GRIFFIN FIELD DECOMMISSIONING ENVIRONMENT PLAN

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REVISION RECORD						
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Acronyms and Glossary

Term	Description
µ	micron
AET	Apparent Effect Threshold
AFMA	Australian Fisheries Management Authority
AHO	Australian Hydrographic Office
ALARP	as low as reasonably practicable
AMOSC	Australian Maritime Oil Spill Centre
AMSA	Australian Maritime Safety Association
ANZECC	Australian & New Zealand Environment and Conservation Council
APPEA	Australian Petroleum Production and Exploration Association
APU	Australian Production Unit
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
AS	Australian Standard
ASBTIA	Australian Southern Bluefin Tuna Industry Association
ATSB	Australian Transport Safety Bureau
BHP	BHP Petroleum Pty Ltd
BIA	biologically important area
BTAC	Buurabalayji Thalanyji Aboriginal Corporation
BTEX	benzene, toluene, ethyl benzene, xylene
CEIA	Comparative Environmental Impact Assessment
CFA	Commonwealth Fisheries Association
CGB	Concrete gravity base
CODA	Centre of Decommissioning Australia
CRG	Community Reference Group
Cwlth	Commonwealth
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DMIRS	Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum)
DNP	Director of National Parks

Term	Description
DoEE	Department of the Environment and Energy
DoT	Department of Transport
DPIRD	WA Department of Primary Industries and Regional Development
EMBA	environment that may be affected
ENVID	environment impact (and risk) identification
EP	Environment Plan, prepared in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPO	environmental performance outcome
EPS	environmental performance standard
ESD	ecologically sustainable development
FPSO	Floating Production Storage and Offloading
GEP	gas export pipeline
GPS	Geographical Positioning System
HEX	heat exchanger
HSE	health, safety and environment
HSEC	health, safety, environment and community
IMCRA	Interim Marine and Coastal Regionalisation of Australia
IMO	International Maritime Organisation
IMT	Incident Management Team
IOGP	International Association of Oil & Gas Producers
ISQG	Interim Sediment Quality Guideline
IUCN	International Union for Conservation of Nature
KEF	key ecological feature
km	kilometre
LoR	limit of reporting
m	metre
MC	measurement criteria
MDB	mid-depth buoy
mm	Millimetre

Term	Description
MNES	matters of national environmental significance, according to the EPBC Act
MPRA	Marine Parks and Reserves Authority
MTE	Marine Transport Emergency
NCWHAC	Ningaloo Coast World Heritage Advisory Committee
NERA	National Energy Resources Australia
NES	National Environmental Significance
nm	nautical mile
NMERA	National Maritime Emergency Response Arrangement
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Petroleum Titles Administrator
NORMs	naturally occurring radioactive materials
NSCV	National Standard for Commercial Vessels
NSW	New South Wales
NWS	North West Shelf
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OSPAR	Oil Spill Prevention, Administration and Response
OSRL	Oil Spill Response Limited
PAH	polycyclic aromatic hydrocarbons
PFW	Produced Formation Water???
PLEM	pipeline end manifold
PMST	Protected Matters Search Tool
PPA	Pearl Producers Association
PSZ	Petroleum Safety Zone
PUF	polyurethane foam
ROV	remotely operated vehicle
RTM	riser turret mooring
SCSMF	South Coast Salmon Managed Fishery
SQG	Sediment Quality Guidelines
SQGV	Sediment Quality Guideline Value
SWCSMF	South West Coast Salmon Managed Fishery
t	tonne

Term	Description
TBT	tributyltin
TOC	total organic carbon
TPH	petroleum hydrocarbons
TRH	total recoverable hydrocarbons
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
WA	Western Australia
WAFIC	Western Australian Fishing Industry Council
WCD	Worst-Case Discharge
XT	Xmas tree
YMAC	Yamatji Marlpa Aboriginal Corporation
Zn	Zinc

1 Introduction

1.1 Proposed Activity

BHP Petroleum (Australia) Pty Ltd (BHP) as Titleholder under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Commonwealth) (referred to as the Environment Regulations), proposes to decommission subsea infrastructure *in situ* within the Griffin field in Permit Area WA-10-L. This activity will hereafter be referred to as the petroleum activity and forms the scope of this Environment Plan (EP). A detailed description of the petroleum activity is provided in Section 3.

This EP has been prepared as part of the requirements under the Environment Regulations, as administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

1.2 Purpose of the Environment Plan

In accordance with the objectives of the Environment Regulations, the purpose of this EP is to demonstrate that:

- the potential environmental impacts and risks from planned (routine and non-routine) activities and unplanned events (including emergency situations) of the petroleum activity are identified and described
- appropriate management controls will be implemented to reduce impacts and risks to a level that is 'as low as reasonably practicable' (ALARP) and acceptable
- the petroleum activity is performed in a manner consistent with the principles of ecologically sustainable development (as defined in Section 3A of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act)).

The EP describes the process used by BHP to identify and evaluate potential environmental impacts and risks arising from the petroleum activity, and defines the environmental performance outcomes, performance standards and measurement criteria to be applied to manage the impacts and risks to ALARP and acceptable levels. This EP includes an implementation strategy for monitoring, auditing and managing the petroleum activity to be performed by BHP and its contractors. The EP documents and considers consultation with relevant authorities, persons and organisations.

1.3 Scope of this Environment Plan

A detailed description of the petroleum activity is provided in Section 4, with an assessment of decommissioning alternatives presented in Section 3. The spatial boundary of the petroleum activity has been described and assessed using the operational area, which is described in Section 4.4.

Other activities relevant to the decommissioning of the Griffin field covered under the following EPs.

- The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes removal of Griffin field infrastructure and management of field infrastructure to ensure it may be removed in accordance with section 572(3) of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act), unless NOPSEMA accepts and is satisfied that an alternative decommissioning approach delivers equal or better environmental, safety and well integrity outcomes compared with complete removal.
- The Griffin Gas Export Pipeline Decommissioning EP (GA-BHPB-N00-0016) includes the decommissioning of the Griffin Gas Export Pipeline (GEP).

1.4 Overview of HSE Management System

All BHP-controlled activities associated with the petroleum activity will be conducted in line with:

- BHP Charter (Appendix A)

- BHP Environment and Climate Change – Our Requirements
- BHP Wells and Seismic Delivery Management System
- BHP Australian Production Unit (APU) Management System
- BHP Petroleum Health, Safety and Environment (HSE) Standard
- any specific commitments laid out in this EP.

All BHP petroleum sites must maintain up-to-date practices that adhere to the requirements contained in the BHP Petroleum Health, Safety and Environment Management System and Standard. Activity-specific environmental management measures specific to the petroleum activity are implemented through this EP.

1.5 Environment Plan Summary

An EP summary will be prepared based on the material provided in this EP, addressing the items listed in Table 1-1 as required by Regulation 11(4) of the Environment Regulations.

Table 1-1: Environment Plan Summary

EP Summary material requirement	Relevant section of this EP containing EP Summary material
The location of the activity	Section 4.2
A description of the receiving environment	Section 5
A description of the activity	Section 4
Details of the environmental impacts and risks	Section 8
The control measures for the activity	Section 8
The arrangements for ongoing monitoring of the titleholder's environmental performance	Section 10
Response arrangements in the oil pollution emergency plan	N/A
Consultation already undertaken and plans for ongoing consultation	Section 6
Details of the titleholder's nominated liaison person for the activity	Section 1.8

1.6 General Direction 832

Table 1-2 provides an assessment of the EP against the requirements of the NOPSEMA General Direction (832) issued on 30 August 2021. This EP is considered the final EP for the Griffin field infrastructure.

Table 1-2: NOPSEMA General Direction Requirements

Direction Number	Relevant Sections of this EP
Direction 1 Remove, or cause to be removed, to the satisfaction of NOPSEMA, from the title areas all property brought into those areas by any person engaged or concerned in the operations authorised by the titles as soon as practicable and before 31 December 2024.	**N/A** The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes removal of Griffin field infrastructure. The Griffin Gas Export Pipeline Decommissioning EP (GA-BHPB-N00-0016) includes the decommissioning of the Griffin Gas Export Pipeline (GEP). Section 3 includes details of the Griffin field infrastructure to be decommissioned *in situ* under this EP.
Direction 2	**N/A**

Direction Number	Relevant Sections of this EP
Until such time as Direction 1 is complete, maintain all property on the titles to NOPSEMA's satisfaction to ensure removal of the property is not precluded.	The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the maintenance of property on the titles.
Direction 3 Provide, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the title areas within 12 months after property referred to in Direction 1 is removed	**N/A** Section 3 includes details of the Griffin field infrastructure to be decommissioned *in situ* under this EP. However, the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes details of the as-left survey that will be undertaken on this infrastructure.
Direction 4 Make good, to the satisfaction of NOPSEMA, any damage to the seabed or subsoil in the title areas caused by any person engaged or concerned in the operations authorised by the titles within 12 months after property referred to in Direction 1 is removed.	**N/A** Section 3 includes details of the Griffin field infrastructure to be decommissioned *in situ* under this EP. However, the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes details of the as-left survey that will be undertaken on this infrastructure. As detailed in the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014), the as-left survey includes general visual inspections and where relevant sediment sampling will be undertaken.
Direction 5 a. Submit to NOPSEMA on an annual basis, until all directions have been met, a progress report detailing planning towards and progress with undertaking the actions required by Direction 1, 2, 3 and 4. b. The report submitted under Direction 5(a) must be to the satisfaction of NOPSEMA and submitted to NOPSEMA no later than 31 December each year. c. Publish the report on the registered holders' website within 14 days of obtaining NOPSEMA satisfaction under Direction 5(b).	**N/A** The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the obligations to submit the reports required under Direction 5.

1.7 Structure of the Environment Plan

The EP has been structured to reflect the process and requirements of the Environment Regulations, as outlined in Table 1-3.

Table 1-3: Environment Plan Process Phases, Applicable Environment Regulations and Relevant Section of Environment Plan

Criteria for acceptance	Content requirements/relevant regulations	Elements	Section of EP
Regulation 10A(a): *is appropriate for the nature and scale of the activity*	Regulation 13: *Environmental Assessment*	The principle of 'nature and scale' applies throughout the EP	Section 3 Section 3 Section 6 Section 7 Section 8
	Regulation 14: *Implementation strategy for the environment plan*		
	Regulation 16: *Other information in the environment plan*		
Regulation 10A(b): *demonstrates that the environmental impacts and risks of*	Regulation 13(1)–13(7): *13(1) Description of the activity*	Set the context (activity and existing environment)	Section 1 Section 2 Section 3

Criteria for acceptance	Content requirements/relevant regulations	Elements	Section of EP
the activity will be reduced to as low as reasonably practicable Regulation 10A(c): *demonstrates that the environmental impacts and risks of the activity will be of an acceptable level*	*13(2)(3) Description of the environment* *13(4) Requirements* *13(5)(6) Evaluation of environmental impacts and risks* *13(7) Environmental performance outcomes and standards* *Regulation 16(a)–16(c):* *A statement of the titleholder's corporate environmental policy* *A report on all consultations between the titleholder and any relevant person*	Define 'acceptable' (the requirements, the corporate policy, relevant persons) Detail the impacts and risks Evaluate the nature and scale Detail the control measures – ALARP and acceptable	Section 3 Section 6 Section 7 Section 8
Regulation 10A(d): *provides for appropriate environmental performance outcomes, environmental performance standards and measurement criteria*	Regulation 13(7): *Environmental performance outcomes and standards*	Environmental Performance Outcomes Environmental Performance Standards Measurement Criteria	N/A
Regulation 10A(e): *includes an appropriate implementation strategy and monitoring, recording and reporting arrangements*	Regulation 14: *Implementation strategy for the environment plan*	Implementation strategy, including: • systems, practices and procedures • performance monitoring • Oil Pollution Emergency Plan (OPEP) and scientific monitoring • ongoing consultation	Section 10
Regulation 10A(f): *does not involve the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being undertaken in any part of a declared World Heritage property within the meaning of the EPBC Act*	Regulation 13 (1)–13(3): *13(1) Description of the activity* *13(2) Description of the environment* *13(3) Without limiting [Regulation 13(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:*	No activity, or part of the activity, undertaken in any part of a declared World Heritage property	Section 3 Section 3 Section 5

Criteria for acceptance	Content requirements/relevant regulations	Elements	Section of EP
	(i) a Commonwealth marine area within the meaning of that Act; or *(ii) Commonwealth land within the meaning of that Act.*		
Regulation 10A(g): *(i) the titleholder has carried out the consultations required by Division 2.2A* *(ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate*	Regulation 11A: *Consultation with relevant authorities, persons and organisations, etc.* Regulation 16(b): *A report on all consultations between the titleholder and any relevant person*	Consultation in preparation of the EP	Section 6
Regulation 10A(h): *complies with the Act and the regulations*	Regulation 15: *Details of the Titleholder and liaison person* Regulation 16(c): *Details of all reportable incidents in relation to the proposed activity.*	All contents of the EP must comply with the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and the Environment Regulations	Section 1.8 Section 10.5

1.8 Titleholder Details

The nominated Titleholder for this activity is BHP Petroleum (Australia) Pty Ltd.

BHP has exploration, development, and production activities in more than a dozen countries around the globe, including a significant deep-water position in the Gulf of Mexico, and operations in Australia, the United Kingdom, Trinidad and Tobago, Algeria and Pakistan. BHP's Australian assets include:

- Macedon Gas Plant – natural gas and condensate (operator)
- Pyrenees Floating Production, Storage and Offloading (FPSO) vessel - crude oil (operator)
- Bass Strait – crude oil, condensate, liquid petroleum gas and natural gas (non-operator)
- North West Shelf – crude oil, condensate, and liquefied natural gas (non-operator).

In accordance with Regulation 15(1) of the Environment Regulations, details of the titleholder are provided in Table 1-4.

Table 1-4: Titleholder Details

Name	BHP Petroleum (Australia) Pty Ltd
Business address	125 St Georges Terrace, Perth, Western Australia 6000
Telephone number	+61 8 6321 4496
Email address	clive.jones@bhp.com
Australian Company Number	39 006 923 879

In accordance with Regulation 15(2) of the Environment Regulations, details of the titleholder's nominated liaison person are provided in Table 1-5.

Table 1-5: Titleholder Nominated Liaison Person

Name	**Steve Jeffcote**
Position	Regional HSE Lead, Australia
Business address	125 St Georges Terrace, Perth, Western Australia 6000
Telephone number	+61 8 6321 2789
Email address	Steve.Jeffcote@bhp.com

In the event of any change in the titleholder, titleholder parent company, a change in the titleholder's nominated liaison person or a change in the contact details for either the titleholder or the liaison person, BHP will notify NOPSEMA in writing in accordance with Regulation 15(3) of the Environment Regulations.

2 Legislative Framework

2.1 Commonwealth Legislation

Environmental aspects of petroleum activity in Australian Commonwealth waters are controlled by two main statutes, the OPGGS Act and the EPBC Act. Each of these, as applicable to the petroleum activity, is described in the next sections. There are also applicable Commonwealth and West Australian statutes and regulations, International Agreements and Conventions and other applicable standards, guidelines, and codes under which the activities are implemented. These are listed in Appendix B of this EP.

2.1.1 Offshore Petroleum and Greenhouse Gas Storage Act 2006

The OPGGS Act provides the regulatory framework for all offshore exploration and production activities in Commonwealth waters (those areas beyond three nautical miles from the Territorial sea baseline and in the Commonwealth Petroleum Jurisdiction Boundary). The Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (referred to as the Environment Regulations) have been made under the auspices of the OPGGS Act for the purposes of ensuring (as described in Section 3) "…any petroleum activity or greenhouse gas activity carried out in an offshore area is:

- carried out in a manner consistent with the principles of ecologically sustainable development set out in section 3A of the EPBC Act
- carried out in a manner by which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable
- carried out in a manner by which the environmental impacts and risks of the activity will be of an acceptable level".

This EP meets the requirements of the Environment Regulations by providing a plan that:

- is appropriate for the nature and scale of the activity
- demonstrates the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable
- demonstrates the environmental impacts and risks of the activity will be of an acceptable level
- provides for appropriate environmental performance outcomes, environmental performance standards and measurement criteria
- includes an appropriate implementation strategy and monitoring, recording, and reporting arrangements
- does not involve the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being performed in any part of a declared World Heritage property within the meaning of the EPBC Act
- demonstrates that:
    - an appropriate level of consultation, as required by Division 2.2A, has been performed
    - the measures (if any) adopted, or proposed to adopt, because of consultations are appropriate
    - complies with the OPGGS Act and the Environment Regulations.

The OPGGS Act and supporting regulations address licensing, health, safety and environmental matters for offshore petroleum and gas exploration and production operations in Commonwealth waters. Obligations in relation to the maintenance and removal of equipment and property brought onto title are provided in OPGGS Act section 572. Section 572 requires the removal of property when it is no longer used, unless NOPSEMA has accepted alternative arrangements where justification is appropriate and with regard to the Australian Government Offshore Petroleum Decommissioning Guideline. Field management covered under Griffin the Decommissioning and Field Management EP (GV-HSE-E-0014) evaluates the infrastructure integrity and applies applicable measures, based on risk, to ensure subsea infrastructure may be removed in accordance with section 572(3) of the OPGGS Act. All Griffin subsea infrastructure (including GEP) will be removed before

31 December 2024, in accordance with section 572(3) of the OPGGS Act, unless NOPSEMA approves and is satisfied that an alternative decommissioning approach delivers equal or better environmental, safety and well integrity outcomes compared with complete removal.

2.1.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places in Australia. These are defined in the Act as Matters of National Environmental Significance (MNES). NOPSEMA, through the Streamlining Offshore Petroleum Environmental Approvals Program, implements these requirements with respect to offshore petroleum activity in Commonwealth waters. The Streamlining Offshore Petroleum Environmental Approvals Program is applicable to all offshore petroleum activity authorised by the OPGGS Act and requires the petroleum activity to be conducted in accordance with an accepted EP, consistent with the principles of ecologically sustainable development (ESD). The definition of 'environment' in the Streamlining Offshore Petroleum Environmental Approvals Program is consistent with that used in the EPBC Act and encompass all matters protected under Part 3 of the EPBC Act.

Under s268 of the EPBC Act:

> "*A Commonwealth agency must not take any action that contravenes a recovery plan or a threat abatement plan*."

In respect to offshore petroleum activity in Commonwealth waters, the above is implemented by NOPSEMA. Commitments relating to listed threatened species and ecological communities under the Act are included in the Program Report (Commonwealth of Australia, 2014):

- NOPSEMA will not accept an Environment Plan that proposes activities which will result in unacceptable impacts to a listed threatened species or ecological community.
- NOPSEMA will not accept an Environment Plan that is inconsistent with a recovery plan or threat abatement plan for a listed threatened species or ecological community.
- NOPSEMA will have regard to any approved conservation advice relating to a threatened species or ecological community before accepting an Environment Plan.

Recovery and management plans relevant to this EP are outlined in Section 9.

2.1.3 Environment Protection (Sea Dumping) Act 1981

The Commonwealth *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) is the legislative instrument that addresses Australia's obligations under the London Protocol. The aims of the London Protocol are to protect and preserve the marine environment from all sources of pollution, and to prevent, reduce and eliminate pollution by controlling the dumping of wastes and other materials at sea. The Sea Dumping Act regulates the dumping at sea of controlled material (including certain wastes and other matter), the incineration at sea of controlled material, loading for the purpose of dumping or incineration, export for the purpose of dumping or incineration, and the placement of artificial reefs. Permits are required to authorise sea dumping activities.

The Sea Dumping Act and associated sea dumping permits are administered by the Department of Agriculture, Water and Environment (DAWE) and are required for subsea infrastructure proposed to be decommissioned *in situ* under the scope of this EP.

2.2 State Legislation

There is no subsea infrastructure in State waters.

2.3 Environmental Guidelines, Standards and Codes of Practice

Multiple international codes of practice and guidelines are relevant to environmental management of the petroleum activity. Those considered most relevant are listed in Appendix B.

The following two international conventions and protocols are considered most relevant to the petroleum activity. An assessment of the petroleum activity against these is provided in Section 8.1.5 and 8.3.5.

2.3.1 Article 192 of the United Nations Convention on the Law of the Sea 1982 (UNCLOS)

A general obligation of Article 192 of the United Nations Convention on the Law of the Sea 1982 (UNCLOS) is to protect and preserve the marine environment. International Maritime Organization (IMO) resolution A.672 (1989) recognises that the general requirement is base case of removal with the objective of protecting and preserving the marine environment. Further details are provided in paragraph 3.9 of the resolution describing that equipment left *in situ* should not move under environmental loading and paragraph 3.2 further describes that infrastructure less than 4000 tonnes in less than 100 m water should be removed.

2.3.2 Annex I(2) of the 1996 London Protocol

Annex I(2) of the 1996 London Protocol to the convention on the prevention of marine pollution by dumping of waste and other matter (update to London Convention and Protocol 1972) describes that material capable of creating floating debris or otherwise contributes to the pollution of the marine environment has to be removed.

3 Decommissioning Alternatives Assessment

3.1 Regulatory Context

Article 60 of the 1982 United Nations Convention on the Law of the Sea (UNCLOS), to which Australia is a party, states:

"Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States."

Australia is a member state of the International Maritime Organization (IMO), a body created by agreement of member states of the United Nations. The IMO is regarded as the competent organization to deal with the requirement of Article 60 of the UNCLOS. Following UNCLOS, the IMO published *Resolution A.672(16) Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone* (IMO 1989). This resolution recognises that structures on the continental shelf should be removed, but coastal states (such as Australia) may make decisions to leave structures partially or completely in the sea.

Section 572 of the OPGGS Act requires that titleholders maintain their property and remove their property from a petroleum title area when it is no longer in use, which is consistent with the requirement of Article 60 of UNCLOS. However, the Commonwealth recognises that removal of property may not be feasible, or may result in environmental, safety and economic outcomes that are worse than leaving property in the sea. The *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018a) outlines the Commonwealth's principles on decommissioning property used for offshore oil and gas exploration and production:

- Decommissioning is the responsibility of the titleholder
- Early planning for decommissioning is encouraged
- Complete removal of property is the base case
- Decommissioning must be completed before the end of the title

Noting these principles, the *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018a) states that NOPSEMA may consider alternatives to complete removal. The guideline requires a titleholder to demonstrate that any proposed alternatives to full removal must result in equal or better environmental, safety and well integrity outcomes compared to full removal.

The *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b) outlined NOPSEMA's position on Section 572 of the OPGGS Act and the *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018a). This policy reinforces full removal of property is the base case for decommissioning and outlines NOPSEMA's position on alternatives to full removal of property. The policy requires that any EP proposing an alternative to full removal must include:

- An evaluation of the feasibility of all alternatives, including partial and complete removal of property
- An evaluation of environmental impacts and risks of all feasible alternatives, including complete property removal, to enable NOPSEMA to have regard to the Australian Government Decommissioning Guideline policy principle that deviations will provide an equal or better environmental outcome when compared to complete property removal. The evaluation of all the environmental impacts and risks of each alternative must include consideration of control measures necessary to manage the impacts and risks
- Evaluation of all environmental impacts and risks within Australia's environment including, where relevant, indirect consequences that may arise from the petroleum activity of removing property from a title area
- Where deviation/s to removal of property or relocation of property is proposed, titleholders are to address arrangements for long-term monitoring and management. Environment plans requiring long-term monitoring for property will be subject to environmental performance reporting requirements and compliance monitoring by NOPSEMA for the duration of the monitoring program. NOPSEMA advises the Joint Authority of EPs requiring long-term monitoring for property and this may be a matter taken into account when considering surrender of titles

- Consideration of relevant persons' consultation with respect to the alternatives being proposed

3.2 Decommissioning Alternatives Environmental Impact Assessment

BHP has removed, or will remove, most of the equipment in the Griffin Field, as detailed in the Griffin Field Management and Equipment Removal EP (GV-HSE-E-0014). The gas export pipeline is proposed to be cleaned and abandoned *in situ*, as detailed in the Griffin Gas Export Pipeline Decommissioning EP (GA-BHPB-N00-0016). The decommissioning of the following equipment is not covered by these EPs, and BHP are proposing the following equipment groups as candidates for abandonment *in situ*:

- The riser turret mooring (RTM) base (assuming the entire structure was not removed within the scope of the Griffin Field Management and Equipment Removal EP)
- RTM anchors
- Piled foundations for the pipeline end manifold (PLEM) and distribution skids (note the PLEM and skids will be removed)
- Mid-depth buoy (MDB) concrete gravity bases

In accordance with NOPSEMA's *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b), BHP identified several feasible decommissioning alternatives for the equipment listed above. These alternatives are summarised in Table 3-1. The implementation of these alternatives assumes controls are implemented to manage environmental impacts and risks that are consistent with industry good practice.

Table 3-1: Feasible decommissioning alternatives for abandonment *in situ* candidate equipment groups

Equipment Group	Full Removal	Partial Removal	Abandonment *In Situ*	Additional Structures
RTM	Feasible – remove RTM either in sections or as a single element	Feasible – remove the top sections of the RTM containing contaminants (e.g., foam) and lower sections without compartment fill.	Feasible – topple onto the seabed	Feasible – topple onto seabed and install additional concrete artificial reef modules around remaining RTM structure (Compartment 1)
RTM anchors	Feasible – excavate and pull anchor from seabed	Not feasible – not amenable to be sectioned	Feasible – leave as is embedded in seabed	Not feasible – anchors embedded in seabed, with no available hard substrate to augment
PLEM and distribution skid pile foundations	Feasible – excavate or vibrate and pull from the seabed	Feasible – cut and remove the section of the pile that extends above the seabed	Feasible – leave as is, with pile partially protruding from the seabed	Not feasible – piles are predominantly embedded in seabed, with little available hard substrate to augment
MDB concrete gravity bases	Feasible – excavate or vibrate and pull from the seabed. Remove in sections or as a single element	Not feasible – Activity aligned with full removal alternative, with no incremental benefits for partial leave in place	Feasible – leave as is, partially embedded in the seabed	Not feasible – concrete gravity bases are predominantly embedded in seabed, with little available hard substrate to augment

Each of the feasible decommissioning alternatives for the candidate equipment groups has a range of different environmental, safety, technical, cost, and socio-economic outcomes. The *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b) requires that BHP evaluate the environmental impacts and risks of the feasible decommissioning alternatives listed above. BHP did this by undertaking a decommissioning alternatives environmental impact assessment (EIA), which is summarised in this section. The EIA used the analytic hierarchy process (AHP), which is described in Section 3.2.1. An AHP analysis was

developed for each equipment group to determine the relative impacts of each of the feasible decommissioning alternatives on environmental values and sensitivities that may credibly be impacted.

The EIA did not explicitly consider risks (i.e., impacts that may occur due to accidents or emergencies) to environmental values and sensitivities. The risk profile of each of the feasible decommissioning alternatives is broadly similar, with risks generally arising from vessel-based activities (e.g., introductions of invasive marine species and hydrocarbon spills). BHP has a proven ability to prevent vessel-based risks becoming realised, and hence the environmental risk profiles of the feasible alternatives were not considered to differentiate the feasible decommissioning alternatives.

3.2.1 EIA Methodology

An environmental impact assessment of the feasible decommissioning alternatives for the GEP was undertaken using the AHP. The AHP is a multi-criteria decision analysis (MCDA) method, where the alternatives can be compared using a suite of criteria. The AHP method has been studied extensively in a range of disciplines (e.g., defence, finance, and medicine) and is supported by a wide body of literature. The AHP methodology is described in detail in Saaty (1996). A concise description of the AHP in the context of environmental impact assessment has been provided by Ramanathan (2001).

Determining the relative environmental outcomes of the feasible alternatives for the equipment groups considered requires consideration of many factors. The AHP facilitates this by identifying these factors and making determinations about each independently. Once each of these smaller determinations has been made, they are aggregated to summarise the deliberations made. Each environmental impact assessment was composed into a hierarchy comprising the following elements:

- the statement of the goal
- the environmental criteria
- the feasible alternatives to be considered for the GEP

Define the Goal

The AHP commenced with the formulation of a goal statement. The goal statement is the root of the AHP hierarchy. The goal statement for the AHP to assess the relative environmental outcomes of the feasible decommissioning alternatives for the equipment groups was:

“Determine the relative environmental outcomes of the feasible decommissioning alternatives for the [EQUIPMENT GROUP]”

Where [EQUIPMENT GROUP] is the specific group being considered.

Identify the Feasible Alternatives

BHP identified the feasible decommissioning alternatives for each equipment group. Each of these feasible alternatives were considered in the environmental impact assessment for each equipment group. These alternatives were identified through:

- A review of relevant requirements, particularly *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b), which requires titleholders proposing alternatives to full removal to:
    - evaluate the feasibility of all alternatives, including partial and complete removal of property, and
    - evaluate the environmental impacts and risks of all feasible alternatives, including complete removal, to demonstrate that the alternative yields equal or better environmental outcomes than full removal.
- A review of offshore decommissioning activities globally
- Preliminary engineering consideration of the methods by which an alternative may be implemented
- Preliminary assessment of the acceptability of the alternatives

The feasible decommissioning alternatives for each equipment group are summarised in Table 3-1, with descriptions provided further in this section. These descriptions are based on preliminary considerations only. Implementation of any of the feasible alternatives would require more detailed engineering analysis and refinement than what is presented in this report.

Care was taken when selecting the methods for the full removal and partial removal alternatives. Methods that clearly had unacceptable impacts and risks to the environment, or could be substituted with less hazardous alternatives, were not considered. This ensures that the environmental impact assessments were not unduly biased against the full removal or partial removal alternatives. The methods presented for each equipment group are reasonable and consistent with contemporary offshore engineering practices.

Identify the Criteria and Sub-criteria

Given the environmental impact assessment is intended to demonstrate the relative environmental outcomes of the feasible alternative for each equipment group, the criteria in the AHP were based on the environmental receptors that could credibly be impacted by the feasible alternatives. Environmental receptors considered in the environmental impact assessments were identified based on the nature and scale of the environmental aspects of the feasible alternatives, such as:

- the spatial extent of each aspect
- the temporal extent of each aspect
- the magnitude or intensity of environmental hazards that may arise from each aspect

No consideration was made for the environmental receptors that may credibly be at risk of impacts from unplanned events.

Each environmental receptor identified as a criterion was assessed to determine if the receptor warranted decomposition into sub-criteria. The decision to break down a criterion further into sub-criteria considered:

- whether the sub-criteria differed in their scale, environmental value, and vulnerability to impacts
- whether the sub-criteria could reasonably be impacted by the decommissioning alternatives in different ways
- whether the sub-criteria had specific relevant requirements that warranted consideration to meet the needs of the Environment Regulations

The environmental receptors identified as criteria and sub-criteria in the AHP hierarchy were compared to determine the relative priority (i.e., weighting) each should receive using the AHP process. The relative environmental value of each criterion and sub-criterion was determined by considering:

- the value placed on the criterion by legislation (which is intended to protect extrinsic and intrinsic value of the environmental receptor), cultural value, economic value, recreational value
- the value placed on it because it supports other environmental values –the “connectedness” of the receptor
- the uniqueness of the environmental value within the environment

Sources of information on the environmental value of criteria and sub-criteria included work commissioned specifically to inform decommissioning of the Griffin field. Other inputs, such as environmental studies, material published by the Commonwealth on threatened and migratory species, and stakeholder consultation were also used.

The environmental receptors identified as criteria by the process described above comprise:

- Sediment quality
- Water quality
- Benthic habitats
- Marine fauna
- Greenhouse gasses
- Onshore environmental receptors
- Other users

The other users criterion comprises several groups; hence the following sub-criteria were identified within this the other users criterion:

- Commercial fishers

- Tourism and recreation
- Petroleum industry
- Commercial shipping

Descriptions of these environmental receptors are provided in the description of the environment (Section 5).

Pairwise Comparisons

Following construction of the AHP hierarchy, all possible pairwise[1] comparisons were made between the child nodes below the goal and the criteria nodes in the hierarchy. These pairwise comparisons were used to determine the weightings for each of the nodes below the goal in the hierarchy.

Deliberations on pairwise comparisons considered the relative merits of the items being compared. The comparisons within each node of the hierarchy were limited to the scope of the node. For example:

- the comparisons between environmental criteria and sub-criteria only considered the relative importance of the criteria or sub-criteria being compared.
- the comparisons of the decommissioning alternatives within a criterion or sub-criterion only considered the potential impacts of each alternative on that criterion.

The comparison ratings and definitions are listed in Table 3-2.

Table 3-2: Relative qualitative judgment criteria used for pairwise comparisons

Rating	Definition	Description
1	Equal importance/preference	Both elements are of equal importance
3	Moderate importance/preference	Experience and judgment slightly favour one element over the other
5	Strong importance/preference	Experience and judgment strongly favour one element over the other
7	Very strong importance/preference	One element is very strongly favoured over the other
9	Extreme importance/preference	The evidence favouring one element is of the highest possible order of affirmation

Pairwise comparisons between criteria generally gave a relatively high weighting to:

- marine fauna (approximately 33.2% of the criteria weighting), based on the high degree of protection of some species (e.g., threatened and migratory species listed under the EPBC Act) and the economic and social benefits provided by fishes in the Griffin field
- other users (approximately 32.7% of the criteria weighting), based on the interest shown to date by members of the local communities in Exmouth and Ashburton

Sediment quality and water quality both received moderate weightings (approximately 12.1% and 8.8% respectively) based on their high environmental connectivity. The remaining three criteria (benthic habitats, greenhouse gasses and onshore environmental receptors) accounted for only approximately 13% (Table 3-3).

[1] Pairwise comparison generally is any process of comparing entities in pairs to judge which of each entity is preferred, or has a greater amount of some quantitative property, or whether the two entities are identical.

Table 3-3: Global weightings for criteria

Criteria	Global Weighting
Sediment Quality	12.1%
Water Quality	8.8%
Benthic Habitats	6.4%
Marine Fauna	33.2%
Greenhouse Gasses	3.4%
Onshore Environmental Receptors	3.3%
Other Users	32.7%
Sum	100%

Pairwise comparisons of the sub-criteria within the other users criterion gave relatively high local weightings to the commercial fisheries (51.3%) and tourism and recreation (26.7%) sub-criteria, with the petroleum industry and commercial shipping sub-criteria receiving relatively low local weightings (Table 3-4).

Table 3-4: Local and global weightings for sub-criteria within the other users criterion

Criteria	Local Weighting	Global Weighting
Commercial Fisheries	51.3%	17.0%
Tourism and Recreation	26.7%	8.9%
Petroleum Industry	11.9%	3.9%
Commercial Shipping	10.1%	3.3%
Sum	100%	32.7%

The criteria and sub-criteria weightings above were applied to the AHP assessments developed for each equipment group. These assessments are summarised below.

3.2.2 RTM

The RTM is a cylindrical structure approximately 100 m in length and 6 m in diameter that provided the attachment point for the Griffin Venture FPSO in WA-10-L (Figure 3-1). The RTM is constructed largely of steel. There are a series of compartments on the RTM that provide buoyancy and one that contains iron ore and concrete ballast. Some of the buoyancy compartments on the upper part of the RTM are filled with foam. The as-built weight of the RTM is approximately 2,410 tonnes, with ~40% of the weight concentrated in the bottom section, Compartment 1.

The RTM is attached to the seabed by six anchor legs (Figure 3-2). Several production risers transferred fluids produced from the wells through the RTM to the FPSO during operations. Umbilicals and well service lines also extend through the RTM between the production system on the seabed and the FPSO (Figure 3-2). The risers, umbilicals and well service lines were flushed and filled with seawater during cessation of production activities.

The RTM has sunk, due to flooding of at least two of the buoyancy compartments (cause unknown) and is standing vertically on the seabed, with the top of the RTM approximately 35 m below the sea surface. The degree to which the RTM is embedded in the seabed is unknown, but surveys suggest it is not significantly embedded.

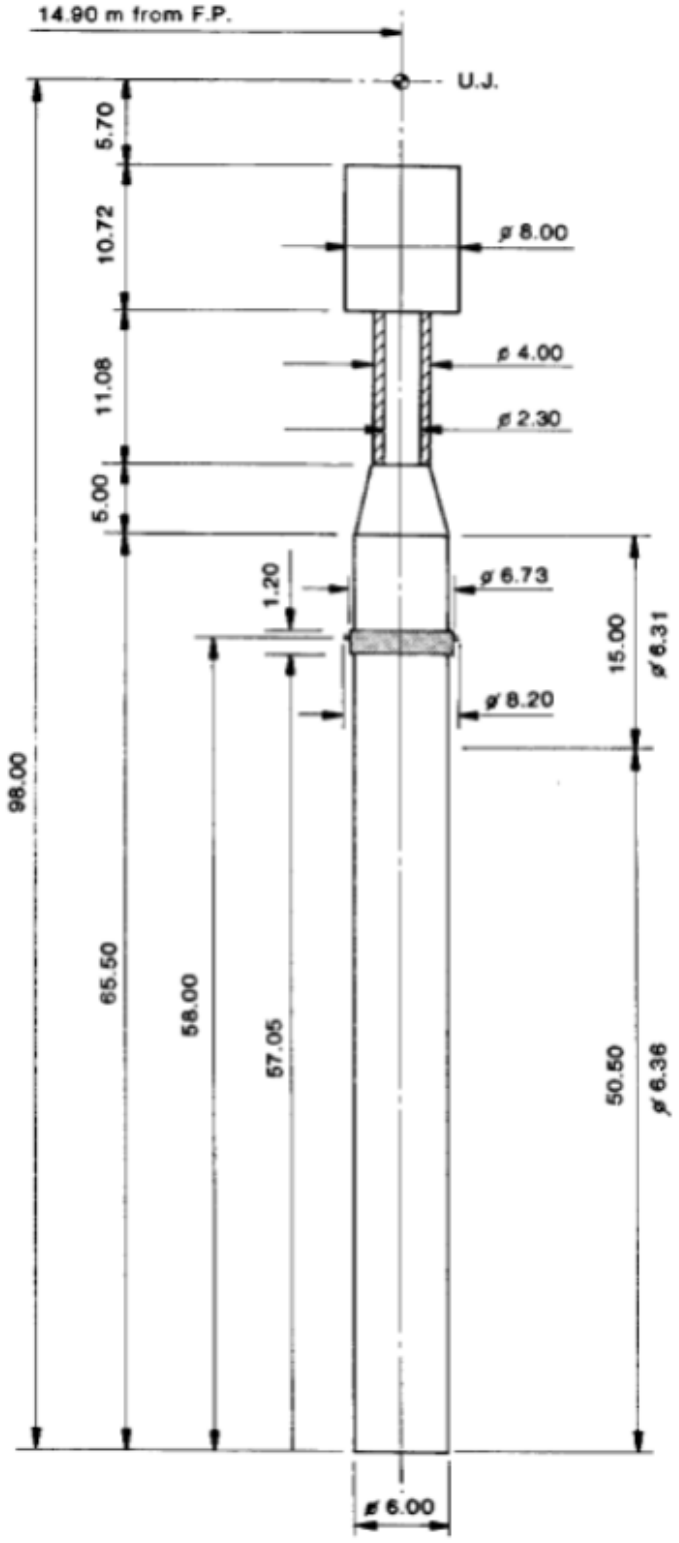

Figure 3-1: General layout of the RTM

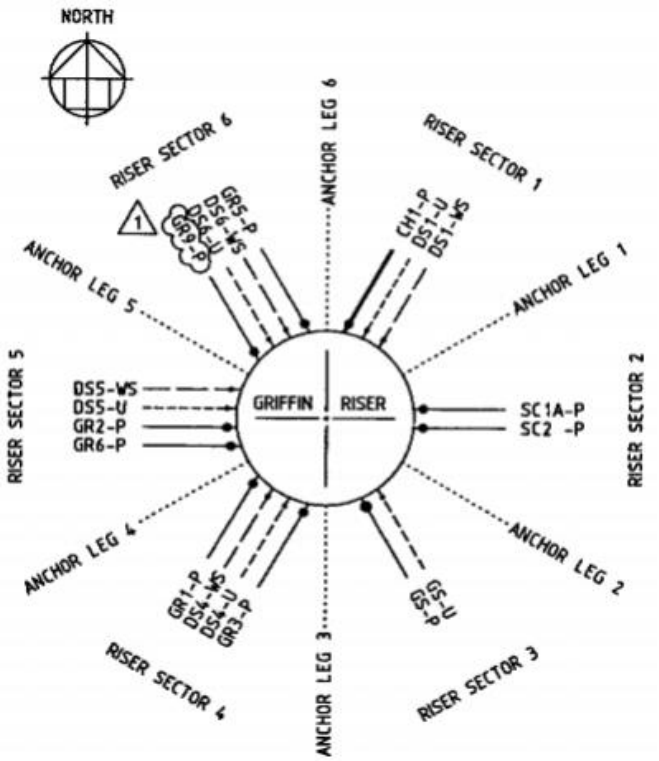

Figure 3-2: RTM plan showing production risers (suffix P), well service lines (suffix WS), umbilicals (suffix U) and anchor legs

Feasible Decommissioning Alternatives

The feasible decommissioning alternatives for the RTM are summarised in Table 3-5.

Table 3-5: Summary descriptions of the feasible decommissioning alternatives identified for the RTM

Feasible Decommissioning Alternative	Description
Full removal	Removal of the RTM presents a technical challenge due to its size, mass and weight distribution. Removal of the RTM is expected to be done by cutting the RTM into sections, with each section recovered independently. The RTM is assumed to be laying on the seabed prior to sectioning, and hence will require toppling prior to sectioning. Alternatives include refloating through added buoyancy and recovering in a single lift.
Partial removal	Partial removal of the RTM consists of removing the majority of the RTM, including the upper sections of the RTM, where foam and plastics are located (Figure 3-1). The RTM is assumed to be laying on the seabed prior to cutting the upper sections off, and hence will require toppling prior to sectioning. The upper sections will be recovered to a vessel and transported to shore for disposal by recycling or landfill. The lower compartment of the RTM will be abandoned *in situ* lying on its side. This compartment, Compartment 1, is filled with iron ore ballast, a concrete keel, and is comprised of steel, and represents ~40% of the weight of the RTM structure.
Abandonment *in situ*	The abandonment *in situ* alternative will topple the RTM at its current location and leave it lying whole on the seabed. No further monitoring or interventions would be undertaken. Although feasible, this does not align with BHP's decommissioning philosophy of removal of predominantly plastic items and contaminants.

Additional Structures	The additional structures alternative consists of installing additional artificial structures in proximity to equipment abandoned *in situ* in the partial removal case Additional structures are intended to provide additional complex structures that promote settlement of sessile biota and provide habitat for organisms. The nature of the structures used to supplement the habitat provided by the RTM has not yet been determined, however any such structures must be: • Inherently stable • Made from long-lasting materials • Have high surface and structural complexity to allow attachment of sessile biota and provide habitat • Of similar size to naturally occurring reef components in the region. A mixture of sizes and geometries of additional structures may result in greater habitat diversity than a single artificial structure design. The environmental impact assessment assumes that all additional structures are: • Made of moulded, steel-reinforced concrete • Made in Perth, Western Australia, and transported to the installation location • Installed by lifting from a vessel into place on the seabed • Inherently stable on the seabed with no requirement for inspection or intervention The number of structures required is assumed to be 10's of concrete structures around the RTM.

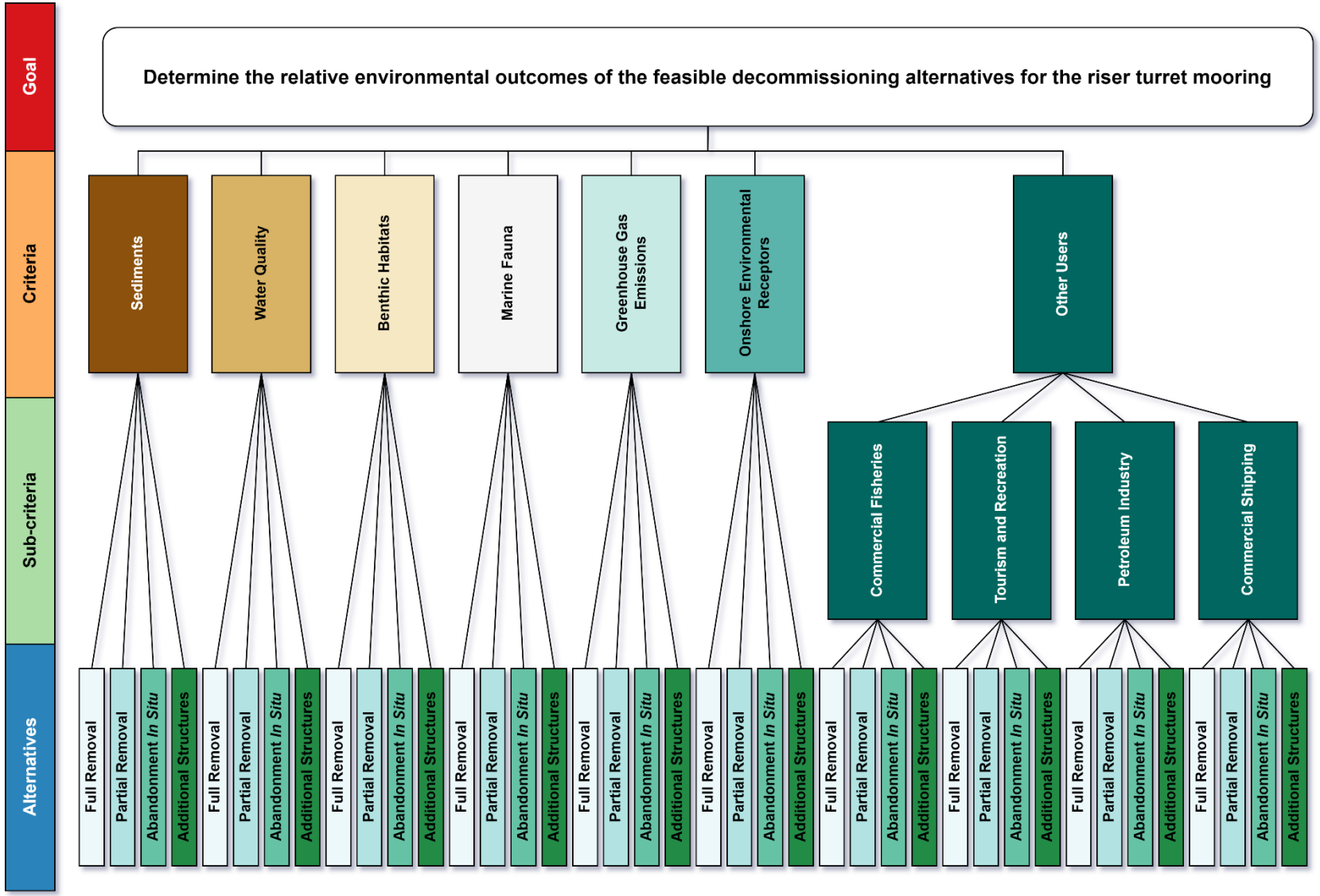

Figure 3-3: AHP hierarchy for the RTM

Summary of EIA Deliberations

Pairwise comparisons between the decommissioning alternatives within each of the criteria and sub-criteria were made as per the AHP process. The relative weightings of the RTM feasible decommissioning alternatives were then derived from these comparisons, which indicated a preference for the additional structures alternative (Figure 3-4).

All alternatives to full removal resulted in better environmental outcomes than full removal.

Alternatives that retain the RTM partially or complete abandonment *in situ* scored well in the other users criterion due to the fish assemblages associated with the RTM potentially benefitting commercial and recreational fishers. The full removal alternative scored relatively poorly in the other users criterion.

The relative preference of the decommissioning alternatives within the fauna criterion reflected the compromise between the beneficial habitat provided by equipment and the potential pollution from equipment as it degrades (particularly plastics). The partial removal alternative scored well in this criterion, as it removes the foam containing sections of the RTM while retaining a portion of the structure which poses negligible risk to, and provides habitat for, fauna.

The full removal alternative was the most preferred within the sediment quality criterion as it eliminated long-term changes to sediment quality due to RTM degradation at the cost of a short-term, localised impact to sediments during removal. This contrasts with the abandonment *in situ* alternative which has relatively little disturbance during implementation but will result in long-term changes to sediments due to degradation.

BHP's preferred alternative is partial removal. The EIA demonstrates this alternative results in equal or better environmental outcomes compared to full removal, hence satisfying the *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018a) and *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b).

The additional structures alternative scored well in the other users criterion due to the perceived benefits to other users, particularly commercial and recreational fishers targeting demersal scalefish. The EIA indicated additional structures is expected resulted in slightly better environmental outcomes compared to partial removal, largely due to the perceived benefits to other users. Although the addition of structures would likely result in an enhanced environmental outcome, the habitat created by the RTM structure is reduced for the partial removal alternative, with only the bottom compartment 1 remaining *in situ*. Habitat created is relatively minor due to the small size (15m x 6m diameter), its low height, its low three-dimensional structural complexity, its isolated nature and the water depth of 130m. The success of the enhancement in creating a thriving artificial reef to support commercial and recreational fishing is considered marginal when compared to the partial removal alternative.

