BMG Closure Project (Phase 2) Environment Plan

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1.0 Introduction

1.1 Overview

Amplitude Energy Limited (Amplitude Energy) is the titleholder (100%) of petroleum retention lease VIC/RL13 in the Gippsland Basin, located entirely within Commonwealth waters approximately 55 km southeast of the Orbost Gas Plant (Figure 1-1). VIC/RL13 includes the Basker Manta Gummy (BMG) subsea facilities.

This Environment Plan (EP) has been prepared to cover the petroleum activities related to Phase 2 of the BMG Closure Project.

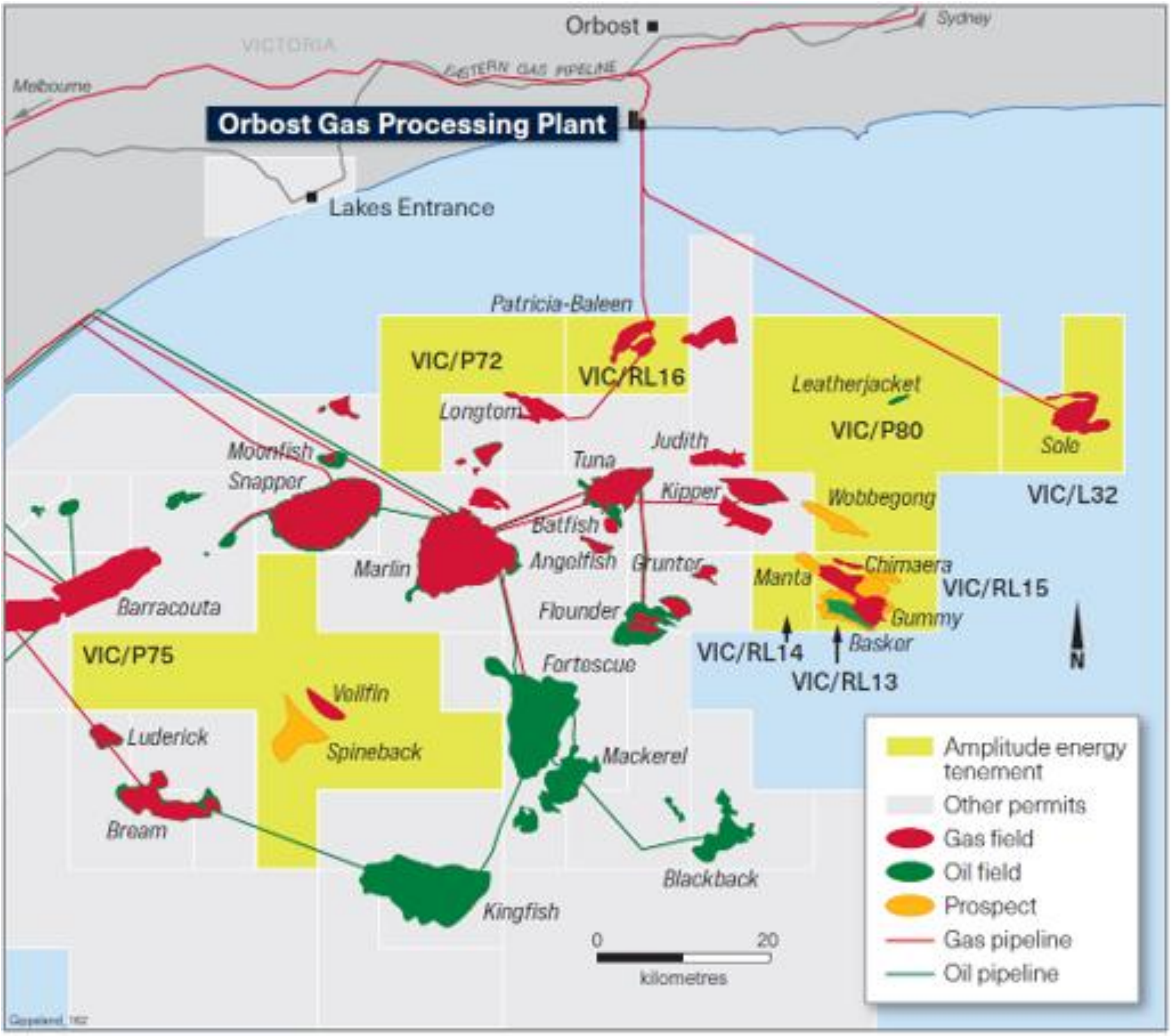


Figure 1-1 - Location of Permit VIC/RL13

1.2 Environment Plan Summary

This BMG Closure Project (Phase 2) EP Summary has been prepared from material provided in this EP. The summary consists of Table 1-1 as required by regulation 35(6) and 35(7) of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R).

Table 1-1 - EP Summary of Material Requirements

EP Summary Material Requirement	Relevant Section of EP Containing EP Summary Material
The location of the activity	Section 3.1.1 and Section 3.1.3
A description of the receiving environment	Section 4.0
A description of the activity	Section 3.0
Details of the environmental impacts and risks of the activity	Section 6.0
A summary of the control measure for the activity	Section 8.0
A summary of the arrangements of ongoing monitoring of the titleholder's environmental performance	Section 10.15
A summary of the response arrangements in the oil pollution emergency plan	Section 7.0 and the Offshore Victoria Oil Pollution Emergency Plan (OPEP) [VIC-ER-EMP-0001]
Details of consultation already undertaken and plans for ongoing consultation	Section 9.0 and Section 10.12
Details of the titleholders nominated liaison person for the activity	Section 1.7

1.3 Background

Between 2005 and 2010, the BMG fields were operational and produced crude oil from seven subsea wells to a floating production storage and offloading unit (FPSO) and shuttle tanker. This production phase was known as Development Phase 1. Phase 2 was envisaged to involve an expanded development piggybacking onto Development Phase 1 facilities.

In November 2010, ROC Oil (the then titleholder) and joint venture partners (JVPs) determined that BMG production under its current operational configuration was not commercially viable, and a decision was taken to enter a non-production phase (NPP), pending a decision for the future Phase 2 development.

