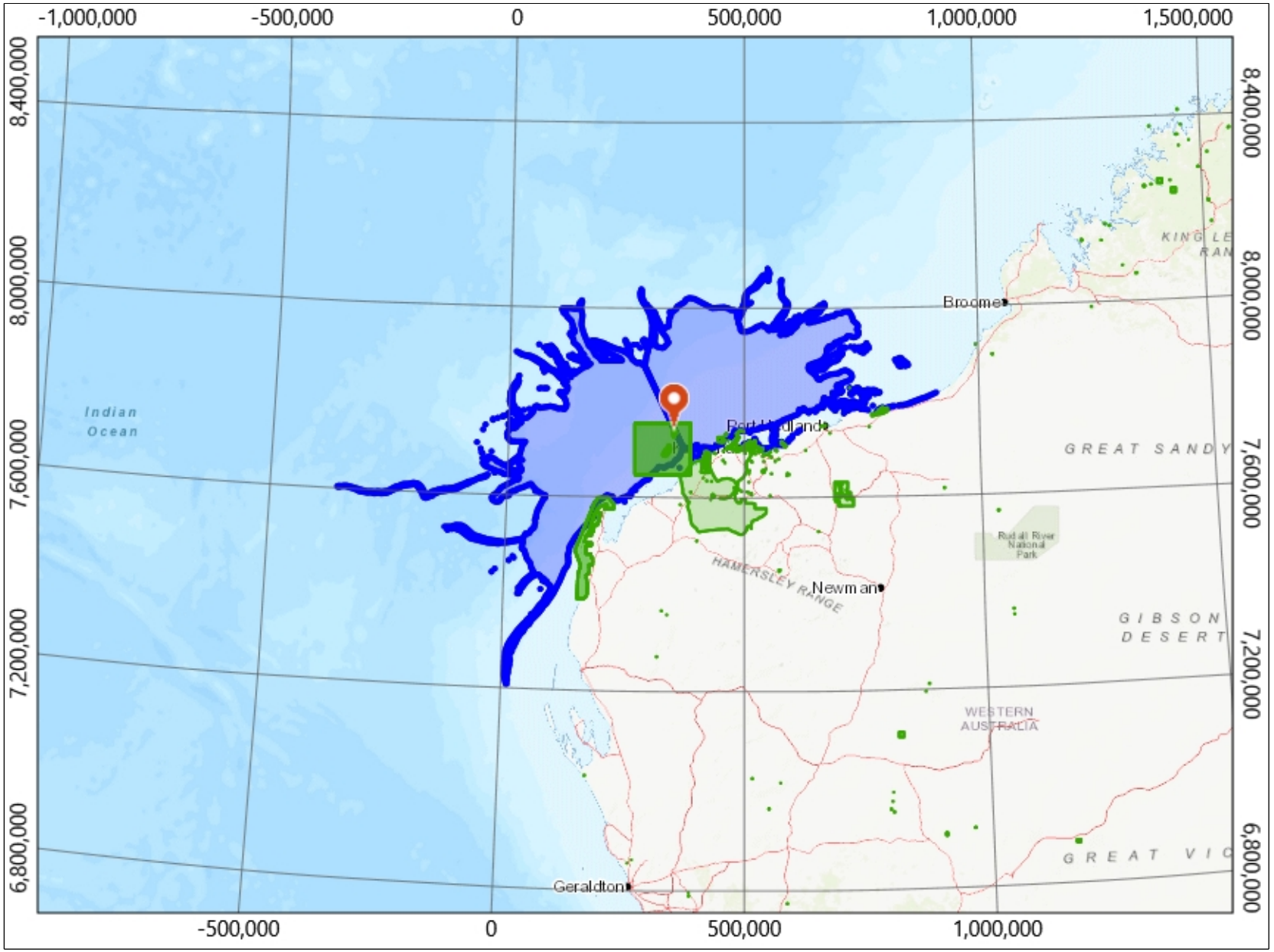
Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
103984	13293	Report to the W.A. Heritage Committee & The Australian Heritage Commission for Quarter Ending December 31, 1982.	Green, N.	Ethnographic	Report to the WA Heritage Committee and the Australian Heritage Commission: sites gazetted as protected areas - (PA No.)7,19,15,14,26,4,8,23,9,34. Also (Id) 4414, 5563, 2093, 13319, 9225, Dampier Climbing Men, Willlow Gully, Twelve Mile Reserve, Kuru Mi,	temp	Field and Desktop
104088	17269	An Archaeological Survey for Department of Resources Development, Burrup Peninsula.	Kirkby, I.	Archaeological	Four areas: a) on the western flank of the Burrup Peninsula, between the LNG plant site and Phillip point. b) corridor of approximately 150m in width along the Woodside access road route - only the area above 7721000mN was surveyed. c) proposed corridor r	Good	Field and Desktop
104517	12405	Myth, Ritual and Rock Art. Mar 1976.	Palmer, K.	Ethnographic	The survey area consists of Depuch Island, DIA sites 11372, 11376, 11987, 11374, 11858, 11860, 11626. Site locations and extents are as per the AHMS.	Unreliable	Field and Desktop
104517	13608	Myth, Ritual and Rock Art. Mar 1976.	Palmer, K.	Ethnographic	The survey area consists of two closed DIA sites: 11943 and 11859. This survey area is indeterminate due to restrictions.	Indeterminate	Field and Desktop
105644	12713	Report on an Ethnographic Survey of the proposed Cape Preston Iron Ore Mine and treatment plant	O'Connor, Rory.	Ethnographic	The survey area consists of approximately 320sqkm of land encompassing a series of leases, which it is proposed will enclose three ore bodies, a treatment plant site and associated ancillary infrastructure, a services corridor and a port and jetty. Survey	Good	Field and Desktop
105645	12388	Report on an Archaeological Survey for Aboriginal Sites Cape Preston, Western Australia	McGann, Sally	Archaeological	The survey area consists of the proposed Cape Preston mine site and gas pipeline. Survey area location and extent are as per Figure 1.	Good	Field and Desktop
106806	16166	Interim report on archaeological fieldwork at Cossack (WA)	Paterson, Alistair	Archaeological	Fieldwork carried out on the remains campsites that fringe the townsite of Cossack and Settlers Beach. Cossack sites, CSK A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12. Settlers Beach sites, SB1, 2, 3. (As shown in Figure 7)	Good	Field and Desktop
106856	13555	A report of an archaeological survey of Bedout Island, near Port Hedland W A	Warren, Louis.	Archaeological	The survey area consists of Bedout Island, located approximately 100km NW of Port Hedland and 35km north of Larrey Point, at 19 35' 21" (lat) and 119 05' 50" (long). The Island measures roughly 1km x 0.3km. Survey area location and extent are as per Figur	Good	Field and Desktop
200066	19323	Aboriginal Heritage Site Identification Survey Report of The Chevron Australia Pty Ltd Proposed Gas Treatment Plant Additional Land, Barrow Island, Western Australia : March 2014 [TBD]	Fordyce, Ben ; Lafrentz, Damien	Archaeological/ Ethnographic	Aboriginal Heritage Site Identification Survey Report of The Chevron Australia Pty Ltd Proposed Gas Treatment Plant Additional Land, Barrow Island, Western Australia : March 2014 [TBD]		Field and Desktop

Survey Report ID	Survey Area ID	Report Title	Report Authors	Survey Type	Area Description	Spatial Accuracy	Field / Desktop
200067	19329	Aboriginal Heritage Archaeological Site Avoidance Survey Report of The Chevron Australia Pty Ltd Proposed Anode Bed Wells, Barrow Island, Western Australia : March 2014 [TBD]	Fordyce, Ben ; Lafrentz, Damien	Archaeological/ Ethnographic	Anode Bed Wells, Barrow Island, Western Australia : March 2014 [TBD]		Field and Desktop
200213	20106	Preliminary Advice on the Results of the Field Trip Six of the Aboriginal Heritage Location and Assessment Survey of the Proposed Infrastructure Corridor and the Proposed Western Indutstrial Estate, Anketell Project Area, West Pilbara Region, Western Aust	Anthropos Australis	Archaeological/ Ethnographic	Preliminary Advice on the Results of the Field Trip Six of the Aboriginal Heritage Location and Assessment Survey of the Proposed Infrastructure Corridor and the Proposed Western Indutstrial Estate, Anketell Project Area, West Pilbara Region, Western Aust	Good	Field and Desktop
200214	20113	Preliminary Advice on the Results of the Field Trip Seven of the Aboriginal Heritage Location and Assessment Survey of the Proposed Infrastructure Corridor and the Proposed Western Indutstrial Estate, Anketell Project Area, West Pilbara Region, Western Au	Anthropos Australis	Archaeological	The Project Area is located approximately 12 km east of Karratha and two km west of Wickham. The Survey area consists of the Port Precinct and the Infrastructure Corridor Project Areas. Table 1,2,4 pages 6 - 12.	Very Good	Field only
200332	19286	The Report of the Excavation, Salvage and Analysis of Registered Aboriginal Site Id 29186, 29189, 29190 And 29191, Winyama Project (353 MTPA Project Area), Within the Cape Lambert Port Facilities Upgrade Area, Cape Lambert, West Pilbara Region, Western Au	Anthropos Australis Pty Ltd ; Context Anthropology Pty Ltd	Archaeological	The Report of the Excavation, Salvage and Analysis of Registered Aboriginal Site Id 29186, 29189, 29190 And 29191, Winyama Project (353 MTPA Project Area), Within the Cape Lambert Port Facilities Upgrade Area, Cape Lambert, West Pilbara Region, Western Au	Good	Field and Desktop
200333	19290	The Report of the Excavation, Salvage and Analysis of Registered Aboriginal Site Id 29186, 29187, 29188 and 29215, Within the Cape Lambert Port Facilities Upgrade Area, Cape Lambert, West Pilbara Region, Western Australia; December 2013 [TBD]	Anthropos Australis (WA) Pty Ltd	Archaeological	The Report of the Excavation, Salvage and Analysis of Registered Aboriginal Site Id 29186, 29187, 29188 and 29215, Within the Cape Lambert Port Facilities Upgrade Area, Cape Lambert, West Pilbara Region, Western Australia; December 2013 [TBD]	Good	Field and Desktop
200424	19956	A Report on the Discovery of an Aboriginal Traditional Burial on Mining Lease M47/389, Point Samson, Western Australia	Brock, Robert	Archaeological	Mining Lease M47/389, Point Samson, Western Australia	Moderate	Field and Desktop

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Heritage Survey Areas



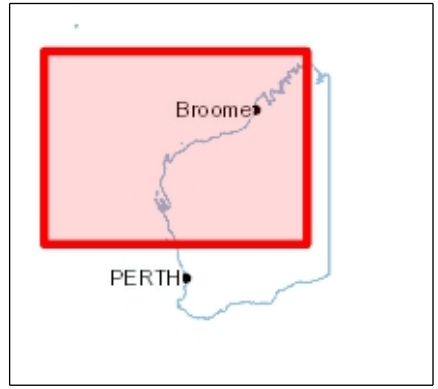
Legend

- Heritage Survey Area
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

431.22 kilometres

Map Scale 1 : 13,070,000

MGA Zone 50 (GDA94)



Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

Search Criteria

180 Aboriginal Cultural Heritage (ACH) Directory in Shapefile - EMBA_Part_1_(GDA94), EMBA_Part_2_(GDA94)

Disclaimer

The *Aboriginal Cultural Heritage Act 2021 (Act)* recognises, protects, conserves, and preserves Aboriginal cultural heritage (ACH), and recognises the fundamental importance of ACH to Aboriginal people and its role in Aboriginal communities past, present and future. The Act recognises the value of ACH to Aboriginal people as well as to the wider Western Australian community.

Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported to the ACH Council or exists on the Directory.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at AboriginalHeritage@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

Copyright

Terminology

ID: Reported ACH is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH places on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- **Boundary Reliable (Yes/No):** Indicates whether the location and extent of the ACH boundary is considered reliable.
- **Boundary Restricted = No:** ACH location is shown as accurately as the information submitted allows.
- **Boundary Restricted = Yes:** To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- **Culturally Sensitive = No:** Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- **Culturally Sensitive = Yes:** Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact AboriginalHeritage@dplh.wa.gov.au.
- **Culturally Sensitive Nature:**
  - **No Gender / Initiation Restrictions:** *Anyone* can view the information.
  - **Men only:** Only *males* can view restricted information.
  - **Women only:** Only *females* can view restricted information.

Status:

- **ACH Directory**: Aboriginal cultural heritage place or cultural landscape.
- **Pending**: Aboriginal cultural heritage place or cultural landscape with information in a verification stage.
- **Historic**: Aboriginal heritage places determined to not meet the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

ACH Type:

- **Cultural Landscape:** a group of areas interconnected through the tangible elements of Aboriginal culture heritage present.
- **Place**: an area in which tangible elements of Aboriginal cultural heritage are present.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy Place Status: A status determined under the previous *Aboriginal Heritage Act 1972*:

- **Registered Site:** the place was assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972.*
- **Lodged:** Information was received in relation to the place, but an assessment was not completed to determine if it met section 5 of the *Aboriginal Heritage Act 1972.*
- **Stored Data/Not a Site:** The place was assessed as not meeting Section 5 of the *Aboriginal Heritage Act 1972.*

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 94 Datum.

Basemap Copyright

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
621	WICKHAM 11.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Historical; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07453
873	MONTEBELLO IS: NOALA CAVE.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Rock Shelter	*Registered Knowledge Holder names available from DPLH	Registered Site	P07287
883	BARROW ISLAND 01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07291
884	BARROW ISLAND 02	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07292
885	BARROW ISLAND 03	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07293
886	BARROW ISLAND 04	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07294
887	BARROW ISLAND 05	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07295
888	BARROW ISLAND 06 A-F	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07296
889	BARROW ISLAND 07	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07297
890	BARROW ISLAND 08	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07298
891	BARROW ISLAND 09	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07299
892	BARROW ISLAND 10	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07300

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
893	BARROW ISLAND 11	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07301
894	BARROW ISLAND 12	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	P07302
926	MONTEBELLO IS: HAYNES CAVE.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter; Midden; Rock Shelter	*Registered Knowledge Holder names available from DPLH	Registered Site	P07286
929	ENDERBY IS.18: MANGROVE CK	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P07235
930	ENDERBY IS.19: MANGROVE CK	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	P07236
931	ENDERBY IS.20: MANGROVE CK	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07237
932	ENDERBY IS.21: BACK QUARRY	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P07238
933	ENDERBY IS.22: TEREBRALIA	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07239
934	ENDERBY IS.23: GRINDING	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	Registered Site	P07240
935	ENDERBY IS.24: LIMESTONE	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Lodged	P07241
936	ENDERBY IS.25: DINGHY MIDDEN	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07242
966	ROSEMARY IS.11: CHOOKIE BAY	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07219

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
967	ROSEMARY IS.12: CHOOKIE BAY	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P07220
968	ROSEMARY IS.13	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07221
969	ROSEMARY IS.14	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07222
970	ROSEMARY IS.15: AIRSTRIP	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07223
971	ROSEMARY IS.16: AIRSTRIP	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P07224
972	ROSEMARY IS.17: AIRSTRIP	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P07225
973	ROSEMARY IS.18: DEEP WATER	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07226
974	ROSEMARY IS.19: CHITON	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07227
975	ROSEMARY IS.20: HALFWAY CK	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07228
976	ROSEMARY IS.21: HALFWAY CK	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Traditional Structure	*Registered Knowledge Holder names available from DPLH	Lodged	P07229
977	ROSEMARY IS.22	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P07230
978	ROSEMARY IS.23: WADJURU R/H	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Engraving; Grinding areas / Grooves; Traditional Structure; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	P07231

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
979	ROSEMARY IS.24: HUNGERFORD	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07232
1062	LEGENDRE 11	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	P07204
1105	LEGENDRE 02	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07195
1106	LEGENDRE 03.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P07196
1109	LEGENDRE 06.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P07199
1110	LEGENDRE 07.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P07200
1111	LEGENDRE 08.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Traditional Structure; Shell	*Registered Knowledge Holder names available from DPLH	Lodged	P07201
1112	LEGENDRE 09.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P07202
1113	LEGENDRE 10.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Rock Shelter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P07203
6014	ABLE MINE	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P07112
6078	ROSEMARY ISLAND 10	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P07019
6187	ANGEL ISLAND: NW.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Engraving; Grinding areas / Grooves; Midden; Rock Shelter	*Registered Knowledge Holder names available from DPLH	Registered Site	P06920

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
6227	MALUS ISLAND.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp; Engraving; Grinding areas / Grooves; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P06908
6325	COWERIE WELL	Yes	No	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Burial	*Registered Knowledge Holder names available from DPLH	Registered Site	P06642
6376	MUD FLATS 2	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P06587
6813	SAMS CREEK MIDDEN	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P06118
6833	WEST MOORE ISLAND	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P06138
6965	ENDERBY ISLAND 07	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P05954
7055	CONZINC BURIAL & MIDDEN	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Burial; Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P05882
7085	WADJUDUKUBRA 1.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P05859
7086	WADJUDUKUBRA 2	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P05860
7087	WADJUDUKUBRA 3	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P05861
7133	ANGEL ISLAND BEACON	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P05799
7208	MILYERING ROCKS.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Hunting Place	*Registered Knowledge Holder names available from DPLH	Lodged	P05712

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
7784	BUNNEENYA.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	P05053
7785	WALUBIDI-MARINGDJINE.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	P05054
7786	BAALYINNYE.	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	P05055
7859	CAPE LAMBERT BURIAL	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Burial	*Registered Knowledge Holder names available from DPLH	Registered Site	P05009
7899	MALUS ISLAND	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	P04947
8008	CAPE LAMBERT MIDDEN 01	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P04659
8009	CAPE LAMBERT MIDDEN 02	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P04660
8014	CAPE LAMBERT MIDDEN 07	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P04665
8018	CAPE LAMBERT MIDDEN 11	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P04669
8797	POINT SAMSON 1	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P03722
8949	SETTLERS BEACH, COSSACK	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P03540
8950	BOAT BEACH	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P03541

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
9479	DRD AREA C-36	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P02687
9481	DRD AREA C-38	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P02689
9520	DRD AREA C-22	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P02673
9521	DRD AREA C-23	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P02674
9522	DRD AREA C-24	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P02675
9523	DRD AREA C-25	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P02676
9524	DRD AREA C-26	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P02677
9525	DRD AREA C-27	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P02678
9529	DRD AREA C-31	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P02682
9532	DRD AREA C-34 (Burrup Peninsula P4)	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Engraving; Grinding areas / Grooves; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P02685
9737	ENDERBY ISLAND 06: BOILER B	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P02449
9818	CLIMBING MEN COMPLEX (Burrup Peninsula F1)	Yes	Yes	Yes	Men only	ACH Directory	Place	Engraving; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P02362

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
10052	CAPE LAMBERT ENGRAVINGS.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp; Engraving; Grinding areas / Grooves; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P02116
10053	CAPE LAMBERT MIDDEN.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P02117
10056	CAPE LAMBERT.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp	*Registered Knowledge Holder names available from DPLH	Registered Site	P02120
10057	CAPE LAMBERT.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp	*Registered Knowledge Holder names available from DPLH	Lodged	P02121
10058	CAPE LAMBERT DUNE BLOWOUT.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp	*Registered Knowledge Holder names available from DPLH	Registered Site	P02122
11328	GAP WELL	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00836
11624	HUNTERS POOL	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00541
11625	DEPUCH ISLAND	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Other	*Registered Knowledge Holder names available from DPLH	Registered Site	P00542
11626	WATERING VALLEY	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P00543
11627	JANE CREEK	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00544
11649	DEBBY'S DUNE (DIXON ISLAND 4)	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P00513
11650	GAYLEEN BAY (DIXON IS. 6).	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P00514

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
11651	CHRISTINE BAY (DIXON IS.5).	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Lodged	P00515
11652	LANDING SITE (DIXON IS. 1)	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P00516
11653	BOBBY'S FLAT E(DIXON IS.2)	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P00517
11654	BOBBY'S FLAT (DIXON IS. 3)	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P00518
11655	LIMESTONE PTF (DIXON IS.8)	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Lodged	P00519
11656	SUSAN BAY (DIXON ISLAND 7)	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P00520
11664	CAPE LAMBERT	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00528
11728	WITHNELL BAY 10	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00433
11729	NGARLUMA POINT, GIDLEY IS.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P00434
11730	MORS HILL, GIDLEY ISLAND.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Burial; Artefacts / Scatter; Engraving; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	P00435
11767	FISH POINT, GIDLEY ISLAND	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00418
11772	ROSEMARY ISLAND 09	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	P00369

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
11773	ROSEMARY ISLAND 08	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving; Grinding areas / Grooves; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Registered Site	P00370
11774	ROSEMARY ISLAND 07	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00371
11775	ROSEMARY ISLAND 06	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00372
11776	ROSEMARY ISLAND 04.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Camp; Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00373
11777	ROSEMARY ISLAND 03	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00374
11789	ROSEMARY ISLAND 01	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Engraving; Midden; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	P00386
11818	ROSEMARY ISLAND 02	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00362
11819	ROSEMARY ISLAND 05	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00363
11820	ENDERBY ISLAND 01	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	P00364
11859	BALLA BALLA	Yes	No	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	Lodged	P00296
11866	POVERTY WINDMLL,MT WELCOME.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Camp	*Registered Knowledge Holder names available from DPLH	Registered Site	P00303
12969	WARRA MURRANGA TALU	Yes	No	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Ritual / Ceremonial; Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	Registered Site	K02270

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
14272	CAPE KERAUDREN	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Burial; Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	Lodged	K00830
18822	Cape Preston 19	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	
18823	Cape Preston 20	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	
18824	Cape Preston 21	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Midden	*Registered Knowledge Holder names available from DPLH	Registered Site	
18825	Cape Preston 22	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	
18826	Cape Preston 23	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	
19171	Ceremonial Ground	Yes	Yes	Yes	Men only	ACH Directory	Place	Ritual / Ceremonial; Creation / Dreaming Narrative; Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
20621	Bedout Island	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative; Landscape / Seascape Feature; Other	*Registered Knowledge Holder names available from DPLH	Lodged	
22111	WCL05-4	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	
22943	Flacourt Bay 01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Rock Shelter	*Registered Knowledge Holder names available from DPLH	Lodged	
25853	P08 - 01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Shell	*Registered Knowledge Holder names available from DPLH	Registered Site	
26416	Burrup Peninsula N1	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Engraving; Quarry; Shell	*Registered Knowledge Holder names available from DPLH	Lodged	

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
26417	Burrup Peninsula P2	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Engraving; Traditional Structure; Quarry	*Registered Knowledge Holder names available from DPLH	Lodged	
26446	P09 - 06	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Quarry	*Registered Knowledge Holder names available from DPLH	Registered Site	
26736	ACHM - 09-05	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
27561	Sam's Creek Burial Site	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Burial	*Registered Knowledge Holder names available from DPLH	Registered Site	
27676	AUSI 11:15	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
27677	AUSI 11:16	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
29198	CL10ENG16	Yes	Yes	Yes	Men only	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Registered Site	
29549	Boodie Soak	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
31100	Cape Lambert Isolated Finds	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Other	*Registered Knowledge Holder names available from DPLH	Lodged	
31762	Site 1	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
31763	Site 2	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
33160	CRL3-12-04	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Lodged	

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
33161	CRL3-12-05	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Midden	*Registered Knowledge Holder names available from DPLH	Lodged	
36199	Boodie Cave	No	Yes	No		ACH Directory	Place	Artefacts / Scatter; Rock Shelter	*Registered Knowledge Holder names available from DPLH	Lodged	
36200	John Wayne Country Rockshelter	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Rock Shelter	*Registered Knowledge Holder names available from DPLH	Lodged	
36234	South End structures, Barrow Island.	No	No	No		ACH Directory	Place	Historical; Traditional Structure	*Registered Knowledge Holder names available from DPLH	Lodged	
36261	G-13-S0001	No	Yes	No		ACH Directory	Place	Quarry	*Registered Knowledge Holder names available from DPLH	Lodged	
36262	H-24-S0001	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36263	H-24-S0002	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36264	I-23-S0001	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36265	I-23-S0002	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36266	I-24-S0003	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36267	J-23-S0001	No	Yes	No		ACH Directory	Place	Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	Lodged	
36268	J-23-S0002	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
36269	J-23-S0003	No	Yes	No		ACH Directory	Place	Modified Tree	*Registered Knowledge Holder names available from DPLH	Lodged	
36270	M-03-S0001	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36271	N-02-S0001	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36272	O-02-S0002	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36273	O-05-S0003	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36344	N-05-S0002	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36345	N-05-S0001	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36346	O-05-S0001	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36347	O-05-S0002	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
36348	P-04-S0001	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
38533	Cape Bruguieres Channel	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
38708	MAC_CB002	Yes	Yes	Yes	Men only	ACH Directory	Place		*Registered Knowledge Holder names available from DPLH	Lodged	

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
38709	MAC_CB003	Yes	Yes	Yes	Men only	ACH Directory	Place	Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	Lodged	
38710	MAC_CB004	Yes	Yes	Yes	Men only	ACH Directory	Place		*Registered Knowledge Holder names available from DPLH	Lodged	
38729	MAC Withnell Bay 15	Yes	Yes	Yes	Men only	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
38732	MAC Withnell Bay 18	Yes	Yes	Yes	Initiated men only	ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
38734	MAC CONZINC BAY 010	No	Yes	No		ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
38735	MAC CONZINC BAY 011	No	Yes	No		ACH Directory	Place	Artefacts / Scatter; Engraving; Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	Lodged	
38736	MAC CONZINC BAY 012	Yes	Yes	Yes	Men only	ACH Directory	Place	Engraving; Grinding areas / Grooves	*Registered Knowledge Holder names available from DPLH	Lodged	
38752	MAC CONZINC BAY 028	No	Yes	No		ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
38753	MAC CONZINC BAY 029	No	Yes	No		ACH Directory	Place	Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
38754	MAC CONZINC BAY 030	Yes	Yes	Yes	Men only	ACH Directory	Place	Artefacts / Scatter; Engraving	*Registered Knowledge Holder names available from DPLH	Lodged	
39191	Warnangura (Cape Range) Cultural Precinct	No	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Ritual / Ceremonial; Creation / Dreaming Narrative; Engraving; Midden; Rock Shelter; Water Source	*Registered Knowledge Holder names available from DPLH	Lodged	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

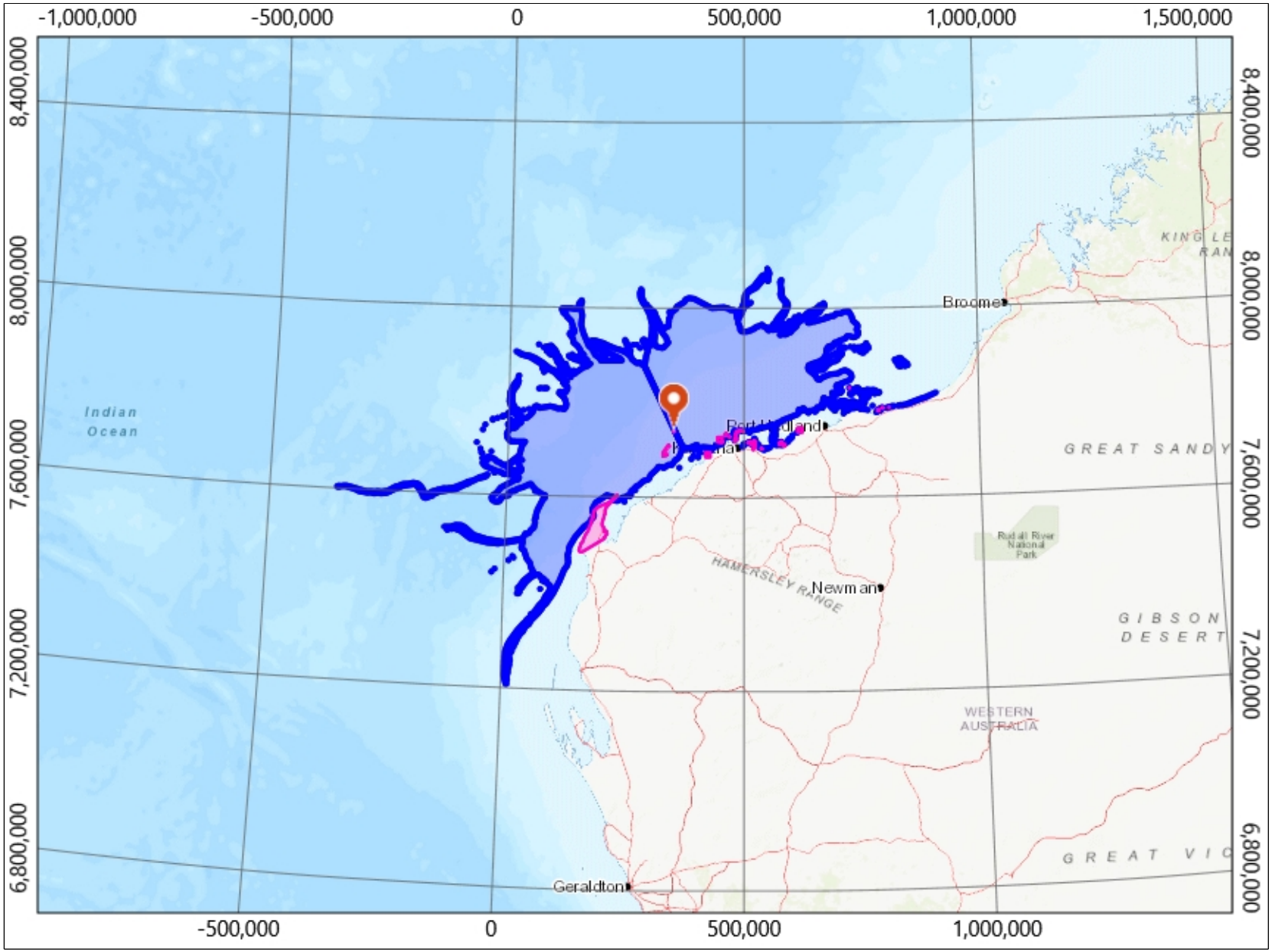
ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
39215	Cossack (Bajinhurrba) Creek	No	Yes	No		ACH Directory	Place	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	Lodged	

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Directory

For further important information on using this information please see the Department of Planning, Lands and Heritage's Disclaimer statement at https://www.wa.gov.au/disclaimer



Legend

- Aboriginal Cultural Heritage (ACH) Directory
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

431.22 kilometres

Map Scale 1 : 13,070,000

MGA Zone 50 (GDA94)

APPENDIX E STAG FIELD STAKEHOLDER CONSULTATION INFORMATION

Appendix E

Table 1: Relevant persons' engagement log - Stag 50H and 51H Drilling EP

Relevant Stakeholders	Date	To/From	Engagement Logistics	Reference Number	Summary of content	Action undertaken/Status
Commonwealth government department or agency						
Australian Fisheries Management Authority (AFMA)	2 Dec 21	SENT	How: Email Supplementary: Fishery information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A
	7 Dec 21	RECEIVED	How: Email	AFMA1	Acknowledgement. Noted to consult directly through relevant fishing organisations.	Refer to Assessment of Merit table – this has been undertaken as part of standard consultation approach
Australian Hydrographic Office (AHO)	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	N/A
	7 Jan 22	RECEIVED	How: Email	AHO1	Acknowledgement. Data will be registered and charts updated	Noted. No further action
Australian Maritime Safety Authority (AMSA)	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A
	2 Dec 21	RECEIVED	How: Email	AMSA1	Notification requirements - refer to assessment of merit table for detail	Response assessed and EP updated

Department of Agriculture, Water and the Environment (Fisheries section)	2 Dec 21	SENT	How:Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Department of Agriculture, Water and the Environment (Marine Pests)	2 Dec 21	SENT	How:Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Department of Agriculture, Water and the Environment (Biosecurity)	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Director of National Parks	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A

	22 Dec 21	RECEIVED	How: Email	DNP1	Response noting outside AMPs and no authorisation required. Referred to guidance note for development of EP and emergency notification requirements	Refer to Assessment of Merit table. No further correspondence required
Department of Industry, Science, Energy and Resources	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Hon Keith Pitt MP – Minister for Resources and Water	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1a	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A
	2 Dec 21	RECEIVED	How: Email	Pitt	Acknowledgement of receipt	Noted. No further action
Hon Angus Taylor MP – Minister for Industry, Energy and Emissions Reduction	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1a	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
WA State government department or agency						
Department of Mines, Industry Regulation and Safety	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and	N/A

					associated management controls). Feedback requested	
	20 Dec 21	RECEIVED	How: Email	DMIRS1	Acknowledgement of receipt. Need to provide pre-start and cessation of activity notification and ensure that notifications reporting environmental incidents are received.	Refer to Assessment of Merit table. No further correspondence required
Department of Primary Industry and Regional Development (Fisheries Branch)	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	N/A
	14 Jan 22	RECEIVED	How: Email	DPIRD1	Suggested changes/ additions to current mitigation and management measures for IMS: • changing the wording from "if required" to "as required" • notification of potential detection of IMS in WA waters is made to DPIRD within 24 via FishWatch (ph 1800 81 5 507) or by email to Aquatic.Biosecurity@dpird.wa.gov.au and will follow subsequent advice provided by Aquatic Biosecurity • Use the online tool Vessel Check to manage the biosecurity risk for vessels entering WA waters https://www.vessel-check.com	Response assessed and EP updated
	19 Jan 22	SENT	How: Email	DPIRD1	Response provided on mitigation and management measures for IMS addressing DPIRD questions.	Refer to Assessment of Merit table and email correspondence

						(Attachment 1) for further detail. No further action
Department of Transport (Marine Pollution)	2 Dec 21	SENT	How: Email Supplementary: General information sheet	DoT1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A
	2 Dec 21	RECEIVED	How: Email	DoT2	Acknowledgement of receipt	Noted
	8 Dec 21	RECEIVED	How: Email	DoT3	Acknowledgement of receipt and asked for OPEP to be sent to DoT for review.	Noted and OPEP to be sent when finalised at same time as submission to NOPSEMA
	25 Jan 22	SENT	How: Email	DoT4	OPEP issued to DoT for comment	N/A
	09 Mar 22	RECEIVED	How: Email		Receipt of comments	OPEP updated
	13 Apr 22	SENT	How: Email		Response to DoT comments issued as a table	Any further comments will be responded to and OPEP updated as required
Hon William (Bill) Johnston MLA - Minister for Mines and Petroleum; Energy; Corrective Services	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1a	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	N/A
	21 Jan 22	RECEIVED	How: Email	Johnston	Acknowledgement of receipt. No comments given DMIRS have provided response.	No further action
	2 Dec 21	SENT	How: Email	G1a	Email sent to stakeholder. Attached was a factsheet with information on the potential	N/A

Hon Amber-Jade Sanderson – Minster for Environment; Climate Action; Commerce			Supplementary: General information sheet		environmental impacts and risks (and associated management controls). Feedback requested	
	2 Dec 21	RECEIVED	How: Email	Sanderson	Acknowledgement of receipt	Noted. No further action
Commercial fishers and fishing associations: Commonwealth						
Australian Fisheries Trade Association	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Australian Southern Bluefin Tuna Industry Association	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Commonwealth Fisheries Association (CFA)	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Commercial fishers and fishing associations: WA state						

Pearl Producers Association	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: Fisheries information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	Email bounced
	7 Jan 22	RECEIVED	How: Email	PPA bounce 1	Email bounced	Find alternative email address
	10 Jan 22	CALL	How: Phone call	N/A	Called number for Pearl Producers Association to try and find another email address to send fact sheet to.	Called to leave message, mailbox full
	17 Jan 22	SENT	How: Email Supplementary: Fisheries information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	Resent Email bounced.
	18 Jan 22	RECEIVED	How: Email	PPA bounce 2	Email bounced	No response expected based on previous consultation activities at Stag. If a response is received it will be included in the next revision of EP
Western Australian Fishing Industry Council (WAFIC)	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A
	16 Dec 21	RECEIVED	How: Email	WAFIC1	Acknowledgement of receipt. Asked for information on the following: • Baseline scientific data on aquatic organisms and the aquatic environment	Noted and following up with OPEP team to provide a response

					• Detailed post spill scientific monitoring of aquatic organism and aquatic environment • Communication strategy that considers the commercial fishing industry in the event of a spill event • Support to the commercial fishing industry with regards to traceability of fish products to manage tainting risks, if required. • Financial assistance to the commercial fishing industry in the event of a spill event.	
	11 Jan 22	SENT	How: Email	WAFIC1	Thanked for feedback and advised that a response to WAFIC questions was being worked on and would be sent through shortly. Asked if WAFIC as peak body have contacted individual licence holders for each fishery in relation to this EP.	Response sent 11 Jan 22
	14 Jan 22	RECEIVED	How: Email	WAFIC1	WAFIC only contact fishers for some Environment Plans, in most cases wouldn't consult again if already undertaken by titleholder to avoid stakeholder fatigue	Responded to on 17 Jan 22
	17 Jan 22	SENT	How: Email	WAFIC1	Following previous discussions with WAFIC on stakeholder fatigue asked WAFIC if a second mail out to individual stakeholders was appropriate or if the contact WAFIC have with individual licence holders as the peak body is sufficient and the preferred approach to reduce stakeholder fatigue.	Response sent 17 Jan 22
	18 Jan 22	SENT	How: Email	WAFIC1	Response provided on incident preparedness at Stag Facility addressing WAFIC questions.	Refer to Assessment of Merit table and email correspondence (Attachment 1) for further detail

	19 Jan 22	RECEIVED	How: Email	WAFIC1	Email thanking Jadestone for response regarding incident preparedness. WAFIC have no further comment at this stage.	Responded to 19 Jan 22
	19 Jan 22	SENT	How: Email	WAFIC1	Emailed WAFIC to follow up on request re response in relation to stakeholder fatigue and requirement for a second mail out to individual licence holders	Response sent 19 Jan 22
	19 Jan 22	RECEIVED	How: Email	WAFIC2	WAFIC advised they have not as they only do it for some EP's and are working through this issue with DPIRD and APPEA to try and find a solution	Responded to 20 Jan 22
	20 Jan 22	SENT	How: Email	WAFIC2	Thanked WAFIC for their feedback and asked to be updated on guidance on stakeholder fatigue in the future	No further action
Onslow Prawn Managed Fishery (individual license holder details in Table 2)	3 Dec 21	SENT	How: Postal mail Supplementary: Fisheries information sheet	F1	Letters posted to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	No responses. Reminders not sent as only postal addresses available.
Mackerel Managed Fishery (Area 2) (individual license holder details in Table 2)	3 Dec 21	SENT	How: Postal mail Supplementary: Fisheries information sheet	F1	Letters posted to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	No responses. Reminders not sent as only postal addresses available.
Pilbara Trap Managed Fishery (individual license holder details in Table 2)	3 Dec 21	SENT	How: Postal mail Supplementary: Fisheries information sheet	F1	Letters posted to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	No responses. Reminders not sent as only postal addresses available.
Pilbara Line Managed Fishery (individual license holder details in Table 2)	3 Dec 21	SENT	How: Postal mail Supplementary: Fisheries information sheet	F1	Letters posted to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	No responses. Reminders not sent as only postal addresses available.

Octopus Development Fishery (individual license holder details in Table 2)	3 Dec 21	SENT	How: Postal mail Supplementary: Fisheries information sheet	F1	Letters posted to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	No responses. Reminders not sent as only postal addresses available.
Marine Tourism WA	2 Dec 21	SENT	How: Email Supplementary: General information sheet	MTWA1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Fishing Tour Operators (individual license holder details in Table 3)	31 Dec 21	SENT	How: Postal mail Supplementary: Fisheries information sheet	F1	Letters posted to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	No responses. Reminders not sent as only postal addresses available.
Recreational fishing						
Recfishwest	2 Dec 21	SENT	How: Email Supplementary: Fisheries information sheet	F1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	N/A
	4 Jan 22	RECEIVED	How: Email	Recfish1	Suggested contact two main fishing clubs in Karratha to notify them of project. Asked to be provided with project updates.	Two main fishing clubs contacted and added to list of relevant persons. Refer to Assessment of Merit table.
	6 Jan 22	SENT	How: Email	Recfish2	Response sent noting feedback and notifying Recfishwest that Jadestone have contacted two fishing clubs as suggested and will keep	No further action

					Recfishwest updated on project through notifications	
King Bay Game Fishing Club	5 Jan 22	SENT	How: Email Supplementary: Fisheries information sheet	Fishclub1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	19 Jan 22	SENT	How: Email Supplementary: Fisheries information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	Response pending
Nickol Bay Sportsfishing Club	5 Jan 22	SENT	How: Email Supplementary: Fisheries information sheet	Fishclub1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	19 Jan 22	SENT	How: Email Supplementary: Fisheries information sheet	F2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	Response pending
Oil and Gas						
Australian Petroleum Production and Exploration Association (APPEA)	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Response Partners						
Australian Marine Oil Spill Centre (AMOSC)	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and	Reminder sent

					associated management controls). Feedback requested	
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
Research						
Australian Institute of Marine Science	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action
CSIRO	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Email bounced. Find alternative email or phone number for relevant person
	2 Dec 21	RECEIVED	How: Email	CSIRO bounce	Email bounce notification	Follow up with a phone call
	6 Dec 21	CALL	How: Call	N/A	Called CSIRO switchboard to find appropriate contact details. Given number for Communications Manager for Energy (Claire Ginn). Left a message	Follow up with phone call in a week
	13 Dec 21	CALL	How: Call	N/A	Left another message for Communications Manager	Follow up with another phone call after Christmas
	5 Jan 22	CALL	How: Call	N/A	Spoke to CSIRO switchboard who advised if we hadn't received a return phone call by now project not considered relevant	No further action. No response expected based on previous consultation activities at Stag. If a response is

						received it will be included in the next revision of EP
Western Australian Marine Science Institute	2 Dec 21	SENT	How: Email Supplementary: General information sheet	G1	Email sent to stakeholder. Attached was a factsheet with information on the potential environmental impacts and risks (and associated management controls). Feedback requested	Reminder sent
	6 Jan 22	SENT	How: Email Supplementary: General information sheet	G2	Reminder - Given no response to previous correspondence, will assume no comment unless JSE hear from you in next week.	No further action

JADESTONE ENERGY

Stag Facility Invitation for Consultation

Invitation for Consultation

Jadestone Energy (Australia) Pty Ltd (Jadestone) is the operator and titleholder of the existing Stag Field Production and Export Facility (Stag Facility). Jadestone is preparing for assessment by the National Offshore Petroleum Regulatory Authority (NOPSEMA) two Environment Plans for the following activities:

- ***Ongoing production and maintenance at the Stag Facility for the next five years; and***
- ***Plugging and abandonment of two production wells and then drilling two new production wells at the Stag Facility.***

We invite you to provide comment for consideration in this process.

Who is Jadestone Energy?

Jadestone Energy (Jadestone) is a leading upstream oil and gas company in the Asia Pacific region, with a focus on production and near-term development assets. The company is listed on the Alternative Investment Market of the London Stock Exchange (JSE). Contact details for the Perth office are provided at the end of this document

What is an Environment Plan?

The purpose of an Environment Plan (EP) is to identify impacts on and risks to the environment related to an activity. The EP also sets measures to reduce environmental impacts and risks and describes how and to what standard those measures will be implemented; this includes emergency situations. There will be two EPs covering:

- Stag operations: covering activities associated with production, oil loading to a third-party tanker, inspection maintenance and repair of the facility, subsea export pipeline, wells and associated subsea infrastructure and non-routine/ unplanned activities and incidents as they arise. This EP is in place and needs to be refreshed after its five-year timeline is now almost due; and,
- Stag drilling: two new production wells to be drilled from the facility, with activities including firstly abandoning two existing wells before drilling the new production wells using a mobile offshore drilling unit or drilling rig.

Length and timing of activities

The Stag Operations EP is being prepared to cover a further five years of operation. The new EP will be consistent with the activities currently undertaken with the facility's operation. Oil is currently produced from the Stag Reservoir by production wells. Seawater is injected into the reservoir to help production and produced water is discharged overboard from the platform. Ongoing drilling and completion activities are necessary to maintain oil production at the facility.

Approximately 90 days is required to plug and abandon two existing wells and then drill two new wells. While timing of the activities will be driven by rig availability, the preferred timing will be between June and October 2022. Activities may occur outside this window and into 2023, and for this reason, it is intended that the drilling EP will remain valid for a two-year period from the time of acceptance.

Location

The Stag Facility is located on the North-west Shelf, approximately 60 km north-west of Dampier. The permit area (WA-15-L) is in Commonwealth waters. The water depth at the Stag Facility is 49 m LAT. Indicative location details are listed here and shown in Figure 1:

- Lat: 20° 16.5" S: Long:116° 15.433" E (GDA 94, Zone 51)

The Stag platform has been present and operating for 20 years, with the required restricted zone in place. This restricted zone of 500 m radius around the platform, catenary anchor leg mooring (CALM) buoy and pipeline will remain in place along with the cautionary area as designated by AMSA of 3 Nm radius charted around the Stag Field facilities.

The Operational Area for the Stag Operations EP is the area within the 500 m radius Restricted Zone that extends around the CPF, subsea export pipeline, and CALM buoy. The Operational Area for the Drilling EP is defined as the area within the 3 Nm radius Restricted Zone that extends around the Stag CPF.

All planned activities will be contained within the Operational Areas.