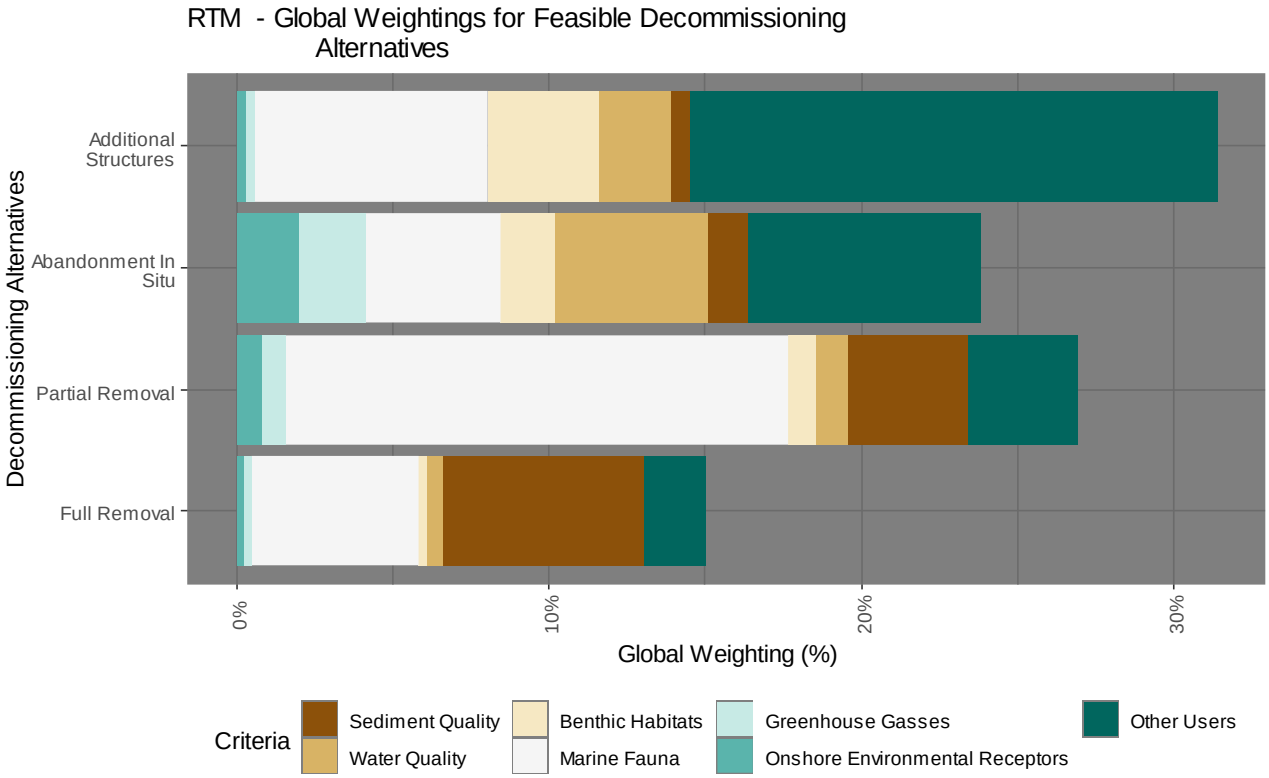

Figure 3-4: Stacked bar plots of weightings within each criterion for the RTM feasible decommissioning alternatives

3.2.3 RTM Anchors

The RTM is held in place by a series of six anchor legs, which are attached to anchors embedded in the seabed. Each leg contains two anchors, in a lead/lag arrangement. The anchors are embedment-type anchors consisting of flukes, a shank and a padeye to which the anchor leg is attached (Figure 3-5). The anchors were set within the seabed by tensioning a line attached to the anchor. The anchor design ensures that tension on the anchor leg encourages further embedment. The anchors are designed not to be removed.

The anchor legs will be removed during an equipment removal campaign under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) (Section 3).

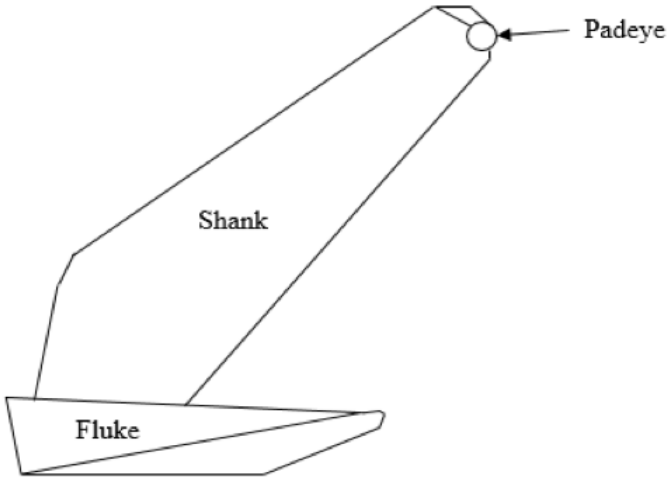

Figure 3-5: Components of a typical drag embedment-type anchor

Feasible Decommissioning Alternatives

The feasible decommissioning alternatives for the RTM anchors are summarised in Table 3-6. Unlike the RTM, installation of additional structures was not deemed feasible – no parts of the anchors protrude above the seabed, hence there is no hard substrate provided by the equipment to augment.

Table 3-6: Summary descriptions of the feasible decommissioning alternatives identified for the RTM anchors

Feasible Decommissioning Alternative	Description
Full removal	The anchors were not designed to be removed; their purpose is to securely hold the RTM, which depends on their ability to remain securely embedded within the seabed. The full removal alternative for the RTM anchors consists of removing each of the 12 anchors by pulling them from the seabed in the opposite direction to which they were installed. This methodology involves: • Securing a line to the anchor leg using an ROV • Pulling the line in the opposite direction to which the anchor was installed until the anchor is dislodged from the seabed • Recovering the anchor from the seabed for onshore disposal • Making good the disturbance to the seabed from removal of the anchor
Abandonment *in situ*	The abandonment *in situ* alternative will leave the RTM anchors as they are in the seabed. No further monitoring or interventions would be undertaken. The RTM anchor legs will be recovered as part of an equipment removal campaign. No vessel activities will be required as part of the abandonment *in situ* alternative for the RTM anchors.

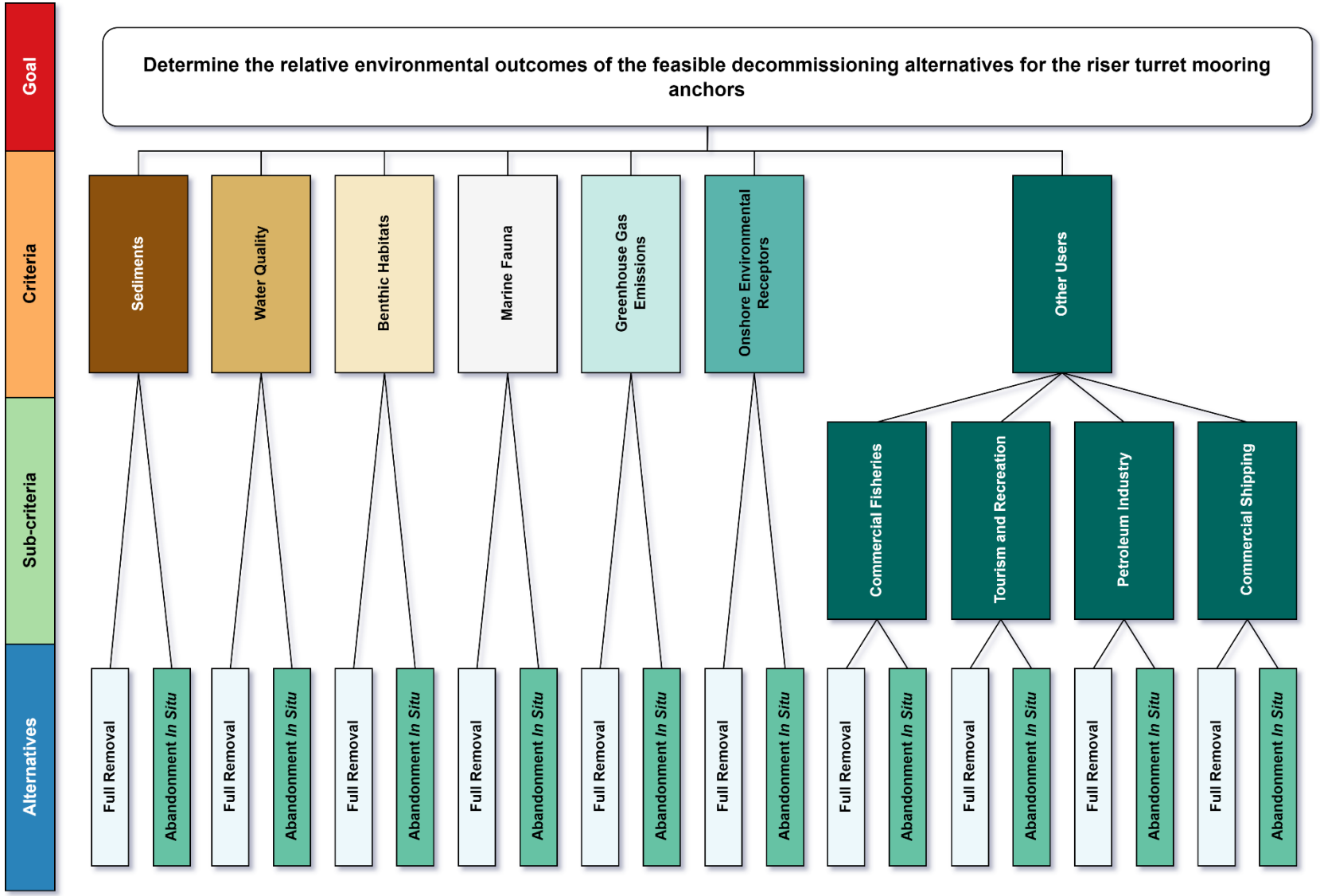

Figure 3-6: AHP hierarchy for the RTM anchors

Summary of EIA Deliberations

Pairwise comparisons between the decommissioning alternatives for the RTM anchors within each of the criteria and sub-criteria were made as per the AHP process. The relative weightings of the feasible decommissioning alternatives were then derived from these comparisons, which indicated a strong preference for the abandonment *in situ* alternative (Figure 3-7).

The vessel-based activities and seabed disturbance required to recover the RTM anchors, and the potential impacts to fauna and other users, accounted for much of the preference for the abandonment *in situ* decommissioning alternative. The very low snag risk to trawled fishing equipment (fisheries management arrangements presently prohibit trawling in the Griffin field) and the very low potential for toxicity of the degradation products (rust) from the RTM anchors over time also resulted in the abandonment *in situ* alternative being preferred.

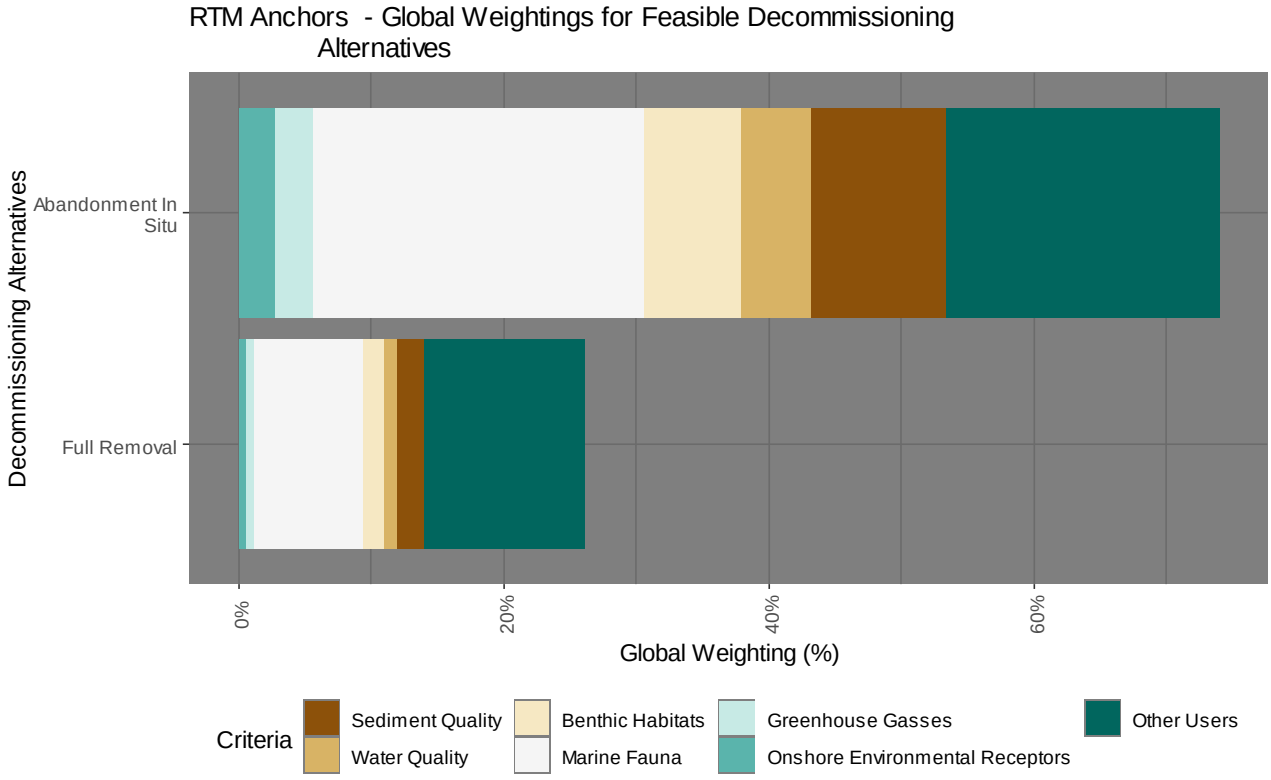

Figure 3-7: Stacked bar plots of weightings within each criterion for the RTM anchors feasible decommissioning alternatives

3.2.4 PLEM and Distribution Skid Pile Foundations

Four distribution skids and PLEM were installed on piled foundations to ensure their stability on the seabed – one pile for each skid and the PLEM (Figure 3-8). The piles are made of steel and concrete/cement, 30 inches in diameter and vary from 23 m to 36 m in length. The piles were installed in the seabed (e.g., by driving or drilling and grouting) during construction of the Griffin field.

The bases of the distribution skids and PLEM that used the piles as foundations will be removed completely. Following removal of the distribution skid and PLEM bases, approximately 1 m of each pile will be exposed above the seabed.

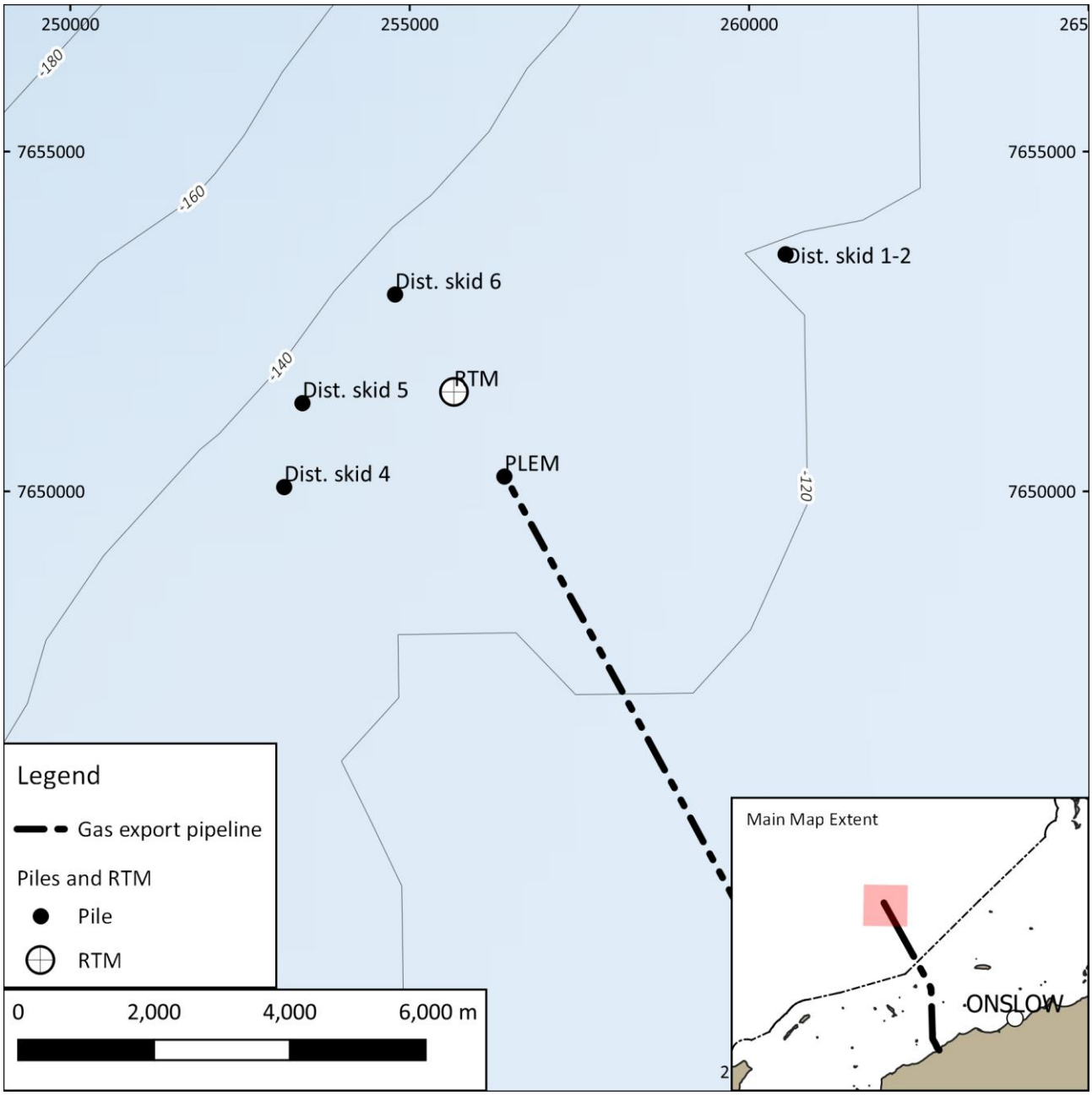

Figure 3-8: Location of piles for distribution skid and PLEM foundations

Feasible Decommissioning Alternatives

The feasible decommissioning alternatives for the PLEM and distribution skids piled foundations are summarised in Table 3-7.

Table 3-7: Summary descriptions of the feasible decommissioning alternatives identified for the PLEM and distribution skid piled foundations

Feasible Decommissioning Alternative	Description
Full removal	The piles installed for the piled foundations were not designed to be removed; their purpose is to provide a secure foundation for the distribution skids and PLEM, which depends on their ability to remain securely embedded within the seabed. The piles are assumed to be removed by vibrating each pile using a vibratory hammer to reduce the skin friction between the pile and the seabed. As the pile is vibrated it would be simultaneously pulled upwards to remove the pile from the seabed. Once free of the seabed, the pile will be recovered to a vessel for transport to shore. Once onshore, the piles will be disposed of as landfill.
Partial removal	Partial removal of the piled foundation consists of cutting the pile at the mudline and removing the severed section of the pile. The cut of the pile is assumed to be made by an ROV with a diamond wire cutting tool. The cut will be made as close to the mudline as practical, to minimise sediment disturbance. External cutting of the pile is the assessed as the worst case method for seabed disturbance. Piles will be cut internally if access permits. The recovered section of the pile will be disposed of onshore as landfill. .
Abandonment *in situ*	The abandonment *in situ* alternative will leave the piled foundations as they are on the seabed following the removal of the distribution skids and PLEM. Approximately 1 m of the pile would extend above the mudline. No further monitoring or interventions would be undertaken.

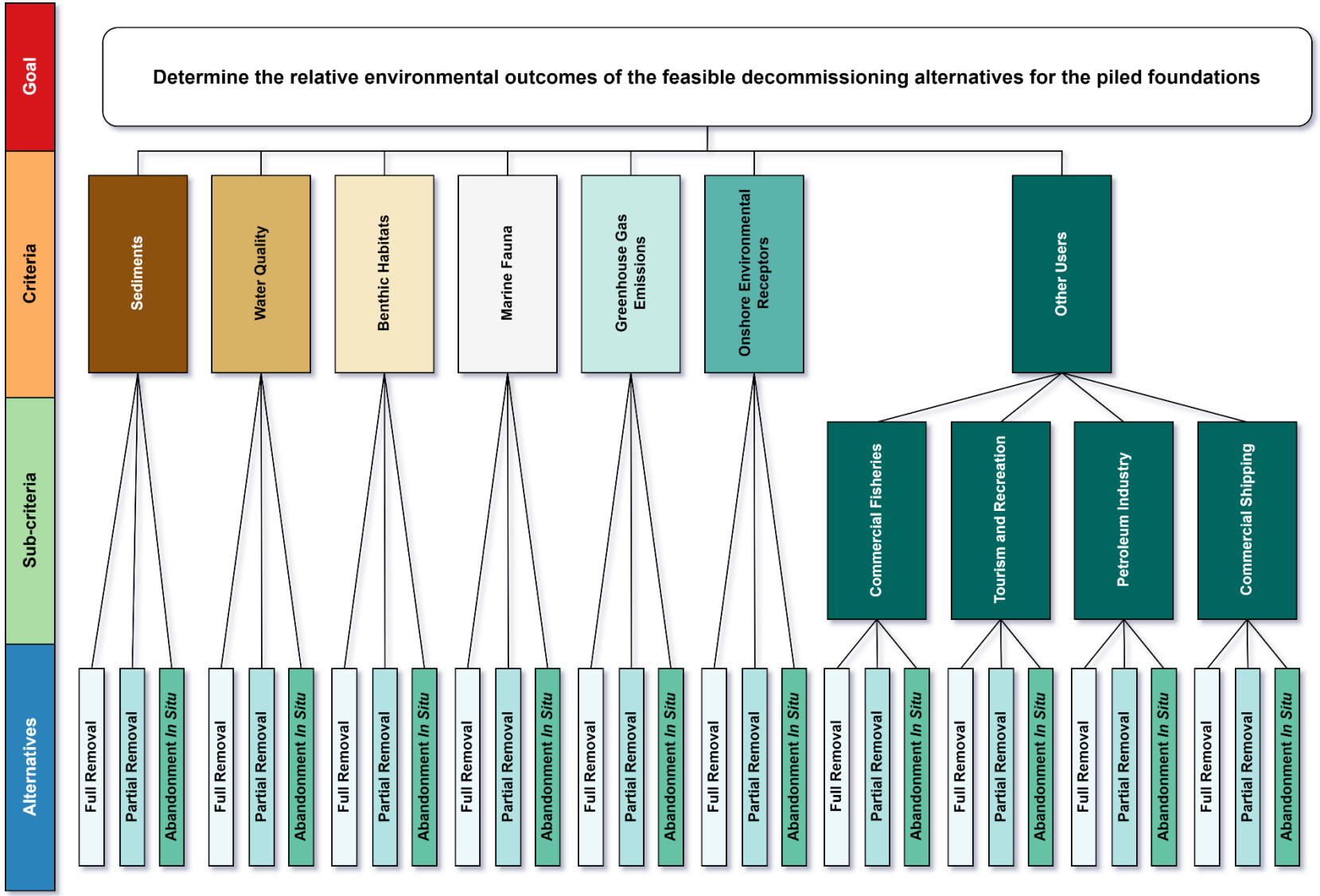

Figure 3-9: AHP hierarchy for the PLEM and distribution skid piled foundations

Summary of EIA Deliberations

Pairwise comparisons between the decommissioning alternatives within each of the criteria and sub-criteria were made as per the AHP process. The relative weightings of the feasible decommissioning alternatives were then derived from these comparisons, which indicated a strong preference for the abandonment *in situ* alternative (Figure 3-10).

The abandonment *in situ* delivers benefits to fauna by providing substrate with vertical relief from the presence of the pile above the seabed. This relatively complex habitat will result in moderate increased biodiversity, but at a highly localised scale. However, the presence of the piles extending approximately 1 m above the seabed may pose a hazard to other users, particularly fishers using trawled gear (which is prohibited within the Griffin field by current management arrangements). Partial and full removal eliminate any benefits to fauna from the presence of the piles, but also reduce or eliminate the risk of snagging to trawled fishing gear. As a result, these alternatives scored relatively poorly in the fauna criterion and relatively strongly in the other users criterion.

BHP's preferred alternative is partial removal of the piled foundations. The EIA demonstrates this alternative results in equal or better environmental outcomes compared to full removal, hence satisfying the *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018a) and *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b).

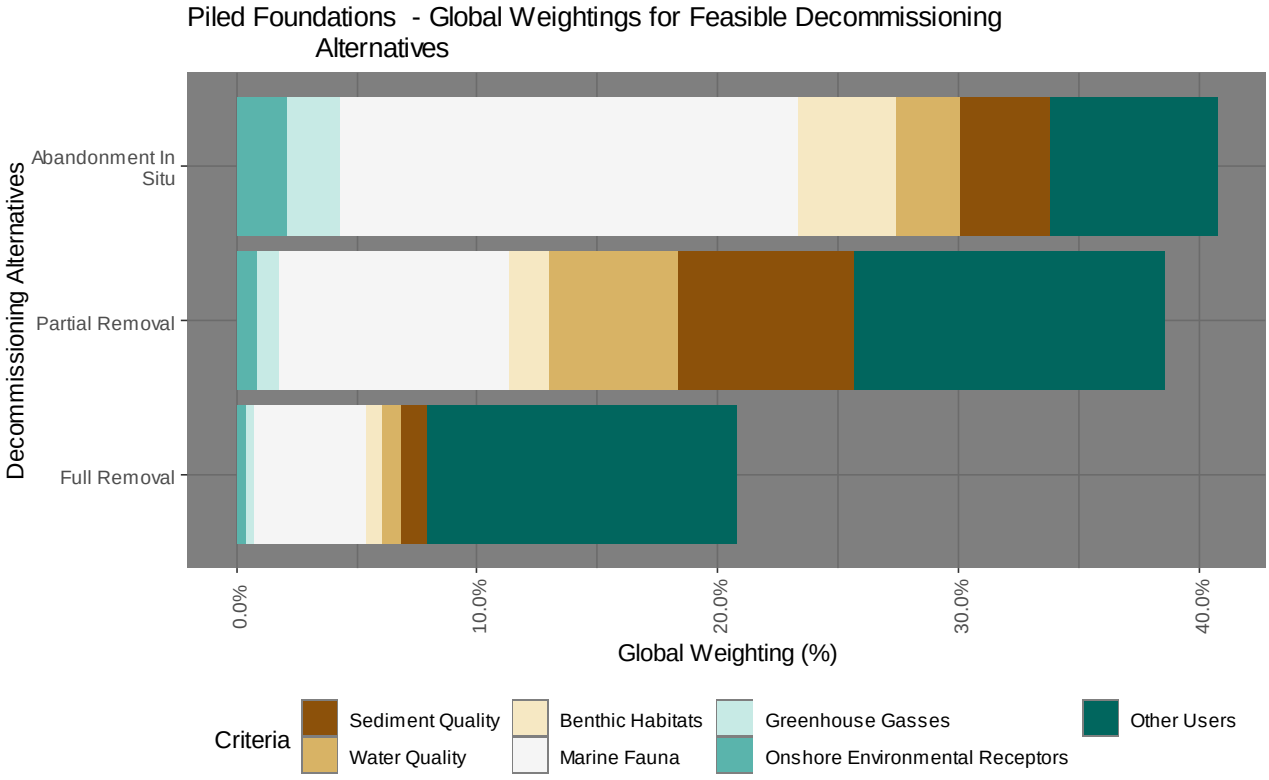

Figure 3-10: Stacked bar plots of weightings within each criterion for the PLEM and distribution skids piled foundations feasible decommissioning alternatives

3.2.5 MDB Concrete Gravity Bases

The CGBs are large (refer Table 4-2 for dimensions) concrete blocks consisting of aggregate, Portland cement and reinforcing steel which are partially embedded in the seabed. The CGBs were installed by lifting into place.

There are six CGBs in WA-10-L (Figure 3-11), to which the MDB mooring chains are attached. The MDBs were removed from the field in 2018 to eliminate buoyant risk. BHP intends to remove the mooring chains during an equipment removal campaign. Following removal of the mooring chains, the CGBs will be the only component of the MDB mooring system in WA-10-L.

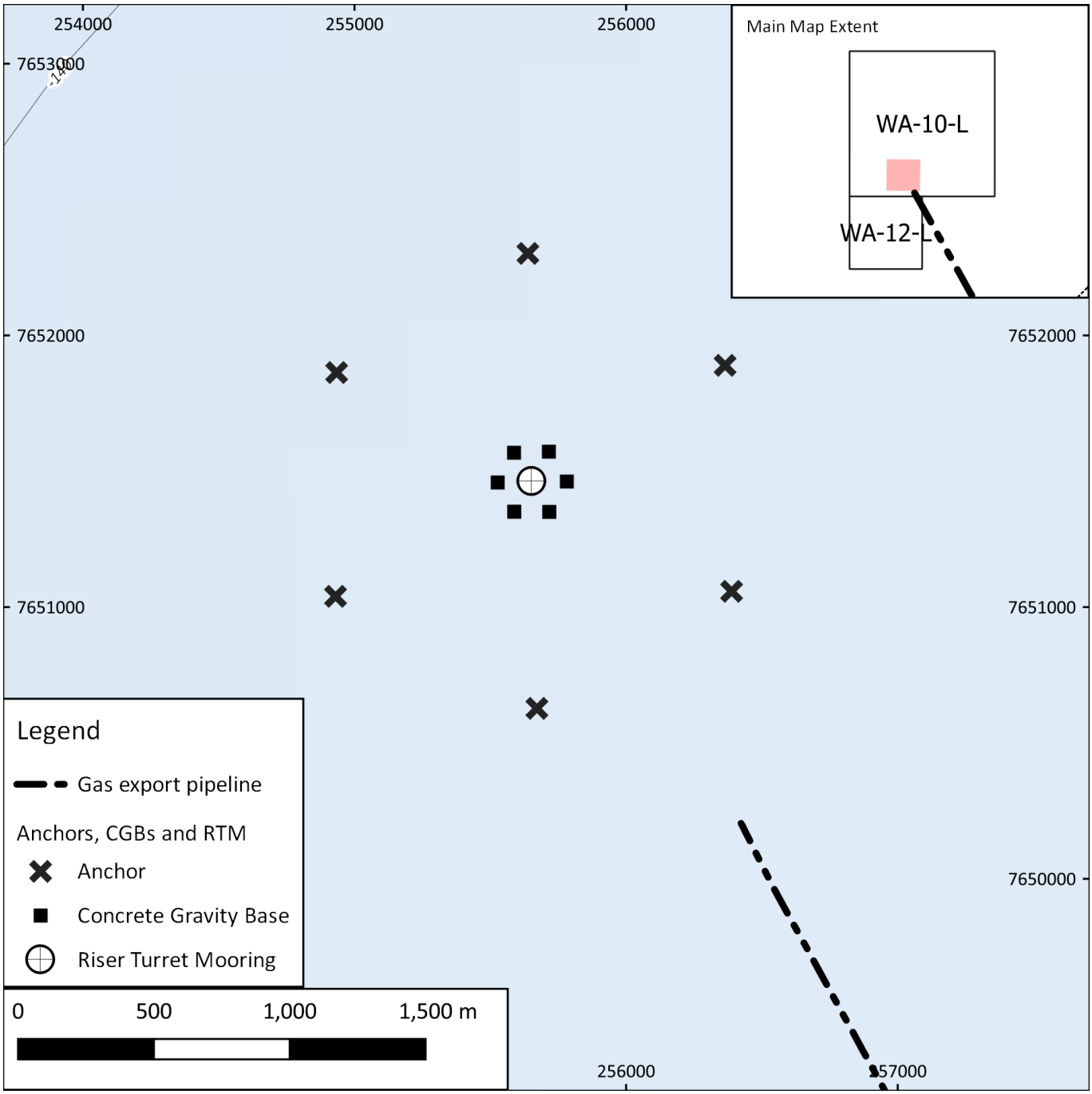

Figure 3-11: Locations of CGBs and anchors in relation to the RTM and GEP

Feasible Decommissioning Alternatives

The feasible decommissioning alternatives for the concrete gravity bases are summarised in Table 3-8. No feasible partial removal alternative was identified, as the nature of the concrete gravity bases (relatively large single structures) is not amenable to a partial removal alternative.

Table 3-8: Summary descriptions of the feasible decommissioning alternatives identified for the concrete gravity bases

Feasible Decommissioning Alternative	Description
Full removal	The CGBs were not designed to be removed. As such, a method to lift the CGDs would need to be engineered. The environmental impact assessment assumes that engineered lifting solution is relatively simple, such as a yoke secured to a CGB, which is then lifted by a vessel crane. The CGBs may need to be broken up into smaller pieces to facilitate removal. Lifting the CGBs will generate suction between their bases and the sediment. This suction will considerably increase the force required to lift the CGBs form the seabed. To mitigate this, some form of intervention would be used, such as sediment displacement from below the CGBs by an ROV. Once recovered to the lifting vessel, the CGBs will be transported to shore for processing and disposal. No feasible opportunities for re-use or recycling of the CGBs were readily identified, with crushing and disposal to landfill the preferred alternative.
Abandonment *in situ*	The abandonment *in situ* alternative will leave the CGBs as they are on the seabed. No further monitoring or interventions would be undertaken. No vessel activities will be required as part of the abandonment *in situ* alternative for the CGBs.

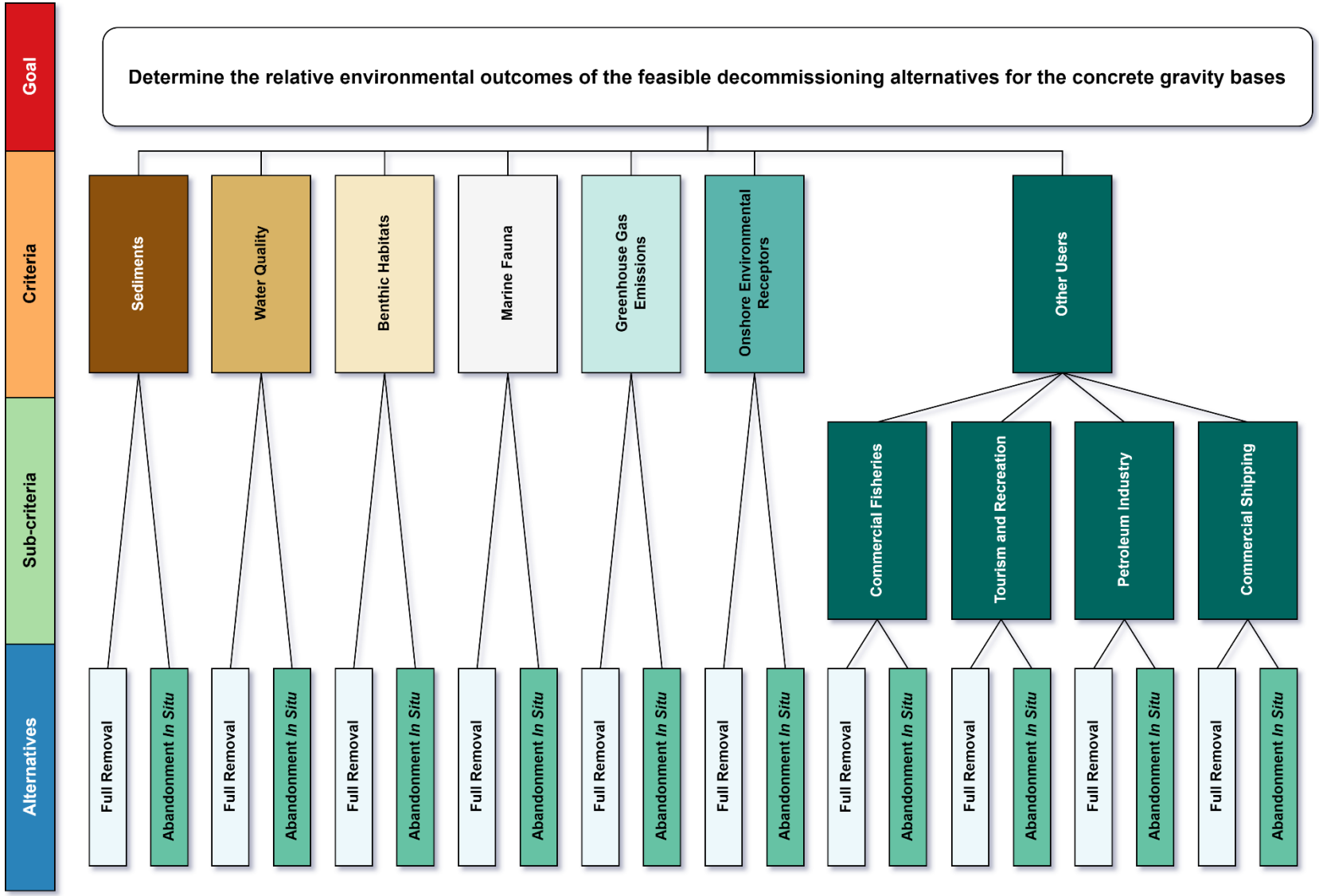

Figure 3-12: AHP hierarchy for the concrete gravity bases

Summary of EIA Deliberations

Pairwise comparisons between the decommissioning alternatives within each of the criteria and sub-criteria were made as per the AHP process. The relative weightings of the feasible decommissioning alternatives were then derived from these comparisons, which indicated a strong preference for the abandonment *in situ* alternative (Figure 3-13).

The abandonment *in situ* alternative was preferred as it would not disturb the seabed habitat and associated biota around the CGBs. Full removal eliminates the risk of snagging to trawled fishing gear – note that trawl fishing is not permitted in the area. The CGBs are largely embedded in the seabed and present very little snagging risk to trawled fishing gear.

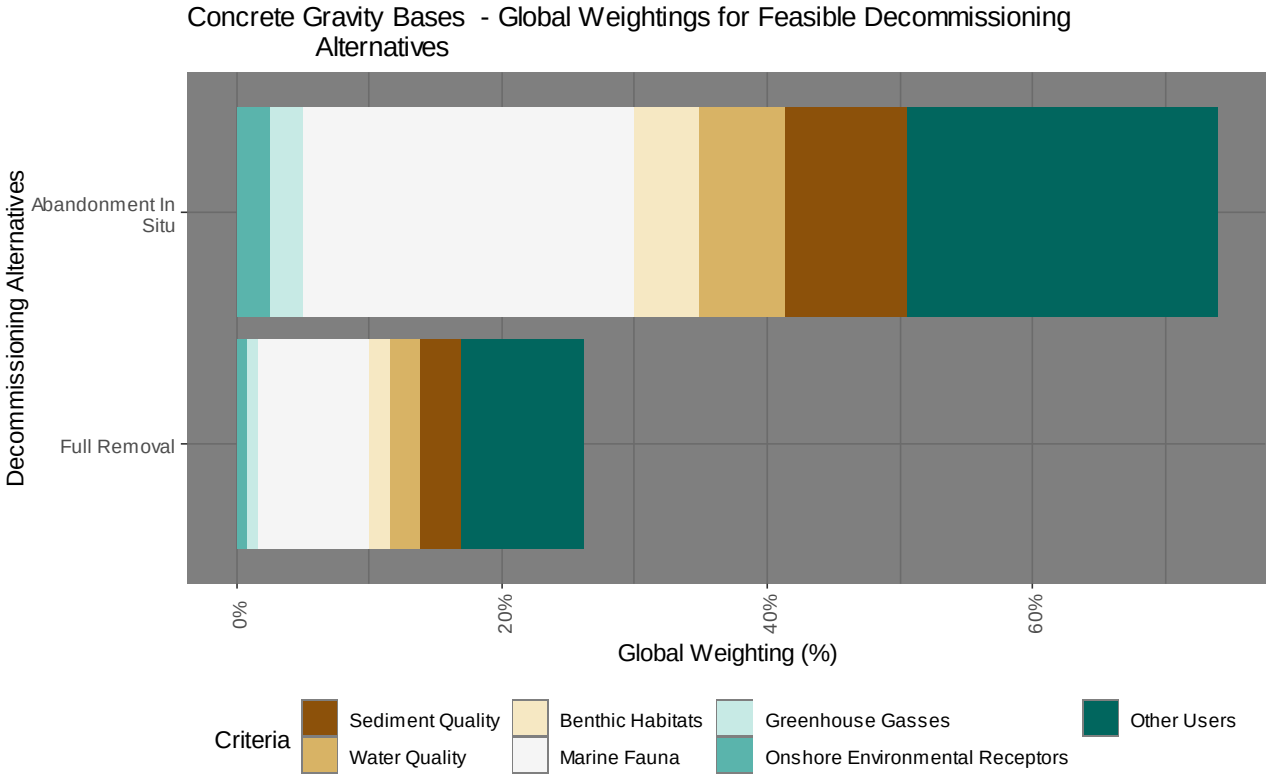

Figure 3-13: Stacked bar plots of weightings within each criterion for the concrete gravity bases feasible decommissioning alternatives

3.3 Conclusion

The decommissioning alternatives EIAs demonstrate that BHP's preferred decommissioning options for the equipment groups considered will yield equal or better environmental outcomes compared to full removal. The preferred options are:

- RTM: partial removal
- RTM anchors: abandonment *in situ*
- Piled foundations: partial removal
- CGBs: abandonment *in situ*

These options satisfy the requirement that any alternatives to full removal result in equal or better environmental outcomes than full removal outlined in the *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018a) and *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b).

4 Description of Activity

4.1 Overview

This section has been prepared in accordance with Regulation 13(1) of the Environment Regulations, and describes the petroleum activity to be performed under this EP.

When in production, the Griffin field comprised the Griffin Venture, a floating production, storage and offloading (FPSO) vessel, with 12 production wells from the Griffin, Scindian and Chinook reservoirs routed to the riser turret mooring (RTM) via flexible and rigid flowlines. Oil products were stabilised and stored for offloading via tanker, while gas products were transported to the shore via the Griffin gas export pipeline (GEP) for domestic sale.

The Griffin field ceased production in 2009. Since then, the following cessation activities have been completed:

- the Griffin Venture floating production, storage and offloading vessel was disconnected from the RTM and demobilised from the field.
- all flowlines and gas lift lines were flushed and filled with treated seawater.
- the GEP was purged with nitrogen and positively pressurised.
- all wells were plugged and abandoned.
- all Xmas trees (XTs) were removed and placed onto mud mats around 25 m from the wells.
- all mid-depth buoys (MDBs) were removed and recovered. MDB mooring chains were laid on the seabed at the concrete gravity bases. Flexible risers were laid on the seabed.

BHP proposes to:

- decommission Griffin subsea infrastructure *in situ*, that is not being removed under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) (Section 3).

An as-left survey of the infrastructure left *in situ* is covered under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

4.2 Location of the Activity

The Griffin field and subsea infrastructure is located within Permit Areas WA-10-L, located in Commonwealth waters, around 58 km north-west of Exmouth, Western Australia and in water depths of about 130 m (Figure 4-1).

The relative distances of key islands/mainland from the closest point in the operational area (refer Section 4.4 for definition) are provided in Table 4-1.

Table 4-1: Operational area distance/direction from Key Islands and Mainland

Key Islands / Mainland	Distance and Direction from Operational Area
Muiron Islands	48 km south west
Thevenard Island	45 km south east
Exmouth	58 km north east
Onslow	45 km south east
Barrow Island	80 km north east
Dampier	235 km north east

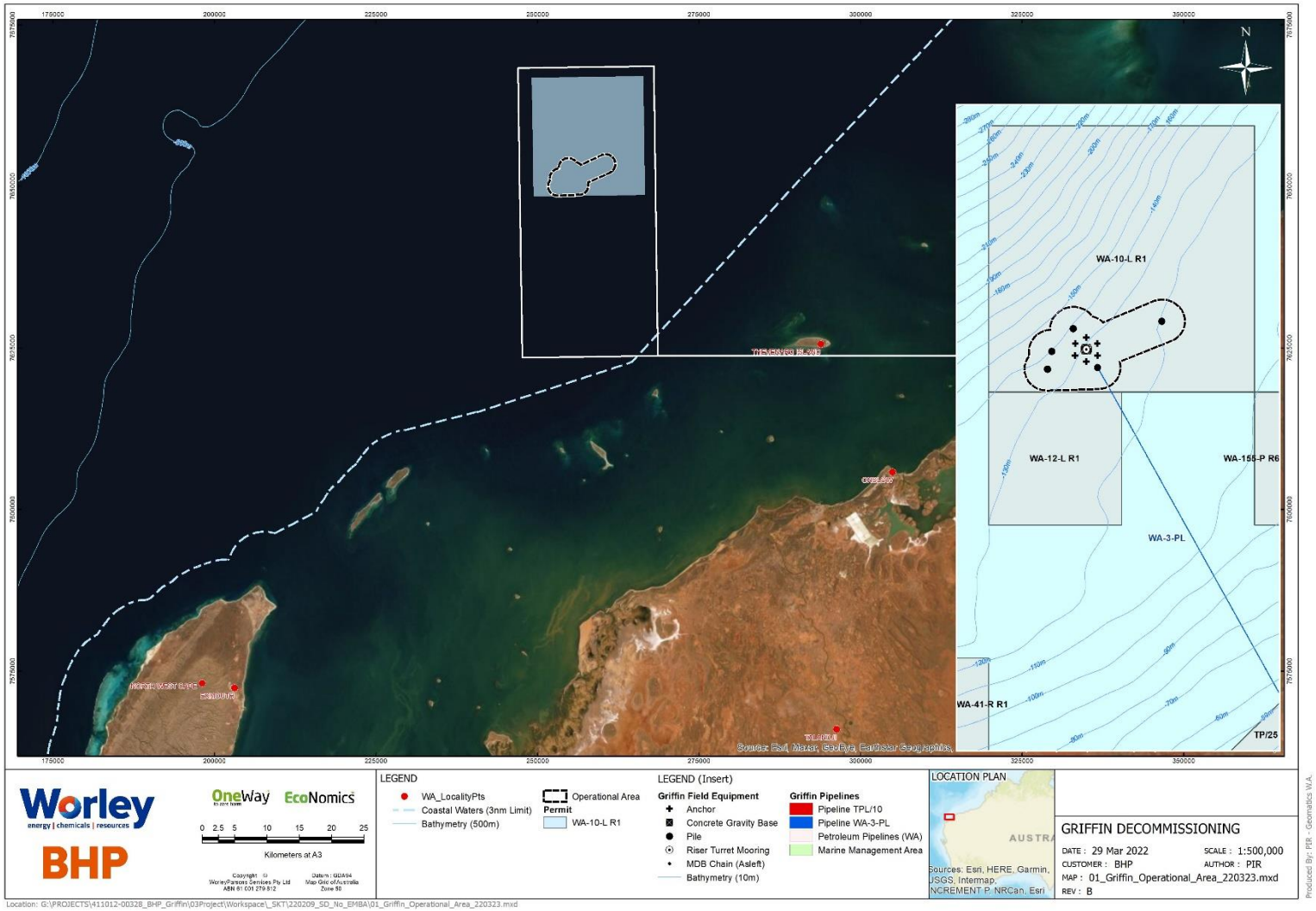

Figure 4-1: Location of the Activity

4.3 Timing of Activity

BHP proposes the petroleum activity is considered to have been completed once the environmental performance standards within the EP have been met and closed out.

Further details on the scheduling of the Griffin field decommissioning is provided in the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

4.4 Operational Area

The operational area shown in Figure 4-2 is the spatial boundary of the petroleum activity, and the extent within which the impacts and risks have been assessed and will be managed by this EP. The operational area includes the area encompassing a 1,500 m radius around the spread of subsea infrastructure proposed to be left *in situ*, within Commonwealth waters. Any potential for impacts from the petroleum activity will be within this operational area.

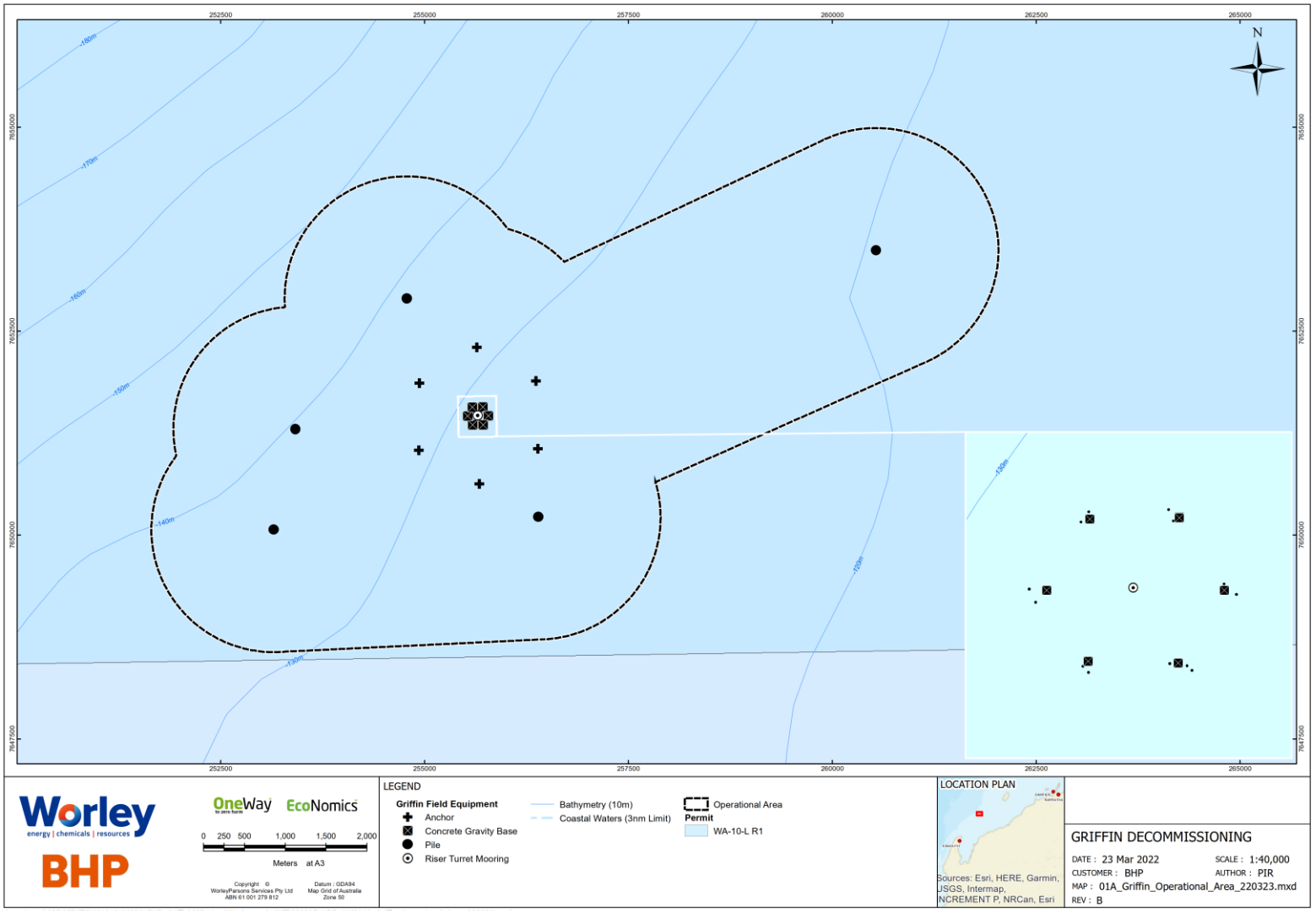

Figure 4-2: Operational Area

4.5 Griffin Subsea Infrastructure Overview

Since Griffin ceased production, the subsea infrastructure has been the subject of surveys to establish status and condition. The following reports contains details of the survey results:

- 00GA-BHPB-S00-0001 DOF Subsea Griffin Field Abandonment Survey Report 2014 (DOF, 2014)
- 00GA-BHPB-N00-0009 Griffin Field Pre-Abandonment Environmental and ROV Survey 2015 (Gardline, 2015)
- 00TG-R00-5997 RTM Stability Buoyancy 2014 (BHP, 2014)
- PET-GDC20-DR-REP-00008 – Griffin P&A End of Campaign Report 2017 (BHP, 2017a)
- 00GA-BHPB-T40-0002 – Griffin Field & Export Pipeline 2017 Subsea Survey (BHP, 2017b)

Subsea infrastructure which is the subject of this EP is presented within Table 4-2, along with the status and condition, based on the information gathered from the above surveys. Figure 4-2 presents the location of all infrastructure to be left *in situ*.