In 2011, to prepare for the NPP, the BMG subsea facilities (wells and subsea infrastructure) were shut-in, depressurised, flushed, and preserved with inhibited water. The mooring system and mid-water equipment were removed in 2012, and the flowline and umbilical were trenched to facilitate reduction of the petroleum safety zone (PSZ). The following PSZs remain around the facilities including the wells (as per **Gazette Notice A443819**); shown in Figure 3-1:

- A distance of 500 m around the BMG field infrastructure
- A distance of 360 m around the Basker-6 wellhead
- A distance of 300 m around the exposed flowlines.

The BMG petroleum titles VIC/RL13, VIC/RL14 and VIC/RL15 (refer to Figure 1-1) and facilities were acquired by Cooper Energy in 2014, during the NPP. Cooper Energy rebranded to Amplitude Energy in November 2024.

Amplitude Energy plans to develop gas reserves from the Manta field. The most likely future development concept for Manta involves new subsea gas wells and production equipment tied back to shore. The existing BMG facilities and layout was designed specifically around the production of the fields oil reserves via an FPSO and is not considered suitable for reuse as part of a future Manta gas development. Any future development of the Manta gas reserves would be covered by a separate EP.

Accordingly, Amplitude Energy is decommissioning the remaining BMG oil production subsea facilities and infrastructure in phases:

- Phase 1a – facility cleaning, preparations, and well plug and abandonment (P&A)

- Phase 1b – removal of structures, flowline spools, and flying leads, depending on progress with well abandonment
- Phase 2 – decommissioning of flowlines, umbilicals, and any remaining equipment not removed in Phase 1.

The P&A of the wells was originally planned in 2018 and an EP providing for the activity was accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in 2018 (BMG-EN-EMP-0002 / NOPSEMA Reference A682731). The 2018 campaign was cancelled prior to the arrival of the mobile offshore drilling unit (MODU) due to the non-acceptance of a separate regulatory approval (Well Operations Management Plan [WOMP]) and the EP was subsequently closed.

Well abandonment plans were revised and a new methodology progressed in consultation with NOPSEMA. In parallel to this planning process, NOPSEMA issued General Direction 824 (NOPSEMA, 2021)to Cooper Energy on 1 September 2021 (refer to Sections 2.1.2 and 2.1.3).

In 2024 the BMG wells were successfully plugged and abandoned, and the subsea production trees (Xmas trees) were removed. These activities were completed under the (now closed) BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001]. All remaining BMG decommissioning activities form part of this BMG Closure Project (Phase 2) EP [BMG-DC-EMP-0002].

1.4 Purpose

This EP has been prepared to demonstrate how the proposed petroleum activities at BMG will be managed to meet the requirements of the Commonwealth OPGGS(E)R, administered by NOPSEMA. The development of this EP has been guided by N-04750-GN1344 Environment Plan Content Requirements (NOPSEMA, 2025a).

The EP also serves to outline how matters related to General Direction 824, and Sections 571, 572 and 270 of the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) will be addressed.

Refer to Section 2.0 and Appendix 1 for full list of relevant legislation and requirements addressed within this EP.

1.5 Scope

Amplitude Energy has developed this EP to manage the environmental impacts and risks associated with the BMG Closure Project (Phase 2) activities. Activities included in the scope of this EP are described in Section 3.0. Property maintenance provisions are also included within this EP (Section 3.5) and are triggered from 2024, following P&A of the wells (Table 1-2).

A summary of the current and previous EPs developed for the BMG assets, their relevant scope, and EP termination dates, are provided in Table 1-2.

Table 1-2 - Overview of Current and Previous BMG EPs

EP Name [Document Number]	Relevant Scope	Initiation Point	Termination Point	EP Status (2026)
Gippsland Offshore Operations Environment Plan [VIC-EN-EMP-0002]	Inspection and maintenance	Superseded previous BMG NPP EP [09/HSEQ/ENV/PL07] to provide coverage of NPP activities.	BMG component of the Gippsland Offshore Operations EP is not active upon commencement of Phase 1 activities. BMG activities were removed from the Gippsland Offshore Operations EP during 2024.	EP in-force; however, scope no longer includes BMG assets.

EP Name [Document Number]	Relevant Scope	Initiation Point	Termination Point	EP Status (2026)
BMG Closure Project (Phase 1) Environment Plan [BMG-DC-EMP-0001]	Well abandonment, and subsea structure recovery. Inspection and maintenance.	From 2023, commencing with the offshore vessel pre-abandonment campaign.	On completion of Phase 1 activities.	EP closed.
BMG Closure Project (Phase 2) Environment Plan [BMG-DC-EMP-0002] (this EP)	Inspection and maintenance Removal of all remaining infrastructure	From 2024, following P&A of the wells and closure of the Phase 1 EP	On completion of Phase 2 activities.	EP in-force.

Activities excluded from the scope of this EP are:

- BMG Closure Project (Phase 1) decommissioning activities that were exclusively covered under the BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001]
- Activities beyond the Operational Area (as defined in Section 3.1.1)
- Future appraisal or development of the Manta gas reserves
- Vessels (including emergency response vessels) transiting to or from the Operational Area; during transit vessels are deemed to be operating under the Commonwealth *Navigation Act 2012* and not performing a petroleum activity
- Helicopters transiting to or from the Operational Area; during transit helicopters are deemed to be operating under the Commonwealth *Air Navigation Act 1920*, Civil Aviation Safety Regulations 1998, and the Federal Aviation Regulations, and not performing a petroleum activity.

Upon completion of the activities detailed in this EP, closure of the existing BMG facilities is considered to have been completed. Although Amplitude Energy do not plan to relinquish VIC/RL13 once activities are complete, Amplitude Energy will submit a notification of completion under regulation 46 of the OPGGS(E)R to close out the EP.

1.6 BMG Decommissioning

The BMG Development history, including production, cessation, and non-production phases was described in the BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001], and has not been repeated here.

Decommissioning of the BMG facilities and infrastructure is managed via Amplitude Energy's project planning process. Amplitude Energy uses a gated process to plan and execute projects; the process workflow is divided into phases (Figure 1-2). Each phase is subject to assurance processes and a gate review, the outcomes of which include continue, stop, hold, or recycle. Further information regarding how this process was applied is provided in Section 3.2.

Decommissioning progress is reported annually, and reports are published on the **Amplitude Energy website**. Several project execution methodologies have been provided for within the EP. These options have been informed via engagement with engineering and execution service providers during the recent engineering and execution tender process.