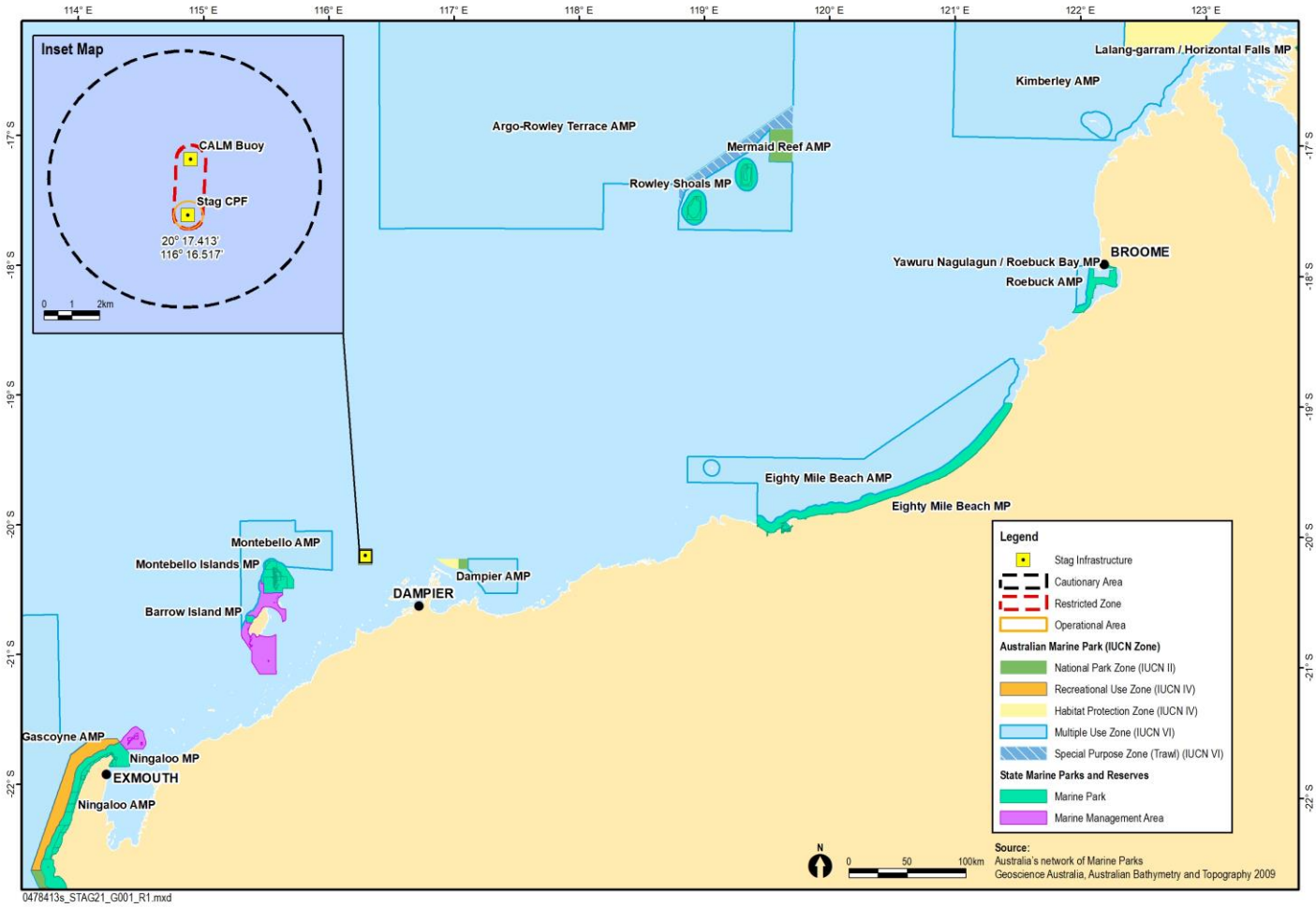


Figure 1 –Stag facility – Location

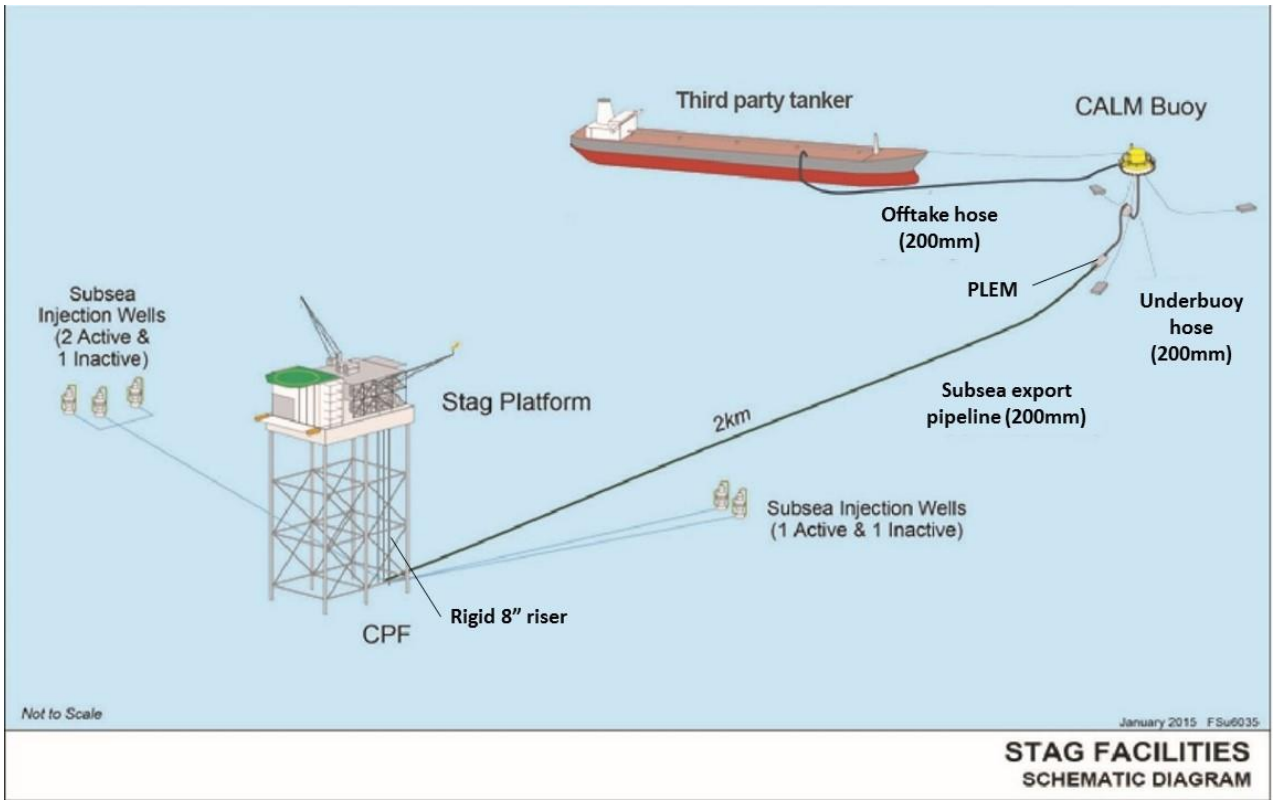


Figure 2 –Stag facility – Existing infrastructure

Operational Area Environmental Values

There are no Matters of National Environmental Significance in the Operational Area.

The distance to Australian Marine Parks (AMP) and other key features in the area is summarised in the table below.

Regional Feature	Distance from Stag CPF
Montebello AMP	30 km
Dampier Archipelago	32 km
Dampier AMP	60 km
Closest Montebello Island	75 km

The benthic habitat in the Operational area is generally sandy seabed with occasional shell or gravel patches that is well represented in the region.

In the event of a hydrocarbon spill the values in a broader Environment that May be Affected (EMBA) have been identified to enable key habitats or locations of particular value in the region to be responded to as protection priorities.

Potential risks and management

A summary of potential risks to the fishery sector that are common to both Environmental Plan activities is provided below. For each risk the associated management measures are summarised in Table 1.

TABLE 1: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES COMMON TO BOTH ENVIRONMENT PLANS

Potential Risks	Mitigation and /or Management Measures
Light Emissions	• Potential impacts from lighting are assessed as occurring within 20 km of a vessel or facility based on the National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2019) • Facility and vessel navigation lights are compliant with the Navigation Act 2012
Noise Emissions	• Vessels and helicopters comply with relevant parts of EPBC Regulation (2000) Part 8 • Vessel and machinery are maintained in accordance with Flag State certification requirements • All engines, compressors and machinery on the CPF and MODU are maintained via a maintenance management system
Atmospheric Emissions	• Flag State Certificate and/or IAPP certifies measures are in place to manage air emissions • All engines, compressors and machinery on the CPF and MODU are maintained via a maintenance management system
Operational discharges	• Emissions and discharges of liquid waste to sea are in accordance with legislative requirements, the impact and risk assessment process indicates that discharges will not result in significant effects to marine fauna • Waste Management Plan
Interaction with other users	• A pre-existing 500 m restricted zone is in place around the facility and will remain in place for the duration of operations under the proposed EPs, including during the drilling activity as the MODU will be within the 500m restricted zone of the CPF. No fishing vessels are to enter this zone • Commercial fishers are permitted to enter the wider 3Nm cautionary zone and fish, transit or anchor for the duration of operations under the proposed EPs, as long as it is safe to do so • Notice to Mariners and charts will show zones
Interaction with fauna	• Vessels operating within the restricted zone must not exceed a speed of five (5) knots • Induction includes information on speed limits and requirements for interacting with marine fauna
Physical Presence	• Seabed disturbance limited to planned activities and defined locations

In addition to the risks outlined in Table 1, the risk of produced water discharge is specific to the Stag Operations EP activities (Table 2).

TABLE 2: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG 5 YEAR OPERATIONS EP

Potential Risks	Mitigation and /or Management Measures
Produced water discharges	• Beyond temporary perturbation to water quality, no environmental impacts due to the discharge of produced water are expected • Produced water discharges are monitored and recorded with adaptive management processes in place if significant changes are identified

In addition to the risks outlined in Table 1, the risk of drilling discharges is specific to the Stag Drilling EP activities (Table 3).

TABLE 3: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG DRILLING EP

Potential Risks	Mitigation and /or Management Measures
Drilling discharges	• Selection process for materials as part of NOPSEMA approval • Process for inventory control to minimise leftovers • Cuttings management system in place to manage muds (no synthetic based muds planned for use)

Additional risks that are associated with events that are not expected to occur during normal activities are outlined in Table 4.

Potential Risks	Mitigation and /or Management Measures
Introduced Marine Species (IMS)	• IMS Management will meet legal requirements and reduce risks to ALARP and acceptable levels • Vessels will be required to adhere to ballast water management, quarantine and biofouling requirements if required
Unplanned discharges	• No release of non-hazardous / hazardous solid wastes or non-hydrocarbon hazardous liquids to the marine environment • Dropped object prevention • Waste management plan implemented, and details included in induction materials • Spill kits available and incident response plans in place
Vessel/MODU collision	• Marine notifications will be made to relevant stakeholders, describing the location of the activity and a 500 m petroleum safety zone is present to prevent the risk of collisions • Vessels operating within the restricted zone must not exceed a speed of five (5) knots • Simultaneous Operations (SIMOPS) plan in place to interface between the Stag facility and MODU during drilling • Navigation lights installed and checked
Hydrocarbon release	• Oil Pollution Emergency Plan • Procedures in place on CPF to prevent hydrocarbon release to sea during operations • Procedures in place on MODU to prevent hydrocarbon release to sea during drilling • Appropriate vessel spill response plans, equipment and materials will be in place and maintained • Appropriate refuelling procedures and equipment will be used to prevent spills to the marine environment

Providing Feedback

If you would like to comment on the proposed activity outlined in this fact sheet or would like additional information, please contact Jadestone before Monday 20th December 2021.

Feedback can be provided at any time before/during or after the activity.

Phone: 08 9486 6600 Email: consult@jadestone-energy.com
Our Perth office is located at: The Atrium, Level 2, 168 St Georges Terrace, Perth WA 6000

Any person providing feedback is asked to advise if this information is to remain confidential and they do not wish it to be published within the Environment Plan.

JADESTONE ENERGY

Stag Facility
Invitation for Consultation

Fishing sector

Invitation for Consultation

Jadestone Energy (Australia) Pty Ltd (Jadestone) is the operator and titleholder of the existing Stag Field Production and Export Facility (Stag Facility). Jadestone is preparing for assessment by the National Offshore Petroleum Regulatory Authority (NOPSEMA) two Environment Plans for the following activities:

- ***Ongoing production and maintenance at the Stag Facility for the next five years; and***
- ***Plugging and abandonment of two production wells and then drilling two new production wells at the Stag Facility.***

We invite you to provide comment for consideration in this process.

Who is Jadestone Energy?

Jadestone Energy (Jadestone) is a leading upstream oil and gas company in the Asia Pacific region, with a focus on production and near-term development assets. The company is listed on the Alternative Investment Market of the London Stock Exchange (JSE). Contact details for the Perth office are provided at the end of this document.

What is an Environment Plan?

The purpose of an Environment Plan (EP) is to identify impacts on and risks to the environment related to an activity. The EP also sets measures to reduce environmental impacts and risks and describe how and to what standard those measures will be implemented; this includes emergency situations. There will be two EPs covering:

- Stag operations: covering activities associated with production, oil loading to a third-party tanker, inspection maintenance and repair of the facility, subsea export pipeline, wells and associated subsea infrastructure and non-routine/ unplanned activities and incidents as they arise. This EP is in place and needs to be refreshed after its five-year timeline is now coming due.
- Stag drilling: two new production wells to be drilled from the facility, including firstly abandoning two existing wells before drilling the new production wells using a mobile offshore drilling unit or drilling rig.

Length and timing of activities

The Stag Operations EP is being prepared to cover a further five years of operation. The new EP will be consistent with the activities currently undertaken with the facility's operation.

Oil is currently produced from the Stag Reservoir by production wells. Seawater is injected into the reservoir to help production and produced water is discharged overboard from the platform. Ongoing drilling and completions activities are necessary to maintain oil production at the facility.

Approximately 90 days is required to plug and abandon two existing wells and then drill two new wells. While timing of the activities will be driven by rig availability, the preferred timing will be between June and October 2022. Activities may occur outside this window and into 2023, and for this reason, it is intended that the drilling EP will remain valid for a two-year period from the time of acceptance.

Location

The Stag Facility is located on the North-west Shelf, approximately 60 km north-west of Dampier. The permit area (WA-15-L) is in Commonwealth waters. The water depth at the Stag Facility is 49 m LAT. Indicative location details are listed here and shown in Figure 1:

- Lat: 20º 16.5" S: Long:116º 15.433" E (GDA 94, Zone 51)

The Stag platform has been present and operating for 20 years, with the required restricted zone in place. This restricted zone of 500 m radius around the platform, catenary anchor leg mooring (CALM) buoy and pipeline will remain in place along with the cautionary area as designated by AMSA of 3 Nm radius charted around the Stag Field facilities.

The Operational Area for the Stag Operations EP is the area within the 500 m radius Restricted Zone that extends around the CPF, subsea export pipeline, and CALM buoy. The Operational Area for the Drilling EP is defined as the area within the 3 Nm radius Restricted Zone that extends around the Stag CPF.

All planned activities will be contained within the Operational Areas.

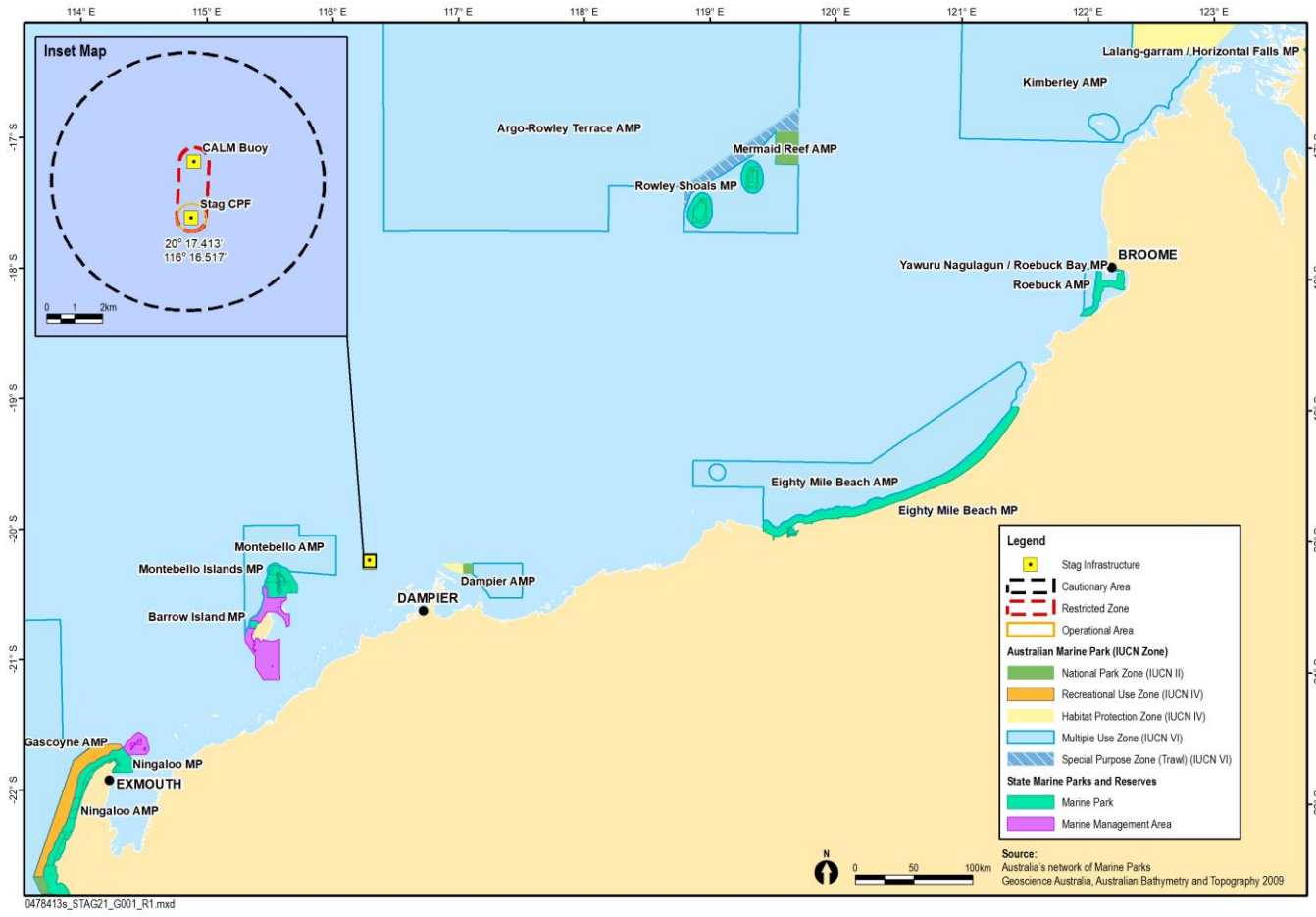


Figure 1 –Stag facility – Location

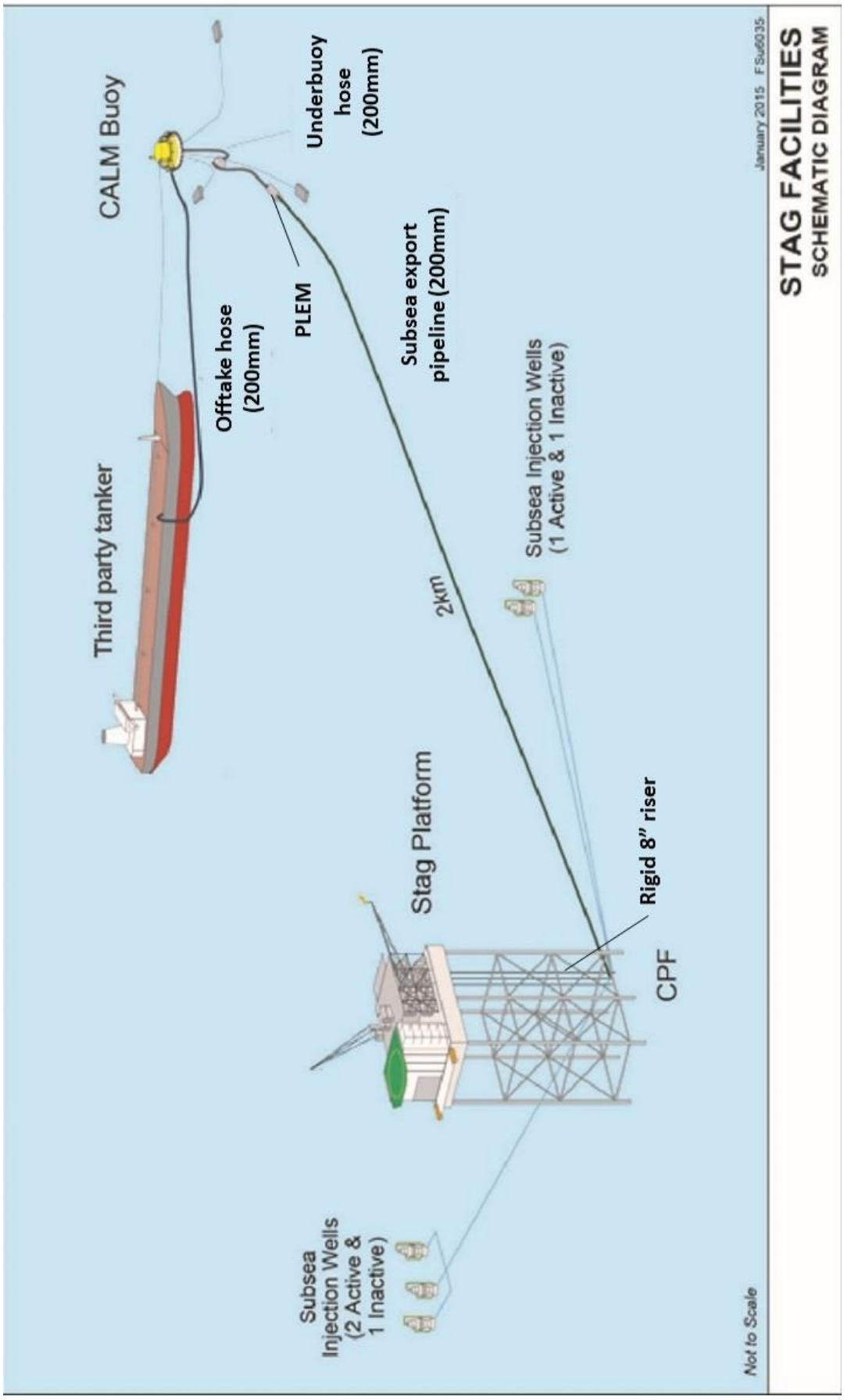


Figure 2 –Stag facility – Existing infrastructure

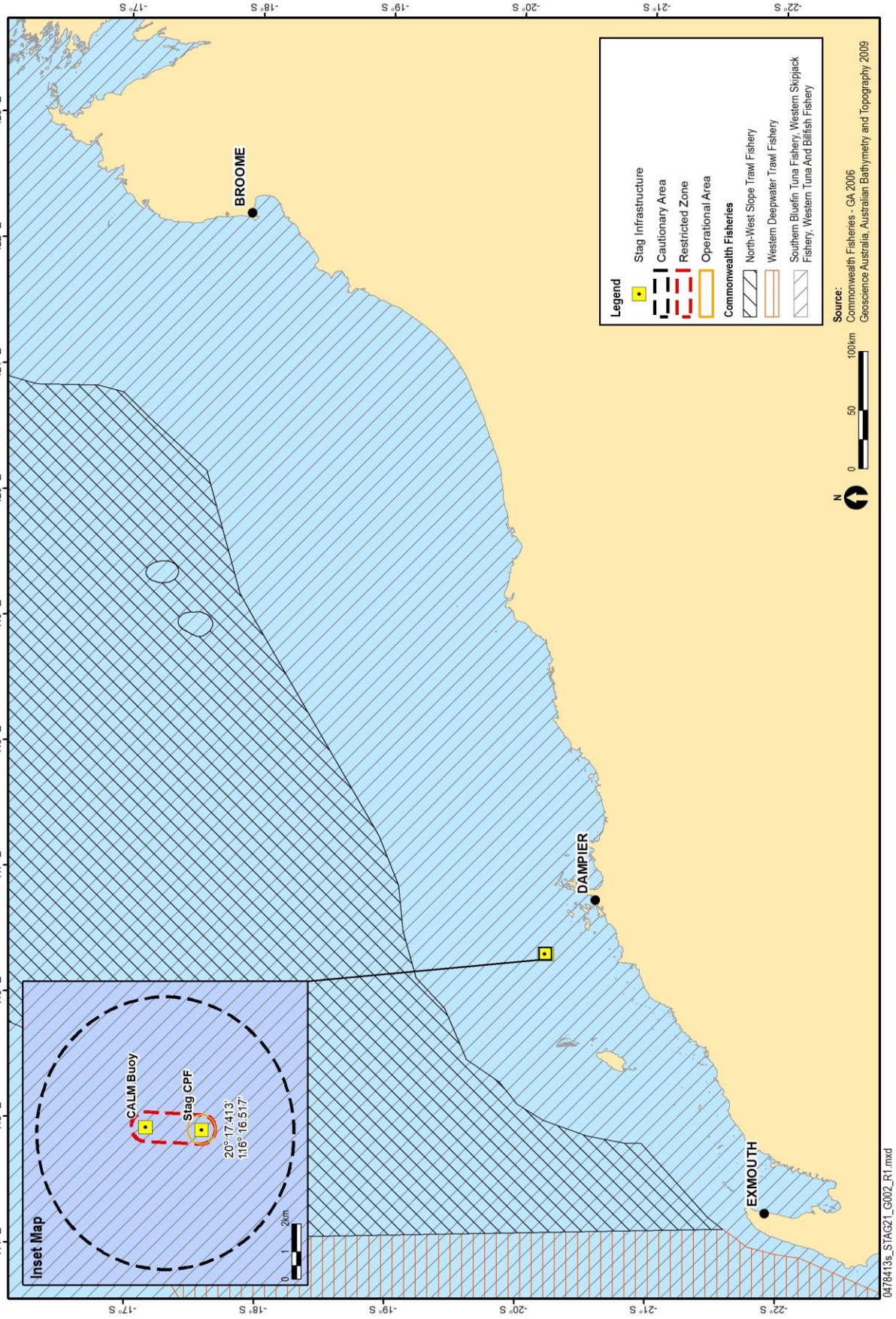


Figure 3 – Commonwealth Commercial Fishing Zones in the vicinity of the Stag Facility

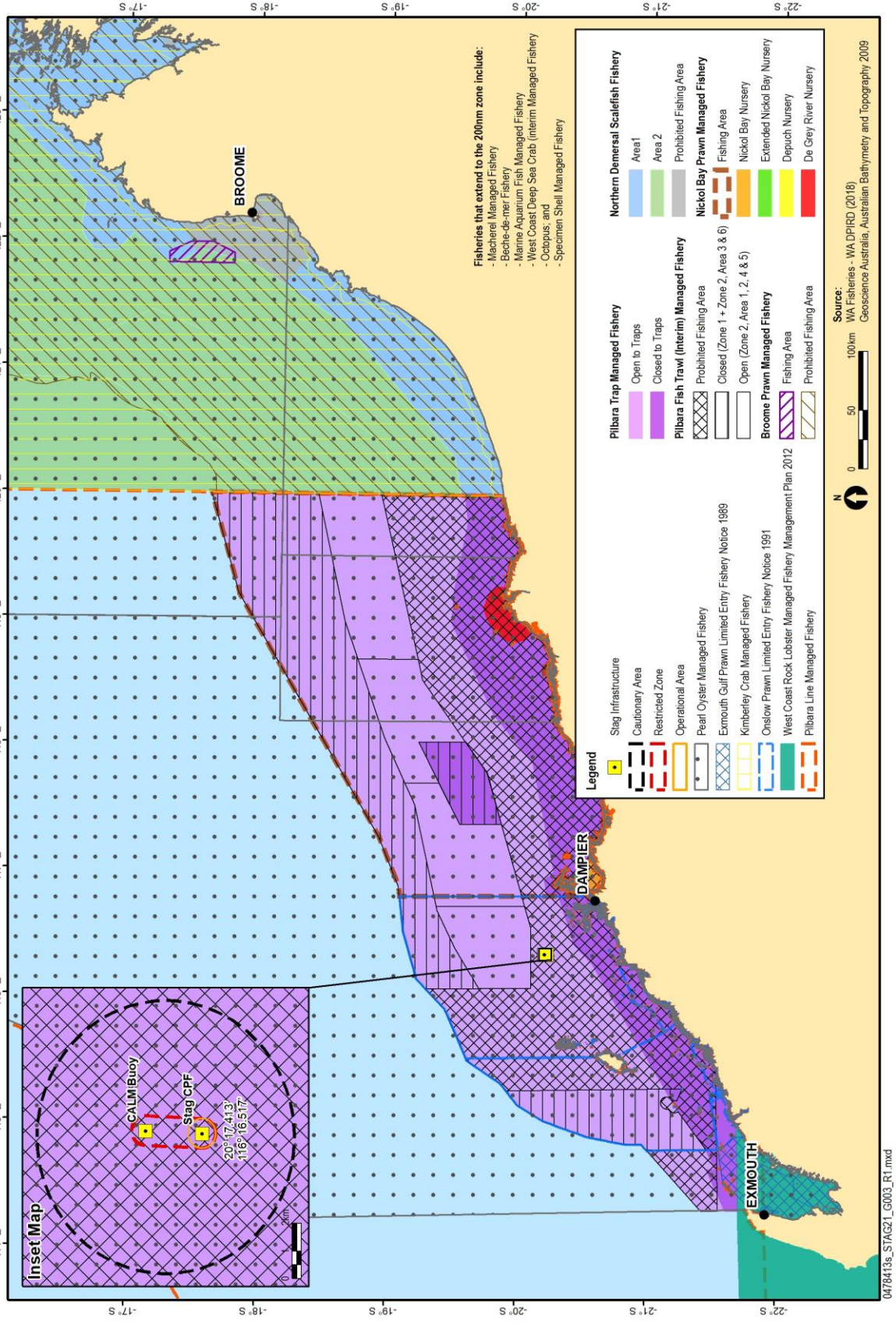


Figure 4 – State Commercial Fishing Zones in the vicinity of the Stag Facility

What fisheries may be affected?

As Figures 3 and 4 indicate, there are a number of fisheries permitted to operate in the operations area. Fisheries that are licensed to operate and were assessed as having potential to utilise this area in the future (based on catch history over the last 5 years) include:

- **Mackerel Managed Fishery - Area 2 (WA)**
- **Onslow Prawn Managed Fishery (WA)**
- **Pilbara Trap Managed Fishery (WA**
- **Pilbara Line Fishery (WA)**
- **Octopus Developmental Fishery (WA)**

These fisheries will be Jadestone's focus for consultation. Consultation for other fisheries will take place through notification of State and Commonwealth representative bodies or directly if requested by representative bodies.

In the unlikely event of a hydrocarbon spill, Jadestone Energy will conduct extensive and immediate consultation with other fisheries licensed to operate within the broader Environment that May be Affected (EMBA) by such a spill.

Potential risks to fishing sector

A summary of potential risks to the fishery sector that are common to both Environmental Plan activities is provided below. For each risk the associated management measures are summarised in Table 1.

TABLE 1: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES COMMON TO BOTH ENVIRONMENT PLANS

Potential Risks	Mitigation and /or Management Measures
Light Emissions	• Potential impacts from lighting are assessed as occurring within 20 km of a vessel or facility based on the National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2019) • Facility and vessel navigation lights are compliant with the Navigation Act 2012
Noise Emissions	• Vessels and helicopters comply with relevant parts of EPBC Regulation (2000) Part 8 • Vessel and machinery are maintained in accordance with Flag State certification requirements • All engines, compressors and machinery on the CPF and MODU are maintained via a maintenance management system
Atmospheric Emissions	• Flag State Certificate and/or IAPP certifies measures are in place to manage air emissions • All engines, compressors and machinery on the CPF and MODU are maintained via a maintenance management system
Operational discharges	• Emissions and discharges of liquid waste to sea are in accordance with legislative requirements, the impact and risk assessment process indicates that discharges will not result in significant effects to marine fauna • Waste Management Plan
Interaction with other users	• A pre-existing 500 m restricted zone is in place around the facility and will remain in place for the duration of operations under the proposed EPs, including during the drilling activity as the MODU will be within the 500m restricted zone of the CPF. No fishing vessels are to enter this zone • Commercial fishers are permitted to enter the wider 3Nm cautionary zone and fish, transit or anchor for the duration of operations under the proposed EPs, as long as it is safe to do so • Notice to Mariners and charts will show zones
Interaction with fauna	• Vessels operating within the restricted zone must not exceed a speed of five (5) knots • Induction includes information on speed limits and requirements for interacting with marine fauna
Physical Presence	• Seabed disturbance limited to planned activities and defined locations

In addition to the risks outlined in Table 1, the risk of produced water discharge is specific to the Stag Operations EP activities (Table 2).

TABLE 2: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG 5 YEAR OPERATIONS EP

Potential Risks	Mitigation and /or Management Measures
Produced water discharges	• Beyond temporary perturbation to water quality, no environmental impacts due to the discharge of produced water are expected • Produced water discharges are monitored and recorded with adaptive management processes in place if significant changes are identified

In addition to the risks outlined in Table 1, the risk of drilling discharges is specific to the Stag Drilling EP activities (Table 3).

TABLE 3: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG DRILLING EP

Potential Risks	Mitigation and /or Management Measures
Drilling discharges	• Selection process for materials as part of NOPSEMA approval • Process for inventory control to minimise leftovers • Cuttings management system in place to manage muds (no synthetic based muds planned for use)

Additional risks that are associated with events that are not expected to occur during normal activities are outlined in Table 4.

TABLE 4: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH UNPLANNED EVENTS

Potential Risks	Mitigation and /or Management Measures
Introduced Marine Species (IMS)	• IMS Management will meet legal requirements and reduce risks to ALARP and Acceptable levels. • Vessels will be required to adhere to ballast water management, quarantine and biofouling requirements if required
Unplanned discharges	• No release of non-hazardous / hazardous solid wastes or non-hydrocarbon hazardous liquids to the marine environment • Dropped object prevention • Waste management plan implemented, and details included in induction materials • Spill kits available and incident response plans in place
Vessel/MODU collision	• Marine notifications will be made to relevant stakeholders, describing the location of the activity and a 500 m petroleum safety zone is present to prevent the risk of collisions • Vessels operating within the restricted zone must not exceed a speed of five (5) knots • Simultaneous Operations (SIMOPS) plan in place to interface between the Stag facility and MODU during drilling • Navigation lights installed and checked
Hydrocarbon release	• Oil Pollution Emergency Plan • Procedures in place on CPF to prevent hydrocarbon release to sea during operations • Procedures in place on MODU to prevent hydrocarbon release to sea during drilling • Appropriate vessel spill response plans, equipment and materials will be in place and maintained • Appropriate refuelling procedures and equipment will be used to prevent spills to the marine environment

Providing Feedback

If you would like to comment on the proposed activity outlined in this fact sheet or would like additional information, please contact Jadestone before Monday 20th December 2021. Feedback can be provided at any time before/during or after the activity.

Phone: 08 9486 6600 Email: consult@jadestone-energy.com
Our Perth office is located at: The Atrium, Level 2, 168 St Georges Terrace, Perth WA 6000

Any person providing feedback is asked to advise if this information is to remain confidential and they do not wish it to be published within the Environment Plan.

Table 2: Relevant Persons' engagement log - current Stag Operations EP

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Commonwealth government department or agency						
Australian Fisheries Management Authority (AFMA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	30-Jan-23	RECEIVED	How: Email	AFMA	Acknowledgement of receipt, no specific comment at this stage. Noted to consult directly through relevant fishing organisations.	Refer to Assessment of Merit table – this has been undertaken as part of standard consultation approach.
	6-Mar-23	SENT	How: Email	AFMA	Acknowledgement of guidance.	No further action. Include RP in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Australian Hydrographic Office (AHO)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	23-Dec-22	RECEIVED	How: Email	AHO	Acknowledgement. Data will be registered and charts updated.	Noted
	6-Mar-23	SENT	How: Email	AHO	Acknowledgement of email.	No further action. Include RP in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Australian Maritime Safety Authority (AMSA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	23-Dec-22	RECEIVED	How: Email	AMSA	Notification requirements - refer to assessment of merit table for detail.	Response assessed and EP updated to include notifications
	6-Mar-23	SENT	How: Email	AMSA	Acknowledgement of email.	No further action. Include RP in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Clean Energy Regulator (CER)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	3-Mar-23	RECEIVED	How: Email	CER	Email advising no comment from CER.	Noted
	22-Mar-23	SENT	How: Email	CER	Acknowledgement of email.	No further action. Include RP in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	10-Jan-24	RECEIVED	How: Email	CER_1	Acknowledgment email.	No further action
Department of Agriculture, Fisheries & Forestry (DAFF)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	22-Dec-22	RECEIVED	How: Email	DAFF_AutoResponse	Auto Response email received.	N/A
	17-Feb-23	SENT	How: Email	G3	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations .	Awaiting response. Read receipt received
	17-Feb-23	RECEIVED	How: Email	DAFF_AutoResponse_2	Auto Response email received.	Awaiting response
	26-Apr-23	PLACED	How: Call	N/A	Called to follow up email.	No response. Call again
	7-Sep-23	PLACED	How: Call	N/A	Called to follow up if emails received. Message passed on and most appropriate person will call back.	Awaiting return phone call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Department of Defence (DOD)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	14-Feb-23	RECEIVED	How: Email	DOD	Acknowledgement of receipt and confirmation that activity area is outside of any Defence Training Areas and restricted airspace. Advised of risk of UXOs. Please provide continued liaison with AHO for Notice to Mariners.	Noted. EP updated to include notifications
	6-Mar-23	SENT	How: Email	DOD	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Department of Industry, Science & Resources (DISR)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response. Read receipt received
	20-Apr-23	PLACED	How: Call	N/A	Called DISR to confirm receipt of information package. More appropriate email address provided.	Relevant contact details recorded and emailed information package
	20-Apr-23	SENT	How: Email	DISR	Email sent to updated email address with information package.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Director of National Parks (DNP), Parks Australia, part of the Department of Climate Change, Energy, the Environment and Water (DCCEEW)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	4-Jan-23	RECEIVED	How: Email	DNP	Acknowledgement of receipt and confirmation that no objections or claims at this time. Provision of relevant guidance note details and notification requirements.	Refer to Assessment of Merit table. EP updated to include notifications.
	6-Mar-23	SENT	How: Email	DNP	Acknowledgement of email	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	6-Dec-23	RECEIVED	How: Email	DNP_1	Email received with updated Parks and NOPSEMA guidance note requirements - Consulting with DP for EPs.	Noted
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	10-Jan-24	RECEIVED	How: Email	DNP_1	Email received with updated Parks and NOPSEMA guidance note requirements - Consulting with DP for EPs.	Noted
	20-Mar-24	SENT	How: Email	DNP_1	Email sent providing information requested in guidance note.	No further action
Maritime Border Command (MBC), part of Australian Border Force (ABF), part of the Department of Home Affairs (DHA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	7-Sep-23	PLACED	How: Call	N/A	Called to follow up if emails received. Message passed on and most appropriate person will call back.	Awaiting return phone call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
National Offshore Petroleum Titles Administrator (NOPTA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response. Read receipt received
	17-Feb-23	RECEIVED	How: Email	NOPTA	Email advising NIL response from NOPTA as they do not provide comment on EPs.	Noted
	6-Mar-23	SENT	How: Email	NOPTA	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
WA State government department or agency						
Department of Biodiversity, Conservation and Attractions (DBCA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	22-Dec-22	RECEIVED	How: Email	DBCA_AutoResponse	Auto Response email received.	N/A
	9-Feb-23	RECEIVED	How: Email	DBCA	Email around baseline survey data for the current area and notification requirements.	Baseline data summary for SMPs sent to DBCA and notification requirements amended in A6 of OPEP and EPS added.
	4-May-23	SENT	How: Email	DBCA	Email sent providing summary of baseline data and incident and emergency response amendment.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	15-Dec-23	SENT	How: Email	DBCA_1	Follow up email sent after meeting representative at community session in Denham.	Awaiting response
	20-Dec-23	RECEIVED	How: Email	DBCA_1	Suggested contacting World Heritage Department of DBCA and provided contact details.	Noted
	20-Dec-23	SENT	How: Email	DBCA_1	Acknowledgement email.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	30-Jan-24	SENT	How: Email	DBCA_2	Email sent following up after meeting at community session in Karratha with PowerPoint presentation, Invitation for Consultation document and section of OPEP relevant to oil spill risk and potential shoreline contact.	No further action
Department of Biodiversity, Conservation and Attractions (DBCA) Shark Bay World Heritage Advisory Committee (SBWHAC)	20-Dec-23	RECEIVED	How: Email	SBWHAC	Email providing contact details for Shark Bay World Heritage Advisory Committee.	Noted
	21-Dec-23	SENT	How: Email	SBWHAC	Email clarifying email address for contact.	Awaiting response
	22-Dec-23	RECEIVED	How: Email	SBWHAC	Confirmation that contact details are correct.	Noted
	22-Dec-23	SENT	How: Email	SBWHAC	Email sent to updated contact details requesting feedback on Stag Ops EP.	Awaiting response
	28-Dec-23	RECEIVED	How: Email	SBWHAC	Information has been forwarded to Shark Bay World Heritage Advisory Committee for feedback.	Noted. Awaiting response
	30-Jan-24	RECEIVED	How: Email	SBWHAC_1	Letter received on behalf of SBWHAC Chair.	Jadestone to respond
	2-Apr-24	SENT	How: Email	SBWHAC_1	Response to letter issued.	No further action. Include in ongoing consultation.
Department of Mines, Industry Regulation and Safety (DMIRS)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	19-Apr-23	PLACED	How: Call	N/A	Called DMIRS to confirm receipt of information package. Unable to confirm if package received. Asked to resend to different email.	Information package sent to updated email
	19-Apr-23	SENT	How: Email	DMIRS	Email sent to DMIRS with information package.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Department of Planning, Lands & Heritage (DPLH)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	22-Dec-22	RECEIVED	How: Email	DPLH_AutoResponse	Auto Response email received.	N/A
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	27-Apr-23	PLACED	How: Call	N/A	Left a message asking DPHL to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Department of Primary Industries and Regional Development (DPIRD)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	26-Apr-23	PLACED	How: Call	N/A	Left a message asking DPIRD to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	Awaiting response
	24-Nov-23	RECEIVED	How: Email	DPIRD	Email received providing previous comments.	Response provided