Subsea surveys over the life of the Griffin development have demonstrated that the equipment, particularly smaller items at seabed rest, have become buried over time. However, the top layer of the seabed sediment is mobile, and equipment may locally bury or become partially exposed over time.

The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes a full itinerary and decommissioning schedule of all subsea equipment within the Griffin field. Equipment to be removed under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes:

- RTM (should full removal be undertaken, refer Section 4.5.1)
- RTM mooring lines
- Wellheads and Christmas trees
- Flexible production flowlines and risers
- Rigid production spools and flowlines
- Electrohydraulic umbilicals and flying leads
- PLEM
- MDB mooring chains
- Distribution skids with attached electrical distribution units (EDUs)
- Mud mat structures

The Griffin Gas Export Pipeline Decommissioning EP (GA-BHPB-N00-0016) includes details of the GEP within the Commonwealth waters and proposed decommissioning.

Table 4-2: Subsea Infrastructure Associated with the Petroleum Activity

Subsea Infrastructure	Quantity	Size	Weight	Material	Status and condition	Location
RTM	1	Refer Table 4-5	1,503 tonnes (excluding ballast water) Refer Table 4-6	Steel Iron-ore (as ballast) Concrete keel Refer Table 4-6	The RTM consists of a vertical, tubular steel buoy structure approximately 93 m in length and 6 m in diameter. The RTM is currently in a vertical position on the seabed and embedded by an unknown amount. The RTM is no longer positively buoyant, with at least two compartments flooded. Light soft marine growth is observed on the RTM. Two of the upper compartments in the riser column contain both high-density and low-density PUF (refer Figure 4-4). Refer to Section 4.5.1 for further detail on the RTM and end state philosophy.	Eastings (m): 255645.5 Northings (m):7651464.3
RTM anchors	12	781 m anchor radius	204 tonnes total (12 x 17 tonne anchors) Refer Table 4-4	Steel	All anchors are buried below the seabed.	Refer Figure 4-2 Refer Table 4-3
PLEM pile foundation	1	3 inch diameter, estimated 23 m long	1.5 tonnes (estimated) Refer Table 4-4	Steel and Concrete	The PLEM assembly sits over a steel and concrete/cement pile foundation. The PLEM itself is to be removed under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014), the PLEM pile foundation which is below the seabed will remain *in situ*.	Eastings (m): 256392.8 Northings (m): 7650217.9
MDB concrete gravity bases	6	3 18x4x1.25 m structures 3 H-shape structures, 12x15x1.25 m	200-360 tonnes each (estimated) Refer Table 4-4	Concrete	All MDB concrete gravity bases are flush with the seabed, in a state of partial burial.	Refer Figure 4-2 125 m from RTM base. Approximately 60 deg apart.

Subsea Infrastructure	Quantity	Size	Weight	Material	Status and condition	Location
Distribution skid pile foundations	4	30 inch diameter, estimated 36 m long	2 tonnes each (estimated) Refer Table 4-4	Steel and Concrete	The distribution skids sit over a steel and concrete/cement pile foundation, which is partially buried below the seabed.	Distribution Skid 4 Eastings (m): 253150.2 Northings (m): 7650065.3 Distribution Skid 5 Eastings (m): 253418.1 Northings (m): 7651296.7 Distribution Skid 1 / 2 Eastings (m): 260535.2 Northings (m): 7653487.8 Distribution Skid 6 Eastings (m): 254782.5 Northings (m): 7652895.7

Table 4-3: RTM Anchor Locations

Anchor Line	Lead Anchor Shackle Position		Tail Anchor Shackle Position	
	Easting	Northing	Easting	Northing
1	567579	7653390	567606	7653405
2	567580	7652594	567606	7652579
3	566888	7652196	566888	7652165
4	566193	7652593	566166	7652578
5	566196	7653391	566169	7653406
6	566890	7653791	566890	7653823

Total volume of materials left *in situ* by infrastructure are provided in Table 4-4. Epoxy coating referred to in the table is a type of resin that covers the steel infrastructure components and is used to protect the infrastructure from corrosion. It is coated onto the infrastructure typically at a thickness between 200 – 400 microns. The details of the RTM materials are provided separately within Section 4.5.1.

Table 4-4: Estimated Total Volume of Infrastructure Materials left *in situ* by Infrastructure

Infrastructure	Material	Total volume / weight
RTM anchors	Steel	204 tonnes total
	Epoxy coating	40 kg
PLEM pile foundation	Steel	0.25 tonnes
	Concrete/Cement	1.25 tonnes
MDB concrete gravity bases	Concrete/Cement	2,160 tonnes
Distribution skid pile foundations	Steel	3 tonnes
	Concrete	5 tonnes

4.5.1 Riser Turret Mooring

The RTM is currently in a vertical position on the seabed and embedded by an unknown amount in the seabed, within the operational area. Figure 4-3**:** shows the base of the RTM resting on the seabed and a 'bowl' has opened up around the base, approximately 9 m in diameter. The RTM is no longer positively buoyant, with at least two compartments flooded, the minimum requirement for loss of buoyancy. The upper compartments of the RTM riser column contain both high-density and low-density PUF (Figure 4-4). The upper compartments of the RTM is to be removed under the scope of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

The main dimensions of the RTM structure are presented in Table 4-5. Table 4-6 presents the weights and materials within the RTM.

Table 4-5: Griffin RTM Dimensions – whole structure

Dimension	Measurement (m)
Length from riser keel to universal joint	98
Length from riser keel to chain table	58
Diameter of upper buoyancy chamber	8
Outside diameter of tidal compartment	4
Inside diameter of tidal compartment	2.5
Diameter of main section	6

Table 4-6: RTM Weights of Material – whole structure

Subsea infrastructure	Material	Weight / Volume
RTM	Steel and steel alloy	1,503 tonnes
	Ballast – iron ore	849 tonnes
	Ballast - concrete	43 tonnes
	High and low density PUF	15 tonnes
	Miscellaneous plastic associated with cabling, seals, gaskets, hydraulic hoses.	Up to 1 tonne
	Epoxy coating	Up to 475 micron thickness

Figure 4-3: Griffin Riser Turret Mooring on Seabed

The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria.

Whilst all RTM compartments and components are considered technically feasible to remove, the lower compartment (Compartment 1: Ballast) (Figure 4-4) is the heaviest weight relative to the other compartments. There are therefore technical risks associated with the removal scope. Given the unknown nature of the iron ore ballast fill (e.g. free flowing, vs solidified), the engineering required to remove this RTM compartment is complex. As a worst case, the lower compartment (Compartment 1: Ballast) (Figure 4-4) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP. The lower compartment dimensions are provided in Table 4-7 and weights of materials are provided in Table 4.8.

Any activities required to prepare the RTM lower compartment for decommissioning *in situ* are covered in the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

Table 4-7: Compartment 1 of RTM Dimensions

Dimension	Measurement (m)
Length	13
Diameter	6

Table 4-8: Estimated weights of Material within Compartment 1 of RTM if left *in situ*

Subsea infrastructure	Material	Weight / Volume
Compartment 1 of RTM	Ballast – iron ore	849 tonnes
	Ballast – concrete	43 tonnes
	Steel and steel alloy	72 tonnes
	Epoxy coating	5-10 kg (estimated)

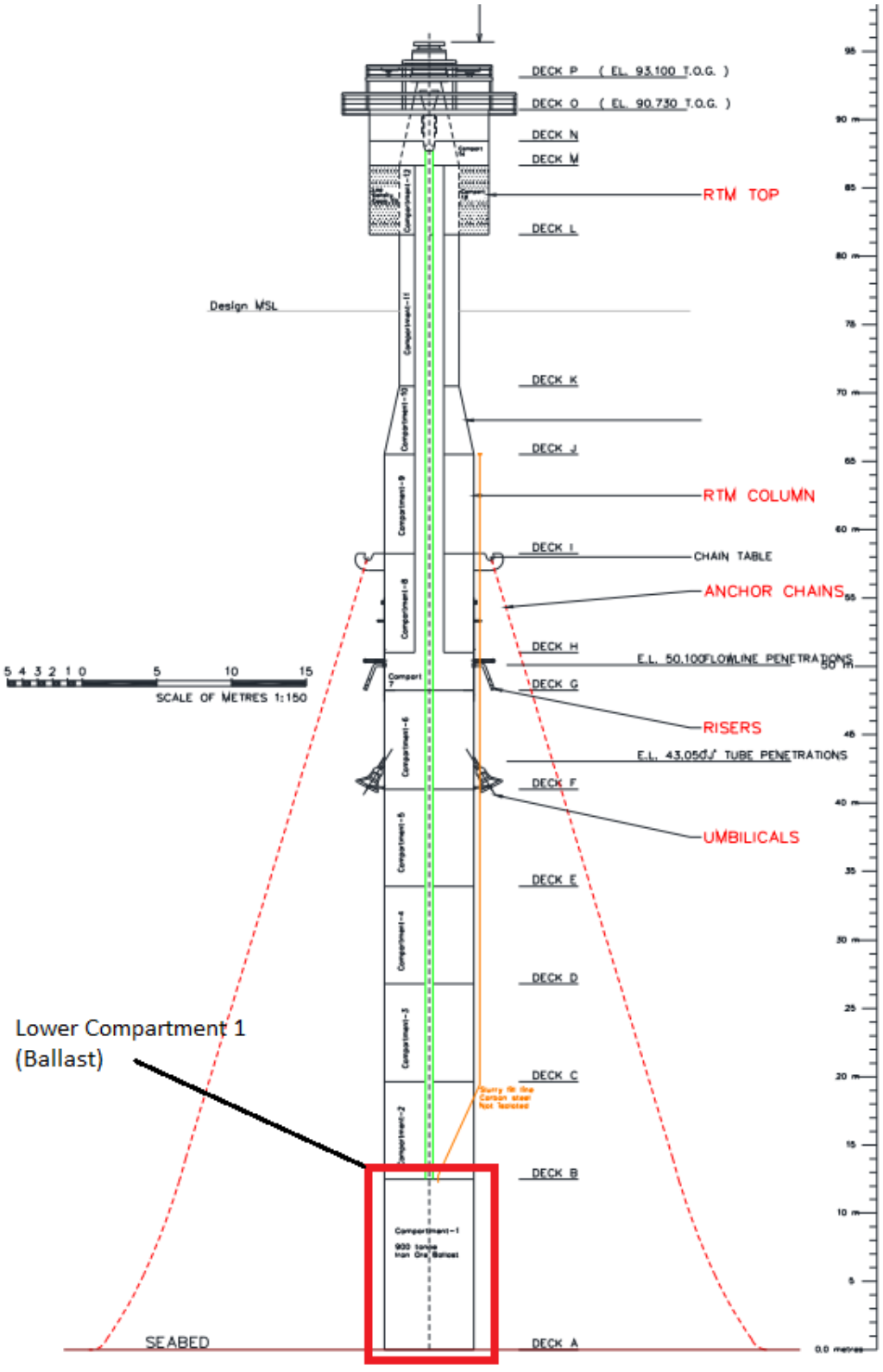

Figure 4-4: Griffin Riser Turret Mooring General Arrangement

5 Description of Environment

The purpose of this section is to address the requirements of Regulation 13(2) and 13(3) of the Environment Regulations through describing the existing environment, including values and sensitivities that may be affected by the petroleum activity.

The description of the environment applies to the operational area (refer Section 4.4), the area encompassing a 1,500 m radius around the subsea equipment left *in situ*.

The petroleum activity does not include a credible spill scenario and therefore no Environment that May be Affected (EMBA) has been described in this EP. The only area where impacts are expected is the operational area. Vessel use relevant to the Griffin field decommissioning is covered under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

The information contained in this section has been used to inform the evaluation and assessment of the environmental impacts and risks presented in Section 8. The level of detail is appropriate to the nature and scale of the impacts and risks to the particular values and sensitivities.

A detailed and comprehensive description of the environment in the operational area is provided in Appendix C.

5.1 Particular Relevant Values and Sensitivities of the Environment

This section summarises environmental values and sensitivities, including physical, biological, socio-economic and cultural features in the marine and coastal environment that are relevant to the operational area. Searches for matters of national environmental significance (MNES) and other matters protected by the EPBC Act were undertaken for the operational area using the Protected Matters Search Tool (PMST).

A full description of the values and sensitivities relevant to the operational area is provided in Appendix C, along with the PMST Search Reports.

5.1.1 Bioregions

The operational area is located approximately 70 km North-West of Onslow, Western Australia and within Commonwealth waters of the Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Northwest Shelf Marine Provincial Bioregion.

Appendix C summarises the characteristics of this provincial bioregion.

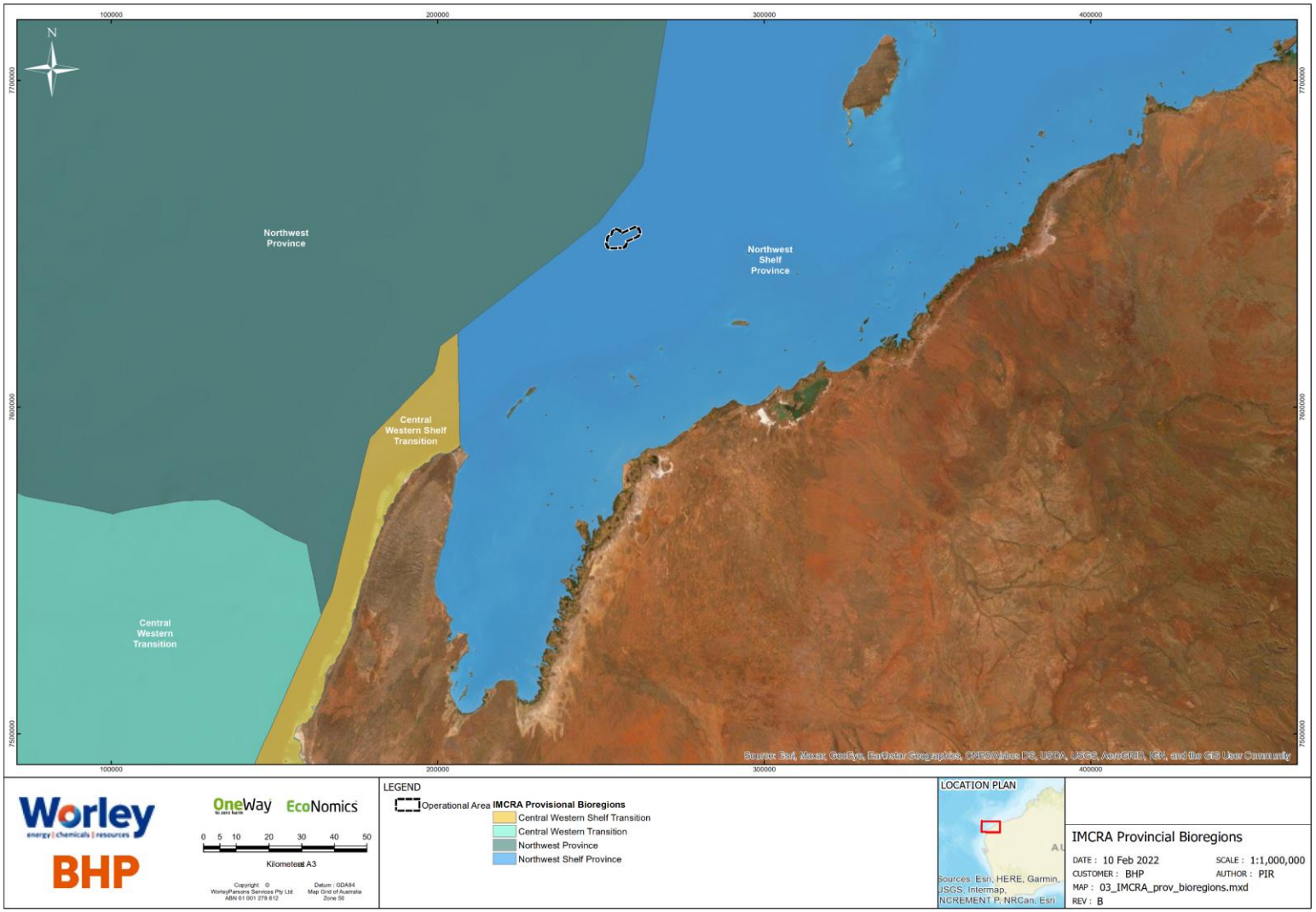

Figure 5-1: IMCRA 4.0 Provincial Bioregions in Relation to the Operational Area

5.1.2 Matters of National Environmental Significance (EPBC Act)

Table 5-1 summarise the MNES identified as potentially occurring within the operational area, as determined by the PMST results (Appendix C).

Additional information on identified MNES are provided throughout this Section and in Appendix C, Section 2.4.

Table 5-1: Summary of MNES within the Operational Area

MNES	Number	Relevant Section
World Heritage Properties	0	N/A
National Heritage Places	0	N/A
Wetlands of International Importance (Ramsar)	0	N/A
Marine Parks	0	N/A
Listed Threatened Ecological Communities	0	N/A
Listed Threatened Species[1]	25	Section 5.5.1
Listed Migratory Species[1, 2]	37	Section 5.5.1

Note 1 Terrestrial species (such as terrestrial mammals, reptiles and bird species) that appear in the PMST results of the operational area and are not relevant to the petroleum activity impacts and risks have not been included in these numbers.

Note 2 The EPBC Act categorise migratory and threatened species independently, therefore migratory spp. can also be threatened.

5.2 Griffin Field Environmental Surveys and Studies

The Griffin field has been the subject of a number of environmental surveys and research studies to understand the fish assemblages and seabed habitat (Table 5-2). Where relevant these studies have been referenced within this Section and throughout the EP.

Table 5-2: Environmental Surveys and Studies relevant to the Griffin field

Study / Research	Description
00GA-BHPB-N00-0009 Griffin Field Pre-Abandonment Environmental and ROV Survey (Gardline, 2015)	The survey was conducted within the Griffin field, in water depths between 115 m and 215 m in October 2014. A total of sixteen 0.1 m^2 day grab stations were selected in the field and eight water sampling stations (water quality and profiling). To inform decommissioning, samples were collected to determine the physico-chemical and benthic infaunal characteristics surrounding infrastructure in the Griffin field. Additionally, a remotely operated vehicle (ROV) was deployed for the capture of digital stills and video footage of the subsea infrastructure, to allow for a visual flora and fauna assessment on the structures at seabed. Sediments and waters hydrocarbons and metals were compared to 'background concentrations' in the wider area of the NW Shelf of Australia. In the absence of any background reference data for the region the Australian and New Zealand Environment and Conservation Council (ANZECC), the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) Water Quality Guidelines (ANZECC, 2000) Simpson et al. (2013) Sediment Quality Guidelines (SQG) are referenced to establish trigger value exceedances. Appendix D provides the Griffin Field infrastructure layout and environmental target locations

00GA-BHPB-R00-0052 Analysis of Benthic Invertebrates, Sediment Chemistry and Water Quality in the Griffin Field (Cardno, 2015)	Investigates the spatial patterns in the distribution of physico-chemical characteristics, including contaminants, in sediment and in the water column and in infauna in relation to their proximity to the Griffin Oil Field wells and other infrastructure. Includes an assessment of the relationship between spatial patterns in the distribution of benthic invertebrates and physico-chemical characteristics of the sediment and water column.
00GA-BHPB-S00-0001 DOF Subsea Griffin Field Abandonment Survey Report 2014 (DOF, 2014) PET-GDC20-DR-REP-00008 – Griffin P&A End of Campaign Report 2017 (BHP, 2017a) 00GA-BHPB-T40-0002 – Griffin Field & Export Pipeline 2017 Subsea Survey (BHP, 2017b)	Various environmental and ROV surveys investigating the status of Griffin field infrastructure.
00GA-BHPB-R00-0004 Griffin Field Commercial Fisheries Assessment (GHD, 2015)	Provides an assessment of the commercial (state only) and recreational fishing interests that exist in, or in close proximity to, the Griffin field. Anecdotal evidence was obtained from several commercial fishers and recreational (game) fishers in the region to establish presence of commercial fisheries use.
00GA-BHPB-R00-0051 The Ecology of The Griffin Field (UTS Decommissioning Ecology Group, 2020)	Desktop study using images taken from ROV in October 2014 to investigate the biodiversity value of the Griffin field. Specifically to: • determine the biodiversity value of Griffin Field infrastructure and determine how diversity varies with individual structure location and depth. • assess fisheries potential.

5.3 Biological Environment

The below sections (5.3.1 to 5.3.3) summarise the results from the sediment and water quality and benthic infauna sampling program undertaken in the pre-abandonment Griffin field in October 2014 (Gardline, 2015).

Appendix D provides the Griffin field infrastructure layout and the target locations/stations selected for the collection of environmental samples.

5.3.1 Sediments

Sediment Characteristics

Analysis of particle size across the stations sampled (refer Appendix D) showed heterogeneity in sediment composition in the survey area. Mean particle size varied between 15 µm and 530 µm, with sediments described as fine silt to medium sand. A spatial gradient was observed within the distribution of the sediment composition, with significantly higher percentages of fines (30.0% to 80.0%; <63 µm, silt and clay) towards the southeast of the survey area, whereas percentages of sand (≥63 µm - <2 mm) and gravel (≥2 mm) significantly increased towards the northwest (>50% and >1% respectively). There was no indication of historic drill cuttings piles in the proximity of existing wells, suggesting dispersion by currents and/or storm events. Total organic carbon (TOC) concentrations did not indicate the presence of organic enrichment, which would be expected in cuttings piles due smothering and anoxic conditions, with all concentrations ≤0.53 ± 0.00%. Finer sediments and associated higher TOC concentrations were found at shallower depths across the survey area. Spatial distribution of sediments was therefore attributed to natural depth variation and thought representative of the wider area of the NW Shelf (Gardline, 2015).

Sediment Organotins, Polychlorinated Biphenyls and Radionuclides

Concentrations of sediment organotins (monobutyltin, dibutyltin and tributyltin; TBT) were <0.5 ngSn g^{-1} and <1.0 ngSn g^{-1} (TBT) at all stations with the exception of the RTM location, where a TBT concentration of 6.2 ± 1.3 ngSn g^{-1} was above the Sediment Quality Guideline Value (SQGV) as cited in Simpson et al. (2013). TBT was used in marine paints as a biocide to prevent fouling on subsea infrastructure until 2008. The RTM

structure was coated in anti-foulant paint, and it was therefore the erosion of this paint which was thought potentially responsible for the elevated concentrations of TBT in the sediments nearby this location. Higher TBT concentration at this location could also have resulted from an historic input from the Griffin Venture vessel, and therefore, this contamination could extend to the sediments within the swing-arc of the vessel and/or a little further. There was no evidence of PFW discharge contamination in sediment. Concentrations of the remaining sediment radionuclides (including naturally occurring radioactive material; NORM) were low and uniform, with small variations attributed to depth and/or variations in sediment size, and were therefore thought representative of background conditions at all stations (Gardline, 2015).

Sediment Characteristics

Analyses across the survey area showed total recoverable hydrocarbons (TRH) concentrations to be composed mainly of petroleum hydrocarbons (TPH). Concentrations were generally low and representative of the wider area. All TPH concentrations were found below the SQGV of 280 µg g^{-1}. Gas chromatograms revealed all stations, bar Station GR5, to present highly weathered heavy weight petrogenic and biogenic hydrocarbons, with very low traces of 'fresher' hydrocarbons of the same sources. These traces resembled those observed in areas of historic oil and gas activity such as the North Sea (Gardline, 2015).

Concentrations of the PAH acenaphthene at Station RTM (Riser Turret Mooring) and HEX (Heat Exchanger Position) were above the (interim sediment quality guideline) ISQG Low trigger value, while the remainder of the PAHs were below the trigger values at all stations (ANZECC, 2000) and total PAH concentrations were below the SQGV at all stations (Simpson et al., 2013). Overall concentrations of total PAH were found significantly similar at all stations, and were found to increase with proximity to existing drilled wells, indicating a potential impact of the oil and gas activities on the sediment. Concentrations of BTEX were <LoR at all stations and did not indicate monocyclic aromatic hydrocarbon contamination within the sediments in the vicinity of the infrastructure targeted (Gardline, 2015).

Sediment Metals

Concentrations of sediment metals across the survey area were found generally representative of the wider region, with concentrations of all metals below their respective SQGV (Simpson et al., 2013) and apparent effect threshold (AET; Buchman, 2008). Most metals concentrations were correlated to the sediment characteristics and depths across the survey area, and their variability was therefore attributed to the heterogeneous nature of the sediment and varying depth. Barium (Ba) in the sediment was generally low, with concentrations ≤30µg g^{-1} at a number of stations, including reference stations and the RTM location. However, concentrations of Ba reached up to 68.6 ± 8.8 µg g^{-1} at Station HEX and CH1 (Chinook-1 well) and up to 1400.0 ± 340.0 µg g^{-1} at Stations GR3 (Griffin-3 well), GR5 (Griffin-5 well) and SC3 (Scindian-3 well) and were increasing with proximity to existing drilled wells, which indicated potential contamination from drilling fluids in the sediments close to infrastructure (Gardline, 2015).

5.3.2 Benthic Habitats and Infauna

Infaunal abundance of individuals and taxa was low across in the Griffin field with a total of 1,088 individuals representing 181 taxa from the 32 samples. The community was dominated by polychaetes and crustaceans representing 75% of the total abundance and 81% of the total number of species. Due to the overall low abundances across the site, the infauna were found significantly unevenly distributed and generally dominated by a small number of species of higher abundances at all stations. Although this might also be the result of the very low abundances observed at all stations, species represented by a single individual were found in high abundance across the stations, which would indicate that the community was subjected to little stress or pollution. However, the abundance of some of the most dominant species across the survey area tended to increase with proximity to infrastructure. This pattern may show a potential influence of contamination over the infaunal communities across the Griffin field, with those species having a greater tolerance to certain contaminants found in higher concentrations near existing drilled wells/infrastructure, i.e., metals and hydrocarbons . However, it is also possible that the physical presence of the infrastructure provides shelter and substrate for a number of species, therefore increasing the availability of food for infauna which could increase in density as a result. In both cases the infaunal community structure and density could be the result of an anthropogenic influence from the oil and gas activities across the survey area, whether due to the presence of infrastructure and/or some of the low-level contamination present around wells.

5.3.3 Water Quality

Water profiling and sampling data collected across the survey area in 2014 (Gardline, 2015) were used to determine whether there were any impacts from oil and gas activities on the water quality of the Griffin field. Analyses of total suspended solids, hydrocarbons, BTEX and radionuclides concentrations within the water column were mostly uniform and below the limit of reporting (LoR). Concentrations were found below the ANZECC (2000) trigger values for the protection of 99% and 95% of species, where available, in addition to being representative of the results in an adjacent survey undertaken in 2009 (Gardline, 2009) and of the conditions in the wider area of the NW Shelf.

There were no discernible differences in the water contaminants measured at stations within the Griffin field, with most of the contaminants having concentrations below the chemical detection level (Cardno, 2015).

Concentrations of metals were generally low and uniform, with the exception of concentrations of nickel (Ni) found significantly higher at infrastructure stations than at reference stations. All concentrations were found below the ANZECC (2000) trigger values, with the exception of concentrations of copper (Cu) and zinc (Zn) truly exceeding ANZECC (2000) trigger values for the protection of 99% and/or 95% of species at one (Zn – Station RTM) to all detected stations (including reference stations - Cu). However, the concentrations of Cu were found homogeneous across the survey area, with no significant difference between infrastructure and reference stations, and therefore these concentrations were thought representative of the wider area. Higher concentrations of Zn at Station RTM, notably at the bottom of the water column, may be attributed to the presence of anodes at the seabed, potentially leaching Zn into the water column. Concentrations of all metals, with the exception of Zn at Station RTM, were therefore found representative of background conditions for the wider area (Gardline, 2009).

5.4 Protected/Significant Areas

5.4.1 Key Ecological Features

Key ecological features (KEFs) are areas of regional importance for either biodiversity or ecosystem function and integrity within the Commonwealth marine environment and have been identified through the marine bioregional planning process.

The presence of KEFs within the operational area are summarised in Table 5-3 and a detailed description of these KEFs is provided in Appendix C, Section 2.10.3.

KEFs within the operational area are presented in Figure 5-2.

Table 5-3: Key Ecological Features within and in the vicinity of the Operational Area

KEF	Operational Area	Distance from Operational Area
Ancient coastline at 125 m depth contour	✓	N/A
Continental slope demersal fish communities	x	5 km
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	x	14 km
Commonwealth waters adjacent to Ningaloo Reef	x	59 km
Exmouth Plateau	x	109 km
Glomar Shoals	x	253 km

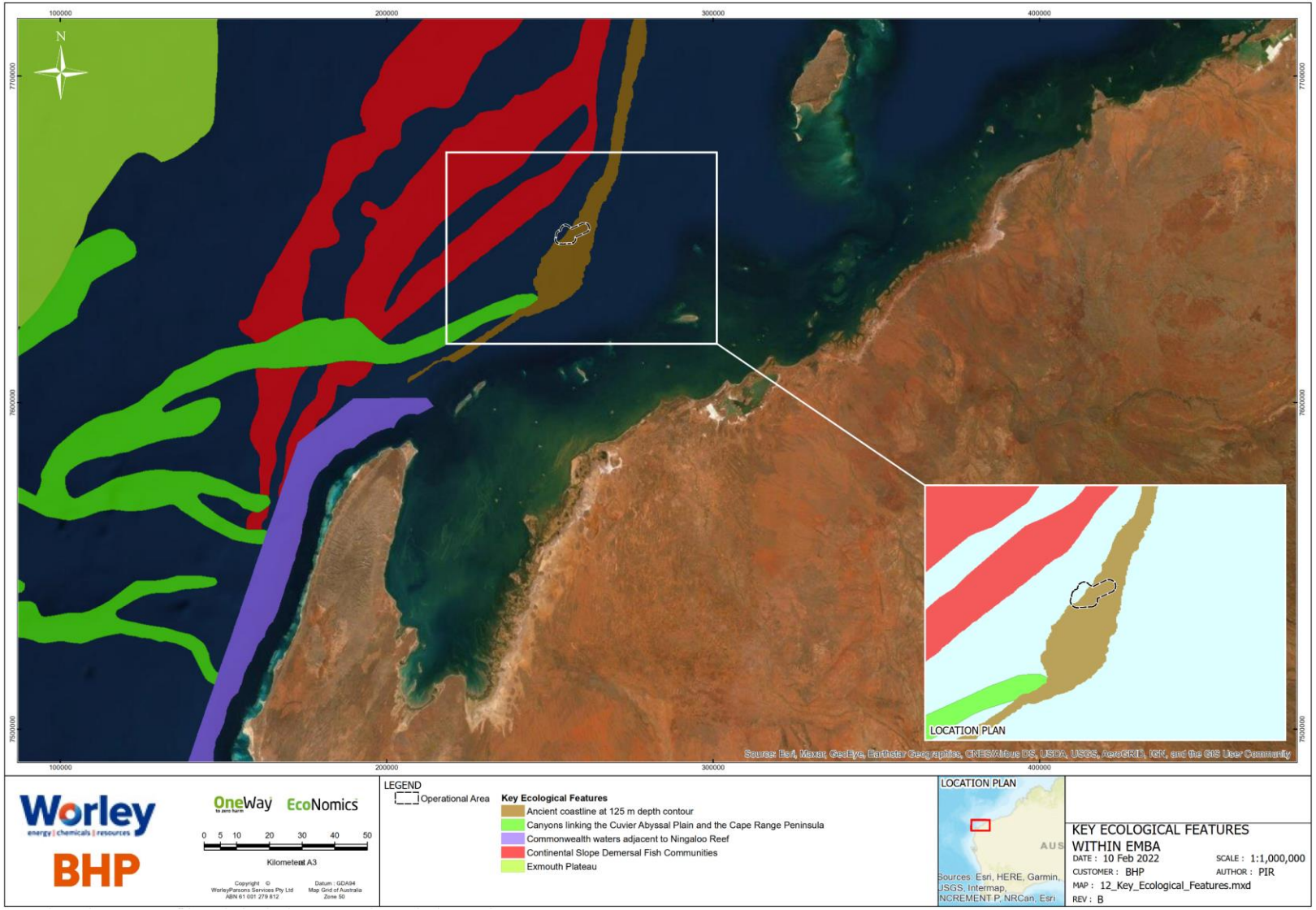

Figure 5-2: Key Ecological Features in relation to the Operational Area

5.4.2 World Heritage Properties

World Heritage Properties represent the best examples of the world's cultural and natural heritage. There are no World Heritage Properties within the operational area.

5.4.3 National Heritage Properties

There are 13 National Heritage Places located in WA, of which none are in the operational area.

5.4.4 State and Australian Marine Parks

There are no Australian or State Marine Parks located in the operational area.

For reference, Australian and State Marine Parks distances to the operational area are presented in Table 5-4 and Figure 5-3.

Table 5-4: Australian and State Marine Parks in relation to the Operational Area

Value / Sensitivity	IUCN category* or relevant park zone	Operational Area	Distance from Operational Area
Australian Marine Parks			
Gascoyne Marine Park	Habitat Protection Zone (IUCN Category IV)	x	75 km
	Multiple Use Zone (IUCN Category VI)		
Montebello Marine Park	Multiple Use Zone (IUCN Category VI	x	67 km
Ningaloo Marine Park	National Park Zone (IUCN Category II)	x	60 km
	Recreational Use Zone (IUCN Category IV)		
State Marine Parks and Marine Management Areas			
Muiron Islands Marine Management Area	-	x	41 km
Barrow Island Marine Management Area	-	x	64 km
Ningaloo Marine Park	-	x	60 km
Barrow Island Marine Park	-	x	73 km

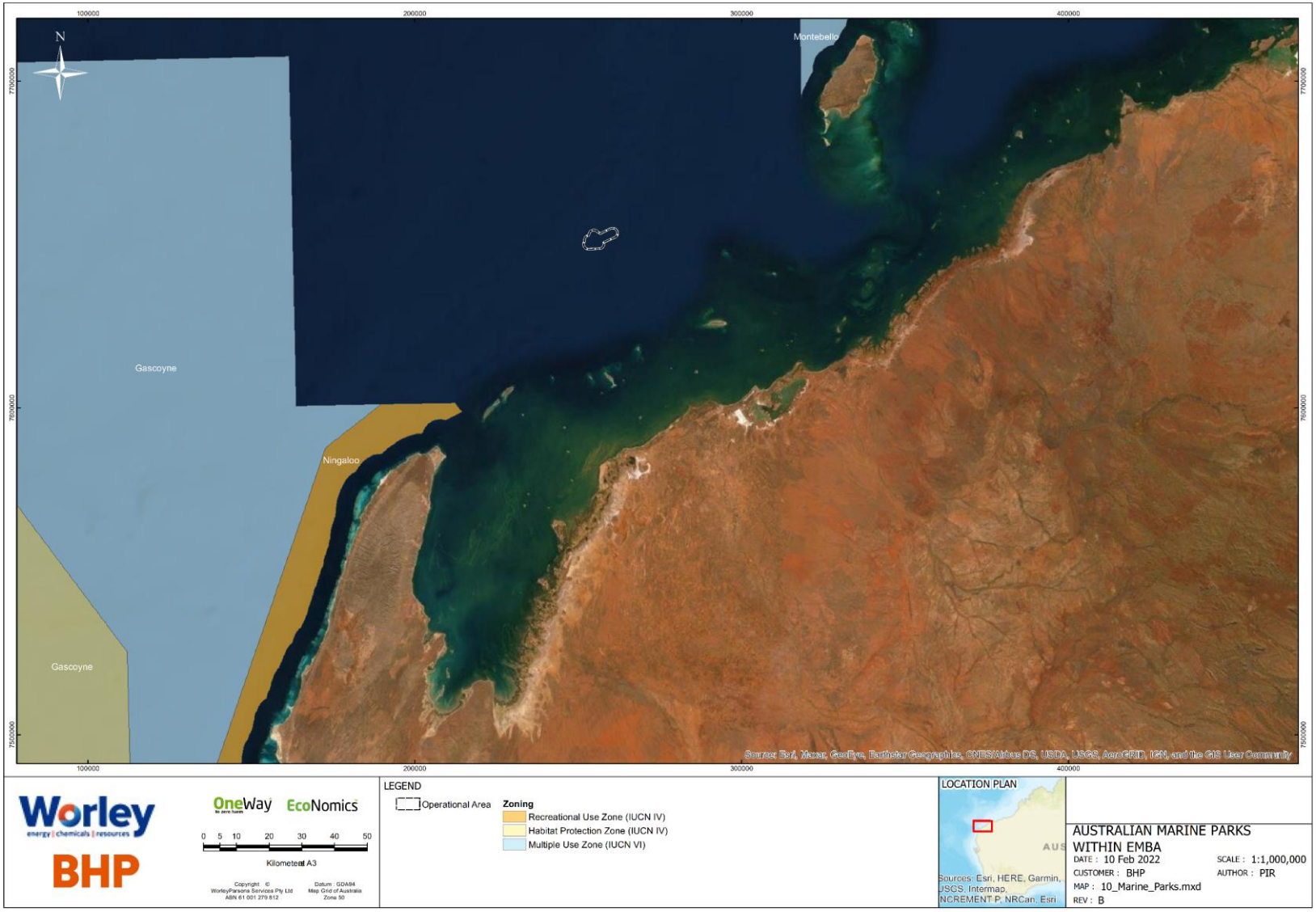

Figure 5-3: Australian and State Marine Parks in relation to the Operational Area

5.5 Marine Fauna

5.5.1 Threatened and Migratory Species

Table 5-5 presents the threatened and migratory species within the operational area. These include all relevant MNES protected under the EPBC Act, as identified in the PMST search for the operational area (PMST search results are provided in Appendix C, Attachment 1). For each species identified, the extent of likely presence is noted.

The PMST results identified 25 marine fauna species listed as `threatened' species and 37 marine fauna species listed as `migratory' within the operational area. A description of the identified threatened and migratory species is included in Appendix C, Section 2.6 – 2.9.

Species with designated biologically important areas (BIAs) and Habitat Critical to their Survival (Habitat Critical) overlapping the operational area have been identified in Section 5.5.2.

Table 5-5: Threatened and Migratory Species Predicted to Occur within the Operational Area

Value/Sensitivity		Threatened Status	Migratory Status	Operational area presence	Sensitivities within operational area
Common Name	**Scientific Name**				
Fish, sharks and rays					
Grey nurse shark (west coast population)	*Carcharias taurus*	Vulnerable	-	✓	Species or species habitat known to occur within area
White shark	*Carcharodon carcharias*	Vulnerable	Migratory	✓	Species or species habitat may occur within area
Dwarf sawfish	*Pristis clavata*	Vulnerable	Migratory	✓	Species or species habitat known to occur within area
Green sawfish	*Pristis zijsron*	Vulnerable	Migratory	✓	Species or species habitat known to occur within area
Whale shark	*Rhincodon typus*	Vulnerable	Migratory	✓	Foraging, feeding or related behaviour known to occur within area
Scalloped Hammerhead	*Sphyrna lewini*	Conservation Dependent	-	✓	Species or species habitat known to occur within area
Southern Bluefin Tuna	*Thunnus maccoyii*	Conservation Dependent	-	✓	Species or species habitat likely to occur within area
Narrow sawfish	*Anoxypristis cuspidata*	-	Migratory	✓	Species or species habitat likely to occur within area
Shortfin mako	*Isurus oxyrinchus*	-	Migratory	✓	Species or species habitat likely to occur within area
Longfin mako	*Isurus paucus*	-	Migratory	✓	Species or species habitat likely to occur within area

Value/Sensitivity		Threatened Status	Migratory Status	Operational area presence	Sensitivities within operational area
Common Name	**Scientific Name**				
Giant manta ray	*Manta birostris*	-	Migratory	✓	Species or species habitat likely to occur within area
Reef manta ray	*Manta alfredi*	-	Migratory	✓	Species or habitat known to occur to occur within area
Oceanic whitetip shark	*Carcharhinus longimanus*	-	Migratory	✓	Species or species habitat likely to occur within area
Marine Mammals					
Sei whale	*Balaenoptera borealis*	Vulnerable	Migratory	✓	Species or species habitat likely occur within area
Blue whale	*Balaenoptera musculus*	Endangered	Migratory	✓	Species or species habitat likely to occur within area
Fin whale	*Balaenoptera physalus*	Vulnerable	Migratory	✓	Species or species habitat likely to occur within area
Southern right whale	*Eubalaena australis*	Endangered	Migratory	✓	Species or species habitat may occur within area
Humpback whale	*Megaptera novaeangliae*	Vulnerable	Migratory	✓	Breeding known to occur within area
Sperm whale	*Physeter macrocephalus*	-	Migratory	✓	Species or species habitat may occur within area
Killer whale	*Orcinus orca*	-	Migratory	✓	Species or species habitat may occur within area

Value/Sensitivity		Threatened Status	Migratory Status	Operational area presence	Sensitivities within operational area
Common Name	**Scientific Name**				
Spotted bottlenose dolphin	*Turdiops aduncus*	-	Migratory	✓	Species or species habitat known to occur within area
Bryde's whale	*Balaenoptera edeni*	-	Migratory	✓	Species or species habitat likely to occur within area
Australian Humpback Dolphin	*Sousa sahulensis as Sousa chinensis*	-	Migratory	✓	Species or species habitat may occur within area
Dugong	*Dugong dugong*	-	Migratory	✓	Species or species habitat likely to occur within area
Marine Reptiles					
Loggerhead turtle	*Caretta caretta*	Endangered	Migratory	✓	Species or species habitat known to occur within area
Green turtle	*Chelonia mydas*	Vulnerable	Migratory	✓	Species or species habitat known to occur within area
Leatherback turtle	*Dermochelys coriacea*	Endangered	Migratory	✓	Species or species habitat likely to occur within area
Hawksbill turtle	*Eretmochelys imbricata*	Vulnerable	Migratory	✓	Species or species habitat known to occur within area
Flatback turtle	*Natator depressus*	Vulnerable	Migratory	✓	Congregation or aggregation known to occur within area
Short-nosed Seasnake	*Aipysurus apraefrontalis*	Critically Endangered	-	✓	Species or species habitat likely to occur within area

Value/Sensitivity		Threatened Status	Migratory Status	Operational area presence	Sensitivities within operational area
Common Name	**Scientific Name**				
Leaf-scaled Seasnake	*Aipysurus foliosquama*	Critically Endangered	-	✓	Species or species habitat likely to occur within area
Marine Birds					
Red knot	*Calidris canutus*	Endangered	Migratory	✓	Species or species habitat may occur within area
Curlew sandpiper	*Calidris ferruginea*	Critically Endangered	Migratory	✓	Species or species habitat may occur within area
Southern giant petrel	*Macronectes giganteus*	Endangered	Migratory	✓	Species or species habitat may occur within area
Eastern curlew	*Numenius madagascariensis*	Critically Endangered	Migratory	✓	Species or species habitat may occur within area
Australian fairy tern	*Sternula nereis nereis*	Vulnerable	-	✓	Breeding known to occur within area
Indian Yellow-nosed Albatross	*Thalassarche carteri*	Vulnerable	Migratory	✓	Species or species habitat may occur within area
Common noddy	*Anous stolidus*	-	Migratory	✓	Species or species habitat may occur within area
Streaked shearwater	*Calonectris leucomelas*	-	Migratory	✓	Species or species habitat likely to occur within area
Lesser frigatebird	*Fregata ariel*	-	Migratory	✓	Species or species habitat likely to occur within area

5.5.2 Biologically Important Areas and Critical Habitats

Biologically important areas (BIAs) are those locations where aggregations of members of a species are known to undertake biologically important behaviours, such as breeding, resting, foraging or migration (DAWE, 2021). BIAs have been identified using expert scientific knowledge about species abundance, distribution and behaviours (DoEE, 2017).

Relevant BIA's and Critical Habitat areas identified within the operational area are presented in Table 5-6 and Table 5-7 respectively.Figure 5-4 to Figure 5-10 show the spatial overlap with relevant BIAs and Habitat Critical areas and the operational area.