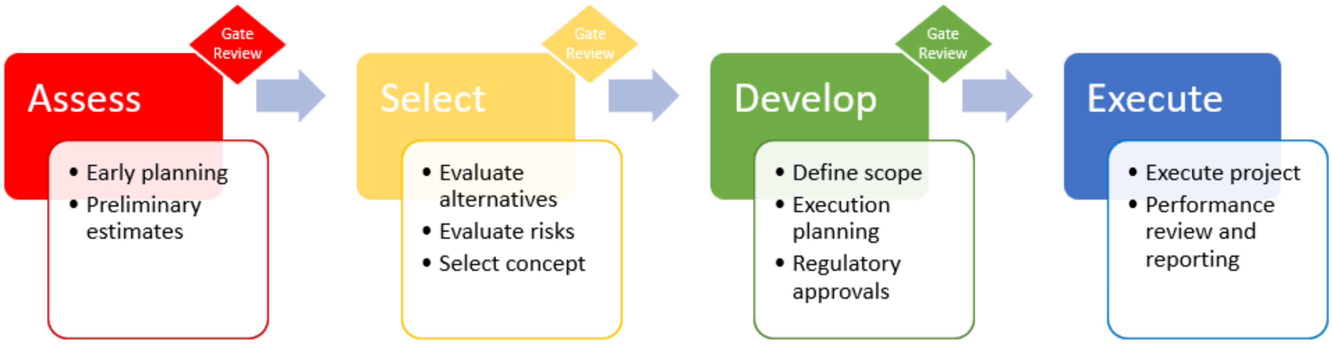


Figure 1-2 - Project Workflow

Phase timing: Discrete period between circa 2026 to 2031 (for Phase 2 activities).

Phase description: Under Section 572 of the OPGGS Act, the base case for decommissioning the BMG facilities is to remove all infrastructure. Table 1-3 outlines the base decommissioning cases and alternatives evaluated.

Table 1-3 - BMG Facility Decommissioning End-states Considered

Facilities/Infrastructure	**Planned End State**	**Alternatives Considered**
Subsea production well	Permanently seal subsurface reservoirs. Removal of surface well equipment.	None.
Major structures	Removal. Recovery of surface section of steel manifold pile.	Full recovery of steel manifold pile from below seabed. Not technically feasible. Reference Report: BMG Technical Considerations for Decommissioning of Subsea Infrastructure [17-033-RP-001].
Umbilical flying leads	Removal.	None.
Flowline jumpers	Removal.	None.
Auxiliary structures	Removal.	None.
Flowlines Umbilicals	Removal. Options include cut and lift, lift and cut, reverse reel.	In situ decommissioning including the following remediation options: • Trench full lengths of lines • Rock cover full length of lines • Rock cover spans / exposures • Trench spans / exposures • Remove ends / remediate snag risk • No intervention. Reference Report: BMG Field Decommissioning Comparative Assessment [BMG-EN-REP-0019].

Decommissioning of the BMG facilities and infrastructure will involve the following phases, with timings planned to align with that required by General Direction 824 (Table 2-2) and/or subsequent communications between NOPSEMA and Amplitude Energy:

- Phase 1 (commence offshore execution in 2023) (covered under the BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001]):
  - Seabed and facility inspection and preparatory activities
  - P&A of all wells to permanently isolate the production zones

   - Removal of structures on the seabed, flowline jumpers, and flying leads. Structure removal will be undertaken either partially or entirely in Phase 1. Equipment not removed in Phase 1 will be recovered in Phase 2.

- Phase 2 (offshore execution window) ~2027 to 2030 (this EP):
   - Decommissioning of flowlines and umbilicals, and any other remaining structures/equipment via full removal; this will be undertaken as a separate campaign following well P&A. The only elements currently planned to be left in situ are the well components at or below the seabed, and the section of the Basker-A Manifold (BAM) pile at or below the seabed; this element is covered under Sea Dumping Permit SD2023-4052[1]
   - Screening studies for full removal of the flowlines and umbilicals have been undertaken and indicate removal via reverse reeling, lifting, and cutting, or cutting then lifting, are possible accounting for the design and condition of equipment [17-033-RP-001, 17-033-RP-002, BMG-EN-REP-0018].

Figure 1-3 provides an overview of the BMG Closure Project milestones, showing indicative timing of project regulatory submissions.