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	24-Nov-23	SENT	How: Email	DPIRD	Acknowledgment of email. Previous comments have been included in EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Department of Transport (DOT)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	5-Jan-23	RECEIVED	How: Email	WA DOT	Acknowledgement of receipt. Provision of relevant guidance note details.	Noted. No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	6-Dec-23	SENT	How: Email	DOT OPEP	Stag OPEP, EP and OSM transmittal to DOT.	Awaiting comments on OPEP
	16-Jan-24	RECEIVED	How: Email	DOT OPEP_1	Transmittal received from DOT with comments on Stag OPEP.	Jadestone to action and respond to comments
	31-May-24	SENT	How: Email	DOT_OPEP_1	Email sent to DOT advising that comments on Stag OPEP have been incorporated and DOT will be issued with updated OPEP upon submission to NOPSEMA.	Jadestone to sent DOT updated OPEP after submission to NOPSEMA.
	21-Jun-24	RECEIVED	How: Email	DOT_OPEP_1	Acknowledgement email.	Noted
	1-Jul-24	SENT	How: Email	DOT_OPEP_1	Following phone call email sent with table detailing how DOT comments have been addressed in OPEP.	Awaiting response
	17-Jul-24	RECEIVED	How: Email	DOT OPEP_1	Acknowledgement email. No further queries.	No further action
	12-Feb-25	SENT	How: Email	DOT_OPEP_2	Updated OPEP and OSM BIP sent to DOT.	No further action
Department of Water & Environmental Regulation (DWER)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	22-Dec-22	RECEIVED	How: Email	DWER_AutoResponse	Auto Response email received.	N/A
	17-Feb-23	SENT	How: Email	G3	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	17-Feb-23	RECEIVED	How: Email	DWER_AutoResponse_2	Auto Response email received.	Awaiting response
	20-Feb-23	RECEIVED	How: Email	DWER	Email advising no comment from DWER as does not relate to any active projects.	Noted
	6-Mar-23	SENT	How: Email	DWER	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Local Government Authorities						
City of Karratha	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	5-Jan-23	RECEIVED	How: Email	COK	Acknowledgement of receipt and that some facilities and reserves are within the EMBA however no significant concerns at this stage.	Noted
	6-Mar-23	SENT	How: Email	COK	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	30-Jan-24	SENT	How: Email	COK_1	Email sent following up after meeting at community session in Karratha with PowerPoint presentation and Invitation for Consultation document.	No further action
Onslow Chamber of Commerce and Industry (OCCI)	30-Jan-24	SENT	How: Email	OCCI	Email sent following up after meeting at community session in Onslow with PowerPoint presentation and Invitation for Consultation document.	Awaiting response
	30-Jan-24	RECEIVED	How: Email	OCCI	Acknowledgment email.	No further action
Shire of Ashburton	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	4-Jan-23	RECEIVED	How: Email	SOA_AutoResponse	Acknowledgement of receipt. Email has been forwarded to relevant shire officer.	Awaiting response
	17-Feb-23	SENT	How: Email	G3	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	20-Feb-23	RECEIVED	How: Email	SOA_AutoResponse_2	Acknowledgement of receipt. Email has been forwarded to relevant shire officer.	Awaiting response
	20-Feb-23	RECEIVED	How: Email	SOA	SOA highlighted the possible risk of impact to the Montebello islands, Barrow Island and further afield should any hydrocarbon spill occur. All appropriate measures should be undertaken to mitigate any environmental impacts.	Response assessed. Refer to Assessment of Merit Table
	23-Mar-23	SENT	How: Email	SOA	Confirmation that EP includes appropriate measures to mitigate environmental impacts should a spill occur. The Montebello Islands and Barrow Island are listed as protection priorities for spill response in the Stag OP and OPEP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	11-Jan-23	RECEIVED	How: Email	SOA_1	Acknowledgement email. Asked if community presentations will be held in Onslow or Karratha.	Awaiting response
	14-Dec-23	SENT	How: Email	SOA_1	Acknowledgement email. Will notify SOA of upcoming community sessions in Onslow and Karratha.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	10-Jan-24	SENT	How: Email	SOA_1	Email sent direct to contact notifying them of upcoming community session in Onslow/ Karratha as previously requested.	No further action
	30-Jan-24	SENT	How: Email	SOA_2	Email sent following up after meeting at community session in Onslow with PowerPoint presentation and Invitation for Consultation document.	No further action
Shire of Exmouth	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response. Read receipt received
	19-Apr-23	PLACED	How: Call	N/A	Called Shire of Exmouth to confirm receipt of information package. Asked for package to be re-sent.	Package resent
	19-Apr-23	SENT	How: Email	SOE	Information package resent.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	21-Nov-23	RECEIVED	How: Email	SOE_1	Acknowledgment email. Email has been passed onto Management Team.	Noted
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Oil and Gas Industry						
Australian Maritime Oil Spill Centre (AMOSC)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response Read receipt received
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	20-Feb-23	RECEIVED	How: Email	AMOSC	Acknowledgement of receipt. Require a copy of the EP and OPEP prior to submission to NOPSEMA. Requests 2 weeks to review the plans.	Email sent with requested documents
	12-Apr-23	SENT	How: Email	AMOSC	Email sent with Stag OPEP and relevant risk scenarios from Stag EP as requested.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	10-Jan-24	RECEIVED	How: Email	AMOSC_1	Acknowledgement email.	No further action
Oil Spill Response Limited (OSRL)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	27-Apr-23	PLACED	How: Call	N/A	Left a message asking OSRL to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
WA Commercial fishers and fishing associations						
Gascoyne Demersal Scalefish Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Mackerel Managed Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Marine Managed Aquarium Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Nickol Bay Prawn Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Northern Demersal Scalefish Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Onslow Prawn Managed Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Pilbara Crab Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Pilbara Demersal Scalefish Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Specimen Shell Managed Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
West Coast Deep Sea Crustacean Managed Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Western Australian Fishing Industry Council (WAFIC)	18-Nov-22	SENT	How: Email	WAFIC	Request fee for service schedule.	Awaiting response
	18-Nov-22	RECEIVED	How: Email	WAFIC	WAFIC Fee for service sent through along with guidelines for consultation.	Email sent with requested documents
	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	7-Feb-23	SENT	How: Email	WAFIC	Introduction of Consultation Specialist as point of contact for consultation with Jadestone. Recommend corresponding directly with him regarding next phase in consultation with fishing license holders.	Awaiting response
	8-Feb-23	RECEIVED	How: Email	WAFIC	Acknowledgement email, suggested times for Consultation Specialist to make contact to discuss matters.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	8-Feb-23	PLACED	How: Call	WAFIC_1	Initial discussion seeking assistance of WAFIC to identify license holders undertaking fishing effort in EMBA.	N/A
	8-Feb-23	RECEIVED	How: Email	WAFIC	Acknowledgment of phone conversation, WAFIC Fee for service sent through along with guidelines for consultation.	Noted.
	9-Feb-23	SENT	How: Email	WAFIC	Email sent asking if WAFIC can undertake review of commercial fishing licence holders as part of their fee for service to help determine which licence holders may undertake fishing effort within the EMBA and require further consultation.	Awaiting response
	13-Feb-23	RECEIVED	How: Email	WAFIC	WAFIC are unable to review or comment on list and do not support consultation with all licence holders who intersect a project EMBA, rather will only consult with those directly impacted by planned activities within a projects Operational Area.	Noted.
	15-Feb-23	PLACED	How: Call	WAFIC_2	WAFIC can only provide advice on fishing licence holders within Operational Area.	Noted.
	17-Feb-23	PLACED	How: Call	WAFIC_3	WAFIC reiterated that they will only provide information based on Operational Area.	Noted. No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	24-Jan-24	RECEIVED	How: Email	WAFIC_4	Email asking for update on planned activities and what community sessions will discuss.	Awaiting response
	30-Jan-24	SENT	How: Email	WAFIC_4	Email sent informing WAFIC no change to activities already consulted on with WAFIC, information sessions are attempt to reach anyone who has not yet been consulted with. Emailed community presentation.	Awaiting response
	31-Jan-24	RECEIVED	How: Email	WAFIC_4	Email thanking for clarification.	No further action.
Commonwealth Commercial fishers and fishing associations						
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	17-Feb-23	SENT	How: Email	ASBTIA	Email seeking advice regarding presumption that no fishing effort taking place for Southern Bluefin Tuna Fishery off NW WA.	Awaiting response
	21-Feb-23	PLACED	How: Call	N/A	Called to follow up email.	No response. Call again
	23-Feb-23	PLACED	How: Call	N/A	Called to follow up email.	No response.
	22-Mar-23	PLACED	How: Call	ASBTIA_1	Indirectly indicated that there is no commercial Southern Bluefin Tuna fishing effort undertaken within or adjacent to EMBA.	Noted. No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Commonwealth Fisheries Association (CFA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	9-Feb-23	RECEIVED	How: Email	CFA	CFA is not resourced to provide feedback, Suggested directing enquiries to associations that represent the directly affected fisheries/fishers.	Noted. The suggested fisheries/fishers have already been consulted. No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Individual Tuna licence holder (1)	9-Aug-23	RECEIVED	How: Email	Tuna_1	Email requesting to be removed from contact list and contact made through Tuna Australia.	Noted
	21-Aug-23	RECEIVED	How: Email	Tuna_1	Email requesting to be removed from contact list and contact made through Tuna Australia.	Noted
	2-Nov-23	SENT	How: Email	Tuna_1	Email sent confirming ongoing correspondence with Tuna Australia and removed from contact list.	No further action
	30-May-24	SENT	How: Email	Tuna_1	Email advising that Jadestone won't be engaging Tuna Australia to consult with individual licence holders and Jadestone will continue to consult directly with individual tuna fishery licence holders.	No further action
	30-May-24	RECEIVED	How: Email	Tuna_1	Requested Jadestone consult with Tuna Australia on their behalf.	Noted. No further action
Individual Tuna licence holder (2)	26-Jul-23	RECEIVED	How: Email	Tuna_2	Email requesting contact made through Tuna Australia.	Noted
	2-Nov-23	SENT	How: Email	Tuna_2	Email sent confirming ongoing correspondence with Tuna Australia. Asked if they would like to be removed from contact list.	Awaiting response
	2-Nov-23	RECEIVED	How: Email	Tuna_2	Email advising would like to be removed from mailing list.	Noted. No further action
	30-May-24	SENT	How: Email	Tuna_2	Email advising that Jadestone won't be engaging Tuna Australia to consult with individual licence holders and Jadestone will continue to consult directly with individual tuna fishery licence holders.	No further action
North West Slope Trawl Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	4-Aug-23	SENT	How: Mail	Refer to SIR *Secondary fisheries licence holder mail out details*	Follow up letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Seafood Industry Australia (SIA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	N/A
	9-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	26-Apr-23	PLACED	How: Call	N/A	Left a message asking SIA to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Southern Bluefin Tuna Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Tuna Australia	14-Aug-23	RECEIVED	How: Mail	Tuna Australia	Email received from Tuna Australia in relation to direct approaches to licence holders. Members have requested engage directly with Tuna Australia.	Review industry position statement
	3-Nov-23	PLACED	How: Call	N/A	Call to Tuna Australia Program Manager. Invited Jadestone to email re Tuna Australia's ability to be the conduit for titleholder consultation with all commercial fishing licence holders in the Australian tuna fisheries, including non-members of Tuna Australia.	Noted
	22-Nov-23	SENT	How: Mail	Tuna Australia	Email advising will continue to consult with Tuna Australia as a Relevant Person, but do not regard consultation with the organisation as a legal means of also consulting with the individual commercial fishery licence holders as Relevant Persons.	Awaiting response
	5-Dec-23	RECEIVED	How: Mail	Tuna Australia	Acknowledgement email. Reattached copy of industry position statement. Jadestone and Tuna Australia have differing views of consultation guidelines. Recommend seek advice from AFMA.	Awaiting response
	24-Jan-24	SENT	How: Mail	Tuna Australia	Acknowledgement email. Out of abundance of caution in meeting regulatory requirements that Jadestone maintains its position of consulting directly with individual commercial fishery licence holders for Stag and Montara facilities. Jadestone regards Tuna Australia as a Relevant Person in its own right.	No further action
Western Deepwater Trawl Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	4-Aug-23	SENT	How: Mail	Refer to SIR *Secondary fisheries licence holder mail out details*	Follow up letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Western Skipjack Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	4-Aug-23	SENT	How: Mail	Refer to SIR *Secondary fisheries licence holder mail out details*	Follow up letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Western Tuna and Billfish Fishery	9-Jan-23	SENT	How: Mail	Refer to SIR *Consolidated fisheries licence holder details* table	Letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	4-Aug-23	SENT	How: Mail	Refer to SIR *Secondary fisheries licence holder mail out details*	Follow up letter sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	No further action
Recreational fishing associations						
Recfishwest (WA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response. Read receipt received

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Response assessed and EP updated to include notifications.
	22-Feb-23	RECEIVED	How: Email	Recfishwest	Email advising it is not expected there will be any new impacts based on the information provided. Asked to be added to incident notifications.	Noted. Refer to Assessment of Merit Table for detail.
	6-Mar-23	SENT	How: Email	Recfishwest	Acknowledgement of email.	No further action. Include in ongoing consultation.
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	30-Jan-24	SENT	How: Email	Recfishwest_1	Email sent following up after meeting at community session in Dampier with PowerPoint presentation and Invitation for Consultation document.	No further action
First Nations peoples						
Buurabalayji Thalanyji Aboriginal Corporation	20-Apr-23	SENT	How: Email	Buurabalayji	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	3-May-23	SENT	How: Email	Buurabalayji	Follow up email sent.	Awaiting response
	3-May-23	RECEIVED	How: Email	Buurabalayji	Acknowledgement of email, will respond shortly.	Awaiting response
	3-May-23	SENT	How: Email	Buurabalayji	Acknowledgement email.	Awaiting response
	9-May-23	RECEIVED	How: Email	Buurabalayji	Email forwarded on to more appropriate contact.	N/A
	9-May-23	SENT	How: Email	Buurabalayji	Email sent requesting contact details to meet in Broome.	N/A
	10-May-23	RECEIVED	How: Email	Buurabalayji	Contact details sent.	N/A
	16-May-23	SENT	How: Email	Buurabalayji	Follow up email sent requesting meeting.	N/A
	16-May-23	RECEIVED	How: Email	Buurabalayji	Acknowledgment of phone conversation, clarification around outcome sought by Jadestone requested.	N/A
	17-May-23	SENT	How: Email	Buurabalayji	Information package on Stag resent as well as link to EP.	N/A
	17-May-23	RECEIVED	How: Email	Buurabalayji	Information being reviewed, question asked if Jadestone would be willing to make a contribution to offset BTAC's costs.	N/A
	17-May-23	SENT	How: Email	Buurabalayji	Jadestone willing to negotiate reasonable cost reimbursement arrangement.	Awaiting response
	21-Jun-23	RECEIVED	How: Email	Buurabalayji_1	Letter received detailing what consultation should address.	Noted. Refer to letter
	10-Jul-23	SENT	How: Email	Buurabalayji_2	Email request to meet Directors at Onslow 21 July.	Awaiting response
	19-Jul-23	SENT	How: Email	Buurabalayji_2	Email recognising BTAC unable to meet on 21 July, request contact to indicate future date, amount of costs, and location.	Awaiting response
	2-Aug-23	SENT	How: Email	Buurabalayji_2	Follow up email seeking meeting date.	Awaiting response
	9-Aug-23	SENT	How: Email	Buurabalayji_2	Follow up email seeking meeting date.	Awaiting response
	10-Aug-23	RECEIVED	How: Email	Buurabalayji_2	BTAC provided date for meeting with JSE in Oct in Perth, Costs Acceptance Letter attached.	Refer to costs letter
	23-Aug-23	SENT	How: Email	Buurabalayji_2	Confirmation of JSE attendance at BTAC's October Board Meeting in Perth; request for date of meeting; JSE to pass on signed letter.	Awaiting response
	12-Sep-23	RECEIVED	How: Email	Buurabalayji_2	Email advising of BTAC's next board meeting in Onslow 2 October.	Jadestone to attend board meeting
	26-Sep-23	RECEIVED	How: Email	Buurabalayji_2	Email advising board meeting will now take place on 10 October.	Noted
	28-Sep-23	SENT	How: Email	Buurabalayji_2	Jadestone confirming availability for 10 October and wish to present.	Noted
	28-Sep-23	RECEIVED	How: Email	Buurabalayji_2	Confirming Jadestone's acceptance to attend meeting on 10-Oct. and requesting Jadestone's acceptance of proposed cost acceptance letter and framework agreement.	Awaiting review of acceptance letter and framework agreement

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	2-Oct-23	RECEIVED	How: Email	Buurabalayji_2	Follow up email stating that due to the lack of response from Jadestone for acceptance of costs and framework agreement, Jadestone no longer able to attend meeting on 10-Oct.	Awaiting response
	4-Oct-23	SENT	How: Email	Buurabalayji_3	Apologies for delay. Signed Acceptance Letter attached. Request for dates for next opportunity to meet.	Awaiting response
	4-Oct-23	RECEIVED	How: Email	Buurabalayji_3	Acknowledge information received. BTAC to provide next available date to meet. Request for Jadestone to review and accept framework agreement.	Awaiting dates for next meeting opportunity.
	23-Oct-23	SENT	How: Email	Buurabalayji_4	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	23-Oct-23	RECEIVED	How: Email	Buurabalayji_4	Acknowledge information received. BTAC believes it is a relevant organisation for consultation regarding the Stag EP. BTAC awaiting response to invitation for meaningful engagement by agreement and reasonable costs.	Awaiting response
	24-Oct-23	SENT	How: Email	Buurabalayji_4	Jadestone to confirm acceptance letter has been sent to BTAC. Apologies for confusion regarding presentation.	Jadestone to review and confirm agreement letter on costs has been sent to BTAC.
	24-Nov-23	SENT	How: Email	Buurabalayji_5	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	24-Nov-23	RECEIVED	How: Email	Buurabalayji_5	Acknowledgment email. Asking for confirmation on Jadestone's position in relation to a number of matters.	Response provided
	29-Nov-23	SENT	How: Email	Buurabalayji_5	Responded with confirmation on Jadestone's position on matters as requested.	Response provided
	29-Nov-23	RECEIVED	How: Email	Buurabalayji_5	Acknowledgement of receipt. Asked for availability to meet BTAC representatives in advance of a board meeting.	Awaiting response
	3-Dec-23	SENT	How: Email	Buurabalayji_6	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	15-Dec-23	RECEIVED	How: Email	Buurabalayji_6	Acknowledgement email inviting Jadestone to meet with Executive team or board and formal response attached.	Awaiting response
	8-Jan-24	SENT	How: Email	Buurabalayji_6	Acknowledgment email. Jadestone able to meet and present to BTAC at the earliest opportunity.	Awaiting response
	10-Jan-24	SENT	How: Email	Buurabalayji_7	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	12-Jan-24	RECEIVED	How: Email	Buurabalayji_6	Email inviting Jadestone to meet with BTAC Executive Team in February. Key matters listed as well as meeting costs.	Awaiting response
	12-Jan-24	SENT	How: Email	Buurabalayji_6	Confirmation Jadestone can meet on date suggested and accepts cost estimate. Requested proposed time for meeting.	Awaiting response
	5-Feb-24	MEETING	How: In person, Perth	PBC Presentation Buurabalayji_11	Jadestone Environment Lead and Consultation Consultant met with BTAC.	Refer to meeting minutes
	5-Feb-24	SENT	How: Email	Buurabalayji_8	Email following up after meeting and providing link to EP to pass onto colleagues.	Awaiting response
	5-Feb-24	SENT	How: Email	Buurabalayji_9	Email with Invitation for Consultation attached, first sent to BTAC 20 April 2023 to pass onto colleagues.	N/A
	6-Feb-24	RECEIVED	How: Email	Buurabalayji_8	Acknowledgement email and intermin response. Meeting yesterday preliminary. Would like to engage environmental expert to review EP. Requested confirmation can pass costs onto Jadestone.	Awaiting response
	6-Feb-24	SENT	How: Email	Buurabalayji_8	Email with PowerPoint presentation attached as requested.	N/A

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	9-Feb-24	RECEIVED	How: Email	Buurabalayji_10	Email requesting Jadestone company information.	Awaiting response
	9-Feb-24	SENT	How: Email	Buurabalayji_10	Reply email sent with company details as requested.	No further action
	12-Feb-24	RECEIVED	How: Email	Buurabalayji_10	Invoices for meeting attached.	JSE to organise payment
	13-Feb-24	SENT	How: Email	Buurabalayji_8	Email requesting BTAC identify aspects of Stag EP wishes expert to review and identifies at least 2 experts to undertake review and obtains quotations from each.	Awaiting response
	7-Mar-24	SENT	How: Email	Buurabalayji_11	Email sent with meeting minutes attached for review.	Awaiting BTAC review of minutes
	15-Mar-24	RECEIVED	How: Email	Burrabalayji_12	Email received with request to engage independent environmental consultant to review EP on behalf of BTAC CEO.	Jadestone to review agreement
	21-Mar-24	SENT	How: Email	Burrabalayji_12	Acknowledgement of receipt. Proposal under consideration.	Awaiting review
	26-Mar-24	RECEIVED	How: Email	Burrabalayji_12	Follow up email.	Awaiting response
	26-Mar-24	SENT	How: Email	Burrabalayji_12	Proposal still under consideration.	Awaiting response
	8-Apr-24	RECEIVED	How: Email	Burrabalayji_12	Follow up email.	Awaiting response
	8-Apr-24	SENT	How: Email	Burrabalayji_12	Proposal is still under consideration by Jadestone.	Awaiting response
	18-Apr-24	RECEIVED	How: Email	Burrabalayji_13	Email following phone call. Reattached proposal for independent environmental consultant review of Stag Ops EP.	Jadestone to respond and send receptors PowerPoint presentation
	30-May-24	SENT	How: Email	Burrabalayji_12	Jadestone has in the first instance, prepared for BTAC's consideration a PowerPoint presentation with extracts from the EP pertaining to specific islands and coastal areas identified by the Corporation.	PowerPoint presentation sent to PBC.
	30-May-24	RECEIVED	How: Email	Burrabalayji_12	Reiterated BTAC would like to undertake independent review of Stag EP.	Awaiting response
	30-May-24	SENT	How: Email	Burrabalayji_12	Jadestone has in the first instance, provided the information as an alternative to the BTAC proposal.	Awaiting response
	25-Jun-24	RECEIVED	How: Email	Burrabalayji_12	Letter received from BTAC CEO.	Jadestone to review letter.
	25-Jun-24	RECEIVED	How: Email	Burrabalayji_14	Email reattaching proposal from Xodus.	Noted.
	10-Jul-24	SENT	How: Email	Burrabalayji_12	Response to letter provided to BTAC as well as request for opportunity to elaborate on information at a further meeting with BTAC.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Burrabalayji_15	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	25-Nov-24	RECEIVED	How: Email	Burrabalayji_15	Acknowledgement email confirming contact details are correct.	Noted.
	25-Nov-24	SENT	How: Email	Burrabalayji_15	Acknowledgement email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Kariyarra Aboriginal Corporation	20-Apr-23	SENT	How: Email	Kariyarra	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	3-May-23	SENT	How: Email	Kariyarra	Reminder email sent.	Awaiting response
	8-Jun-23	SENT	How: Email	Kariyarra_1	Email request to meet 26 July, seek confirmation.	Await reply to confirm
	21-Jun-23	SENT	How: Email	Kariyarra_1	Email follow-up to confirm date and costs to be charged for presentations.	Await reply to confirm
	23-Jun-23	RECEIVED	How: Email	Kariyarra_1	Email confirm Jadestone on the agenda on 26 July. Advise on presentation time and format.	Date confirmed, seek advice on meeting format
	3-Jul-23	SENT	How: Email	Kariyarra_1	Email advising meeting format and information schedule. Request for information on ranger group and marine capability.	Awaiting advice
	14-Jul-23	SENT	How: Email	Kariyarra_1	Follow up on previous email request.	Follow-up for response
	19-Jul-23	SENT	How: Email	Kariyarra_1	Email following on from SMS exchange discussing EP presentation and cost payment process.	N/A
	28-Jul-23	MEETING	How: In Person, KAC, Port Hedland	PBC Presentation Kariyarra_2	Jadestone Country Manager, Environment Lead and Consultation Consultant met with KAC.	Refer to meeting minutes
	7-Aug-23	SENT	How: Email	Kariyarra_3	Follow up email seeking names of Directors at recent meeting.	Awaiting response
	28-Aug-23	SENT	How: Email	Kariyarra_3	Further follow up email.	Awaiting response
	1-Sep-23	SENT	How: Email	Kariyarra_3	Further follow up with meeting minute notes attached for review.	Refer to meeting minutes (Kariyarra_2)

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	23-Oct-23	SENT	How: Email	Kariyarra_4	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	23-Oct-23	SENT	How: Email	Kariyarra_3	Further follow up email requesting list of Kariyarra attendees from recent presentation.	Awaiting response
	24-Nov-23	SENT	How: Email	Kariyarra_5	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	10-Jan-24	SENT	How: Email	Kariyarra_6	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	10-Jan-24	RECEIVED	How: Email	Kariyarra_6	Acknowledgement email will inform members via Facebook page. Requested copy of presentation.	Noted. Presentation sent
	10-Jan-24	SENT	How: Email	Kariyarra_6	Presentation emailed.	No further action
	18-Jan-24	RECEIVED	How: Email	Kariyarra_6	Email from KAC lawyer, KAC seeking to make a consultative agreement with Jadestone in near future.	Noted
	30-Jan-24	RECEIVED	How: Email	Kariyarra_7	Email received with letter.	Jadestone to review letter and respond
	31-Jan-24	SENT	How: Email	Kariyarra_7	Reply detailing original meeting with KAC 28 July 2023, need for ongoing consultation and further meeting with KAC.	Awaiting response
	31-Jan-24	RECEIVED	How: Email	Kariyarra_7	Request for confirmation that Jadestone will fund a meeting in Port Hedland.	Awaiting response
	2-Feb-24	SENT	How: Email	Kariyarra_7	Request for cost estimate for further meeting. Request for outcome from Directors private discussions and names of attendees at July meeting.	Awaiting response
	13-Feb-24	SENT	How: Email	Kariyarra_7	Email resending Stag Invitation for Consultation and Consultation on offshore petroleum environment plans brochure.	N/A
	14-Feb-24	RECEIVED	How: Email	Kariyarra_8	Email with the costs for the meeting and request for possible meeting dates for March and April.	Jadestone to review costs and respond
	15-Feb-24	SENT	How: Email	Kariyarra_8	Reply sent not accepting the costs for meeting and requesting the names of attendees and for Kariyarra's perspective of July's meeting. Kariyarra's purpose and expectations of further meeting are unclear.	Awaiting response
	21-Feb-24	RECEIVED	How: Email	Kariyarra_8	Email informing that KAC is engaging through its PKMN negotiation team. Also informed the costs are for the team and that an agreement is sought and a meeting is needed.	Jadestone to respond
	14-Mar-24	SENT	How: Email	Kariyarra_9	Draft Cost Acceptance Letter sent.	Awaiting response
	14-Mar-24	SENT	How: Email	Kariyarra_9	Email resent as bounced.	Noted.
	3-Jul-24	RECEIVED	How: Email	Kariyarra_10	Email received from legal adviser indicating KAC engaging in-house legal adviser who will contact Jadestone.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Kariyarra_11	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	25-Nov-24	SENT	How: Email	Kariyarra_11	Email forwarded onto alternative address to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	2-Dec-24	RECEIVED	How: Email	Kariyarra_11	Email received providing most up to date contact details for PBC.	Contact details updated. Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Malgana Aboriginal Corporation	20-Apr-23	SENT	How: Email	Malgana	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	3-May-23	SENT	How: Email	Malgana	Follow up email sent.	Awaiting response
	16-May-23	SENT	How: Email	Malgana	Further follow up email.	Awaiting response
	23-May-23	SENT	How: Email	Malgana	Follow up email seeking meeting.	Awaiting response from new contact
	21-Jun-23	SENT	How: Email	Malgana	Follow up email seeking meeting.	Awaiting response from initial contact

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	21-Jun-23	RECEIVED	How: Email	Malgana	Acknowledgement email, will determine meeting times with Directors and advise.	Awaiting provision of dates
	19-Jul-23	RECEIVED	How: Email	Malgana	Email advising no time on upcoming agenda, will advise next available date.	Awaiting provision of dates
	19-Jul-23	SENT	How: Email	Malgana	Email request to confirm if consult opportunity will be September or October.	Awaiting response
	21-Aug-23	RECEIVED	How: Email	Malgana	Email advising in process of confirming dates for September.	Awaiting provision of dates
	28-Aug-23	SENT	How: Email	Malgana	Follow up email seeking clarification around meeting date.	Awaiting response
	17-Oct-23	SENT	How: Email	Malgana	Further follow up email requesting next opportunity to present to the board.	Awaiting response
	18-Oct-23	RECEIVED	How: Email	Malgana	Email advising previous contacts no longer work for MAC and in the process of recruiting. Look forward to working together and honouring commitment for Jadestone to present at board meeting.	Noted. Jadestone to organise time to speak on phone and work out logistics, timeline and scope
	23-Oct-23	SENT	How: Email	Malgana_1	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	14-Nov-23	SENT	How: Email	Malgana	Follow up email to arrange phone call.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Jadestone called updated Malgana contact. Updated contact advised he is no longer a Director of the Corporation and will pass on Jadestone request for the opportunity to consult re Stag to an appropriate Director for a response. Corporation has not yet recruited a new CEO.	Noted.
	24-Nov-23	SENT	How: Email	Malgana_2	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	3-Dec-23	SENT	How: Email	Malgana_3	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	8-Jan-23	SENT	How: Email	Malgana_2	Follow up email.	Awaiting response
	31-Jan-23	SENT	How: Email	Malgana_2	Further follow up email.	Awaiting response
	31-Jan-23	RECEIVED	How: Email	Malgana_2	Email providing director and chairperson details.	Alternative contact details recorded.
	31-Jan-23	SENT	How: Email	Malgana_2	Follow up email to alternative contact.	Awaiting response
	13-Feb-24	SENT	How: Email	Malgana_2	Email reiterating previous attempts seeking opportunity to make a presentation to the Directors. Jadestone continues to seek opportunity to make a presentation to directors.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Malgana_4	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	6-Dec-24	SENT	How: Email	Malgana_4	Further follow up email.	Awaiting response
	17-Dec-24	SENT	How: Email	Malgana_4	Further follow up email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	23-Dec-24	RECEIVED	How: Call	N/A	Call received from new Chairperson providing contact details.	Noted
	5-Jan-25	SENT	How: Email	Malgana_5	Email sent to YMAC contact following phone call with Malgana Chairperson to offer to present to Malgana Directors.	Awaiting response
	23-Jan-25	SENT	How: Email	Malgana_5	Further follow up email.	Awaiting response
	23-Jan-25	RECEIVED	How: Email	Malgana_5	Acknowledgement email, will be in touch once discussed with board.	Noted.
Nanda Aboriginal Corporation	3-May-23	SENT	How: Email	Nanda	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	16-May-23	SENT	How: Email	Nanda	Follow up email requesting appropriate contact.	Awaiting response
	23-May-23	SENT	How: Email	Nanda	Follow up email seeking alternative contact details.	Awaiting response
	23-May-23	RECEIVED	How: Email	Nanda	Alternative contact details provided.	Alternative contact details provided. Email updated contact
	23-May-23	SENT	How: Email	Nanda	Email seeking meeting sent to updated contact details.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	26-May-23	RECEIVED	How: Email	Nanda	Email received advising suitable meeting times.	Awaiting response from Jadestone
	2-Jun-23	RECEIVED	How: Email	Nanda	Email confirming meeting details.	Awaiting response from Jadestone
	8-Jun-23	SENT	How: Email	Nanda	Apologies Jadestone unable to make suggested date, requested next availability of Nanda.	Awaiting response
	21-Jun-23	SENT	How: Email	Nanda	Follow up email on next availability for meeting.	Awaiting response
	20-Jul-23	SENT	How: Email	Nanda_1	Email to progress contact with YMAC due to non-response.	Awaiting advice
	20-Jul-23	RECEIVED	How: Email	Nanda_1	Email reply advising NAC contact on leave and will follow-up with dates on their return. Note no meeting until after 25 August.	Hold until contact returns from leave
	20-Jul-23	SENT	How: Email	Nanda_1	Acknowledge information received.	N/A
	9-Aug-23	SENT	How: Email	Nanda_2	Email following up on potential meeting date.	Awaiting response
	10-Aug-23	RECEIVED	How: Email	Nanda_2	Board meeting scheduled for 19 October.	N/A
	10-Aug-23	SENT	How: Email	Nanda_2	Jadestone will take opportunity to present at the next scheduled board meeting. Question cost for contribution.	N/A
	10-Aug-23	RECEIVED	How: Email	Nanda_2	Confirmation of meeting and allocation of 1 hour time slot. Cost for contribution confirmed and official approval by Jadestone required.	N/A
	10-Aug-23	SENT	How: Email	Nanda_2	Email confirming fee proposal is accepted and requesting information to enable payment.	N/A
	10-Aug-23	RECEIVED	How: Email	Nanda_2	Invoice will be sent closer to date including requested information.	Noted
	13-Sep-23	MEETING	Jadestone via teams, meeting in Geraldton	PBC Presentation Nanda_6	PBC PowerPoint presentation. Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	26-Sep-23	RECEIVED	How: Email	Nanda_3	Email requesting copy of PowerPoint presentation to Nanda board.	Jadestone to send presentation
	27-Sep-23	SENT	How: Email	Nanda_3	Email with presentation sent.	Presentation sent
	27-Sep-23	RECEIVED	How: Email	Nanda_3	Acknowledgement email.	No further action
	18-Oct-23	SENT	How: Email	Nanda_4	Email requesting names and positions of attendees at 13th September meeting.	Awaiting response
	23-Oct-23	SENT	How: Email	Nanda_5	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	2-Nov-23	SENT	How: Email	Nanda_4	Further follow up email seeking names and positions of meeting attendees.	Awaiting response
	15-Nov-23	SENT	How: Email	Nanda_4	Further follow up email.	Awaiting response
	20-Nov-23	RECEIVED	How: Email	Nanda_4	Email received with names of Directors in attendance on 13 September 2023.	Noted
	21-Nov-23	SENT	How: Email	Nanda_4	Acknowledgment email.	N/A
	22-Nov-23	SENT	How: Email	Nanda_7	Email sent with draft meeting minutes from 13 September meeting for comment.	Refer to meeting minutes (Nanda_6)
	22-Nov-23	RECEIVED	How: Email	Nanda_7	Acknowledgement email.	Noted
	24-Nov-23	SENT	How: Email	Nanda_8	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	3-Dec-23	SENT	How: Email	Nanda_9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	13-Feb-24	SENT	How: Email	Nanda_10	Email following up if any outstanding matters arising from Jadestone's consultation and reattaching notes from presentation to directors on 13 September 2023.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Nanda_11	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	29-Nov-24	RECEIVED	How: Email	Nanda_11	Acknowledgement email confirming contact details are correct.	Noted.

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	29-Nov-24	SENT	How: Email	Nanda_11	Acknowledgement email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Nganhurra Thanardi Garrbu Aboriginal Corporation	20-Apr-23	SENT	How: Email	Nganhurra Thanardi Garrbu	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	21-Apr-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu	Email detailing next available board meeting 5 September and meeting contribution fee.	Response sent
	3-May-23	SENT	How: Email	Nganhurra Thanardi Garrbu_8	Email informing that Jadestone will be on the 5 September meeting, however would like to be advised if any earlier date comes up.	Awaiting response
	16-Jun-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu	Email advising of updated contact and date of next board meeting.	Noted
	21-Jun-23	SENT	How: Email	Nganhurra Thanardi Garrbu	Confirmation that Jadestone will present to directors on 16th August. Confirmation around fee.	Awaiting response
	3-Jul-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu	Acknowledged phone call, confirm contribution costs and agenda length.	Noted
	5-Jul-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu	Request confirm acceptance of contribution costs.	Awaiting response
	7-Jul-23	SENT	How: Email	Nganhurra Thanardi Garrbu	Acknowledged costs are agreed.	N/A
	19-Jul-23	SENT	How: Email	Nganhurra Thanardi Garrbu	Request confirmation of presentation time on 16 August, Exmouth.	Awaiting confirmation
	20-Jul-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu	Confirm presentation agenda time and calendar invite to be sent.	Noted
	20-Jul-23	SENT	How: Email	Nganhurra Thanardi Garrbu	Email requesting information to setup supplier account for payment.	Awaiting response
	7-Aug-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu	Email requesting attendee list for meeting.	Awaiting response
	16-Aug-23	MEETING	How: In person, Exmouth	PBC Presentation Nganhurra Thanardi Garrbu_1	Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	23-Oct-23	SENT	How: Email	Nganhurra Thanardi Garrbu_2	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	24-Nov-23	SENT	How: Email	Nganhurra Thanardi Garrbu_3	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	24-Nov-23	SENT	How: Email	Nganhurra Thanardi Garrbu_4	Email sent with draft meeting minutes from 16 August meeting for comment.	Awaiting response Refer to meeting minutes (Nganhurra Thanardi Garrbu_1)
	3-Dec-23	SENT	How: Email	Nganhurra Thanardi Garrbu_5	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	4-Dec-23	RECEIVED	How: Email	Nganhurra Thanardi Garrbu_5	Acknowledgement email. Provision of updated contact email for future correspondence.	Updated email noted
	4-Dec-23	SENT	How: Email	Nganhurra Thanardi Garrbu_5	Acknowledgment email.	No further action
	10-Jan-24	SENT	How: Email	Nganhurra Thanardi Garrbu_6	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	13-Feb-24	SENT	How: Email	Nganhurra Thanardi Garrbu_7	Email following up if any outstanding matters arising from Jadestone's consultation and reattaching notes from presentation to directors on 16 August 2023.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Nganhurra Thanardi Garrbu_9	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	27-Nov-24	RECEIVED	How: Email	Nganhurra Thanardi Garrbu_9	Acknowledgement email confirming contact details are correct.	Noted.
	27-Nov-24	SENT	How: Email	Nganhurra Thanardi Garrbu_9	Acknowledgement email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Ngarluma Aboriginal Corporation	20-Apr-23	SENT	How: Email	Ngarluma	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	3-May-23	SENT	How: Email	Ngarluma	Reminder email sent following up on meeting.	Awaiting response
	16-May-23	SENT	How: Email	Ngarluma	Follow up email resending information.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	23-May-23	SENT	How: Email	Ngarluma	Follow up email on meeting date.	Awaiting response
	24-May-23	RECEIVED	How: Email	Ngarluma	Acknowledgement email, will respond shortly.	N/A
	7-Jun-23	RECEIVED	How: Email	Ngarluma	CEO would like to meet before presentation to board.	N/A
	8-Jun-23	SENT	How: Email	Ngarluma	Email organising meeting.	N/A
	8-Jun-23	RECEIVED	How: Email	Ngarluma	Email organising meeting.	N/A
	8-Jun-23	SENT	How: Email	Ngarluma	Email organising meeting.	N/A
	8-Jun-23	RECEIVED	How: Email	Ngarluma	Email organising meeting.	N/A
	21-Jun-23	SENT	How: Email	Ngarluma	Email requesting update on possible meeting.	N/A
	21-Jun-23	RECEIVED	How: Email	Ngarluma	Meeting could be between 17-21 July.	N/A
	21-Jun-23	SENT	How: Email	Ngarluma	Request update on attendees and meeting format.	N/A
	22-Jun-23	RECEIVED	How: Email	Ngarluma	Tentative meeting booked for 18 July.	N/A
	6-Jul-23	RECEIVED	How: Email	Ngarluma_1	Decline of meeting invite for July 18 due to board meetings, request reschedule later in July.	N/A
	10-Jul-23	SENT	How: Email	Ngarluma_1	Offer to meet in Karratha July 17 or 18.	N/A
	11-Jul-23	RECEIVED	How: Email	Ngarluma_1	Apology but unable to meet.	N/A
	19-Jul-23	SENT	How: Email	Ngarluma_1	Follow up email seeking alternative date and time.	Awaiting response
	2-Aug-23	SENT	How: Email	Ngarluma	Follow-up email on date to book Zoom meeting.	Awaiting response
	9-Aug-23	SENT	How: Email	Ngarluma	Following up dates for meeting.	Awaiting response
	17-Oct-23	SENT	How: Email	Ngarluma	Further follow up email requesting opportunity to meet with CEO.	Awaiting response
	17-Oct-23	SENT	How: Email	Ngarluma	Further follow up email in absence of CEO requesting meeting.	Awaiting response
	17-Oct-23	RECEIVED	How: Email	Ngarluma	Email with some questions around previous correspondence.	Questions answered
	17-Oct-23	SENT	How: Email	Ngarluma	Email with answers provided.	Awaiting response
	23-Oct-23	SENT	How: Email	Ngarluma_2	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Left a message requesting status of CEO and CEO EA who had previously advised to be on extended medical and an update on opportunity for Jadestone to present to the Directors of the Corporation.	Awaiting return phone call
	24-Nov-23	SENT	How: Email	Ngarluma_3	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	8-Jan-24	SENT	How: Email	Ngarluma_3	Follow up email.	Awaiting response
	10-Jan-24	SENT	How: Email	Ngarluma_4	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	16-Jan-24	RECEIVED	How: Email	Ngarluma_3	Acknowledgement email, have reviewed and will be available to discuss further.	Noted
	16-Jan-24	SENT	How: Email	Ngarluma_3	Acknowledgement email requesting potential meeting dates.	Awaiting response
	13-Feb-24	SENT	How: Email	Ngarluma_3	Email reiterating previous attempts seeking opportunity to make a presentation to the Directors. Jadestone continues to seek opportunity to make a presentation to directors.	Awaiting response
	9-May-24	SENT	How: Email	Ngarluma_5	Further follow up email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Ngarluma_6	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	6-Dec-24	SENT	How: Email	Ngarluma_6	Further follow up email.	Awaiting response
	17-Dec-24	SENT	How: Email	Ngarluma_6	Further follow up email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Nyangumarta Karajarri Aboriginal Corporation	3-May-23	SENT	How: Email	Nyangumarta Karajarri	Email trying to find contact details for the Corporation.	Awaiting response
	16-May-23	SENT	How: Email	Nyangumarta Karajarri	Follow up email seeking contact details.	Awaiting response
	16-May-23	RECEIVED	How: Email	Nyangumarta Karajarri	Email received providing advice on contact details.	Noted
	16-May-23	SENT	How: Email	Nyangumarta Karajarri	Acknowledgment email.	N/A

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	17-May-23	SENT	How: Email	Nyangumarta Karajarri_1	Email sent to updated contact details seeking meeting.	Awaiting response
	8-Jun-23	SENT	How: Email	Nyangumarta Karajarri_1	Follow up email.	Awaiting response
	8-Jun-23	RECEIVED	How: Email	Nyangumarta Karajarri_1	Email forwarded to Directors to respond.	Awaiting response from Directors
	8-Jun-23	SENT	How: Email	Nyangumarta Karajarri_1	Acknowledgement email.	N/A
	21-Jun-23	SENT	How: Email	Nyangumarta Karajarri_1	Follow up email requesting names and contact details of chairperson of the Directors of NKAC.	Awaiting response
	21-Jun-23	RECEIVED	How: Email	Nyangumarta Karajarri_1	Acknowledgement email, meeting request put forward and will advise next meeting date.	Information to be provided
	21-Jun-23	SENT	How: Email	Nyangumarta Karajarri_1	Acknowledgement email.	N/A
	19-Jul-23	SENT	How: Email	Nyangumarta Karajarri_1	Email follow-up on meeting date with Directors.	Awaiting meeting date
	2-Aug-23	SENT	How: Email	Nyangumarta Karajarri_2	Acknowledgement email.	N/A
	3-Aug-23	RECEIVED	How: Email	Nyangumarta Karajarri_2	Request to send through presentation material.	Noted
	3-Aug-23	SENT	How: Email	Nyangumarta Karajarri_2	Email explaining requirement to consult for Montara as well and attaching information packages for Stag and Montara.	Awaiting response
	7-Aug-23	RECEIVED	How: Email	Nyangumarta Karajarri_2	Confirmation email for Jadestone to present at upcoming Director's meeting.	Noted
	9-Aug-23	SENT	How: Email	Nyangumarta Karajarri_2	Jadestone to make presentation by Teams meeting. Request for marine capabilities for Indigenous Ranger groups.	Noted
	11-Aug-23	RECEIVED	How: Email	Nyangumarta Karajarri_2	Email asking to accept teams meeting and providing ranger details.	Noted
	21-Aug-23	N/A	N/A	N/A	Meeting cancelled morning of meeting.	Awaiting new meeting date
	17-Oct-23	SENT	How: Email	Nyangumarta Karajarri_3	Follow up email sent requesting next opportunity to present to Directors.	Awaiting response
	19-Oct-23	RECEIVED	How: Email	Nyangumarta Karajarri_3	Email received advising the board won't be meeting again until early 2024 and to keep in touch for updates.	Noted. Jadestone will continue to follow up and request earliest available meeting in 2024
	24-Nov-23	SENT	How: Email	Nyangumarta Karajarri_4	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	28-Nov-23	SENT	How: Email	Nyangumarta Karajarri_3	Follow up email for Directors meeting dates in 2024.	Awaiting response
	5-Dec-23	RECEIVED	How: Email	Nyangumarta Karajarri_3	Acknowledgement email. Will follow up in the new year.	Awaiting response
	10-Jan-24	SENT	How: Email	Nyangumarta Karajarri_5	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	31-Jan-24	SENT	How: Email	Nyangumarta Karajarri_3	Further follow up email.	Awaiting response
	1-Feb-24	RECEIVED	How: Email	Nyangumarta Karajarri_3	Acknowledgment email. Has followed up with the chair.	Awaiting response
	1-Feb-24	SENT	How: Email	Nyangumarta Karajarri_3	Acknowledgement email.	Awaiting response
	14-Feb-24	SENT	How: Email	Nyangumarta Karajarri_6	Email reiterating previous attempts seeking opportunity to make a presentation to the Directors. Jadestone continues to seek opportunity to make a presentation in relation to both Stag and Montara.	Awaiting response
	14-Feb-24	RECEIVED	How: Email	Nyangumarta Karajarri_6	Acknowledgement email. Aiming to hold Directors meeting in April.	Noted
	14-Feb-24	SENT	How: Email	Nyangumarta Karajarri_6	Acknowledgement email.	Awaiting date for board meeting
	21-Mar-24	RECEIVED	How: Email	Nyangumarta Karajarri_7	Email advising date of Directors meeting in April and asking if Jadestone would like to present and how long is needed.	Awaiting response
	21-Mar-24	SENT	How: Email	Nyangumarta Karajarri_7	Email advising Jadestone would like to attend and length of presentation.	Awaiting meeting confirmation
	25-Mar-24	RECEIVED	How: Email	Nyangumarta Karajarri_7	Email advising meeting is confirmed. Are Jadestone happy for budget estimate for directors time and meeting expenses to be provided.	Awaiting response
	25-Mar-24	SENT	How: Email	Nyangumarta Karajarri_7	Jadestone request budget.	Awaiting budget
	27-Mar-24	RECEIVED	How: Email	Nyangumarta Karajarri_8	Request for agenda items, presentations and print outs.	Awaiting response
	28-Mar-24	RECEIVED	How: Email	Nyangumarta Karajarri_7	Budget provided.	Jadestone to review budget
	3-Apr-24	SENT	How: Email	Nyangumarta Karajarri_8	Email providing names of Jadestone attendees and information packages. Will send through PowerPoint presentation closer to the meeting date.	Jadestone to send PowerPoint presentation