Table 5-6: Biologically Important Areas within the operational area

Value / Sensitivity	BIA Type
Marine Mammals	
Humpback whales	Migration
Pygmy blue whales	Distribution
Fish, Sharks and Rays	
Whale sharks	Foraging
Marine Turtles	
Flatback turtle	Internesting buffer
Birds	
Wedge-tailed shearwater	Breeding

Note 1. The lesser crested tern is not listed as threatened or migratory under the EPBC Act

Table 5-7: Habitat Critical areas within the operational area

Value / Sensitivity	Type
Flatback turtle	Internesting

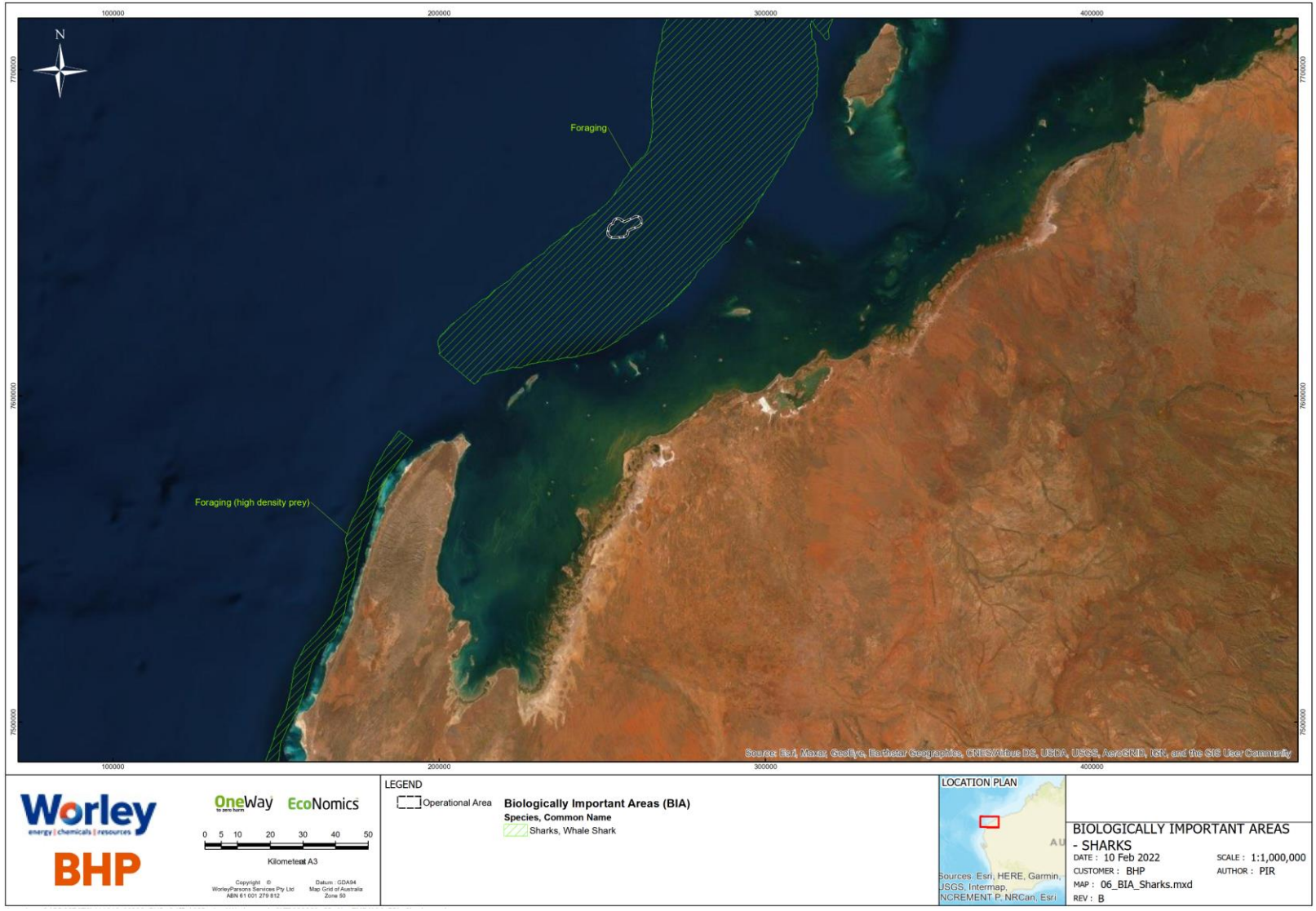

Figure 5-4: Fish and Sharks Biologically Important Areas in relation to the Operational Area

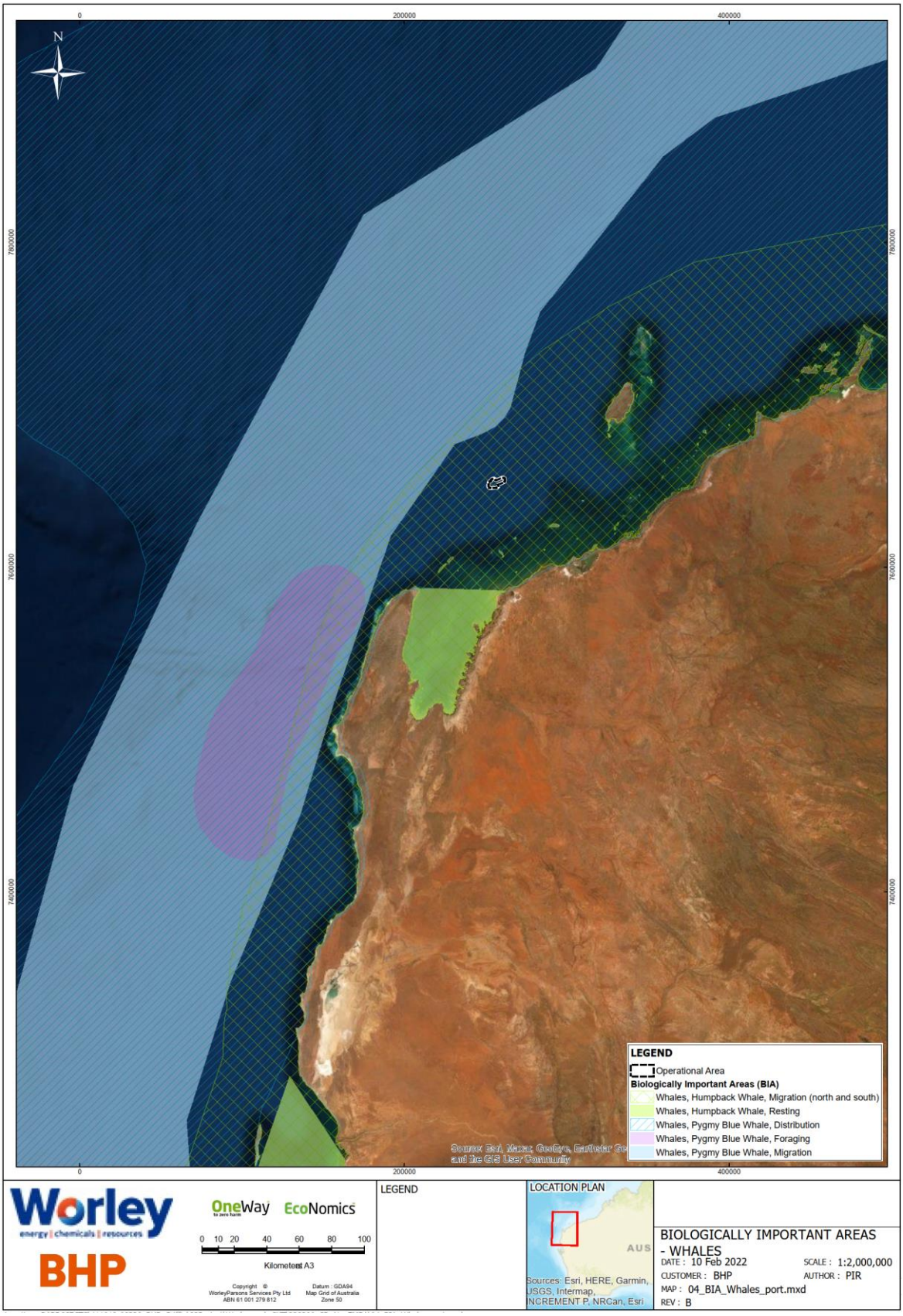

Figure 5-5: Whale Migration Biologically Important Areas in relation to the Operational Area

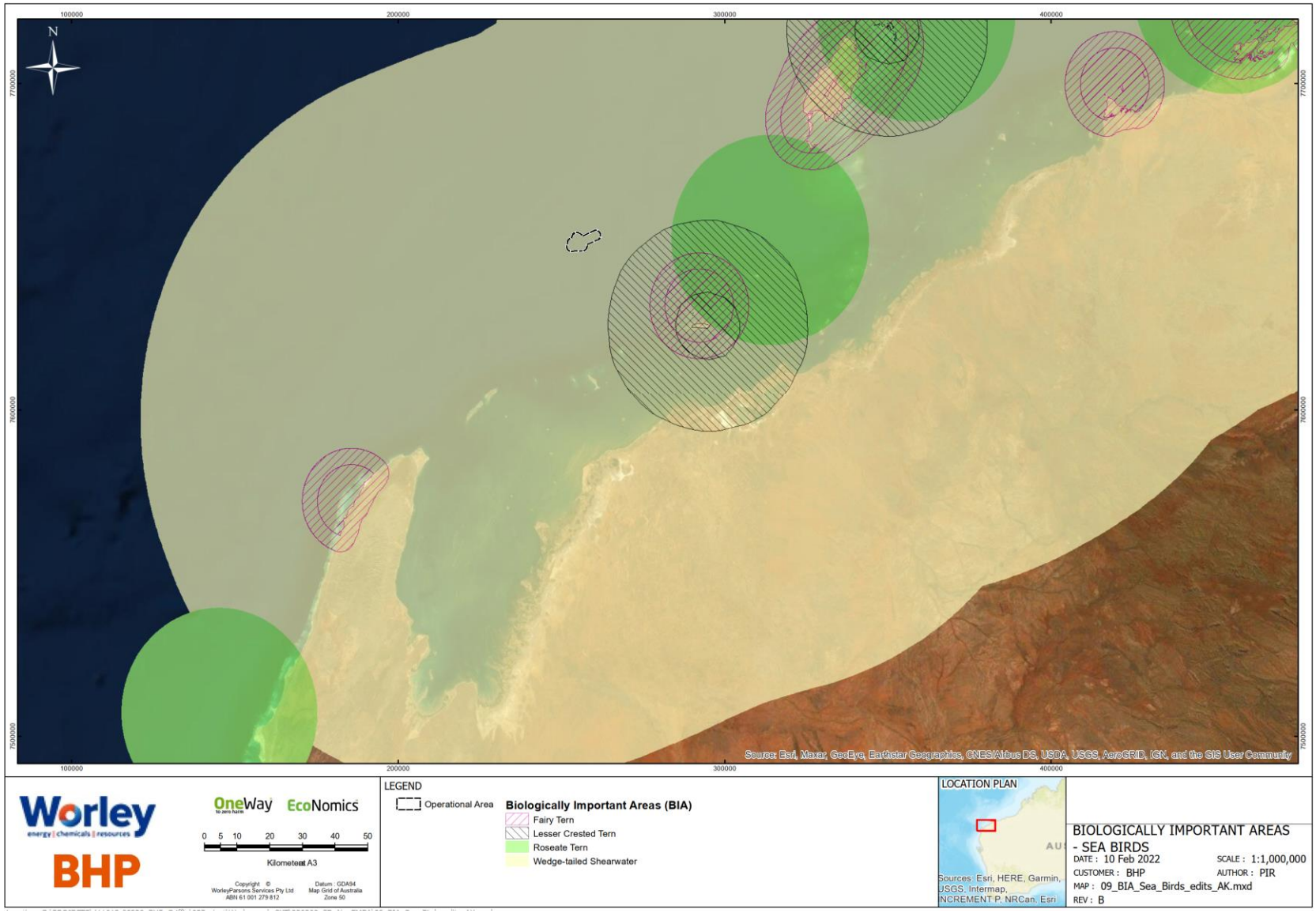

Figure 5-6: Seabird Biologically Important Areas in relation to the Operational Area

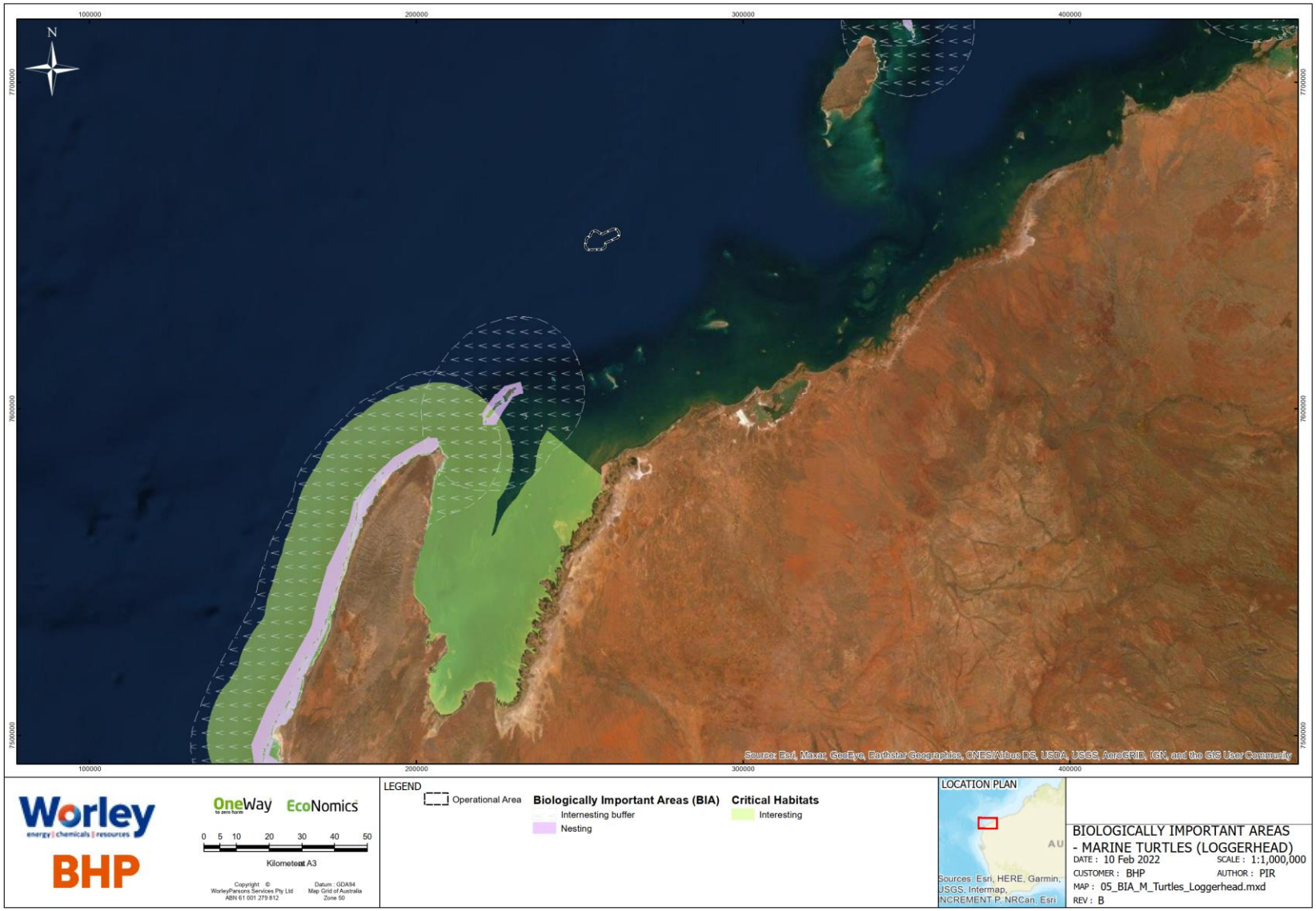

Figure 5-7: Loggerhead Turtle Biologically Important Areas and Critical Habitats in relation to the Operational Area

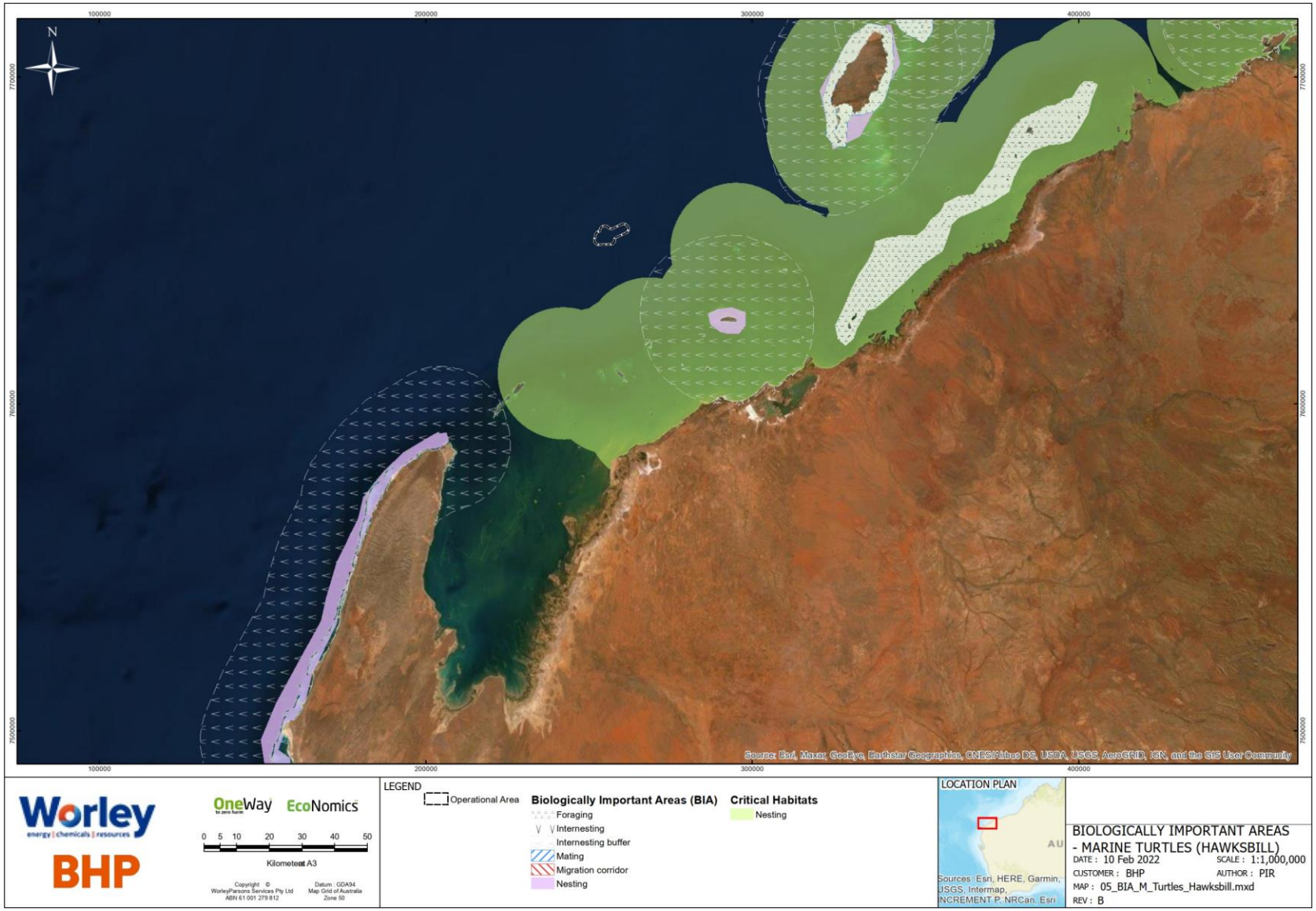

Figure 5-8: Hawksbill Turtle Biologically Important Areas and Critical Habitats in relation to the Operational Area

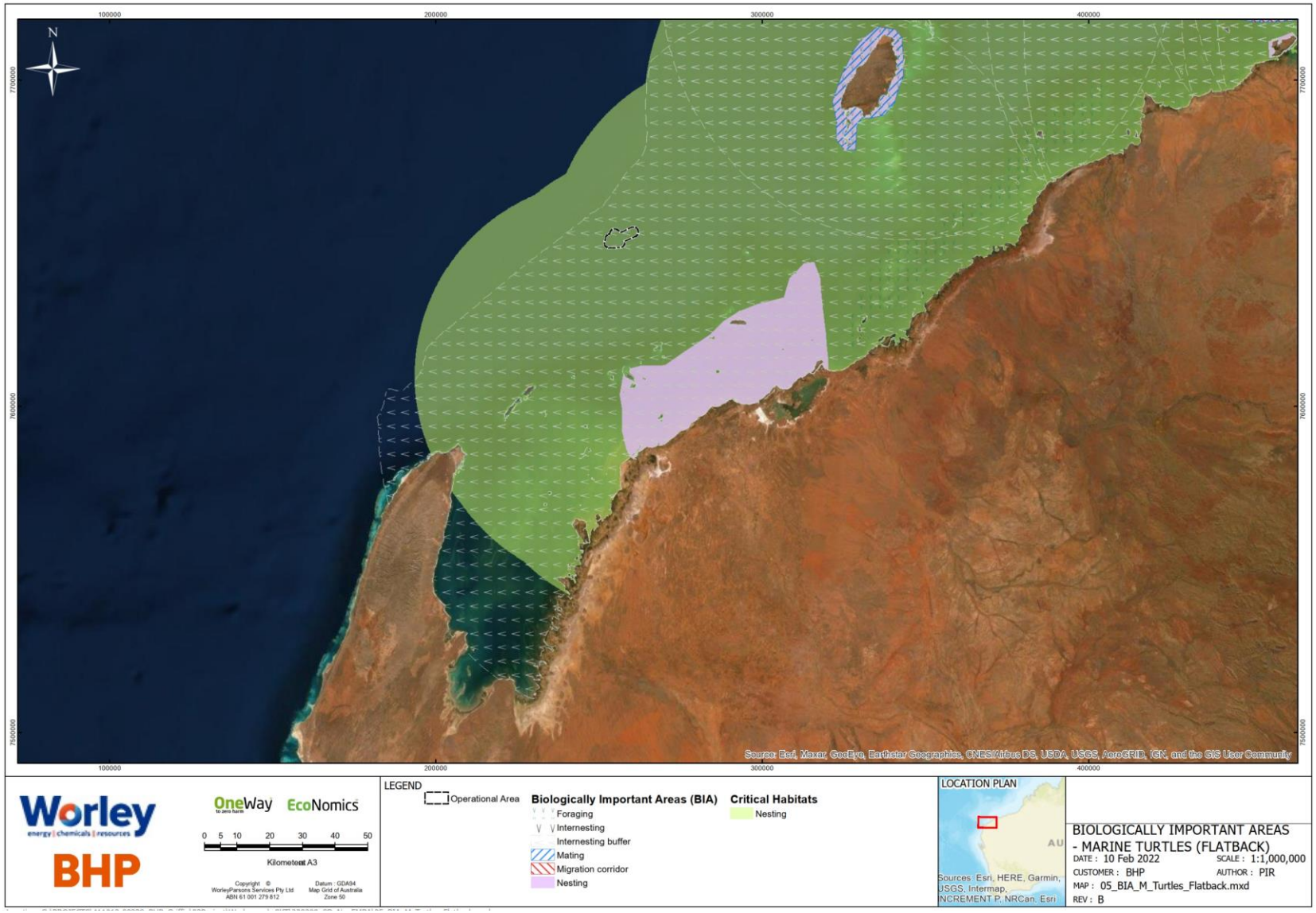

Figure 5-9: Flatback Turtle Biologically Important Areas and Critical Habitats in relation to the Operational Area

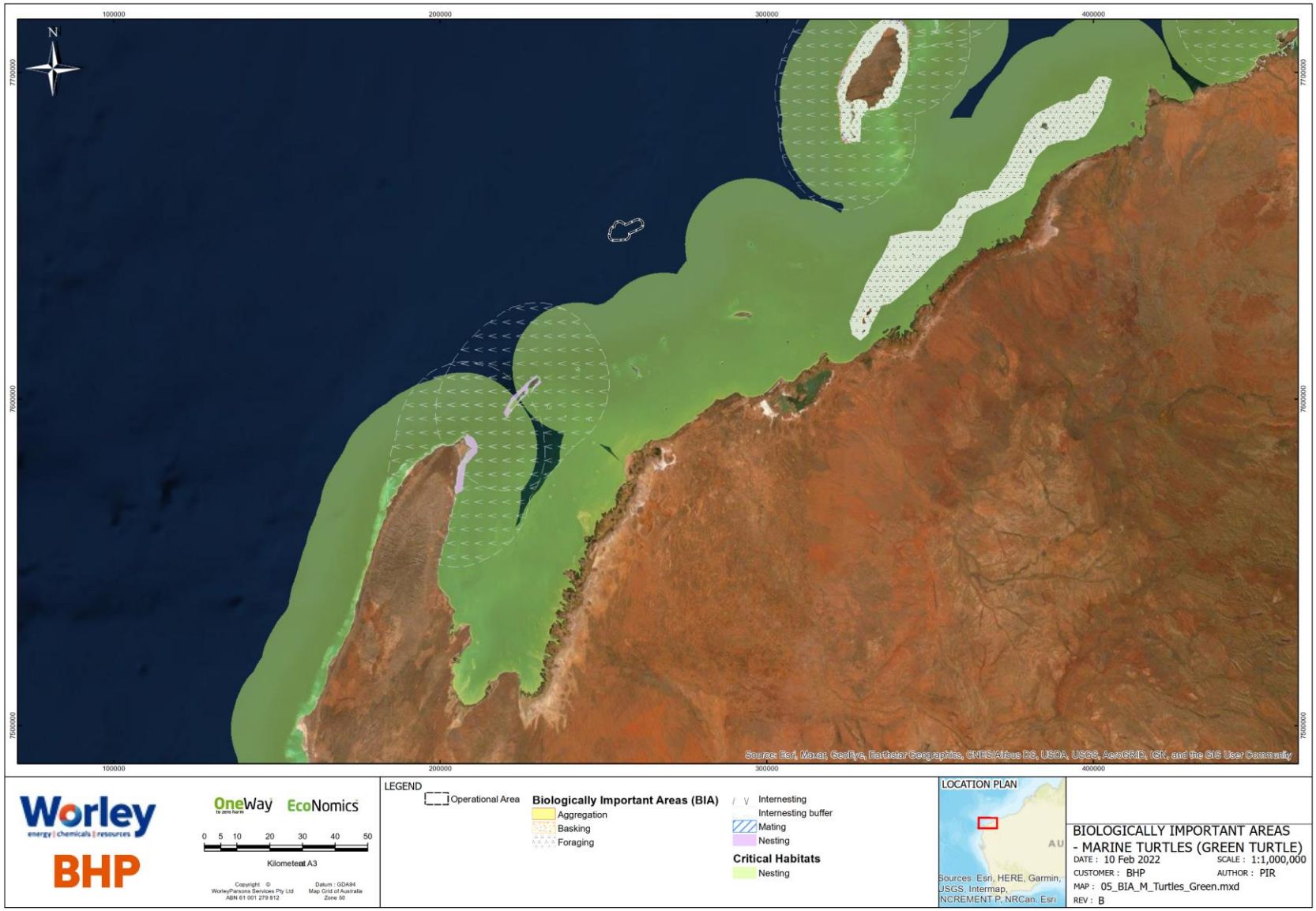

Figure 5-10: Green Turtle Biologically Important Areas and Critical Habitats in relation to the Operational Area

5.6 Socio-economic

Socio-economic activities that may occur within operational area and adjacent waters include commercial fishing, oil and gas exploration and production, and to a lesser extent, recreational fishing and tourism as summarised below.

More detailed descriptions of socio-economic considerations are provided in Appendix C, Section 2.10.

5.6.1 Commercial Fisheries

ROV footage from infrastructure surveys conducted in the Griffin field and anecdotal evidence from commercial and recreational fishers in the region confirm that the Griffin subsea infrastructure attracts a diverse population of fish, including many species of economic (commercial and recreational) importance (GHD, 2015). Fishers that use trap or line equipment are generally positive about its presence and support the concept that the Griffin subsea infrastructure provides enhancement of the fish populations in the area. A commercial fisher commented that a diverse range of fish have been found on the subsea infrastructure, presumed to be resident populations, with typical catch including red emperor, trevallies, saddle tail snapper, moses snapper, sea bream, goldband snapper and mangrove jack. Dominant and established species associated with the infrastructure are red emperor, coral trout, crimson snapper and some large cod species (GHD, 2015). The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes removal of the majority of Griffin field infrastructure, therefore the remaining infrastructure covered under this EP is likely to provide a significantly less fish habitat to that previously observed.

Table 5-8 identifies the Commonwealth and State commercial fisheries overlapping the operational area and provides an assessment of the potential interaction based on the nature of the fishery and historic DPIRD catch data.

Table 5-8: Commonwealth and State Commercial Fisheries Overlapping the Operational Area and Potential for Interaction with the Petroleum Activity

Fishery name	Interaction potential with the Petroleum Activity	
Commonwealth fishery		
Western Tuna and Billfish	No	In 2020 there were three active fishing vessels. Fishing effort has concentrated off south-west Western Australia, with occasional activity off South Australia (Patterson et al, 2021). Whilst there is an overlap with the fishery management area, there is no potential for interaction given the current distribution of fishing effort.
Western Skipjack Tuna	No	Historically, effort in the Western Skipjack Tuna has been low and was 885 t in 2007–08. There has been no fishing in the since 2008–09 (Patterson et al, 2021). Whilst the operational area overlaps with the fishery management area, there is no potential for interaction given the current distribution of fishing effort.
Southern Bluefin Tuna Fishery	No	Fishing effort for the Southern Bluefin Tuna Fishery occurs in the Great Australian Bight and north east of Eden in New South Wales (Patterson et al, 2021). Whilst the operational area overlap with the fishery management area, there is no potential for interaction given the current distribution of fishing effort.
State fishery		
Pilbara Line Fishery	No	The Pilbara Line Fishery encompasses all of the 'Pilbara waters', extending from a line commencing at the intersection of 21°56'S latitude and the boundary of the Australian Fishing Zone and north to longitude 120°E (Newman et al., 2014). There are no stated depth limits of the fishery. The fishing vessels primarily target goldband snapper. Records show there has been up to six active Pilbara Line Fishery vessels that operate annually within the 10 NM blocks that cover the operational area. These vessels have operated there within the past four years (DPIRD, 2021). Given the known Pilbara Line Fishery fishing effort, it is possible that vessels may be operating within the vicinity of the surface waters of the operational area, however there would be no interaction with the subsea infrastructure. Eighty-eight fish species have been observed at Griffin field, most of which have recreational and commercial value, including 8-10 of each of the *Lutjanidae* (tropical snappers) and *Epinephalidae* (groupers), as well as jacks and dhufish (UTS Decommissioning Ecology Group, 2020).
Pilbara Trap Managed Fishery	No	The Pilbara Trap Managed Fishery covers the area from Exmouth northwards and eastwards to the 120° line of longitude, and offshore as far as the 200 m isobath. The fishery targets high value species such as *Lutjanus sebae* (red emperor) and *Pristipomoides multidens* (goldband snapper). Records show there were less than three Pilbara Trap Managed Fishery vessels operating annually within the10 NM blocks that cover the operational area. These vessels have operated there within the past four years, however no catch has been recorded (DPIRD, 2021). Given the known Pilbara Line Fishery fishing effort, it is possible that vessels may be operating within the vicinity of the surface waters if the operational area, however there would be no interaction with the subsea infrastructure.
Pilbara Trawl Managed Fishery	No	The Pilbara Trawl Managed Fishery is divided into two zones and waters inside of the 50 m isobath are permanently closed to fish trawling. The operational area is located within Schedule 2 (Zone 1), which has been closed to fish trawling since 1998 (DPIRD, 2021). Only if this fishery was to reopen would there be any potential for interaction.
Mackerel Managed Fishery	No	The Mackerel Managed Fishery targets Spanish mackerel (*Scomberomorus commerson*) using near-surface trawling gear from small vessels in coastal areas around reefs, shoals and headlands. The commercial fishery extends from Geraldton to the Northern Territory border. Records show there were less than three Mackerel Managed Fishery vessels operating annually within the 10 NM blocks that cover the operational area. These vessels have operated there within the past four years, however no catch has been recorded (DPIRD, 2021). No interaction is expected given the known fishing effort.

Fishery name	Interaction potential with the Petroleum Activity	
Onslow Prawn Managed Fishery	No	The Onslow Prawn Managed Fishery encompasses a portion of the continental shelf off the Pilbara. The fishery targets a range of penaeids (primarily king prawns) which typically inhabit soft sediments <45 m water depth. Fishing is carried out using trawl gear over unconsolidated sediments (sand and mud). Records show there were less than three Onslow Prawn Managed Fishery vessels operating annually within the10 NM blocks that cover the operational area. These vessels have operated there within the past four years, however no catch has been recorded (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery, no interaction is expected.
Marine Aquarium Fish Managed Fishery	No	The Marine Aquarium Managed Fishery operates within Western Australian waters. The fishery is primarily a dive-based fishery that uses hand-held nets to capture the desired target species and is restricted to safe diving depths (typically < 30 m). The fishery is typically active from Esperance to Broome, with popular areas including the coastal waters of the Cape Leeuwin/Cape Naturaliste region, Dampier and Exmouth. The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery.
Specimen Shell Managed Fishery	No	The Specimen Shell Managed Fishery can be conducted anywhere within Western Australia waters and targets the collection of specimen shells for display, collection, cataloguing and sale. The Specimen Shell Managed Fishery encompasses the entire WA coastline, but effort is concentrated in areas adjacent to the largest population centres such as: Broome, Karratha, Shark Bay, Mandurah, Exmouth, Capes area, Albany and Perth. The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the Operational Area are typically not conducive for this fishery
Pearl Oyster Managed Fishery	No	The Western Australian Pearl Oyster Fishery is the only remaining significant wild-stock fishery for pearl oysters in the world. Pearl oysters (*Pinctada maxima*) are collected by divers in shallow coastal waters (>23 m) along the North West Shelf and Kimberley, which are mainly for use in the culture of pearls (Hart et al., 2018). The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery.
Abalone	No	The Western Australian abalone fishery includes all coastal waters from the Western Australian and South Australian border to the Western Australian and Northern Territory border. The fishery is concentrated on the south coast (greenlip and brownlip abalone) and the west coast (Roe's abalone). Abalone are harvested by divers, limiting the fishery to shallow waters (typically < 30 m). The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery.
Pilbara Crab Fishery	No	Blue swimmer crabs are targeted by the Pilbara Crab Managed Fishery using hourglass traps, primarily within inshore waters around Nickol Bay and Dampier. The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery.
West Coast Deep Sea Crustacean	No	The West Coast Deep Sea Crustacean Fishery is a 'pot' fishery using baited pots operated in a long-line formation in the shelf edge waters (>150 m) of the West Coast and Gascoyne Bioregions. The fishery primarily targets crystal crabs. The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery.
South West Coast Salmon	No	The commercial salmon fishery use beach seine net to catch fish. There are two commercial salmon fisheries operating in Western Australia they include, the South Coast Salmon Managed Fishery (SCSMF) and South West Coast Salmon Managed Fishery (SWCSMF). There are currently 18 SCSMF licenses, and six SWCSMF Licences. The fishery has not been active in the operational area within the last four years (DPIRD, 2021). Water depths in the operational area are not conducive for this fishery.

5.6.2 Traditional Fisheries

There are not expected to be any traditional fisheries that operate within the operational area. Traditional fisheries are typically restricted to coastal waters and/or areas with suitable fishing structures such as reefs.

5.6.3 Tourism and Recreation

Recreational fishing and tourism along the GEP has been noted during consultation with the Ashburton/Onslow fishing communities. The Griffin Field Commercial Fish Assessment (GHD, 2015) assessed the likelihood of recreational fishers utilizing the field. Anecdotal evidence from a prominent game fishing club in the North West region made reference to the fact that the numbers of larger fishing boats is on the increase, enabling game and recreational fishing further offshore (GHD, 2015).

5.6.4 Oil and Gas Activities

The NWS is Australia's most prolific oil and gas production area, largely responsible for WA accounting for 66% of the country's oil production, 76% of the country's condensate production and 37% of the country's gas production in 2013 (APPEA, 2014).

Oil and gas activities close to the operational area include:

- BHP's Pyrenees Development (Pyrenees Venture floating production, storage and offloading vessel (FPSO)) within WA-42-L
- BHP's Macedon development within WA-42-L
- Woodside's Vincent Development (Maersk Ngujima-Yin FPSO) in production licence WA-38-L,
- Santos' Ningaloo Vision Development (Ningaloo Vision FPSO) in production licence WA-35-L,

Other oil and gas activities in the region include production areas located on Barrow, Thevenard and Varanus islands.

5.6.5 Commercial Shipping

Under the Commonwealth *Navigation Act 2012*, all vessels operating in Australian waters are required to report their location on a daily basis to the Rescue Coordination Centre in Canberra. This Australian Ship Reporting System is an integral part of the Australian Maritime Search and Rescue system and is operated by Australian Maritime Safety Authority (AMSA) through the Rescue Coordination Centre.

There are no recognised shipping routes in or near the operational area, with the nearest shipping fairway designated by AMSA located over 80 km to the north-west (Figure 5-11).

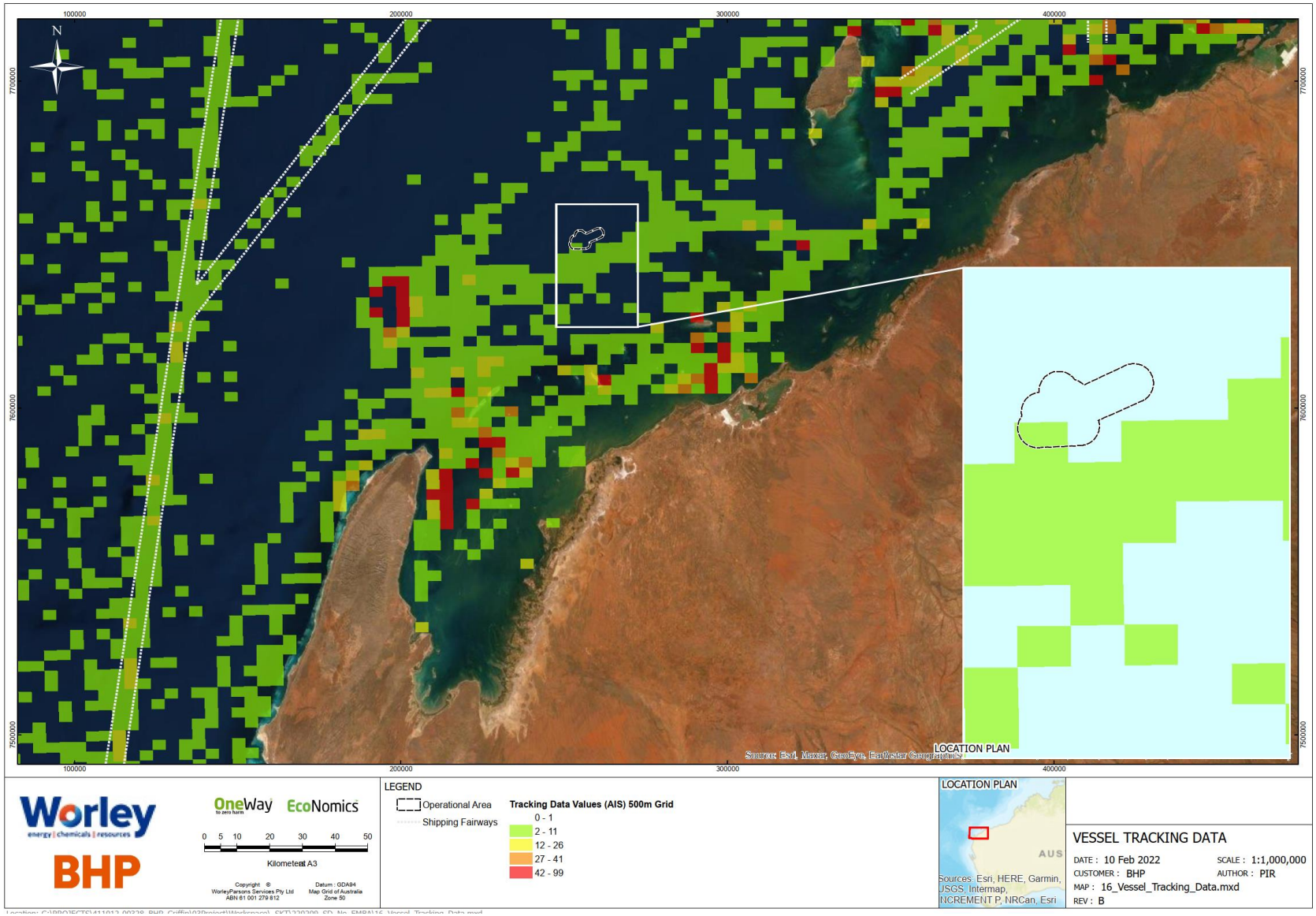

Figure 5-11: Commercial Shipping Traffic in the vicinity of the Operational Area

5.6.6 Defence

Military exercise areas are located at Exmouth associated with Royal Australian Air Force Base Learmonth, approximately 149 km to the south west of the operational area. The operational area is within the North Western Training Area and military restricted airspace (R8541A) a designated defence exercise area which encompasses waters and airspace off the North West Cape (Figure 5-12). When activated by a 'Notice to Airmen', the restricted airspace can operate down to sea level.

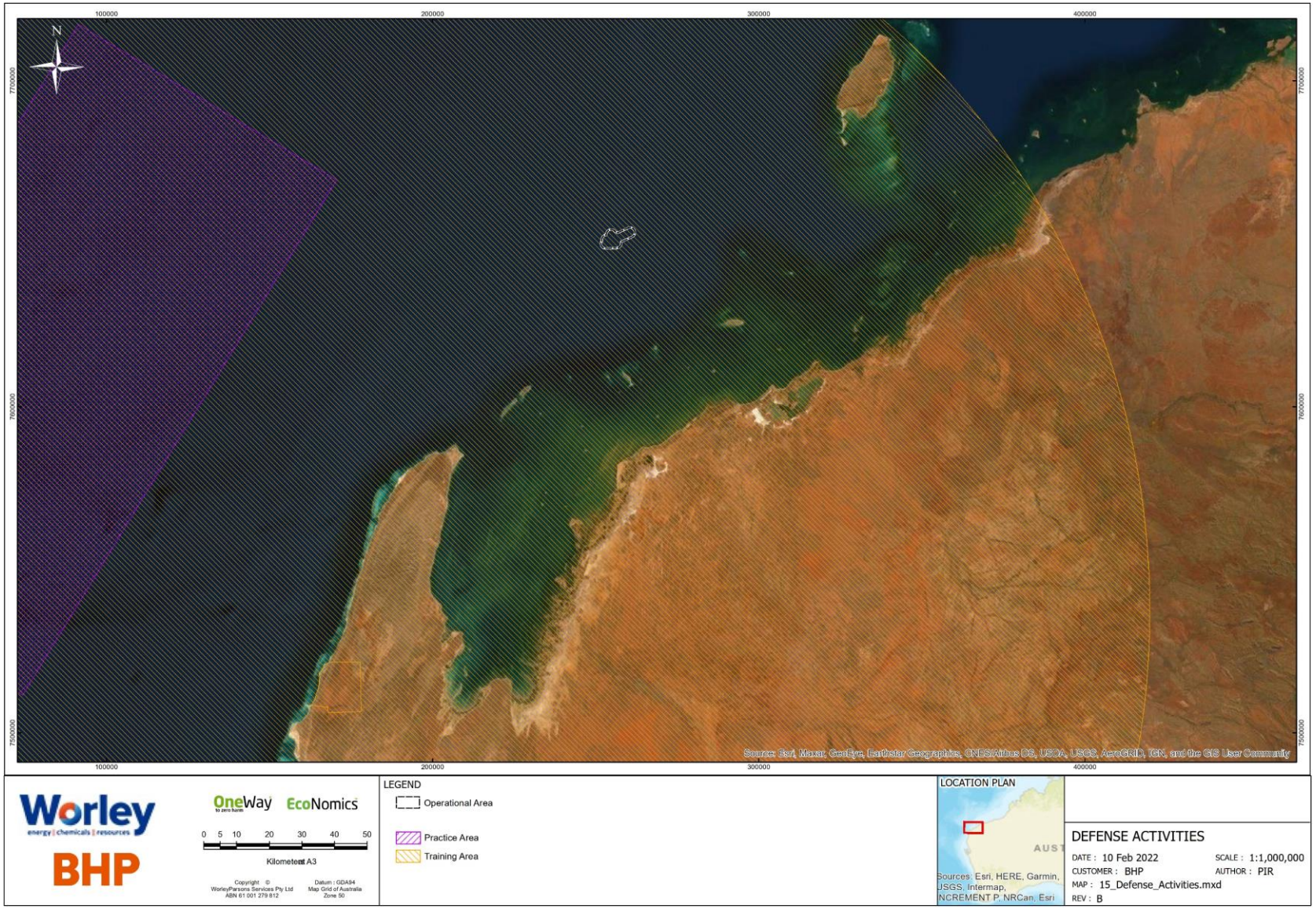

Figure 5-12: Defence Activities in the vicinity of the Operational Area

6 Stakeholder Engagement

In accordance with requirements of Regulations 11A and 14(9) of the Environment Regulations, BHP has consulted with relevant and interested stakeholders during the preparation of this EP.

BHP's approach to stakeholder consultation aims to demonstrate to relevant persons that the environmental impacts and risks of an activity are being appropriately managed. BHP is committed to ongoing engagement and consultation with stakeholders during all project stages.

BHP has consulted with relevant stakeholders regarding this petroleum activity, including sharing information with stakeholders and responding directly to enquiries. Information provided included details of all remaining decommissioning activities, with stakeholders advised that these would be covered by three separate EPs across Commonwealth and State regulatory jurisdictions.

Stakeholders were consulted regarding the activities covered in this EP commenced in January 2022, with consultation activities including:

- Griffin Decommissioning Environment Plan Stakeholder Information Fact Sheet distributed to relevant stakeholders in January 2022;
- Exmouth Community Reference Group (CRG) meeting held in October 2021.

BHP has considered all stakeholder feedback and assessed the merits of responses received. The process adopted to assess any objections and claims is outlined in Section 6.1.5. A summary of BHP's responses is provided in Table 6-2.

BHP has also considered feedback from previous consultation activities for decommissioning of the Griffin Field, as well as from a public Comparative Assessment process undertaken by BHP in 2021.

BHP considers that consultation with relevant stakeholders has been adequate to inform the development of this EP. BHP has a process for ongoing stakeholder engagement and any concerns raised by stakeholders after the EP submission will be considered and addressed.

6.1 Stakeholder Engagement Process

6.1.1 Stakeholder Identification

Regulation 11A(1) of the Environment Regulations states that in the course of preparing an environment plan, or revision to an environment plan, the titleholder must consult with each of the following categories of relevant persons:

(a) each Department or agency of the Commonwealth to which the activities to be carried out under 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.

Relevant persons for the proposed petroleum activity were identified based on BHP's existing relationships and relevant persons identified in previous EP consultations, together with desktop stakeholder identification and analysis. BHP has engaged with key stakeholders through the EP preparation including:

- Commonwealth and State departments and agencies;
- Local Government;
    - Commercial fishery licence holders and their representative associations within both Commonwealth and State managed fisheries that overlap the Operational Area;
    - Non-governmental organisations.

As part of BHP's general stakeholder identification process, the Department of Primary Industries and Regional Development (DPIRD) current State of Fisheries Report and FishCube data (refer Section 5.6.1) was reviewed to understand catch effort, fishing method and water depths of those managed fisheries with boundaries that overlap the Operational Area, to determine if the fishery was to be considered a relevant stakeholder to be consulted. This assessment is included in Section 5.6.1 of this EP.

6.1.2 Community Consultation History

BHP has also consulted wider community interests for this EP, principally through the Exmouth and Onslow CRGs, which were established to facilitate consultation in relation to BHP's multiple assets offshore North West Cape, Western Australia. The CRG forums aim for proactive and regular interaction to promote open and inclusive communication with stakeholders with an interest in BHP's current and planned activities. Current membership of each CRG includes representatives from local government, Exmouth and Onslow-based State and Commonwealth Government Departments, local industry, tourism, Indigenous and community interests.

Meetings are held regularly (typically quarterly), and participants are given an update summary of BHP's current petroleum and upcoming activities and invited to raise any concerns or issues. Meeting agendas are prepared and circulated in advance of meetings, minutes are recorded, and feedback sought from stakeholders. The BHP Corporate Affairs' toll-free 1800 number and email address are made available to stakeholders.

The latest Exmouth CRG meeting was held on 4 October 2021 and included an overview of BHP's proposed Griffin activities. Both Exmouth and Onslow CRG members were emailed a copy of the Griffin Decommissioning Environment Plan Stakeholder Information Fact Sheet (Appendix E). An Exmouth CRG meeting was planned for 17 March 2022, but was cancelled due to COVID-19 concerns and restrictions. It is in planning to be rescheduled for early/mid April 2022.

In addition to CRG consultation, targeted consultation has been undertaken for the EP as outlined in Section 6.1.3, with identified stakeholders provided information about the proposed activities and given adequate opportunity to evaluate and convey how it may impact on functions, interests and activities. The consultation process also provided opportunity for additional stakeholders identified during the consultation process to be contacted, with a commitment to assess any new concerns or claims as part of ongoing consultation.

6.1.3 Identified stakeholders

Identified stakeholders and an assessment of their relevance under the Environment Regulations for the purposes of consultation for this petroleum activity are listed in Table 6-1.

Table 6-1: Stakeholders engaged with for the proposed activity

Stakeholder	Relevant to Activity	Rationale
Commonwealth Government Department or Agency		
Australian Border Force	Yes	Maintain the integrity of Australia's internal borders including customs and immigration
Australian Fisheries Management Authority (AFMA)	Yes	AFMA is the Commonwealth government agency responsible for the efficient management and sustainable use of Commonwealth fish resources from three nautical miles out to the extent of the Australian Fishing Zone.
Australian Hydrographic Office (AHO)	Yes	The AHO is Commonwealth government agency responsible for the publication and distribution of nautical charts and other information related for the

Stakeholder	Relevant to Activity	Rationale
		safety of ships navigating in Australian waters including the distribution of Notice to Mariners.
Australian Maritime Safety Authority (AMSA)	Yes	AMSA is Australia's national agency responsible for maritime safety and navigation, marine pollution response in Commonwealth waters.
Department of Agriculture, Water and the Environment (DAWE) – Sea Dumping Permit	Yes	The Sea Dumping Act and associated sea dumping permits are administered by the DAWE. Preliminary discussions with DAWE indicate Sea Dumping permits will be required for all equipment to be left *in situ*.
Department of Agriculture, Water and the Environment (DAWE) – Fisheries	Yes	Department's Fisheries Branch has primary policy responsibility for promoting the biological, economic and social sustainability of Australian fisheries. The DAWE (Fisheries) is the relevant agency where the activity has the potential to negatively impact fishing operations and/or fishing habitats in Commonwealth waters.
Department of Agriculture, Water and the Environment (DAWE) – Biosecurity (vessels, aircraft and personnel)	Yes	Department's Biosecurity Branch has inspection and reporting requirements to ensure that all conveyances (vessels, installations and aircraft) arriving in Australian territory comply with international health regulations and that any biosecurity risk is managed.
Department of Defence (DoD)	Yes	The department is the responsible agency for the defence of Australia and its national interests. DoD is a relevant agency where the proposed activity may impact operational requirements; encroach on known training areas and/or restricted airspace, or when nautical products or other maritime safety information is required to be updated.
Department of Industry, Science, Energy and Resources	Yes	The Department is responsible for consolidating the Government's efforts to drive economic growth, productivity, and competitiveness by bringing together industry, energy, resources and science. The Department is required to be consulted under Regulation 11A(1) of the Environment Regulations.
Director of National Parks (DNP)	Yes	The DNP is the statutory authority responsible for the administration and management of the Australian Marine Parks under the EPBC Act.
WA Government Department or Agency		
Department of Biodiversity, Conservation and Attractions (DBCA)	Yes	The Department is a relevant State agency responsible for the management of State marine parks and reserves and protected marine fauna and flora.
Department of Mines, Industry Regulation and Safety (DMIRS)	Yes	Department responsible for the management of offshore petroleum in the adjacent State waters. The Department is required to be consulted under Regulation 11A(1) of the Environment Regulations
Department of Primary Industries and Regional Development (DPIRD)	Yes	DPIRD is responsible for managed WA State fisheries. The operational area intersects with State managed fisheries.
Department of Transport (DoT)	Yes	The Department is the control agency for marine pollution emergencies in State waters.
Ningaloo Coast World Heritage Advisory Committee (NCWHAC)	Yes	The NCWHAC provides advice to the Australian and Western Australian Governments on the protection, conservation and management of the values of the Ningaloo World Heritage Area.
Industry Representative Organisations		
Australian Petroleum Production and Exploration Association (APPEA)	Yes	APPEA is the peak national body representing Australia's oil and gas exploration and production industry.

Stakeholder	Relevant to Activity	Rationale
Fishing Bodies / Industry Representative Organisations		
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	Yes	ASBTIA is the peak body representing the Australian Southern Bluefin Tuna industry.
Commonwealth Fisheries Association (CFA)	Yes	Represents the interests of commercial fishing industry in Commonwealth-regulated fisheries, including Skipjack Tuna Fisheries
Marine Tourism WA	Yes	Represents the interests of charter boat operators in Western Australia.
Pearl Producers Association (PPA)	Yes	PPA is the peak industry representative body for the Australian pearl oyster (*Pinctada maxima)* pearling industry licensees in WA.
Recfishwest	Yes	Recfishwest is the peak body representing recreational fishers in WA.
Tuna Australia	Yes	Tuna Australia is the peak body representing the Western Tuna and Billfish Fishery.
Western Australian Fishing Industry Council (WAFIC)	Yes	WAFIC is the peak industry body representing the interests of the WA commercial fishing, pearling and aquaculture sector.
Commonwealth Fisheries		
Commercial fisheries with boundaries overlapping or close to the planned petroleum operational area and with licence holders' activities or interests that may be affected by the planned petroleum activity.		
Western Tuna and Billfish	No	Refer Table 5-8
Western Skipjack Tuna	No	Refer Table 5-8
Southern Bluefin Tuna	No	Refer Table 5-8
Commercial fisheries with boundaries overlapping or close to the planned petroleum operational area, but licence holders' activities or interests are not expected to be affected by the planned petroleum activity.		
North West Slope Trawl	No	Refer Table 5-8
Western Deepwater Trawl	No	Refer Table 5-8
State Fisheries		
Commercial fisheries with boundaries overlapping or close to the planned petroleum operational area and with licence holders' activities or interests that may be affected by the planned petroleum activity.		
Pilbara Demersal Scalefish Fishery: • Pilbara Line Fishery • Pilbara Trap Managed Fishery	Yes	Based on a review of DPIRD current State of Fisheries Report and FishCube data, the fisheries boundaries overlap the operational area, and the fishery has been active in recent years (refer Table 5-8).
Mackerel Managed Fishery	Yes	Based on a review of DPIRD current State of Fisheries Report and FishCube data, the fisheries boundaries overlap the operational area and the fishery has been active within the past four years (refer Table 5-8).
Commercial fisheries with boundaries overlapping or close to the planned petroleum operational area, but licence holders' activities or interests are not expected to be affected by the planned petroleum activity.		
Pilbara Trawl Managed Fishery	No	Based on a review of DPIRD current State of Fisheries Report and FishCube data, the fishery boundaries overlap the proposed operational area and the fisheries have not been active in recent years (refer Table 5-8). Licence holders have not been consulted during the development of the EP; however, fishery's interest considered in the development of the EP.
Onslow Prawn Managed Fishery	No	
Specimen Shell Managed	No	
Marine Aquarium Fish Managed Fishery	No	
Specimen Shell Managed Fishery	No	
Pearl Oyster Managed Fishery	No	
Pearl Oyster Managed Fishery	No	
Abalone	No	

Stakeholder	Relevant to Activity	Rationale
Pilbara Crab Fishery	No	DPIRD to be informed in the event of an unplanned emergency oil pollution event.
West Coast Deep Sea Crustacean	No	
Neighbouring Operators		
Nil	N/A	No adjacent titles
Other Stakeholders		
Local Government • Shire of Ashburton • Shire of Exmouth	Yes	Represents the interests of local community members relevant to the progressive decommissioning of the Griffin facilities.
Community Reference Groups • Exmouth Community Reference Group • Onslow Community Reference Group	Yes	Representatives from local government, locally-based State and Commonwealth Government Departments, local industry, tourism, and organisations with Indigenous, conservation and community interests.
Indigenous • Buurabalayji Thalanyji Aboriginal Corporation (BTAC)	Yes	Represents the interests of native title claimants in the regions relevant to the progressive decommissioning of the Griffin facilities.
Industry • Exmouth Chamber of Commerce and Industry • Onslow Chamber of Commerce and Industry	Yes	Represents the interests of businesses in the regions relevant to the progressive decommissioning of the Griffin facilities.
Fishing clubs • King Bay Fishing Club (Dampier) • Nickol Bay Fishing Club (Dampier) • Ashburton Anglers (Onslow) • Exmouth game Fishing Club (Exmouth)	Yes	Represents the interests of recreational fishing club members in the regions relevant to the progressive decommissioning of the Griffin facilities.
Charter Boat / Marine Tourism Operators • Dampier • Onslow • Exmouth	Yes	May undertake marine tourism activities in proximity of the planned activities.
Cape Conservation Group	Yes	Exmouth-based community and volunteer conservation group with an interest in conservation of the North West Cape.
Australian Maritime Oil Spill Centre (AMOSC)	Yes	Industry-funded organisation to coordinate and support marine pollution response.
Centre of Decommissioning Australia (CODA)	Yes	Established by the National Energy Resources Australia (NERA), an independent science organisation funded by the Australian Government in conjunction with industry.