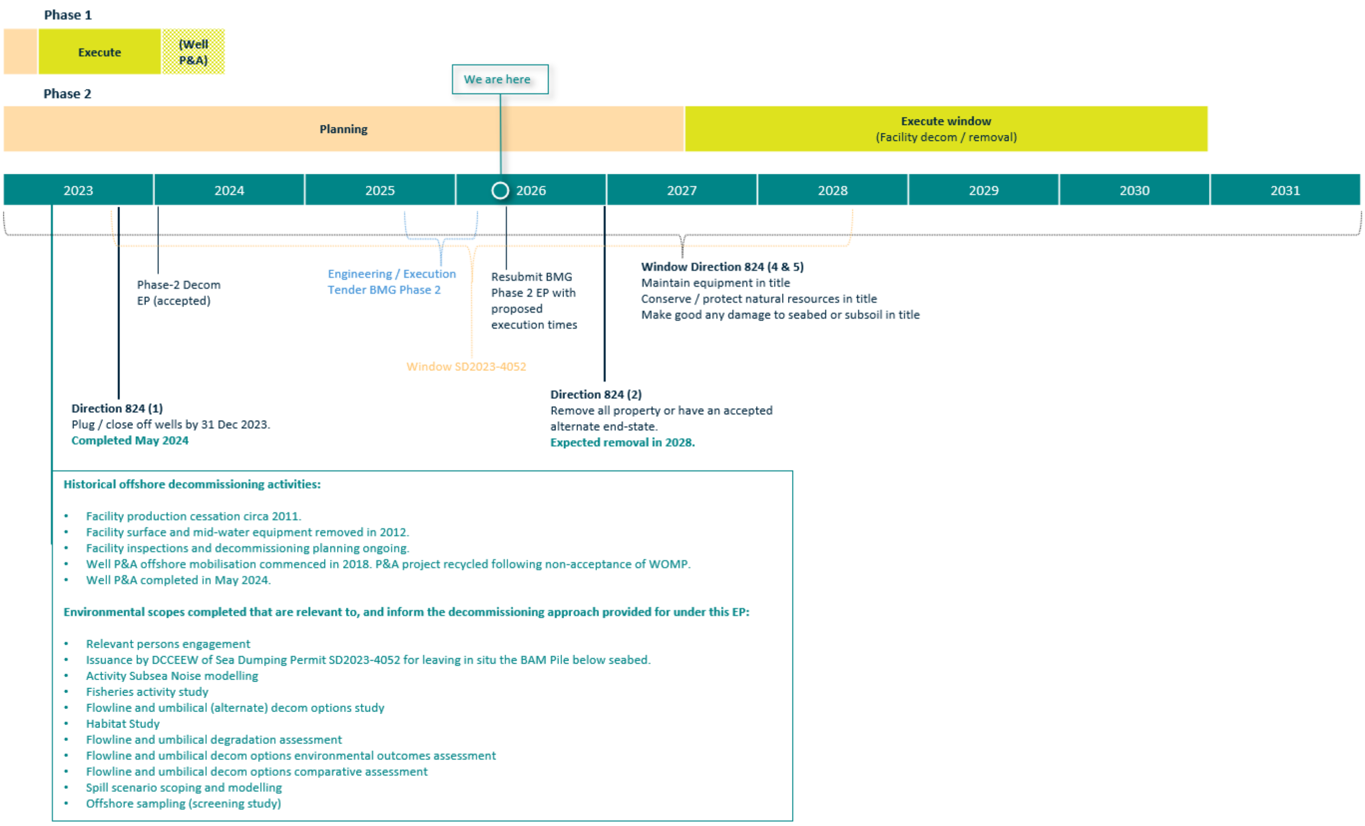


Figure 1-3 - Indicative Timeline for BMG Closure Project Milestones and Directions

1.7 Titleholder Details

In accordance with regulation 23 of the OPGGS(E)R, Table 1-4 provides the details of titleholders and liaison person for the VIC/RL13 retention lease where the petroleum activity will take place.

[1] Should validity SDP expire prior to completion of the BAM Pile decommissioning works, DCCEEW will be engaged on the requirements of the Sea Dumping Act and policy at that time, and revised SDP application submitted as required.

If the titleholder's nominated liaison person or contact details for the nominated liaison person changes, Amplitude Energy will notify the relevant Regulator/s in accordance with regulation 23(3) of the OPGGS(E)R and regulation 286A of the OPGGS Act.

Table 1-4 - Details of Titleholder and Liaison Person

Titleholder	Titleholder Details	Liaison Person
Name: Amplitude Energy Limited ABN: 93 096 170 295 Lease: VIC/RL 13	Address: Level 11, 55 Currie Street, Adelaide, 5000 Telephone Number: (08) 8100 4900	Nathan Childs Chief Corporate Services Officer Amplitude Energy Limited Level 11, 55 Currie St, Adelaide, SA, 5000 Phone: (08) 8100 4900 Email: **customerservice@cooperenergy.com.au**

2.0 Requirements

This section provides information on the requirements that apply to the petroleum activity described in this EP and are relevant to the environmental management of the activity, including relevant laws, codes, other approvals and conditions, standards, agreements, treaties, conventions, or practices (in whole or part) that apply to jurisdiction/s in which the activity takes place.

The proposed petroleum activity is located within Commonwealth waters off the Victorian coast. Planned petroleum activities undertaken in this area are regulated by Commonwealth legislation, primarily under the Commonwealth OPGGS Act and OPGGS(E)R.

Table 2-1 details the relevant requirements of the OPGGS(E)R, and the corresponding section of this EP where the requirements are addressed.

On the basis that a worst-case credible oil spill has the potential to intersect both State and Commonwealth waters, a summary of key Commonwealth and State (Victoria, New South Wales (NSW) and Tasmania) legislative requirements, and any codes or guidelines applicable to the environmental management of the petroleum activity are summarised below, with additional requirements provided in Appendix 1.

Table 2-1 - Requirements of the OPGGS(E)R

OPGGS(E)R	Description	Document Section
21(1)	A description of proposed activities	Section 3.0
21(2), 21(3)	A description of the existing environment including details of the relevant values and sensitivities (if any) of that environment that may be affected by the activity including details of matters of national environmental significance (MNES) as outlined under Part 3 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).	Section 4.0
21(4), 22(16)	An overview of the environment legislation applicable to the proposed activities and a demonstration on how they are met.	Section 2.0, and Appendix 1
21(5), 21(6)	An identification and evaluation of environmental impacts and risks of described petroleum activities and details of control measures that will be used to reduce impacts and risks to as low as reasonably practicable (ALARP) and an acceptable level, for both planned activities and unplanned events.	Section 6.0, and Section 7.0
21(7)	The environmental performance outcomes, standards, and measurement criteria that apply to both planned activities and unplanned events.	Section 8.0
22(1), 22(7)	An appropriate implementation strategy including routine reporting arrangements to the Regulator in relation to environmental performance.	Section 10.0
22(2)	A description of the environmental management system and measures to ensure that impacts and risks are continually identified and reduced to ALARP, control measures are effective in reducing impacts and risks to ALARP and acceptable levels, and that performance outcomes and standards are being met.	Section 10.0
22(3)	Details of role and responsibilities of personnel in relation to implementation, management, and review of this EP, including during emergencies or potential emergencies.	Section 10.5
22(4)	Details of measures to ensure personnel and contractors are aware of their responsibilities and has the appropriate competencies and training, including during emergencies or potential emergencies.	Section 10.6
22(5)	Details of monitoring, recording, auditing, management of non-conformance and review of environmental performance and the implementation strategy.	Section 10.15