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	3-Apr-24	SENT	How: Email	Nyangumarta Karajarri_7	Budget accepted and invoicing details provided.	Noted
	4-Apr-24	RECEIVED	How: Email	Nyangumarta Karajarri_7	Invoice will be prepared by KLC.	N/A
	4-Apr-24	SENT	How: Email	Nyangumarta Karajarri_7	Please pass on invoicing details to KLC.	N/A
	4-Apr-24	RECEIVED	How: Email	Nyangumarta Karajarri_7	Acknowledgement email.	N/A
	9-Apr-24	SENT	How: Email	Nyangumarta Karajarri_9	Email sent with PowerPoint slides for tomorrows presentation.	N/A
	10-Apr-24	MEETING	How: In person, Broome	Nyangumarta Karajarri_9 Nyangumarta Karajarri_10 PBC presentation	Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	9-May-24	SENT	How: Email	Nyangumarta Karajarri_10	Draft meeting minutes issued.	Meeting minutes issued.
	9-May-24	SENT	How: Email	Nyangumarta Karajarri_10	Updated meeting minutes issued.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Nyangumarta Karajarri_11	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	26-Nov-24	RECEIVED	How: Email	Nyangumarta Karajarri_11	Acknowledgement email, suggest referring to contact details on specified website.	Noted. Will check website.
	26-Nov-24	SENT	How: Email	Nyangumarta Karajarri_11	Acknowledgement email.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Nyangumarta Warrarn Aboriginal Corporation	3-May-23	SENT	How: Email	Nyangumarta Warrarn	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	16-May-23	SENT	How: Email	Nyangumarta Warrarn	Follow up email requesting meeting.	Awaiting response
	16-May-23	RECEIVED	How: Email	Nyangumarta Warrarn	Email explaining communications protocol and costs associated with such meetings.	Noted
	16-May-23	SENT	How: Email	Nyangumarta Warrarn	Acknowledgement of receipt.	N/A
	17-May-23	SENT	How: Email	Nyangumarta Warrarn	Email seeking clarification on questions in previous email.	N/A
	17-May-23	RECEIVED	How: Email	Nyangumarta Warrarn	Email advising CEO contact details and asking how much time required to discuss with EMT.	N/A
	17-May-23	SENT	How: Email	Nyangumarta Warrarn	Email advising amount of time required for meeting.	N/A
	17-May-23	RECEIVED	How: Email	Nyangumarta Warrarn	Cost estimate for meeting provided.	Refer to cost estimate
	8-Jun-23	SENT	How: Email	Nyangumarta Warrarn	Concerns about cost for preliminary meeting. Request to meet to discuss.	Awaiting response
	21-Jun-23	SENT	How: Email	Nyangumarta Warrarn	Follow up email.	N/A
	21-Jun-23	RECEIVED	How: Email	Nyangumarta Warrarn	Response currently being prepared by NWAC CEO.	Noted
	21-Jun-23	SENT	How: Email	Nyangumarta Warrarn	Acknowledgement email.	N/A
	22-Jun-23	RECEIVED	How: Email	Nyangumarta Warrarn	Correspondence letter from CEO received.	Refer to correspondence letter
	3-Jul-23	SENT	How: Email	Nyangumarta Warrarn	Acknowledgement of letter and acceptance of costs. Please advise suitable meeting dates.	Awaiting response
	7-Jul-23	RECEIVED	How: Email	Nyangumarta Warrarn	Advise Board away and unable to meet until end July. Confirm meeting will be in Perth.	Awaiting meeting date
	2-Aug-23	SENT	How: Email	Nyangumarta Warrarn	Following up dates for meeting.	N/A
	2-Aug-23	RECEIVED	How: Email	Nyangumarta Warrarn	Unable to advise a date, will advise ASAP.	Awaiting meeting date
	9-Aug-23	SENT	How: Email	Nyangumarta Warrarn	Following up dates for meeting.	N/A
	9-Aug-23	RECEIVED	How: Email	Nyangumarta Warrarn	Suggested meeting date 15 August.	Noted
	15-Aug-23	MEETING	How: In person, Perth	PBC Presentation Nyangymarta Warrarn_1	PBC PowerPoint presentation. Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	23-Oct-23	SENT	How: Email	Nyangumarta Warrarn_2	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	24-Nov-23	SENT	How: Email	Nyangumarta Warrarn_3	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	24-Nov-23	SENT	How: Email	Nyangumarta Warrarn_4	Email sent with draft meeting minutes from 15 August meeting for comment.	Awaiting response Refer to meeting minutes (Nyangymarta Warrarn_1)
	10-Jan-24	SENT	How: Email	Nyangumarta Warrarn_5	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	10-Jan-24	SENT	How: Email	Nyangumarta Warrarn_6	Email sent asking if Corporation has reached a conclusion about Jadestone presenting to the Directors.	Awaiting response
	10-Jan-24	RECEIVED	How: Email	Nyangumarta Warrarn_6	Email advising board not meeting until March. Will update Jadestone.	Noted
	10-Jan-24	SENT	How: Email	Nyangumarta Warrarn_6	Acknowledgement email.	Awaiting response re meeting date
	14-Feb-24	SENT	How: Email	Nyangumarta Warrarn_7	Email following up if any outstanding matters arising from Jadestone's consultation and reattaching notes from EMT meeting on 15 August 2023.	Awaiting response
	15-Feb-24	RECEIVED	How: Email	Nyangumarta Warrarn_7	Preferred approach is to arrange opportunity to meet with the Board, working on that and will contact Jadestone to arrange scheduling.	Noted
	15-Feb-24	SENT	How: Email	Nyangumarta Warrarn_7	Acknowledgement email.	Awaiting date for board meeting
	29-Apr-24	RECEIVED	How: Email	Nyangumarta Warrarn_8	Email notifying that date has opened up for meeting Board of Directors and asking if Jadestone would like to present. Apology for late notice.	Awaiting response
	7-May-24	SENT	How: Email	Nyangumarta Warrarn_8	Email confirming Jadestone would like to take the opportunity to meet the Directors this Thursday.	Awaiting response
	23-May-24	MEETING	How: In Person, Perth	Nyangumarta Warrarn_9	Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	24-May-24	SENT	How: Email	Nyangumarta Warrarn_9	Email sent with draft meeting minutes for comment.	Meeting minutes issued. Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Nyangumarta Warran_10	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	26-Nov-24	RECEIVED	How: Email	Nyangumarta Warran_10	Acknowledgement email confirming contact details are correct.	Noted. Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Wanparta Aboriginal Corporation	20-Apr-23	SENT	How: Email	Wanparta	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	27-Apr-23	RECEIVED	How: Email	Wanparta	Acknowledgment of receipt, will liaise with Directors and revert in due course.	N/A
	27-Apr-23	SENT	How: Email	Wanparta	Asked where directors meet.	N/A
	27-Apr-23	RECEIVED	How: Email	Wanparta	Board meetings held in Port Hedland.	Awaiting response from Directors
	23-May-23	SENT	How: Email	Wanparta	Follow up email on timing of presentation to Directors.	Awaiting response
	8-Jun-23	SENT	How: Email	Wanparta	Follow up email on timing of presentation to Directors.	Awaiting response
	20-Jun-23	RECEIVED	How: Email	Wanparta	Scheduled for discussion with Directors 27 June.	N/A
	5-Jul-23	SENT	How: Email	Wanparta	Request if date to present to Directors was set on 27 June.	Awaiting response
	10-Jul-23	RECEIVED	How: Email	Wanparta	Wanparta contacted by several proponents due to Relevant Persons status, each proponent present to board in same meeting. Requested Jadestone's meeting availability in July and August.	N/A
	10-Jul-23	SENT	How: Email	Wanparta	Reply with dates booked for presentations to other PBCs.	N/A
	13-Jul-23	RECEIVED	How: Email	Wanparta	Will advise once Board confirms a date.	Awaiting Board confirmation
	24-Jul-23	RECEIVED	How: Email	Wanparta	Email to advise 31 August likely only available date, will confirm.	Awaiting date confirmation
	2-Aug-23	SENT	How: Email	Wanparta	Follow up email to confirm date of meeting.	Awaiting response
	16-Aug-23	MEETING	How: In person, South Hedland	PBC Presentation Wanparta_1	Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	26-Aug-23	RECEIVED	How: Email	Wanparta_2	Email with summary of initial consultation and suggested further consultations.	Refer to correspondence letter. Jadestone to review and respond.
	1-Sep-23	INTERNAL	How: Email	Wanparta_2	Email forward onto Jadestone team.	N/A
	23-Oct-23	SENT	How: Email	Wanparta_3	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	1-Nov-23	RECEIVED	How: Email	Wanparta_3	Acknowledgment email. Advised times available for a phone call.	Jadestone to arrange phone call.
	14-Nov-23	SENT	How: Email	Wanparta_3	Apologised for delay, suggested phone call for November 15.	Awaiting response
	20-Nov-23	RECEIVED	How: Email	Wanparta_3	Available for call Nov 21.	Jadestone to call Wanparta
	20-24 Nov	PLACED	How: Calls	N/A	Phone calls over 4 consecutive days not answered. Voice mails left.	Awaiting return phone call
	24-Nov-23	SENT	How: Email	Wanparta_4	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	24-Nov-23	SENT	How: Email	Wanparta_5	Email sent with draft meeting minutes from 16 August meeting for comment.	Awaiting response Refer to meeting minutes (Wanparta_1)
	1-Dec-23	RECEIVED	How: Email	Wanparta_6	Email requesting Jadestone's attendance at a Directors meeting in early 2024.	Awaiting response
	10-Jan-24	SENT	How: Email	Wanparta_7	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	22-Jan-24	PLACED	How: Call	N/A	Call to discuss context of 23/10/2023 email.	N/A
	24-Jan-24	SENT	How: Email	Wanparta_6	Email following up on 22nd Jan phone call and explaining purpose of 23/10/23 email.	Noted
	25-Jan-24	RECEIVED	How: Email	Wanparta_6	Acknowledgement email. Will liaise with Chairperson and Board if required and revert ASAP.	Awaiting response
	14-Feb-24	SENT	How: Email	Wanparta_8	Email following up if any outstanding matters arising from Jadestone's consultation and reattaching notes from presentation to directors on 16 August 2023.	Awaiting response
	4-Apr-24	RECEIVED	How: Email	Wanparta_9	Email inviting Jadestone to attend Directors meeting in May. Cost estimate provided.	Awaiting response
	15-Apr-24	RECEIVED	How: Email	Wanparta_9	Follow up email after phone call. Board requires confirmation of Jadestone's attendance as soon as possible for May meeting.	Awaiting response
	13-May-24	SENT	How: Email	Wanparta_10	Apologies for delay, cost of workshop significant. Requests Wanparta's consideration of shorter consultation opportunity at next ordinary scheduled Directors meeting.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	14-Aug-24	RECEIVED	How: Email	Wanparta_10	Email received, Wanparta Board requesting to meet JSE by end of year. Checking JSE availability to meet with board November 13. Cost will be shared with several proponents.	Awaiting response
	15-Aug-24	SENT	How: Email	Wanparta_10	Acknowledgement of receipt and confirmation JSE can attend. Request for cost estimate.	Awaiting response
	19-Aug-24	RECEIVED	How: Email	Wanparta_10	Acknowledgement of receipt. Will provide cost estimate as soon as possible.	Awaiting cost estimate.
	4-Nov-24	RECEIVED	How: Email	Wanparta_11	Draft meeting agenda attached.	Awaiting response
	6-Nov-24	SENT	How: Email	Wanparta_11	Jadestone satisified with draft agenda.	Awaiting response
	7-Nov-24	RECEIVED	How: Email	Wanparta_11	Confirming powerpoint presentation.	Awaiting response
	8-Nov-24	SENT	How: Email	Wanparta_11	Update on powerpoint presentation.	Awaiting response
	11-Nov-24	RECEIVED	How: Email	Wanparta_11	Will send through finalised agenda prior to meeting.	Awaiting response
	11-Nov-24	SENT	How: Email	Wanparta_11	Email advising still working on powerpoint presentation.	Awaiting response
	11-Nov-24	RECEIVED	How: Email	Wanparta_11	Meeting logistics.	Awaiting response
	11-Nov-24	SENT	How: Email	Wanparta_11	Attendance will be in person.	Noted
	13-Nov-24	MEETING	How: In person, Perth	N/A	Meeting held at Oaks Hotel, Perth. Meeting minutes to be drafted and distributed to attendees for comment and approval.	Meeting minutes to be issued
	25-Nov-24	SENT	How: Email	Wanparta_12	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	5-Dec-24	RECEIVED	How: Email	Wanparta_12	Email received providing most up to date contact details for PBC.	Contact details updated. Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	12-Dec-24	RECEIVED	How: Email	Wanparta_13	Attached correspondence from meeting,	Awaiting response
	23-Dec-24	SENT	How: Email	Wanparta_13	Meeting minutes issued for comment.	Awaiting response
	8-Jan-25	RECEIVED	How: Email	Wanparta_13	Email received with updates to meeting minutes.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	14-Jan-25	SENT	How: Email	Wanparta_13	Email sent with revised meeting minutes and map indicating mangrove locations.	Awaiting response
	14-Jan-25	RECEIVED	How: Email	Wanparta_13	Acknowledgement email. Request for high resolution map.	Awaiting response
	16-Jan-25	SENT	How: Email	Wanparta_13	Email sent with satellite image.	No further action.
	16-Jan-25	RECEIVED	How: Email	Wanparta_13	Acknowledgement email.	Noted.
Wirrawandi Aboriginal Corporation	20-Apr-23	SENT	How: Email	Wirrawandi	Email seeking opportunity to meet with Directors to introduce Stag project and seek advice on the most appropriate means of undertaking consultation.	Awaiting response
	21-Apr-23	RECEIVED	How: Email	Wirrawandi	Acknowledgement of email, will respond shortly.	Awaiting response
	3-May-23	SENT	How: Email	Wirrawandi	Follow up email.	Awaiting response
	3-May-23	RECEIVED	How: Email	Wirrawandi	Email received from General Manager, would like opportunity to meet prior to meeting with Directors.	Jadestone organising meeting
	3-May-23	SENT	How: Email	Wirrawandi	Scheduling meeting.	N/A
	3-May-23	RECEIVED	How: Email	Wirrawandi	Scheduling meeting.	N/A
	3-May-23	SENT	How: Email	Wirrawandi	Scheduling meeting.	N/A
	3-May-23	RECEIVED	How: Email	Wirrawandi	Scheduling meeting.	N/A
	4-May-23	SENT	How: Email	Wirrawandi	Scheduling meeting.	N/A
	5-May-23	RECEIVED	How: Email	Wirrawandi	Scheduling meeting 12 May.	N/A
	12-May-23	MEETING	How: In person, Perth	N/A	Meeting held with General Manager before presentation to the board.	Noted
	16-May-23	SENT	How: Email	Wirrawandi	Email following up on meeting outcomes.	N/A
	23-May-23	SENT	How: Email	Wirrawandi	Email following up on appropriate time to present to Directors.	Awaiting response
	23-May-23	RECEIVED	How: Email	Wirrawandi	Meeting date suggested.	Awaiting response
	8-Jun-23	SENT	How: Email	Wirrawandi	Jadestone unable to make suggested date, requested next availability.	Awaiting response
	8-Jun-23	RECEIVED	How: Email	Wirrawandi	Alternative meeting date put forward.	Awaiting response
	8-Jun-23	SENT	How: Email	Wirrawandi	Confirming date with Jadestone representatives.	Confirming date
	21-Jun-23	SENT	How: Email	Wirrawandi	Jadestone confirm availability to present 18 July.	Noted
	27-Jun-23	RECEIVED	How: Email	Wirrawandi	Meeting logistics.	N/A
	3-Jul-23	SENT	How: Email	Wirrawandi	Confirm meeting presentation schedule and arrangement.	N/A
	3-Jul-23	RECEIVED	How: Email	Wirrawandi	Confirm meeting presentation email, request attendee detail, costs.	N/A
	3-Jul-23	SENT	How: Email	Wirrawandi	Acknowledge costs, request advance cost estimate, confirmed attendee numbers.	N/A
	3-Jul-23	RECEIVED	How: Email	Wirrawandi	Confirm costs protocol, will send quote.	Awaiting quote
	10-Jul-23	SENT	How: Email	Wirrawandi	Follow-up on costs reminder.	Awaiting quote
	10-Jul-23	RECEIVED	How: Email	Wirrawandi	Unable to confirm, awaiting information, follow-up pending.	Still awaiting quotes
	10-Jul-23	SENT	How: Email	Wirrawandi	Acknowledgement email.	N/A
	12-Jul-23	RECEIVED	How: Email	Wirrawandi	Email with quote and costs acceptance letter.	Refer to costs and acceptance letter
	14-Jul-23	RECEIVED	How: Email	Wirrawandi	Follow-up on quote for costs.	Awaiting response
	14-Jul-23	SENT	How: Email	Wirrawandi	Acknowledgement quote provided, further consideration needed. Pending internal process, further cost breakdown requested.	Request further detail on costs
	14-Jul-23	RECEIVED	How: Email	Wirrawandi	Further response from GM regarding consultation expectation and process and cost expectations.	N/A
	18-Jul-23	MEETING	In person: Karratha	PBC Presentation Wirrawandi_1	Meeting held at Karratha International Hotel. Meeting minutes to be drafted and distributed to attendees for comment and approval.	Meeting minutes to be issued
	20-Jul-23	SENT	How: Email	Wirrawandi_2	Email following up information from Tuesdays presentation, request names of attendees, copy of Strategic Plan.	Await post-meeting information
	1-Aug-23	SENT	How: Email	Wirrawandi_2	Follow-up on information request post-meeting.	Awaiting response
	1-Aug-23	RECEIVED	How: Email	Wirrawandi_2	Sent post meeting attendee names and Strategic Plan.	Refer to Strategic Plan
	2-Aug-23	SENT	How: Email	Wirrawandi_2	Following on from meeting request for WAC Cultural Awareness Program.	Awaiting response
	7-Aug-23	RECEIVED	How: Email	Wirrawandi_2	Email with Cultural Awareness Program attached.	Refer to Cultural Awareness Program
	7-Aug-23	INTERNAL	How: Email	Wirrawandi_2	Email passed on internally with WAC Cultural Awareness Program.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	23-Oct-23	SENT	How: Email	Wirrawandi_3	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	23-Oct-23	RECEIVED	How: Email	Wirrawandi_3	Email advising new CEO and requesting further background information.	Awaiting response
	24-Oct-23	SENT	How: Email	Wirrawandi_3	Email providing information package and meeting minutes from JSE presentation to Director and Elders on 18 July 2023. Offer to meet to provide further information.	Refer to meeting minutes (Wirrawandi_1) Awaiting response
	24-Oct-23	RECEIVED	How: Email	Wirrawandi_3	Email advising proposed meeting time.	Confirm attendance
	31-Oct-23	SENT	How: Email	Wirrawandi_3	Email to propose new meeting date.	Awaiting response
	31-Oct-23	RECEIVED	How: Email	Wirrawandi_3	Email confirming new meeting time and date.	Meeting confirmed
	3-Nov-23	MEETING	How: In person meeting in Perth	N/A	Opportunity to explain EP timeline requirements which has led to Stag EP being re-submitted prior to completion of consultation activities.	N/A
	9-Nov-23	SENT	How: Email	Wirrawandi_3	Email thanking CEO for meeting and explaining EP will be submitted prior to completion of consultation activities. Asked to contact Jadestone once had chance to consider consultation activities and previous correspondence.	Awaiting response
	24-Nov-23	SENT	How: Email	Wirrawandi_4	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	10-Jan-24	SENT	How: Email	Wirrawandi_5	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
	10-Jan-24	RECEIVED	How: Email	Wirrawandi_5	Acknowledgement email. Will post on website and inform members.	Noted
	10-Jan-24	SENT	How: Email	Wirrawandi_5	Acknowledgement email.	No further action
	11-Jan-24	RECEIVED	How: Email	Wirrawandi_5	Arranging meeting.	N/A
	11-Jan-24	SENT	How: Email	Wirrawandi_5	Arranging meeting.	N/A
	11-Jan-24	RECEIVED	How: Email	Wirrawandi_5	Arranging meeting.	N/A
	11-Jan-24	SENT	How: Email	Wirrawandi_5	Arranging meeting.	N/A
	11-Jan-24	RECEIVED	How: Email	Wirrawandi_5	Arranging meeting.	Meeting location confirmed
	12-Jan-24	MEETING	How: In Person	N/A	Jadestone Consultation Consultant met with WAC CEO.	N/A
	15-Jan-24	SENT	How: Email	Wirrawandi_6	Email following up post meeting with previous emails, meeting minutes from 18 July 2023 and information sheet attached.	Awaiting response
	6-Feb-24	RECEIVED	How: Email	Wirrawandi_7	Email from CEO notifying Jadestone that they are leaving WAC and advising contact going forward.	Noted
	13-Feb-24	SENT	How: Email	Wirrawandi_8	Email following up if any outstanding matters arising from Jadestone's consultation with WAC and reattaching notes from presentation to directors on 18 August 2023.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Wirrawandi_9	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	25-Nov-24	RECEIVED	How: Email	Wirrawandi_9	Email forwarded onto alternative address to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	25-Nov-24	SENT	How: Email	Wirrawandi_9	Email sent confirming which PBC email is in relation to.	Awaiting response
	25-Nov-24	RECEIVED	How: Email	Wirrawandi_9	Acknowledgement email and confirmation of contact details.	Noted.
	25-Nov-24	SENT	How: Email	Wirrawandi_10	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	25-Nov-24	RECEIVED	How: Email	Wirrawandi_10	Acknowledgement email and confirmation of contact details.	Noted. Include in ongoing consultation. Confirm contact details remain the same in 6 months time.

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Yamatji Marlpa Aboriginal Corporation (YMAC)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response. Read receipt received
	30-Jan-23	SENT	How: Email	YMAC	Email providing EMBA and seeking assistance to identify Traditional Owner Clan groups along the coastline.	Awaiting response
	16-Feb-23	RECEIVED	How: Email	YMAC	Email providing information and asking for draft EP and to arrange a meeting with NTGAC board.	Response provided
	21-Feb-23	SENT	How: Email	YMAC	Not yet able to provide a draft EP. Seeking information on traditional owners.	Awaiting response
	28-Feb-23	RECEIVED	How: Email	YMAC	Act for NTGAC not other PCBs. Response forwarded to relevant people within YMAC to identify relevant aboriginal groups within EMBA.	Response provided
	1-Mar-23	RECEIVED	How: Email	YMAC_1	Email with attachment asking for response.	Note: original email sent by YMAC on 6th February not received due to incorrect email
	3-Mar-23	SENT	How: Email	YMAC_1	Response to February 6 email and Jadestone requested face to face meeting with YMAC.	Response sent
	4-Apr-23	MEETING	How: In person meeting in Perth	YMAC_2	Meeting to seek YMAC assistance in identifying and engaging with individual TO groups.	Refer to meeting minutes
	17-Apr-23	SENT	How: Email	YMAC_2	Meeting minutes sent for comment.	Meeting minutes sent
	19-Apr-23	RECEIVED	How: Email	YMAC_2	Acknowledgment of email, will review and respond.	Awaiting response
	26-Apr-23	SENT	How: Email	YMAC_3	Following up consultation methodology.	Awaiting response
	2-May-23	RECEIVED	How: Email	YMAC_3	Internal YMAC email asking appropriate person to contact Jadestone.	Awaiting response
	2-May-23	SENT	How: Email	YMAC_3	Request for YMAC contact for each of the PBCs.	Response provided
	4-May-23	RECEIVED	How: Email	YMAC_3	Confirmation that contact details are those listed.	Noted
	4-May-23	SENT	How: Email	YMAC_3	Request for specific PBC details.	Awaiting response
	17-May-23	SENT	How: Email	YMAC_4	Meeting minute feedback sought.	Awaiting response
	12-Jun-23	RECEIVED	How: Email	YMAC_5	YMAC's draft consultation framework sent.	Jadestone currently reviewing consultation framework
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action. Include in ongoing consultation.
Yinggarda Aboriginal Corporation	10-May-23	SENT	How: Email	Yinggarda	Email providing information pack and EMBA, seeking opportunity to present to Directors.	Awaiting response
	23-May-23	SENT	How: Email	Yinggarda	Follow up email.	Awaiting response
	15-Jun-23	RECEIVED	How: Email	Yinggarda	Email with proposed date to present to Directors.	N/A
	15-Jun-23	SENT	How: Email	Yinggarda	Confirming meeting with Jadestone personnel.	Confirming date
	24-Jul-23	RECEIVED	How: Email	Yinggarda_1	Email to advise date change of Board meeting.	Noted
	24-Jul-23	SENT	How: Email	Yinggarda_1	Email reply to confirm attendance on new date.	N/A
	25-Jul-23	RECEIVED	How: Email	Yinggarda_1	Email requesting attendees. Invoice being finalised.	Confirm attendee numbers
	25-Jul-23	SENT	How: Email	Yinggarda_1	Email confirming attendee numbers, request timeframe for document receipt.	Awaiting response
	1-Aug-23	RECEIVED	How: Email	Yinggarda_2	Email requesting confirmation of attendance for presentation to Board.	Awaiting response
	1-Aug-23	SENT	How: Email	Yinggarda_2	Email reply to confirm attendance and PowerPoint presentation.	Confirm attendance
	2-Aug-23	RECEIVED	How: Email	Yinggarda_2	Acknowledgement email, confirmation of equipment for PowerPoint presentation.	Noted
	2-Aug-23	INTERNAL	How: Email	Yinggarda_2	Forward email confirmation to Jadestone team.	N/A
	3-Aug-23	MEETING	In person: Perth	PBC Presentation Yinggarda_6	Meeting minutes to be finalised and sent to attendees for approval.	Meeting minutes to be issued
	8-Aug-23	RECEIVED	How: Email	Yinggarda_3	Confirmation that Banks-Smith & Associates (BSA) has been retained by YAC to deal with request for consultation; instructions for proposed consultation agreement provided.	Noted

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	28-Aug-23	SENT	How: Email	Yinggarda_3	Acknowledgement of email, apologies for delayed response, JSE still reviewing and will respond soon.	JSE to review consultation agreement and respond
	23-Oct-23	SENT	How: Email	Yinggarda_4	Email seeking questions and feedback regarding facility and activity as well as providing figure of Stag EMBA in relation to cultural heritage sites, and requesting advice.	Awaiting response
	27-Oct-23	RECEIVED	How: Email	Yinggarda_5	Email from YAC lawyer. If Jadestone wishes to consult with YAC must enter consultation agreement to consult with YAC.	Jadestone reviewing consultation agreement
	21-Nov-23	SENT	How: Email	Yinggarda_5	Email advising Jadestone is not able to provide payment requested, however can contribute to YAC reasonable costs in responding to Invitation for Consultation package including meetings.	Awaiting response
	21-Nov-23	RECEIVED	How: Email	Yinggarda_5	Email advising will take instruction from YAC Board and be in touch ASAP.	Awaiting response
	22-Nov-23	SENT	How: Email	Yinggarda_5	Email sent with draft meeting minutes from 3 August meeting for comment.	Meeting minutes issued. Refer to meeting minutes (Yinggarda_6)
	24-Nov-23	SENT	How: Email	Yinggarda_7	Email advising of re-submission of Operations EP and date for submission of Drilling EP.	Awaiting response
	24-Nov-23	RECEIVED	How: Email	Yinggarda_7	YAC does not consider JSE actions to date to constitute appropriate consultation.	Response provided
	29-Nov-23	SENT	How: Email	Yinggarda_7	Acknowledgement of receipt of email and response provided.	Awaiting response
	3-Dec-23	SENT	How: Email	Yinggarda_8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	4-Dec-23	RECEIVED	How: Email	Yinggarda_8	Without formal consultation agreement no consultation will take place.	Awaiting response
	11-Jan-24	SENT	How: Email	Yinggarda_8	Jadestone prepared to contribute to costs of consultation with YAC on per consultation basis at mutually agreed rate. Not in agreement with large amounts of monies or indemnifying YAC.	Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
	25-Nov-24	SENT	How: Email	Yinggarda_9	Email sent to confirm contact details Jadestone have for PBC are correct.	Awaiting response
	26-Nov-24	RECEIVED	How: Email	Yinggarda_9	Email received providing most up to date contact details for PBC.	Contact details updated. Include in ongoing consultation. Confirm contact details remain the same in 6 months time.
Ports/ Maritime Facilities						
Carnarvon Boat Harbour	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	13-Nov-23	PLACED	How: Call	N/A	Called to confirm receipt of information package. Unsure if package received. Message passed on and most appropriate person will call back.	Awaiting return phone call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Coral Bay Maritime Facility	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	13-Nov-23	PLACED	How: Call	N/A	Called to confirm receipt of information package. Unsure if package received. Alternative contact details provided.	Send information package to alternative email
	14-Nov-23	SENT	How: Email	Exmouth and Coral Bay Ports	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	14-Nov-23	RECEIVED	How: Email	Exmouth and Coral Bay Ports	Acknowledgement of receipt and no comment or concerns.	Noted
	20-Nov-23	SENT	How: Email	Exmouth and Coral Bay Ports	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Denham Maritime Facility	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	13-Nov-23	PLACED	How: Call	N/A	Called to confirm receipt of information package. Unsure if package received. Message passed on and most appropriate person will call back.	Awaiting return phone call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Exmouth Boat Harbour	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	13-Nov-23	PLACED	How: Call	N/A	Called to confirm receipt of information package. Unsure if package received. Alternative contact details provided.	Send information package to alternative email
	14-Nov-23	SENT	How: Email	Exmouth and Coral Bay Ports	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	14-Nov-23	RECEIVED	How: Email	Exmouth and Coral Bay Ports	Acknowledgement of receipt and no comment or concerns.	Noted
	20-Nov-23	SENT	How: Email	Exmouth and Coral Bay Ports	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Onslow Beadon Creek Maritime Facility	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Called Onslow Beadon Creek to confirm receipt of information package. Unsure if package received. Asked to send through again and provided an alternative email.	Information package resent to alternative email
	15-Nov-23	SENT	How: Email	Onslow Beadon Creek	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Pilbara Ports Authority	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	17-Feb-23	RECEIVED	How: Email	Pilbara Ports	Acknowledgement of receipt. Pilbara Ports has no comment. Confirmation that email address is correct for future engagement.	Noted
	6-Mar-23	SENT	How: Email	Pilbara Ports	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Point Samson Johns Creek Boat Harbour	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Called Point Samson to confirm receipt of information package. Unsure if package received. Asked to send through again and provided an alternative email.	Information package resent
	15-Nov-23	SENT	How: Email	Point Samson	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	15-Nov-23	RECEIVED	How: Email	Point Samson_1	Reply email informing Jadestone that email has been referred onto Perth team.	Noted
	16-Nov-23	RECEIVED	How: Email	Point Samson	Email informing Jadestone to contact the main office.	Noted
	17-Nov-23	SENT	How: Email	Point Samson	Reply email that Jadestone have received a response that email has been referred onto Perth team.	No further action
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	Awaiting response
	20-Nov-23	RECEIVED	How: Email	Point Samson_2	Email received asking Jadestone to consult with Marine Pollution Team.	Marine Pollution Team have already been consulted as a Relevant Person. Refer to Assessment of Merit table for details.
	22-Nov-23	SENT	How: Email	Point Samson_2	Acknowledgement email advising MPT have already been consulted as a Relevant Person for Stag Activities.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Tourism and Business Associations/ Tour Operators						
Apache Charters	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Apache Charters to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	14-Nov-23	RECEIVED	How: Call	N/A	Return phone call. Unsure if information package received. Asked to send through again and will pass onto appropriate person.	Information package resent
	14-Nov-23	SENT	How: Email	Apache Charters	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Blue Juice Charters	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called to confirm if consultation package was received and provide any feedback. Phone rang out.	Try to call again at a later date
	15-Nov-23	PLACED	How: Call	N/A	Called Blue Juice Charters to confirm receipt of information package. Unsure if package received. Asked to send through again.	Information package resent
	15-Nov-23	SENT	How: Email	Blue Juice	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Blue Lightning Charters	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Blue Lightning to confirm receipt of information package. Unsure if package received. Asked to send through again.	Information package resent
	14-Nov-23	SENT	How: Email	Blue Lightning	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Cape Immersion Tours	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	28-Aug-23	RECEIVED	How: Email	Immersion_bounce	Email bounced.	Look for alternative email
	1-Sep-23	SENT	How: Email	G5	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Cape Immersion Tours to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	15-Nov-23	PLACED	How: Call	N/A	Called Cape Immersion to confirm receipt of information package. Will review information package.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Coral Bay Eco Tours	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	28-Aug-23	RECEIVED	How: Email	Coral Bay_bounce	Email bounced.	Look for alternative email
	1-Sep-23	SENT	How: Email	G5	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Coral Bay Eco Tours to confirm receipt of information package. Package located in junk mail. Have passed on to more appropriate person to respond.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Cossack Boat Hire	1-Sep-23	SENT	How: Email	G5	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Cossack Boat Hire to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Dirk Hartog Island Eco Lodge	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Dirk Hartog Island Eco Lodge to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Dive Ningaloo	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Dive Ningaloo to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Exmouth Dive Centre	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Exmouth Dive Centre to confirm receipt of information package. Email address no longer active. Provided alternative email to send information package.	Information package resent to updated email
	14-Nov-23	SENT	How: Email	Exmouth Dive	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Live Ningaloo	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Live Ningaloo to confirm receipt of information package. Package received, no comment. Send through again and will respond with no comment.	Information package resent to updated email
	14-Nov-23	SENT	How: Email	Live Ningaloo	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	14-Nov-23	RECEIVED	How: Email	Live Ningaloo	Acknowledgement email thanking Jadestone for reaching out however not interested at this time.	Noted. No further action. Include in ongoing consultation

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Mac Attack Fishing Charters	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Mac Attack to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Mackerel Islands	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Mackerel Islands to confirm receipt of information package. Unsure if information package received. Asked to send through again and will pass onto appropriate person.	Information package resent
	14-Nov-23	SENT	How: Email	Mackerel Islands	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	14-Nov-23	RECEIVED	How: Email	Mackerel Islands	Acknowledgement email and notification that email has been passed onto management team.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	22-Nov-23	RECEIVED	How: Email	Mackerel Islands_1	Acknowledgement of receipt. Mackerel Islands has no comment.	Noted
	23-Nov-23	SENT	How: Email	Mackerel Islands_1	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Ningaloo Blue Dive	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Ningaloo Blue Dive to confirm receipt of information package. Unsure if information package received. Asked to send through again.	Information package resent
	14-Nov-23	SENT	How: Email	Ningaloo Blue Dive	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Ningaloo Coral Bay Boats	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Ningaloo Coral Bay boats to confirm receipt of information package. Unsure if information package received. Asked to send through again and will pass onto appropriate person.	Information package resent
	14-Nov-23	SENT	How: Email	Ningaloo Coral Bay boats	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	15-Nov-23	RECEIVED	How: Email	Ningaloo Coral Bay boats	Acknowledgement of receipt. Ningaloo Coral Bay Boats has no comment.	Noted
	17-Nov-23	SENT	How: Email	Ningaloo Coral Bay boats	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Ningaloo Discovery	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Ningaloo Discovery to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	14-Nov-23	RECEIVED	How: Call	N/A	Return phone call. Unsure if information package received. No concerns with proposed Stag operations. Don't want to receive further information.	Noted. No further action.
Ningaloo Glass Bottom Boat	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Ningaloo Glass Bottom Boat to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Ningaloo Reef Dive & Snorkel	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Called Ningaloo Reef Dive to confirm receipt of information package. Unsure if information package received. Provided alternative email to send information package.	Information package resent to updated email
	15-Nov-23	SENT	How: Email	Ningaloo Reef Dive	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Ningaloo Safari Tours	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Ningaloo Safari Tours to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Ocean Eco Adventures	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called to confirm receipt of information package. Unsure if package received. Message passed on and most appropriate person will call back.	Awaiting return phone call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Pelican Charters	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Pelican Charters to confirm receipt of information package. Unsure if information package received. Provided alternative contact to call.	Call alternative contact
	14-Nov-23	PLACED	How: Call	N/A	Alternative contact called. No concerns with proposed Stag operations.	Noted. No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Perfect Nature Cruises	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Perfect Nature Cruises to confirm receipt of information package. Unsure if information package received. Asked to send through again and will pass onto appropriate person.	Information package resent
	14-Nov-23	SENT	How: Email	Perfect Nature	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Pilbara Tours	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called Pilbara Tours to confirm receipt of information package. Package received, no comment. Send through again and will respond with no comment.	Information package resent to updated email
	14-Nov-23	SENT	How: Email	Pilbara Tours	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Reef Seeker Charters	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Reef Seeker Charters to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Sail Ningaloo	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Sail Ningaloo to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	14-Nov-23	RECEIVED	How: Call	N/A	Return phone call. Unsure if information package received. Provided alternative email to send information package.	Information package resent to updated email
	14-Nov-23	SENT	How: Email	Sail Ningaloo	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Shark Bay Boat Hire	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Shark Bay Boat Hire to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	14-Nov-23	RECEIVED	How: Call	N/A	Return phone call. Unsure if information package received. Provided alternative email to send information package.	Information package resent to updated email
	14-Nov-23	SENT	How: Email	Shark Bay Boat Hire	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Shark Bay Dive & Marine Safaris	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Shark Dive & Marine Safaris to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Shark Bay World Heritage Discovery & Visitor Centre	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called to confirm receipt of information package. Unsure if package received. Message passed on and most appropriate person will call back.	Awaiting return phone call
	14-Nov-23	RECEIVED	How: Call	N/A	Return phone call. Unsure if information package received. Asked for information package to be resent and provided alternative email.	Send information package to alternative email

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	14-Nov-23	SENT	How: Email	Shark Bay Visitor	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Three Islands Whale Shark Dive	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Three Islands to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
View Ningaloo	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Called View Ningaloo to confirm receipt of information package. Package received. Asked why being consulted. Explained RP due to EMBA. Will review and respond.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Yardie Creek Boat Tours	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	14-Nov-23	PLACED	How: Call	N/A	Left a message asking Yardie Creek Boat Tours to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
eNGOs						
Australian Conservation Foundation (ACF)	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Called ACF to confirm receipt of information package. Unsure if package received. Asked to send through again.	Information package resent
	15-Nov-23	SENT	How: Email	ACF	Information package resent.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Australian Marine Conservation Society (AMCS)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	23-Feb-23	PLACED	How: Call	N/A	Called AMCS to confirm receipt of information package. Unsure if package received, confirming and will have appropriate person contact Jadestone.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	15-Nov-23	SENT	How: Email	AMCS	Email sent following up to see if previous correspondence and information package was received and asking to provide contact details of most appropriate person to contact.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	Awaiting response
	23-Nov-23	PLACED	How: Call	N/A	Representative of AMCS confirmed receipt of Stag and Montara Invitation for Consultation emails and has been forwarded onto the appropriate person to consider and respond as appropriate. Indicated that AMCS does not respond to all of the consultation communications received by the organisation.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Conservation Council of Western Australia (CCWA)	4-May-23	SENT	How: Email	CCWA	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	15-Nov-23	SENT	How: Email	CCWA_1	Email sent following up to see if previous correspondence and information package was received and asking to provide contact details of most appropriate person to contact.	Awaiting response
	20-Nov-23	RECEIVED	How: Email	CCWA_1	Email received with contact for future consultation opportunities. CCWA does not have capacity to engage with proponents on all projects, however interested in ongoing consultation opportunities.	Noted
	21-Nov-23	SENT	How: Email	CCWA_1	Acknowledgment email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Greenpeace	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	N/A
	22-Dec-22	RECEIVED	How: Email	GreenPeace_AutoResponse	Automatic email response.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	17-Feb-23	RECEIVED	How: Email	GreenPeace_AutoResponse_2	Auto Response email received.	Awaiting response
	24-Feb-23	RECEIVED	How: Email	Greenpeace	Correspondence received in relation to Stag and Montara EPs. Requesting information on emissions, spill modelling and spill response plan as well as information on how Jadestone have identified relevant persons.	Response email sent

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	27-Mar-23	SENT	How: Email	Greenpeace_1	Acknowledgement email. Jadestone will respond shortly.	Response to be sent
	31-Mar-23	SENT	How: Email	Greenpeace_1	Response sent to queries raised in email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Protect Ningaloo	28-Aug-23	SENT	How: Email	G4	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	19-Oct-23	SENT	How: Email	G6	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	17-Nov-23	SENT	How: Email	Protect Ningaloo	Suitable contact number not known. Email sent following up to see if previous correspondence and information package was received and asking to provide contact details of most appropriate person to contact.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
The Wilderness Society	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	15-Nov-23	PLACED	How: Call	N/A	Called TWS to confirm receipt of information package for Stag and Montara. Asked for information packages to be resent.	Information packages resent
	15-Nov-23	SENT	How: Email	TWS	Information package resent.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
World Wildlife Fund (WWF)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	27-Sep-23	PLACED	How: Call	N/A	Called WWF to confirm receipt of information package. Unsure if package received. Asked to send through again.	Information packages resent
	27-Sep-23	SENT	How: Email	WWF	Email resent with attached information package for Stag and Montara Operations EP.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Other Associations						
Australian Council of Prawn Fisheries (ACPF)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	7-Sep-23	SENT	How: web form	N/A	Unable to find contact number for relevant person. Completed web form asking for most appropriate email to send information package to.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	Awaiting response
	20-Nov-23	RECEIVED	How: Email	ACPF	Email received asking Jadestone to consult with WAFIC. Commented that seafood industry is overwhelmed with requests and has limited capacity to respond.	WAFIC have already been consulted as a Relevant Person. Refer to Assessment of Merit table for details.
	22-Nov-23	SENT	How: Email	ACPF	Acknowledgement email advising WAFIC have been consulted as a Relevant Person for Stag Activities.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Exmouth Game Fishing Club	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	19-Apr-23	PLACED	How: Email	N/A	Left a message asking Exmouth GFC to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Karratha and Districts Chamber of Commerce and Industry	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	19-Apr-23	PLACED	How: Call	N/A	Left a message asking KDCCI to call Jadestone to confirm if consultation package was received and provide any feedback.	Awaiting return call
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
King Bay Game Fishing Club (KBGFC)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	18-Feb-23	RECEIVED	How: Email	KBGFC	Acknowledgement of receipt. KBGFC have no questions and appreciate the information. Confirmed contact details for future engagement.	Noted
	6-Mar-23	SENT	How: Email	KBGFC	Acknowledgement of email.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
Marine Tourism Association of Western Australia (MTWA)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	23-Feb-23	PLACED	How: Call	N/A	Called MTWA to confirm receipt of information package. Package received. Will review and respond.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Nickol Bay Sport Fishing Club	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	19-Apr-23	PLACED	How: Call	N/A	Called Nickol Bay SFC to confirm receipt of information package. Asked for package to be resent.	Package resent
	19-Apr-23	SENT	How: Email	NBSFC	Information package resent.	Awaiting response
	20-Nov-23	SENT	How: Email	G7	Email sent advising of closing date for consultation on Stag Activities prior to re-submitting EP to NOPSEMA, that our records indicate despite past efforts we have not received a response, and this is final attempt to elicit a response before re-submitting EP.	No further action. Include in ongoing consultation
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Academic and Research Organisations						
Australian Institute of Marine Science (AIMS)	22-Dec-22	SENT	How: Email	G1	Email sent to stakeholder with attached information package providing an update on 5 year revision of Stag EP and details on why they have been engaged and what is required.	Awaiting response
	17-Feb-23	SENT	How: Email	G2	Reminder- Given no correspondence, email sent to stakeholder to try and elicit a response as required by the regulations.	Awaiting response
	26-Sep-23	PLACED	How: Call	N/A	Called AIMS to confirm receipt of information package. Unsure if package received. Updated email provided.	Updated email noted
	26-Sep-23	SENT	How: Email	AIMS	Email sent to updated email with attached information package for Stag and Montara Operations EP.	Awaiting response
	28-Sep-23	RECEIVED	How: Email	AIMS	Acknowledgement of receipt. AIMS confirmed planned activities will not interfere with AIMS operations.	Noted. No further action. Include in ongoing consultation

Relevant person	Date	To/from	Engagement logistics	Reference Number	Summary of content	Action undertaken/Status
	5-Dec-23	SENT	How: Email	G8	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Coral Bay, Exmouth, Carnarvon and Denham.	No further action
	10-Jan-24	SENT	How: Email	G9	Email sent to stakeholder notifying them of upcoming community consultation information sessions in Onslow, Karratha, Dampier and Port Hedland.	No further action
Other*						
Community consultation_1	31-Jan-24	SENT	How: Email	Community Consultation_1	Email sent following up after meeting at community session in Karratha with PowerPoint presentation and Invitation for Consultation document.	No further action
Ngarluma Yindjibarndi Foundation Ltd (NYFL)	28-Nov-23	RECEIVED	How: Email	NYFL	Letter received in relation to consulting with NYFL.	Awaiting response
	20-Feb-24	SENT	How: Email	NYFL	Response sent explaining emails reached NYFL by mistake. Currently consulting directly with Ngarluma Aboriginal Corporation. Path open for NYFL to self-identify as a Relevant Person.	No further action

** In the course of consulting with current Relevant Persons and community sessions the following stakeholders were referred or suggested for consultation.*

Jadestone Energy

Invitation for Consultation
Stag Field Operations
and Future Activities

Invitation for Consultation

Jadestone Energy (Jadestone) is the operator of the existing Stag Field off the Pilbara coast. Jadestone is preparing two Environment Plans (EPs) for assessment by the Commonwealth regulatory authority, the National Offshore Petroleum Regulatory Authority (NOPSEMA).