6.1.4 Stakeholder Consultation Activities

BHP's consultation for this EP included the wide distribution of a general Fact Sheet (Appendix E) and follow up email correspondence. The information provided included the timing and duration of the activity, the mitigation measures for relevant impacts and risks, BHP's policies and experience, and contact details to facilitate providing feedback to BHP.

Additional materials have been provided to some government, industry and regional community members as part of BHPs ongoing involvement of stakeholders in the proposed decommissioning of the Griffin facilities, including a Comparative Assessment to inform decision making on the preferred decommissioning option.

Recent stakeholder engagement and consultation activities informing this EP include:

- Comparative Assessment Expression of Interest issued to stakeholders and advertisement in regional media in April 2021.

- Comparative Assessment Workshop in Exmouth, Western Australia on 16 June 2021.
- Email communication on 31 January 2022 to relevant stakeholders, providing information on the proposed activity and invitation for comment.
- Exmouth CRG meeting on 4 November 2021.
- Consideration of responses for the Griffin Decommissioning and Field Management EP submitted to NOPSEMA in December 2021.
- Consideration of all responses from stakeholders received prior to submission of the EP, providing additional information where requested.

All stakeholder engagement records are maintained by BHP Corporate Affairs.

6.1.5 Assessment of Stakeholder Objections and Claims

A summary of the stakeholder consultation undertaken for this EP, including responses received, BHP's assessment of all comments received and how each of the responses has been addressed in the EP is provided in Table 6-2. Full transcripts between BHP and stakeholders are provided in a confidential submission to NOPSEMA.

No objections or significant concerns were raised by stakeholders during consultation in the preparation of this EP. Some stakeholders expressed support for leaving equipment *in situ*, provided equipment had been cleaned of contaminants.

Table 6-2: Stakeholder consultation summary

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
Commonwealth Departments / Agencies		
Australian Border Force (ABF)	ABF was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received by Australian Border Force at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Australian Fisheries Management Authority(AFMA)	AFMA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. AFMA responded on 3 March 2022 and provided the following advice: 1. Due to limited resources AFMA is unable to comment on individual proposals, however, it is important to continue consulting with all fishers who have entitlements to fish within the proposed area. 2. AFMA advised fishers could be consulted through the relevant fishing industry associations or directly with fishers who hold entitlements in the area. 3. AFMA acknowledged BHPs advice that it would be consulting the relevant industry associations and requested BHP also consult with the Western Australia Fishing Industry Council (WAFIC) with regards to the North West Slope Trawl and Western Deepwater Trawl Fisheries, and the Australian Southern Bluefin Tuna Industry Association (ASBTIA) with regards to the Western Skipjack Tuna Fishery. BHP responded on 3 March 2022 acknowledging advice provided to Commonwealth fishery licence holders.	BHP has consulted relevant representative organisations on behalf of licence holders for the proposed activity. BHP has also consulted WAFIC for the proposed activity. BHP considers it has addressed the stakeholder's feedback and no further consultation is required.
Australian Hydrographic Office (AHO)	AHO was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. AHS replied on 1 February 2022 with the following response: 1. Please accept this email as acknowledgement that your email has been received by the AHO. The data you have supplied will now be registered, assessed, prioritised and validated in preparation for updating our Navigational Charting products. These adhere to International and Australian Charting Specifications and standards. These standards may result in some data generalisation or filtering due to the scale of existing charts, proximity to other features, and the level of risk a reported feature presents to mariners.	Vessel activities are not proposed under the scope of this EP. Section 8.1 relates to the physical presence of infrastructure. BHP considers it has addressed the stakeholder's feedback and no further consultation is required.
Australian Maritime Safety Authority (AMSA)	AMSA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. AMSA responded on 7 February 2022 providing the following requests: 1. Please have the main vessel/s notify AMSA's Joint Rescue Coordination Centre (JRCC) for promulgation of radio-navigation warnings 24-48 hours before operations commence. AMSA's JRCC will require the vessel details (including name, call sign and Maritime Mobile Service Identity (MMSI)), satellite communications details (including INMARSAT-C and satellite telephone), area of operation, requested clearance from other vessels and need to be advised when operations start and end. 2. The Australian Hydrographic Office must be contacted through datacentre@hydro.gov.au no less than four working weeks before operations commence for the promulgation of related notices to mariners. AMSA also had the following queries on BHP's activities: 3. Does the outcome of the decommissioning result in an ongoing exclusion zone around the abandonment area and, if so, the total size of that area? 4. Does BHP's assessment of the environment also include other users of the area, i.e. the social and economic aspects such as shipping? BHP responded on 3 March 2022 addressing AMSAs expectations with respect to maritime safety information: 1. Notify AMSA's Joint Rescue Coordination Centre (JRCC) at least 24-48 hours before operations commence, in order to promulgate radio-navigation warnings. Notify JRCC when operations start and end. 2. Notify the AHO no less than four weeks before operations, with details relevant to the operations in order for the AHO promulgate the appropriate Notice to Mariners. BHP also advised it would provide updates to AHO and the JRCC on progress and any changes to intended operations, as well as ensure the appropriate exhibition of appropriate lights and shapes and will • Comply with the International Rules for Preventing Collisions at Sea • Ensure vessel navigation status is set correctly in the ship's AIS unit BHP provided the following responses with respect to exclusion zones and EP socio/economic assessment: 3. There is presently a 500-metre exclusion zone and a five nautical mile cautionary zone around the riser turret mooring. These exclusion zones will remain in place until decommissioning activities are complete and petroleum titles surrendered. The RTM and GEP may remain on navigational charts, with this requirement to be established with AHO at the appropriate time. 4. The Environment Plan for proposed activities includes an assessment of a range of environmental and social impacts within the Operational Area, as well as the environment that may be affected (EMBA) in the unlikely event of the worst-case hydrocarbon spill scenario identified as relevant to the activity. These socio-economic aspects include commercial fishing, traditional fishing, tourism and recreation, oil and gas activities, commercial shipping and defence. These assessments	Vessel activities are not proposed under the scope of this EP. Section 8.1 relates to the physical presence of infrastructure. Figure 5-11 includes vessel traffic plotting. BHP considers it has addressed the stakeholder's feedback and no further consultation is required.

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
	have been supported by consultation with stakeholders relevant to these activities and include relevant government departments, representative organisations, commercial fishing licence holders and marine tourism operators. With respect to marine traffic, there are no recognised shipping routes in or near the Operational Area, with the nearest shipping fairway designated by AMSA located over 80 km to the north-west. We would be happy to provide further details on these assessments if you have interest.	
Department of Agriculture, Water and the Environment (DAWE) – Biosecurity (vessels, aircraft and personnel)	DAWE was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received by DAWE at the time of submission of the EP. BHP has addressed matters relevant to DAWE's interests in the following section of the EP: No further consultation is required.
Department of Agriculture, Water and the Environment (DAWE) – Fisheries	DAWE was provided the Griffin Decommissioning Environment Plans Fact Sheet by email on 31 January 2022.	No response has been received by DAWE at the time of submission of the EP. No further consultation is required.
Department of Defence (DoD)	DoD was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received by DoD at the time of submission of the EP. BHP notes DoD's feedback from previous consultation on Griffin decommissioning activities as the operational area is within the North West Exercise Area. Vessel activities are not proposed under the scope of this EP, therefore there is no requirement to notify DoD. No further consultation is required.
Director of National Parks (DNP)	DNP was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. DNP responded on 16 February 2022 seeking clarification on activities to be managed under the EP. DNP also requested a list of equipment specifically being assessed to be abandoned *in situ* under this EP including a list of what is covered by 'selected equipment' and confirm whether the Riser Turret Mooring abandonment will be covered by a future EP. BHP responded on 21 February 2022, advising it had undertaken a single consultation activity with relevant stakeholders for the remaining scope of decommissioning of the Griffin Field and associated infrastructure, which includes the following activities: • Removing residual mercury contamination within the Gas Export Pipeline (GEP) • Abandoning the GEP *in situ* following verification of successful mercury removal and surveying • Abandoning *in situ* selected equipment in the Griffin Field • Constructing, operating and rehabilitating a temporary pumping and liquid storage area (onshore Western Australia). BHP also provided a list of equipment proposed to be left *in situ* in the Griffin Field. DNP responded on 25 February 2022 with the following response: 1. Based on the information sheet provided, we note that the planned activities do not overlap any Australian Marine Parks. You have noted that the operational area is approximately 59 km, 69 km, and 78 km from Ningaloo, Montebello, and Gascoyne marine parks respectively. Therefore, there are no authorisation requirements from the DNP. 2. Given the proximity to the Marine Parks however, activities undertaken may affect the values present in this Marine Park. Based on the map provided, we note that the following biologically important areas (BIAs) are present in the title area and parts of the operational area: • Turtle internesting buffer – flatback turtle • Seabird breeding – wedge-tailed shearwater • Foraging – whale shark • Migration – humpback whale • Distribution – pygmy blue whale 3. We also note that the Key Ecological Feature (KEF) of the Ningaloo Coast World Heritage Area is located nearby to the operational site. These BIAs and the KEF are identified values of the Ningaloo, Montebello and Gascoyne Marine Parks and it is expected that activities that could affect these BIAs are managed accordingly and factored into risk assessments. 4. To enable our consideration of the proposed activity and to identify any claims and objections we may have, we are seeking further detail in regards to the equipment expected to be left *in situ*. Please provide documentation relating to the assessment of options for the decommissioning of the equipment proposed to be left *in situ*, in particular the Riser Turret mooring, and the associated identification of risks to the environment across short, medium and long-term horizons. 5. Please note also that a Sea Dumping permit may be required for leaving equipment *in situ*. The responsible area's contact details can be found on the Department of Agriculture, Water and the Environment's website. Please be aware that engaging with this area of the Department is separate to the Director of National Parks. 6. To assist in the preparation of an EP for petroleum activities that may affect Australian marine parks, NOPSEMA has worked closely with Parks Australia to develop and publish a guidance note that outlines what titleholders need to consider and evaluate. In preparing the EP, you should consider the Australian marine parks and their representativeness. In the context of the management plan objectives and values, you should ensure that the EP:	BHP considers it has addressed the stakeholder's feedback and no further consultation is required. BIAs have been presented in Section 5.5.2. Australian Marine Parks have been presented in Section 5.4.4. Vessel activities are not proposed under the scope of this EP.

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
	• identifies and manages all impacts and risks on Australian marine park values (including ecosystem values) to an acceptable level and has considered all options to avoid or reduce them to as low as reasonably practicable. • clearly demonstrates that the activity will not be inconsistent with the management plan. 7. The North-west Marine Parks Network Management Plan 2018 (management plan) came into effect on 1 July 2018 and provides further information on values for Ningaloo, Montebello, and Gascoyne marine parks. Australian marine park values are broadly defined into four categories: natural (including ecosystems), cultural, heritage and socio-economic. Information on the values for the marine parks is also located on the Australian Marine Parks Science Atlas. 8. Emergency responses: The DNP should be made aware of oil/gas pollution incidences which occur within 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. The notification should include: • titleholder details • time and location of the incident (including name of marine park likely to be affected) • proposed response arrangements as per the Oil Pollution Emergency Plan (e.g. dispersant, containment, etc.) • confirmation of providing access to relevant monitoring and evaluation reports when available; and • contact details for the response coordinator. Note that the DNP may request daily or weekly Situation Reports, depending on the scale and severity of the pollution incident. BHP responded on 3 March 2022 with the following response: 1. Acknowledging DNP's confirmation that the proposed activities do not overlap an Australian Marine Park and that no authorisations were required from the DNP. 2. BHP noted DNP's comments on the presence of BIA's confirmed those BIAs that had been identified and assessed in the EP were: • Turtle internesting buffer – flatback turtle • Seabird breeding – wedge-tailed shearwater • Foraging – whale shark • Migration – humpback whale • Distribution – pygmy blue whale 3. The operational area overlaps one key ecological feature (KEF), the Ancient coastline at 125 m depth contour. 4. BHP provided a summary of infrastructure proposed to be left *in situ*, assessment options and assessment criteria. Of the feasible decommissioning options, BHP's preferred option is removal of contaminants (where applicable) and abandonment *in situ*. BHP confirmed that the options represent the best safety outcomes and preserve the environment that has developed on and around the equipment, minimising disturbance to other users. 5. BHP confirmed it is progressing is progressing discussions with DAWE on the implications for sea dumping permissions for infrastructure proposed to be left *in situ*. 6. BHP noted DNP's provision of its guidance note for the preparation EPs for activities that may impact Australian marine parks and that the EP should: • identify and manage all impacts and risks on Australian marine park values (including ecosystem values) to an acceptable level and consider all options to avoid or reduce them to as low as reasonably practicable • demonstrate that the activity will not be inconsistent with the North-west Marine Parks Network Management Plan 2018. 7. BHP advised DNP it did not anticipate that planned activities will impact the nearest marine parks (Ningaloo, Montebello and Gascoyne marine parks), given their distance from Production Licences WA-10-L and WA-12-L. BHP also confirmed that it had referenced the North-west Marine Parks Network Management Plan 2018 in the planning the EP, as well as the Australian Marine Parks Science Atlas as a source of information on the values for the marine parks. 8. Emergency responses: BHP noted DNPs expectations for notification in the event of a marine pollution occurring within a marine park or is likely to impact on a marine park, and had included DNP contact details in its stakeholder notification matrix in Section 12 of the EP.	
Department of Industry, Science, Energy and Resources (DISER)	DISER was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
State Government Departments		
Department of Biodiversity, Conservation and Attractions (DBCA)	DBCA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. DBCA was sent a reminder email on 14 February 2022 with an invitation to provide feedback. DBCA responded on 15 February 2022 and advised it had no comments on proposed activities in relation to its responsibilities under the *Conservation and Land Management Act 1984* and *Biodiversity Conservation Act 2016.*	BHP considers it has addressed the stakeholder's feedback and no further consultation is required.

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
Department of Mines, Industry Regulation and Safety (DMIRS)	DMIRS was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. DMIRS responded 23 February 2022 advising it would assess the notification and would respond within a target assessment timeframe of 30 calendar days. DMIRS responded on 28 February 2022 with the following response: 1. DMIRS acknowledged that the proposed activity will be assessed under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 and regulated by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). 2. DMIRS had reviewed the consultation information and did not require further information at this stage 3. DMIRS requested pre-start and cessation of activity notifications 4. DMIRS requested that BHP ensure the EP include: a. Information about the reporting of environmental incidents that could potentially impact on any land or water in State jurisdiction. b. DMIRS contact details for any required notifications or reports. 5. Proposed petroleum activities in State lands and waters will be assessed by DMIRS following submission of an associated Environment Plan. BHP responded on 6 December 2021 with the following response: 1. BHP noted DMIRS acknowledgement that the EP would be assessed by NOPSEMA 2. BHP noted DMIRS required no further information 3. BHP confirmed it would notify DMIRS prior to and following the cessation of activities 4. BHP confirmed the EP would include information about the reporting of environmental incidents that could potentially impact on any land or water in State jurisdiction, including requested contact details for DMIRS. 5. BHP notes that feedback on State waters EPs are outside the scope of this EP.	Vessel activities are not proposed under the scope of this EP. No spill response is therefore within the scope of this EP.
Department of Primary Industries and Regional Development (DPIRD)	DPIRD was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received by DPIRD at the time of submission of the EP. Vessel activities are not proposed under the scope of this EP.
Department of Transport (DoT)	DoT was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. DoT responded on 31 January 2022 acknowledging receipt of BHP's advice. DoT responded on 7 February 2022 with the following response: 1. If there is a risk of a spill impacting State waters from the activity, please ensure that the Department of Transport is consulted as outlined in the Department of Transport Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (July 2020).	Vessel activities are not proposed under the scope of this EP. No spill response is therefore within the scope of this EP.
Ningaloo Coast World Heritage Advisory Committee (NCWHAC)	NCWHAC was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Fishing Bodies / Industry Representative Organisations		
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	ASBTIA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. ASBTIA was sent a reminder email on 14 February 2022 with an invitation to provide feedback.	No response has been received from ASBTIA at the time of submission of the EP. Section 8.1 relates to the physical presence of vessels and infrastructure and includes impacts to fisheries. BHP will address any comments from this stakeholder should they arise in the future.
Commonwealth Fisheries Association (CFA)	CFA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. CFA was sent a reminder email on 14 February 2022 with an invitation to provide feedback.	No response has been received from CFA at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Marine Tourism WA	MTWA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. MTWA was sent a reminder email on 14 February 2022 with an invitation to provide feedback.	No response has been received from Marine Tourism WA at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Pearl Producers Association (PPA)	PPA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. PPA was sent a reminder email on 14 February 2022 with an invitation to provide feedback.	No response has been received from PPA at the time of submission of the EP. Section 8.1 relates to the physical presence of vessels and infrastructure and includes impacts to fisheries. BHP will address any comments from this stakeholder should they arise in the future.

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
Recfishwest	Recfishwest was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. Recfishwest responded on 23 February and providing the following feedback: 1. Recfishwest provided an overview of recreational fishing activities in the Gascoyne and Pilbara regions, noting its importance to regional communities and economies. 2. Recfishwest provided comment on opportunities for healthy and resilient marine ecosystems through the creation and retention of key marine habitats from artificial reefs. Recfishwest also provided information on its experience in how marine infrastructure can benefit the environment, fishing experiences and communities. 3. Recfishwest advised while it supported retaining marine infrastructure on the principle that these structures provide important ecosystem services and overall environmental benefit, its support for such projects were dependent on five reefing principles. Recfishwest added that it did not object with the steps being taken by BHP to address concerns that the recreational fishing sector might have. 4. Recfishwest also added that abandoned infrastructure should be augmented with purpose-built concrete artificial reef modules, particularly in the section commencing in line with Ashburton Island to Commonwealth waters. This would ensure minimum productive volume required for ecological productivity of the marine communities associated with the equipment. In addition, it would increase the social and economic benefits to the local communities of Exmouth and Onslow through increased fishing opportunities. 5. Recfishwest requested further updates on the progress on these decommissioning activities, so it can make sure its constituents are well aware of any planned activities that are due to take place in the area. 6. Additionally, Recfishwest requested to be consulted on any upcoming offshore decommissioning activities, irrespective of the distance from shore and that all charts are updated, so recreational fishers can locate the structure. BHP responded on 2 March 2022 and provided the following response: 1. BHP noted the information provided on recreational fishing in the Gascoyne/Pilbara, including its contribution to economic and social well-being of regional communities. 2. BHP also noted Recfishwest's comments on the proximity of the Griffin Field to fishing grounds, as well as opportunities for artificial reefs or alternative decommissioning strategies that can be achieved from the decommissioning of oil and gas infrastructure, in turn creating healthy and resilient marine ecosystems through the creation and retention of key marine habitats. BHP advised it had considered a number of decommissioning options for the Griffin Field, and sought feedback from a broad range of stakeholders through an independently facilitated Comparative Assessment process in 2021 as part of decision-making for the proposed end-state of the Griffin Field. BHP advised it had since progressively engaged stakeholders on our plans for decommissioning by way of meetings with regional communities, and stakeholders with interests in commercial and recreational fishing, and marine tourism. These discussions also include consultation activities for Environment Plan approvals to undertake specific activities, including the provision of information to Exmouth, Onslow and Dampier-based fishing clubs. 3. BHP noted Recfishwest's positon on its expectations for supporting reefing opportunities, including its five key principles, and that Recfishwest does not object with the steps being taken by BHP to address concerns that the recreational fishing sector might have with respect to environmental safety and benefits. 4. BHP acknowledged that Recfishwest's preference for structure augmentation. BHP advised it approaches decommissioning on a case-by-case basis. On this occasion, augmentation was not progressed as an option for the pipeline due to its length and complexity of regulatory permissioning. 5. BHP noted Recfishwest's request to receive further updates on the progress on these decommissioning activities, so its constituents are aware of planned activities that are due to take place in the area. 6. BHP also noted Recfishwest's request to be consulted on future offshore decommissioning activities and that the location of infrastructure left *in situ* will be maintained on nautical charts.	BHP notes Recfishwest's feedback that it did not object to proposed activities and its requests to keep updated on decommissioning of the Griffin Field. BHP will continue to consult Recfishwest on future offshore decommissioning activities and the location of infrastructure left *in situ*. BHP also notes Recfishwest's general comments on economic and community benefits of recreational fishing, opportunities and principles for artificial reefing, its preference for augmentation and request to be consulted on other BHP decommissioning activities. Section 8.1 relates to the physical presence of vessels and infrastructure and includes impacts to fisheries.
Tuna Australia	Tuna Australia was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. Tuna Australia was sent a reminder email on 14 February 2022 with an invitation to provide feedback. Tuna Australia responded on 21 February 2022, advising it had no objections proposed activities, as its members did not currently fishing in the areas identified in the activity overview.	BHPs notes advice and from Tuna Australia and no further consultation is required. Section 8.1 relates to the physical presence of vessels and infrastructure and includes impacts to fisheries.
Western Australian Fishing Industry Council (WAFIC)	WAFIC was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. WAFIC responded on 10 February and requested the following information, following receipt of which WAFIC would provide a formal response: • Images of the proposed infrastructure that is expected to remain *in situ* • The estimated final footprint, including what navigational safety are expected following decommissioning activities. • Confirmation if any plastic type material is proposed to be left *in situ* BHP responded on 16 February 2022 by way of a phone call and an email with a presentation covering the proposed decommissioning activities and requested a meeting.	BHP has responded to WAFIC's request for information and considers it has addressed the stakeholder's feedback. BHP will continue to consult with WAFIC on the proposed decommissioning.

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
	WAFIC responded on 3 March 2022 requesting an assessment of fisheries interaction for proposed activities. BHP responded on 4 March 2022, providing an assessment of the likelihood of fisher interaction (Commonwealth and State-managed fisheries) in the Operational Area and the Environment that May be Affected (EMBA) for Griffin decommissioning activities. WAFIC responded on 18 March 2022 requesting final footprint areas for equipment above the seabed and provided information on the fisheries assessment for future consideration. BHP responded on 28 March 2022 providing the requested footprint areas.	
Commercial Fisheries – State Managed		
Onslow Prawn Managed Fishery Pilbara Fish Trawl Interim Managed Fishery Pilbara Line Fishery Pilbara Trap Managed Fishery	Licence holders were provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by letter/email on 31 January 2022. Licence holders were sent a reminder letter/email on 14 February 2022 with an invitation to provide feedback.	No response has been received from State managed fishery licence holders at the time of submission of the EP. Section 8.1 relates to the physical presence of vessels and infrastructure and includes impacts to fisheries. BHP will address any comments from this stakeholder should they arise in the future.
Other stakeholders		
Local Government • Shire of Ashburton (SoA) • Shire of Exmouth (SoE)	SoA and SoE were provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. SoA responded on 2 February 2022 advising that BHPs consultation email had been forwarded to the Shire's Waste Team for response, noting that the Shire's C4 land site was a primary opportunity for managing waste streams. SoA was sent a reminder email on 4 March 2022 with an invitation for the Waste Team to provide feedback.	BHP notes initial feedback and will address any comments from SoA or SoE should they arise in the future.
Community Reference Groups (CRGs) • Exmouth Community Reference Group • Onslow Community Reference Group	The latest Exmouth CRG meeting was held on 4 October 2021 and included an overview of BHP's proposed Griffin activities. An Exmouth CRG meeting was scheduled for March 2022, but has been cancelled due to COVID. Exmouth and Onslow CRGs were provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received from the Exmouth and Onslow CRGs at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Indigenous • Buurabalayji Thalanyji Aboriginal Corporation (BTAC)	BTAC was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 4 November 2021.	No response has been received from BTAC at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Industry • Exmouth Chamber of Commerce and Industry (ECCI) • Onslow Chamber of Commerce and Industry (OCCI)	ECCI and OCCI were provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received from the ECCI or OCCI at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future
Fishing clubs • King Bay Fishing Club (Dampier) • Nickol Bay Fishing Club (Dampier) • Ashburton Anglers (Onslow) • Exmouth game Fishing Club (Exmouth)	Dampier, Onslow and Exmouth-based fishing clubs were provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. Ashburton Anglers responded on 11 February 2022 endorsing BHP's proposal to: 1. Remove contaminants and leave the GEP *in situ*. 2. Remove contaminants and leave as much of the Griffin Field infrastructure as possible. Ashburton Anglers also noted this feedback was consistent with its original feedback at the start of the decommissioning process. BHP responded to Ashburton Anglers on 23 February 2022, noting its feedback. Dampier and Exmouth-based fishing clubs were sent a reminder email on 14 February 2022 with an invitation to provide feedback.	BHP notes feedback from Ashburton Anglers and considers it has addressed the stakeholder's feedback and no further consultation is required. BHP will address any comments from Dampier and Exmouth fishing clubs should they arise in the future.
Charter Boat / Marine Tourism Operators • Dampier • Onslow • Exmouth	Dampier, Onslow and Exmouth-based charter boat / marine tourism operators were provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022. Dampier, Onslow and Exmouth-based charter boat / marine tourism operators were sent a reminder email on 14 February 2022 with an invitation to provide feedback.	No response has been received from State managed fishery licence holders at the time of submission of the EP. Section 8.1 relates to the physical presence of vessels and infrastructure and includes impacts to fisheries. BHP will address any comments from this stakeholder should they arise in the future.

Organisation	Summary of Stakeholder and Titleholder Correspondence, and Any Objections and Claims Made	Assessment of Stakeholder Objections and Claims
	• A Dampier-based operator advised that areas BHP mentioned do not interfere with its operations and have no objection on what you BHP is proposing. BHP acknowledged the stakeholder's feedback on 3 March 2022.	
Cape Conservation Group (CCG)	The CCG was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received from CCG at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Australian Maritime Oil Spill Centre (AMOSC)	AMOSC was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received from AMOSC at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.
Centre of Decommissioning Australia (CODA)	CODA was provided the Griffin Decommissioning Environment Plans Fact Sheet (Appendix E) by email on 31 January 2022.	No response has been received from CODA at the time of submission of the EP. BHP will address any comments from this stakeholder should they arise in the future.

6.2 Ongoing Consultation

Stakeholder consultation will be ongoing, and BHP will work with stakeholders to address any future concerns if they arise throughout the validity of this EP. Should any new stakeholders be identified, they will be added to the stakeholder database and included in all future correspondence as required.

BHP's commitments to ongoing consultation include:

- Continued quarterly Exmouth and Onslow CRG meetings.
- Responding in a timely manner to all stakeholder and community contact regarding the proposed Griffin decommissioning activities.
- Stakeholders who raise objections and claims following EP submission will be responded to directly, and should any concerns raised have not already been addressed in the EP, these will be assessed in the same manner as all risks identified by BHP.

7 BHP Environmental Risk Management Framework

BHP has established a risk management governance framework with supporting processes and performance requirements that provide an overarching and consistent approach for identifying, assessing, and managing risks. BHP Policies have been formulated to comply with the intent of the Risk Management Policy and are consistent with the AS/ISO 31000-2009 Risk Management Principles and Guidance.

An integrated risk assessment and impact process is used to identify the most appropriate management strategy and relevant controls to reduce impacts and risks from planned (routine and non-routine) activities and unplanned (accidents/incidents) events to as low as reasonably practicable (ALARP) and acceptable levels (Figure 7-1). The process includes incorporating historic stakeholder and legal and environmental monitoring data for the relevant environmental impacts.

7.1 Evaluation of Impacts and Risks

The primary objective of the impact and risk assessment is to demonstrate that the identified impacts and risks associated with the petroleum activity (Section 3) are reduced to ALARP and are of an acceptable level to BHP. An environment hazard identification (ENVID) workshop was conducted in February 2022 to support the impact and risk assessment and involved participants from the BHP HSE, projects and engineering departments and specialist environmental consultants.

The impact and risk assessment process is illustrated in Figure 7-1 and considers planned (routine and non-routine) activities, unplanned (accidents/incidents) events and emergency conditions. The process includes:

- confirming the sources of hazards for the planned activities and unplanned events
- identifying environmental impact and risk receptors
- analysing environmental impact and risk receptors
- identifying potential controls to reduce the impacts and risks
- allocating a likelihood rating for all unplanned events
- allocating a severity rating for all planned activities and unplanned events
- accepting controls through an ALARP process
- assessing final acceptability of the risks and impacts using the BHP acceptability criteria.

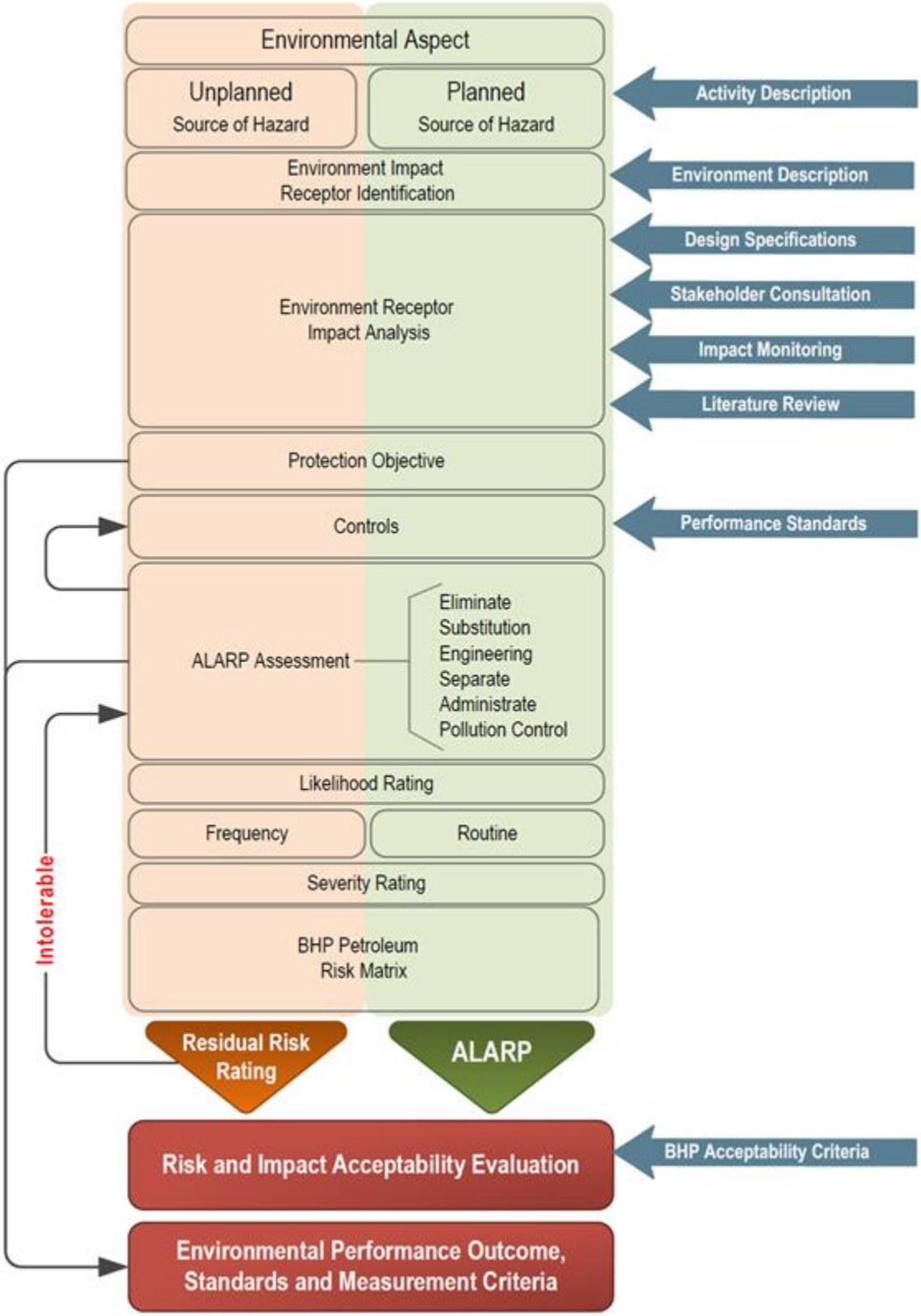

Figure 7-1: Environment Plan Integrated Impact and Risk Assessment Process

7.1.1 Decision Context

Consistent with the United Kingdom Offshore Operators Association Framework for Risk-Related Decision Support (Oil & Gas UK, 2014), BHP has applied decision criteria to determine whether impacts and risks created during the petroleum activity constitute 'lower-order' or 'higher-order' impacts and risks, and subsequently how each are managed to ALARP (Section 7.2) and acceptable levels (Section 7.3). This approach implies a level of proportionality wherein the principles of decision-making applied to each particular hazard are proportionate to the acceptability of environmental risk of that hazard.

BHP considers lower-order (or 'Type A') impacts or risks as those that:

- are well understood
- are derived from standard, non-complex, or routine operations familiar to BHP
- there are clearly defined regulatory, corporate or industry (good practice) controls to manage the impact or risk
- have no concerns or objections from relevant stakeholders
- have a 'severity level' for planned operations (impacts) and unplanned events (risks) that does not exceed '2' based upon the BHP severity level definition (Figure 7-3)
- have a 'likelihood' for unplanned events that is either 'unlikely' or 'highly unlikely' based upon the BHP likelihood definitions (Figure 7-4).

BHP considers higher-order (or 'Type B') impacts or risks as those that:

- are not well understood or there is some uncertainty
- are derived from complex operations not routinely performed by BHP
- have regulatory, corporate or industry (good practice) controls that require additional definition or validation
- have had some concerns or objections raised by relevant stakeholders
- have a 'severity level' for planned operations (impacts) and unplanned events (risks) that is '3' based upon the BHP severity level definition (Figure 7-3)
- have a 'likelihood' for unplanned events that is considered 'probable' to 'highly likely' based upon the BHP likelihood definitions (Figure 7-4).

BHP considers highest-order (or 'Type C') impacts or risks as those that:

- are not understood or there is a high degree of uncertainty
- are derived from operations not previously performed by BHP
- have corporate or industry (good practice) controls that either do not exist or are insufficient to manage impacts or risks
- have had multiple concerns or objections raised by relevant stakeholders or lobby groups
- have a 'severity level' for planned operations (impacts) and unplanned events (risks) that is equal to or exceeds '4' based upon the BHP severity level definition (Figure 7-3)
- have a 'likelihood' for unplanned events that is considered 'probable' to 'highly likely' based upon the BHP likelihood definitions (Figure 7-4).

The decision-making principles described above are consistent with the precautionary principle (as defined in the EPBC Act) and provide assurance that the environmental impacts and risks are reduced to ALARP and of an acceptable level.

7.1.2 Environmental Impact Analysis

The environmental impact analysis is based on the environmental receptors identified in Section 5. Impact and risk descriptions are developed in an initial screening process that identifies the specific receptor that may be impacted. Quantitative or qualitative definition of the impact and risk may be completed to ensure an understanding of and to confirm the severity of the risk and impact.

7.1.3 Planned Activity Assessment

All planned activities were assessed as being a routine impact and defined as such in the ENVID. The description and degree of impact formed the basis for the severity rating applied, with a quantitative assessment of impact conducted where possible to ensure the impact was well understood and clearly categorised on the severity table. Where this was not possible, a robust qualitative assessment was completed and the severity rating assigned during the ENVID process in accordance with the BHP HSE Risk Matrix, which is consistent with the BHP Our Requirements Risk Management Severity Table (Figure 7-3), taking into account any of the mitigative controls assigned. Given routine operations are planned, and impacts are mitigated by applying control measures, likelihood or residual risk ratings were not applied.

7.1.4 Unplanned Event Risk Assessment

Risk ranking of an unplanned event is the product of the consequence of an event (the severity) and the likelihood of that event occurring.

Likelihood and potential severity ratings were assigned in accordance with the BHP HSE Risk Matrix PHSE-03-PO1 (Figure 7-2), which allowed the risk of individual events to be categorised in a methodical and structured process. This was completed based upon judgement by the ENVID assessment team, with detailed potential impact descriptions used to ensure a robust and comprehensive decision.

The likelihood rating was based on the frequency of the source of hazard occurring with all preventative controls taken into consideration.

The potential severity rating was determined based on the potential impact that may occur once the source of hazard had occurred, considering any mitigative controls in place to reduce the impact.

Likelihood	Severity Level				
	1	2	3	4	5
Highly Likely	30	90	300	900	3000
Likely	10	30	100	300	1000
Probable	3	9	30	90	300
Unlikely	1	3	10	30	100
Highly Unlikely	0.3	0.9	3	9	30

Figure 7-2: BHP Risk Matrix

Severity Page #11	Descriptor	Severity Factor
5	6 or more fatalities or 6 or more life shortening illnesses; or Severe impact to the environment and where recovery of ecosystem function takes 10 years or more; or Severe impact on community lasting more than 12 months or a substantiated human rights violation impacting 6 or more people; or Severe impact on company reputation, investment attractiveness, legal rights or compliance, social value proposition or ability to access opportunities at a global level; or US$2 billion or more[2].	1000
4	1-5 fatalities or 1-5 life shortening illnesses; or Serious impact to the environment, where recovery of ecosystem function takes between 3 and up to 10 years; or Serious impact on community lasting 6-12 months or a substantiated human rights violation impacting 1-5 persons; or Serious impact on company reputation, investment attractiveness, legal rights or compliance, social value proposition or ability to access opportunities at a national level; or Between US$250 million and up to US$2 billion[2].	300
3	Life altering or long term/permanent disabling injury or illness to one or more persons; or Substantial impact to the environment, where recovery of ecosystem function takes between 1 and up to 3 years; or Substantial impact on community lasting 2-6 months; or Substantial impact on company reputation, legal rights or compliance, social value proposition, or ability to access opportunities at a sub national level (state, territory, province); or Between US$50 million and up to US$250 million[2].	100
2	Non-life altering or short-term disabling injury or illness to one or more persons; or Measureable but limited impact to the environment, where recovery of ecosystem function takes less than 1 year; or Measureable but limited community impact lasting less than one month; or Measureable but limited impact on company reputation, legal rights or compliance, or social value proposition at a local level (region, city, town); or Between US$2 million and up to US$50 million[2].	30
1	Low level impact resulting in first aid only; or Minor, temporary impact to the environment, where the ecosystem recovers with little intervention; or Minor, temporary community impact that recovers with little intervention; or Minor, temporary impact on company reputation, legal rights or compliance, or social value proposition; or Less than US$2 million[2].	10

Figure 7-3: BHP Severity Level Definitions

Uncertainty	Frequency	Likelihood factor
Highly Likely	Likely to occur within a 1 year period.	**3**
Likely	Likely to occur within a 1 - 5 year period.	**1**
Probable	Likely to occur within a 5 - 20 year period.	**0.3**
Unlikely	Likely to occur within a 20 - 50 year period.	**0.1**
Highly Unlikely	Not likely to occur within a 50 year period.	**0.03**

Figure 7-4: BHP Likelihood Definitions

7.2 Demonstration of As Low As Reasonably Practicable

Regulation 10A(b) of the Environment Regulations requires demonstration that the environmental impacts and risks of the activity will be reduced to ALARP.

7.2.1 Planned Activity and Unplanned Event As Low As Reasonably Practicable Evaluation

This section details the process for demonstrating ALARP for both planned routine operations and unplanned events.

Demonstrating ALARP for lower-order ('Type A') impacts or risks

When an impact or risk has been evaluated as 'lower-order' based upon the Decision Context detailed in Section 7.1.1, and identified regulatory, corporate and industry good practice controls are implemented, BHP considers the impact or risk to be managed to ALARP and no further detailed engineering evaluation of controls is required. The application of feasible and readily implementable alternate, additional or improved controls may be adopted opportunistically when demonstrated to further reduce potential environmental impacts or risks.

Demonstrating ALARP for higher-order ('Type B') impacts or risks

When an impact or risk has been evaluated as higher order based upon the Decision Context detailed in Section 7.1.1, in addition to relevant regulatory, corporate and industry good practice controls being implemented, alternate, additional or improved controls should be proposed and evaluated according to their feasibility, reasonableness and practicability to implement to further reduce the potential for impacts and risks associated with the petroleum activity. BHP applies a cost and benefit analysis when evaluating additional controls and applies those that are both feasible and where the cost (safety, time, effort and financial) are not grossly disproportionate to the potential reduction in environmental impact or risk afforded by the control.

Demonstrating ALARP for highest-order ('Type C') impacts or risks

When an impact or risk has been evaluated as highest-order based upon the Decision Context detailed in Section 7.1.1, alternate, additional or improved controls over and above relevant regulatory, corporate and industry good practice must be proposed and evaluated based upon a precautionary approach, ensuring any and all feasible controls that have the potential to reduce environmental impacts and risks are implemented, when safe to do so and irrespective of the additional effort, time or financial cost associated with implementing the control.

When evaluating additional controls for 'Type B' and 'Type C' impacts and risks, BHP has applied the hierarchy of controls as defined below and illustrated in Figure 7-5:

- Eliminate – Remove the source preventing the impact; in other words, eliminate the hazard.
- Substitution – Replace the source preventing the impact.
- Engineer – Introduce engineering controls to prevent or control the source having an impact.

- Separate – Separate the source from the receptor preventing impact.
- Administrate – Procedures, competency and training implemented to minimise the source causing an impact.
- Pollution Control – Implement a pollution control system to reduce the impact.
- Contingency Planning – Mitigate control reducing the impact.
- Monitor – Program or system used to monitor the impact over time.

The general preference is to accept controls that are ranked in the Tier 1 categories of Eliminate, Substitute, Engineer and Separate as these controls provide a preventive means of reducing the likelihood of the hazard occurring over and above Tier 2 controls.

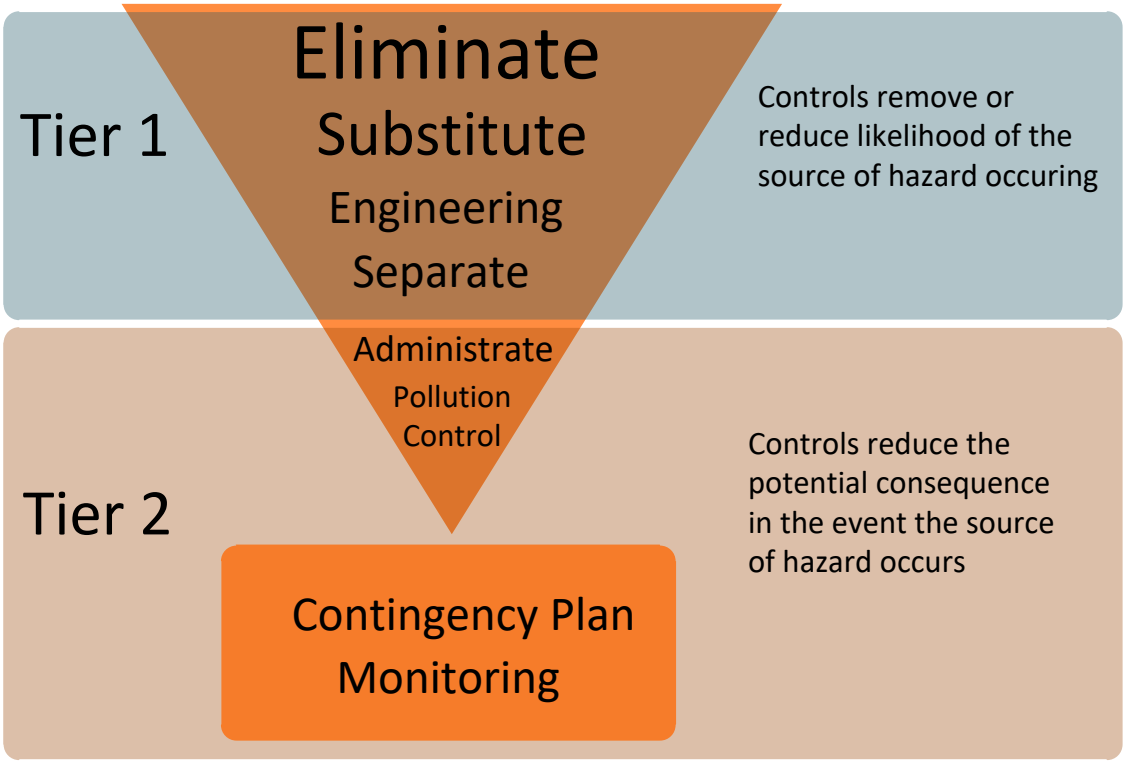

Figure 7-5: Hierarchy of Control Framework

7.3 Demonstration of Acceptability

Regulation 10A(c) of the Environment Regulations requires demonstration that the environmental impacts and risks of the activity will be of an acceptable (tolerable) level.

The demonstration of acceptability is completed independently of the ALARP evaluation described above. However, as with the demonstration of ALARP, the demonstration of acceptability detailed below applies the decision-making principles described in Section 7.1.1, ensuring consistency with the precautionary principle when considering the acceptable levels of impact and risk caused by the activity.

Demonstrating acceptability for lower-order ('Type A') and higher-order ('Type B') impacts or risks

When an impact or risk has been evaluated as 'lower-order' or 'higher-order' based upon the Decision Context detailed in Section 7.1.1, acceptability of the impact or risk is evaluated based upon the following criteria:

- Relevant regulatory, corporate and industry good practice controls have been identified and implemented, including consideration of relevant actions prescribed in recovery plans and approved conservation.

- The activity does not contravene any relevant Plan of Management for a World Heritage place, National Heritage place or Ramsar wetland identified within the EMBA.
- Any alternate, additional or improved controls adopted via the detailed engineering risk assessment have been or will be implemented to manage potential impacts and risks to ALARP.
- There are either no objections or claims made by relevant stakeholders for the aspect of the activity being assessed, or any objections or claims received from relevant stakeholders are assessed for merit and controls adopted to address the objections or claims where merited.
- Where industry good practice cannot be adopted, professional judgement made by subject matter experts have been used to evaluate the acceptability of potential environmental impact or risk based upon adoption of alternate, additional or improved controls identified during detailed engineering risk assessment.
- Consideration of relevant actions prescribed in listed species recovery plans, conservation advice and threat abatement plans have informed the development of control measures.
- The application of adopted controls clearly indicates the aspect-specific EPOs can be achieved.
- The proposed impact is consistent with the principles of Ecologically Sustainable Development (ESD) (as defined in Section 3A of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)), including:
  - Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the 'integration principle')
  - If there are threat of serious or irreversible damage lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle')
  - The principle of intergenerational equity- that the present generation should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'intergenerational principle')
  - The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making ('the biodiversity principle').

Demonstrating acceptability for highest-order ('Type C') impacts or risks

When an impact or risk has been evaluated as 'highest-order' based upon the Decision Context detailed in Section 7.1.1, the potential environmental impact or risk can only be deemed acceptable once the criteria for 'Type B' demonstration of acceptability detailed above has been met and:

- any alternate, additional or improved controls adopted via implementing a precautionary approach can demonstrate residual impacts have been lowered, such that a severity level of '4' becomes 'unlikely' or the severity level of '5' becomes 'highly unlikely' based upon the BHP Risk Matrix (Figure 7-2).

7.4 Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

Regulation 10A(d) of the Environment Regulations requires the EP provides appropriate EPOs, environmental performance standards (EPSs) and measurement criteria (MC).

An objective of the EP is to ensure all activities are performed in accordance with appropriate EPSs, thus ensuring EPOs are achieved. This requires (among other things) appropriate measurement criteria for demonstrating the EPSs have been met as defined within the EP.

Establishing EPOs and EPSs involves a process of taking into account legal requirements and the environmental risks (described in the risk assessment presented in Section 8), and considering available control options (Section 8), and the views of interested parties (Section 6). The resulting outcomes and standards must be measurable where practicable and consistent with the BHP Charter.

7.4.1 Environmental Performance Outcomes

EPOs are developed to ensure protection of the environment from the impact or risk and to ensure ongoing performance and measurability of the controls. These were developed using the below criteria:

- Be specific to the source of the hazard.
- Indicate how the environmental impact will be managed (for example, minimise or prevent).
- Contain a statement of measurable performance (where applicable).
- Contain a timeframe for action (where applicable).
- Be consistent with legislative and HSE requirements.

7.4.2 Environmental Performance Standards

An EPS is a statement of performance required from a control measure (a system, an item of equipment, a procedure or functional responsibility (person)), which is used as a basis for managing environmental impact and risk, for the duration of the activity.

There is a specific link between the EPOs, the EPSs and control measures; each EPO has one or more standards defining the performance requirement that needs to be met by a control measure to meet the EPO.

EPSs detailed within this EP are specific, measurable and achievable.

7.4.3 Environmental Measurement Criteria

MCs have been assigned for each EPS as a means of validating that each EPO and EPS will be or has been met throughout the duration of the petroleum activity, thus continually reducing environmental impacts and risks to ALARP and acceptable levels.

All MCs are designed to be inspected or audited via compliance assurance activities and enable a traceable record of performance to be maintained.

EPOs, EPSs and MCs, both in relation to planned activities and unplanned events, have been detailed throughout Section 8.

EPOs, EPSs and MCs relating to Incident Management Team (IMT) capability and competency are detailed within the APU Incident Management Team Capability Assessment (AOHSE-ER-0071).

8 Environmental Risk Assessment and Evaluation

The purpose of this section is to address the requirements of Regulations 13(5) and 13(6) of the Environment Regulations by assessing and evaluating all the identified impacts and risks associated with the petroleum activity and associated control measures that will be applied to reduce the impacts and risks to an ALARP and an acceptable level.