OPGGS(E)R	Description	Document Section
22(6)	Details of monitoring and maintenance of quantitative records for emissions and discharges.	Section 10.15
22(8), 22(9), 22(11), 22(12), 22(13), 22(14)	Details of the OPEP, provision for its updating, inclusion of response arrangements for monitoring and responding to oil pollution, and details of testing of the plan.	Section 7.0, Section 10.7.2, and the Offshore Victoria OPEP [VIC-ER-EMP-0001]
22(10)	Details of monitoring of impacts to the environment from oil pollution and response activities.	Section 7.0, Offshore Victoria OPEP [VIC-ER-EMP-0001], and Offshore Victoria Operational and Scientific Monitoring Plan (OSMP) [VIC-ER-EMP-0002]
22(15)	Details for appropriate ongoing consultation with relevant authorities of the Commonwealth, a State or a Territory; and other relevant interested persons or organisations.	Section 10.12
23(1), 23(2), 23(3)	Details of the titleholder and an appropriate nominated liaison person, including arrangements for notifying the Regulator should this change.	Section 1.7
24(a)	Details of the titleholders' environmental policy.	Section 2.3, and Section 10.1
24(b), 25	Details of relevant persons consultation that has been undertaken during preparation of the EP, including all correspondence.	Section 9.0
24(c), 47, 48, 49, 50	Details of reportable incidents in relation to the activity, procedures for reporting and notifying reportable and recordable incidents.	Section 10.14
46	Details of titleholder notification requirements at end of operation of an EP.	Section 10.15.3
51	Environmental performance report must be submitted to NOPSEMA at the times or intervals provided for in the environment plan in force for the activity.	Section 10.15
52, 53	Details of the storage of the EP.	Section 10.16
54	Details of titleholder notification for commencement and completion of a petroleum activity.	Section 10.15.3

2.1 Commonwealth Legislation

The Operational Area is located entirely in Commonwealth waters. Legislation relevant to the Commonwealth and this petroleum activity is listed in Appendix 1.

2.1.1 OPGGS Act and OPGGS(E)R

The OPGGS Act addresses all licensing, health, safety, environmental, and royalty considerations for offshore petroleum exploration and development operations extending beyond the 3 nautical mile (nm) limit. The OPGGS(E)R specify the requirements to manage the environmental impacts and risks of petroleum activities. Key to these regulations is the submission of an EP to the regulatory authority (NOPSEMA) for acceptance prior to commencing the proposed petroleum activities.

Section 572 of the OPGGS Act describes the requirement for titleholders to maintain all structures, equipment, and property in a title area in good condition and repair, and to remove property when it is neither used nor to be used in connection with operations authorised by the title. NOPSEMA's policy "Section 572 Maintenance and Removal of Property" (NOPSEMA, 2026a) outlines NOPSEMA's administration of Section 572. This EP has been prepared to describe the removal of property and compliance with the obligations described in Section 572 of the OPGGS Act where relevant to the activity.

Section 270 of the OPGGS Act describes the requirements for titleholders when they apply for consent to surrender a title under Section 269. NOPSEMA's policy "Section 270 Consent to surrender title - NOPSEMA advice" (NOPSEMA, 2026b) outlines the principles adopted when advising the Joint Authority about giving or refusing consent to surrender a title. Amplitude Energy acknowledge this policy, however, do not plan to relinquish the title on completion of the activities under this EP (as detailed in Section 1.5).

2.1.2 General Direction 824

In September 2021 NOPSEMA issued General Direction 824 under Section 574 of the OPGGS Act in relation to the BMG facilities. The schedule of directions, and the relevant plans are outlined in Table 2-2.

Performance outcomes, standards and control measures related to General Direction 824 are provided in Table 8-1.

Table 2-2 - General Direction 824: Directions and Relevant Plans or Reports

Schedule 1 – Directions		Relevant Plans or Reports	Direction Status (2026)
1	Plug or close off, to the satisfaction of NOPSEMA, all wells made in the title area by any person engaged or concerned in operations authorised by the title as soon as practicable and no later than 31 December 2023.	BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001] BMG Well Operations Management Plan [BMG-DC-WMP-0001]	Complete
2	Remove, or cause to be removed, to the satisfaction of NOPSEMA, from the title area all property brought into that area by any person engaged or concerned in the operations authorised by the title as soon as practicable and no later than 31 December 2026.	BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001] BMG Closure Project (Phase 2) EP [BMG-DC-EMP-0002; this document]	In progress
3	Until such time as Direction 1 and 2 are complete, maintain all property on the title to NOPSEMA's satisfaction, to ensure removal of property is not precluded.	BMG Closure Project (Phase 2) EP [BMG-DC-EMP-0002; this document] BMG Facilities Integrity Management Plan (IMP) [BMG-IT-IMP-0001] BMG Well Operations Management Plan [BMG-DC-WMP-0001]	In progress
4	Provide, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the title area within 12 months after property referred to in Direction 2 is removed.	BMG Closure Project (Phase 2) EP [BMG-DC-EMP-0002; this document] Specifically refer to Section 6.3	In progress
5	Make good to the satisfaction of NOPSEMA, any damage to the seabed or subsoil in the title area caused by any person engaged or concerned in those operations within 12 months after property referred to in Direction 2 is removed.	BMG Closure Project (Phase 2) EP [BMG-DC-EMP-0002; this document] Specifically refer to Section 6.3	In progress
6	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, 4, and 5. b. The report submitted under Direction 6(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 holder's website within 14 days of obtaining NOPSEMA satisfaction under Direction 6(b).	Annual Progress Reports for the BMG Closure Project are available online: **https://amplitudeenergy.com.au/what-we-do/projects/gippsland-basin**	In progress

2.1.3 Legislative Considerations

As this is to be the final EP for the BMG Development in its current form, the relevant requirements in Sections 270 and 572 of the OPGGS Act are set out in Table 2-3. Although the petroleum title is not planned to be relinquished, Amplitude Energy has set out the requirements below in a manner to demonstrate the requirements of the OPGGS Act have been met.

Table 2-3 - Relevant Requirements of the OPGGS Act 2006

OPGGS Act		How this Requirement has been addressed in this EP
Section 270 – Consent to surrender title		
270(3)	The Joint Authority may consent to the surrender sought by the application only if the registered holder of the permit, lease or licence:	
270(3)(c)	has: (i) to the satisfaction of NOPSEMA, removed or caused to be removed from the surrender area (defined by subsection (7)) all property brought into the surrender area by any person engaged or concerned in the operations authorised by the permit, lease or licence; or (ii) made arrangements that are satisfactory to NOPSEMA in relation to that property; and	As detailed in Sections 3.3 and 3.4 Amplitude Energy plan to remove all remaining subsea infrastructure except for the sub-seabed section of the BAM pile.
270(3)(e)	has provided, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the surrender area; and	As the petroleum title is not planned to be surrendered (Section 1.5), this requirement is not considered applicable.
270(3)(f)	has, to the satisfaction of NOPSEMA, made good any damage to the seabed or subsoil in the surrender area caused by any person engaged or concerned in the operations authorised by the permit, lease or licence;	Refer to Section 6.3 where a detailed analysis of impacts to the seabed over the life of the BMG development has been detailed.
Section 572 - Maintenance and removal of property etc. by titleholder		
572(2)	A titleholder must maintain in good condition and repair all structures that are, and all equipment and other property that is: (a) in the title area; and (b) used in connection with the operations authorised by the permit, lease, licence or authority.	Section 3.5 details how the infrastructure is planned to be maintained.
572(3)	A titleholder must remove from the title area all structures that are, and all equipment and other property that is, neither used nor to be used in connection with the operations: (a) in which the titleholder is or will be engaged; and (b) that are authorised by the permit, lease, licence or authority.	As detailed in Sections 3.3 and 3.4 Amplitude Energy plan to remove all remaining subsea infrastructure except for the sub-seabed section of the BAM pile.