The Environment Plans are for:

- ***Ongoing production and maintenance at the Stag Facility (Stag Operations); and***
- ***Plugging and abandonment of production wells and drilling new production wells at the Stag Facility as needed (Stag Drilling).***

Jadestone invites comments for its consideration during the period of the preparation of each EP.

Who is Jadestone Energy?

Jadestone is a leading upstream oil and gas company in the Asia Pacific region, with a focus on production and near-term development assets. The company is listed on the Alternative Investment Market of the London Stock Exchange (JSE). Contact details for Jadestone's Australian Operations are provided at the end of this document.

What is an Environment Plan?

The purpose of an Environment Plan (EP) is to identify the proposed petroleum activity's impacts on and risks to the environment. The EP also sets measures to reduce identified environmental impacts, potential risks due to the activity, and describe how and to what level of performance those measures will be implemented throughout the activity, including in the unlikely event of a significant unplanned event, e.g., hydrocarbon spill.

The NOPSEMA accepted Stag Operations EP must be revised and resubmitted every five years, or sooner if required.

Jadestone has revised and re-submitted the accepted Stag Operations EP in accordance with legislation (administrated by NOSPEMA). Jadestone continually updates the Stag Operations EP including consultation outcomes. The Stag Operations EP will not be accepted by NOPSEMA until they are satisfied that it meets the requirements of the legislation.

The Stag Operations EP covers activities associated with production; oil loading to a third-party tanker; the inspection, maintenance and repair of the wellhead platform; subsea export pipeline; wells; associated subsea infrastructure; and non-routine / unplanned activities and events should they arise.

Activities that will be subject to the future EP

The Stag Drilling EP is for the abandonment of existing wells before drilling new production wells from the facility, using a mobile offshore drilling unit (MODU) or drilling rig. The abandonment of existing wells and the drilling of new wells is required to maintain production. These activities occur approximately every two years (last drilled November 2022) and a five-year term drilling EP will be prepared in 2023.

Location

The Stag Field is located on the Northwest Shelf, approximately 60 km north-west of Dampier (Figure 1.). The permit area (WA-15-L) is in Commonwealth waters. The water depth at the Stag Field is 49 m. Location details are on Figure 1, including key features in the area.

The distance to Australian Marine Parks (AMPs) and other key features in the area is indicated in Table 1.

Table 1: Distance to AMPs and other key features

Regional Feature	Minimum distance from Wellheads
Montebello AMP	30 km
Dampier Archipelago	32 km
Dampier AMP	60 km
Closest Montebello Island	75 km

The Stag facility has been producing since 1998 with the required restricted zone in place. A Petroleum Safety Zone (PSZ) extends 500 m around the following Stag infrastructure:

- Wellhead platform (WHP)
- Catenary anchor leg mooring (CALM) buoy
- 2 km long carbon steel export oil pipeline

Pursuant to Section 616 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act) all vessels, other than those under the control of Jadestone or authorised by Jadestone, are prohibited from entering or being present in the PSZ.

A cautionary zone of 2.5 NM radius is maintained around the facilities, with the centre located 1.4 km due north of the WHP. The information has been noted on Admiralty Charts covering the region (#AUS 741 and AUS 57), and although vessels are requested to avoid navigating, anchoring and fishing within the cautionary zone, it is not an exclusion zone.

All current activities are contained within the PSZ, although vessel activities and offtakes may occur outside of the defined PSZ, but within the cautionary zone.

All planned activities such as drilling, including MODU activity, will be contained within the defined Operational Area in permit area WA-15-L.

In the unlikely event of a significant unplanned event, e.g., hydrocarbon spill, the values in the area (habitats and locations), having been identified in the EP, will be prioritised for prompt protection activities.

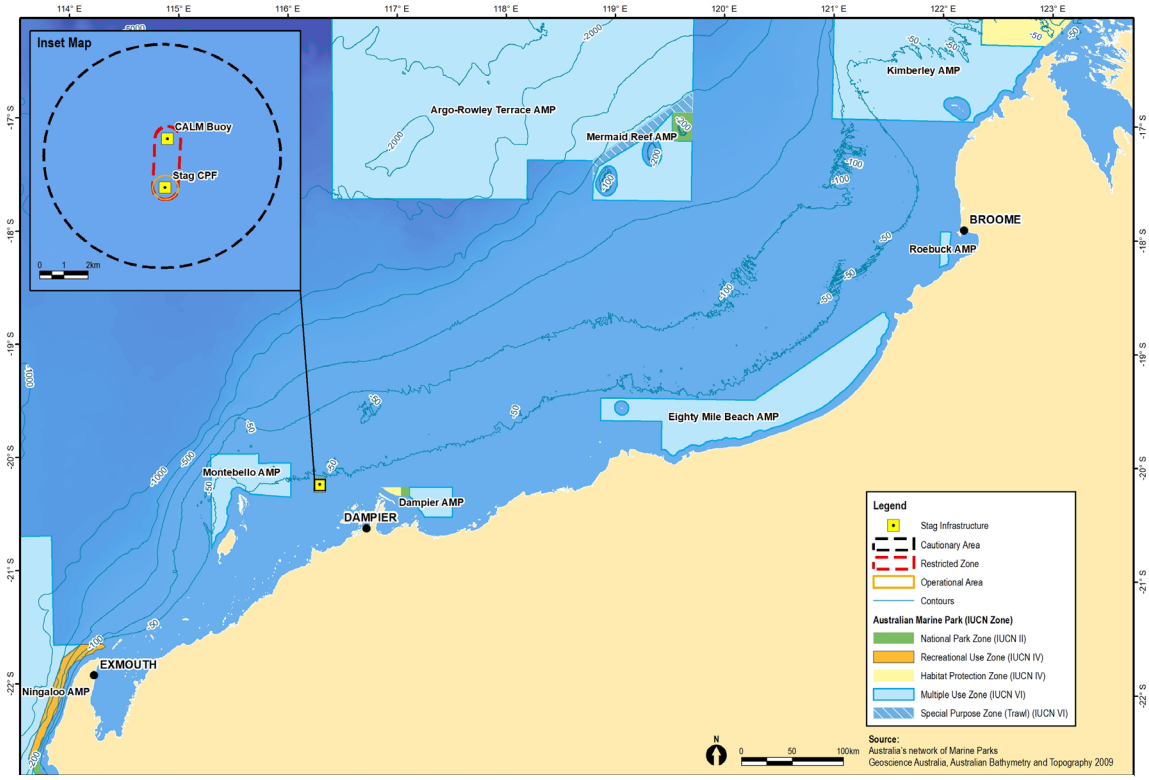


FIGURE 1: STAG LOCATION MAP

Why are you being engaged?

Jadestone has identified that you or your organisation is a 'relevant person' under the Offshore Petroleum and Greenhouse Gas (Environment) Regulations 2009 because of your functions, activities, or interests within the Environment that Might Be Affected (EMBA) for Stag. This is defined as the area that might be affected by planned events that will occur within a defined operational area or unplanned events that could extend beyond the defined operational area e.g., in the low likelihood of an unplanned hydrocarbon spill.

The NOPSEMA website includes a video about EMBAs and how they are determined.

www.nopsema.gov.au/news-and-resources/presentations-and-videos#Oil%20Spill%20Modelling

Figure 2 shows the Stag EMBA.

What do we do with information provided?

In line with Regulation 9(8) of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009, correspondence between Jadestone and you or your organisation must be provided to NOPSEMA. All comments are compiled into a report and are published in the publicly available EP, with names and contact details redacted.

There is, however, the opportunity for you to request that your correspondence not be published. That is, whilst the correspondence is still required to be provided to NOPSEMA, it will be provided in a separate report that is for NOPSEMA only and is not published.

Please notify Jadestone of any correspondence that we receive from you or your organisation that you wish to be confidential. That correspondence will be provided to NOPSEMA in a separate report, and not published on NOPSEMA's website.

All comments received by Jadestone will be carefully assessed to understand the potential impacts of the activity upon you or your organisation as a relevant person, that is your functions, activities, or interests. Jadestone's assessment will be provided to you and documented in the EP.

How do I find out more?

Further information on Jadestone's Stag facility is available on our website: https://www.jadestone-energy.com/assets/australia-portfolio/stag/

The EP has been published, minus any confidential material, on the NOPSEMA's website.

https://info.nopsema.gov.au/offshore_projects/19/show_public

What do Jadestone want to know?

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes your or your organisation's comments at any time.

Please let us know if you:

- have any comments on the activity and the potential impacts on you or your organisation's interests.
- require any further information.
- have any preference on how we contact you in the future.
- need anything further from us to assist you with comments you might wish to make.

Could you also help us make an informed decision about your requirement for ongoing consultation by letting us know if you do not wish to receive further updates for activities associated with the Stag Field.

What Happens next?

Jadestone will make reasonable efforts to consult with all parties that have been identified as potentially relevant persons.

Please be aware that it is a requirement of NOPSEMA that Jadestone documents no responses to this Invitation for Consultation, and consequently, if no response is received, Jadestone may make follow-up contact with you or your organisation several times to seek a response.

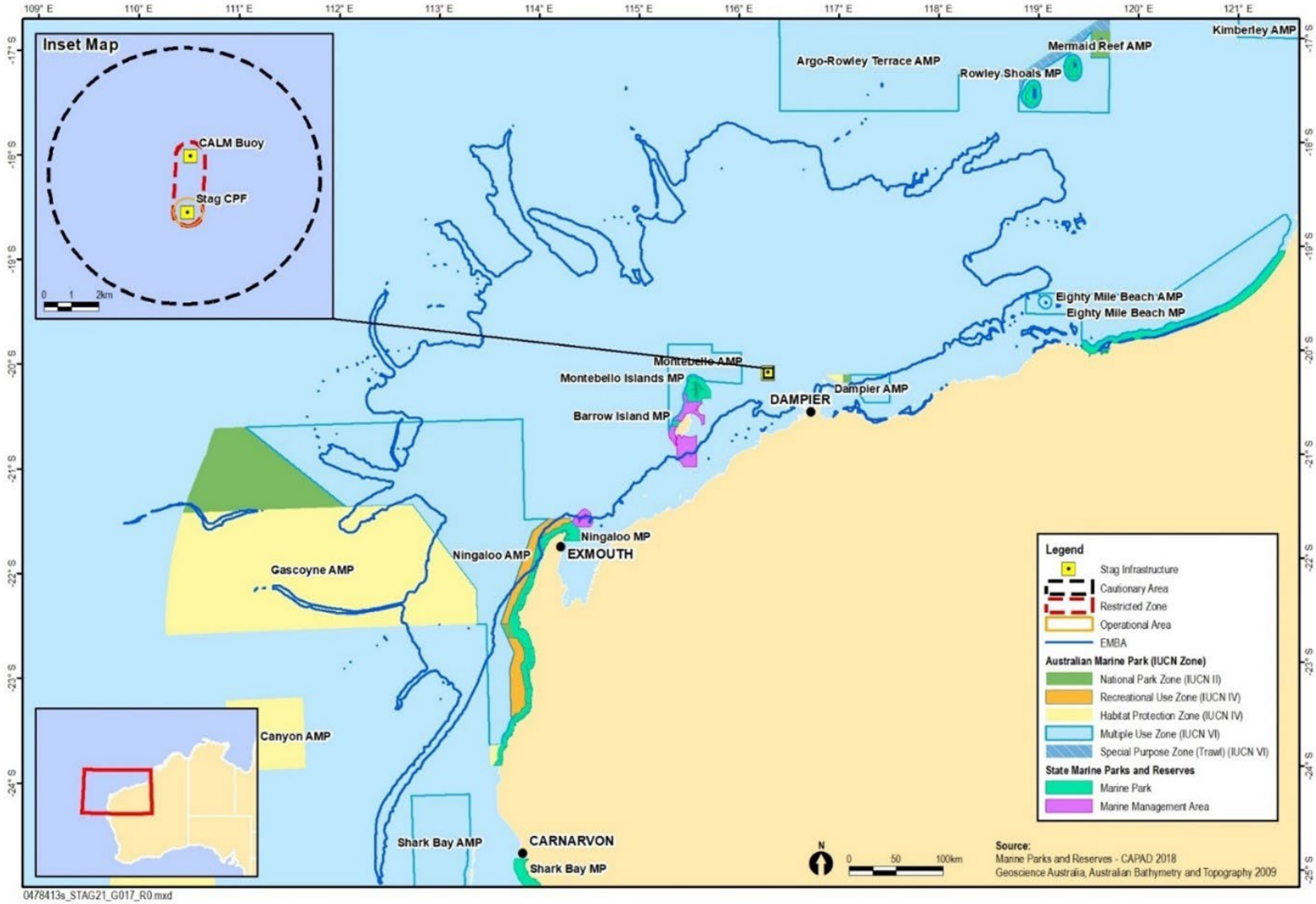


FIGURE 2: **STAG ENVIRONMENT THAT MAY BE AFFECTED (EMBA) IN THE EVENT OF A LOSS OF HYDROCARBONS**

Potential Risks and Management

A summary of potential risks to relevant persons who may have functions, activities or interests within the EMBA, that are common to all planned activities, is provided below. For each risk the associated management measures are summarised in Table 1.

TABLE 1: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES COMMON TO BOTH ENVIRONMENT PLANS

Potential Risks	Mitigation and /or Management Measures
Light Emissions	- Potential impacts from lighting are assessed as occurring within 20 km of a vessel or facility based on the National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2019) - Facility and vessel navigation lights are compliant with the Navigation Act 2012.
Noise Emissions	- Vessels and helicopters comply with relevant parts of Environment Protection and Biodiversity Conservation (EPBC) Regulation (2000) Part 8 - Vessel and machinery are maintained in accordance with Flag State certification requirements. - All engines, compressors and machinery on the CPF and Mobile Offshore Drilling Rig (MODU) are maintained via a maintenance management system
Atmospheric Emissions	- Flag State Certificate and/or IAPP certifies measures are in place to manage air emissions. - All engines, compressors and machinery on the CPF and MODU are maintained via a maintenance management system
Liquid (operational) discharges	- Emissions and discharges of liquid waste to sea are in accordance with legislative requirements, the impact and risk assessment process indicates that discharges will not result in significant effects to marine fauna. - Waste Management Plan
Interaction with other users	- A pre-existing 500 m restricted zone is in place around the infrastructure and will remain in place for the duration of operations under the proposed EPs, including during the drilling activity as the MODU will be within the 500m restricted zone of the CPF. No fishing vessels are to enter this zone. - Marine notifications will be made to relevant stakeholders, describing the location of the activity and a 500 m petroleum safety zone is present to prevent the risk of collisions and marked on charts. - Commercial fishers are permitted to enter the wider 2.5 Nm cautionary zone and fish, transit or anchor for the duration of operations under the proposed EP, but not the 500m exclusion zone, as long as it is safe to do so. - Consultation is undertaken with all relevant persons
Physical Footprint	- Plans are in place for any future decommissioning including inspection and maintenance of all infrastructure. - Surveys of seabed undertaken prior to integrity, maintenance or repair work - Seabed disturbance limited to planned activities and defined locations

In addition to the risks outlined in Table 1, the risk of produced water discharge is specific to the Stag Operations EP activities (Table 2).

TABLE 2: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG OPERATIONS EP

Potential Risks	Mitigation and /or Management Measures
Produced water discharges	- Beyond temporary perturbation to water quality, no environmental impacts due to the discharge of produced water are expected. - Produced water discharges are monitored and recorded with adaptive management processes in place if significant changes are identified

In addition to the risks outlined in Table 1, the risk of drilling discharges is specific to the Stag Drilling EP activities (Table 3).

TABLE 3: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG DRILLING EP

Potential Risks	Mitigation and /or Management Measures
Drilling discharges	- Selection process for materials as part of NOPSEMA approval - Process for inventory control to minimise leftovers. - Cuttings management system in place to manage muds (no synthetic based muds planned for use)

Additional risks that are associated with events that are not expected to occur during normal activities are outlined in Table 4.

TABLE 4: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH UNPLANNED EVENTS

Potential Risks	Mitigation and /or Management Measures
Introduced Marine Species (IMS)	- IMS Management will meet legal requirements and reduce risks to As Low as Reasonably Practicable (ALARP) and Acceptable levels. - Vessels will be required to adhere to ballast water management, quarantine and biofouling requirements if required
Interaction with fauna	- Vessels operating within the restricted zone must not exceed a speed of five (5) knots. - Induction includes information on speed limits and requirements for interacting with marine fauna
Unplanned discharges	- No release of non-hazardous / hazardous solid wastes or non-hydrocarbon hazardous liquids to the marine environment - Limitations of flaring volumes - Integrity and maintenance requirements maintained. - Dropped object prevention. - Waste management plan implemented, and details included in induction materials. - Competent and trained personnel are inducted and have appropriate qualifications. - Spill kits available and incident response plans in place
Vessel/MODU collision	- Marine notifications will be made to relevant stakeholders, describing the location of the activity and a 500 m petroleum safety zone is present to prevent the risk of collisions. - Vessels operating within the restricted zone must not exceed a speed of five (5) knots. - Simultaneous Operations (SIMOPS) plan in place to interface between the Stag facility and MODU during drilling. - Navigation lights installed and checked
Hydrocarbon release	- NOPSEMA accepted Oil Pollution Emergency Plan (OPEP) and well operations management plan (WOMP) - Procedures in place on WHP and vessels to prevent hydrocarbon release to sea during operations. - Procedures in place on MODU to prevent hydrocarbon release to sea during drilling. - Maintenance and integrity checks and inspections - Appropriate vessel/MODU spill response plans, equipment and materials will be in place and maintained. - Appropriate refuelling procedures and equipment will be used to prevent spills to the marine environment

Providing Feedback

If you would like to comment on the proposed activities outlined in this fact sheet or would like additional information, please contact Jadestone.

Email: consult@jadestone-energy.com **Phone: 08 9486 6600**

The Atrium, Level 2, 168 St Georges Terrace, Perth WA 6000

Jadestone Energy

Invitation for Consultation
Stag Field Operations and Future Activities

Invitation for Consultation

Jadestone Energy (Jadestone) is the operator of the existing Stag Field off the Pilbara coast. Jadestone is preparing two Environment Plans (EPs) for assessment by the Commonwealth regulatory authority, the National Offshore Petroleum Regulatory Authority (NOPSEMA).

The Environment Plans are for:

- ***Ongoing production and maintenance at the Stag Facility (Stag Operations); and***
- ***Plugging and abandonment of production wells and drilling new production wells at the Stag Facility as needed (Stag Drilling).***

Jadestone invites comments for its consideration during the period of the preparation of each EP.

Who is Jadestone Energy?

Jadestone is a leading upstream oil and gas company in the Asia Pacific region, with a focus on production and near-term development assets. The company is listed on the Alternative Investment Market of the London Stock Exchange (JSE).

Contact details for Jadestone's Australian Operations are provided at the end of this document.

What is an Environment Plan?

The purpose of an EP is to identify the proposed petroleum activity's impacts on and risks to the environment. The EP also sets measures to reduce identified environmental impacts, potential risks due to the activity, and describe how and to what level of performance those measures will be implemented throughout the activity, including in the unlikely event of a unplanned event, e.g., hydrocarbon spill.

NOPSEMA requires that the existing EP, in place for Stag operations, must be revised and resubmitted every five years, or sooner if required.

There will be two EPs.

One for the existing Stag Operations which is now due its five-year revision, and one for Stag Drilling, for the abandonment of production wells and for drilling new production wells.

- The Stag Operations revision EP is currently in preparation, covering activities associated with production; oil loading to a third-party tanker; the inspection, maintenance and repair of the calm buoy; central processing facility; subsea export pipeline; wells; associated subsea infrastructure; and non-routine / unplanned activities and events should they arise.

- The Stag Drilling EP is for the abandonment of existing wells before drilling new production wells from the facility, using a mobile offshore drilling unit (MODU) or drilling rig. The abandonment of existing wells and the drilling of new wells is required to maintain production. These activities occur approximately every two years (last drilled November 2022) and a five-year term drilling EP will be prepared in 2023.

Why are you being engaged?

Jadestone has identified that you or your organisation is a 'relevant person' under the Offshore Petroleum and Greenhouse Gas (Environment) Regulations 2009 because of your functions, activities, or interests within the operational area and Environment that Might Be Affected (EMBA) for Stag.

This is defined as the area that might be affected by planned events that will occur within a defined operational area or unplanned events which could extend beyond the defined operational area e.g., in the low likelihood of an unplanned hydrocarbon spill.

What do we do with information provided?

In line with Regulation 9(8) of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009, correspondence between Jadestone and you or your organisation must be provided to NOPSEMA. All comments are compiled into a report and are published in the publicly available EP, with names and contact details redacted.

There is, however, the opportunity for you to request that your correspondence not be published. That is, whilst the correspondence is still required to be provided to NOPSEMA, it will be provided in a separate report that is for NOPSEMA only and is not published.

Please notify Jadestone of any correspondence that we receive from you or your organisation that you wish to be confidential.

All comments received by Jadestone will be carefully assessed to understand the potential impacts of the activity upon you or your organisation as a relevant person, that is your functions, activities, or interests. Jadestone's assessment will be provided to you and documented in the EP.

How do I find out more?

Further information on Jadestone's Stag facility is available on our website: https://www.jadestone-energy.com/assets/australia-portfolio/stag/

Following NOPSEMA's completion of its pre-assessment checks of the EP it will be published, minus any confidential material, on the NOPSEMA's website.

https://info.nopsema.gov.au/offshore_projects/19/show_public

What do Jadestone want to know?

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes your or your organisation's comments at any time.

Please let us know if you:

- have any comments on the activity and the potential impacts on you or your organisation's interests
- require any further information
- have any preference on how we contact you in the future
- need anything further from us to assist you with comments you might wish to make.

Could you also help us make an informed decision about your requirement for ongoing consultation by letting us know if you do not wish to receive further updates for activities associated with the Stag field operations or drilling activities.

What Happens next?

Jadestone will make reasonable efforts to consult with all parties that have been identified as potentially relevant persons.

Please be aware that it is a requirement of NOPSEMA that Jadestone documents no responses to this Invitation for Consultation, and consequently, if no response is received, Jadestone may make follow-up contact with you or your organisation several times to seek a response.

Location

The Stag Field is located on the Northwest Shelf, approximately 60 km north-west of Dampier. The permit area (WA-15-L) is in Commonwealth waters. The water depth at the Stag Field is 49 m LAT. Location details are on Figure 1, including key features in the area.

The distance to Australian Marine Parks (AMP) and other key features in the area is indicated in table 1.

Table 1: Distance to Regional Features

Regional Feature	Distance from Stag CPF
Montebello AMP	30 km
Dampier Archipelago	32 km
Dampier AMP	60 km
Closest Montebello Island	75 km

The Stag facility has been producing since 1998 with the required restricted zone in place. Petroleum Safety Zone (PSZ) extends 500 m around the following Stag infrastructure:

- central processing facility
- catenary anchor leg mooring (CALM) buoy
- 2 km long carbon steel export oil pipeline

Pursuant to Section 616 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act) all vessels, other than those under the control of Jadestone or authorised by Jadestone, are prohibited from entering or being present in the PSZ.

A cautionary zone of 2.5nm radius is maintained around the facilities, with the centre located 1.4 km due north of the CPF. Although vessels are requested to avoid navigating, anchoring and fishing within the cautionary zone, it is not an exclusion zone.

All current activities are contained within the PSZ, although vessel activities and offtakes may occur outside of the defined PSZ, but within the cautionary zone.

Future activities such as drilling, including MODU activity, will be contained within the defined Operational Areas in permit area WA-15-L.

In the unlikely event of a significant unplanned event, e.g., hydrocarbon spill, the values in the EMBA (habitats and locations), having been identified in the EP, will be prioritised for prompt protection activities.

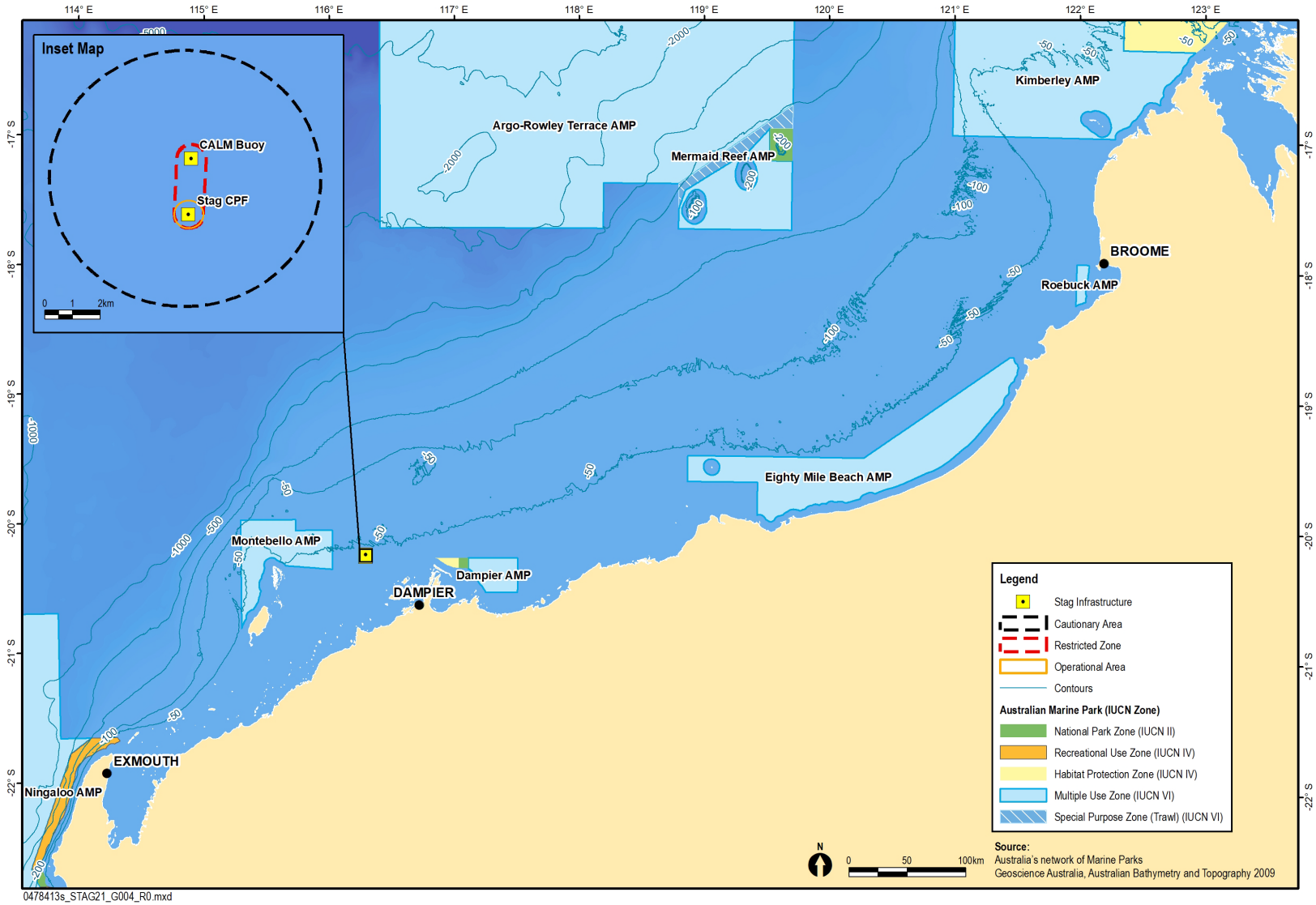


Figure 1 – Location map

Potential Risks and Management

A summary of potential risks to relevant persons who may have functions, activities or interests within the EMBA, that are common to all planned activities, is provided below. For each risk the associated management measures are summarised in Table 1.

TABLE 1: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES COMMON TO BOTH ENVIRONMENT PLANS

Potential Risks	Mitigation and /or Management Measures
Light Emissions	- Potential impacts from lighting are assessed as occurring within 20 km of a vessel or facility based on the National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2019) - Facility and vessel navigation lights are compliant with the Navigation Act 2012.
Noise Emissions	- Vessels and helicopters comply with relevant parts of Environment Protection and Biodiversity Conservation (EPBC) Regulation (2000) Part 8 - Vessel and machinery are maintained in accordance with Flag State certification requirements. - All engines, compressors and machinery on the CPF and Mobile Offshore Drilling Rig (MODU) are maintained via a maintenance management system
Atmospheric Emissions	- Flag State Certificate and/or IAPP certifies measures are in place to manage air emissions - All engines, compressors and machinery on the CPF and MODU are maintained via a maintenance management system
Liquid (operational) discharges	- Emissions and discharges of liquid waste to sea are in accordance with legislative requirements, the impact and risk assessment process indicates that discharges will not result in significant effects to marine fauna - Waste Management Plan
Interaction with other users	- A pre-existing 500 m restricted zone is in place around the infrastructure and will remain in place for the duration of operations under the proposed EPs, including during the drilling activity as the MODU will be within the 500m restricted zone of the CPF. No fishing vessels are to enter this zone - Marine notifications will be made to relevant stakeholders, describing the location of the activity and a 500 m petroleum safety zone is present to prevent the risk of collisions and marked on charts - Commercial fishers are permitted to enter the wider 2.5 Nm cautionary zone and fish, transit or anchor for the duration of operations under the proposed EP, but not the 500m exclusion zone, as long as it is safe to do so - Consultation is undertaken with all relevant persons -
Physical Footprint	- Plans are in place for any future decommissioning including inspection and maintenance of all infrastructure - Surveys of seabed undertaken prior to integrity, maintenance or repair work - Seabed disturbance limited to planned activities and defined locations

In addition to the risks outlined in Table 1, the risk of produced water discharge is specific to the Stag Operations EP activities (Table 2).

TABLE 2: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG OPERATIONS EP

Potential Risks	Mitigation and /or Management Measures
Produced water discharges	- Beyond temporary perturbation to water quality, no environmental impacts due to the discharge of produced water are expected - Produced water discharges are monitored and recorded with adaptive management processes in place if significant changes are identified

In addition to the risks outlined in Table 1, the risk of drilling discharges is specific to the Stag Drilling EP activities (Table 3).

TABLE 3: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH STAG DRILLING EP

Potential Risks	Mitigation and /or Management Measures
Drilling discharges	- Selection process for materials as part of NOPSEMA approval - Process for inventory control to minimise leftovers - Cuttings management system in place to manage muds (no synthetic based muds planned for use)

Additional risks that are associated with events that are not expected to occur during normal activities are outlined in Table 4.

TABLE 4: POTENTIAL RISKS AND MITIGATION/MANAGEMENT MEASURES ASSOCIATED ONLY WITH UNPLANNED EVENTS

Potential Risks	Mitigation and /or Management Measures
Introduced Marine Species (IMS)	- IMS Management will meet legal requirements and reduce risks to As Low As Reasonably Practicable (ALARP) and Acceptable levels. - Vessels will be required to adhere to ballast water management, quarantine and biofouling requirements if required
Interaction with fauna	- Vessels operating within the restricted zone must not exceed a speed of five (5) knots - Induction includes information on speed limits and requirements for interacting with marine fauna
Unplanned discharges	- No release of non-hazardous / hazardous solid wastes or non-hydrocarbon hazardous liquids to the marine environment - Limitations of flaring volumes - Integrity and maintenance requirements maintained - Dropped object prevention - Waste management plan implemented, and details included in induction materials - Competent and trained personnel are inducted and have appropriate qualifications - Spill kits available and incident response plans in place
Vessel/MODU collision	- Marine notifications will be made to relevant stakeholders, describing the location of the activity and a 500 m petroleum safety zone is present to prevent the risk of collisions - Vessels operating within the restricted zone must not exceed a speed of five (5) knots - Simultaneous Operations (SIMOPS) plan in place to interface between the Stag facility and MODU during drilling - Navigation lights installed and checked
Hydrocarbon release	- NOPSEMA accepted Oil Pollution Emergency Plan (OPEP) and well operations management plan (WOMP) - Procedures in place on CPF and FPSO to prevent hydrocarbon release to sea during operations - Procedures in place on MODU to prevent hydrocarbon release to sea during drilling - Maintenance and integrity checks and inspections - Appropriate vessel/MODU spill response plans, equipment and materials will be in place and maintained - Appropriate refuelling procedures and equipment will be used to prevent spills to the marine environment

Providing Feedback

If you would like to comment on the proposed activities outlined in this fact sheet or would like additional information, please contact Jadestone before 17th February 2023.

Email: consult@jadestone-energy.com **Phone: 08 9486 6600**

The Atrium, Level 2, 168 St Georges Terrace, Perth WA 6000

NOTICES

www.theaustralian.com.au

POSSIBLE BENEFICIARIES

Would any children of **ALFRED LOWE, WILIAM LOWE** and **FREDERICK GEORGE LOWE** or their father **ALFRED LOWE** or any person knowing their whereabouts or claiming to be related to them or **GEORGE ALFRED LOWE** also known as **ALFRED GEORGE LOWE** deceased please contact The Public Trustee of Queensland, G.P.O. Box 2251 Brisbane 4001, Queensland, Australia (or email maria.murphy@pt.qld.gov.au) quoting reference 20126241 and provide full details of their claim.

Notice is hereby given on or after the 25th May 2023 The Public Trustee intends, pursuant to Section 132 of the *Public Trustee Act 1978* to proceed to distribute the assets in the estate of **GEORGE ALFRED LOWE** deceased late of 2082 Wynnum Road, Wynnum West in the State of Queensland having regard only to the persons whose claims have been established to his satisfaction or who then appear to him to have the best claim in law.

SAMAY ZHOUAND
THE PUBLIC TRUSTEE OF QUEENSLAND AND CEO

M8337

POSSIBLE BENEFICIARIES

Would **MARION JOAN HARRINGTON** also known as **MARION JOAN SADER** or **EDWARD FRANCIS HARRINGTON** also known as **EDWARD HARRINGTON** or any children of **MARION JOAN HARRINGTON** also known as **MARION JOAN SADER** or **EDWARD FRANCIS HARRINGTON** also known as **EDWARD HARRINGTON** or any person knowing their whereabouts or claiming to be related to them or **PAMELA FLORENCE SHEAD** deceased please contact The Public Trustee of Queensland, G.P.O. Box 2251 Brisbane 4001, Queensland, Australia (or email maria.murphy@pt.qld.gov.au quoting reference 20567893 and provide full details of their claim.

Notice is hereby given on or after the 1st June 2023 The Public Trustee intends, pursuant to Section 132 of the *Public Trustee Act 1978* to proceed to distribute the assets in the estate of **PAMELA FLORENCE SHEAD** deceased late of 1/26 Alice Street, Mount Isa in the State of Queensland having regard only to the persons whose claims have been established to his satisfaction or who then appear to him to have the best claim in law.

SAMAY ZHOUAND
THE PUBLIC TRUSTEE OF QUEENSLAND AND CEO

M8335

News Limited would like to congratulate the winners of the "Win a Chance to WIN $1 Million!" Promotion:

MAJOR PRIZE WINNERS
R West, 0810

MINOR PRIZE WINNERS
N Cronin 2037; M Cheney 4218; J Brealey 5086; A Gourley 3977; LHong Chua 2142; H Phillipe 4873; O Daysh 5260; H Nazzari 3166; B Richard 2210; A Lassig 4670; M Troiano 5031; K Fleming 3910; A Ishak 2176; R Da Costa 4173; J Grech 5038; T Hocking 3550; J Cabarrus 2250; A McFarlane 4000; H Eldridge 5169; D Leigh 3150; D Goldman 2036; D Kleidon 4214; L Thessalonikeous 5037; S Roberts 3218; L Waterson 2232; B Prior 4810; E STEWART 5011; T Rode 3805; S Tapp 2234; S Hickson 4507; D White 5074; R Dunne 3340; P Fornasier 2137; P Townend 4070; J Reddock 5016; C Williams 3809; B Forward 2750; S Gleeson 4352; G Troiano 5031; R Bowlen 3939; J Schafer 2671; K Kroll 4133; D Allen 5127; T Haintz 3230; M Winney 2223; S Foley 4503; G Sanderson 810; J Wilson 3337; K Anderson 2261; E Watts 4562; J Craft 0832; K Rowswell 3191; A Edwards 2261; H Watts 4070; E Dean 836; W Driscoll 3978.

CSL gene therapy saving lives, for just $3.5m a dose

JARED LYNCH

As CSL's former chief executive Paul Perreault was packing up his desk in Melbourne last month there was one milestone achieved during his 10 years at the helm that could not escape his attention.

"Who thought CSL would be the first one in the world with gene therapy for haemophilia?" Mr Perreault told this masthead.

"I mean, I can tell you, a decade ago, nobody thought we would."

CSL was originally solely in the plasma business. It was established in World War I as the Commonwealth Serum Laboratories, before branching out into vaccines, floating on the ASX in 1994 and becoming not only one of the biggest companies on the Australian sharemarket but a global pharmaceutical juggernaut.

Last November it took another step in cementing its position in the cutting edge of drug development – an area it spends about $1bn a year on – when the US Food and Drug Administration approved CSL's new treatment Hemgenix.

The drug injects a functioning copy of the blood clotting gene into a patient with haemophilia B, providing a single dose fix to the debilitating illness that plagued the European royalty in the 19th and early 20th centuries and affects about one in 40,000 males today.

Crucially, the one shot replaces a lifetime of fortnightly infusions to control the blood disorder, effectively curing a patient.

European regulators were quick to follow the US FDA in approving Hemgenix. But seemingly miraculous treatment comes at a cost – about $US3.5m ($5.23m) a dose – becoming the world's most expensive drug.

It is one of the handful of approved gene therapies that have sparked a wave of drugs priced in the millions of dollars per patient. The high cost of the drugs – which promise to cure or treat diseases in a single course – has raised eyebrows. After all, big pharma was previously reluctant to charge any more than six figures for a drug.

AARON FRANCIS

Former CSL chief executive Paul Perreault is proud of CSL's accomplishments

But patients say the massive expense is worth it, particularly when amortised over their lifetime. It is this rationale health funders need to face as they potentially baulk at paying the handsome fee for these groundbreaking treatments — which have been approved to not only cure blood disorders such as Haemophilia B, but also muscle wasting conditions and rare childhood neurological diseases.

Steven Yatomi-Clarke, chief executive of ASX-listed biotech Prescient Therapeutics – which has developed a gene therapy to treat a rare and aggressive form of lymphoma – says while the treatments are expensive, they flip the traditional model of big pharma.

To put it in context, current haemophilia treatments cost $US250,000 to $US500,000 per patient, per year, for the rest of their lives.

"It's really flying in the face of the big pharma business model in many ways. They want someone to stay on a drug for a very long time ... that's the big pharma model," Mr Yatomi-Smith says.

"But gene and cell therapy throws that playbook out the window. It's a single infusion.

"In the case of rare childhood diseases, if my child was normally not going to live past the age of eight years old, and you can cure my son, my son or daughter, then they're going to live a long and productive life. They're going to be paying taxes, consuming goods and services. All of a sudden, $2m or $3m looks to be a bargain."

> 'All of a sudden, $2m or $3m looks to be a bargain'
>
> **STEVEN YATOMI-CLARKE**
> PRESCIENT THERAPEUTICS CEO

But government health budgets are under pressure as people live longer with chronic conditions. According to the latest spending data, Australian federal and state governments spent $142.6bn on healthcare in the 2020 financial year, a 5 per cent increase on the previous year. This accounted for 70 per cent of overall health spending, which totalled $202.5bn.

Around the world, health spending accounts for about 10 per cent of global GDP, and the World Health Organisation forecasts that proportion to increase to 13 per cent in coming years.

For CSL, the move into gene therapy was not as dramatic as it sounds. For years the company produced a plasma-derived product that replaced the missing blood clotting factor IX in patients with haemophilia B.

CSL's head of research and development and chief medical officer, Bill Mezzanotte, said that product "helped patients a lot", but it required an intravenous injection about three times a week.

Then last decade it launched Idelvion: a recombinant factor IX product that lengthened the treatment time for patients to once every two weeks. It continues to remain popular, with sales leaping 22 per cent to $US363m in the six months to December 31.

"It's still an IV infusion on a regular basis and we thought we could do better. And because we had deep scientific and commercial expertise, we knew what we were looking for," Dr Mezzanotte said.

The solution was found when it licensed Dutch biotech uniQure's gene therapy technology, which underpins Hemgenix. CSL funded the later stage clinical trials and has the global rights to commercialise the treatment.

Wilsons analyst Shane Storey said the partnership allowed CSL to expand and fortify its "leadership position in haemophilia B".

"The potential to replace more than 10 years of regular prophylactic management for these patients with a single shot of Hemgenix is a powerful driver of sector dominance, which brings with it margin expansion and sales leverage opportunities within the CSL Behring recombinant haemophilia," Dr Wilson said in a note to investors when the FDA granted its approval.

For Dr Mezzanotte, it's about balance. He hopes the company's foray into gene therapy will not cannibalise its existing businesses.

"We won't walk away from plasma therapy, we won't walk away from recombinants. We believe they can all work together for the right patients because even Hemgenix won't be right for every patient," he said, adding it had nothing to do with the gene therapy's price.

"Not every patient would be a good candidate. Either their bleeding is not severe enough, and look, first of all, we still have to do studies in children. And people may be happy with Ildelvion.

"So, we'll still have Ildelvion available for many of those patients where (Hemgenix) is not right for them."

In regard to children, CSL's vice president of research Michael Wilson says the underlying technology has limitations.

TENDERS

www.theaustralian.com.au

Invitation for Consultation: Montara Project and Stag Field

Montara Project

Jadestone Energy (Jadestone) is the operator of the producing Montara Project in Australian waters, approximately 690 km west of Darwin in the Timor Sea. The Montara Project operations involve oil production using wellhead platform (WHP) wells for the Montara field, and subsea wells for the Swift, Skua and Swallow fields. The oil from the subsea wells is piped via flowlines to the unmanned WHP, and then to the Montara Venture floating production storage and offloading (FPSO) facility, which acts as a hub for the project in production since 2013.

Stag Field

Jadestone is also the operator of the producing Stag field in Australian waters and located approximately 60 km northwest of Dampier in the Indian Ocean. The Stag field was developed using a fixed leg, 12 well-slot, manned central processing facility platform in production since 1998. This is connected, by an eight-inch underwater export pipeline, to a pipeline end manifold where shuttle tankers directly load crude oil via a catenary anchor leg mooring buoy.

Environment Plans (EP)

Jadestone is updating the currently approved EPs, the Montara EP for the Montara Project, and the Stag EP for the Stag field. Each EP will govern production and maintenance activities for the next five years. The revised Montara EP and Stag EP will be assessed by the National Offshore Petroleum Safety and Environmental Management Authority for acceptance.

In addition, Jadestone is preparing an EP for the removal of three subsea wellheads at Montara that are no longer in use (the Wellhead Removal EP). This activity is tentatively planned to occur in 2023/2024.

Jadestone is also preparing an EP for the drilling activities at the Stag platform (the Stag Drilling EP). This will include new production wells from recovered well-slots and may include plugging and abandonment of other wells potentially involving wellhead removal.

The purpose of the EPs is to identify the risks and impact of each proposed petroleum activity on the environment. The EPs will also set out measures to reduce identified environmental impacts and describe how and to what level of performance those measures will be implemented throughout each activity.

Jadestone is inviting comments for consideration during the preparation of each of the EPs discussed above.

Further information on Jadestone's Montara Project is available on the company's website at:

www.jadestone-energy.com/assets/australia-portfolio/montara.

Further information on Jadestone's Stag field is available on the company's website at:

www.jadestone-energy.com/assets/australia-portfolio/stag.

Please let us know if you:

- require any further information; and/or
- have any comments on the activity and the potential impacts on your interests.

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes their comments at any time.

For further information or to make comment please email: consult@jadestone-energy.com.

Jadestone Energy

ACARP

The Australian Coal Industry's Research Program

ACARP assists the Australian coal industry in developing and adopting technology and mining practice that leads the world. ACARP is seeking research in the following categories driving minimised emissions and environmental impact of industry:

- Underground Mining
- Open Cut Mining
- Environment and Community
- Coal Preparation
- Technical Market Support
- Mine Site Greenhouse Gas Mitigation

This program is entirely funded, owned and managed by the black coal producers.

Additional information including specific research priorities, the proposal format and proposal summary sheet can be obtained from **www.acarp.com.au** or by phoning 07 3225 3600.

The closing date for proposals is Wednesday, 26 April 2023.

DEATH & FUNERAL NOTICES

www.theaustralian.com.au

JOHNSTON AC, Robert Alan (Bob)

Dearly loved and loving Husband of Judith. Dearly loved Husband of Verna (dec). Devoted Father of Ian (dec), Bruce (dec), Helen and Margaret. Father-in-law of Linda, Jenny, Victor and Graeme. Proud Grandfather of Rebeccah, Cameron, Andrew, Stephanie, Melanie, Philippa, Alexander, Alana, Alison and Rachel. Fond Great-Grandfather of their 17 Children.

Always in our Hearts

A Service for Bob will be held on Thursday, 30th March, 2023 commencing 11am, in St Stephen's Uniting Church, Macquarie Street, Sydney. In lieu of flowers, please consider a donation in Bob's memory to The Brain and Mind Centre - https://www.sydney.edu.au/engage/give/how-to-donate.html

For details of how to live stream this service please contact enquiries@waltercarter.com.au

WALTER CARTER
CRAFTING FAREWELLS
02 9389 3499

26-year-old Edward Craven paid more than $80m for 29-31 St Georges Rd, Toorak

Billionaire central: The richest suburbs

Continued from Page 17

Toorak. Many of Melbourne's blue bloods gather around four main streets: Albany Rd, Irving Rd, Clendon Rd and St Georges Rd.