Table 8-1 summarises the impact analysis for the aspects associated with the planned activities. A comprehensive risk and impact assessment for each of the planned activities, and subsequent control measures proposed by BHP to reduce the impacts and risks to ALARP and acceptable levels, are detailed in the subsections.

Table 8-1: Summary of the Environmental Impact Analysis for Planned Activities

Activity		Environmental								Socio-Economic				Risk Assessment & Evaluation			
		Marine Mammals	Marine Turtles	Fish	Seabirds/ Shorebirds	Seabed	Water Quality	Marine Protected Areas	Key Ecological Features	Commercial Fisheries	Shipping Activities	Tourism / Recreation	Air Quality	Severity Factor	Likelihood Factor	Residual Risk	Acceptability
Planned Activities																	
8.1	**Physical Presence – interaction with other users**																
	Presence of subsea infrastructure									x	x			10	N/A	-	Tolerable
8.2	**Seabed Disturbance from Subsea Infrastructure**																
	Long-term physical presence of the subsea infrastructure on the seabed					x								10	N/A	-	Tolerable
8.3	**Subsea Contamination from Subsea Infrastructure Breakdown**																
	Steel released during the breakdown of subsea infrastructure (RTM, anchors) / RTM lower compartment					x								10	N/A	-	Tolerable
	Concrete/cement released during the breakdown of subsea infrastructure (gravity bases, PLEM pile foundation)					x								10	N/A	-	Tolerable
	Iron ballast released during the breakdown of RTM lower compartment					x								10	N/A	-	Tolerable
	Epoxy coating released during the breakdown of subsea infrastructure / RTM lower compartment					x								10	N/A	-	Tolerable

8.1 Physical Presence – Interaction with Other Users (Planned and Unplanned)

8.1.1 Summary of Risk Assessment and Evaluation

Aspect	Source of Hazard	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability
Physical Presence – Interaction with other users	Presence of subsea infrastructure (decommissioning RTM lower compartment *in situ*)	Interaction with other marine users (such as commercial fishing or other third-party vessels).	10	N/A	-	Type A Low Order Impact	Tolerable

8.1.2 Source of Hazard

The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria.

As a worst case the lower compartment (Compartment 1: Ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP. The lower compartment dimensions are provided in Table 4-7 and weights of materials are provided in Table 4-8.

The RTM lower compartment on its side will protrude 6 m above the seabed. All other subsea infrastructure within the scope of this EP does not protrude above the seabed and is therefore not considered a credible hazard to other users such as trawling vessels.

The long-term physical presence the RTM lower compartment on the seabed, presents the possibility of unplanned interactions with other marine users, including commercial shipping and commercial fishing. The worst case event is determined to be a commercial fishing vessel snagging fishing equipment on the RTM lower compartment. Should snagging incidents occur with oil and gas infrastructure such as the RTM, it may result in disruption to fishing operations and financial loss (through loss of catch or damage to fishing equipment). Vessel damage or loss has occurred in less than 0.5% of snagging events and one vessel capsize in the UK between 1989 and 2016 (Rouse, 2020), however capsize is likely the result of attempts to release the snag.

Trawl fishery vessels are equipped with navigational equipment such as echo sounders and Geographical Positioning System (GPS) plotters, which enables them to detect and avoid infrastructure on the seabed. Therefore, makes the snagging events highly unlikely. Historical fishing vessel incident data from the AMSA Monthly Domestic Vessel Incident Reporting Database (2018-2021) and the Australian Transport Safety Bureau (ATSB) Marine Safety Investigation reports, show there were no reported fishing vessel incidents related to offshore oil and gas infrastructure in Australia. Internationally, production infrastructure has been involved in 4% of incidents over the same period (Rouse, 2020). The likelihood of interactions between trawl equipment and oil and gas infrastructure has been reducing over time as a result of an increase in communication between the oil and gas industry and improvement in fishery GPS equipment (Rouse, 2020).

8.1.3 Environmental Impact Assessment

Commercial Fishing

Several State and Commonwealth-managed commercial fisheries have boundaries that overlap the operational area and whilst fishing effort is low, the State managed Pilbara Line Fishery have recently recorded fishing effort (Section 5.6.1). The field subsea infrastructure has essentially created a large artificial reef system in an otherwise fine sand and mud habitat with sparse benthic populations (Cardno, 2015; Gardline, 2015) typical of the continental slope and shelf. Eighty-eight fish species have been observed at Griffin field, most of which have recreational and commercial value, including 8-10 species of each of the *Lutjanidae* (tropical snappers) and *Epinephalidae* (groupers), as well as jacks and dhufish (UTS Decommissioning Ecology Group, 2020), which are species the Pilbara Line Fishery target. Given the location and protrusion (6 m) of the RTM lower compartment on the seabed and water depth (130 m), its presence is not a hazard to line and trap fisheries.

No trawling vessels are utilising the operational area presently (Section 5.6.1). Given the fisheries over the operational area and lack of trawling effort (the operational area is located within Schedule 2 (Zone 1) of the Pilbara trawl fishery, which has been closed to fish trawling since 1998) (Section 5.6.1), the RTM is currently not a hazard to commercial fishing vessels through snagging events.

Interaction of the RTM lower compartment with any future commercial trawling fisheries is highly unlikely, based on the navigational equipment on board the vessels to navigate the RTM lower compartment, historical information on vessel incidents related to oil and gas infrastructure in Australia (refer Section 8.1.2) and likely improvements in GPS fishing equipment in the future. The impact to commercial fishing activity (should trawling resume) from the presence of the RTM lower compartment on the seabed is considered minor, for the period until it breaks down structurally, which is estimated to take hundreds to thousands of years.

BHP have consulted with fishing industry bodies, WAFIC and individual fishing licence holders (see Section 6). During consultation no concerns were raised by fishing licence holders. Consultation is ongoing with WAFIC (refer Table 6-2).

Commercial Shipping

The RTM lower compartment is no longer considered a navigation hazard. This has been confirmed by consultation with AMSA who raised no comments regarding this risk or concerns during consultation.

8.1.4 Demonstration of As Low As Reasonably Practicable

The ALARP process performed for the environmental aspect is summarised in Table 8-2. This process was completed as outlined in Section 7.1.1 and included consideration of all controls, analysis of the risk reduction proportional to the benefit gained, and final acceptance or justification if the control was rejected.

Table 8-2: Physical Presence – As Low As Reasonably Practicable Assessment Summary

Hierarchy of Control	Control Measure	Accept/ Reject	Reason	Associated Performance Standards
Administrate	Navigational charting of RTM lower compartment	Accept	Legislative requirements will be followed which reduces the risk of third-party vessel interactions. RTM lower compartment charting on AHO Nautical Charts (if required by AHO) allows other users to be aware of its presence. Vessels must navigate with particular caution to reduce the risk. Control is feasible, standard practice with minimal cost. Benefits outweigh any cost sacrifice.	**PS 7.1.4**
Eliminate	Removal of RTM lower compartment	Reject	The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within	-

Hierarchy of Control	Control Measure	Accept/ Reject	Reason	Associated Performance Standards
			Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria. As a worst-case the lower compartment (Compartment 1: ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP.	

ALARP Summary

Impacts are considered localised and minor from physical presence of the RTM. Reasonable control measures were identified in Table 8-4 that, when implemented, are considered to manage the impacts of the physical presence of the subsea infrastructure on other marine users to ALARP.

8.1.5 Demonstration of Acceptability

Physical presence of the RTM lower compartment will not result in a potential impact greater than a minor disturbance to other users. Further opportunities to reduce the impacts have been investigated in Table 8-2.

No concerns or objections regarding physical presence of the RTM lower compartment have been raised by relevant stakeholders. The impact is consistent with the principles of ESD (as defined under the EPBC Act) (refer Table 8-3). BHP has considered information contained in recovery plans and threat abatement plans (Section 9). The environmental impacts meet the BHP environmental risk acceptability criteria (Section 7.3). BHP considers the impact to be managed to an acceptable level.

The following subsections provide further detail on the determination of acceptability for the physical presence of the subsea infrastructure left *in situ*.

Principles of ESD Assessment

As outlined in Section 3A of the EPBC Act, the titleholder needs to ensure that the activity is undertaken in a manner consistent with the ESD (refer Table 8-3).

Table 8-3 Assessment of Impact Against the Principals of ESD

Principals of ESD	Assessment
Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the integration principle)	The impact assessment has assessed both the long-term and short-term, environmental, and social aspects associated with leaving the subsea infrastructure *in situ*. The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria. As a worst case the lower compartment (Compartment 1: ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP.
If there are threat of serious or irreversible damage lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle')	The impact assessment has been supported by a number of fish assessment studies as detailed in Table 5-2, scientific literature and stakeholder feedback. The degradation of the RTM lower compartment components is well understood, as is the breakdown of steel and steel alloys in the marine environment.
The principle of intergenerational equity- that the present generation should ensure the	Leaving the RTM lower compartment *in situ* has the potential to provide habitat for fish in a predominately soft substrate environment, and

Principals of ESD	Assessment
health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'intergenerational principle')	increase the abundance of fish including commercially retained species. This provides an enhanced benefit to future generations in the short to medium-term before degradation of the RTM lower compartment occurs.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making ('the biodiversity principle')	The impact assessment (Section 8.1.3) has assessed both biological diversity and ecological integrity.

Acceptability against Article 192 of the United Nations Convention on the Law of the Sea 1982 (UNCLOS)

A general obligation of Article 192 of the United Nations Convention on the Law of the Sea 1982 (UNCLOS) is to protect and preserve the marine environment. International Maritime Organization (IMO) resolution A.672 (1989) recognises that the general requirement is base case of removal with the objective of protecting and preserving the marine environment. Further details are provided in paragraph 3.9 of the resolution describing that equipment left *in situ* should not move under environmental loading.

The corrosion and breakdown of material within the RTM lower compartment will occur over a period of hundreds of years, as detailed in Section 8.3. The remaining RTM lower compartment materials are made of steel and steel alloy and iron ore ballast (refer Table 4-8). As the RTM lower compartment degrades, the material, being higher density than seawater will sink and degrade further. It is not credible that its degradation results in floating debris.

8.1.6 Environmental Performance Outcome, Performance Standards and Measurement Criteria

Environmental Performance Outcome	Performance Standard	Measurement Criteria
Other marine users are made aware of relevant infrastructure left *in situ*	**PS 7.1.4** RTM lower compartment is charted on AHO Nautical Charts (as required by AHO).	AHO Nautical Charts show RTM lower compartment (as required).

8.2 Seabed Disturbance from Subsea Infrastructure

8.2.1 Summary of Risk Assessment and Evaluation

Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability
Physical disturbance to seabed	Long-term presence of the subsea infrastructure on the seabed.	Physical modification to the seabed.	10	N/A	-	Type A Low Order Impact	Tolerable

8.2.2 Source of Hazard

The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria.

As a worst-case the lower compartment (Compartment 1: ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP. The lower compartment dimensions are provided in Table 4-7 and weights of materials are provided in Table 4-8.

The long-term physical presence of the RTM lower compartment on the seabed has the potential to cause localised seabed disturbance / physical modification to the seabed and an alteration of benthic habitats by continuing to provide a hard substrate on an otherwise featureless seabed. Other infrastructure left *in situ* (refer Table 4-2) is buried below the seabed and therefore is providing limited disturbance / physical modification impacts to the seabed.

The subsea infrastructure is expected to take hundreds of years break down (based on the degradation of steel). It is expected that until this point infrastructure will continue to provide hard substrate that hosts benthic habitat.

8.2.3 Environmental Impact Assessment

Physical Modification to the Seabed and Soft Sediments

The presence of the RTM lower compartment on the seabed can interact with surrounding hydrodynamic conditions potentially resulting in disturbance to the seabed (scouring) which may impact associated benthic habitats.

The RTM lower compartment material is expected to progressively self-bury in sandy sediment, particularly as once the steel breaks down structurally into smaller pieces. Burial will occur through the initiation of scour underneath the subsea infrastructure at discrete locations. Local scour will only occur whilst the RTM lower compartment materials are intact and provide a disruption to the flow of water. The RTM lower compartment includes an iron-ore ballast, once the RTM lower compartment steel breaks down this ballast is likely to present a longer term disruption of flow and alteration of the seabed.

The operational area overlaps the Ancient Coastline at 125 m depth contour (refer Figure 5-2) and seabed modifications may directly disturb a very small, localised area of sediments over the KEF. However, no lasting effects are anticipated to the ecological properties of the KEF and impacts are considered to be localised and minor.

8.2.4 Demonstration of As Low As Reasonably Practicable

The ALARP process for the environmental aspect is summarised in Table 8-4. This process was completed as outlined in Section 7.1.1 and included consideration of all controls, analysis of the risk reduction proportional to the benefit gained and final acceptance or justification if the control was rejected.

Table 8-4: Seabed Disturbance – As Low As Reasonably Practicable Assessment Summary

Hierarchy of Control	Control Measure	Accept/ Reject	Reason	Associated Performance Standard
Eliminate	Removal of subsea infrastructure (anchor, gravity bases, pile foundations	Reject	Section 3 determined that leaving the subsea infrastructure *in situ* provides equal or better environmental outcomes compared to complete removal.	-

Hierarchy of Control	Control Measure	Accept/ Reject	Reason	Associated Performance Standard
	Removal of RTM	Reject	The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria. As a worst-case the lower compartment (Compartment 1: ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP.	-
Administrate	Environmental monitoring of the seabed to assess any impacts to the seabed from subsea infrastructure breakdown / burial.	Reject	Studies have shown the degradation of the subsea infrastructure will occur over an extended period (thousands of years for the breakdown of the steel), therefore the rate of change is predicted to be slow and unlikely to be easily detected over short to medium timeframes. Given the timeframe for breakdown of materials, ongoing monitoring is impractical. Control grossly disproportionate. Monitoring will not reduce the consequence of the already minor disturbance to the seabed, and the costs associated with the level of monitoring required to accurately assess any impacts greatly outweighs any benefits.	-

ALARP Summary

Impacts are considered localised and minor from seabed disturbance impacts from subsea infrastructure presence. Reasonable control measures were identified in Table 8-4 to further reduce impacts but rejected since the associated cost and sacrifice was grossly disproportionate to any benefit. The impacts are therefore considered reduced to ALARP.

8.2.5 Demonstration of Acceptability

Seabed impacts will not result in potential impacts greater than minor disturbance to seabed habitat. Further opportunities to reduce the impacts have been investigated in Table 8-4.

No concerns or objections regarding seabed disturbance have been raised by relevant stakeholders. The impact is consistent with the principles of ESD (as defined under the EPBC Act) (refer Table 8-7). BHP has considered information contained in recovery plans and threat abatement plans (Section 9). The environmental impacts meet the BHP environmental risk acceptability criteria (Section 7.3). BHP considers the impact to be managed to an acceptable level.

8.2.6 Environmental Performance Outcome, Performance Standards and Measurement Criteria

Not applicable as seabed disturbance impacts are considered to be as low as reasonably practicable.

8.3 Subsea Contamination from Subsea Infrastructure Breakdown

8.3.1 Summary of Risk Assessment and Evaluation

Aspect	Source of Hazard	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability
Subsea contamination from breakdown of subsea infrastructure	Steel released during the breakdown of subsea infrastructure (RTM, anchors) / RTM lower compartment	Localised and long-term reduction in sediment quality.	10	N/A	-	Type A Low Order Impact	Tolerable
	Concrete released during the breakdown of subsea infrastructure (gravity bases, PLEM pile foundation)	Localised and long-term reduction in sediment quality.	10	N/A	-	Type A Low Order Impact	Tolerable
	Iron ballast released during the breakdown of RTM lower compartment	Localised and long-term reduction in sediment quality.	10	N/A	-	Type A Low Order Impact	Tolerable
	Epoxy coating released during the breakdown of subsea infrastructure / RTM lower compartment	Localised and long-term reduction in sediment quality.	10	N/A	-	Type A Low Order Impact	Tolerable

8.3.2 Source of Hazard

Corrosion and breakdown of metals and concrete within the subsea infrastructure (refer to Table 4-4 for materials) will occur over time causing particles to be released to the marine environment.

The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria.

As a worst-case the lower compartment (Compartment 1: ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP. The lower compartment dimensions are provided in Table 4-7 and weights of materials are provided in Table 4-8.

The RTM lower compartment is made of predominantly of steel and steel alloys (with minor amounts of aluminium and copper), with an iron-ore ballast. The anchors are made up of steel, whilst the gravity bases and piles are made of concrete/cement and steel. Further details on the total volume of materials left *in situ* by infrastructure is provided in Table 4-4. Total volume of materials within the RTM lower compartment is provided in Table 4-8.

Epoxy coating covers the steel infrastructure components and is used to protect the infrastructure from corrosion. It is coated onto the infrastructure at a thickness between 200 – 400 microns typically. Table 8-5

provides an insight into the events which are likely to result in the largest and smallest likely particle sizes being released from the subsea infrastructure material.

Table 8-5: Material Breakdown (updated from Atteris, 2019a)

Material	Estimated Degradation Events Leading to Material Breakup		Likely Particle Size and Event	Estimated Dispersion Characteristics
	Small Particles	Large Particles		
Steel	• Relatively uniform corrosion	• Extreme environmental loading • External impact • Very irregular corrosion • Fatigue • On-Bottom instability	Small and Moderate Flakes <5 cm Dislodgement of particles exposed above the seabed are likely to be caused by abrasion and environmental loading.	Irregular corrosion, on-bottom stability and fatigue may cause the separation of sections of steel. Any large, separated sections of steel will continue to corrode in their new position. Steel particles will bury or be dispersed into the surrounding area due to hydrodynamic load. Particles are likely to remain in the immediate area and be incorporated into the seabed due to the significantly higher density than seawater. A portion of the metals may remain dissolved and be incorporated into local marine life. Given the anchors are buried dispersion of steel particles is unlikely and particles are anticipated to remain buried.
Iron-ore ballast	• Relatively uniform corrosion	• Extreme impact • Fatigue	Small particles Significant breakdown / corrosion unlikely	Iron-ore ballast is likely to corrode and breakdown very slowly (thousands of years). Only in the event of extreme impact or fatigue will the iron-ore ballast break down into large pieces. Such extreme impact is unlikely to occur. Due to its iron-ores high density, it is likely to remain in the immediate area.

Concrete	• Spalling • Abrasion • Biotic degradation (Mastic)	• Spalling • Extreme environmental loading • External impact	< 10 cm Spalling	The rate of spalling is likely to dictate the size of the concrete pieces, with rapid spalling likely to result in larger pieces. Given the concrete infrastructure is buried dispersion of particles is unlikely and particles are anticipated to remain buried. Some minor dispersion into the surrounding area may occur due to extreme hydrodynamic loads. Due to its high density, it is likely to remain in the immediate area.

8.3.3 Environmental Impact Assessment

As the subsea infrastructure is left *in situ*, the components will eventually breakdown over time, which will result in the discharge of material from the infrastructure. Any degraded material buried which lie below the regional scour depth will remain buried, this is likely to comprise of material from the RTM anchors, PLEM pile foundation and MDB concrete gravity bases. Buried material is unlikely to disperse.

The subsea infrastructure material will breakdown into a range of particle sizes (refer Table 8-5). Dispersion of material from buried infrastructure is unlikely to occur and this material is anticipated to remain buried. Some minor dispersion into the surrounding area may occur due to extreme hydrodynamic loads. However, due to the materials high density, it is likely to remain in the immediate area. Given the nature of the materials released, the rapid dispersion of releases in the marine environment and the, degradation timeframes impacts to water quality and marine fauna are not considered credible.

Steel

Moderate flake particles from the RTM lower compartment steel break down will settle within the operational area and very small particles released predominately from abrasion may become dissolved and/or suspended in the water column and undergo rapid dilution in the open water marine environment. This is expected to occur over a prolonged period of time (hundreds of years). Steel is made up of 98.5% iron, which is not considered a significant contaminant in the marine environment and is only toxic to marine organisms at high concentrations (Grimwood and Dixon, 1997). Elevated levels of iron may appear in the marine sediments directly adjacent and beneath the RTM lower compartment as it corrodes and degrades, however given the rate of corrosion (hundreds of years) and lack on sensitive habitat in the Griffin field (refer Section 5), iron levels are unlikely to result in an impact greater than a localised and minor change in sediment quality. Impacts to marine fauna are not considered credible. A change in burrowing infauna and surface epifauna invertebrates on or around the RTM lower compartment may occur over time, however as this occurs naturally over time, this change would be hard to attribute to the release of steel from the RTM lower compartment alone.

Dispersion of steel from the anchors is unlikely to occur and this material is anticipated to remain buried. Some minor dispersion into the surrounding area may occur due to extreme hydrodynamic loads. However, due to the materials high density, it is likely to remain in the immediate area of release.

Given the lack on sensitive habitat at the Griffin field (refer Section 5) impacts from the fate of the steel corrosion particles are unlikely to result in an impact greater than a localised, long-term and minor change in sediment quality within the operational area.

Concrete

Although the exact composition of the concrete in the PLEM pile foundation and MDB concrete gravity bases is unknown, concrete components are usually chemically inert. This indicates corrosion products from concrete will not react in the marine environment.

Concrete has a higher density than seawater and is likely to remain in the operational area as it degrades. Any concrete material which lies below the regional scour depth will remain buried. The breakdown of material is a slow process, as the concrete erodes small amount of material will enter the water column and undergo rapid dilution in the open water marine environment.

Given the lack on sensitive habitat in the Griffin field (refer Section 5) impacts from the fate of the concrete particles are unlikely to result in an impact greater than a localised, long-term and minor change in sediment quality within the operational area.

Iron-ore ballast

Iron-ore ballast is likely to corrode and breakdown very slowly (thousands of years). Due to its iron-ore high density, it is likely to remain in the immediate area. Elevated levels of iron may appear in the marine sediments directly adjacent and beneath the RTM lower compartment ballast as it corrodes and degrades, however given the rate of corrosion (thousands of years) and lack on sensitive habitat in the Griffin field (refer Section 5), iron levels are unlikely to result in an impact greater than a localised and minor change in sediment quality.

Epoxy coating

Volumes of epoxy coating the infrastructure is minor (refer Table 4-2). The volumes coating RTM lower compartment (refer Table 4-8) are very minor and will release over a period of hundreds of years and may enter the water column and disperse or bury within the sediment, however given such minor volumes this is

not considered not be measurable. Impacts from the release of epoxy coating, given the minor volumes are unlikely to result in an impact greater than a localised, long term and minor change in sediment quality within the operational area.

Species Recovery Plans and Threat Abatement Plans

BHP has considered information contained in relevant recovery plans and approved conservation advice for marine fauna that identify marine debris as a threat (Section 9).

8.3.4 Demonstration of As Low As Reasonably Practicable

The ALARP process for the environmental risk is summarised in Table 8-6. This process was completed as outlined in Section 7.1.1 and included consideration of all controls, analysis of the risk reduction proportional to the benefit gained and final acceptance or justification if the control was rejected.

Table 8-6: Subsea Contamination – As Low As Reasonably Practicable Assessment Summary

Hierarchy of Control	Control Measure	Accept/ Reject	Reason	Associated Performance Standard
Eliminate	Removal of subsea infrastructure (anchor, gravity bases, pile foundations	Reject	Section 3 determined that leaving the subsea infrastructure *in situ* provides equal or better environmental outcomes compared to complete removal.	-
	Full removal of RTM	Reject	The feasibility of removing the RTM will be assessed as part of the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) using the evaluation and criteria within Table 3-19 of that EP. The Griffin Decommissioning and Field Management EP (GV-HSE-E-0014) includes the scope for removing various components of the RTM, as determined by the evaluation and criteria. As a worst-case the lower compartment (Compartment 1: ballast) of the RTM will be abandoned *in situ* on its side, and is within the scope of this EP.	-
Administrate	Environmental monitoring of the seabed to assess any impacts to the seabed from subsea infrastructure breakdown	Reject	The degradation of the subsea infrastructure left *in situ* will occur over a period of hundreds to thousands of years, therefore the rate of change is predicted to be slow and unlikely to be easily detected over short to medium timeframes. Given the timeframe for breakdown of materials, ongoing monitoring is impractical. In addition the impact from the subsea infrastructure breakdown is unlikely to result in an impact greater than a localised, long-term and minor change in sediment quality. This impact is determined acceptable based on BHP environmental risk acceptability criteria (Section 7.3). Control grossly disproportionate. Monitoring will not reduce the consequence of any impacts to the seabed / sediment quality (which has already been determined localised and minor), and the costs associated with the level of monitoring required to accurately assess any impacts greatly outweighs the benefits.	-

ALARP Summary

Impacts are considered localised and minor from subsea contamination impacts from infrastructure breakdown. Reasonable control measures were identified in Table 8-6 to further reduce impacts but rejected

since the associated cost and sacrifice was grossly disproportionate to any benefit. The impacts are therefore considered reduced to ALARP.

8.3.5 Demonstration of Acceptability

Subsea contamination impacts will not result in potential impacts greater than temporary and minor reduction in sediment quality. Further opportunities to reduce the impacts have been investigated in Table 8-6.

No concerns or objections regarding subsea discharge impacts from infrastructure breakdown have been raised by relevant stakeholders. BHP has considered information contained in recovery plans and threat abatement plans (Section 9). The impact is consistent with the principles of ESD (as defined under the EPBC Act). The environmental impacts meet the BHP environmental risk acceptability criteria (Section 7.3). BHP considers the impact to be managed to an acceptable level.

The following subsections provide further detail on the determination of acceptability for subsea contamination from the material breakdown.

Principles of ESD Assessment

As outlined in Section 3A of the EPBC Act, the titleholder needs to ensure that the activity is undertaken in a manner consistent with the ESD. The equal or better environmental outcomes evaluation assess the activity and impact against the relevant principles of ESD Table 8-7.

Table 8-7 Assessment of Impact Against the Principals of ESD

Principals of ESD	Assessment
Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the 'integration principle')	The impact assessment has assessed both the long-term and short-term, environmental, and social aspects associated with leaving the subsea infrastructure *in situ*. In the short term the RTM lower compartment will provide habitat for a number of commercial fish species and is likely to continue to do (refer Section 8.1) for the short to medium term. The RTM anchors, PLEM pile foundation and MDB concrete gravity bases are buried infrastructure. Any degraded material buried which lie below the regional scour depth will remain buried. Buried material is unlikely to disperse and impacts are considered localised and minor both in the short and long term. Buried material is unlikely to disperse and impacts are considered localised and minor both in the short and long term.
If there are threat of serious or irreversible damage lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle')	The impact assessment has been supported the material degradation study Atteris (2019a) which provides details on the degradation of materials within the subsea infrastructure. There is a scientific certainly over the fate of the materials within the subsea infrastructure, such as steel and concrete as they degrade. This has been supported by relevant literature detailed within Section 8.3.3. There is a strong understanding of seabed and habitat within the Griffin field (Refer to Table 5-2 for details of the surveys). This ensures that there is a level of scientific certainty in the risk assessment for the subsea infrastructure degradation and associated impacts.
The principle of intergenerational equity- that the present generation should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'intergenerational principle')	Degradation of the materials in the subsea infrastructure will occur over hundreds of years, The RTM anchors, PLEM pile foundation and MDB concrete gravity bases are buried infrastructure. Any degraded material buried which lie below the regional scour depth will remain buried. Buried material is unlikely to disperse and impacts are considered localised and minor both in the short and long-term. No impacts to future generations are anticipated.

Principals of ESD	Assessment
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making ('the biodiversity principle')	The impact assessment has assessed both the long-term and short-term, environmental, and social aspects associated with leaving the subsea infrastructure *in situ* and its degradation. The CEIA (Section 3) includes both biological diversity and ecological integrity in the decommissioning decision making. The CEIA demonstrates the abandonment *in situ* alternative will result in equal or better environmental outcomes compared to full removal, which is required by NOPSEMA's *Section 572 Maintenance and Removal of Property* policy (NOPSEMA, 2020b)

Monitoring to meet the requirements of NOPSEMA General Direction (832)

Whilst ongoing monitoring has been determined not to be required based on the ALARP assessment (refer Table 8-6) and the acceptability of the impact from the subsea contamination, a single ROV survey will be undertaken on the subsea infrastructure left *in situ* (referenced in Table 4-2). Footage will be provided to NOPSEMA to meet the requirements of NOPSEMA General Direction (832), which requires:

'Provide, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the title areas within 12 months after property referred to in direction 1 is removed'

and

'Make good, to the satisfaction of NOPSEMA, any damage to the seabed or subsoil in the title areas caused by any person engaged or concerned in the operations authorised by the titles within 12 months after property referred to in direction 1 is removed'

As referenced in Section 4.1, an as left survey of the infrastructure left *in situ* is covered under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

Acceptability against the Annex I(2) of the 1996 London Protocol

Annex I(2) of the 1996 London Protocol to the convention on the prevention of marine pollution by dumping of waste and other matter (update to London Convention and Protocol 1972) describes that material capable of creating floating debris or otherwise contributes to the pollution of the marine environment has to be removed.

The RTM anchors, PLEM pile foundation, distribution skid pile foundations and MDB concrete gravity bases are buried infrastructure. It is therefore not credible that its degradation results in floating debris.

Whilst the RTM lower compartment will be above the seabed, the remaining components are made of steel and steel alloy materials and iron ballast. As the RTM degrades it will breakdown, this material, being higher density than seawater will remain *in situ* / sink and degrade further. It is not credible that the RTM lower compartment degradation results in floating debris.

The petroleum activity is therefore not inconsistent with Annex I(2) of the 1996 London Protocol.

8.3.6 Environmental Performance Outcome, Performance Standards and Measurement Criteria

Not applicable as seabed disturbance impacts are considered to be as low as reasonably practicable.

9 Recovery and Management Plan Assessment

This section provides an assessment to demonstrate that the petroleum activity are not inconsistent with any relevant recovery plans, conservation management plans or threat abatement plans.

Relevant recovery plans to the petroleum activity and the receiving environment are:

- Recovery Plan for Marine Turtles in Australia 2017–2027 (Commonwealth of Australia, 2017)
- Conservation Management Plan for the Blue Whale 2015–2025 (Commonwealth of Australia, 2015a)
- Sawfish and River Shark Multispecies Recovery Plan (Commonwealth of Australia, 2015b)
- Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans 2018 (Commonwealth of Australia, 2018b).
- Conservation Management Plan for the Southern Right Whale 2011 to 2021 (2012)
- Whale shark management with particular reference to Ningaloo Marine Park, Wildlife Management Program no. 57 (DPAW, 2013)
- National Recovery Plan for threatened albatrosses and giant petrels 2011 to 2016 (DSEWPC, 2011)
- Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*) (Commonwealth of Australia, 2014)
- Recovery Plan for the White Shark (*Carcharodon carcharias*) (Commonwealth of Australia, 2013)

Objectives and relevant actions from the above plans have been identified in Table 9-1. The table includes an assessment on whether the petroleum activity, including resulting impacts and risks identified in Section 8 are inconsistent with those objectives and actions.

Table 9-1: Assessment of the Petroleum activity' Consistency with Objectives and Actions in Relevant Recovery Plans and Threat Abatement Plans

Recovery plans and threat abatement plans	Relevant Action Areas/Objectives	Assessment of consistency
Recovery Plan for Marine Turtles in Australia 2017–2027	Action Area A3: Reduce the impacts from marine debris • Understand the threat posed to green turtle NWS stock by marine debris. • Determine the extent to which marine debris is impacting Western Australian loggerhead turtles.	**Not inconsistent** Section 8.3 considers the impacts of the degradation of the subsea infrastructure. Given the impacts will not result in potential impacts greater than minor alteration in sediment quality, no impacts to marine turtles are anticipated. Appropriate controls have been considered and adopted to reduce the risk of degradation of the subsea infrastructure to ALARP and acceptable levels.
Conservation Management Plan for the Blue Whale 2015–2025	No relevant Action Areas/Objectives.	
Sawfish and River Shark Multispecies Recovery Plan	Objective 6: Reduce and, where possible, eliminate any adverse impacts of marine debris on sawfish and river shark species.	**Not inconsistent** Section 8.3 considers the impacts of the degradation of the subsea infrastructure. Given the impacts will not result in potential impacts greater than minor alteration in sediment quality, no impacts to sawfish and river shark are anticipated. Appropriate controls have been considered and adopted to reduce the risk of degradation of the subsea infrastructure to ALARP and acceptable levels.
Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans	Objective 1: Contribute to long-term prevention of marine debris. • Limit the amount of single use plastic material lost to the environment in Australia.	**Not inconsistent** Infrastructure containing plastics are not left *in situ* under this EP.
Conservation Management Plan for the Southern Right Whale 2011 to 2021 (2012)	No relevant Action Areas/Objectives.	
Whale shark management with particular reference to Ningaloo Marine Park, Wildlife Management Program no. 57	No relevant Action Areas/Objectives.	
National recovery plan for threatened albatrosses and giant petrels 2011 to 2016	No relevant Action Areas/Objectives.	
Recovery Plan for the Grey Nurse Shark (*Carcharias taurus*)	No relevant Action Areas/Objectives.	
Recovery Plan for the White Shark (*Carcharodon carcharias*)	No relevant Action Areas/Objectives.	

10 Implementation Strategy

In accordance with Regulation 14 of the Environment Regulations, the EP must contain an implementation strategy for the petroleum activity and monitoring, recording and reporting arrangements. The implementation strategy presented in this section provides specific practices and procedures to ensure:

- all the environmental impacts and risks of the petroleum 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
- environmental performance outcomes and environmental performance standards are met
- arrangements are in place to respond to and monitor impacts of oil pollution emergencies
- arrangements for ongoing consultation with relevant authorities, persons and organisations are in place and maintained through the activities.

10.1 Systems, Practices and Procedures

10.1.1 BHP Petroleum Health, Safety and Environment Management System

The BHP Petroleum HSE Management System defines the boundaries within which all activities are conducted. It provides a structured framework to set common requirements, boundaries, expectations, governance and assurance for all activities. It also supports accountabilities and responsibilities as defined in the organisational structure. The overarching objective of the BHP Petroleum HSE Management System is to aspire to zero harm to people, communities and the environment, and achieve leading industry practice. The structure of the BHP HSE Management System is hierarchical (Figure 10-1).

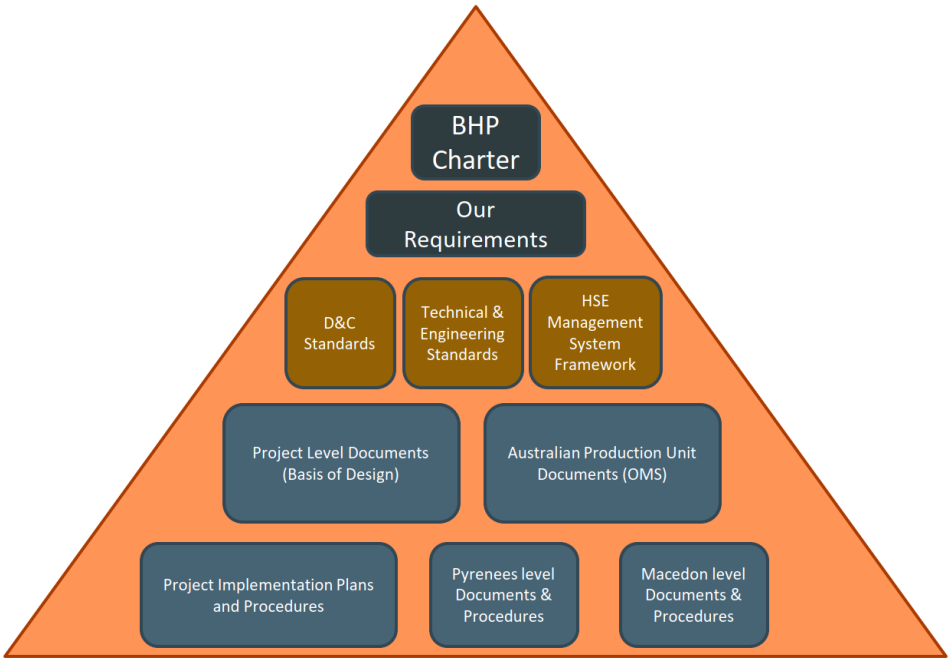

Figure 10-1: BHP HSE Management System

The documents in Figure 10-1 address specific areas (for example, corporate performance reporting, risk management, incident investigation) where it is important activities are conducted consistently across the organisation.

The top level of the triangle shown in Figure 10-1 is the BHP Charter; a copy of the Charter is provided in Appendix A. The Charter details BHP's values and directs the approach to all activities in BHP. It includes value statements about sustainability, integrity, respect, performance, simplicity and accountability. It also provides a means of aligning BHP's values with strategic direction and measures of success. The Charter is supported by BHP's Code of Business Conduct and Working with Integrity. The Charter is signed by the BHP Chief Executive Officer.

The BHP Our Requirements detail and define business planning, risk management and assurance expectations of key process areas. They also serve as audit protocol against which all groups in BHP are assessed. Categories of Our Requirements include HSEC, Human Resources, Legal, Corporate Affairs, Supply and Information Management.

- Direction for environmental performance in BHP is established by the Environment and Climate Change – Our Requirements. The BHP Charter provides a public statement and commitment to zero harm through planning and execution. The petroleum activity will be performed in accordance with the objectives of this Charter, which includes compliance or exceedance with regulatory requirements, setting of objectives and targets and continual improvement. The Charter will be available to all personnel involved in the petroleum activity through the intranet, and hard copies where appropriate.
- The HSE Management System establishes the foundation for continual improvement through applying consistent requirements across all aspects of the petroleum activity, including:
    - identifying statutory obligations and commitments to maintain a licence to operate
    - implementing petroleum risk management processes, including this EP
    - establishing and maintaining the competencies for personnel and providing training to promote expected behaviours
    - managing all contractors and suppliers of petroleum goods and services
    - completing reviews and reporting outcomes of these reviews.

The BHP Petroleum HSE Standard details the mandatory HSE performance requirements as described in the HSE-related Our Requirements and are met through the HSE Management System. They address specific performance requirements that define functional and governance expectations. The controls apply to the entire lifecycle of petroleum activity, processes and products. Contractors are required to comply with the controls, and partners and suppliers are encouraged to adopt the intent and nature of the performance requirements. The controls are regularly monitored through scheduled audit and verification activities and cover the broad areas of:

- hazards and risk management
- crisis and emergency management
- security
- health and hygiene
- aviation
- marine operations
- fatal risks
- environment
- data reporting.

10.2 Environment Plan Organisation, Roles and Responsibilities

A defined chain of command with the roles and responsibilities for key BHP and contractor personnel in relation to EP implementation, management and review are described in Table 10-1. It is the responsibility of all BHP employees and contractors to ensure the BHP Petroleum HSE-related Our Requirements and the BHP Charter (Appendix A) are applied in their areas of responsibility.

Table 10-1: Key Personnel and Environmental Responsibilities

Title	Environmental Responsibilities
Office-based Roles	
BHP Operations Manager	• Ensure compliance with the BHP Charter and Management Standards • Ensure sufficient resources are provided to implement the commitments made in this EP • Provide vessel contractors with the EP and make them aware of the requirements for their activities • Ensure HSE incidents are reported to regulatory authorities as required • Assist the IMT in developing a response strategy in the event of a spill incident
BHP Director of Projects Australia	• Have Technical Authority and manage team of projects and decommissioning professionals • Ensure sufficient resources are provided to implement the commitments made in this EP
BHP Decommissioning Engineering Manager (or equivalent)	• Supervise decommissioning operations, including management of change • Be accountable for developing the decommissioning engineering and associated programs • Ensure compliance with company policies, standards and statutory requirements
BHP Regional HSE Lead	• Ensure compliance with BHP's Charter and Management Standards, this EP and regulatory responsibilities • Ensure incident prepared and response arrangement meet BHP and regulatory requirements • Ensure environmental incidents or breaches of EPOs, EPSs or MCs are reported in line with BHP's incident reporting requirements
BHP HSE Specialist	• Liaise with the Operations Manager, Projects Team and Vessel Master to ensure compliance to legislation, procedures, standards and commitments • Perform environmental education and ensure HSE inductions completed • Ensure compliance with this EP, regulatory and HSE responsibilities • Participate in the hydrocarbon spill response drills • Complete environmental audits to ensure compliance with this EP • Report environmental recordable incidents to NOPSEMA
Contractor Manager	• Prepare, maintain and implement Contractor HSE Management Plans and Procedures • Ensure compliance with this EP, regulatory and HSE responsibilities relevant to their scope of work • Maintain clear lines of communication with the BHP Operations Manager

10.3 Training and Competency

Training is not relevant to this EP on the basis that there will be no field activities, vessel-based activities or contractor engagement required to implement the EP.

10.4 Monitoring, Auditing and Management of Non-Conformance and Review

The *Offshore Petroleum Decommissioning Guideline* (Commonwealth of Australia, 2018), *Section 572 Maintenance and Removal of Property* (NOPSEMA 2020b) and draft *Section 270 NOPSEMA Advice - Consent to Surrender Title* (NOPSEMA 2021) describe the requirement for titleholders to address arrangements for long-term monitoring of equipment abandoned *in situ*. These arrangements are addressed in this section.

BHP's approach to monitoring is intended to:

- Confirm the condition of the equipment in the Griffin field at the time of abandonment
- Credibly predict the future condition of the equipment as it degrades

- Determine if additional risk management is required if the assumptions made in the impact assessment are found to be incorrect.

No ongoing monitoring has been proposed under this EP. This is on the basis that monitoring is not required to manage impacts associated with leaving the Griffin subsea infrastructure *in situ*.

Confirming the Condition at the Time of Abandonment

BHP has routinely undertaken inspections of the equipment in the Griffin field during the operational and cessation of production phases.

A single ROV survey will be undertaken on the subsea infrastructure left *in situ* (referenced in Table 4-2) and will be provided to NOPSEMA to meet the requirements of NOPSEMA General Direction (832), which requires:

'Provide, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the title areas within 12 months after property referred to in direction 1 is removed'

and

'Make good, to the satisfaction of NOPSEMA, any damage to the seabed or subsoil in the title areas caused by any person engaged or concerned in the operations authorised by the titles within 12 months after property referred to in direction 1 is removed'

As referenced in Section 4.1, an as-left survey of the infrastructure left *in situ* is covered under the Griffin Decommissioning and Field Management EP (GV-HSE-E-0014).

Predicting the Future Condition of the Subsea Infrastructure Left *in situ*

Materials will be released to the environment as they degrade. As outlined in Section 4.5, steel and concrete constitute most of the material. These materials do not pose credible risk of toxic effects in the marine environment and their impacts on the environment are reliably predicted in Section 8.3. As such, monitoring for potential toxicants in sediments or biota (e.g., fishes) is not warranted.

Based on the outcomes of surveys during the operational and cessation of production phases, the corrosion assessment, BHP is confident that the equipment abandoned *in situ* is stable and will not move. No long-term monitoring to confirm the position of the equipment is warranted.

Determining if Additional Mitigation is Required

The existing environment in which the equipment will be abandoned is closed to trawl fishing. The only fishery in the region that uses trawled gear in the water depths within the Griffin field is the Pilbara Trawl Fishery. This fishery targets demersal fish using trawl nets that are dragged along the seabed, resulting in disturbance to the seabed.

The current management arrangements for the Pilbara trawl fishery came into effect in the 1990's recognise the environmental impact of trawl fishing and limit trawling to several management areas north of Dampier and Port Hedland, the nearest of which is over 180 km from the Griffin field. Anecdotal evidence from the Western Australian Department of Fisheries suggests that the current management boundaries are very unlikely to be extended to permit the Pilbara trawl fishery to operate over the Griffin field.

Other fishing methods targeting demersal scalefish, such as lines and traps, have very little potential to interact with the equipment once abandoned *in situ*. Fishers using these methods may reasonably be expected to target the Griffin field to benefit from the fish assemblage associated with the equipment.

BHP will monitor for potential interactions with fishers by continuing to monitor the management arrangements for fisheries using trawled gear in the region. If these arrangements change such that there is an increased risk of interactions with the equipment in the Griffin field, BHP will consult further to inform fishers that the RTM lower compartment should be avoided.

10.5 Reporting

To meet the environmental performance outcomes and standards outlined in the EP, BHP reports at a number of levels as described in the next subsections.

10.5.1 Routine Reporting (External)

No field activities are planned, no routine reporting is required. BHP propose that the acceptance of the EP constitutes the completion of the *in situ* decommissioning of infrastructure in Table 4-2.

An environmental performance report required by Regulation 14 (2) and 26C of the Environment Regulations will be submitted within three months of submission of acceptance of this EP, detailing that the environmental performance standards in the EP have been met and closed out.

Whilst ongoing monitoring has been determined not to be required based on the ALARP assessment (refer Table 8-6) and the acceptability of the impacts described in this EP, an as-left ROV survey will be undertaken of the infrastructure left *in situ*. Footage will be provided to NOPSEMA to meet the requirements of NOPSEMA General Direction (832), which requires:

'Provide, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the title areas within 12 months after property referred to in direction 1 is removed'

and

'Make good, to the satisfaction of NOPSEMA, any damage to the seabed or subsoil in the title areas caused by any person engaged or concerned in the operations authorised by the titles within 12 months after property referred to in direction 1 is removed'.

10.5.2 Incident Reporting (Internal)

BHP employees and contractors are required to report all environmental incidents and non-conformance with commitments made in the EP. It is the responsibility of the BHP Regional HSE Lead to ensure reporting of environmental incidents meets both regulatory reporting requirements and BHP Petroleum HSE Standard.

1SAP is used for recording and reporting these incidents. Detailed investigations are completed for all actual and high-potential environmental incidents. The classification, reporting, investigation, and actioning of all incidents, including environmental, are performed in accordance with the BHP Petroleum Event and Investigation Management Protocol. Incident (potential or actual) corrective actions are monitored using 1SAP.

10.5.3 Incident Reporting (External) – Reportable and Recordable

Reportable Incidents

A reportable environmental incident is defined in Regulation 4 of the Environment Regulations as:

> *"…**reportable incident**, for an activity, means an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage".*

Reportable incidents for the petroleum activity include those that have been identified through the risk assessment process as having a severity (consequence) level of ≥3 (refer to Figure 7-3) and have not been identified in this EP.

In accordance with Regulations 26, 26A and 26AA, BHP will report all reportable incidents orally to NOPSEMA, as soon as practicable, and in any case not later than two hours after the first occurrence of the reportable incident; or if the reportable incident was not detected at the time of the first occurrence, the time of becoming aware of the reportable incident.

Oral notifications of a reportable incident to NOPSEMA will be via telephone: 1300 674 472.

The oral notification must contain:

- all material facts and circumstances concerning the reportable incident known or could be obtained by reasonable search or enquiry
- any action taken to avoid or mitigate any adverse environment impacts of the reportable incident
- the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident.

A written record of the reportable incident will be provided to NOPSEMA, as soon as practicable after making the oral notification, but within three days after the first occurrence of the reportable incident unless NOPSEMA specifies otherwise. The written report should use a format consistent with NOPSEMA's Report of an Accident, Dangerous Occurrence or Environmental Incident (Form FM0929).

Within seven days of giving a written report of a reportable incident to NOPSEMA, a copy of the same written report must be provided to the National Petroleum Titles Administrator (NOPTA), and Department of Mines, Industry Regulation and Safety (DMIRS).

Written notification must be provided of any environmental incident that could potentially impact on any land or water in State jurisdiction via: petroleum.environment@dmirs.wa.gov.au.

Recordable Incidents

A recordable environmental incident is defined in Regulation 4 of the Environment Regulations as:

> *"…**recordable incident**, for an activity, means a breach of an environmental performance outcome or environmental performance standard, in the environment plan that applies to the activity, that is not a reportable incident".*

In terms of the activities within the scope of this EP, a recordable incident is a breach of the environmental performance outcome or environmental performance standards listed in this EP.

In the event of a recordable in recordable incident, BHP will report the occurrence to NOPSEMA as soon as is practicable after the end of the calendar month in which it occurs; and in any case, not later than 15 days after the end of the calendar month. If no recordable incidents have occurred, a 'nil incident' report will be submitted to NOPSEMA. Written reporting to NOPSEMA of recordable incidents and 'nil incidents' can be via completion of NOPSEMA's Form FM0928– Recordable Environmental Incident Monthly Report. The report will contain:

- a record of all the recordable incidents that occurred during the calendar month;
- all material facts and circumstances concerning the recordable incidents that are known or can, by reasonable search or enquiry, be found out;
- any action taken to avoid or mitigate any adverse environmental impacts of the recordable incidents;
- the corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the recordable incident; and
- the action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future.

10.6 Oil Pollution Emergency Plan

Oil pollution emergency planning is not relevant to this EP on the basis that there are no credible spill scenarios associated with this EP.

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Appendix A

BHP Charter

BHP

Our Charter

We are BHP, a leading global resources company.

Our Purpose

To bring people and resources together to build a better world.

Our Strategy

Our strategy is to have the best capabilities, best commodities and best assets, to create long-term value and high returns.

Our Values

Sustainability
Putting health and safety first, being environmentally responsible and supporting our communities.

Integrity
Doing what is right and doing what we say we will do.

Respect
Embracing openness, trust, teamwork, diversity and relationships that are mutually beneficial.

Performance
Achieving superior business results by stretching our capabilities.

Simplicity
Focusing our efforts on the things that matter most.

Accountability
Defining and accepting responsibility and delivering on our commitments.

We are successful when:

Our people start each day with a sense of purpose and end the day with a sense of accomplishment.

Our teams are inclusive and diverse.

Our communities, customers and suppliers value their relationships with us.

Our asset portfolio is world-class and sustainably developed.

Our operational discipline and financial strength enables our future growth.

Our shareholders receive a superior return on their investment.