2.1.4 Matters to be Addressed (Permissioning Documents)

In September 2021 NOPSEMA issued Cooper Energy a list of matters to be addressed in relation to their policy on Section 572 and General Direction 824 for the BMG assets within permissioning documents. Table 2-4 describes how these matters have been addressed within this EP or has been addressed within other plans.

Note: BMG assets are no longer within scope of the in-force revision of the Gippsland Offshore Operations Environment Plan [VIC-EN-EMP-0002], and as such, reference to this EP has been removed from Table 2-4.

Table 2-4 - Matters to be Addressed (Permissioning Documents)

		BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001]	BMG Closure Project (Phase 2) EP [BMP-DC-EMP-0002; this EP]
Item	**Matters to be Addressed**	**EP Closed in 2024**	**EP In-force from 2025**
A	Description of all property brought onto the title, including its current status and condition.	The BMG Closure Project (Phase 1) EP included a description of all property at BMG and provides an overview of status and condition.	The BMG Closure Project (Phase 2) EP includes a description of all property at BMG and provides an overview of status and condition.
B	Description of the activities associated with the plugging or closing of wells and removal of remaining property from the title area to meet the requirements of section 572(3) and the General Direction 824 to NOPSEMA's satisfaction.	The BMG Closure Project (Phase 1) EP provided for the P&A of wells and removal of structures. Specifically, to meet the requirements of section 572(3) and Direction 1 of General Direction 824 as soon as practicable and by no later than 31 December 2023.	The BMG Closure Project (Phase 2) EP provides for the decommissioning of remaining equipment including any alternate end states. Specifically, to meet the requirements of section 572(3) and Direction 2 of General Direction 824 as soon as practicable. This revision to this Phase 2 EP also acts as the permissioning document for an extension of Direction 2 until 31 December 2030.
C	Description of the planning processes and timetable of activities to support decommissioning. In particular, the fate of all property on the title, proposed decommissioning methodology, scope of work and execution strategy.	The BMG Closure Project (Phase 1) EP included description of the planning process and timetable for decommissioning of BMG facilities, with reference to the BMG Closure Project (Phase 2) EP for the remaining scope. The BMG Closure Project (Phase 1) EP included a description of the fate of all property within the scope of the EP, the proposed decommissioning methodology, scope of work and execution strategy.	The BMG Closure Project (Phase 2) EP includes description of the planning process and timetable for decommissioning the remaining BMG infrastructure post Phase 1. The BMG Closure Project (Phase 2) EP includes a description of the fate of all property, proposed decommissioning methodology, scope of work and execution strategy.
D	Provision of the schedule of activities including submission of permissioning documents to support decommissioning.	The BMG Closure Project (Phase 1) EP schedule of activities included all decommissioning activities and permissioning documents.	The BMG Closure Project (Phase 2) EP schedule of activities includes all decommissioning activities and permissioning documents.
E	An evaluation of all impacts and risks from the decommissioning activities to demonstrate they are managed to acceptable levels and ALARP.	The BMG Closure Project (Phase 1) EP provided for the P&A of wells and removal of structures. BMG activity specific studies integrated into the EP that support the evaluation of impacts and risks included: • Existing environment • Subsea noise modelling	The BMG Closure Project (Phase 2) EP provides for the decommissioning of remaining equipment, including any alternate end states. BMG or activity specific studies completed relevant to this scope includes: • Habitat study • Fishing type and intensity study

		BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001]	BMG Closure Project (Phase 2) EP [BMP-DC-EMP-0002; this EP]
		• Subsea noise adaptive management plan • Worst case discharge assessment • Oil spill modelling • Spill response resourcing • Subsea dispersant study • Expansion of OSMP • Capping feasibility study. An activity specific OPEP was drafted for the Phase 1 decommissioning activity (BMG Closure Project (Phase 1) OPEP [BMG-ER-EMP-0004]), noting the spill scenario for P&A differs significantly in nature and scale compared to NPP scenarios and Phase 2 decommissioning scenarios. Relevant person engagement (informing the assessment) has also been undertaken for the P&A and structure removal scope inclusive of State government engagement on the OPEP.	• Flowline and umbilical decommissioning options screening study • Flowline and umbilical comparative assessment of decommissioning options • Flowline and umbilical environmental outcomes assessment of decommissioning options • Flowline and BAM padeye corrosion and integrity studies. Relevant person engagement (informing the evaluation of impacts and risks within both the original submission and this revision) has been undertaken for the BMG Closure Project (Phase 2) EP scope, including with DCCEEW on Sea Dumping Permits. Ongoing engagement with relevant persons will continue as required.
F	Description of how Amplitude Energy will maintain all property on the title as required by s572(2) of the Act to ensure that wells can be plugged or closed off and decommissioning end states are not precluded.	The BMG Closure Project (Phase 1) EP outlined how the P&A activities would be managed such that full removal was not precluded.	The BMG Closure Project (Phase 2) EP provides for the decommissioning end states for the infrastructure. The Phase 2 EP also provides for integrity management of facilities whilst in NPP. The Phase 2 EP links to the BMG Facilities IMP [BMG-IT-IMP-0001]. The IMP is a control measure which steps out the strategies required/implemented to maintain the assets as close to their design condition as possible.
G	Description of the arrangements for reporting to NOPSEMA on progress with implementing the activities under the EP, until these activities are complete.	The BMG Closure Project (Phase 1) EP included a description of arrangements for reporting to NOPSEMA on progress with implementing the activities under the EP, until the activities are complete. This included reports submitted to NOPSEMA under Direction 6 of General Direction 824.	The BMG Closure Project (Phase 2) EP includes description of arrangements for reporting to NOPSEMA on progress with implementing the activities under the EP, until the activities are complete. This includes reports submitted to NOPSEMA under Direction 6 of General Direction 824.