Vaucluse (12)

Billionaire Harry Triguboff is one big name who lives in Sydney's prime waterfront location. He and his wife have one of the largest privately held landholdings on Vaucluse's waterfront, which includes two dwellings.

Arthur Tzaneros, who owns ACFS Port Logistics with father Terry, paid $38m in 2021 for a mansion on Olola Ave, complete with a tennis court and swimming pool.

But the biggest splash of late was fashion mogul Nicky Zimmermann paying $60m last December for a three-storey residence on about 1700sq m of waterfront.

There are formal and informal living and dining rooms, a rumpus and billiard room, darkroom, home office, cellar, six bedrooms, nine bathrooms and garaging for four cars. There's also a boat shed, jetty and sauna.

Meanwhile, Jerry Schwartz is renovating his $67m Phoenix Acres waterfront estate, which could include an ice rink, lap pool and cinema.

But they are all overshadowed by Menulog co-founder Leon Kamenev, who is putting the finishing touches to his lavish mansion that neighbours describe as "the best house in Sydney".

Kamenev paid $80m to amalgamate several sites over 4200sq m of prime waterfront.

Point Piper (12)

Home to Australia's most expensive residential sale, Point Piper is where Australia's technology titans spend their money.

Atlassian co-founder Scott Farquhar has taken possession of his $130m Uig Lodge without the need for a mortgage.

The cash transaction came about five years after Farquhar shelled out $71m for an estate in the same suburb, though his refurbishment plans for that house have been stymied.

Farquhar's $130m buy eclipsed the previous record of $100m by his Atlassian co-founder Mike Cannon-Brookes, who bought the 1.12ha Fairwater in 2018.

Mosman Park (6)

Billionaire mining magnate Chris Ellison is the biggest name in Perth's most wealthy enclave. Ellison set a record in 2009 when he paid $57.5m for Angela Bennett's mansion on Bennett St.

Five years later he snapped up two neighbouring properties for about $12m. Nearby Saunders St is also considered an elite area.

Hunters Hill (6)

Billionaire Lang Walker's Millthorpe estate has been in his family's hands since 1986, when he paid $4.25m for the 7280sq m site on Sydney's lower north shore.

The Gothic Revival residence was built in 1841 by the fourth Surveyor-General Sir Thomas Mitchell. Len Ainsworth is another resident, as is Dick Honan.

Trades & Services

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PUBLIC NOTICES

AUCTION OF IMPOUNDED VEHICLES

Town of Port Hedland

Pickles E-Salvage 28.03.2023

By Public The Town of Port Hedland is selling 'Goods'. In accordance with Section 3.58(2)(a) of the Local Government Act 1995, disposal of property will be to the highest bidder at public auction.

The items offered for sale are 'as is where is'. The successful bidders must collect the goods by making an appointment with Ranger Services after 8am Monday 3 April 2023 and before Thursday 6 April 2023. Any goods not collected before this date will be forfeited along with any payment made.

Goods cannot be taken on the day of auction.

Interested parties requiring further information should contact Ranger Services on (08) 9158 9300 during business hours Monday to Friday or visit *www.pickles.com.au*

Canvassing of Staff or Councillors will disqualify.

Note: It is the responsibility of the purchaser of a vehicle to confirm the vehicle is not encumbered prior to any bids being made.

Carl Askew
CHIEF EXECUTIVE OFFICER

Land Administration Act 1997

Town of Port Hedland

EXTENSION OF TIME FOR COMMENT - NOTICE OF PUBLIC ADVERTISEMENT OF PEDESTRIAN ACCESS WAY CLOSURE - LOT 3280 STEAMER AVENUE, SOUTH HEDLAND

Notice is hereby given that that the Town of Port Hedland (Town) has received an application to close the above-mentioned pedestrian access way. Details of the proposal are available to view at the Town's Civic Centre during office hours up to and including close of business on 29 March 2023. Any queries can be directed to Development Services on 9158 9300. The proposal can also be viewed on the Town of Port Hedland website at:

https://www.porthedland.wa.gov.au/planning-building-and-environment/planning/public-consultation.aspx

Submissions on the proposal may be lodged in writing addressed to Development Services, Town of Port Hedland, PO Box 41, Port Hedland WA 6721 or via email: eplanning@porthedland.wa.gov.au. Submissions should be lodged with the Town on or before close of business on **29 March 2023.**

Carl Askew
Chief Executive Officer

Jadestone Energy

Invitation for Consultation: Stag Field

Jadestone Energy (Jadestone) is the operator of the producing Stag field in Australian waters, in a water depth of approximately 47 metres and located approximately 60 km northwest of Dampier in the Indian Ocean. The Stag field was developed using a fixed leg, 12-slot manned central processing facility platform. This is connected, by an eight-inch underwater export pipeline, to a pipeline end manifold where shuttle tankers directly load crude oil via a catenary anchor leg mooring buoy.

Jadestone is updating the currently approved environment plan (the Stag EP) for the Stag field, which will govern production and maintenance activities for the next five years. The revised Stag EP will be assessed by the National Offshore Petroleum Safety and Environmental Management Authority for acceptance.

Jadestone is also preparing an EP for the drilling activities at the Stag platform (the Stag Drilling EP). This will include new production wells from recovered well-slots and may include plugging and abandonment of other wells potentially involving wellhead removal.

The purpose of the EPs is to identify the risks and impacts of each proposed petroleum activity on the environment. The EPs will also set out measures to reduce identified environmental impacts and describe how and to what level of performance those measures will be implemented throughout the activity.

Jadestone is inviting comments for consideration during the preparation of the EPs discussed above. Further information on Jadestone's Stag field is available on the company's website at:

www.jadestone-energy.com/assets/australia-portfolio/stag

Please let us know if you

- require any further information; and/or
- have any comments on the activity and the potential impacts on your interests.

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes their comments at any time.

For further information or to make comment please email: ***consult@jadestone-energy.com***

Searcher

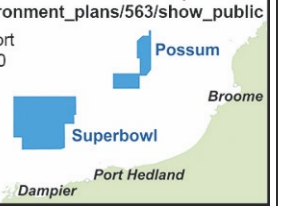
Seismic Survey Consultation Invitation

Searcher Seismic Pty Ltd is proposing to conduct 3D Marine Seismic Surveys (MSS) located Offshore in the North West Region of Western Australia. As such Searcher wishes to provide all potential stakeholders the opportunity to provide us with any values or sensitivities affecting your functions, interests or activities in order to address any issues or concerns.

Possum 3D MSS is approximately 211km offshore of Broome and 246km from Port Hedland. Survey duration will be about 70 days commencing sometime between Jan and July 2023. Full Environment Plan: **https://info.nopsema.gov.au/environment_plans/563/show_public**

Superbowl 3D MSS is approximately 106km offshore of Port Hedland. Maximum annual survey duration will be about 80 days with acquisition between Jan 2023 to Dec 2025. Project details are available on our website: **searcherseismic.com/stakeholderfeedback**

or contact us direct :
Phone: +61 (0)8 9327 0301
Email: feedback@searcherseismic.com



AUCTIONS

PERSONAL

ADULT SERVICES

TRUSTEES ACT 1962
DECEASED ESTATES
Notice to Creditors and Claimants

Bruce Haulgrave Cullen, late of Castledare Retirement Village, 108 Fern Road, Wilson, Western Australia, deceased.
Creditors and other persons having claims (to which Section 63 of the Trustees Act 1962 relates) in respect of the estate of the deceased, who died on the 14th day of May 2021 are required by the Executors Lawrence James Richards and Gary Francis Glossop of 6 Kent Street Bicton Western Australia 6157, to send particulars of their claims within one month of the date of publication of this notice to them, after which date they may convey or distribute the assets, having regard only to claims of which they then have notice.

Public Notices

GENERAL

SEEKING WHEREABOUTS OF Neil Lambrecht and **Lee Hutchison**, who worked at Nookawarra Station, via Cue WA between 1977 and 1981. Please contact Rodney **0428 881 115** for reunion.

Psychics and Clairvoyants

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The Meeting Place

INTRODUCTIONS

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Personal

GENERAL

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2000M SUITS CASCADIAN

JAY ROONEY

Trainer James Cummings is confident Cascadian can go one better when he backs up in Saturday's $3 million Group 1 Australian Cup (2000m) at Flemington.

The dual Group 1 winner stormed home to run a close second to Mr Brightside in the $5m All-Star Mile (1600m) at Moonee Valley last Saturday.

Cummings expects the evergeen eight-year-old to relish stepping up in distance at Flemington.

"He pulled up beautifully from the All-Star Mile," Cummings said.

"The Australian Cup looks a really intriguing race for him, third-up from a spell. For his first run at Moonee Valley against a horse who loves the Valley in Mr Brightside, I thought he acquitted himself exceptionally well.

"If he got into the clear a little earlier or had a better gate, what might have been?

"He should be well suited up to 2000m in a solidly run Australian Cup."

Cascadian has been backed from $4.60 into $3 favouritism.

He has drawn barrier 11 with Ben Melham booked to ride. Noncomforist, an impressive first-up winner of the Blamey Stakes (1600m) at Flemington, is the second favourite at $6.50. Cummings and Melham will also combine with consistent sprinter Kallos in the Listed ATA/Bob Hoysted Handicap (1000m) at Flemington.

Kallos is a $6 chance after winning first-up down the Flemington straight on March 4.

"Kallos will need to be a little bit better again, but he puts himself right into the picture from the draw with plenty of natural pace," Cummings said.

"He enjoys the straight at Flemington, he ran beautifully there at his first run as a gelding and I can see him running another good race here.

"He gets a good draw and that sets up pretty well."

Results

MT BARKER

RACE 1: WORK HOME FRONT 10, MOVING ON 1, FIRST CONTACT 9. TAB Nos: 10 1 9. SO: $11.20; pl: $2.60; $4.60; $2.00. Quinella: $58.50. Exacta: $171.40. Trifecta: (10-1-9) $1,089.10. First 4: (10-1-9-6) $5,145.40; Scratched 3 5 13.
RACE 2: MINE HOST 8, ARAMAT 9, WIN TO RETIRE 13. TAB Nos: 8 9 13. SO: $3.10; pl: $1.90; $3.00; $2.90. Quinella: $10.30. Exacta: $15.90. Trifecta: (8-9-13) $113.90. First 4: (8-9-13-14) $2,408.70. Double: (10-8) $40.00; Scratched 12.
RACE 3: DIVINE MERCY 5, DIGITAL MISS 2, ROSE OF DENMARK 8. TAB Nos: 5 2 8. SO: $5.00; pl: $1.40; $1.04; $2.70. Quinella: $4.10. Exacta: $11.60. Trifecta: (5-2-8) $52.70. First 4: (5-2-8-3) $226.30. Double: (8-5) $20.10; Scratched 7.
RACE 4: OXBRIDGE 5, GOD'S MOMENT 2, WINSALOT 6. TAB Nos: 5 2 6. SO: $5.00; pl: $1.90; $1.20; $2.30. Quinella: $8.60. Exacta: $26.80. Trifecta: (5-2-6) $127.80. First 4: (5-2-6-4) $865.80. Double: (5-5) $33.80. Quaddie: (10-8-5-5) $1,553.90; Scratched 9.
RACE 5: BONNIE LAD 4, MILLIVOY 1, SPEEDY PYE 9. TAB Nos: 4 1 9. SO: $4.50; pl: $1.60; $1.04; $2.10. Quinella: $4.50. Exacta: $8.50. Trifecta: (4-1-9) $54.10. First 4: (4-1-9-3) $430.20. Double: (5-4) $15.80; No scratchings.
RACE 6: HIGHFRIAR 10, SNEAKY FOX 6, TREVELLO 7. TAB Nos: 10 6 7. SO: $27.90; pl: $6.50; $1.20; $2.30. Quinella: $38.00. Exacta: $130.70. Trifecta: (10-6-7) $422.40. First 4: (10-6-7-11) $3,152.40. Double: (4-10) $143.20; No scratchings.
RACE 7: SCREAM IN BLUE 7, BENTLEY BEAU 3, BLAISZEN CAZAH 5. TAB Nos: 7 3 5. SO: $18.10; pl: $4.40; $1.50; $1.60. Quinella: $26.30. Exacta: $71.10. Trifecta: (7-3-5) $334.50. First 4: (7-3-5-4) $1,730.10. Double: (10-7) $399.50. Quaddie: (5-4-10-7) $19,445.50; Scratched 11 12 13 14.

GEELONG

RACE 1: CZARACER 3, ANOTHER NEPHEW 1. TAB Nos: 3 1. SO: $3.60; pl: $1.60; $2.10; NTD. Quinella: (1-3) $5.70. Exacta: (3-1) $11.10. Trifecta: (3-1-5) $38.40. First 4: (3-1-5-2) $57.70; No scratchings.
RACE 2: RUSSIAN FRONT 7, NEW HAMPSHIRE 4, HURRICANE THUNDER 2. TAB Nos: 7 4 2. SO: $21.10; pl: $5.20; $5.00; $1.30. Quinella: $158.00. Exacta: $229.90. Trifecta: (7-4-2) $1,220.10. First 4: (7-4-2-11) $4,367.00. Double: (3-7) $85.10; Scratched 3 10 14 15.
RACE 3: FIFTYSEVENYEARS 2, BACKLIT BEAUTY 14, TENACE 5. TAB Nos: 2 14 5. SO: $3.60; pl: $1.50; $10.90; $2.70. Quinella: $127.40. Exacta: $138.60. Trifecta: (2-14-5) $914.60. First 4: (2-14-5-15) $12,661.20. Double: (7-2) $137.70; Scratched 1 4 6 10.
RACE 4: MOOTESSA 9, BLUE CHIP GIRL 5, COUNT NICHOLAS 3. TAB Nos: 9 5 3. SO: $4.30; pl: $1.70; $2.40; $1.70. Quinella: $18.90. Exacta: $36.70. Trifecta: (9-5-3) $132.20. First 4: (9-5-3-7) $960.00. Double: (2-9) $18.20. Quaddie: (3-7-2-9) $2,178.20; Scratched 1.
RACE 5: CRYSTALAA 4, VAGRANT 9, NASDANA 14. TAB Nos: 4 9 14. SO: $4.10; pl: $1.80; $1.20; $4.60. Quinella: $6.30. Exacta: $12.90. Trifecta: (4-9-14) $121.10. First 4: (4-9-14-12) $1,191.20. Double: (9-4) $26.20; Scratched 2 5 8 11 13 15.
RACE 6: SHOW ME CHAMPAGNE 2, MISS LANGTRY 1. TAB Nos: 2 1. SO: $4.00; pl: $1.80; $5.30; NTD. Quinella: (1-2) $18.10. Exacta: (2-1) $47.60. Trifecta: (2-1-4) $114.50. First 4: (2-1-4-7) $667.90. Double: (4-2) $28.90; Scratched 5.
RACE 7: PERITO MORENO 9, KERMY 2. TAB Nos: 9 2. SO: $8.80; pl: $3.40; $1.60; NTD. Quinella: (2-9) $9.60. Exacta: (9-2) $27.90. Trifecta: (9-2-8) $49.30. First 4: (9-2-8-7) $158.30. Double: (2-9) $38.60; Scratched 3 5 6 10.
RACE 8: KAPALUA SUNSET 7, VIVACIOUS AWARD 10, MORRISSETTE 9. TAB Nos: 7 10 9. SO: $4.20; pl: $1.60; $2.10; $2.70. Quinella: $11.70. Exacta: $25.60. Trifecta: (7-10-9) $128.30. First 4: (7-10-9-3) $826.90. Double: (9-7) $33.70. Quaddie: (4-2-9-7) $981.50; Scratched 1 2 5 13 14.

ALBURY

RACE 1: INDIAN SOLDIER 4, NUTBUSH AMBUSH 5, TOO SHARP 7. TAB Nos: 4 5 7. SO: $4.50; pl: $1.80; $1.70; $1.50. Quinella: $8.00. Exacta: $18.60. Trifecta: (4-5-7) $38.40. First 4: (4-5-7-9) $235.40; Scratched 2 3 8.
RACE 2: PERFECT ILLUSION 4, FESTIVUS 5. TAB Nos: 4 5. SO: $9.00; pl: $3.90; $1.20; NTD. Quinella: (4-5) $8.10. Exacta: (4-5) $31.60. Trifecta: (4-5-8) $135.50. First 4: (4-5-8-6) $551.70. Double: (4-4) $48.10; Scratched 7 9 10.
RACE 3: DIESEL 7, FOX APPEAL 6, TAPA CAPALL 4. TAB Nos: 7 6 4. SO: $11.40; pl: $2.70; $3.90; $1.04. Quinella: $66.80. Exacta: $125.40. Trifecta: (7-6-4) $443.60. First 4: (7-6-4-5) $7,668.60. Double: (4-7) $98.50; Scratched 3.
RACE 4: SIZZLING CAT 7, LES GOH 11, CLIFF HOUSE 4. TAB Nos: 7 11 4. SO: $9.20; pl: $2.40; $3.20; $2.20. Quinella: $44.40. Exacta: $107.30. Trifecta: (7-11-4) $320.70. First 4: (7-11-4-2) $2,324.00. Double: (7-7) $135.50. Quaddie: (4-4-7-7) $5,708.80; Scratched 5 13 14 15.
RACE 5: VERY SHAMUS 16, WONDEREACH 3, IMASUPERSTAR 5. TAB Nos: 16 3 5. SO: $64.40; pl: $9.00; $1.04; $3.60. Quinella: $66.40. Exacta: $287.90. Trifecta: (16-3-5) $1,758.20. First 4: (16-3-5-14) $14,097.70. Double: (7-16) $420.70; Scratched 2 6 9 18.
RACE 6: SMILER MARSHALL 2, KAURAVA 11, BLUEGRASS BIJOUX 13. TAB Nos: 2 11 13. SO: $12.00; pl: $3.70; $1.90; $1.50. Quinella: $29.20. Exacta: $69.20. Trifecta: (2-11-13) $318.70. First 4: (2-11-13-5) $1,252.40. Double: (16-2) $1,201.00; Scratched 3 6 7 8 9 12 16 18.
RACE 7: BELTORO 4, MARSABIT 9, MANKAYAN 1. TAB Nos: 4 9 1. SO: $4.90; pl: $2.10; $6.80; $1.20. Quinella: $57.40. Exacta: $97.80. Trifecta: (4-9-1) $330.30. First 4: (4-9-1-14) $3,938.50. Double: (2-4) $65.80; Scratched 2 6 12.

TOWNSVILLE

RACE 1: CAMPIONE 5, MISHANI PATRIOT 3. TAB Nos: 5 3. SO: $1.20; pl: $1.04; $1.90; NTD. Quinella: (3-5) $2.80. Exacta: (5-3) $3.40. Trifecta: (5-3-2) $19.30. First 4: (5-3-2-1) $38.50; Scratched 8.
RACE 2: CASTILE 3. TAB Nos:. SO: $2.20; pl:; NTD. Quinella: (1-3) $2.10. Exacta: (3-1) $3.30. Trifecta: (3-1-5) $5.40. Double: (5-3) $3.20; Scratched 2 4 6.
RACE 3: KING'S HALO 3, EL OF A SENORITA 4, YANKEE BLOSSOM 8. TAB Nos: 3 4 8. SO: $5.70; pl: $1.60; $1.04; $1.70. Quinella: $2.70. Exacta: $9.10. Trifecta: (3-4-8) $17.70. First 4: (3-4-8-1) $45.40. Double: (3-3) $19.00; No scratchings.
RACE 4: INCLUSION 8, SHOW AND GO 6, DONENOTHING 2. TAB Nos: 8 6 2. SO: $5.00; pl: $1.30; $1.30; $1.70. Quinella: $7.30. Exacta: $22.70. Trifecta: (8-6-2) $54.60. First 4: (8-6-2-1) $567.00. Double: (3-8) $42.30. Quaddie: (5-3-3-8) $179.30; No scratchings.
RACE 5: CIAO BICKY 2, MAGNETIC DRIVE 3. TAB Nos: 2 3. SO: $3.50; pl: $2.00; $1.20; NTD. Quinella: (2-3) $2.20. Exacta: (2-3) $5.70. Trifecta: (2-3-8) $18.90. First 4: (2-3-8-6) $59.30. Double: (8-2) $31.60; Scratched 1 4.
RACE 6: TIERRA DEL FUEGO 1, IT'S A PLOY 2, CAT IN THE RAINE 6. TAB Nos: 1 2 6. SO: $3.40; pl: $1.50; $2.70; $1.40. Quinella: $22.50. Exacta: $35.10. Trifecta: (1-2-6) $92.60. First 4: (1-2-6-9) $480.60. Double: (2-1) $21.90; Scratched 3.
RACE 7: DAWN STRIKE 5, NEWITT 1, EAGLE EYE STAR 2. TAB Nos: 5 1 2. SO: $6.10; pl: $2.70; $1.80; $1.90. Quinella: $33.20. Exacta: $63.60. Trifecta: (5-1-2) $274.30. First 4: (5-1-2-3) $1,018.60. Double: (1-5) $35.10; Scratched 6 8.
RACE 8: DAWN TOO GOOD 1, PROXIMATE CAUSE 3, BAY OF BENGAL 8. TAB Nos: 1 3 8. SO: $4.90; pl: $2.00; $1.20; $3.20. Quinella: $11.10. Exacta: $23.10. Trifecta: (1-3-8) $245.10. First 4: (1-3-8-2) $913.10. Double: (5-1) $33.10. Quaddie: (2-1-5-1) $593.20; Scratched 9.

MOONEE VALLEY

RACE 1: CAP DE JOIE 8, ASPEN COLORADO 2, SOARING EAGLE 10. TAB Nos: 8 2 10. SO: $2.70; pl: $1.30; $3.30; $2.50. Quinella: $17.00. Exacta: $24.30. Trifecta: (8-2-10) $140.10. First 4: (8-2-10-5) $999.40; No scratchings.
RACE 2: OUR HEIDI 5, IT'S KIND OF MAGIC 4, ZION 3. TAB Nos: 5 4 3. SO: $4.20; pl: $1.60; $2.00; $2.50. Quinella: $12.40. Exacta: $30.70. Trifecta: (5-4-3) $125.20. First 4: (5-4-3-10) $615.70. Double: (8-5) $7.90; Scratched 1 7.
RACE 3: BRAVE MEAD 1, ANA JAAHZA 6. TAB Nos: 1 6. SO: $1.30; pl: $1.04; $2.20; NTD. Quinella: (1-6) $3.30. Exacta: (1-6) $3.40. Trifecta: (1-6-7) $5.40. First 4: (1-6-7-9) $19.20. Double: (5-1) $7.00; Scratched 2 3 4 5 10.
RACE 4: GOLDEN CRUSADER 1, MIXMULTI 12, TEOFILO STAR 2. TAB Nos: 1 12 2. SO: $3.20; pl: $1.50; $2.90; $2.10. Quinella: $15.90. Exacta: $28.20. Trifecta: (1-12-2) $151.40. First 4: (1-12-2-10) $2,178.10. Double: (1-1) $4.60. Quaddie: (8-5-1-1) $56.90; Scratched 4 6 9.
RACE 5: SIRILEO MISS 2, REVOLUTIONARY MISS 8, DENY KNOWLEDGE 4. TAB Nos: 2 8 4. SO: $3.60; pl: $1.40; $1.30; $3.10. Quinella: $3.70. Exacta: $9.20. Trifecta: (2-8-4) $60.20. First 4: (2-8-4-1) $167.40. Double: (1-2) $10.70; No scratchings.
RACE 6: UNFLINCHING 2, FOXICON 8, HOME RULE 6. TAB Nos: 2 8 6. SO: $3.40; pl: $1.40; $1.10; $2.20. Quinella: $2.20. Exacta: $5.50. Trifecta: (2-8-6) $27.10. First 4: (2-8-6-4) $68.00. Double: (2-2) $15.90; Scratched 1 7 9 10.
RACE 7: IMPERATRIZ 11, BELLA NIPOTINA 8, ROCH 'N' HORSE 9. TAB Nos: 11 8 9. SO: $3.70; pl: $1.70; $2.70; $4.50. Quinella: $18.00. Exacta: $28.90. Trifecta: (11-8-9) $431.20. First 4: (11-8-9-10) $3,693.60. Double: (2-11) $14.30; Scratched 2 14.
RACE 8: PAPILLON CLUB 1, AMATI 4, TASS 6. TAB Nos: 1 4 6. SO: $1.60; pl: $1.04; $2.70; $2.10. Quinella: $12.60. Exacta: $17.20. Trifecta: (1-4-6) $94.20. First 4: (1-4-6-2) $232.50. Double: (11-1) $7.30. Quaddie: (2-2-11-1) $98.20; Scratched 3.

SUNSHINE COAST

RACE 1: TENGUN READY 2, DIBBA DOBBA 6, KING YOSHI 1. TAB Nos: 2 6 1. SO: $9.40; pl: $2.30; $1.04; $2.50. Quinella: $11.30. Exacta: $29.40. Trifecta: (2-6-1) $93.00. First 4: (2-6-1-4) $252.90; No scratchings.
RACE 2: AMERICAN PIONEER 4, LOOSE UNIT 2, CALL ME HILTON 6. TAB Nos: 4 2 6. SO: $4.00; pl: $1.50; $1.20; $1.90. Quinella: $4.30. Exacta: $13.00. Trifecta: (4-2-6) $58.80. First 4: (4-2-6-5) $269.70. Double: (2-4) $44.70; No scratchings.
RACE 3: BURNT BY BERNIE 2, AZURE PRIDE 1, DIFFERENT ROAD 5. TAB Nos: 2 1 5. SO: $2.90; pl: $1.50; $1.30; $1.20. Quinella: $4.30. Exacta: $10.00. Trifecta: (2-1-5) $22.50. First 4: (2-1-5-3) $53.70. Double: (4-2) $11.40; Scratched 4 10 12.

ALBION PARK

TROT 1: MISTER DOMINGO 6, TOMMY BLIGH 3. TAB Nos: 6 3. SO: $2.30; pl: $1.40; $3.10; NTD. Quinella: (3-6) $6.70. Exacta: (6-3) $8.40. Trifecta: (6-3-4) $95.60. First 4: (6-3-4-5) $386.30; No scratchings.
TROT 2: JILLIBY CHAMBERS 7, MAYWYNS LA NINA 6, SHE DAZZLES 8. TAB Nos: 7 6 8. SO: $2.60; pl: $1.40; $1.50; $3.60. Quinella: $3.20. Exacta: $7.40. Trifecta: (7-6-8) $59.00. First 4: (7-6-8-5) $192.00. Double: (6-7) $9.20; No scratchings.
TROT 3: MISS PAU 3, MISTER WOODPORT 7, SPORTY AZZ 9. TAB Nos: 3 7 9. SO: $3.00; pl: $1.80; $2.10; $1.90. Quinella: $16.80. Exacta: $19.50. Trifecta: (3-7-9) $103.90. First 4: (3-7-9-10) $479.70. Double: (7-3) $17.30; No scratchings.
TROT 4: VANITY BAY 10, TORQUE ONETWOTHREE 4, TACTFILLY MIRACLE 1. TAB Nos: 10 4 1. SO: $5.00; pl: $1.40; $3.50; $1.50. Quinella: $27.40. Exacta: $38.60. Trifecta: (10-4-1) $193.30. First 4: (10-4-1-2) $901.50. Double: (3-10) $27.60. Quaddie: (6-7-3-10) $190.20; Scratched 5.
TROT 5: TORQUE LIKE MOTION 4, SUNRISE RUBY 3, ROCK SUPREME 7. TAB Nos: 4 3 7. SO: $2.90; pl: $1.40; $2.80; $3.00. Quinella: $15.20. Exacta: $14.20. Trifecta: (4-3-7) $122.90. First 4: (4-3-7-1) $727.30. Double: (10-4) $27.30; No scratchings.
TROT 6: NO MOTIVE 6, HES SWEET 1, HEY MISTER TAYLOR 3. TAB Nos: 6 1 3. SO: $3.60; pl: $1.80; $6.50; $2.50. Quinella: $39.70. Exacta: $66.10. Trifecta: (6-1-3) $412.00. First 4: (6-1-3-4) $2,845.50. Double: (4-6) $17.10; Scratched 8.
TROT 7: THE GROGFATHER 4, CLASSICMAJOR 3, COMMODORE JUJON 9. TAB Nos: 4 3 9. SO: $10.60; pl: $2.60; $1.70; $2.10. Quinella: $25.70. Exacta: $41.70. Trifecta: (4-3-9) $345.80. First 4: (4-3-9-1) $1,676.60. Double: (6-4) $110.20; No scratchings.
TROT 8: THE WATERBOY 3, LANOCH BOY 4, BOTTLE ROCK 1. TAB Nos: 3 4 1. SO: $3.70; pl: $2.10; $13.30; $1.30. Quinella: $135.50. Exacta: $121.90. Trifecta: (3-4-1) $446.90. First 4: (3-4-1-8) $3,923.10. Double: (4-3) $56.40. Quaddie: (4-6-4-3) $1,050.30; No scratchings.

GLOUCESTER PARK

TROT 1: HECTOR 2, RAVEN BANNER 1, FEELING ACES 10. TAB Nos: 2 1 10. SO: $3.00; pl: $1.20; $1.04; $1.70. Quinella: $1.90. Exacta: $5.50. Trifecta: (2-1-10) $12.50. First 4: (2-1-10-3) $170.00; Scratched 11.
TROT 2: JAMES BUTT 4, MASTER YOSSI 2, GRAN CHICO 3. TAB Nos: 4 2 3. SO: $8.40; pl: $2.10; $2.00; $4.00. Quinella: $15.10. Exacta: $73.50. Trifecta: (4-2-3) $831.90. First 4: (4-2-3-1) $2,335.00. Double: (2-4) $32.40; No scratchings.

NARROGIN

TROT 1: HEZA BEAUTY 1, BATAVIA PLAYBOY 7, GRAPELLIES BOY 2. TAB Nos: 1 7 2. SO: $1.70; pl: $1.30; $1.20; $2.00. Quinella: $5.00. Exacta: $6.30. Trifecta: (1-7-2) $30.20. First 4: (1-7-2-9) $430.20; No scratchings.

Equestrian Notices

EQUINE HEALTH

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Invitation for Consultation: Montara Project and Stag Field

Jadestone Energy

Montara Project
Jadestone Energy (Jadestone) is the operator of the producing Montara Project in Australian waters, approximately 690 km west of Darwin in the Timor Sea. The Montara Project operations involve oil production using wellhead platform (WHP) wells for the Montara field, and subsea wells for the Swift, Skua and Swallow fields. The oil from the subsea wells is piped via flowlines to the unmanned WHP, and then to the Montara Venture floating production storage and offloading (FPSO) facility, which acts as a hub for the project in production since 2013.

Stag Field
Jadestone is also the operator of the producing Stag field in Australian waters and located approximately 60 km northwest of Dampier in the Indian Ocean. The Stag field was developed using a fixed leg, 12 well-slot, manned central processing facility platform in production since 1998. This is connected, by an eight-inch underwater export pipeline, to a pipeline end manifold where shuttle tankers directly load crude oil via a catenary anchor leg mooring buoy.

Environment Plans (EP)
Jadestone is updating the currently approved EPs, the Montara EP for the Montara Project, and the Stag EP for the Stag field. Each EP will govern production and maintenance activities for the next five years. The revised Montara EP and Stag EP will be assessed by the National Offshore Petroleum Safety and Environmental Management Authority for acceptance.

In addition, Jadestone is preparing an EP for the removal of three subsea wellheads at Montara that are no longer in use (the Wellhead Removal EP). This activity is tentatively planned to occur in 2023/2024.

Jadestone is also preparing an EP for the drilling activities at the Stag platform (the Stag Drilling EP). This will include new production wells from recovered well-slots and may include plugging and abandonment of other wells potentially involving wellhead removal.

The purpose of the EPs is to identify the risks and impact of each proposed petroleum activity on the environment. The EPs will also set out measures to reduce identified environmental impacts and describe how and to what level of performance those measures will be implemented throughout each activity. Jadestone is inviting comments for consideration during the preparation of each of the EPs discussed above.

Further information on Jadestone's Montara Project is available on the company's website at: www.jadestone-energy.com/assets/australia-portfolio/montara.

Further information on Jadestone's Stag field is available on the company's website at: www.jadestone-energy.com/assets/australia-portfolio/stag.

Please let us know if you:
- require any further information; and/or
- have any comments on the activity and the potential impacts on your interests.

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes their comments at any time.

For further information or to make comment please email: consult@jadestone-energy.com.

GOVERNMENT OF WESTERN AUSTRALIA

NOTICE TO GRANT MINING TENEMENTS

NATIVE TITLE ACT 1993 (CTH) SECTION 29

The State of Western Australia HEREBY GIVES NOTICE that the Minister for Mines and Petroleum, C/- Department of Mines, Industry Regulation and Safety, 100 Plain Street, East Perth WA 6004 may grant the following tenement applications under the *Mining Act 1978*:

Tenement Type	No.	Applicant	Area*	Locality	Centroid	Shire
Exploration Licence	15/1713	JINDALEE RESOURCES LIMITED	9BL	20.1km SW'ly of Kambalda	Lat: 31° 21' S: Long: 121° 33' E	COOLGARDIE SHIRE
Exploration Licence	16/627	NZE MINING RESOURCES PTY LTD	1BL	40.6km SW'ly of Ora Banda	Lat: 30° 37' S: Long: 120° 45' E	COOLGARDIE SHIRE
Exploration Licence	26/245	JAVELIN MINERALS LIMITED	1BL	23.3km NE'ly of Kambalda	Lat: 31° 2' S: Long: 121° 49' E	KALGOORLIE-BOULDER CITY
Exploration Licence	26/248	JAVELIN MINERALS LIMITED	2BL	28.1km NE'ly of Kambalda	Lat: 31° 5' S: Long: 121° 56' E	KALGOORLIE-BOULDER CITY
Exploration Licence	28/3271	CARAWINE RESOURCES LIMITED	12BL	158.2km N'ly of Balladonia	Lat: 31° 2' S: Long: 123° 58' E	KALGOORLIE-BOULDER CITY
Exploration Licence	29/1210	RIO TINTO EXPLORATION PTY LIMITED	16BL	78.5km S'ly of Leinster	Lat: 28° 35' S: Long: 120° 25' E	MENZIES SHIRE
Exploration Licence	38/3617	DUKETON MINING LIMITED	8BL	125km N'ly of Laverton	Lat: 27° 29' S: Long: 122° 20' E	LAVERTON SHIRE
Exploration Licence	38/3714	JINDALEE RESOURCES LIMITED	6BL	21.5km S'ly of Laverton	Lat: 28° 48' S: Long: 122° 19' E	LAVERTON SHIRE
Exploration Licence	38/3811	ENCOUNTER YENEENA PTY LTD	70BL	66.9km NW'ly of Laverton	Lat: 28° 12' S: Long: 121° 54' E	LAVERTON SHIRE, LEONORA SHIRE
Exploration Licence	40/435	ULYSSES MINING PTY LTD	1BL	57.5km SE'ly of Leonora	Lat: 29° 21' S: Long: 121° 34' E	MENZIES SHIRE
Exploration Licence	45/6432	FMG RESOURCES PTY LTD	1BL	40.5km N'ly of Nullagine	Lat: 21° 31' S: Long: 120° 5' E	EAST PILBARA SHIRE
Exploration Licence	45/6471	HAWKER GEOLOGICAL SERVICES PTY LTD	5BL	51km NW'ly of Nullagine	Lat: 21° 42' S: Long: 119° 39' E	EAST PILBARA SHIRE
Exploration Licence	46/1437	ODETTE TWO PTY LTD	5BL	40.4km NE'ly of Nullagine	Lat: 21° 42' S: Long: 120° 27' E	EAST PILBARA SHIRE
Exploration Licence	51/2135	WARRINGA BLUE PTY LTD	1BL	47.4km SE'ly of Peak Hill	Lat: 25° 55' S: Long: 119° 4' E	MEEKATHARRA SHIRE
Exploration Licence	51/2136	LIL BOYTEETH PTY LTD	1BL	48.7km SE'ly of Peak Hill	Lat: 25° 55' S: Long: 119° 5' E	MEEKATHARRA SHIRE
Exploration Licence	51/2140	MT RESOURCES PTY LTD	10BL	76.9km W'ly of Wiluna	Lat: 26° 29' S: Long: 119° 27' E	MEEKATHARRA SHIRE
Exploration Licence	57/1220	AUSTRALIAN TITANIUM PTY LTD	29BL	31.3km N'ly of Sandstone	Lat: 27° 42' S: Long: 119° 16' E	SANDSTONE SHIRE
Exploration Licence	57/1273	AURUMIN GIDGEE PTY LTD	19BL	54.5km NE'ly of Sandstone	Lat: 27° 32' S: Long: 119° 31' E	SANDSTONE SHIRE
Exploration Licence	70/5788	WEPNER EXPLORATION PTY LTD	172BL	76.8km S'ly of Paynes Find	Lat: 29° 57' S: Long: 117° 43' E	DALWALLINU SHIRE, MOUNT MARSHALL SHIRE
Exploration Licence	70/6352	TERRAIN MINERALS LTD	32BL	24.9km E'ly of Mukinbudin	Lat: 30° 53' S: Long: 118° 27' E	MUKINBUDIN SHIRE, NUNGARIN SHIRE
Exploration Licence	70/6359	EXPLORATION AUSTRALIA PTY LTD	11BL	38.4km NE'ly of Mukinbudin	Lat: 30° 36' S: Long: 118° 24' E	MUKINBUDIN SHIRE
Exploration Licence	70/6379	SYNDICATE MINERALS PTY LTD CURIOSITY EXPLORATION PTY LTD	40BL	29.1km NE'ly of Mukinbudin	Lat: 30° 46' S: Long: 118° 27' E	MUKINBUDIN SHIRE
Exploration Licence	77/2948	POLARIS METALS PTY LTD	1BL	58.1km N'ly of Southern Cross	Lat: 30° 42' S: Long: 119° 24' E	YILGARN SHIRE
Exploration Licence	77/3016	SENTINEL EXPLORATION LTD	1BL	150km E'ly of Paynes Find	Lat: 29° 37' S: Long: 119° 10' E	MENZIES SHIRE
Exploration Licence	77/3017	SENTINEL EXPLORATION LTD	3BL	152.1km E'ly of Paynes Find	Lat: 29° 43' S: Long: 119° 9' E	MENZIES SHIRE
Exploration Licence	77/3018 & 77/3035	SENTINEL EXPLORATION LTD	6BL	147.7km E'ly of Paynes Find	Lat: 29° 39' S: Long: 119° 8' E	MENZIES SHIRE
Exploration Licence	77/3039	LI3 MINERALS PTY LTD	65BL	29.9km SE'ly of Marvel Loch	Lat: 31° 41' S: Long: 119° 40' E	YILGARN SHIRE
Exploration Licence	77/3042	SYNDICATE MINERALS PTY LTD CURIOSITY EXPLORATION PTY LTD	53BL	37km NE'ly of Mukinbudin	Lat: 30° 44' S: Long: 118° 32' E	MUKINBUDIN SHIRE, WESTONIA SHIRE
Exploration Licence	77/3043	TERRAIN MINERALS LTD	62BL	33.5km E'ly of Mukinbudin	Lat: 30° 57' S: Long: 118° 33' E	MUKINBUDIN SHIRE, NUNGARIN SHIRE, WESTONIA SHIRE
Exploration Licence	80/5840	CHANDLER, Ross Berge	25BL	137.9km SW'ly of Halls Creek	Lat: 19° 15' S: Long: 126° 56' E	HALLS CREEK SHIRE
Exploration Licence	80/5889	BARACUS PTY LTD	55BL	83.6km S'ly of Wyndham	Lat: 16° 13' S: Long: 127° 58' E	WYNDHAM-EAST KIMBERLEY SHIRE
Exploration Licence	80/5890	BARACUS PTY LTD	21BL	103.3km S'ly of Wyndham	Lat: 16° 23' S: Long: 127° 54' E	WYNDHAM-EAST KIMBERLEY SHIRE
Prospecting Licence	15/6778	POTTER, Vernan John	9.39HA	19km W'ly of Kambalda	Lat: 31° 14' S: Long: 121° 28' E	COOLGARDIE SHIRE
Prospecting Licence	16/3411	FORTUNA RESOURCES PTY LTD	1.81HA	28.8km S'ly of Ora Banda	Lat: 30° 37' S: Long: 121° 3' E	COOLGARDIE SHIRE
Prospecting Licence	25/2713-S	BRANCH, Ian Robert	4.96HA	39.8km NE'ly of Kambalda	Lat: 30° 58' S: Long: 121° 59' E	KALGOORLIE-BOULDER CITY
Prospecting Licence	25/2744-S	BRANCH, Ian Robert	9.93HA	47.7km NE'ly of Kambalda	Lat: 30° 59' S: Long: 122° 6' E	KALGOORLIE-BOULDER CITY
Prospecting Licence	37/9625	MT MALCOLM GOLD HOLDINGS PTY LTD	113.28HA	21.7km E'ly of Leonora	Lat: 28° 56' S: Long: 121° 32' E	LEONORA SHIRE
Prospecting Licence	38/4562-S	LEBILLON, Lou	9.81HA	40.6km SE'ly of Laverton	Lat: 28° 49' S: Long: 122° 44' E	LAVERTON SHIRE
Prospecting Licence	39/6369	KILKENNY MINERALS PTY LTD	114.05HA	43.2km E'ly of Leonora	Lat: 28° 57' S: Long: 121° 45' E	LEONORA SHIRE
Prospecting Licence	39/6379	14 MILE WELL GOLD PTY LTD	182.00HA	44.6km W'ly of Laverton	Lat: 28° 46' S: Long: 121° 58' E	LAVERTON SHIRE
Prospecting Licence	39/6380 & 39/6382	14 MILE WELL GOLD PTY LTD	392.56HA	46.5km W'ly of Laverton	Lat: 28° 46' S: Long: 121° 57' E	LAVERTON SHIRE
Prospecting Licence	39/6381	14 MILE WELL GOLD PTY LTD	160.48HA	44.1km SW'ly of Laverton	Lat: 28° 47' S: Long: 121° 59' E	LAVERTON SHIRE
Prospecting Licence	77/4629-4631	WEST AUSTRALIAN PROSPECTORS PTY LTD	480.01HA	83km NE'ly of Mukinbudin	Lat: 30° 29' S: Long: 118° 54' E	YILGARN SHIRE
Prospecting Licence	77/4634	WHITE, Andrew Roy	167.45HA	8.5km S'ly of Southern Cross	Lat: 31° 17' S: Long: 119° 17' E	YILGARN SHIRE
Prospecting Licence	80/1885	YNEMA, Marten Hendrick	122.79HA	26.5km SE'ly of Halls Creek	Lat: 18° 26' S: Long: 127° 45' E	HALLS CREEK SHIRE

Nature of the act: Grant of prospecting licences which authorises the applicant to prospect for minerals for a term of 4 years from date of grant. Grant of Special Prospecting Licences, which authorises the applicant to prospect for minerals for a term up to 4 years from the date of grant. Grant of exploration licences, which authorises the applicant to explore for minerals for a term of 5 years from the date of grant.

Notification day: 22 March 2023

Native title parties: Under section 30 of the *Native Title Act 1993 (Cth)*, persons have until 3 months after the notification day to take certain steps to become native title parties in relation to applications. The 3 month period closes on **22 June 2023**. Any person who is, or becomes a native title party, is entitled to the negotiation and/or procedural rights provided in Part 2 Division 3 Subdivision P of *Native Title Act 1993 (Cth)*. Enquiries in relation to filing a native title determination application to become a native title party should be directed to the Federal Court of Australia, 1 Victoria Avenue, Perth WA 6000, telephone (08) 9268 7100.

Expedited procedure: The State of Western Australia considers that these acts are acts attracting the expedited procedure. Each licence may be granted unless, within the period of 4 months after the notification day (i.e. **22 July 2023**), a native title party lodges an objection with the National Native Title Tribunal against the inclusion of the statement that the State considers the grant of the licence is an act attracting the expedited procedure. Enquiries in relation to lodging an objection should be directed to the National Native Title Tribunal, Level 5, 1 Victoria Avenue, Perth, or GPO Box 9973, Perth, WA 6848, telephone (08) 9425 1000.

For further information about the act (including extracts of plans showing the boundaries of the applications), contact the Department of Mines, Industry Regulation and Safety, 100 Plain Street, East Perth WA 6004, or telephone (08) 9222 3518.

* - 1 Graticular Block = 2.8 km^2

DMIRS 14143

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9482 2300 Place an ad: regionalclassifieds@wanews.com.au *or go to* pilbaranews.com.au

PUBLIC NOTICES

Annual General Meeting Notice

Karratha Business Enterprise Centre Inc.

When: Thursday 30th March 2023
Time: 5:00pm
Where: Enterprise Hub Karratha Boardroom
Level 1, 18 Hedland Place
Karratha WA 6714

Refreshments will be provided.
Please register your interest & RSVP to
admin@businesscentre.org.au
by Friday 17th March 2023

Enterprise Hub
BUSINESS CENTRE PILBARA

4733925

Jadestone Energy

Invitation for Consultation: Stag Field

Jadestone Energy (Jadestone) is the operator of the producing Stag field in Australian waters, in a water depth of approximately 47 metres and located approximately 60 km northwest of Dampier in the Indian Ocean. The Stag field was developed using a fixed leg, 12-slot manned central processing facility platform. This is connected, by an eight-inch underwater export pipeline, to a pipeline end manifold where shuttle tankers directly load crude oil via a catenary anchor leg mooring buoy.