Appendix B

Relevant Legislation, Regulations and Other Requirements

Commonwealth Legislation and Regulations

Legislation or Regulation	Description	Relevance	EP Section
Corporations Act 2001	This Act is the principal legislation regulating matters of Australian companies, such as the formation and operation of companies, duties of officers, takeovers and fundraising.	The titleholder has provided ACN details within the meaning of the Act.	Section 1.8
Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act) Environment Protection and Biodiversity Conservation Regulations 2000	Commonwealth Department of Sustainability, Environment, Water, Population & Communities administers Act that provides legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined in the EPBC Act as matters of national environmental significance (NES). These include nationally threatened species and ecological communities, migratory species and Commonwealth marine areas. The Act regulates assessment and approval of proposed actions likely to have a significant impact on a matter of NES. The approval decision is made by a delegate of the Australian Government Environment Minister. Regulations provide for a wide range of detail essential for the operation of the Act, including regulations relating to management of Commonwealth reserves, information requirements for assessment processes, enforcement, granting of various permits, publication requirements and criteria that need to be met in relation to a wide variety of decision making processes provided for under the Act.	This Act applies to all aspects of the activity that have the potential to impact MNES. NOPSEMA manages compliance with the relevant regulations and plans under the Act for this EP. Where activities have existing approvals under the Act, these will continue to apply.	Section 5 Section 8.1 Section 8.2 Section 8.3
Environment Protection (Sea Dumping) Act 1981 Environment Protection (Sea Dumping) Regulations 1983	The Act regulates the dumping at sea of controlled material (including certain wastes and other matter), the incineration at sea of controlled material, loading for the purpose of dumping or incineration, export for the purpose of dumping or incineration, and the placement of artificial reefs. Permits are required for any sea dumping activities. Operational discharges from vessels are not defined as 'dumping' under the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and therefore not regulated under the Act.	Prior to permanently leaving any structure *in situ*, BHP will obtain a Sea Dumping Permit in accordance with the requirements of the *Environment Protection (Sea Dumping) Act 1981*.	Section 2.1.3 BHP will obtain a Sea Dumping Permit in accordance with the requirements of the *Environment Protection (Sea Dumping) Act 1981*
Hazardous Waste (Regulation of Exports and Imports) Act 1989	Relates to controls over import and export of hazardous waste material. Permits are required to import waste into Australia.	Activity does not involve transboundary movement of hazardous wastes.	N/A

Legislation or Regulation	Description	Relevance	EP Section
Offshore Petroleum and Greenhouse Gas Storage Act 2006	Legislation concerning Australian offshore petroleum exploration & production in Commonwealth Waters. National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) is an independent safety and environmental management Authority funded by levies on industry participants and regulates matters with powers conferred directly from OPGGS Act and via Regulations concerned with: • occupational health & safety law at facilities and offshore operations under Schedule 3 • environmental management • structural integrity of Wells under Resource management regulations. NOPSEMA may also declare a 500 metre petroleum safety zone around wells associated with drilling operations.	Refer Section 2.1.1.	Section 2.1.1
Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009	Regulations administered by NOPSEMA to ensure offshore petroleum activity is carried out in a manner consistent with the principles of ecologically sustainable development and in accordance with an accepted environment plan, in particular: • assessment of EPs, including associated OPEPs (previously oil spill contingency plans) • investigation of accidents, occurrences and circumstances with regard to deficiencies in environmental management.	Refer Section 2.1.1.	Section 2.1.1
Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Act 2003	Act to impose levies relating to the regulation of offshore petroleum activity, including well levies and environment plan levy.	A levy will be applied to the petroleum activity under this EP.	N/A
Offshore Petroleum and Greenhouse Gas Storage (Regulatory Levies) Regulations 2004	Regulations prescribing the amount and method of calculation for imposition of levies relating to the regulation of offshore petroleum activity, including well levies and environment plan levy.	A levy will be applied to the petroleum activity under this EP.	N/A
Protection of the Sea (Prevention of Pollution from Ships) (Orders) Regulations 1994	Sets penalty levels for non-compliance.	Relates to vessel non-compliance to Marine Orders.	N/A

Western Australian Legislation and Regulations

Legislation or Regulation	Description
Aboriginal Heritage Act 1972	Enacted to ensure all Aboriginal cultural heritage within Western Australia could be properly protected and preserved. The Act provides recognition, protection and preservation of Aboriginal sites in Western Australia. It is an offence under s.17 of the Act to excavate, destroy, damage, conceal, or in any way alter an Aboriginal site.
Conservation and Land Management Act 1984	DBCA is responsible for the day-to-day management of marine parks vested with Marine Parks and Reserves Authority (MPRA) and provide administrative support to the MPRA. MPRA is responsible for the preparation of management plans for all lands and waters which are vested in it. Marine nature reserves, marine parks and marine management areas are the three reserve categories vested in the MPRA. Offshore operations must comply with specific marine park conditions when navigating or conducting activities in or near areas designated as marine sanctuaries for conservation, recreational, ecological, historical, research, educational, or aesthetic qualities, such as Ningaloo Marine Park (state waters) (Class A reserve) and Muiron Islands Marine Management Area.
Conservation and Land Management Regulations 2002	Details further requirements for protection of flora and fauna including restrictions on approaches to fauna, fishing restrictions and operation of vessels in marine protected areas. Also includes prohibition of pollution in marine protected areas.
Emergency Management Act 2005	WestPlan-Marine Transport Emergency (MTE) details the emergency management arrangements relating to the prevention of, preparation for, response to and recovery from Marine Transport Emergencies that occur in WA waters.
Emergency Management Regulations 2006	DoT Marine Safety is the prescribed Hazard Management Agency for response under the Emergency Management Regulations 2006 for all emergencies in which there is an actual or impending event involving a ship that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment.
Environmental Protection Act 1986	Act contains measures for preventing or minimising pollution, which includes a general prohibition against pollution. Applicable areas include discharge of operational waste (sewage, galley waste) and oily water from vessels, gaseous emissions from diesel engines and ballast water exchange and discharge.
Environmental Protection Regulations 1987	Prescribes further matters to give effect to the Act including control of pollution and licence fees.
Environmental Protection (Unauthorised Discharges) Regulations 2004	Prescribes further details of materials that are prohibited from discharge into the environment.
Fish Resources Management Act 1994 *Fish Resources Management Regulations 1995*	Act establishes framework for management of fishery resources. Commercial fishing is licensed or under a Fisheries Management Plan. Fisheries in WA waters are subject to the Act and include a wide range of aquatic organisms, other than protected species. Threatened aquatic species may be protected under State and Commonwealth biodiversity conservation laws. Department of Fisheries manages commercial and recreational fishing in Western Australia within four regions: the West Coast, Gascoyne, South Coast and North Coast. The Act also has power to declare Fish Habitat Protection Areas.

Legislation or Regulation	Description
Maritime Archaeology Act 1973	Maritime Archaeology Act of 1973 protects maritime archaeological sites in state waters, such as bays, harbours and rivers. Other than shipwrecks, it includes single relics, such as an anchor, and land sites associated with exploration, early settlements, whaling and pearling camps and shipwreck survivor camps.
Western Australian Marine (Sea Dumping) Act 1981	An Act to provide for the protection of the environment by regulating the dumping into the sea, and the incineration at sea, of wastes and other matter and the dumping into the sea of certain other objects.
Western Australian Marine (Sea Dumping) Regulations 1982	Primarily concerns fees and prescribed information for reports of dumping.
WA Marine (Surveys and Certificates of Survey) Regulations 1983	Marine Safety is responsible for approving plans, inspecting, approving construction and carrying out periodical surveys of all commercial vessels under WA jurisdiction, be they passenger carrying, trading, fishing, or offshore industry vessels.
Wildlife Conservation Act 1950 *Wildlife Conservation Regulations 1970*	An Act to provide for the conservation and protection of wildlife.
Wildlife Conservation (Specially Protected Fauna) Notice 2006	Declaration of specially protected fauna in WA, including fauna that is rare of is likely to become extinct. List includes over 199 species, itemising scientific and common name.

Industry Standards, Codes of Practice, Guidelines and Commonwealth Guidance Material

APPEA Australian Offshore Titleholder's Source Control Guideline (June 2021)
Australia's Oceans Policy - Western Australia South-West, Western-Central and North-West Marine Plans
Australian Petroleum Production and Exploration Association (APPEA) Code of Practice 2008
Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000
DAWE Policy Statement: 'Indirect consequences' of an action: Section 527E of the EPBC Act (2013): https://www.environment.gov.au/system/files/resources/f96c4a92-ffb1-4b77-befe-e2fd9130b0d8/files/epbc-act-policy-indirect-consequences.pdf
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NOPSEMA (2012). Control Measures and Performance Standards Guidance Note. N040300-GN0271 Revision No. 4. December 2012
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NOPSEMA Guidance note: Environment plan content requirements – (GN1344) 11.9.2020
NOPSEMA Guidance note: Petroleum activity and Australian marine parks – (GN1785) 3.6.2020
NOPSEMA Guidance note: Notification and reporting of environmental incidents – (GN0926) 8.6.2020
NOPSEMA Guidance note: ALARP – Rev 6 (GN0166) (2015)
NOPSEMA Policy: Environment plan assessment - (PL1347) 19.5.2020
NOPSEMA Guideline: Environment plan decision making – Rev 7 (GL1721) (2021)
NOPSEMA Guideline: Making submissions to NOPSEMA – (GL0255) 4.5.2020
NOPSEMA Guideline: Consultation with Commonwealth agencies with responsibilities in the marine area (GL1887) 3.7.2020
NOPSEMA Bulletin #2: Clarifying Statutory Requirements and Good Practice Consultation – Rev 0 (A696998) (2019)
NOPSEMA Explanatory Note: Australian dispersant acceptance process (N-04750-IP1597 A446655) (06/07/2020)
NOPSEMA Policy Section 572 Maintenance and removal of property (N-00500-PL1903) 20/11/2020 This document sets out the principles that NOPSEMA will apply in compliance oversight, and where necessary, enforcement of section 572 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act) which requires titleholders to: • Maintain all structures, equipment and property in a title area in good condition and repair • Remove all structures, equipment and property when it is neither used nor to be used in connection with operations authorised by the title.
Offshore Petroleum Industry Guidance Note; Marine Oil pollution: Response and Consultation Arrangements (Western Australian Department of Transport, July 2020).

Appendix C

Existing Environment and EPBC Protected Matters Search

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1 Introduction

This Appendix describes the operational area (refer to Section 4.4 of the EP for a description of the operational area), including relevant values and sensitivities, by both planned activities (routine and non-routine) and unplanned events (accidents/incidents), associated with proposed petroleum activities for the Griffin field. The level of detail is appropriate to the nature and scale of the impacts and risks to the particular values and sensitivities.

Throughout this document reference is made to the Griffin Field Infrastructure Decommissioning EP, from here on in, this will be referred to as the 'EP'.

The Griffin field and subsea infrastructure is located within Permit Areas WA-10-L, located in Commonwealth waters, around 58 km north-west of Exmouth, Western Australia and in water depths of about 130 m. Figure 4-1 of the EP shows the location of the operational area.

2 Description of Environment

2.1 Regional Setting

Australia's offshore waters have been divided into six marine regions to facilitate their management by the Australian Government under the Environment Protection and Biodiversity Conservation (EPBC) Act. The operational area for this activity are located in Commonwealth waters within the Northwest Shelf Province

The inner shelf component of the Northwest Province, with water depth ranges from 30 to 60 m, is virtually flat and overlain by sparse sandy substrata. Relict sediments are also present and rhodolith beds of coralline red algae growing on rocks occur between 30 to 90 m (DEWHA, 2007). In the deeper waters of the mid shelf (60 to 100 m), sediments comprise sands and gravels on cemented hard grounds. It is reasonably barren substratum with 50% comprising relict reworked material, such as ooid old shoal; hence, there is little recent organic material, and the substrata support a generally low biota (DEWHA, 2007). The sediments of the outer shelf (100 to 200 m) comprise sands and gravels, transitioning to muds with increasing distance offshore. Detrital rain transports some organic material to the seafloor; however, there is believed to be very few benthic living organisms on this outer shelf (DEWHA, 2007).

2.2 Physical Environment

2.2.1 Climate and Meteorology

The operational area experiences an arid sub-tropical climate and a distinct summer monsoonal 'wet' season from November to February, followed by a typically cooler winter 'dry' season (ANRA, 2013). Historical rainfall data shows the highest mean monthly rainfall occurs from January to June (BoM, 2021). The climate is controlled by two major atmospheric pressure systems: Indian Tropical Maritime air moving in from the west or north-west, and tropical continental air from the inland (ANRA, 2013).

The northwest coast between Broome and Exmouth experiences on average about five tropical cyclones between November to April each year (BoM, 2021). Cyclones can bring vast amounts of rain to the area, with strong swell and rough seas common during these meteorological events. Most cyclones approach the region from the east-northeast, veering to a southerly track the further south they go (BoM, 2021). Observations from the Onslow Airport weather station are summarised in Table 2-1.

Historical rainfall data indicates the highest rainfall occurs in February and March, while the lowest rainfall occurs in late spring/early summer (September to December).

Table 2-1: Meteorological Conditions (for Onslow Airport) Representative of the Operational Area (Bureau of Meteorology, 2021)

Month	Mean Maximum Monthly Temperature (°C)	Mean Minimum Monthly Temperature (°C)	Mean Rainfall (mm)
January	36.5	24.5	37.1
February	36.3	25.1	58.4
March	36.2	24.3	71.0
April	34.0	21.6	11.7
May	29.4	17.4	47.8
June	26.0	14.4	45.4
July	25.6	13.1	19.2
August	27.4	13.7	8.2
September	30.2	15.5	1.3
October	33.0	18.0	0.8
November	34.4	20.2	2.6
December	36.0	22.5	3.3
Annual Average	32.1	19.2	304.2

Sea surface wind data was sourced from the National Centre for Environmental Predictions' (NCEP) Climate Forecast System Reanalysis. Table 2-2 presents wind data from the nearest NCEP wind station to the operational area. The data indicates winds across the region are relatively strong (average 12.6 knots, maximum 55.9 knots) and varied throughout the year. The average wind speeds are weakest during April (10.2 knots) and predominantly from the south-southwest; strongest average winds occur during November (14.2 knots) when they are predominantly from the southwest.

Table 2-2: Predicted average and maximum winds from the closest station to the operational area. Data derived from CFSR hindcast model from 2009-2013 (inclusive) (RPS-APASA, 2014)

Month	Average wind (knots)	Maximum wind (knots)	General Direction
January	13.3	50.5	southwest
February	12.7	55.9	southwest
March	11.7	36.9	southwest
April	10.2	25.6	south-southwest
May	11.7	3.2	east
June	13.0	32.4	east- southeast
July	12.7	34.3	south-southeast
August	11.2	29.1	south
September	13.7	29.4	south-southwest
October	13.5	28.8	southwest
November	14.2	26.9	southwest
December	13.4	31.1	southwest
Minimum	10.2	25.6	-
Maximum	14.2	55.9	-
Annual Average	12.6	34.5	-

2.2.2 Oceanography

Currents and Tides

The oceanography within the operational area is strongly influenced by the warm, low-salinity waters of the Indonesian Throughflow (ITF), which influences the upper 1250 m of the water column (DEHWA, 2007). While the origin and movement of shelf waters such as those in the permit areas are not well understood, it is believed ITF waters flood the shelf via the Eastern Gyral Current and the Leeuwin Current (Figure 2-1). Surface currents are subject to strong seasonal variations; the Eastern Gyral Current intensifies during July to September and the Leeuwin Current is strongest in autumn and weakens from December to March.

Waves

The wave regimes in the vicinity of the operational area are caused by the combination of sea waves and swells. Sea waves occur predominantly from the southwest throughout the year, with more easterly waves experienced in winter, while the largest swells generally occur from June to October (Woodside, 2002; Pearce et al., 2003). Therefore, the largest total waves (sea waves combined with swell) occur from June to September, with April and May the calmest months, noting only 10% of significant wave heights off Dampier exceed 1.2 m, with average wave height being 0.7 m (Pearce et al., 2003). However tropical cyclones can generate extreme swells, generally from the northeast.

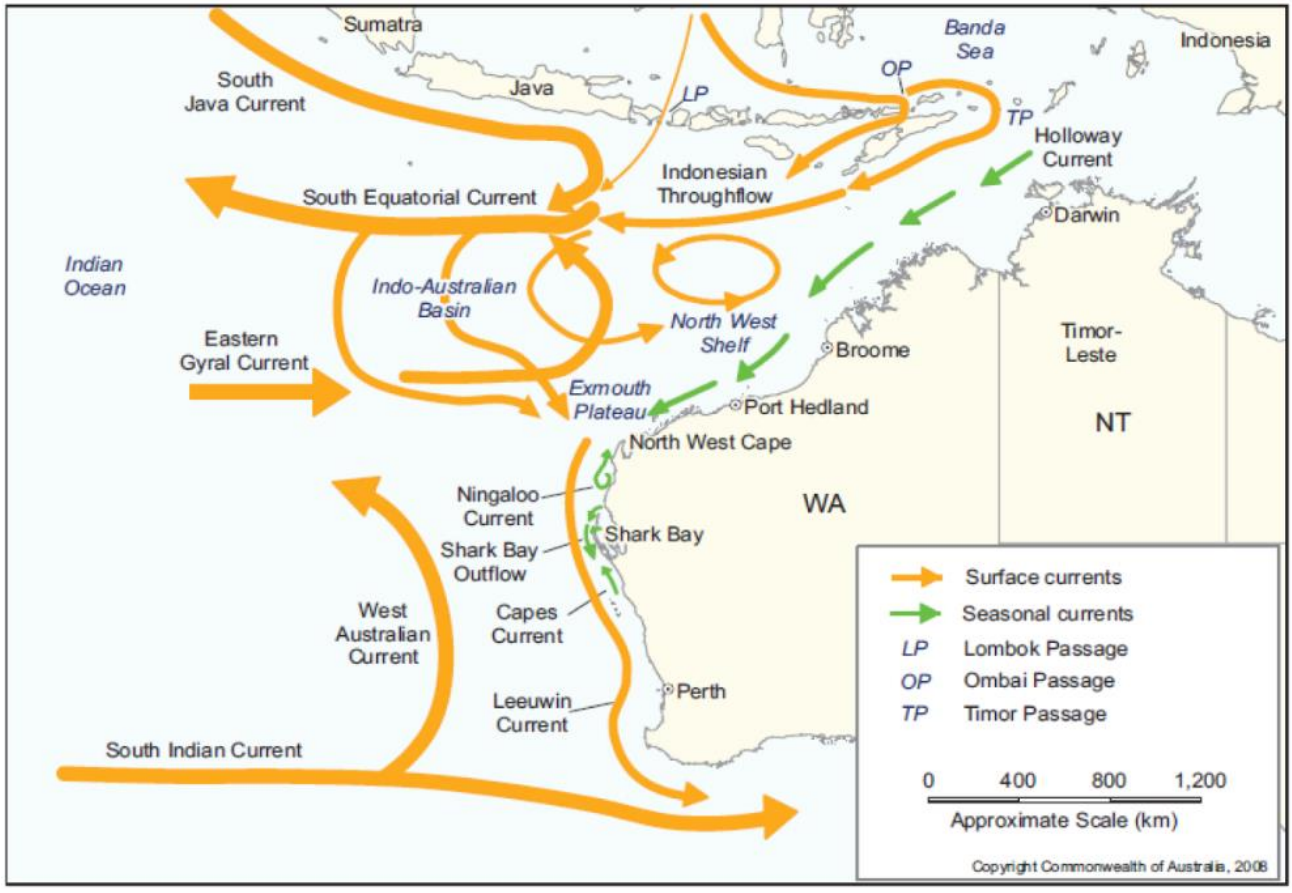

Figure 2-1: Major Ocean Currents Influencing Western Australia (DEWHA, 2008a)

Water Temperature and Salinity

The average sea surface temperature within vicinity of the operational area ranges from 20°C to 24°C during winter and 24°C to 28°C during summer (BoM, 2021). There is likely to be a distinct thermocline in deep offshore waters, associated with the warming influence of the Leeuwin Current, which overlays colder, more saline, deeper ocean waters that vary seasonally (DEWHA, 2008). Salinity is relatively uniform at 35 parts per thousand (ppt).

Although the Leeuwin Current is a core movement of the region, it is overall dominated by the ITF. The ITF is one of the primary links in the global exchange of water and heat between ocean basins and is an essential element in the global climate system. It delivers warm, oligotrophic (low in nutrients) and low-salinity water from the western Pacific Ocean to the Indian Ocean, and is a fundamental driver of oceanographic and ecological processes in the vicinity of the operational area (DEWHA, 2008).

2.3 Biological Environment

2.3.1 Benthic Habitats

Refer to Section 5.3 of the EP.

2.3.2 Pelagic Environments

Plankton

Plankton consists of microscopic organisms typically divided into phytoplankton (algae) and zooplankton (fauna including larvae). Plankton plays a major role in the trophic system, with phytoplankton being a primary producer and zooplankton a primary consumer. They are both in turn consumed by other faunal species.

Phytoplankton are autotrophic planktonic organisms living within the photic zone and spend either part or all of their lifecycle drifting with the ocean currents. Phytoplankton depend on oceanographic processes, such as currents and vertical mixing, that supply nutrients needed for photosynthesis. Thus, phytoplankton biomass is typically variable (spatially and temporally) (Evans et al., 2016) but greatest in areas of upwelling, or in shallow waters where nutrient levels are high. Peak primary productivity, however, varies on a local and regional scale.

The trophic system in the pelagic zone of the NWMR is based on phytoplankton (DEWHA, 2008). The distribution of plankton is often associated with localised and seasonal productivity that results in sporadic bursts of phytoplankton and zooplankton communities (DEWHA, 2008). However, in general, the mixing of warm surface water with deeper, more nutrient-rich water generates phytoplankton production and zooplankton blooms.

According to the Australia State of the Environment 2016 Report (Jackson et al., 2017), warming ocean temperatures have extended the distribution of tropical phytoplankton species (which have a lower productivity), further south resulting in a decline in primary productivity in oceanic waters north of 35°, especially the NWS (Evans et al., 2016). However, trends in primary productivity across Australia vary, with the southwest of Australia experiencing an increase in productivity and northern Australia experiencing no change between 2002 to 2016 (Evans et al., 2016).

Cyclones can influence the distribution and abundance of plankton. Observations of Cyclone Tiffany, which affected the NWS in January 1988, noted that communities of phytoplankton rapidly recovered as a result of changed nutrient conditions, while zooplankton species were transported into areas beyond their normal range due to changes in current, wind and wave patterns (DEHWA, 2008).

Fish

Some 1400 species of finfish are known to occur in the vicinity of the operational area, mostly of a tropical Indo-West Pacific affinity, with a greater proportion occurring in shallow coastal waters (DEWHA, 2008). In general, most fish in the region are associated with coral reefs. For example, the abundance, species richness and assemblage structure of juvenile fishes was quantified in 2009 to 2011 at 20 locations extending from Bundegi to 3-Mile Camp and covering around 280 km of the Ningaloo coastline. Sampling included back reef and lagoonal reef zones as well as sanctuary and recreational management zones. In total, 36,791 juvenile fishes from 120 species were observed over the three recruitment years, providing an average of 53 individuals (± 2.6 standard error) per 30 m² transect.

Interestingly, recruitment rates varied significantly among sampling times (in other words, temporal variation). Transect abundance means ranged from 82 ± 6.3 individuals (2009), 19 ± 1.2 individuals (2010) to 77 ± 4.6 individuals (Depczynski et al., 2011). The authors of this study noted the 75% drop in abundance in 2010 coincided with a small increase in mean species richness. Different pelagic fish occur in the deeper offshore waters of the region. Pelagic fish species are seasonally abundant and may pass through the area during annual migrations. The most notable species of deep-water pelagic fishes in the area are the billfish, which include sailfish, marlin (both family Istiophoridae) and swordfish (*Xiphias gladius*).

The region also supports diverse and abundant shark and ray populations. Whaler sharks (Family Carcharhinidae) are the most numerous and diverse, occurring in a wide range of habitats such as intertidal (black-tip reef shark – *Carcharhinus melanopterus*), offshore reefs (grey reef shark – *C. amblyrhynchos*) and deep ocean areas (oceanic white-tip shark – *C. longimanus*).

Information about commercial fisheries and recreational fishing activities in the operational area are provided in Section 5.6 of the EP.

2.4 Matters of National Significance

Conservation values and sensitivities listed and protected under the EPBC Act include matters of environmental significance (MNES) and other protected matters. Other internationally significant conservation values have been identified via the World Database on Protected Areas and UNESCO data sources.

Table 5.2 of the EP summarises the MNES identified as potentially occurring within the operational area, as determined by the EPBC Protected Matters search results included in this Attachment 1 of this Appendix.

2.4.1 Commonwealth and International Marine Areas

The operational area is within Australia's exclusive economic zone (EEZ) and Territorial Sea, which is a Commonwealth marine area. The Commonwealth marine area is any part of the sea, including the waters, seabed and airspace, within Australia's EEZ or over the continental shelf of Australia, that is not State or NT waters. The Australian Commonwealth marine area stretches from 3 to 200 nm from the coast.

2.4.2 World Heritage Properties

There are no World Heritage Properties in the operational area.

2.4.3 National Heritage Properties

There are 13 National Heritage Places located in WA, none of which are in the operational area.

2.4.4 Commonwealth Heritage Places

The Commonwealth Heritage list is a list of the historic, cultural and natural heritage places on Commonwealth land, in Commonwealth waters, or owned or managed by the Commonwealth Government. These include places connected to defence, maritime safety, communications, customs and other government activities that also reflect Australia's development as a nation.

No Commonwealth heritage places exist within the operational area.

2.4.5 Wetlands of International Importance

There are no Ramsar wetlands within the operational area. The nearest Ramsar wetland is Eighty Mile Beach, located near Port Hedland (around 541 km to the east of the operational area).

2.4.6 Wetlands of National Importance

There are no Ramsar wetlands within the operational area. The nearest Ramsar wetland is Cape Range Subterranean Waterways (around 97 km from the operational area).

2.4.7 Key Ecological Features

KEFs are areas of regional importance for either biodiversity or ecosystem function and integrity within the Commonwealth marine environment and have been identified through the marine bioregional planning process (DSEWPaC, 2012b). KEFs meet one or more criteria of:

- a species, group of species or a community with a regionally important ecological role (such as a predator, prey that affects a large biomass or number of other marine species)
- a species, group of species or a community that is nationally or regionally important for biodiversity
- an area or habitat that is nationally or regionally important for:
  - enhanced or high productivity (such as predictable upwellings – an upwelling occurs when cold nutrient-rich waters from the bottom of the ocean rise to the surface)
  - aggregations of marine life (such as feeding, resting, breeding or nursery areas)
  - biodiversity and endemism (species which only occur in a specific area).
- a unique seafloor feature, with known or presumed ecological properties of regional significance.

One KEF overlaps the operational area. Refer Section 5.4.1 of the EP.

Ancient Coastline at the 125 m Depth Contour

This KEF is recognised for its biodiversity values (unique seafloor feature with ecological properties of regional significance), which apply to both the benthic and pelagic habitats within the KEF. The shelf of the NWMR contains several terraces and steps that reflect increases in sea level across the shelf that occurred during the Holocene period. The most prominent of these occurs episodically as an escarpment through the Northwest Shelf Province and the Northwest Shelf Transition, at a depth of around 125 m.

Parts of the ancient coastline, particularly where it exists as a rocky escarpment, are thought to provide biologically important habitats in areas otherwise dominated by soft sediments. Little is known about fauna associated with the hard substrate of the escarpment, but it is likely to include sponges, corals, crinoids, molluscs, echinoderms and other benthic invertebrates representative of hard substrate fauna in the NWS bioregion.

The topographic complexity of the escarpment may also facilitate vertical mixing of the water column, providing relatively nutrient-rich local environments. Enhanced productivity may also attract opportunistic feeding by larger marine life including humpback whales, whale sharks and large pelagic fish.

2.4.8 Australian Marine Parks

There are no Australian Marine Parks within the operational area. Refer Section 5.4.4 of the EP.

2.4.9 State Marine Parks and Marine Management Areas

There are no State Marine Parks or Marine Management Areas within the operational area. Refer Section 5.4.4 of the EP.

2.4.10 Threatened Ecological Communities

Listing threatened ecological communities is a form of landscape or systems level protection. These communities provide vital wildlife corridors and habitat refuges for many plant and animal species, including threatened species and other Australian plants and animals in decline.

The PMST reports identified no threatened ecological communities within the operational area.

2.4.11 Protected Species

The EPBC Act PMST was used to identify listed threatened and migratory species that may occur within the operational area (refer to Table 5-8 in EP). The PMST results identified 25 marine fauna species listed as `threatened' species and 37 marine fauna species listed as `migratory' within the operational area.

Descriptions of the threatened and migratory species are provided in this section. The full list of marine species from the protected matters search is provided in Attachment 1 of this Appendix.

Biologically Important Areas and Habitat Critical to the Survival of a Species

The Conservation Values Atlas[1] identifies biologically important areas (BIAs) for some of the region's protected species. These are areas considered particularly important for conserving protected species and where aggregations of individuals display biologically important behaviour such as breeding, foraging, resting or migration. BIAs are not protected matters and should not be confused with 'critical habitat' as defined in the EPBC Act. A review of the Conservation Values Atlas identified BIAs for protected species that intersect with the operational area. Table 5-11 in the EP provides a breakdown of the BIAs within the operational area.

[1] Department of the Environment and Energy. Commonwealth of Australia. Atlas. <http://www.environment.gov.au/arcgis-framework/apps/ncva/ncva.jsf>

Biologically Important Areas for Seabirds Habitat Critical to the Survival of a Species 'Habitat critical to the survival of a species' is defined within the EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DoE, 2013) as areas that are necessary:

- for activities such as foraging, breeding, roosting or dispersal
- for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species.

The Recovery Plan for Marine Turtles in Australia (DoEE, 2017) provides details of habitat critical to the survival of several species of marine turtle genetic stock. Table 5-11 of the EP presents the habitat critical areas within the operational area.

2.5 Summary of Windows of Ecological Sensitivity

Table 2-3 summarises the windows of ecological sensitivity for values identified within the operational area. These receptors are considered throughout the Environment Plan in terms of the identified potential risk. Figures within Section 5.5.2 of the EP present the location of BIAs.

Table 2-3: Key Environmental Sensitivities and Timing of Biologically Important Activity

Category	Environmental Sensitivity	Location	Season
Marine mammals	Humpback – migration	The migration corridor extends from the coast to out to around 100 km offshore in the Kimberley region extending south to North-west Cape	Northern migration, late July to September
	Pygmy blue whale – distribution	-	Note: April and August (north-bound migration) and October to January (south-bound migration)
Marine reptiles	Flatback turtle – internesting	Thevenard Island (South), Montebello Islands (Hermite Island	Summer
Sharks/fish	Whale shark – foraging	Northwards of Ningaloo	Spring
Birds	Wedge-tailed shearwater – breeding	Kimberley, Pilbara and Gascoyne coasts and islands including Ashmore Reef	Breeding visitor arriving in mid-August and leaving in April in Pilbara and mid-May in Shark Bay

2.6 Marine Mammals

A search of the EPBC Protected Matters database identified 11 protected marine mammal species with potential to occur within the operational area (refer to Attachment 1 and Table 5-5 of the EP).

2.6.1 Threatened and Migratory Species

Sei Whale

Sei whales (*Balaenoptera borealis*) are listed as vulnerable and migratory under the EPBC Act. Sei whales are not commonly recorded in Australian waters and their similarity to Bryde's whales has resulted in confusion about their distributional limits and the accuracy of recorded observations (DoE, 2020a). There are no known mating or calving areas in Australian waters. The species migrates 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 in Victoria) as well as in deeper offshore waters, and have only been sighted in summer and autumn (DAWE, 2021).

According to the PMST report, sei whales are likely to occur or have habitat within the operational area; however, due to infrequent sighting in Australia, the likelihood of these whales being present is very low.

Blue Whale

Blue whales (*Balaenoptera musculus*) are listed as endangered and migratory under the EPBC Act. There are two recognised subspecies of blue whale in the southern hemisphere that are both recorded in Australian waters, the southern (or 'true') blue whale (*Balaenoptera musculus intermedia*) and the 'pygmy' blue whale (*Balaenoptera musculus brevicauda*). In general, southern blue whales occur in waters south of 60°S and pygmy blue whales occur in waters north of 55°S (not in the Antarctic). By this definition, all blue whales in waters from Kalbarri to the NT border are assumed to be pygmy blue whales and are discussed below.

Pygmy blue whales have a southern hemisphere distribution, migrating from tropical water breeding grounds in winter to temperate and polar water feeding grounds in summer (Bannister et al., 1996; Double et al., 2014). Passive acoustic data documented pygmy blue whales migrating along the WA shelf break at depths of 500 to 1000 m (McCauley & Jenner, 2010).

During the southern migration, pygmy blue whales pass south of the Montebello Islands and Exmouth from October to the end of January, peaking in late November to early December (Double et al., 2012). On the return journey, 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. Blue whales have been detected off Exmouth and the Montebello Islands between April and August (Double et al., 2012; McCauley & Jenner, 2010) (Figure 2-2).

According to the PMST report, pygmy blue whales were identified as likely to occur or have habitat within the operational area. It is likely the pygmy blue whale will be regionally present, particularly over the summer season between April and August (north-bound migration) and October to January (south-bound migration).

Bryde's Whale

Bryde's whale (*Balaenoptera edeni*) is listed as migratory under the EPBC Act. It is considered the least migratory of the whale species in Australian waters and is typically found in tropical waters between 40°S and 40°N year-round (Bannister et al., 1996; DAWE, 2020). The species frequents oceanic waters as well as nearshore areas following zones of upwelling around the continental shelf (Mustoe and Edmunds, 2008).

According to the PMST report, Bryde's whales were identified as likely to occur or have habitat within the operational area.

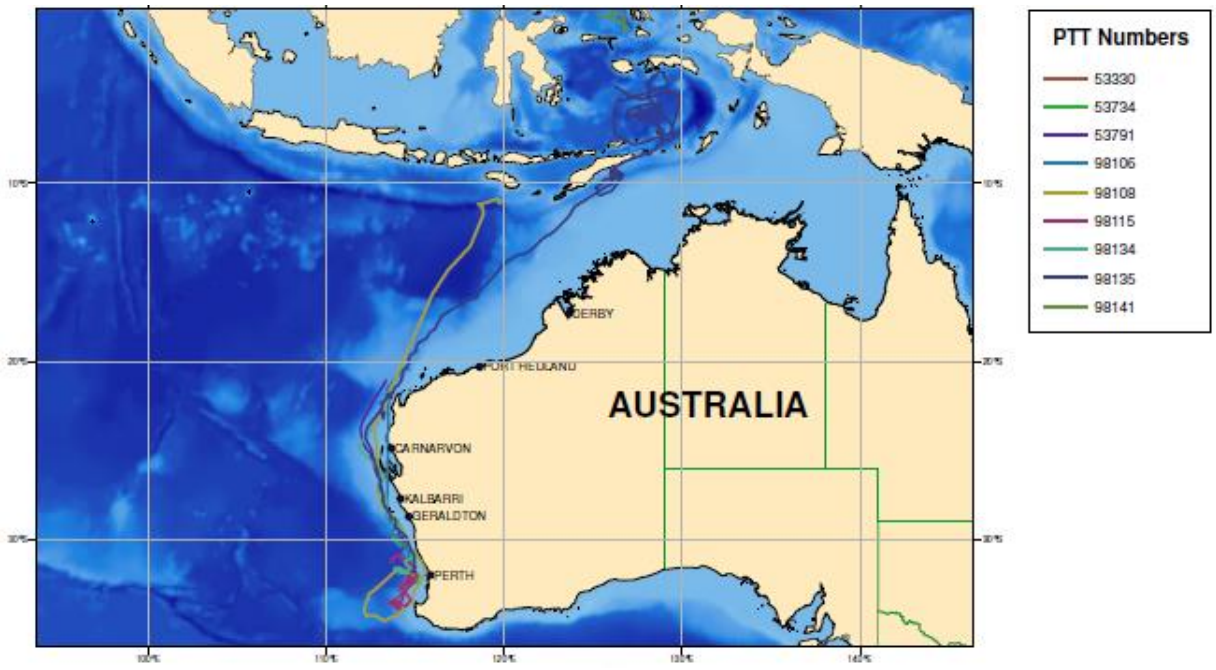

Figure 2-2: Satellite Tracking of Blue Whales in 2010/2011, Modified from Double et al. (2012)

Fin Whale

The fin whale (*Balaenoptera physalus*) is listed as vulnerable and migratory under the EPBC Act. It is the second-largest whale species after the blue whale. Fin whale distribution in Australian waters is known

primarily from stranding events and whaling records. Due to scarcity of sighting records, the distribution cannot be accurately determined, although it is thought to be along the western coast of Australia, southern Australia around to Tasmania. The Australian Antarctic waters are important feeding grounds but there are no known mating or calving areas in Australian waters (Morrice et al., 2004). The migration routes and location of winter breeding grounds are uncertain, but presence in Australian waters has been detected in summer and autumn months (DoEE, 2017).

According to the PMST report, fin whales were identified as likely to occur or have habitat in the operational area; however, due to infrequent sightings in Australia, the likelihood of these whales being present is low.

Southern Right Whale

The southern right whale (*Eubalaena australis*) is listed as endangered and migratory under the EPBC Act. The species is seasonally present on the Australian coast between May and November and recorded in the coastal waters of all Australian states (Bannister et al., 1996). Major calving areas are located in WA at Doubtful Island Bay, east of Israelite Bay in the southwest; and in South Australia at Head of Bight (Bannister et al., 1996). The distribution of southern right whales in Australian waters other than near the coast is unknown and very little information is known about the migratory patterns, habitats, calving areas or feeding habits, but peak periods for mating are known to be from mid-July through to August (DAWE, 2020).

Isolated individuals have been seen outside the normal season, but a summer sighting would be very unusual. Australian southern right whales migrate seasonally between higher and middle latitudes. The general timing of migratory arrivals and departures varies slightly each year. Migratory pathways are not well known (Bannister et al., 1996). A circular, anticlockwise migration pattern south of the Australian continent was proposed by Hart et al. (1842), based on the seasonal location of whaling activity. This generalised migratory pattern is further supported by most inter-year coastal movements, being in a westerly direction, and between-year coastal movements, being in an easterly direction (Burnell, 2001).

According to the PMST report, the southern right whale and its habitat may occur within the operational area.

Humpback Whale

The humpback whale (*Megaptera novaengliae*) is listed as vulnerable and migratory under the EPBC Act. Humpback whales occur throughout Australian waters, their distribution being influenced by their migratory pathways and aggregation areas for resting, breeding and calving. In the southern hemisphere, humpback whale populations spend the summer months feeding in the Antarctic polar region before migrating north to tropical breeding/calving grounds in the coastal waters of the Kimberley.

Aerial surveys and noise logger recordings for Chevron's Wheatstone Project show most distributions of humpback whales were sighted at an average distance of 50 km from the mainland during the northern migration and 35 km during the southbound migration (RPS, 2010). The southbound migration moves down the coast between late August and November, although females with calves have been documented leaving the calving areas last, with a later peak in abundance observed from mid-August to mid-September (Jenner et al., 2001). Figure 2-3 illustrates the results of aerial surveys conducted during a single year between the North West Cape and Barrow Island.

Humpback whales were identified as known to occur within the operational area. The operational area intersects the humpback whale migration BIA and waters out to around 50 km offshore as part of the migratory corridor for these whales.

According to the PMST report, the humpback whale and its habitat is known to occur within the operational area. Considering the likely utilisation of the waters as feeding ground, this assessment is believed to be accurate.

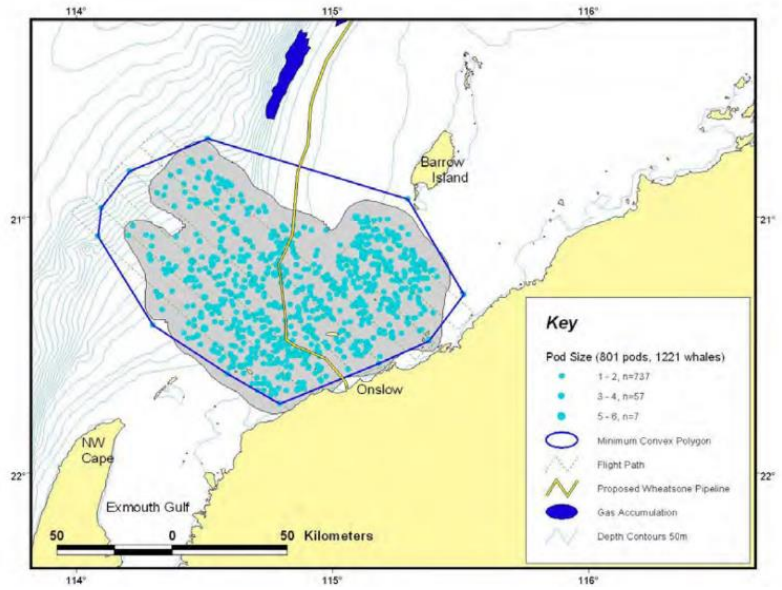

Figure 2-3: Aerial Survey Sightings of Humpback Whales from June to December 2009 (taken from Jenner et al., 2010)

Sperm Whale

The sperm whale (*Physeter macrocephalus*) is listed as migratory under the EPBC Act. It has a wide distribution extending from the polar regions to the equator, although it is usually found in deeper oceanic waters near continental breaks and canyons (DAWE, 2020). Females and young males tend to remain in warmer waters, whereas adult males venture further away from the equator to colder waters. Limited information exists about sperm whale distribution in Australian waters.

According to the PMST report, sperm whales have been identified as may occur or have habitat within the operational area.

Killer Whale (Orca)

The orca (*Orcinus orca*) is listed as migratory under the EPBC Act and is the largest member of the dolphin family. Orcas are found in both tropical and temperate waters in oceanic, pelagic and neritic waters (DAWE, 2020). Orcas usually travel in groups of ten to 30 individuals and make seasonal migrations, and may follow regular migratory pathways; however, this has not been proven. No specific information about migratory pathways along the WA coast is documented. Orcas have been recorded relocating to Antarctic waters during summer months and back to warmer waters during winter. This suggests that during the winter months would be the highest likelihood of occurrence of orcas on the NWS.

According to the PMST report, the orca has been identified as may occur or have habitat within the operational area.

Spotted Bottlenose Dolphin

The spotted bottlenose dolphin (Arafura/Timor Sea population) (*Tursiops aduncus*) is listed as migratory under the EPBC Act. Occurring Australia-wide, this species resembles the common bottlenose dolphin. This species prefers shallower inshore bays and estuaries and travels in groups consisting on average of between five and 16 individuals (DAWE, 2020). Migratory movements in Australia vary and are likely to be triggered by baitfish movements. This species can spend all year in one location but can also make long-range movements.

According to the PMST report, the spotted bottlenose dolphin was identified as known to occur or have habitat within the operational area. As the species prefers shallower, inshore waters they are not likely to occur within the operational area or deeper waters.

Australian Humpback Dolphin

The Australian humpback dolphin (*Sousa sahulensis*) is listed as migratory under the EPBC Act. The species are typically found in tropical to subtropical waters off the Sahul Shelf from northern Australia to the southern waters of the island of New Guinea (Jefferson and Rosenbaum, 2014). Australian humpback dolphins are found primarily in coastal waters (Parra & Cagnazzi 2016).

According to the PMST report, the Australian Humpback Dolphin was identified as may occur or have habitat within the operational area.

Dugong

Dugongs (*Dugong dugon*) are protected under the EPBC Act, which lists them as marine and migratory species. They are large, herbivorous marine mammals that feed on seagrass and mostly inhabit shallow (up to 5 m) waters fringing coasts and offshore islands, occurring in close conjunction with the seagrass and algae beds on which they feed. There is little data about the presence of dugongs in deeper offshore waters, although the absence of food would suggest this is unlikely.

The distribution of dugongs in Australia ranges from Shark Bay in WA, extending around the NT coastline to Moreton Bay in Queensland. Dugongs are long-lived and slow-breeding. Breeding occurs from September through to April.

According to the PMST report, dugongs are likely to occur or have habitat in the operational area.

2.7 Marine Reptiles

A search of the EPBC Protected Matters database identified seven protected reptile species with potential to occur within the operational area (refer to Attachment 1 and Table 5-9 of the EP).

2.7.1 Threatened and Migratory Species

Short-Nosed Seasnake

The short-nosed seasnake (*Aipysurus apraefrontalis*) is listed as critically endangered under the EPBC Act. It is a fully aquatic, small snake and is endemic to WA. It has been recorded from Exmouth Gulf, WA, to the reefs of the Sahul Shelf, in the eastern Indian Ocean. This species is believed to show strong site fidelity to shallow coral reef habitats in less than 10 m of water, with most specimens having been collected from Ashmore and Hibernia reefs (Minton & Heatwole, 1975; Guinea & Whiting, 2005).

The species prefers the reef flats or shallow waters along the outer reef edge in water depths to 10 m (McCosker, 1975; Cogger, 2000). The species has been observed during daylight hours, resting beneath small coral overhangs or coral heads in 1 to 2 m of water (McCosker, 1975). Guinea and Whiting (2005) reported that very few short-nosed seasnakes moved even as far as 50 m away from the reef flat and are therefore unlikely to be expected in high numbers in offshore, deeper waters.

According to the PMST report, the short-nosed seasnake was identified as likely to occur within the operational area.

Leaf-Scaled Seasnake

The leaf-scaled seasnake (*Aipysurus foliosquama*) is listed as critically endangered under the EPBC Act. The species is usually solitary but is sometimes found in groups at particular coral outcrops, together with other species of seasnake, including the short-nosed seasnake (*A. apraefrontalis*) described above (McCosker, 1975). These congregations contain gravid (pregnant) females (Guinea & Whiting. 2005).

The leaf-scaled seasnake is found only on the reefs of the Sahul Shelf in WA, especially on Ashmore and Hibernia reefs (Cogger, 2000; Minton & Heatwole, 1975; Storr et al., 2002) in the NWMR (DEWHA, 2008).

The current extent of occurrence is estimated to be 750 km² and the area of occupancy is around 228 km² (Guinea and Whiting, 2005).

The leaf-scaled seasnake was the most common seasnake encountered on the reef flat at Ashmore Reef (Guinea & Whiting, 2005; Minton & Heatwole, 1975). However, sightings of this species have become rare on both Ashmore Reef and Hibernia Reef (Guinea, 2006; 2007) and it has not been reported in surveys since 2001 (Guinea, 2007; Lukoschek et al., 2013). In 2010, a dead specimen was collected from Barrow Island and deposited in the WA Museum, although it is unknown whether the individual was a resident or a waif (displaced from original habitat) (Lukoschek et al., 2013).

According to the PMST report, the leaf-scaled seasnake was identified as known to occur or have habitat within the operational area, however, considering the species is most common at Ashmore Reef and only one specimen was observed on Barrow Island from unknown origin it is reasonable to assume the species may be present in very low numbers.

Loggerhead Turtle

The loggerhead turtle (*Caretta caretta*) is listed as endangered and migratory under the EPBC Act. It has a worldwide distribution, living and breeding in subtropical to tropical locations (Limpus, 2008a). The annual nesting population in WA is thought to be 3000 females annually (Baldwin et al., 2003), and this is considered to support the third largest population in the world (Limpus, 2008a).

Nesting and breeding occur from October to March, with a peak in late December/early January (DoEE, 2017). Major nesting beaches include the Muiron Islands, Ningaloo Coast south to Carnarvon.

Foraging areas are widespread for loggerhead turtle populations and migrations from nesting to feeding grounds can stretch thousands of kilometres, including feeding grounds as far north as the Java Sea of Indonesia for the WA population (Limpus, 2008a). Loggerhead turtles are carnivorous and feed primarily on benthic invertebrates from depths ranging from around 50 m to nearshore tidal areas (DAWE, 2020), including areas of rocky and coral reef, muddy bays, sand flats, estuaries and seagrass meadows (Limpus, 2008a).

According to the PMST report, the loggerhead turtle or its habitat is known to occur within the operational area. No BIAs for the species lie within the operational area. Considering the known habitat utilisation and presence, this assessment is believed to be accurate.

Green Turtle

The green turtle (*Chelonia mydas*) is listed as vulnerable and migratory under the EPBC Act. It has a worldwide tropical and subtropical distribution and is widespread and abundant in WA waters, with an estimated 20,000 individuals occurring in WA, arguably the largest population in the Indian Ocean (Limpus, 2008b). The principal rookeries in WA include the Lacepede Islands, Barrow Island, Montebello Islands (all sandy beaches), Muiron Islands, Browse Island, Northwest Cape, and Ningaloo Coast North. Nesting occurs between November and March, with the peak period between January and March.

Green turtles are omnivores, mainly feeding in shallow benthic habitats on seagrass or algae, but are also known to feed on sponges, jellyfish and mangroves (Limpus, 2008b). Green turtles are unlikely to forage or dwell within deeper offshore waters due to the water depths; however, they may occasionally migrate through it.

According to the PMST report, the green turtle or its habitat is known to occur within the operational area. Considering the known habitat utilisation and presence, this assessment is believed to be accurate.

Leatherback Turtle

The leatherback turtle (*Dermochelys coriacea*) is listed as endangered and migratory under the EPBC Act. It has the widest distribution of any marine turtle and can be found from tropical to temperate waters throughout the world (Márquez, 1990). There are no major centres of nesting activity that have been recorded in Australia, although scattered isolated nesting (one to three nests per annum) occurs in southern Queensland and the NT (Limpus & McLachlin, 1994). There have been several records of leatherback turtles off the coast of WA but no confirmed nesting sites (Limpus, 2009).

According to the PMST report, the leatherback turtle was identified as likely to occur or have habitat within the operational area.

Hawksbill Turtle

The hawksbill turtle (*Eretmochelys imbricata*) is listed as vulnerable and migratory under the EPBC Act. Hawksbill turtles have a global distribution throughout tropical and subtropical marine waters. The WA stock is concentrated on the NWS, one of the largest hawksbill populations in the world. The most significant breeding areas are around the sandy beaches of the Dampier Archipelago and the Montebello Islands. Hawksbill turtles also nest at North West Cape/Ningaloo Coast, Muiron Islands, Varanus Island, the Lowendal Islands and Rosemary Island. Nesting occurs throughout the year in WA, peaking between October and January.

Adults tend to forage in tropical tidal and subtidal coral and rocky reef habitat where they feed on an omnivorous diet of sponges, algae, jellyfish and cephalopods (DAWE, 2020).

According to the PMST report, the hawksbill turtle was identified as known to occur or have habitat within the operational area. Considering the water depth, it is unlikely hawksbill turtles forage in this area but may migrate through it.

Flatback Turtle

The flatback turtle (*Natator depressus*) is listed as vulnerable and migratory under the EPBC Act. It has an Australasian distribution, with all recorded nesting beaches occurring within tropical to subtropical Australian waters (Limpus, 2007). They are known to feed on mid-water plankton and benthic organisms and can forage in mid-shelf water depths (up to about 50 m). Breeding and nesting is restricted to northern WA (Limpus, 2007). The Pilbara genetic stock of flatback turtles is concentrated on islands of the Pilbara coastal change, Barrow Island and Dampier Archipelago (DAWE, 2017). Significant rookeries are centred on Barrow Island, especially the east coast beaches (DoEE, 2017). While internesting flatback turtles can travel up to 62 km away from their rookery between nesting events, these movements were in a longshore direction and individuals were restricted to shallow water depths (Whittock et al., 2014).