2.1.5 Environment Protection and Biodiversity Conservation Act 1999

In 2005 the BMG development was referred under the EPBC Act (EPBC 2005/2026) and assessed by the Commonwealth Department of Environment and Heritage, Approvals and Wildlife Division. The development was approved as '*not a controlled action*'.

Since February 2014, NOPSEMA's environmental management authorisation process has been endorsed by the Federal Minister for the Environment as a Program (the Program) that meets the requirements of Part 10, Section 146, of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Under the Program, the Minister for the Environment has approved a class of actions which, if undertaken in accordance with the endorsed Program, will not require referral, assessment, and approval under the EPBC Act. Petroleum and greenhouse gas activities undertaken in Commonwealth waters in accordance with the Program are considered to be "approved classes of action". The Program has objectives which include ensuring activities undertaken in the offshore area are conducted in a manner consistent with the principles of ecologically sustainable development (ESD) and will not result in unacceptable impacts to MNES protected under Part 3 of the EPBC Act.

This EP considers the impacts to protected matters (summarised in Table 2-5 and Table 2-6) as described in the EPBC Act, and key terms of the Blue Whale Conservation Management Plan (Table 2-7). This has included making specific reference in Section 4.0 to the values of matters protected under Part 3 of the EPBC Act using references and relevant guidance documents, such as EPBC Act significance guidance documents, relevant policy statements, plans of management established by government, recovery plans and online databases.

The assessment of these protected matters has been conducted as per the assessment process described in Figure 2-1.

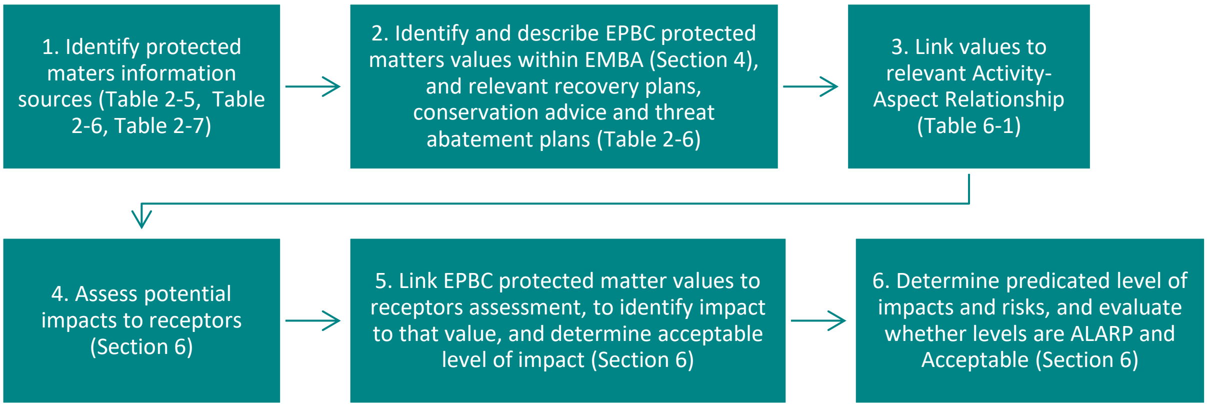


Figure 2-1 - Impact Assessment Process of EPBC MNES

Table 2-5 - EPBC Act Information Incorporated into this EP

EPBC Act Relevant Information Considered	How Information is Used	Document Section
Protected matters search tool (PMST) (DCCEEW, 2025a)	An EPBC Act Protected Matters database search has been conducted for the project boundaries (as defined in Section 4.2). A description of the marine or coastal receptors occurring within the environment that may be affected (EMBA) is provided in Section 4.0. The EPBC Act PMST reports also include some terrestrial receptors (e.g. threatened species, threatened ecological communities (TEC), or heritage places); some of which have not been considered further within this EP given impacts are not expected and considered outside the bounds	Section 4.0, and Appendix 3

EPBC Act Relevant Information Considered	How Information is Used	Document Section
	of oil spill impact assessment. The EPBC Act PMST reports are included in Appendix 3.	
Threatened species recovery plans, threat abatement plans, and species conservation advices	Relevant plans or advice are identified in Table 2-6 according to the management advice applicable to the activity and associated impacts and risks.	Section 2.1.5, and Section 6.0
Plans of management for World Heritage properties, Australian Marine Parks (AMPs), Commonwealth Heritage Places, or National Heritage places	The Australian Government has established numerous AMPs around Australia under the EPBC Act. There is one AMP that occurs within the Spill EMBA: the East Gippsland Marine Park. This AMP is approximately 100 km to the east of BMG infrastructure. The Commonwealth Heritage List is a list of natural, Indigenous, and historic heritage places owned or controlled by the Australian Government. There was one Commonwealth Heritage Place identified within the EPBC Act PMST report for the Spill EMBA, however, the site (a lighthouse) does not have a marine/coastal interface. Sites accepted to the World Heritage listing are only inscribed if considered to represent the best examples of the world's cultural and natural heritage. The National Heritage list is Australia's list of natural, historic, and Indigenous places of outstanding significance to the nation. No World Heritage properties or National Heritage places were identified in the EPBC Act PMST report for the Spill EMBA.	Section 4.0, Section 6.0, and Amplitude Energy's Description of the Environment [AEL-EN-EMP-0001; Appendix 2]
EPBC Act related guidelines	Relevant guidelines/policies are considered in the management of impacts and risks, such as: • EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing, and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia, 2017a) • National Light Pollution Guidelines for Wildlife (DCCEEW, 2023h) • Threat Abatement Plan for the impact of marine debris on vertebrate wildlife of Australia's coasts and oceans (Commonwealth of Australia, 2018).	Section 6.0
Ramsar wetland ecological character descriptions	There is no Ramsar wetland that has coastal boundaries intersecting with the Spill EMBA. The closest Ramsar wetland is Gippsland Lakes.	Section4.0, and Appendix 2
Marine bioregional plan	Marine bioregional plans are identified and considered in Section 4.0 and Section 6.0. Key Ecological Features (KEFs) are elements of the Commonwealth marine environment considered as regional importance for either a region's biodiversity or its ecosystem function and integrity. Two KEFs intersect with the Spill EMBA: • Big Horseshoe Canyon • Upwelling East of Eden. There are three other KEFs known to occur in the South-East Marine Region, but shapefiles are not available that spatially define these KEFs (DotE, 2015b). Two of these KEFs may also intersect with the Spill EMBA: • Bass Cascade • Shelf rocky reefs and hard substrates.	Section 4.0, Section 6.0, and Appendix 2
Australian Marine Spatial Information System (AMSIS) (Geoscience Australia, [no date])	The AMSIS has been developed by the Australian Government as an interactive web-based tool to present government and non-government geospatial information, including biologically important areas (BIAs) and KEFs. This marine spatial information has been presented specific to	Section 4.0, Section 6.0, and Appendix 2