Jadestone is updating the currently approved environment plan (the Stag EP) for the Stag field, which will govern production and maintenance activities for the next five years. The revised Stag EP will be assessed by the National Offshore Petroleum Safety and Environmental Management Authority for acceptance.

Jadestone is also preparing an EP for the drilling activities at the Stag platform (the Stag Drilling EP). This will include new production wells from recovered well-slots and may include plugging and abandonment of other wells potentially involving wellhead removal.

The purpose of the EPs is to identify the risks and impacts of each proposed petroleum activity on the environment. The EPs will also set out measures to reduce identified environmental impacts and describe how and to what level of performance those measures will be implemented throughout the activity.

Jadestone is inviting comments for consideration during the preparation of the EPs discussed above. Further information on Jadestone's Stag field is available on the company's website at:
www.jadestone-energy.com/assets/australia-portfolio/stag

Please let us know if you
- require any further information; and/or
- have any comments on the activity and the potential impacts on your interests.

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes their comments at any time.

For further information or to make comment please email: ***consult@jadestone-energy.com***

City of Karratha

PROPOSAL TO DISPOSE OF PROPERTY

The City proposes to sell the following lots that form part of the Hancock Way subdivision located on Lot 651 Bayview Road, Bulgarra.

Lot	Size	Buyer	Offer
4	600m²	Karratha Housing Pty Ltd	$178,500
7	663m²	Karratha Housing Pty Ltd	$199,500

The market value of Lot 651 Bayview Road, Bulgarra as assessed on 12 August 2021 was $1.3M and the individual lots is equal to the Offers received.

Members of the public are invited to make submissions in relation to the proposal.

Submissions should be made to leasing@karratha.wa.gov.au or City of Karratha, PO Box 219, Karratha WA 6714 no later than 6 April 2023.

Virginia Miltrup
Chief Executive Officer

ADVERTISING INDEMNITY & WARRANTY

WEST AUSTRALIAN REGIONAL NEWSPAPERS

The advertiser (or agent) indemnifies the Company (and its employees and agents) against all actions, proceedings, claims, demands, losses, damages, costs and expenses arising out of or in connection with the publication of the advertisement (including any relating to defamation, malicious falsehood, infringement of copyright, trademark or design, or breach of the Trade Practices Act 1974, the Consumer Credit Code, or the Fair Trading Act 1987) and warrants that publication of the advertisement will not give rise to any legal, equitable or statutory rights against the Company and will not breach any laws or regulations including the prohibitions relating to advertising in the Trade Practices Act 1974, the Consumer Credit Code, and the Fair Trading Act 1987.

All advertisements are accepted on the following terms and conditions:

RIGHT TO REFUSE: The Company has the right to refuse to publish or republish any advertisement without giving any reason.

ENGAGEMENT AND MARRIAGE NOTICES: Must be signed by one of the people concerned or by one parent of the couple.

ADULT SERVICES, PERSONAL NOTICES AND GARAGE SALES: Must be paid at time of lodgement.

CANCELLATIONS AND ALTERATIONS: Same deadlines as insertions.

DISCLAIMER OF LIABILITY: No liability will be incurred by the Company by reason of any amendment to or error or inaccuracy in, or the partial or total omission of, an advertisement (single or multiple insertion) or by reason of any delay or default or from any other cause whatsoever. If an error occurs which in the opinion of the Company clearly lessens the value of the advertisement and which is in no way the fault of the advertiser and the advertiser notifies the Company of the error prior to the advertisement deadline on the first day the error was published, then a refund will be provided on the cost of the advertisement proportionate to the Company's opinion of its reduced value.

ADJUSTMENT AND CLAIMS: The advertiser must notify the Company of any error in the invoice for an advertisement within 30 days from the end of the month in which the advertisement was published. The Company will not consider claims for an invoice error lodged outside this period.

EMPLOYMENT

Government of **Western Australia**
Western Australia Police Force

Children's Crossings Unit

VACANCIES - TRAFFIC WARDENS

The WA Police Force are looking to establish a pool of applicants to fill current and future vacancies in Karratha.

Duties:
The position of Traffic Warden is to ensure safe pedestrian access of essentially primary age children across carriageways at children's crossings.

Working Conditions:
- School Days, Monday to Friday.
- Contract: casual contract opportunities are available. (Terms and conditions of employment are those provided by the Western Australia Police School Traffic Wardens Agreement 2011).
- Standard Children's Crossing Hours: 1 hour in morning and 1 hour in afternoon
- Hourly Rate: $25.90 per hour, which includes 20% loading in lieu of payment for public holidays, annual leave and sick leave.
- Laundry Allowance: $0.70 per week.
- Motor Vehicle Allowance payable under certain conditions.
- Full training and uniform provided.

For Further Information and an Application Package Telephone:
(08) 6274 8731 or email Childrenscrossingsunitsmail@police.wa.gov.au

PLEASE NOTE: Applicants must have a current WA driver's licence and use of a motorised vehicle. Applicants will be required to complete a health assessment, integrity and criminal check, training and if successful, will also be required to apply for a 'Working with Children' card.

The cost of the Working with Children Card and up to $70 towards a health assessment will be reimbursed after working one month.

WAP_13802

AUCTIONS

REGISTER AND START BIDDING

TRAILERS, MOBILE & STATIONARY EQUIPMENT ONLINE AUCTION

109 Bedrock Turn, Gap Ridge, Karratha
Ends: Wednesday 12th April at 1pm

MOBILE PLANT: Caterpillar 2.5T Forklifts, TCM 10t Forklift, JLG Scissor Lift, Komatsu WA320 Wheeled Loader, Sky Jack Boom Lift, ASV RT30 Posi Trak, 2T Electric Reach Stacker. **STATIONARY PLANT:** 3X 20KVA Diesel Gen Sets. **TRAILERS & TRAILER MOUNTED PLANT:** 40FT Tri Axle Flat Bed, 2T Excavator Trailer, 3T Plant Trailer, Vermeer Vacuum, Water Tankers, Nifty Boom Lift, JLG & BriteForce Led Lighting Towers.

Contact: Mark Davenport 0429 085 606
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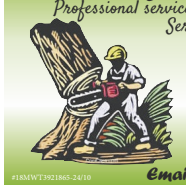

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FUNERAL NOTICES

MACLEOD:
Family and friends of the late Angus Guy MacLeod of Geraldton are respectfully informed that a Funeral Service to pay tribute to Angus's life will take place at GERALDTON Crematorium on THURSDAY (23.03.2023) at 10.00am.

mid West FUNERALS Phone 24/7 9965 2100

HEALTH AND BEAUTY

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Enjoy a relaxing body massage with the best service.
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Share the important *with* Classifieds

EMPLOYMENT

Government of **Western Australia**
Department of **Biodiversity, Conservation and Attractions**

Operations Officer

Parks and Wildlife Service

Web Search No: DBCA3128414

Level/Salary: Level 4, $84,582 - $88,927 p.a. plus Superannuation

Under the general direction of the Marine Park Coordinator; this position delivers parks and conservation compliance services in the district, leads investigations as appropriate, conducts nature protection issue and licence assessments, maintains a close technical relationship within the wildlife compliance program at district and regional level to provide for an integrated delivery of wildlife protection and marine park compliance. The role is responsible for all aspects of workplace safety in the district and ensures / facilitates Job Prescriptions, Job Safety Analysis (JSA), job inductions, Occupational Health and Safety (OH&S) training and appropriate safety equipment is used for work undertaken.

To Access Detailed Information: Visit https://search.jobs.wa.gov.au and key in the Web Search No. to access detailed information.

For Specific Inquiries: Please contact **Abby Leyendekkers on 9948 2226.**

Location: Denham

Closing Date: Friday, 24 March 2023 at midday

DBCA_14037

Government of **Western Australia**
Western Australia Museum

Engagement Assistant

Salary: Level 2, PS CSA Agreement 2022, $34.40 - $37.00 (plus 25% casual loading) per annum pro rata

Position number: 14540

Work type: Casual

Location: Carnarvon

Closing date: 31st March 2023, 4pm

This recruitment process is for a 12 month casual pool.

We currently have casual vacancies for Engagement Assistants for immediate filling up to the 30 June 2024 with the possibility of extension.

The Department recognises Aboriginality as a genuine qualification for this position under 50D of the *Equal Opportunity Act 1984*. To apply you must be of Aboriginal or Torres Strait Islander (ATSI) descent, identify as ATSI and be recognised as such by the ATSI community.

About the role

The Engagement Assistant's primary purpose is to enhance Gwoonwardu Mia's public profile through the delivery of high-quality customer service and positive interaction with the public.

This position is responsible for presenting/facilitating a range of educational and interpretive experiences to diverse audiences including school groups, general public and special interest groups.

This role also provides a retail and merchandise service to visitors as well as supporting the Artist in Residence program.

About you

We are looking for an outgoing, self-motivated individual who loves working with the public, in a positive team environment, enjoys a challenge and wants to make a positive difference in their community.

Further Information

If you would like further information on this opportunity please contact **Carleen Ryder, Operations Manager 0448 369 681**.

To apply

To submit your application, please visit search.jobs.wa.gov.au and key in the position number (14540).

WAM_14163

NAGLE CATHOLIC COLLEGE EST 1994

Applications are invited for the following positions:
English Teacher - Ongoing
Please see College website for further details and the application form.
www.ncc.wa.edu.au/employment
4740136

PUBLIC NOTICES

Jadestone Energy

Invitation for Consultation: Stag Field

Jadestone Energy (Jadestone) is the operator of the producing Stag field in Australian waters, in a water depth of approximately 47 metres and located approximately 60 km northwest of Dampier in the Indian Ocean. The Stag field was developed using a fixed leg, 12-slot manned central processing facility platform. This is connected, by an eight-inch underwater export pipeline, to a pipeline end manifold where shuttle tankers directly load crude oil via a catenary anchor leg mooring buoy.

Jadestone is updating the currently approved environment plan (the Stag EP) for the Stag field, which will govern production and maintenance activities for the next five years. The revised Stag EP will be assessed by the National Offshore Petroleum Safety and Environmental Management Authority for acceptance.

Jadestone is also preparing an EP for the drilling activities at the Stag platform (the Stag Drilling EP). This will include new production wells from recovered well-slots and may include plugging and abandonment of other wells potentially involving wellhead removal.

The purpose of the EPs is to identify the risks and impacts of each proposed petroleum activity on the environment. The EPs will also set out measures to reduce identified environmental impacts and describe how and to what level of performance those measures will be implemented throughout the activity.

Jadestone is inviting comments for consideration during the preparation of the EPs discussed above. Further information on Jadestone's Stag field is available on the company's website at:
www.jadestone-energy.com/assets/australia-portfolio/stag

Please let us know if you

- require any further information; and/or
- have any comments on the activity and the potential impacts on your interests.

Jadestone is committed to ongoing dialogue with all its stakeholders and welcomes their comments at any time.

For further information or to make comment please email: ***consult@jadestone-energy.com***

Death Notices - All notices will be published before the Main Family notice unless otherwise advised. Notices requested in a foreign language MUST have the English translation printed after the foreign language.

Jadestone Energy invites you to provide your feedback on the current Stag oil field operation off the Pilbara Coast.

A community consultation session will be held in Coral Bay and Exmouth.

Coral Bay
Tuesday 12th December 12:30pm
Bill's Bar Function Room

Exmouth
Tuesday 12th December 5:30pm
Ningaloo Centre Mandu Mandu Room – West

For more information please visit our website.

Jadestone Energy

Jadestone Energy invites you to provide your feedback on the current Stag oil field operation off the Pilbara Coast.

A community consultation session will be held in Denham and Carnarvon.

Carnarvon
Wednesday 13th December 5:30pm
Gwoonwardu Mia Conference Room

Denham
Thursday 14th December 12:30pm
Denham Town Hall

For more information please visit our website.

Jadestone Energy

Jadestone Energy invites you to provide your feedback on the current Stag oil field operation off the Pilbara Coast.

A community consultation session will be held in Karratha, Dampier and Onslow.

Onslow
Wednesday 17th January
12:30pm – 1:30pm
RM Forrest Hall

Karratha
Thursday 18th January
12:30pm – 1:30pm
Pegs Creek Pavilion

Dampier
Thursday 18th January
5:30pm – 6:30pm
Dampier Community Hub
Multi-Purpose Room Two

For more information please visit our website.

Jadestone Energy

Jadestone Energy invites you to provide your feedback on the current Stag oil field operation off the Pilbara Coast.

A community consultation session will be held in Port Hedland.

Friday 19th January
12:30pm – 1:30pm
Gratwick Hall

For more information
please visit our website.

Jadestone Energy

Community Consultation Sessions – Stag (Phase 1)

Jadestone Energy

12-14th December 2023

Goals of the community consultation sessions

- Identify any relevant persons who may not have been contacted through the usual means (fishery licence holders, tour operators etc)
- Ensure Jadestone have shown reasonable efforts to capture any person who wishes to be consulted
- Talk to anyone in the coastal communities where the EMBA overlaps the coastal waters to capture anyone who could be affected by an unplanned event

Jadestone Energy

Advertising ahead of the sessions

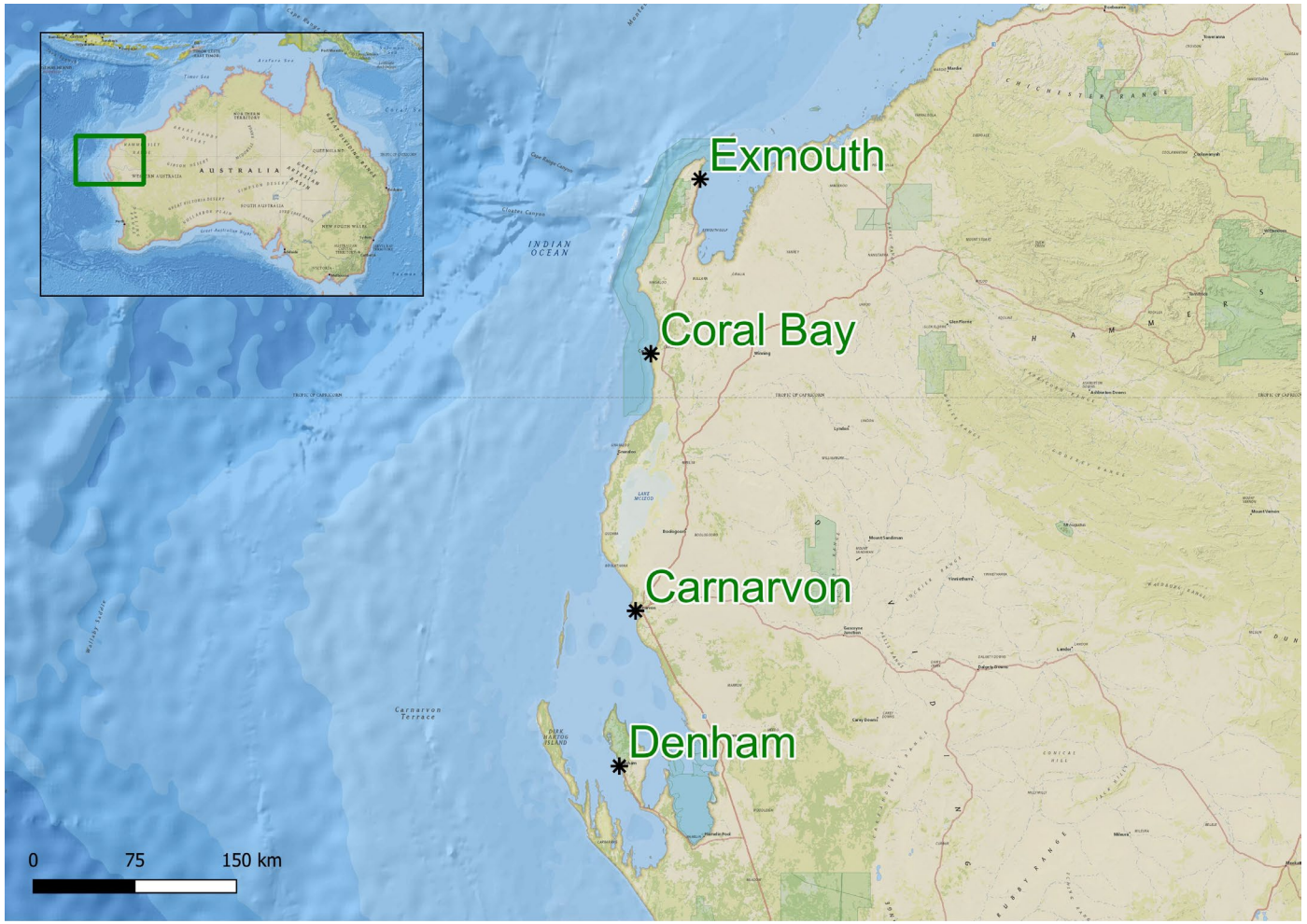
- Newspaper adverts placed in the local news (Mid-West Time and Pilbara Times on 6th December.
- Adverts placed on noticeboards in Carnarvon (local Facebook page), Exmouth and Denham.
- Social media adverts published 4th December that appeared in Facebook feeds for the local area

Jadestone Energy

Locations sessions held

- Exmouth (1730-1815)
- Coral Bay (1230-1315)
- Carnarvon (1730-1815)
- Denham (1230-1315)

- Kilometres driven: 1319



Jadestone Energy

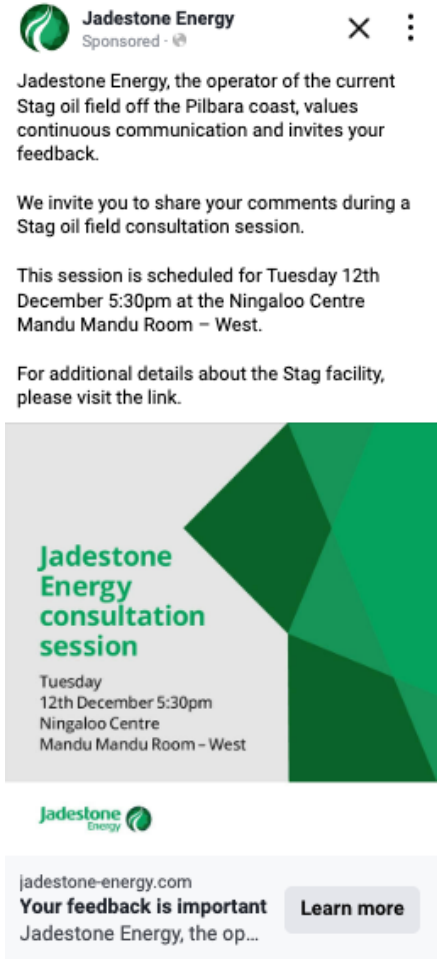
Exmouth

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 06/12/23 – 13/12/23
- Readership: 11,545

SOCIAL ADVERT

- Advertised from 05/12/2023 – 12/12/2023
- Total reach: 5,384
- Total impressions: 7,641
- Total link clicks: 8



COMMUNITY NOTICE BOARD

- Put up at the Shire of Exmouth noticeboard

Jadestone Energy

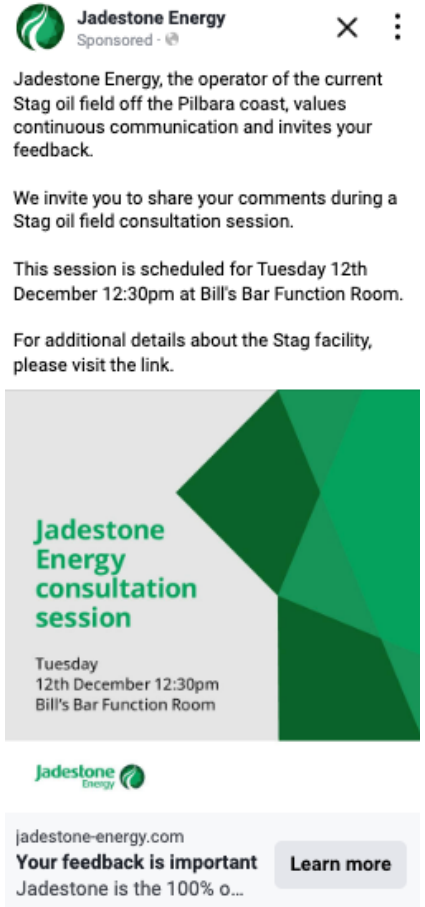
Coral Bay

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 06/12/23 – 13/12/23
- Readership: 11,545

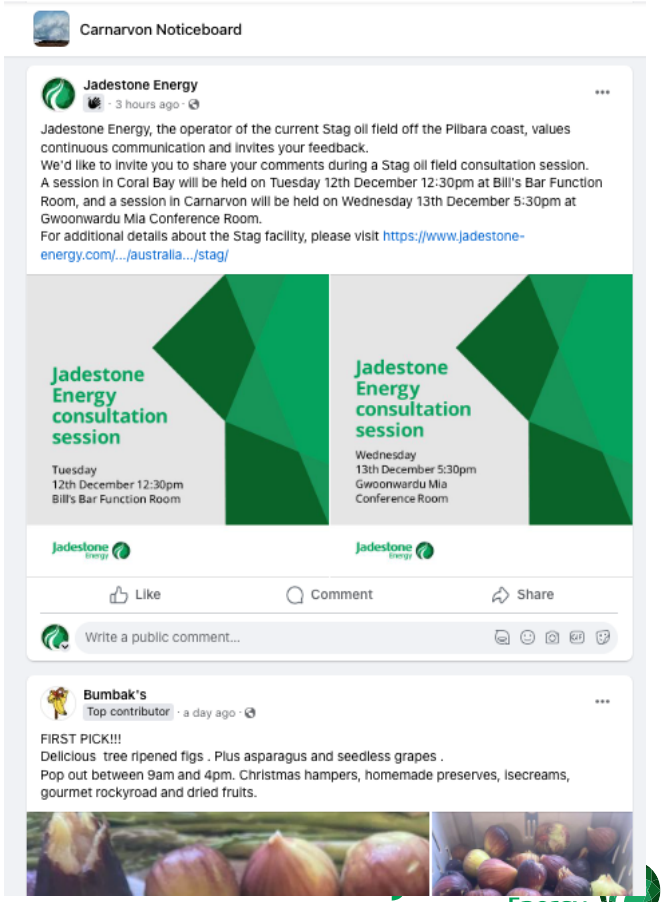
SOCIAL ADVERT

- Advertised from 05/12/2023 – 12/12/2023
- Total reach: 658
- Total impressions: 1,333
- Total link clicks: 3



COMMUNITY NOTICE BOARD

- Posted on Carnarvon noticeboard Facebook group on 07/12/23



Energy

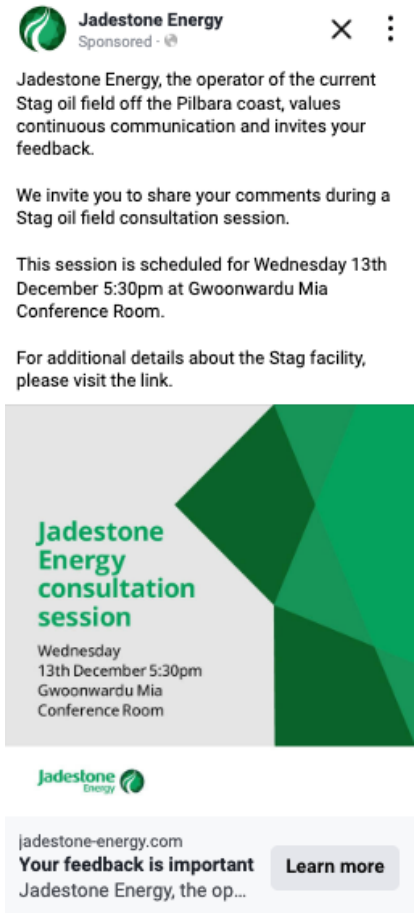
Carnarvon

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 06/12/23 – 13/12/23
- Readership: 16,739

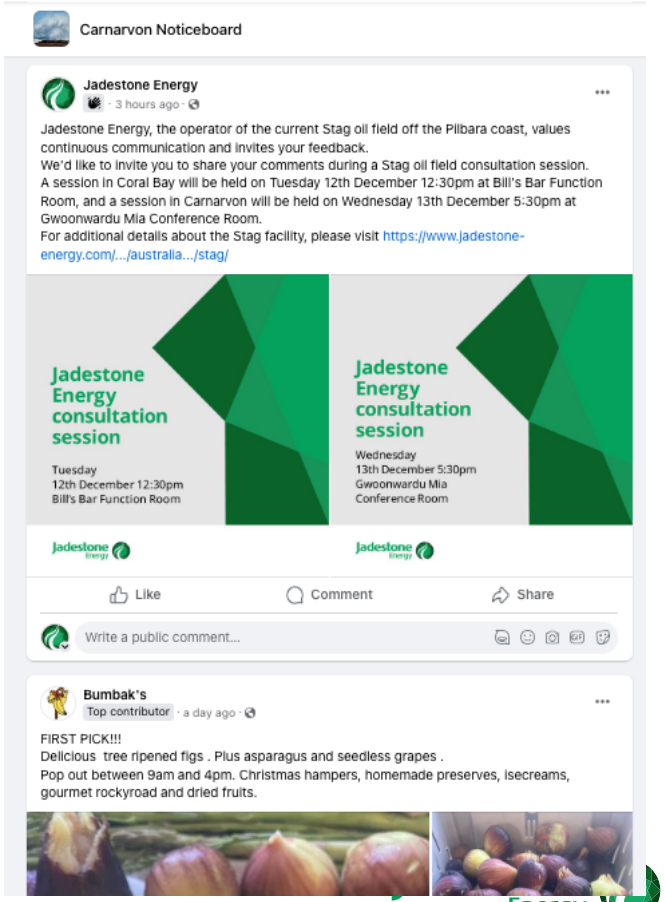
SOCIAL ADVERT

- Advertised from 05/12/2023 – 13/12/2023
- Total reach: 5,688
- Total impressions: 8,103
- Total link clicks: 11



COMMUNITY NOTICE BOARD

- Posted on Carnarvon noticeboard Facebook group on 07/12/23



Energy

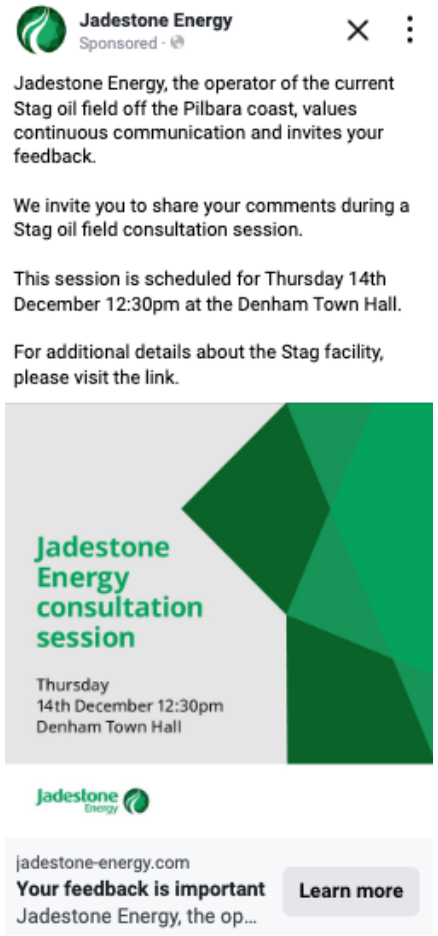
Denham

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 06/12/23 – 13/12/23
- Readership: 16,739

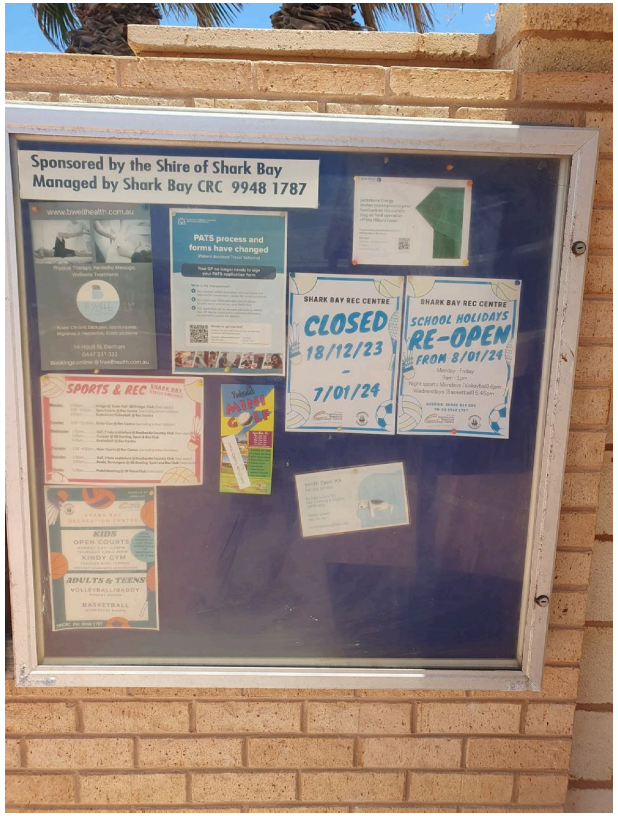
SOCIAL ADVERT

- Advertised from 05/12/2023 – 14/12/2023
- Total reach: 2,302
- Total impressions: 3,882
- Total link clicks: 9



COMMUNITY NOTICE BOARD

- Put up at the Shire of Shark Bay noticeboard



Jadestone Energy

Overall

SOCIAL STATISTICS

	Reach	Impressions	Clicks	Total spend
CORAL BAY	658	1,333	3	$40
EXMOUTH	5,384	7,641	8	$50
CARNARVON	5,688	8,103	11	$50
DENHAM	2,302	3,882	9	$50
TOTAL	**14,032**	**20,959**	**31**	**$190**

QR Scans

1 Dec – 3 Jan : 52*

3 Jan – 31 Jan:

*as no one attended the first sessions, we can assume that all scans are as a result of the advertisements.

Jadestone Energy

Outcomes of the community consultation sessions

- 1 attendee at Denham from the local shire
- No significant concerns from the communities
- No new relevant persons identified
- Achieved our objectives
- Discussions with staff at venues indicated there was no attendance at similar sessions held by Woodside recently

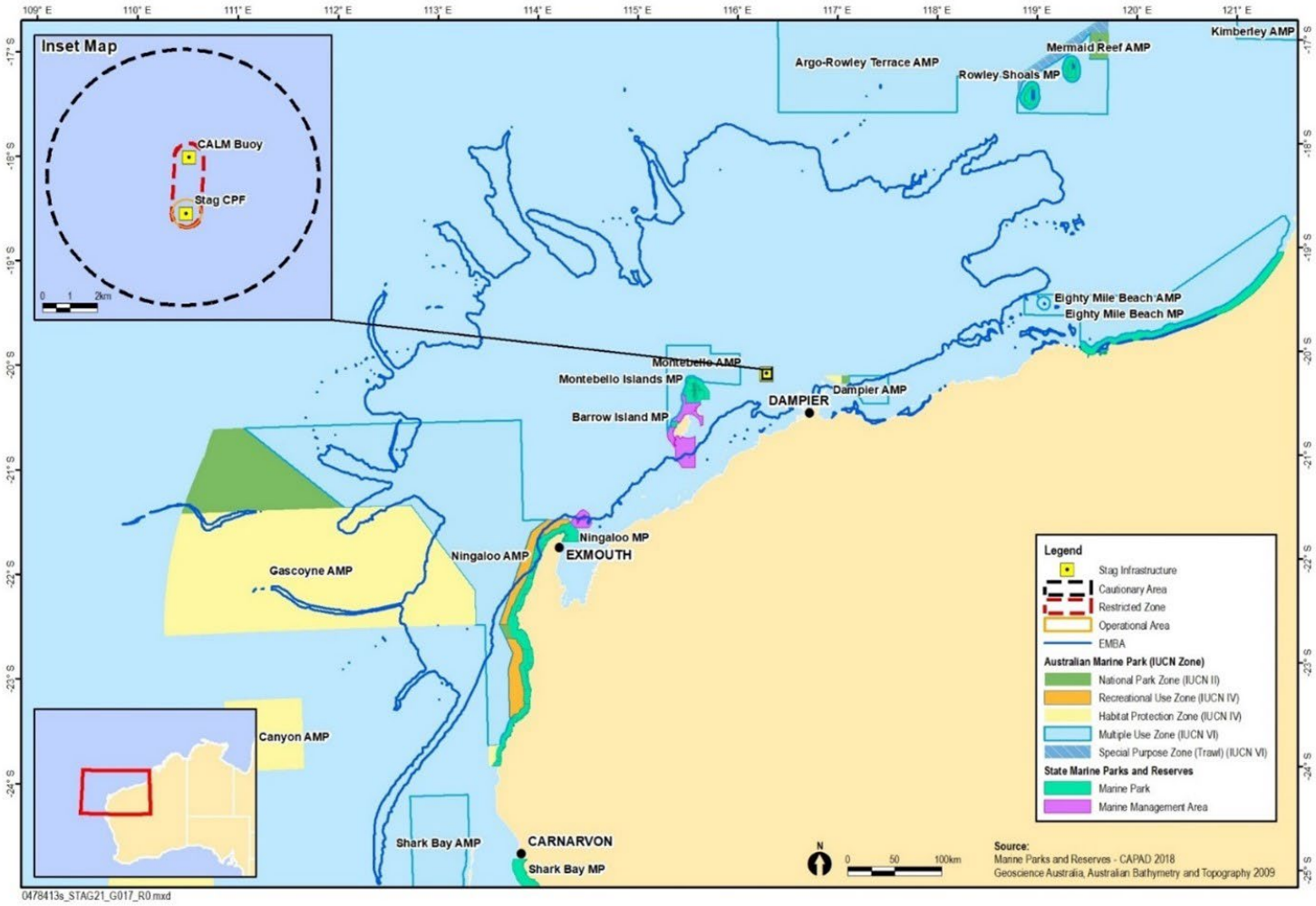
- Overall a positive outcome

Jadestone Energy

Next Steps

- Sessions to be held in
- Dampier
- Karratha
- Onslow
- Port/South Hedland?

- These areas are closer to Stag and we expect some attendance at these sessions.



Reporting to NOPSEMA

Clarity will provide a final report with the number of interactions with the QR code which was in the newspapers, social adverts and online.

This will demonstrate how many people interacted with the code and we will monitor the consult email inbox for any newly identified relevant persons

Community Consultation Sessions – Stag (Phase 2)

Jadestone Energy

17-19th January 2024

Goals of the community consultation sessions

- Identify any relevant persons who may not have been contacted through the usual means (fishery licence holders, tour operators etc)
- Ensure Jadestone have shown reasonable efforts to capture any person who wishes to be consulted
- Talk to anyone in the coastal communities where the EMBA overlaps the coastal waters to capture anyone who could be affected by an unplanned event

Jadestone Energy

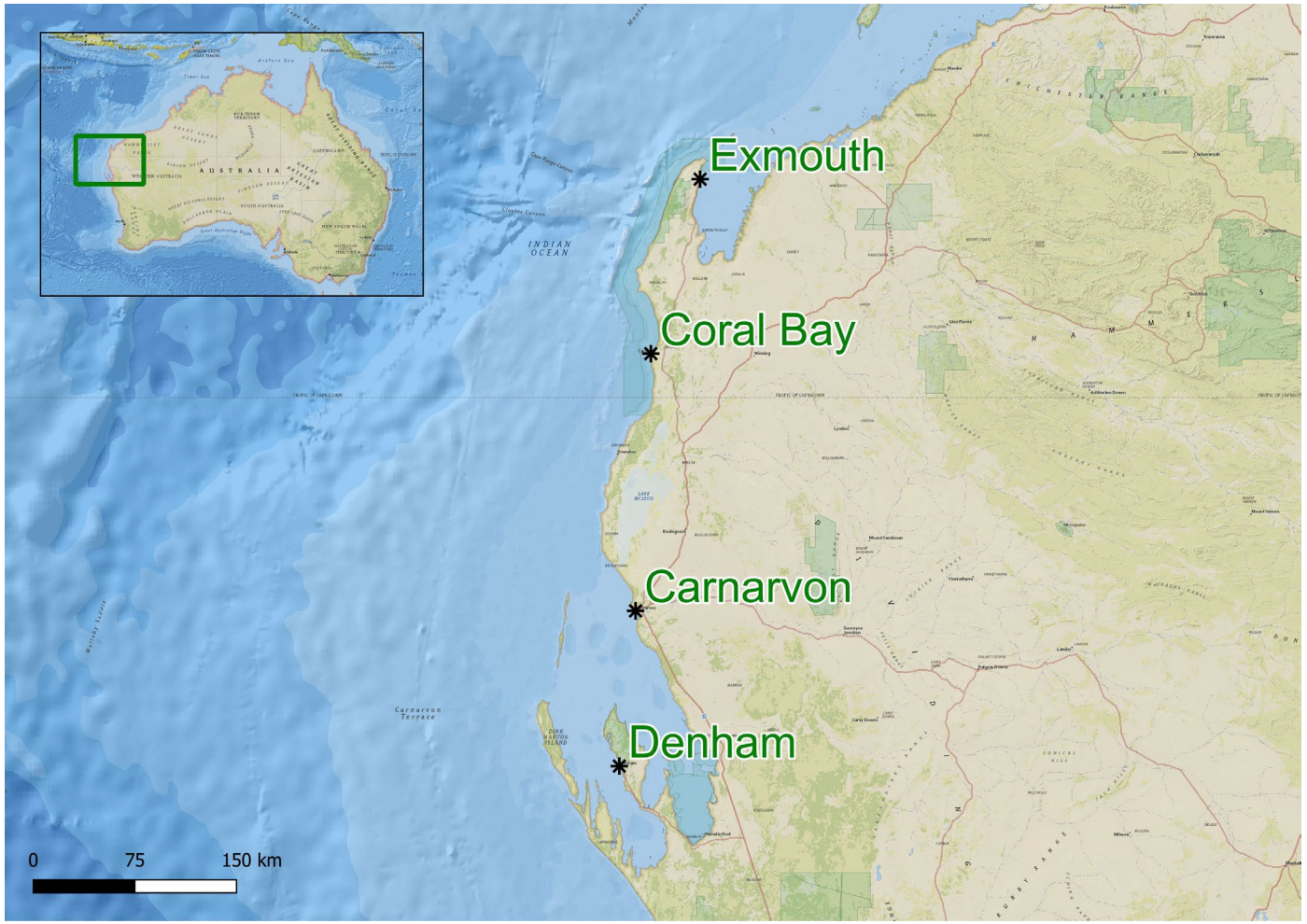
Advertising ahead of the sessions

- Newspaper adverts placed in the local news (North-West Telegraph and Pilbara Times 10th-17th January.
- Adverts placed on physical noticeboards in Shire of Ashburton and Dampier Community Hub.
- Adverts placed in local facebook groups for Karratha and Port Hedland
- Social media adverts published 8th-19th January that appeared in Facebook feeds for the local area

Jadestone Energy

Locations sessions held

- Onslow (1230-1330)
- Karratha (1230-1330)
- Dampier (1730-1830)
- Port Hedland (1230-1330)



Jadestone Energy

Onslow

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 10/01/2024 – 17/01/2024
- Readership: 11,545

10 NEWS pilbaranews.com.au Pilbara NEWS Wednesday, January 10, 2024

'Unusual' change in road toll

Survey shows WA trend towards the lowest fatalities in a decade

CALEB RUNCIMAN & PHIL HICKEY

Deaths on WA's regional roads have fallen to their lowest levels in a decade, drawing equal with fatalities on Perth roads in 2022, in a trend authorities have called "unusual".

It comes amid revelations a big portion of WA drivers think driving tired is OK.

Over the past 10 years, the road toll on regional roads has eclipsed the figure in Perth, with the number of people dying in crashes in the country almost double those in Perth, 105 deaths to 58.

Statistics to the two weeks prior to the end of 2023 revealed 74 people have died on country roads and 71 in the city — figures Road Safety Commissioner Adrian Warner acknowledged were "very unusual".

"Regional road deaths have outnumbered metropolitan deaths for the past decade," he said. "We have to go back to 2013 when there were 67 regional fatalities compared to 81 metropolitan fatalities for similar numbers."

In total, 2023 was tracking to have lowest number of road deaths in more than a decade, with 145, compared to 163 at the same time in 2022.

Mr Warner said while the reduction of deaths on regional roads was welcome, it was too early to say that it was a "sustained trend".

"We hope that regional communities are getting the message that it is mostly regional people dying on high-speed regional roads (in their own or neighbouring district) and people are taking more care driving on what are familiar but higher risk roads," he said.

"The State Government has also invested heavily in improving regional roads and there is good evidence to show that the addition of wider bitumen and rumble strips on a regional road can cut the risk of a crash."

Mr Warner said speed was the biggest factor in fatal crashes on regional roads — most often occurring on 110km/h stretches, while in the city serious crashes were more commonly on roads with a 60km/h speed limit. He emphasised the importance of staying safe on the roads.

"The best you can give is to arrive safely," he said.

"This means driving to the conditions — whatever the speed limit, if it is raining, if visibility if poor, or the road is in bad shape — slow down."

The warning comes as a new RAC survey found one in four WA drivers believe it's acceptable to drive while tired.

The same survey carried out in 2022 found just 16 per cent thought that was acceptable, and 20 per cent thought it was OK in 2021.

The results, based on responses received from about 600 WA drivers, has prompted a renewed safety message from the RAC.

RAC general manager of external relations Will Golsby said fatigue was a "silent killer" on WA roads.

"It slows down your reaction time and reduces your alertness," Mr Golsby said.

"The . . . school holidays can be stressful and exhausting, especially after a long year, but when you combine fatigue and driving, the results can be catastrophic. Nothing is more important than making sure you and your family arrive safely."

Fatigue is considered a factor in a substantial number of crashes across the country every year.

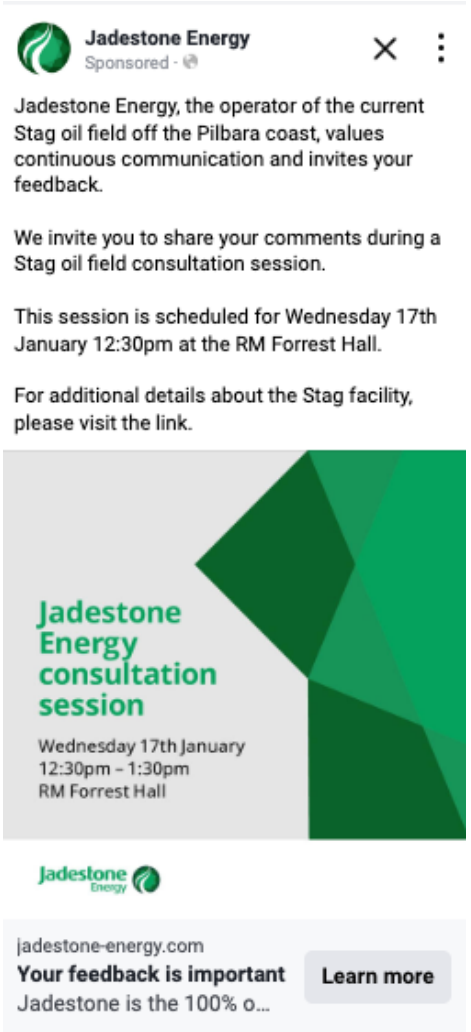
Figures show 196 people were killed or seriously injured in a fatigue related crash in WA in 2022. In 2021, 211 people died or were seriously hurt in a fatigue related collision.

December is typically one of the worst months of the year on WA roads.

Police at a major crash. Picture: Rebecca Parish

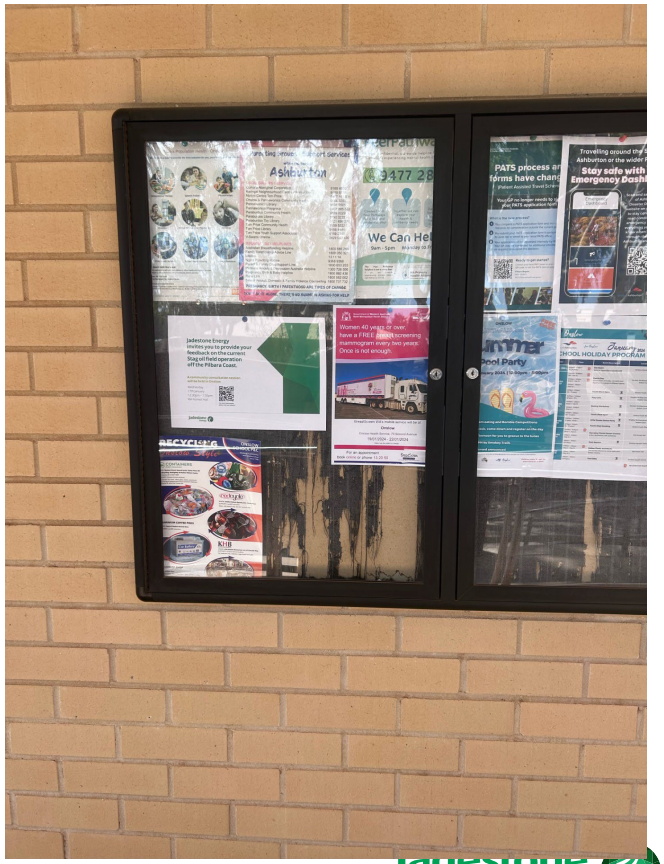
SOCIAL ADVERT

- Advertised from 08/01/2024 – 17/01/2024
- Total reach: 7,044
- Total impressions: 9,988
- Total link clicks: 11



COMMUNITY NOTICE BOARD

- Put up at the Shire of Ashburton noticeboard



Jadestone Energy

Attendees in Onslow

Session 1: Onslow, 17 January 2024 – 1230 to 1330

- Two community representatives participated in the information session, representing the Onslow Chamber of Commerce (OCC) and the Shire of Ashton (SoA)
- Both requested to be added to relevant persons list. OCC can assist with future communication with board members (~120) and at biannual community information sessions (next 20 May 2024)
- General comment that community is not overly concerned re. environment matters, more interested in commercial opportunities
- Expressed interested in decommissioning, specifically requested to be consulted when decommissioning EP is planned. Referenced option to use the Onslow port as point / access for decom
- SoA representative interested in oil spill response (addressed during presentation)
- **ACTION**: Send presentation and handout via email to both attendees and add to stakeholder list for any future updates

Jadestone Energy

Karratha

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 10/01/2024 – 17/01/24
- Readership: 11,545

10 NEWS

pilbaranews.com.au

Pilbara NEWS
Wednesday, January 10, 2024

'Unusual' change in road toll

Survey shows WA trend towards the lowest fatalities in a decade

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It comes amid revelations a big portion of WA drivers think driving tired is OK.