Unlike other sea turtles, the flatback turtle lacks a wide oceanic dispersal phase and adults tend to be found in soft sediment habitats within the continental shelf of northern Australia (DAWE, 2020).

According to the PMST report, the flatback turtle was identified as known to congregate within the operational area. The operational area intersects with an internesting buffer BIA.

2.8 Fish, Sharks and Rays

A search of the EPBC Protected Matters database identified 13 protected fish, shark and ray species with potential to occur within the operational area (refer to Attachment 1 and Table 5-9 of the EP).

2.8.1 Threatened and Migratory Species

Narrow Sawfish

The narrow sawfish (*Anoxypristis cuspidata*), also known as the knifetooth sawfish, is listed as a migratory species under the EPBC Act. It inhabits estuarine, inshore and offshore waters to at least 40 m depth (Last & Stevens, 2009). Inshore and estuarine waters are important for juveniles and pupping females, while adults predominantly occur offshore (Peverell, 2005).

According to the PMST report, the narrow sawfish is likely to occur or have habitat within the operational area. As the species prefers shallower, inshore waters it is not expected within the operational area or deeper waters.

Oceanic Whitetip Shark

The oceanic whitetip shark is listed as a migratory species under the EPBC Act. The oceanic whitetip shark is a widespread pelagic species that has been subject to overfishing throughout much of its distribution. The oceanic whitetip shark is widespread throughout tropical and subtropical pelagic waters of the world (30ºN to 35ºS). Within Australian waters, it is found from Cape Leeuwin (WA) through parts of the NT, down the east coast of Queensland and NSW to Sydney (DAWE, 2021b).

According to the PMST report, the oceanic whitetip shark was identified as likely to occur or have habitat within the operational area.

Grey Nurse Shark

The grey nurse shark (*Carcharias taurus*, west coast population) is listed as vulnerable under the EPBC Act. Globally, the species is listed as vulnerable in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Grey nurse sharks are now restricted to two populations, one on the east coast from southern Queensland to southern NSW and the other around the southwest coast of WA. The grey nurse shark is now considered extinct in Victorian waters. It is believed the east and west coast populations do not interact. The west coast population has a broad inshore distribution, primarily in subtropical to cool temperate waters (Last and Stevens, 2009). The population of grey nurse sharks (west coast population) is predominantly found in the southwest coastal waters of WA (DoE, 2014) and has been recorded as far north as the NWS (Stevens, 1999; Pogonoski et al., 2002).

Adult grey nurse sharks feed on a wide range of fish, other sharks, squid, crabs and lobsters, and the greatest threat to grey nurse sharks is considered to be incidental bycatch in commercial fisheries.

Individuals are thought to have a high degree of site fidelity, although some studies have suggested the species exhibits some migratory characteristics, moving between different habitats and localities (McCauley, 2004). The high endemism of the species ensures the grey nurse shark is vulnerable to localised pressures in certain

areas. The status of the west coast population is poorly understood, although it is reported to remain widely distributed along the WA coast and individuals are regularly encountered, albeit with low and indeterminate frequency (Chidlow et al., 2006).

Grey nurse sharks are frequently observed hovering motionless just above the seabed in or near deep sandy-bottomed gutters or rocky caves, and in the vicinity of inshore rocky reefs and islands (Pollard et al., 1996). The species has been recorded at varying depths but is generally found between 15 to 40 m (Otway and Parker, 2000). 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).

According to the PMST report, the grey nurse shark has known habitat within the operational area. Considering that the operational area is located in water depth of 130 m and grey nurse sharks have been recorded at depths of ~200 m on the continental shelf, this assessment is believed to be accurate.

White Shark

The white shark (*Carcharodon carcharias*) is listed as vulnerable and migratory under the EPBC Act. It occurs in almost all coastal and offshore waters of the major oceans that have water temperature between 12 and 24°C with greater concentrations in the United States of America (Atlantic Northeast and California), South Africa, Japan, Australia/Oceania, Chile and the Mediterranean. In Australian waters, they are widely but not evenly distributed, and sightings are considered uncommon to rare compared to most other large sharks. Great white sharks can be found in areas close inshore around rocky reefs, surf beaches and shallow coastal bays, and as far out as the outer continental shelf and slope areas (Pogonoski et al., 2002).

This shark reaches its maturity around 15 years of age and can have a life span of more than 30 years. White sharks are known to prey on marine mammals and various other marine animals, including fish and seabirds, and have been frequently recorded in WA, particularly during humpback whale migrations.

According to the PMST report, the white shark may occur or have habitat within the operational area.

Shortfin Mako

The shortfin mako shark (*Isurus oxyrinchus*) is listed as a migratory species under the EPBC Act. It is a coastal, oceanic species occurring from the surface to at least 500 m depth and is widespread in temperate and tropical waters of all oceans, from about 50°N (up to 60°N in the northeast Atlantic) to 50°S. It is occasionally found close inshore where the continental shelf is narrow.

According to the PMST report, the shortfin mako shark is likely to occur or have habitat within the operational area.

Longfin Mako

The longfin mako (*Isurus paucus*) is listed as a migratory species under the EPBC Act. It is a widely distributed but rarely encountered oceanic shark. This species is known to be caught as bycatch in tropical pelagic longline fisheries for tuna, swordfish and sharks and in other oceanic fisheries. This species appears to be cosmopolitan in tropical and warm temperate waters. However, present records are sporadic, and the complete distribution remains unclear.

According to the PMST report, the longfin mako shark is likely to occur or have habitat within the operational area.

Reef Manta Ray

The reef manta ray (*Manta alfredi*) is listed as a migratory species under the EPBC Act. It has a widespread distribution in tropical and subtropical waters worldwide, including WA. Reef manta rays are thought to have relatively sedentary behaviour, with precise areas for cleaning and feeding still close to coasts, reefs or islands. The migratory pattern in WA is not well documented.

According to the PMST report, the reef manta ray is known to have habitat within the operational area.

Giant Manta Ray

The giant manta ray (*Manta birostris*) is listed as a migratory species under the EPBC Act and is the largest of the rays. The species has a tropical and semi-temperate distribution worldwide that includes WA. The giant manta ray appears to be a seasonal visitor to coastal sites and satellite tracking studies have revealed it to be capable of migrations of more than 1000 km in distance. The migratory pattern in WA is not well documented however giant manta rays have been recorded in abundance off Ningaloo Reef (Sleeman et al, 2007).

According to the PMST report, the giant manta ray is likely to occur or have habitat within the operational area.

Dwarf Sawfish

The dwarf sawfish (*Pristis clavata*) is listed as vulnerable and migratory under the EPBC Act. Dwarf sawfish are rays, somewhat resembling sharks, with elongated and serrated rostrums. The distribution of dwarf sawfish is considered to be restricted to northern Australia, ranging from northern Queensland to the Pilbara coastline. Sawfish generally inhabit shallow coastal waters along with estuaries, which are used as nurseries for juveniles. Surveys have found most captures of dwarf sawfish over soft sediment environments. The diets of sawfish are primarily made up of small fish, which they stun using their serrated rostrums (DAWE, 2020).

According to the PMST report, the dwarf sawfish was identified as known to occur or have habitat within the operational area.

Green Sawfish

The green sawfish (*Pristis zijsron*) is listed as vulnerable and migratory under the EPBC Act and is also classified as critically endangered on the IUCN Red List of Threatened Species. This species has been recorded across northern Australia, generally in coastal waters off Broome for WA populations. As with other species of sawfish, the green sawfish mainly inhabits shallower soft sediment coastal and estuarine environments but has also been recorded in up to 70 m of water (DoEE, 2017).

According to the PMST report, the green sawfish was identified as known to occur or have habitat within the operational area s. Considering that the operational area is located in water depth of 130 m and green sawfish have only been recorded at depths of ~70 m it is unlikely the species will be present within the operational area.

Whale Shark

The whale shark (*Rhincodon typus*) is listed as vulnerable and migratory under the EPBC Act and it is also classified as endangered on the IUCN Red List of Threatened Species.

The whale shark is an oceanic and coastal, tropical to warm-temperature pelagic fish, generally found in areas where the surface water temperature is 21 to 25°C. The whale shark is widely distributed in Australian waters and is known to frequent the region, aggregating at Ningaloo reef each year between March and June, with the largest numbers generally recorded in April (Meekan et al., 2006). The Ningaloo population of whale sharks has been shown to be part of a wider Indian Ocean whale shark stock that is likely to encompass much of the south eastern Indian Ocean and the waters of South East Asia (Meekan et al., 2006). Figure 2-4 illustrates satellite tracking of whale sharks along the northwest coast.

According to the PMST report, whale sharks were identified as known to forage within the operational area. A foraging BIA intersects with the operational area.

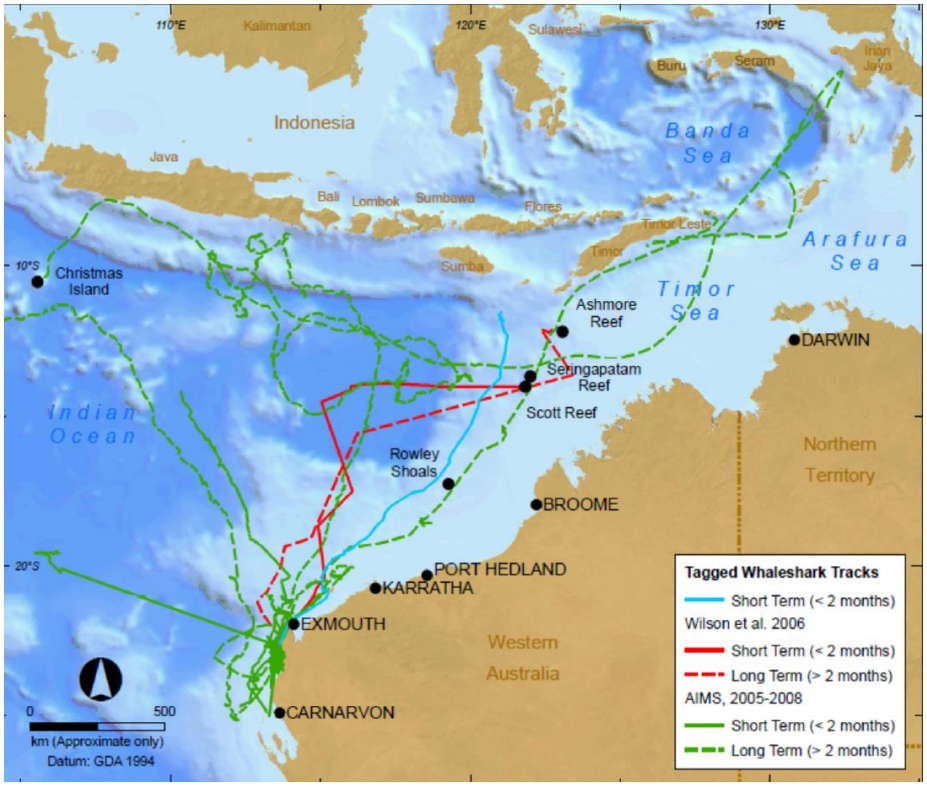

Figure 2-4: Satellite Tracking of Whale Sharks 2002 to 2008

2.8.2 Conservation-Dependent Species

Scalloped Hammerhead Shark

The scalloped hammerhead shark (*Sphyrna lewini*) is classified as critically endangered on the IUCN Red List of Threatened Species (last assessed November 2018) and was listed as a conservation-dependent species on 15 March 2018 in the EPBC Act. There is no adopted or made recovery plan for this species. The following information is sourced from the Commonwealth Listing Advice (TSSC, 2018).

The scalloped hammerhead is a coastal and semi-oceanic shark. Pups are born in shallow intertidal habitats where they remain in shallow inshore habitats for the first few years. Information collected from deeper water fisheries (but still on the continental shelf) suggests juveniles and some adults, particularly males, remain in coastal waters, while some mature adults may move into deeper pelagic waters.

The principal threat to the species is fishing activity. The species has a circum-global distribution in tropical and subtropical waters and the Australian stock is likely to be shared with Indonesia and possibly a broader Indo-Pacific population. Within Australian waters, scalloped hammerheads are found across northern and temperate Australian waters, extending from NSW, around the north of the continent and then south into WA, to around Geographe Bay (see Figure 2-5). The distribution of the species in WA is sparse. They have been recorded in WA in the catch of the Pilbara Fish Trawl Fishery.

It is possible scalloped hammerheads are in the operational area.

Figure 2-5: Distribution Map of Scallop Hammerhead Sharks (Geosciences Australia, 2014)

Southern Bluefin Tuna

The southern bluefin tuna (*Thunnus maccoyii*) is classified as critically endangered on the IUCN Red List of Threatened Species (last assessed January 2021) and was listed as a conservation-dependent species on 15 December 2010 in the EPBC Act. There is no adopted or made recovery plan for this species. The following information is sourced from the Commonwealth Listing Advice (TSSC, 2010).

The southern bluefin tuna is a highly migratory species that occurs globally in waters between 30°S and 50°S, though is mainly found in the eastern Indian Ocean and in the south Western Pacific Ocean. In Australian waters, the southern bluefin tuna ranges from northern WA, around the southern region of the continent, to northern NSW (see Figure 2-6). The southernmost portion of the spawning ground lies within Australia's EEZ.

It is possible southern bluefin tuna are in the operational area.

Figure 2-6: Distribution Map of Southern Bluefin Tuna (Geosciences Australia, 2014)

2.9 Seabirds and Migratory Shorebirds

A search of the EPBC Protected Matters database identified 9 protected seabird and migratory shorebird species with potential to occur within the operational area (refer to Attachment 1 and Table 5-5 of the EP).

2.9.1 Threatened and Migratory Species

Seabirds

Australian Fairy Tern

The Australian fairy tern (*Sternula nereis nereis*) is listed as vulnerable under the EPBC Act and has been identified as a conservation value in the NWMR. The Australian fairy tern is a subspecies of the fairy tern, therefore the identification of fairy terns within the operational area would be the subspecies Australian fairy tern.

Breeding occurs between October to February on continental islands, coral cays, on sandy islands and beaches inside estuaries, and on open sandy beaches (DAWE, 2020). The species feeds predominantly on small fish in shallow waters (DSEWPC, 2011d).

The main threat to the subspecies is the disturbance of breeding sites by human activities and predation by introduced species and birds.

According to the PMST report, the Australian fairy tern was identified as known to breed within the operational area.

Indian Yellow-nosed Albatross

The Indian Yellow-nosed Albatross (*Thalassarche carteri*) is listed as vulnerable and migratory under the EPBC Act. The Indian Yellow-nosed Albatross forages mostly in the southern Indian Ocean and is abundant off Western Australia (Marchant & Higgins 1990). In waters off southern Western Australia and South Australia the species is most abundant between March and May.

According to the PMST report, the Indian Yellow-nosed Albatross may occur within the operational area.

Common Noddy

The common noddy (*Anous stolidus*) is listed as migratory under the EPBC Act. Four sub-species of the common noddy are recognised, but only the sub-species *Anous stolidus pileatus* occurs in the Australian region. It occurs mainly off the Queensland coast, but also off the northwest and central WA coast.

The migratory movements of the species are poorly known. The common noddy is a gregarious bird, normally occurring in flocks, sometimes of hundreds of individuals, when feeding or roosting. They feed mainly on fish, but are also known to take squid, pelagic molluscs and aquatic insects by dipping or skimming the sea surface. The species usually feeds during the day but will also feed at night when there is a full moon. Timing of breeding varies between sites and may be annual or twice a year. On some islands, the species is known to breed throughout the year. It is known to disperse to the open ocean after breeding (DoEE, 2017).

According to the PMST report, the common noddy may occur or have habitat within the operational.

Lesser Frigatebird

The lesser frigatebird (*Fregata ariel*) is listed as a migratory species under the EPBC Act and is found widespread throughout the northern reaches of Australia, from around Geraldton on the west coast throughout the north to the east coast. The species is found throughout most shorelines. The species is the smallest frigatebird and is well adapted for an aerial existence and may range significant distances from land. This seabird is found in tropical waters of the Indian Ocean and breeds on small, remote tropical and subtropical islands in mangroves or bushes, and even on bare ground. It feeds on fish, cephalopods, seabird eggs and chicks, carrion and fish scraps. Little information is available about the migratory movements of this species. Breeding appears to occur between May and December in Australia. Outside the breeding season, the species is sedentary.

According to the PMST report, the lesser frigatebird is likely to occur or have habitat within the operational area.

Southern Giant Petrel

The southern giant petrel (*Macronectes giganteus*) is listed as endangered and migratory under the EPBC Act. It is the largest of the petrels and occurs from Antarctic to subtropical waters. The petrel spends most of the warmer months of the year in the southern extents of its distribution range while breeding, before leaving for warmer waters during winter, including the southern portion of the NWS for foraging. The southern giant petrel is both an opportunistic scavenger of carrion and a predator, with prey items ranging from surface marine life (including krill) to smaller seabirds (DoEE, 2017). The southern giant petrel breeds once a year between August and September, returning from foraging locations to breeding grounds in Antarctic waters.

According to the PMST report, the southern giant petrel may occur or have habitat within the operational area.

Streaked Shearwater

The streaked shearwater (*Calonectris leucomelas*) is a listed migratory seabird under the EPBC Act and spends non-breeding periods in the tropical west Pacific (October to March). It has been regularly recorded offshore from Broome to Timor Sea, and from Barrow Island to the Houtman Abrolhos Islands, occurring over pelagic and inshore waters but usually found offshore more than 18 km from the mainland coast (Marchant & Higgins, 1993).

According to the PMST report, the streaked shearwater was identified as likely to occur or have habitat within the operational area.

Curlew Sandpiper

The curlew sandpiper (*Calidris ferruginea*) is a listed as a critically endangered and migratory shorebird under the EPBC Act. A small, slender, gregarious sandpiper that is found along the coastlines and inland waters of Australia. In WA, the species occurs extensively between Cape Arid to the Kimberley region (DoEE, 2017). It is most common on sheltered intertidal mudflats, roosts on dry beaches, spits and islets, and breeds only in Siberia. It leaves breeding grounds in July and August, arriving in Australia in late August and early September (Higgins and Davies, 1996). Flocks stop in northern Australia before moving on to south-eastern Australia. Most birds arrive in September. Return migration commences in March (DoEE, 2017).

According to the PMST report, this species may occur or have habitat within the operational area, however due to its coastal distribution its presence is unlikely.

Eastern Curlew

The eastern curlew (*Numenius madagascariensis*) is listed as critically endangered and migratory under the EPBC Act. The eastern curlew has a primarily coastal distribution, known from all states in Australia (DoEE, 2017). It has a continuous distribution from Barrow Island and Dampier Archipelago, through the Kimberley and along the NT, Queensland and NSW coasts and the islands of Torres Strait. It is patchily distributed elsewhere. The eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms or rocky islets. They are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves.

The species breeds in the northern hemisphere, migrating into Australia in boreal winter. It arrives in eastern Australia, such as NSW, from mid-August to December (DoEE, 2017; Marchant and Higgins, 1993). The species roosts in large flocks, separate to other waders, and generally roost on sandy spits and islets (Marchant and Higgins, 1993). This shorebird is carnivorous, mainly eating crustaceans (including crabs, shrimps and prawns), small molluscs and some insects.

According to the PMST report, the eastern curlew may occur or have habitat within the operational area, however due to its coastal distribution its presence is unlikely.

Red Knot

The red knot (*Calidris canutus*) is listed as endangered and migratory under the EPBC Act. The red knot is a robust wader which breeds in Siberia and spends the non-breeding season in Australia and New Zealand, specifically in north-western WA (Higgins and Davies, 1996). The non-breeding season is spent on tidal mudflats or sandflats where the omnivorous species feeds on intertidal invertebrates, especially shellfish (Garnet et al., 2011). Although the species is found throughout many suitable habitats in Australia, the highest number of the species is found throughout the northwest of Australia, between Eighty Mile Beach and Roebuck Bay.

According to the PMST report, this species may occur or have habitat within the operational area, however due to its coastal distribution its presence is unlikely.

2.10 Other Values and Sensitivities

2.10.1 Australian Commercial Fisheries

Commonwealth and State managed fisheries have boundaries that overlap with the operational area. Table 5-8 of the EP provides a summary description of the commercial fisheries and the potential for their operations to be affected by the petroleum activities based on their historic level of activity.

2.10.2 Traditional Fisheries

There are not expected to be any traditional fisheries that operate within the operational area. Traditional fisheries are typically restricted to coastal waters and/or areas with suitable fishing structures such as reefs.

2.10.3 Tourism and Recreation

Refer to Section 5.6.3 of the EP.

2.10.4 Oil and Gas Activities

Refer to Section 5.6.4 of the EP.

2.10.5 Commercial Shipping

Refer to Section 5.6.5 of the EP.

2.10.6 Defence

Refer to Section 5.6.6 of the EP.

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Australian Government
Department of Agriculture, Water and the Environment

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: 07-Feb-2022

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:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	25
Listed Migratory Species:	37

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

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 http://www.environment.gov.au/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:	63
Whales and Other Cetaceans:	26
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:	14
Key Ecological Features (Marine):	3
Biologically Important Areas:	8
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
EEZ and Territorial Sea

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 canutus Red Knot, Knot [855]	Endangered	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
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
FISH		

Scientific Name	Threatened Category	Presence Text
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
MAMMAL		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to 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 likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
REPTILE		
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Aipysurus foliosquama Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
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 known 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 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 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 may occur within area
Calonectris leucomelas		
Streaked Shearwater [1077]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
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
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may 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 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	Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area
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 may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to 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 likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat may 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]	Vulnerable	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
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

Scientific Name	Threatened Category	Presence Text
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	Species or species habitat known to 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 known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
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
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	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

Scientific Name	Threatened Category	Presence Text
[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
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
[Thalasseus bengalensis as Sterna bengalensis](#) Lesser Crested Tern [66546]		Breeding known to occur within area
Fish		
[Acentronura larsonae](#) Helen's Pygmy Pipehorse [66186]		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 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

Scientific Name	Threatened Category	Presence Text
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
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

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 trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
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

Scientific Name	Threatened Category	Presence Text
[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 likely to occur within area
Reptile		
[Acalyptophis peronii](#) Horned Seasnake [1114]		Species or species habitat may occur within area
[Aipysurus apraefrontalis](#) Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
[Aipysurus duboisii](#) Dubois' Seasnake [1116]		Species or species habitat may occur within area
[Aipysurus eydouxii](#) Spine-tailed Seasnake [1117]		Species or species habitat may occur within area
[Aipysurus foliosquama](#) Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
[Aipysurus laevis](#) Olive Seasnake [1120]		Species or species habitat may occur within area
[Astrotia stokesii](#) Stokes' Seasnake [1122]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Chitulia ornata as Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [87377]		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
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Emydocephalus annulatus Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
Ephalophis greyi North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area

Scientific Name	Threatened Category	Presence Text
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may 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 borealis Sei Whale [34]	Vulnerable	Species or species habitat 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	Species or species habitat likely to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat 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 may 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

Current Scientific Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia sima as Kogia simus Dwarf Sperm Whale [85043]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding 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 as Sousa chinensis 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
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
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

Habitat Critical to the Survival of Marine Turtles		
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			
Ashburton Infrastructure Project	2021/9064	Controlled Action	Completed
Construct and operate LNG & domestic gas plant including onshore and offshore facilities - Wheatstone	2008/4469	Controlled Action	Post-Approval
Not controlled action			
HCA05X Macedon Experimental Survey	2004/1926	Not Controlled Action	Completed
Infill Production Well (Griffin-9)	2001/417	Not Controlled Action	Completed
Klammer 2D Seismic Survey	2002/868	Not Controlled Action	Completed
Subsea Gas Pipeline From Stybarrow Field to Griffin Venture Gas Export Pipeline	2005/2033	Not Controlled Action	Completed
Wanda Offshore Research Project, 80 km north-east of Exmouth, WA	2018/8293	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
2D and 3D seismic surveys	2005/2151	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
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

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
Munmorah 2D seismic survey within permits WA-308/9-P	2003/970	Not Controlled Action (Particular Manner)	Post-Approval
Ocean Bottom Cable Seismic Survey	2005/2017	Not Controlled Action (Particular Manner)	Post-Approval

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
Continental Slope Demersal Fish Communities	North-west

Biologically Important Areas

Scientific Name	Behaviour	Presence
Marine Turtles		
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
Sternula nereis Fairy Tern [82949]	Breeding	Known to occur
Thalasseus bengalensis Lesser Crested Tern [66546]	Breeding	Known to occur
Sharks		
Rhincodon typus Whale Shark [66680]	Foraging	Known to occur
Whales		

Scientific Name	Behaviour	Presence
Balaenoptera musculus brevicauda		
Pygmy Blue Whale [81317]	Distribution	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.

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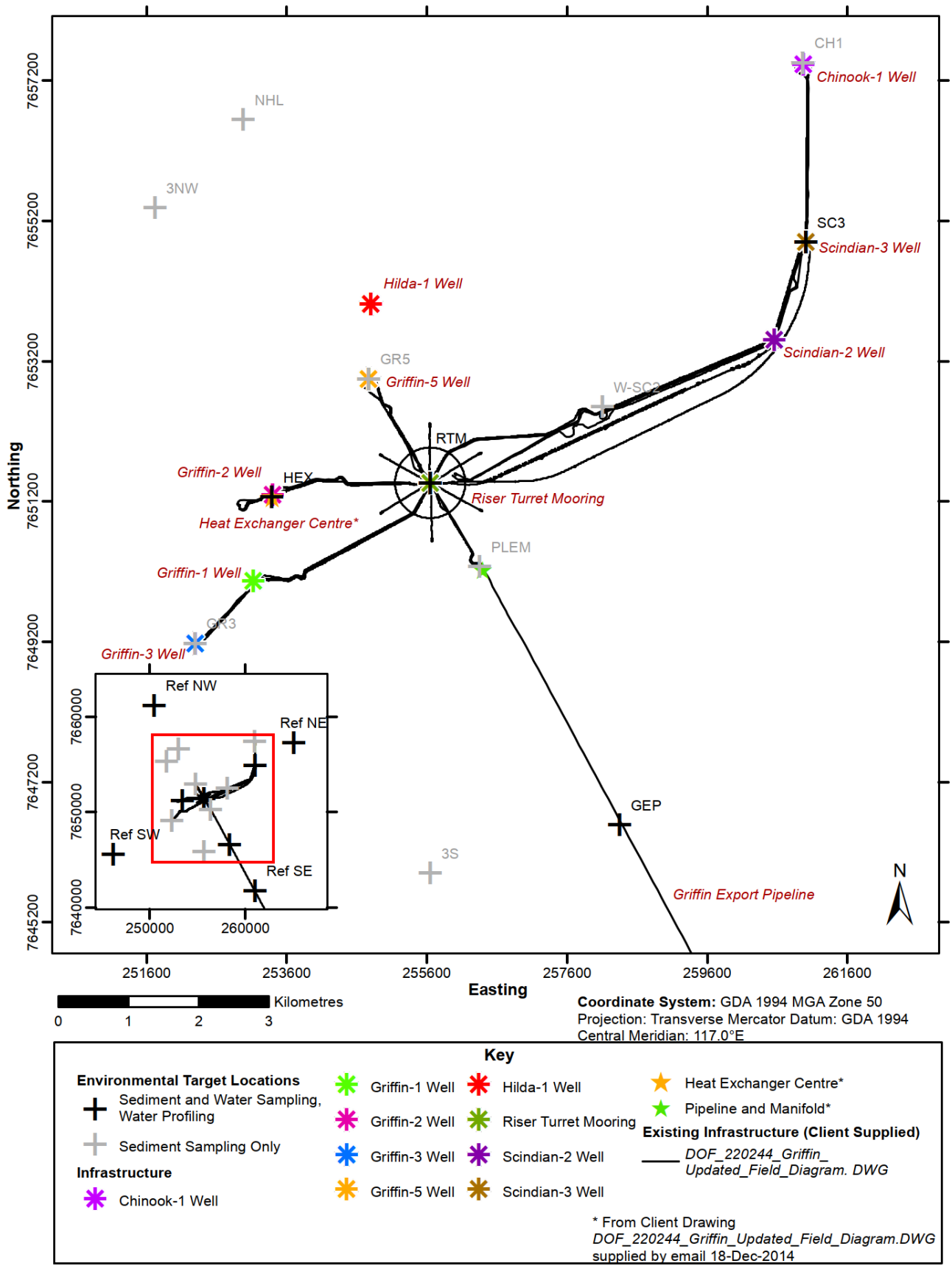
Appendix D

Griffin Field Infrastructure Layout and Environmental Target Locations


CH1
Chinook-1 Well
NHL
3NW
SC3
Scindian-3 Well
Hilda-1 Well
Scindian-2 Well
GR5
Griffin-5 Well
W-SC2
RTM
Griffin-2 Well
HEX
Riser Turret Mooring
Heat Exchanger Centre*
PLEM
Griffin-1 Well
GR3
Griffin-3 Well
Ref NW
Ref NE
Ref SW
Ref SE
GEP
3S
Griffin Export Pipeline
N
Northing
7657200
7655200
7653200
7651200
7649200
7647200
7645200
7660000
7650000
7640000
250000
260000
251600
253600
255600
257600
259600
261600
Easting
Kilometres
0 1 2 3
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator Datum: GDA 1994
Central Meridian: 117.0°E
Key
Environmental Target Locations
Sediment and Water Sampling, Water Profiling
Sediment Sampling Only
Infrastructure
Chinook-1 Well
Griffin-1 Well
Griffin-2 Well
Griffin-3 Well
Griffin-5 Well
Hilda-1 Well
Riser Turret Mooring
Scindian-2 Well
Scindian-3 Well
Heat Exchanger Centre*
Pipeline and Manifold*
Existing Infrastructure (Client Supplied)
DOF_220244_Griffin_Updated_Field_Diagram. DWG
* From Client Drawing
DOF_220244_Griffin_Updated_Field_Diagram.DWG
supplied by email 18-Dec-2014

Appendix E

Stakeholder Information Fact Sheet

Petroleum

Invitation for Feedback: Stakeholder Information Fact Sheet

Griffin Decommissioning Environment Plans

Northern Carnarvon Basin, North West Australia

BHP is decommissioning the Griffin Field (in production licences WA-10-L) and the associated gas export pipeline (GEP) (pipeline licences WA-3-PL, TPL/10, and PL 20) (Figure 1). BHP is the designated operator of the Griffin Field and pipeline on behalf of BHP Petroleum Pty Ltd, INPEX Alpha Ltd, and Mobil Exploration and Producing Australia Pty Ltd.

The Griffin Field lies approximately 67 km north-east of Onslow, Western Australia. The GEP extends from the Griffin Field to shore, near the former Griffin Gas Export facility, now AGIG's Tubridgi gas storage facility.

Decommissioning activities to date in the Griffin Field include plug and abandonment of all wells in 2017 and removal of the mid-depth buoys.

In November 2021 BHP consulted on the removal of the majority of the remaining equipment located in the Griffin Field. On 22 December 2021 the associated environment plan (EP) for these removal activities, the *Griffin Decommissioning and Field Management EP*, was submitted to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) for assessment.

BHP is now planning additional decommissioning activities and is seeking stakeholder feedback to inform the development of the associated EPs for submission to NOPSEMA and the Department of Mines, Industry Regulation and Safety (DMIRS). These activities comprise:

- Construction, operation and rehabilitation of a temporary pumping and liquid storage area (onshore Western Australia).
- Removal of residual mercury contamination within the GEP (onshore Western Australia, coastal waters, and Commonwealth waters) to acceptable thresholds for mercury in sediment, as defined by *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2018) and Department of Water and Environmental Regulation (DWER) guidelines.
- Abandoning the GEP *in situ* following verification of successful mercury removal and surveying (coastal waters and Commonwealth waters).
- Abandoning *in situ* selected equipment in the Griffin Field (Commonwealth waters).

Separate EPs will be required for the proposed additional activities, with two EPs to be submitted to NOPSEMA for activities planned for Commonwealth waters and an EP to be submitted to the DMIRS for activities planned for State waters/lands. The EPs are being written to allow the activity to occur at any time of year as schedules are subject to change and to allow our business flexibility.

BHP is considering leaving the following equipment *in situ* at the completion of decommissioning activities:

- Concrete gravity bases
- The riser turret mooring (RTM) following removal of sections containing foam and other contaminants (plastics, batteries)
- The RTM mooring leg anchors, which are embedded in the seabed

- Piled foundations embedded in the seabed following removal of the portion of the piles above the seabed
- the GEP

BHP undertook an environmental impact assessment of the feasible decommissioning options for the equipment groups and GEP being left *in situ*. This assessment concluded that leaving these items *in situ* was a better environmental outcome due to:

- the environmental damage caused by their removal. The items listed above are either very heavy (the RTM is approximately 2,000 tonnes) or deeply embedded in the seabed.
- the very low environmental risk from the degradation of equipment. Once mercury removal from the GEP and foam and contaminants removal from the RTM is complete, the remaining equipment consists almost entirely of steel and concrete. The degradation products of steel and concrete are not considered toxic and these materials are routinely used in the construction of marinas, breakwaters etc.
- the marine communities associated with the equipment, particularly the GEP and RTM. Studies of the fish assemblages along the GEP noted a higher diversity and abundance of fishes, including substantially greater biomass of commercially and recreationally important fish species.

The equipment BHP is considering abandoning *in situ* in Commonwealth waters is subject to NOPSEMA's *Section 572 Maintenance and Removal of Property* (2020). This policy requires that BHP demonstrate that any alternatives to full removal of property, such as abandonment *in situ*, yields equal or better environmental outcomes compared to full removal.

The decommissioning activities will not take place within any marine conservation areas. Marine conservation areas and their distances from the decommissioning activities operational area are listed in Table 1.

The decommissioning activities described in this Stakeholder Fact Sheet are planned to commence in Q1 2023, pending approvals, vessel availability and weather constraints.

Table 1 Marine conservation areas in proximity to the decommissioning activities operational area

Marine Conservation Area	**Approx. Distance from the Operational Area**
Muiron Islands Marine Management Area (State)	38 km
Ningaloo Marine Park (State)	52 km
Ningaloo Marine Park (Commonwealth)	59 km
Barrow Island Marine Management Area (State)	66 km
Montebello Marine Park (Commonwealth)	69 km
Gascoyne Marine Park (Commonwealth)	78 km

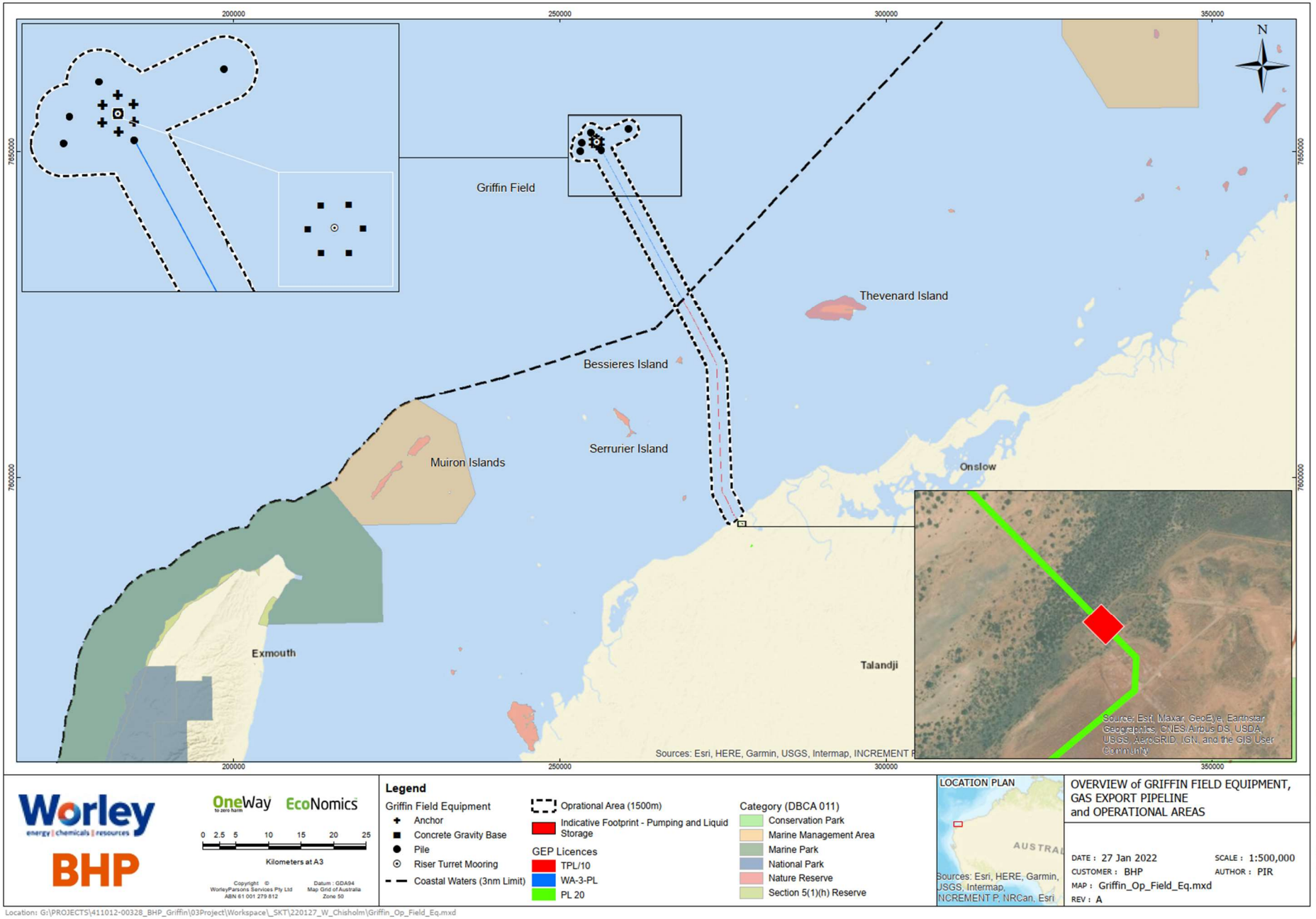


Figure 1 Overview of decommissioning activities in this stakeholder fact sheet

Document number: 411012-00328-23000-LST-0009

Proposed Activity

A summary of decommissioning activities is presented in Table 2. The decommissioning activities are anticipated to include:

- Construction, operation and rehabilitation of temporary onshore pumping and liquid storage area.
- Removal of mercury contamination within the GEP.
- Abandonment *in situ* of the GEP. The GEP is a concrete-coated, 219 mm diameter steel pipeline that extends between the Griffin field and the former Griffin onshore gas plant. The length of the GEP between the Griffin field and the shore crossing is approximately 61.6 km long. The GEP is largely buried in state waters due to trenching during installation, with some sections that couldn't be buried secured to the seabed by rock bolts. The majority of the GEP in Commonwealth waters was laid directly on the seabed as no additional stabilisation was required. The GEP is stable on the seabed, with little evidence of any lateral displacement following installation.
- Abandonment *in situ* of the following equipment within the Griffin Field:
    - Six concrete gravity bases for the mid-depth buoys. These are large concrete structures and are mostly buried, sitting flush with the seabed.
    - The riser turret mooring (RTM), following placement of the mooring on the seabed and removal of the top sections containing foam and other contaminants. The remaining section of the RTM is a steel structure with iron ore ballast and is ~65 m long and 6 m in diameter.
    - Piled foundations for the pipeline end manifold (PLEM) and four distribution skids. Piles will be cut as close as practical to the mudline. Piles are steel and cement structures, 30-inch diameter and ~20 m long.
    - Anchors used to hold the RTM in place (anchor legs removed from above the seabed). There are 12 anchors, 2 per mooring leg. They are buried and any protrusions will be cut at as close as practical to the mudline.

The location of the equipment is in Table 3.

The GEP contains residual mercury. BHP will remove mercury from the GEP using a chemical cleaning process that involves specialist chemicals being pushed by pipeline inspection gauges (PIGs) from shore to the end of the GEP in Commonwealth waters. The fluids will then be pushed back to shore, along with extracted mercury in the GEP, where they will be recovered and disposed of.

A temporary onshore pumping and liquid storage area is required to send and receive cleaning fluids along the GEP. This temporary pumping and liquid storage area will be constructed onshore behind the dunes along the PL 20 pipeline licence. Access to and from the temporary pumping and liquid storage area will be by existing roads and tracks where practicable. The tank storage for liquids, including potentially hazardous hydrocarbon and mercury removal liquids, and high-risk spill locations will be bunded to prevent accidental releases polluting the environment.

After the mercury removal activities are completed, all equipment will be removed from the temporary pumping and liquid storage area. The area disturbed by the construction and operation of the temporary pumping and liquid storage area will then be rehabilitated.

The mercury removal process will require a vessel at the PLEM to support the pigging operations. BHP will verify the effectiveness of mercury removal from the GEP following the pigging activities. There are no planned releases of chemicals in Commonwealth or State waters. The PLEM and GEP Z spool will be removed, as described in the *Griffin Field Management and Equipment Removal EP*. If mercury levels in the GEP cannot be reduced to acceptable thresholds, additional mitigation measures will be implemented, such as burial or removal.

Following cleaning, BHP will undertake a survey of the GEP, which may include multibeam sonar, side scan sonar and visual inspection, after which the GEP will be abandoned *in situ*.

The equipment in the Griffin Field that BHP proposes to abandon *in situ* will be left as is following the equipment removal campaign. This equipment consists of benign materials, such as concrete and steel, and lies in approximately 130 m water depth. The RTM, along with the GEP, supports diverse benthic habitats and associated communities. These habitats support relatively high diversity and abundance fish communities, including fish species targeted by recreational and commercial fishers. Removal of the equipment proposed to be abandoned *in situ* would eliminate these habitats and associated fish, as well as substantially disturb the seabed.

The buried structures do not support benthic habitats or associated communities, but given the degree of burial, materials of construction and the object sizes, their recovery will create a significant environmental disturbance. The buried structures are made from concrete and steel, which poses negligible environmental risk as they degrade over time.

Table 2 Summary of decommissioning activities

Griffin Subsea Infrastructure Decommissioning Activities	
Earliest expected commencement date	Earliest start is Q1 2023, subject to approvals, vessel availability, and weather constraints.
Petroleum licences	WA-10-L (Cwlth), WA-12-L (Cwlth), WA-3-PL (Cwlth), TPL/10 (WA), PL 20 (WA)
Operational area	A 1,500 m radius temporary Operational Area (precautionary) around the GEP and equipment in the Griffin Field A temporary onshore site hosting tanks, pumping equipment, and supporting facilities. All material from the temporary onshore site will be removed following completion of the mercury removal activities. The site will then be rehabilitated.
Estimated duration	90-120 days
Infrastructure	1 x gas export pipeline (GEP) 1 x riser turret mooring (RTM) 12 x RTM anchors 5 x piled foundations (1 x PLEM, 4 x distribution skids) 6 x concrete gravity bases
Vessels	Support vessels are planned to be used to support removal of mercury from the GEP. No more than 2 vessels will be used at any one time
Distance to nearest towns/land fall (from field centre point)	Muiron Islands ~43 km Thevenard Island ~20 km Onslow ~41 km Exmouth ~85 km North West Cape ~71 km

Table 3 Indicative locations of equipment considered in this stakeholder fact sheet

Subsea Infrastructure	Easting[1]	Northing[1]	Activity
Gas export pipeline – start (PLEM)	256393	7650218	Remove mercury and leave *in-situ*
Gas export pipeline – KP0	277214	7593548	
Riser turret mooring (RTM)	255645	7651464	Leave *in situ* after placement on seabed and removal of sections containing foam
RTM anchor pair 1[2]	255639	7652302	Leave *in situ*
RTM anchor pair 2[2]	256364	7651890	
RTM anchor pair 3[2]	256388	7651058	
RTM anchor pair 4[2]	255671	7650628	
RTM anchor pair 5[2]	254930	7651040	
RTM anchor pair 6[2]	254934	7651863	
PLEM pile foundation	256393	7650218	Cut at the seabed, remove cut section, and leave buried section *in situ*
Distribution skid 1/2	260535	7653488	
Distribution Skid 4	253150	7650065	

Subsea Infrastructure	Easting[1]	Northing[1]	Activity
Distribution Skid 5	253418	7651297	
Distribution Skid 6	254782	7652896	
Concrete gravity base 1	255714	7651571	Leave *in situ*
Concrete gravity base 2	255779	7651463	
Concrete gravity base 3	255716	7651352	
Concrete gravity base 4	255589	7651351	
Concrete gravity base 5	255524	7651460	
Concrete gravity base 6	255587	7651567]	
Onshore temporary pumping and liquid storage area	Indicative footprint shown in Figure 1		Construction, operation, and rehabilitation

[1] All coordinates in MGA50/GDA94

[2] Both anchors within 100 m of point

Project Vessels

At least one offshore support vessel is required for the mercury removal from the GEP and subsequent pipeline survey. Vessels may require routine support, such as resupply and personnel transfers.

Communication with Mariners

A 1,500 m radius Operational Area will apply around the GEP to allow for vessels to undertake decommissioning activities. A temporary 500 m exclusion zone will apply around the vessel supporting mercury removal activities at the PLEM.

Marine notices will be issued prior to activity commencement to alert vessels which may be operating in waters nearby.

Implications for Stakeholders

BHP will consult relevant stakeholders whose functions, interests, and activities may be affected by the proposed decommissioning activities outlined in this Stakeholder Fact Sheet. We will also keep other stakeholders who have identified an interest in the activities informed about our planned activities.

Summary of Key Impacts and Risks

BHP has identified potential impacts and risks to the environment based on the nature and scale of the decommissioning activities. Mitigation and management measures for these impacts and risks are summarised in Table 4. Further details will be provided in the EP.

Table 4 Potential risks and associated management measures

Potential Risks	Management and/or mitigation measures
Planned Activities	
Physical presence: Interactions with other marine users	• BHP's existing infrastructure is marked on nautical charts. • Establishment of a 1,500 m operational area around the GEP for the duration of the activity. • Consultation with relevant stakeholders (e.g., adjacent petroleum titleholders, commercial fishers and their representative organisations, and government departments and agencies) to inform decision making for the proposed activity and the development of the EP. • BHP will notify relevant fishing industry representative organisations/associations and Government maritime safety agencies of the start and end dates for the activity, and details of exclusion zones prior to commencement of the activity.
Emissions: Light	• Lighting is minimised to that required for safety and navigational purposes.

Potential Risks	Management and/or mitigation measures
Emissions: Above water and under water noise	• Measures will be in place for interacting with protected marine fauna as per the Environment Protection Biodiversity Conservation (EPBC) Regulations (Part 8).
Planned discharges to the marine environment	• Chemical use will be managed in accordance with BHP and contractor chemical selection and approval procedures. • All routine marine discharges will be managed according to legislative and regulatory requirements and BHP's Environment Performance Standards where applicable.
Waste generation	• Waste generated aboard the support vessels will be managed in accordance with legislative requirements and a Waste Management Plan. • Wastes will be managed and disposed of in a safe and environmentally responsible manner that prevents accidental loss to the marine or terrestrial environment. • Wastes transported onshore will be sent to appropriate recycling or disposal facilities by a licenced waste contractor.
Emissions: Air	• Vessels will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 Annex VI and Marine Order 97 (Marine Pollution Prevention – Air Pollution)
Benthic habitat disturbance	• Minimise disturbance where possible noting that physical removal of subsea infrastructure may have measurable but limited impacts to the environment, where recovery of ecosystem function is expected within <1 year.
Cleaning of vegetation	• Clearing to be limited to area in approved EP • Make use of existing roads where practicable • Rehabilitation of cleared areas following completion of onshore activities • Stockpiling of topsoil during clearing for rehabilitation use
Introduction of weeds	• Weed management of vehicles and equipment
Disturbance of heritage sites	• Heritage survey prior to commencing ground disturbance • Avoidance of known and discovered heritage sites
Unplanned Risks	
Marine fauna interaction	• Measures will be in place for interacting with protected marine fauna as per the EPBC Regulations (Part 8).
Invasive marine species	• BHP contracted vessels comply with Australian biosecurity requirements and guidance, and Australian ballast water requirements. • Vessels will be assessed and managed in line with BHP procedures to prevent the introduction of invasive marine species.
Unplanned releases including hydrocarbons	• All personnel undertaking activities will undergo relevant inductions and training. • Procedures for lifts, equipment maintenance, inspections and bunding. • All offshore activities will be managed in accordance with lifting and transfer procedures. • Recovery of solid wastes lost overboard where safe and practicable to do so. • Oil Pollution Emergency Plan (OPEP) and Operational and Scientific Monitoring Plan (OSMP) in place and tested. • Appropriate vessel spill response plans, equipment and materials will be in place and maintained. • Bunding of onshore storage of hazardous liquids
Vessel collision	• Marine notifications will be made to relevant stakeholders, describing the location of the activity and the 1,500 m operational area, to manage the risk of vessel collisions.

Protecting Our People and the Environment

Safety of our people and the communities in which we operate always comes first. Identifying, controlling, and mitigating safety risks is managed through an overarching, consistent approach guided by BHP's Risk Management governance framework, with supporting processes and performance standards. All activities (routine and non-routine) will be performed in accordance with the industry-leading standards established in BHP's Charter, HSEC Framework and Controls, BHP's Wells and Seismic Delivery Management System, Engineering Standards and Procedures, and the EP accepted by NOPSEMA.

Offshore petroleum activities are regulated through a robust and comprehensive environmental protection regime administered by NOPSEMA under the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006*. BHP undertakes risk assessments for all environmental aspects of a petroleum activity and stringently adheres to the regulatory regime.

The objective of the EP is to ensure that potential adverse impacts on the environment associated with activities, during both routine and non-routine activities, are identified, and will be continuously reduced to as low as reasonably practicable (ALARP) and an acceptable level. BHP is committed to understanding the impacts of our activities on stakeholders with an interest in the Griffin field and seeks feedback as part of the development of the EP.

Responding to Emergencies

BHP's incident response plans are accepted by the regulator NOPSEMA. The Commonwealth Oil Pollution Emergency Plan (OPEP) is required by law under the Environmental Regulations and forms an appendix to the full EP. The OPEP outlines responsibilities, specific procedures and identifies resources available in the unlikely event of an oil pollution incident. BHP maintains a constant vigilance and readiness to prevent and/or respond to hydrocarbon loss of containment incidents. The readiness and competency of BHP to respond to incidents is maintained and tested by conducting activity-specific emergency response exercises.

Should you have any questions, concerns or grievances regarding these activities or any other BHP Petroleum activities, please call BHP WA Community Hotline on **1800 421 077** or send an email to **bhppetexternalaffairs@bhp.com**

BHP believes in putting health and safety first, being environmentally responsible and supporting our communities.


BHP