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Statistics to the two weeks prior to the end of 2023 revealed 74 people have died on country roads and 71 in the city — figures Road Safety Commissioner Adrian Warner acknowledged were "very unusual".

"Regional road deaths have outnumbered metropolitan deaths for the past decade," he said. "We have to go back to 2013 when there were 67 regional fatalities compared to 81 metropolitan fatalities for similar numbers."

In total, 2023 was tracking to have lowest number of road deaths in more than a decade, with 145, compared to 163 at the same time in 2022.

Mr Warner said while the reduction of deaths on regional roads was welcome, it was too early to say that it was a "sustained trend".

"We hope that regional communities are getting the message that it is mostly regional people dying on high-speed regional roads (in their own or neighbouring district) and people are taking more care driving on what are familiar but higher risk roads," he said.

"The State Government has also invested heavily in improving regional roads and there is good evidence to show that the addition of wider bitumen and rumble strips on a regional road can cut the risk of a crash."

Mr Warner said speed was the biggest factor in fatal crashes on regional roads — most often occurring on 110km/h stretches, while in the city serious crashes were more commonly on roads with a 60km/h speed limit. He emphasised the importance of staying safe on the roads.

"The best you can give is to arrive safely," he said.

"This means driving to the conditions — whatever the speed limit, if it is raining, if visibility if poor, or the road is in bad shape — slow down."

The warning comes as a new RAC survey found one in four WA drivers believe it's acceptable to drive while tired.

The same survey carried out in 2022 found just 16 per cent thought that was acceptable, and 20 per cent thought it was OK in 2021.

The results, based on responses received from about 600 WA drivers, has prompted a renewed safety message from the RAC.

RAC general manager of external relations Will Golsby said fatigue was a "silent killer" on WA roads.

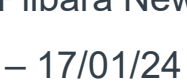
"It slows down your reaction time and reduces your alertness," Mr Golsby said.

"The . . . school holidays can be stressful and exhausting, especially after a long year, but when you combine fatigue and driving, the results can be catastrophic. Nothing is more important than making sure you and your family arrive safely."

Fatigue is considered a factor in a substantial number of crashes across the country every year.

Figures show 196 people were killed or seriously injured in a fatigue related crash in WA in 2022. In 2021, 211 people died or were seriously hurt in a fatigue related collision.

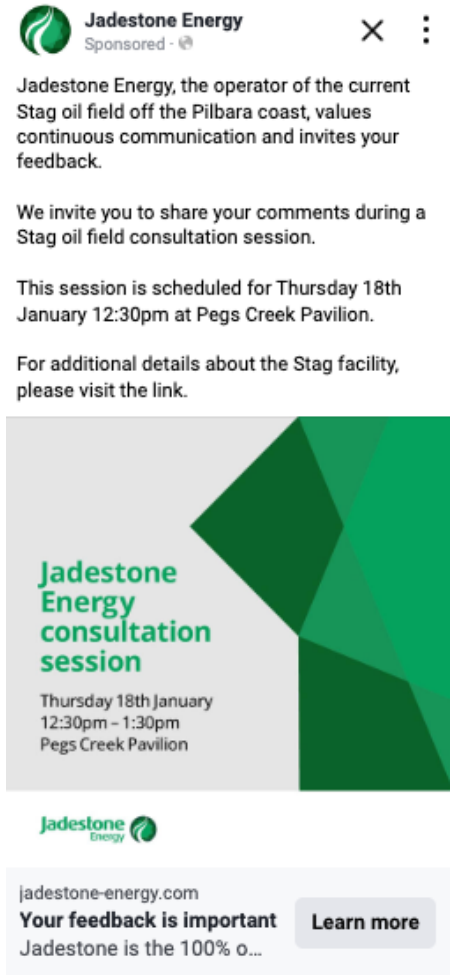
December is typically one of the worst months of the year on WA roads.



Police at a major crash. Picture: Rebecca Parish

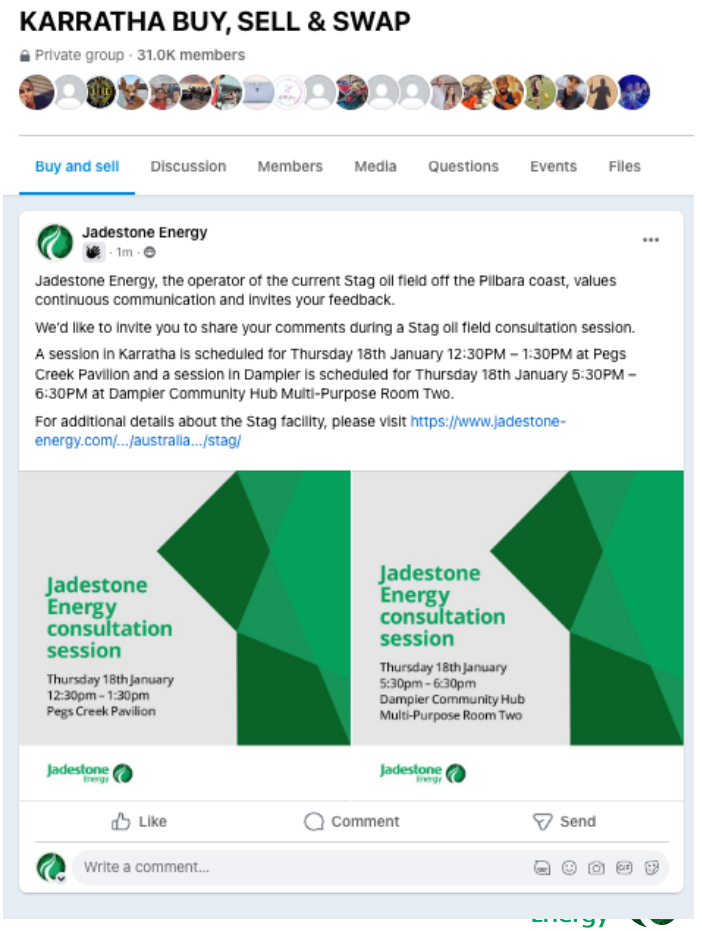
SOCIAL ADVERT

- Advertised from 08/01/2024 – 18/01/2024
- Total reach: 17,158
- Total impressions: 23,625
- Total link clicks: 16



COMMUNITY NOTICE BOARD

- Posted on Karratha noticeboard Facebook group on 15/01/2024



Attendees in Karratha

Session 2: Karratha, 18 January 2024 – 1230 to 1330

- Three participants attended the information session (see insert 2), representing City of Karratha, DBCA Parks & Wildlife Service and community member
- General discussion on the management of GHG by Jadestone, specifically reference to Scope 1 and 3 emissions.
- General discussion on prevention of incidents at an aging facility, with reference to Jadestone's maintenance management system and ongoing preventative maintenance programs.
- DBCA expressed interest in oil spill risk and potential shoreline contact.
- Inquiry on visiting the facility, Jadestone advised this is not typically an option.
- City of Karratha representative inquired about decommissioning, asking if there is an opportunity for leaving equipment in-situ to encourage fishing opportunities. Noted that WA Rec-fishing will be interested.
- General discussion on decommissioning, noting NOPSEMA base position is full removal. Jadestone will develop an EP specific to decommissioning.
- **ACTION 1**: Send presentation and handout via email to attendees and add to stakeholder list for any future updates.
- **ACTION 2:** Provide copies of the EP and OPEP to DBCA representative and shoreline contact times and volumes

Jadestone Energy

Dampier

NEWSPAPER ADVERT

- Appeared in the Pilbara News from 10/01/2024 – 17/01/24
- Readership: 11,545

10 NEWS

pilbaranews.com.au

Pilbara NEWS
Wednesday, January 10, 2024

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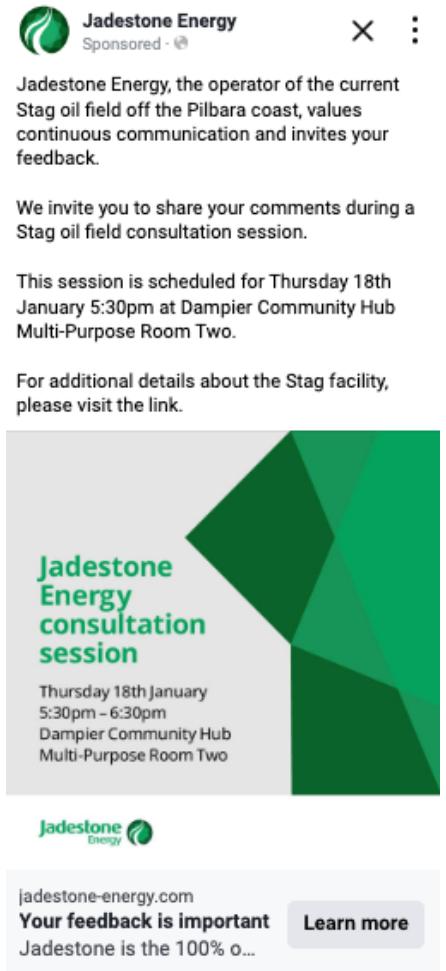
Police at a major crash. Picture: Rebecca Parish

SOCIAL ADVERT

- Advertised from 08/01/2024 – 18/01/2024
- Total reach: 12,508
- Total impressions: 17,234
- Total link clicks: 14



Jadestone Energy
Sponsored ·

Jadestone Energy, the operator of the current Stag oil field off the Pilbara coast, values continuous communication and invites your feedback.

We invite you to share your comments during a Stag oil field consultation session.

This session is scheduled for Thursday 18th January 5:30pm at Dampier Community Hub Multi-Purpose Room Two.

For additional details about the Stag facility, please visit the link.

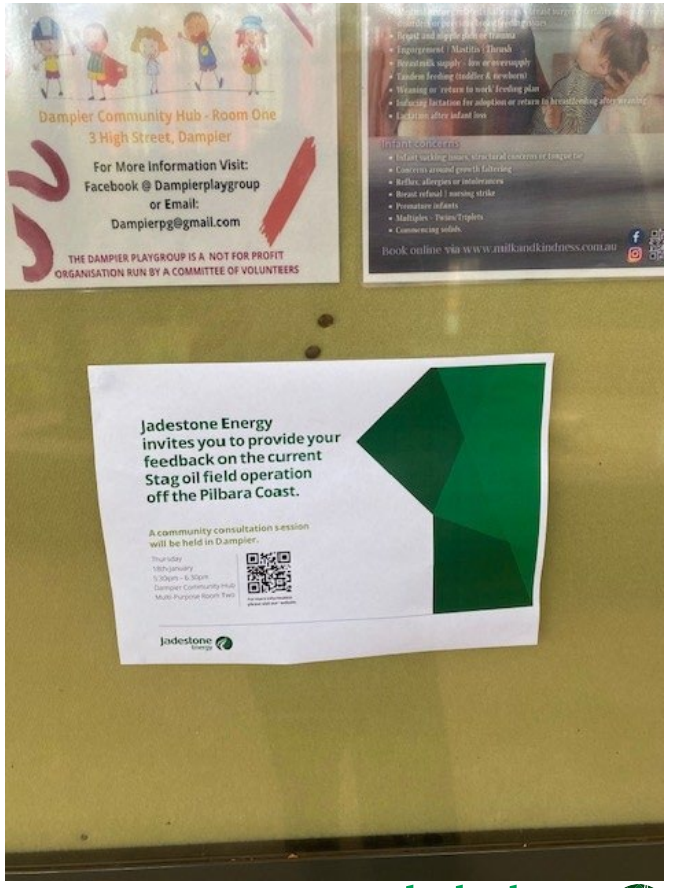
Jadestone Energy consultation session
Thursday 18th January
5:30pm – 6:30pm
Dampier Community Hub
Multi-Purpose Room Two

Jadestone Energy

jadestone-energy.com
Your feedback is important
Jadestone is the 100% o...
Learn more

COMMUNITY NOTICE BOARD

- Put up at the Dampier Community Hub



Attendees in Dampier

Session 3: Dampier, 18 January 2024 – 1730 to 1830

- Recfishwest expressed interest in supporting Jadestone to leave any material insitu as part of decommissioning. Specifically, with social and ecological data supporting fishing activities
- Recfishwest has provided support to other operators to leave material insitu (state waters)
- Recfishwest would like to be consulted going forward as Stag is a known fishing area and most well known for platform for fishing – the fishing location is known as Stag.
- Not considering Montara relevant as it is to far from cost for recreational fishers.
- Light from Stag is considered as a positive for fishing
- Advised that a FAD was recently hit by a vessel (not necessarily related to Stag). Requested information on approach that vessel operators use.
- Recfishwest would be interested in towing material (e.g. mooring chains) to state waters to create artificial reef. Would like to support Jadestone and requested early engagement during decommissioning planning (e.g. sustainability studies)
- Recfishwest is predominantly interested in decommissioning, not operations or drilling
- **ACTION 1**: Send presentation, handout, EP and OPEP via email to attendee and add to stakeholder list for any future updates.
- **ACTION 2:** Provide typical vessel approach information for Stag, alternatively provide contact information
- **ACTION 3:** Arrange meeting with Recfishwest representative to review decommissioning support Recfishwest can provide to Jadestone

Jadestone Energy

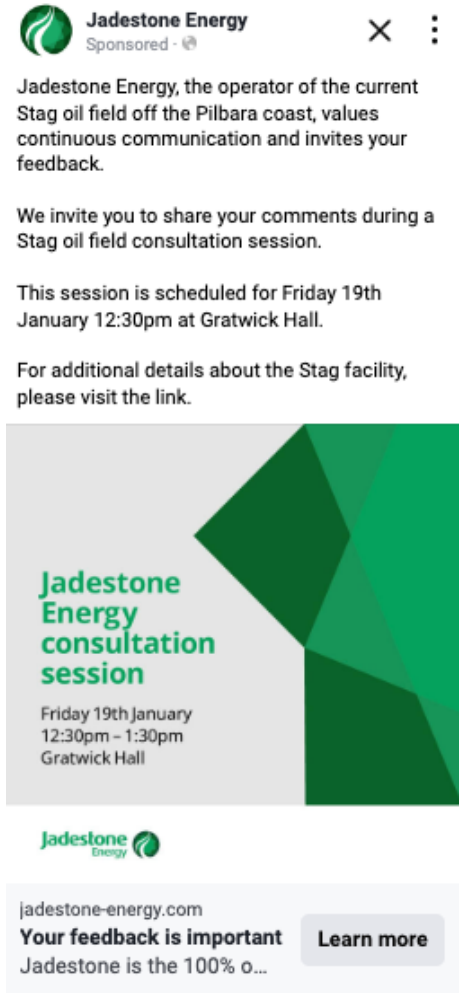
Port Hedland

NEWSPAPER ADVERT

- Appeared in the North West Telegraph from 10/01/2024 – 17/01/24
- Readership: 5,485

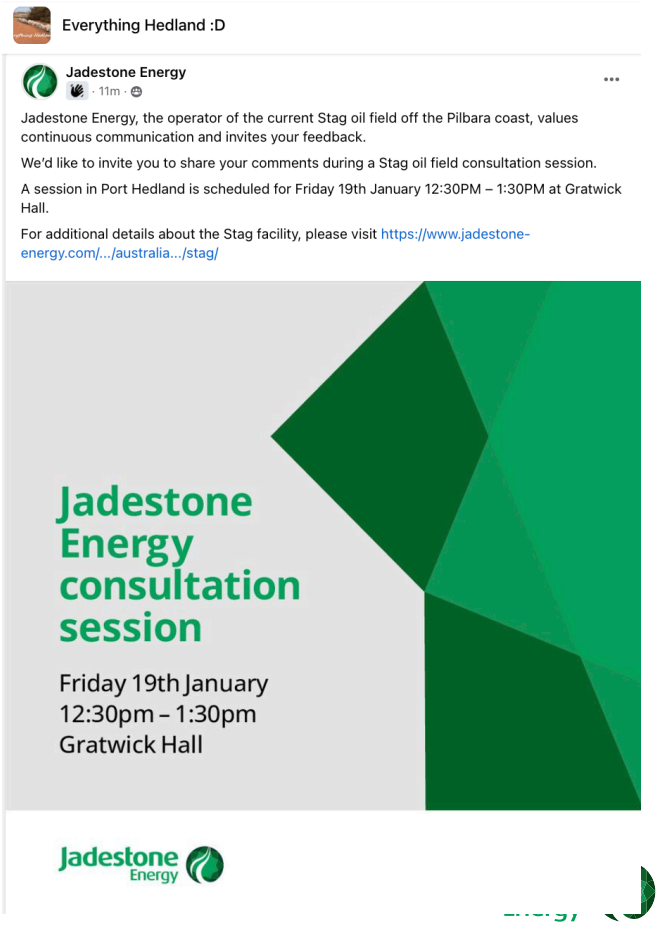
SOCIAL ADVERT

- Advertised from 08/01/2024 – 19/01/2024
- Total reach: 17,190
- Total impressions: 24,285
- Total link clicks: 16



COMMUNITY NOTICE BOARD

- Posted on Port Hedland noticeboard Facebook group on 11/01/2024



Attendees in Port Hedland

Session 3: Port Hedland, 19 January 2024 – 1230 to 1330

- No Attendees

Overall

SOCIAL STATISTICS

	Reach	Impressions	Clicks	Total spend
ONSLOW	7,044	9,988	11	$50
KARRATHA	17,158	23,625	16	$70
DAMPIER	12,508	17,234	14	$50
PORT HEDLAND	17,190	24,285	16	$70
TOTAL	**53,900**	**75,132**	**57**	**$240**

ATTENDEE STATISTICS

	Attendance	Representatives
ONSLOW	2	Onslow Chamber of Commerce Shire of Asburton
KARRATHA	3	City of Karratha, DBCA Parks & Wildlife Service and community member
DAMPIER	1	Recfishwest
PORT HEDLAND	0	N/a

QR Scans

1 Dec – 3 Jan : 52*

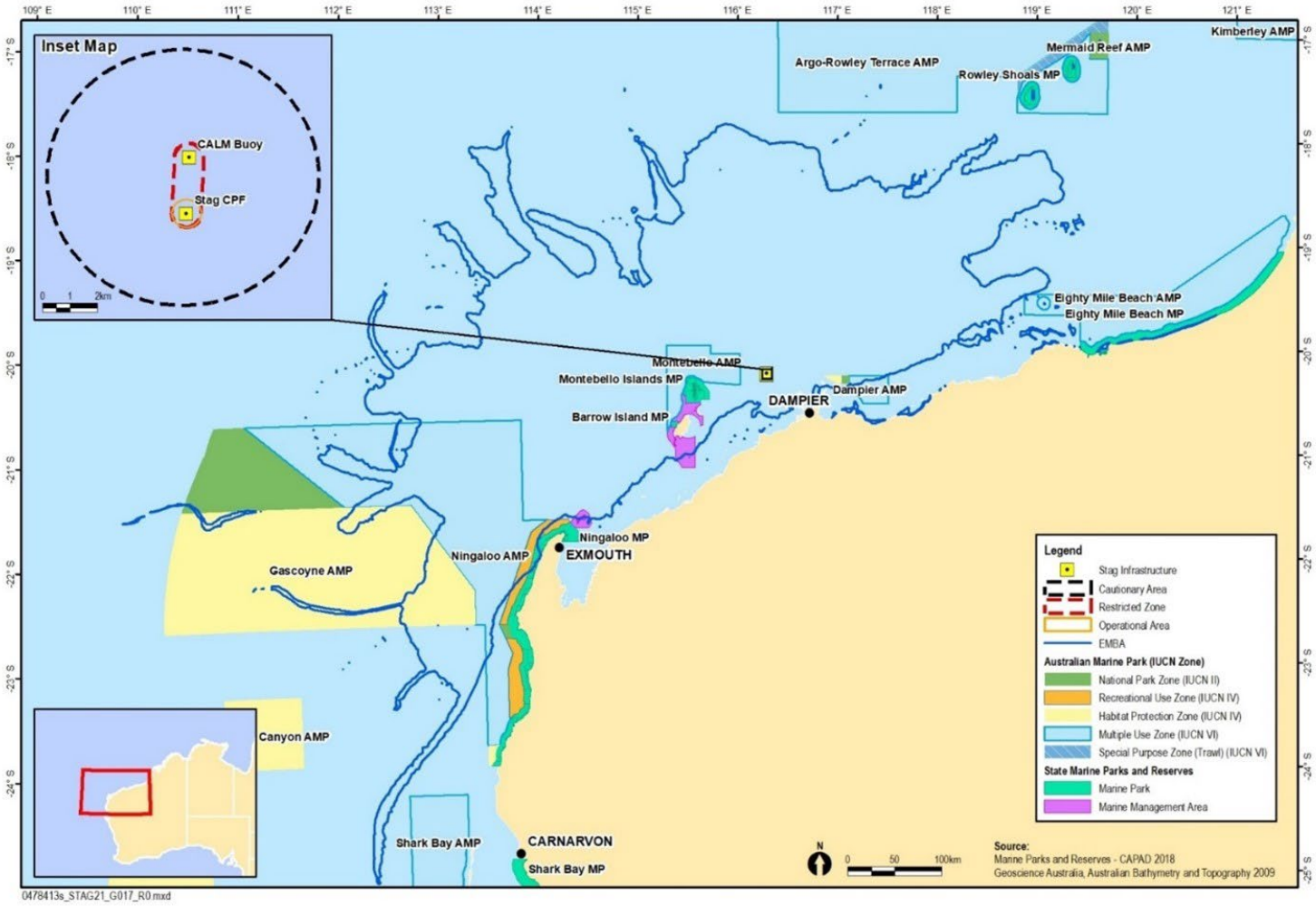
3 Jan – 22 Jan: 45

*as no one attended the first sessions, we can assume that all scans are as a result of the advertisements.

Jadestone Energy

Next Steps

- Close out actions
- Report for EP
- Recommendations for ongoing consultation



APPENDIX F STAG CRUDE OIL ASSAY (INTERTEK 2008)

Sample ID	2063		1	Cut Points					
Crude ID	STAG CPF EXPORT			2	3	4	5	6	7
Client ID	APACHE ENERGY LIMITED								
Date	19 September 2008								
			Whole	LPG	IBP - 230C	230 - 360C	360 - 540C	360C +	540C +
Test	Method	Unit							
Mass Yield	D2892/D5236	%mass		Nil	4.9	48.2	36.4	47.0	10.8
Volume Yield		%volume		Nil	5.2	49.4	35.4	45.4	10.0
Density @15°C	D5002/D4052	kg/L	0.9428		0.8788	0.9175	0.9670	0.9754	0.9937
Specific Gravity @60/60°F		-	0.9433		0.8793	0.9180	0.9676	0.9760	0.9943
API Gravity		API	18.5		29.4	22.6	14.7	13.5	10.8
Aniline Point	D611	°C			51.9	54.5	62.3	68.8	
Aniline Gravity Product	Calc	-			3685	2940	2119	2103	
Arsenic	ICPMS	mg/kg	2.3						
Ash	D482	%mass	0.0004					0.0070	
Asphaltenes	IP143	%mass	0.14					0.40	
Carbon Residue - Micro	D4530	%mass	1.05					2.48	
Cetane Index - Procedure A	D4737	-				33.2			
Cetane Index - Procedure B	D4737	-				33.0			
Characterisation Factor	UOP375	-	11.3					11.5	
Cloud Point	D2500	°C				<-45.0			
Colour - ASTM	D1500	-				L0.5			
Copper Corrosion (3hrs @ 50C)	D130	-				1A			
FIA - Aromatics	D1319	%volume			1.8				
Flash Point	D93	°C	111.0						
Freeze Point	D5972	°C			<-70.0				
Heat of Combustion - Gross	D4868	MJ/kg	43.98					43.5	
Heat of Combustion - Net	D4868	MJ/kg	41.48					41.1	
Hydrocarbon - Mono-Aromatics	IP391	%mass				23.4			
Hydrocarbon - Di-Aromatics	IP391	%mass				4.8			
Hydrocarbon - Polycyclic-Aromatics	IP391	%mass				5.0			
Kinematic Viscosity @-20°C	D445	cSt			11.32				
Kinematic Viscosity @20°C	D445	cSt	122.5		3.476				
Kinematic Viscosity @40°C	D445	cSt	37.26		2.282	7.342			
Kinematic Viscosity @50°C	D445	cSt					200.2	675.2	
Kinematic Viscosity @100°C	D445	cSt					14.69	33.54	
Mercury Content	UOP938	wt ppb	<1						
Metal - Nickel	ICP-OES	wt ppm	4.0					7.2	31.4
Metal - Vanadium	ICP-OES	wt ppm	<1.0					<1	<1
Nitrogen - Basic	UOP269	wt ppm	299					158	
Nitrogen - Total	D4629	wt ppm	516				830	1284	3421
PIONA (Benzene)	D6730	%volume			NA				
Pour Point	D5950/D5853	°C	-33			<-39.0	-3.0	0.0	48.0
Reid Vapour Pressure	D323	kPa	<1						
Reid Vapour Pressure	D323	psi	<0.15						
Sediment by Extraction	D4737	%wt	<0.01						
Smoke Point	D1322	mm			16.5				
Sulphur - Mercaptan	D3227	wt ppm							
Sulphur - Total	IP336	%mass	0.14		<0.030	0.057	0.20	0.22	0.31
Total Acid Number	D664	mg KOH/g	0.50			0.08	0.80	0.9	
Water Content	D4006	%volume	0.150						
Wax Content	UOP46	%mass	<5						

APPENDIX G HYDROCARBON THRESHOLDS

Hydrocarbon impact pathways and thresholds

The modelling method described is able to track hydrocarbon concentrations of floating oil, entrained oil and dissolved aromatic hydrocarbons below biologically significant impact levels. Consequently, threshold concentrations are specified for the model to control what contact is recorded for surface (floating oil and shoreline accumulation) and subsurface locations (entrained oil and dissolved aromatic hydrocarbons) to ensure that recorded contacts are for biologically meaningful concentrations.

The determination of biologically meaningful impact levels is complex since the degree of impact will depend on the sensitivity of the biota contacted, the duration of the contact (exposure) and the toxicity of the hydrocarbon mixture making the contact. The toxicity of a hydrocarbon will change over time, due to weathering processes altering the composition of the hydrocarbon. To ensure conservatism in the environmental impact assessment process, the threshold concentrations applied to the model are selected to adopt the most sensitive receptors that may be exposed, the longest likely exposure times and the more toxic hydrocarbons.

Impact pathways and impact threshold concentrations are detailed below for surface (floating and shoreline accumulation) oil, entrained oil and dissolved aromatic hydrocarbons (DAHs). The thresholds discussed and used in modelling are provided in Table 1.

Table 1: Low, moderate and high exposure thresholds used for spill modelling

Threshold Level	Floating oil (g/m^2)	Shoreline loading (g/m^3)	Entrained oil (ppb)	Dissolved aromatic hydrocarbons (ppb)
Low	1	10	10	10
Moderate	10	100	-	50
High	50	>1,000	100	400

Surface (floating) oil

The impact threshold concentration for exposure to surface (floating) oil is derived from levels likely to cause adverse impacts to marine/ coastal fauna and habitats. Marine/ coastal fauna, habitats and socio-economic receptors may be impacted by floating oil in the following way:

- Marine mammals, reptiles and birds can be exposed to oil when at the water surface. For marine mammals and reptiles this can occur when surfacing within a slick to breathe while for birds this includes contact from diving into a slick or floating on the sea surface while feeding or resting. For marine fauna surfacing in floating oil contact to sensitive areas may occur (e.g. eyes, mouth and respiratory system) creating irritation and potentially cell damage. Volatile compounds evaporating form surface oil may be inhaled by marine mammals and reptiles, particularly when the oil is fresh and relatively unweathered. Inhalation of these compounds may cause damage to internal respiratory structures. It is generally considered that marine mammals with smooth skin (e.g. cetaceans) are less susceptible to coating of oil than those covered with hair given hair has a greater potential to trap and retain oil causing longer exposure times. Birds are particularly susceptible to impact from floating oil in that feathers retain oil, particularly when the oil is 'sticky' (e.g. heavy crudes). The coating of oil on birds may hinder flight and feeding, reduce the ability of the bird to thermoregulate (control body temperature) and irritate/damage sensitive surfaces such as eyes, ears and nasal structures.

Secondary impacts can occur through the ingestion of oil as birds attempt to preen contaminated feathers. Ingestion may lead to oil absorption and further toxic impacts;

- Surface oil can coat emergent habitats such as coral or rocky reefs and intertidal and shoreline areas around islands or along coastlines. Habitats that can be affected include rocky shorelines, sandy beaches, mangrove communities and intertidal areas which may support seagrass, algae and coral reef communities. The physical coating of mangroves, in particular their root system, can prevent gas exchange and/or cause toxicity at the cellular level. Mangrove response to oil contact includes deforestation, yellowing of leaves and mortality. Other chronic responses include reduced growth, reduced reproductive output and success and genetic mutation. Intertidal areas may be contacted at low tides where emergent habitat is coated by oil. Seagrass, algae and sessile fauna such as hard corals, soft corals and sponges may be smothered as well as small low mobility fauna that live in close association with these and other benthic habitats or within/on sediments. Smothering of intertidal photosynthetic organisms such as seagrass, algae and hard coral may reduce their capacity for photosynthesis (energy production) or lead to a toxic response at the cellular level. For seagrass and algae this could lead to plant death, shedding of leaves/thalli, reduced growth, reduced reproductive output/success and genetic mutation. Similarly, for hard corals, bleaching, colony death, reduced growth and reduced reproductive capacity may occur. Such impacts may be exacerbated if these organisms are already under stress from marginal environmental conditions or if impacts occur during critical life-history stages (e.g. spawning periods). Small fauna smothered by oil may be hindered in their ability to move and feed or may suffer a toxic response from mortality to reduced growth rate or reproductive success. The coating of habitats can lead to secondary impacts to marine/coastal fauna. For example, marine turtles and shorebirds may be contacted by oil when using nesting beaches or when roosting/feeding along shorelines, respectively. Marine/coastal fauna may also ingest oil when feeding on coated habitats, e.g. dugongs or turtles ingesting coated seagrass/algae and shorebirds ingesting coated intertidal organisms such as molluscs and crabs; and
- Surface oil may impact on socio-economic receptors such as the oil and gas industry, commercial shipping, fisheries/aquaculture and tourism. The presence of floating oil may pose a human health risk from volatile compounds depending on the nature and freshness of the oil (i.e. fresh light oils and condensates posing the greatest risk) while oil spill response activities targeting floating oil may preclude or disrupt activities by other users in the area both offshore and at oil affected shorelines. This could have an economic impact on affected industries. In addition, floating and stranded oil may be highly visible to the general public and have a resultant negative effect on tourism in affected areas. Real or perceived deterioration of nearshore and coastal habitats may also have long lasting effect on the tourism value of an area and of fisheries activities that may rely on those areas to support healthy fish stocks.

The low threshold to assess the potential for floating oil exposure, was 1 g/m^2, which equates approximately to an average thickness of 1 µm, referred to as visible oil. Oil of this thickness is described as rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (Bonn Agreement, 2009; AMSA, 2014). This threshold is considered below levels which would cause environmental harm, and it is more indicative of the areas perceived to be affected due to its visibility on the sea surface and potential to trigger temporary closures of areas (i.e. fishing grounds) as a precautionary measure.

Ecological impact has been estimated to occur at 10 g/m^2 (a film thickness of approximately 10 µm or 0.01 mm) according to French et al. (1996) and French-McCay (2009) as this level of fresh oiling has been observed to mortally impact some birds through adhesion of oil to their feathers, exposing them to secondary effects such as hypothermia. The appearance of oil at this average thickness has been described as a metallic sheen (Bonn Agreement, 2009).

Scholten et al. (1996) and Koops et al. (2004) indicated that at oil concentrations on the sea surface of 25 g/m^2 (or greater), would be harmful for all birds that have landed in an oil film due to potential

contamination of their feathers, with secondary effects such as loss of temperature regulation and ingestion of oil through preening. The appearance of oil at this thickness is also described as metallic sheen (Bonn Agreement, 2009). For this study the high exposure threshold was set to 50 g/m2 and above based on NOPSEMA (2019). This threshold can also be used to inform response planning (RPS APASA, 2023).

Shoreline Accumulation

There are many different types of shorelines, ranging from cliffs, rocky beaches, sandy beaches, mud flats and mangroves, and each of these influences the volume of oil that can remain stranded ashore and its thickness before the shoreline saturation point occurs. For instance, a sandy beach may allow oil to percolate through the sand, thus increasing its ability to hold more oil ashore over tidal cycles and various wave actions than an equivalent area of water; hence oil can increase in thickness onshore over time. A sandy beach shoreline was assumed as the default shoreline type for the modelling for this activity, as it allows for the highest carrying capacity of oil (of the available open/exposed shoreline types). Hence the results would be indicative of a worst-case scenario, where the highest volume of oil may be stranded on the shoreline (when compared to other shoreline types, such as exposed rocky shores).

In previous risk assessment studies, French-McCay et al. (2005a; 2005b) used a threshold of 10 g/m^2 to assess the potential for shoreline accumulation. This is a conservative threshold used to define regions of socio-economic impact, such as triggering temporary closures of adjoining fisheries or the need for shore clean-up on beaches or man-made features/amenities (breakwaters, jetties, marinas, etc.). It would equate to approximately 2 teaspoons of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a stain/film. On that basis, the 10 g/m^2 shoreline accumulation threshold has been selected to define the zone of potential “low shoreline accumulation” (RPS, 2023).

French et al. (1996) and French-McCay (2009) define a shoreline oil accumulation threshold of 100 g/m^2, or above, would potentially harm shorebirds and wildlife (furbearing aquatic mammals and marine reptiles on or along the shore) based on studies for sub-lethal and lethal impacts. This threshold has been used in previous environmental risk assessment studies (see French-McCay, 2003; French-McCay et al., 2004, French-McCay et al., 2011; 2012; NOAA, 2013). Additionally, a shoreline concentration of 100 g/m^2, or above, is the minimum limit that the oil can be effectively cleaned according to the AMSA (2015) guideline. This threshold equates to approximately ½ a cup of oil per square meter of shoreline accumulation. The appearance is described as a thin oil coat. Therefore, 100 g/m^2 has been selected to define the zone of potential “moderate shoreline accumulation” (RPS, 2023).

Observations by Lin & Mendelssohn (1996) demonstrated that loadings of more than 1,000 g/m^2 of hydrocarbon during the growing season would be required to impact marsh plants significantly. Similar thresholds have been found in studies assessing hydrocarbon impacts on mangroves (Grant et al., 1993; Suprayogi & Murray, 1999). Hence, 1,000 g/m^2 has been selected to define the zone of potential “high shoreline accumulation”. It equates to approximately 1 litre of hydrocarbon per square meter of shoreline accumulation. The appearance is described as a hydrocarbon cover.

It is worth noting that the shoreline accumulation thresholds derived from extensive literature review (RPS, 2023) agree with the commonly used threshold values for oil spill modelling specified in NOPSEMA (2019)

Entrained oil

Entrained oil is oil that is dispersed within the water column as oil droplets. As such, insoluble compounds in oil cannot be absorbed from the water column by aquatic organisms, hence are not bioavailable through absorption of compounds from the water. Exposure to these compounds would require routes of uptake other than absorption of soluble compounds. The route of exposure of organisms to whole oil alone include direct contact with tissues of organisms and uptake of oil

by direct consumption, with potential for biomagnification through the food chain (NRC, 2005). For oil spills released at surface, entrained oil is created in the top few meters of the water column through mixing of surface oil by wave action. For oil spills released subsea (e.g. pipelines leaks, well blowouts) entrained oil may be distributed deeper within the water column.

The concentrations of entrained droplets output by SIMAP represent hydrocarbons that are not bioavailable. The soluble and semi-soluble fractions dissolve from the droplets over time, and a potential effects analysis based on the dissolved hydrocarbons characterizes their risk. The 10-ppb threshold represents the very lowest concentration and corresponds generally with the lowest trigger levels for chronic exposure for entrained hydrocarbons in the ANZECC & ARMCANZ (2000) water quality guidelines. Due to the requirement for relatively long exposure times (> 24 hours) for these concentrations to be significant, they are likely to be more meaningful for juvenile fish, larvae and planktonic organisms that might be entrained (or otherwise moving) within the entrained plumes, or when entrained hydrocarbons adhere to organisms or trapped against a shoreline for periods of several days or more.

This exposure zone is not considered to be of significant biological impact and is therefore outside the adverse exposure zone. This exposure zone represents the area contacted by the spill. This area does not define the area of influence as it is considered that the environment will not be affected by the entrained hydrocarbon at this level.

Thresholds of 10 ppb and 100 ppb were applied over a 1-hour time exposure (RPS, 2023), to cover the range of thresholds outlined in ANZECC & ARMCANZ (2000) water quality guidelines, the incremental change for greater potential effect and is per NOPSEMA (2019).

A complicating factor that should be considered when assessing the consequence of dissolved and entrained oil distributions is that there will be some areas where both physically entrained oil droplets and dissolved hydrocarbons co-exist. Higher concentrations of each will tend to occur close to the source where sea conditions can force mixing of relatively unweathered oil into the water column, resulting in more rapid dissolution of soluble compounds.

Dissolved Aromatic Hydrocarbons

Dissolved hydrocarbons are taken up into organisms directly through external surfaces and gills, as well as through the digestive tract. Thus, soluble and semi-soluble hydrocarbons are bioavailable, whereas insoluble compounds in oil are not bioavailable to aquatic organisms. Laboratory studies have shown that the dissolved hydrocarbons exert the most effects on aquatic biota (Carls et al. 2008; Nordtug et al. 2011; Redman 2015). The mode of action is a narcotic effect, which is positively related to the concentration of soluble hydrocarbons in the body tissues of organisms (French-McCay, 2002). The volatilization rates of hydrocarbons from surface slicks are faster than the dissolution rates. Thus, dissolution from oil droplets in the water column is the main source of concentrations dissolved in the water.

Hydrocarbon compounds vary in water-solubility and the toxicity exerted by individual compounds is inversely related to solubility, however bioavailability will be modified by the volatility of individual compounds (Nirmalakhandan & Speece, 1988; Blum & Speece, 1990; McCarty, 1986; McCarty et al., 1992a, 1992b; Mackay et al., 1992; McCarty & Mackay, 1993; Verhaar et al., 1992, 1999; Swartz et al., 1995; French-McCay, 2002; McGrath and Di Toro, 2009). Of the soluble compounds, the greatest contributor to toxicity for water-column and benthic organisms are the lower-molecular-weight aromatic compounds, which are both volatile and soluble in water. Although they are not the most water-soluble hydrocarbons within most oil types, the polynuclear aromatic hydrocarbons (PAHs) containing 2-3 aromatic ring structures typically exert the largest narcotic effects because they are semi-soluble and not highly volatile, so they persist in the environment long enough for significant accumulation to occur (Anderson et al., 1974, 1987; Neff & Anderson, 1981; Malins & Hodgins, 1981; McAuliffe, 1987; NRC, 2003). The monoaromatic hydrocarbons (MAHs), including the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), and the soluble alkanes (straight chain hydrocarbons) also contribute to toxicity, but these

compounds are highly volatile, so that their contribution will be low when oil is exposed to evaporation and higher when oil is discharged at depth where volatilisation does not occur (French-McCay, 2002).

French-McCay (2002) reviewed available toxicity data, where marine biota was exposed to dissolved hydrocarbons prepared from oil mixtures, finding that 95% of species and life stages exhibited 50% population mortality (LC50) between 6 and 400 ppb total PAH concentration after 96 hrs exposure, with an average of 50 ppb. Hence, concentrations lower than 6 ppb total PAH value should be protective of 97.5% of species and life stages even with exposure periods of days (at least 96 hours). Early life-history stages of fish appear to be more sensitive than older fish stages and invertebrates.

Exceedances of 10, 50 or 400 ppb over a 1-hour timestep was applied in the modelling (RPS, 2023) to indicate increasing potential for sub-lethal to lethal toxic effects (or low to high), based on NOPSEMA (2019).

APPENDIX H MANAGEMENT OF CHANGE PROCEDURE (JS-90-PR-G-00017) APPENDIX 5: ENVIRONMENT PLAN (EP) MOC

APPENDIX 5 – Environment Plan (EP) MOC

Environment Plan (EP) MOC			
MOC Ref.		**Date Raised:**	

Note: To comply with the OPGGS Regulations the EP MOC process must consider the change in the context of the demonstration of impacts and risks to levels that are acceptable and ALARP, and whether the change may alter the basis upon which the EP was accepted.

1. INITIATION			
Document Name			
Document No.		**Rev.**	
1.1 **Brief description of specific change(s) or proposed change(s)** *List multiple changes if it relates to the same EP. The Activity can refer to operational details, management control and performance standards, etc.*			
1.2 **Is the proposed change already included in the EP/approval document?**			
1.2.1 The proposed change covered by existing the approved document (i.e. further assessment of the change is not required).		☐	*Go to Section 4 for sign off*
References to relevant sections of document:			
1.2.2 The proposed change differs from arrangements described in the approved document.		☐	*Complete Sections 2 and 3*

2. CHANGE & RISK ASSESSMENT			
2.1 **Risk Assessment**			
2.1.1	Personnel involved in the risk assessment:		
Either copy the details below or attach separate document. The completed risk assessment needs to justify some of the check boxes in this Section. Refer to Environmental Hazard Identification and Assessment Procedure (JS-70-PR-I-00036).			
2.2 **Check against Regulatory requirements**			
	Requirement	**YES**	**NO**
2.2.1	Does the change constitute a significant modification or new stage of the activity that is not provided for in the current EP?	☐	☐
2.2.2	Does the change result in one of the following: a. The occurrence of any significant new environmental impact or risk, or significant increase in an existing environmental impact or risk, not provided for in the EP in force for the activity; b. The occurrence of a series of new environmental impacts or risks, or a series of increases in existing environmental impacts or risks, which, taken together, amount to the occurrence of: i. A significant new environmental impact or risk or ii. a significant increase in an existing environmental impact or risk that is not provided for in the EP in force for the activity?	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
2.2.3	Is the change or proposed change contrary or incompatible with existing EP?	☐	☐
2.2.4	Are all the new or existing risks reduced to ALARP? Ensure ALARP demonstration remains in place if a management control is changed or deleted, or if the activity is modified. Reduction of risks to ALARP means the cost of further risk reduction is grossly disproportionate to the benefit gained	☐	☐

If YES to any of the above, then a proposed revision of the EP must be submitted for assessment by NOPSEMA.
Justification for selections made in 2.2.1 to 2.2.4:

3. IMPLEMENTATION			
3.1	**Document Revision Requirement**		
3.1.1	Revise and re-submit approval document to Regulator		☐
	OR		
3.1.2	Conduct internal 'minor' revision of the approval document and issue for use.		☐
3.2	**Other considerations**		
		YES	**NO**
3.2.1	Can we commence or continue on the work (if it has already started)? *(If NO, discuss & assess impact with General Manager and obtain sign off)*	☐	☐
3.2.2	Does this change require Legal review? *(If YES, obtain Legal review and sign off)*	☐	☐
3.2.3	Does this change require deviation from BMS, EPBC Act, licence or other approval? *(If YES, assess impact on current activity and determine whether further discussion with relevant Regulator or re-approval will be required)*	☐	☐
3.2.4	Does this change require Spill Scenario re-modelling? *(If YES, capture this in the task table below)*	☐	☐
3.2.5	If there is a change to the spill scenario, does this require review of Financial Assurance under the OPGGS Act (ref. Financial Assurance Calculation, GF-70-REP-I-00002)? *(If YES, obtain Finance Manager review and sign off)*	☐	☐

3.2.6 Does this change require further stakeholder consultation? *(If YES, capture this in the task table below)*	☐	☐

3.3 **List any critical MoC implementation tasks below (if applicable):**		
MoC Tasks	**Responsible**	**Due date**

4. APPROVALS			
Title	**Name:**	**Signature:**	**Date:**
Engineering Coordinator			
HSE Manager			
Operations Superintendent			