EPBC Act Relevant Information Considered	How Information is Used	Document Section
	receptors in the Section 4.0 and considered in the assessment of impacts and risks in Section 6.0. BIAs are spatially defined areas of the State and Commonwealth marine environment used for critical life functions (reproduction, feeding, migration, resting) by protected marine species. BIAs are designated using the best available scientific evidence and Indigenous ecological knowledge (DCCEEW, 2023i)). Multiple BIAs intersect with the Spill EMBA, including for: • One dolphin species • 13 bird species • Two shark species • Three whale species.	
Species profile and threats database (DCCEEW, 2025b)	This database has been used as a source of information on the receptors. Information accessed has included species details such as habitat, movements, feeding, reproduction, and taxonomy. Note that profiles are not available for all species and ecological communities.	Section 4.0, and Appendix 2

Table 2-6 - Recovery Plans, Threat Abatement Plans, and Species Conservation Advices, relevant to BMG Closure Project (Phase 2)

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
Fish		
Approved Conservation Advice for *Epinephelus daemelii* (black cod) (DSEWPaC, 2012a)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the species.	None identified.
Conservation Advice *Prototroctes maraena* (Australian grayling) (TSSC, 2021)	Conservation advice provides actions that can be undertaken to ensure the conservation of the Australian grayling.	Threats: • Climate change. No explicit relevant conservation actions.
National Recovery Plan for Australian Grayling (Backhouse, et al., 2008)	The overall objective of recovery is to minimise the probability of extinction of the Australian Grayling in the wild, and to increase the probability of important populations becoming self-sustaining in the long-term.	Threatening processes: • Poor water quality • Climate change. No explicit relevant management actions.
Recovery Plan for the Grey Nurse Shark (*Carcharias Taurus*) (DotE, 2014b)	The overarching objective of this recovery plan is to assist the recovery of the grey nurse shark in the wild, throughout its range in Australian waters.	Potential threats: • Pollution and disease and ecosystem effects as a result of habitat modification and climate change. No explicit relevant management actions.
Recovery Plan for the White Shark (*Carcharodon carcharias*) (DSEWPaC, 2013d)	The overarching objective of this recovery plan is to assist the recovery of the white shark in the wild throughout its range in Australian waters.	Potential threats: • Ecosystemeffects as a resultof habitat modification and climate change. No explicit relevant management actions.

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
Conservation Advice *Rhincodon typus* (whale shark) (TSSC, 2015e)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the whale shark.	Threats: • Boat strike from large vessels • Habitat disruption from mineral exploration, production and transportation • Marine debris • Climate change. Conservation actions: Assess the impacts of offshore installations and associated environmental changes (light spill, chronic noise, changed water temperature, localised nutrient levels) on whale sharks and mitigation options for these impacts.
Marine Turtles		
Approved Conservation Advice for Dermochelys coriacea (Leatherback Turtle) (DEWHA, 2009a)	Conservation advice provides actions that can be undertaken to ensure the conservation of the leatherback turtle.	Threats: • Ingestion of marine debris • Boat strike • Degradation of foraging areas and changes to breeding sites • Climate change. No explicit relevant conservation actions.
Recovery Plan for Marine Turtles in Australia, 2017-2027 (Commonwealth of Australia, 2017d)	The long-term recovery plan objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list.	Threats: • Climate change and variability • Marine debris • Chemical and terrestrial discharge • Light pollution • Habitat modification • Vessel disturbance • Noise interference. Management actions: • A2.1—continue to meet Australia’s international commitments to address the causes of climate change • A4.2—ensure spill risk strategies and response programs adequately include management for marine turtles and their habitats, particularly in reference to ‘slow to recover habitats’, e.g. nesting habitat, seagrass meadows or coral reefs • A8.2—develop and implement best practice light management guidelines for existing and future developments adjacent to marine turtle nesting beaches • A8.3—identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution • A9.1—manage infrastructure, coastal development, dredging and trawling to ensure ongoing biologically

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
		important behaviours for marine turtle stocks continues. •
Migratory shorebirds and seabirds		
Conservation Advice for *Ardenna grisea* (sooty shearwater) (DCCEEW, 2023d)	Conservation advice provides actions that can be undertaken to ensure the conservation of the sooty shearwater.	Threats: • Climate change. No explicit relevant conservation actions.
Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW, 2024a)	Conservation advice provides actions that can be undertaken to ensure the conservation of the ruddy turnstone.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
Conservation Advice for *Botaurus poiciloptilus* (Australasian bittern) (TSSC, 2019a)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Australasian bittern.	Threats: • Climate change. No explicit relevant conservation actions.
National Recovery Plan for the Australasian Bittern (*Botaurus poiciloptilus*) (Commonwealth of Australia, 2022c)	The long-term vision for this recovery plan is that the Australasian bittern population has increased in size to such an extent that the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.	Threats: • Climate variability and change. No explicit relevant management actions.
Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW, 2024b)	Conservation advice provides actions that can be undertaken to ensure the conservation of the sharp-tailed sandpiper.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
Conservation Advice for *Calidris canutus* (red knot) (DCCEEW, 2024c)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the red knot.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
Conservation Advice for *Calidris ferruginea* (curlew sandpiper) (DCCEEW, 2023e)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the curlew sandpiper.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
Conservation Advice for *Calidris tenuirostriss* (great knot) (DCCEEW, 2024d)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the great knot.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
Conservation Advice for *Charadrius leschenaultii* (greater sand plover) (DCCEEW, 2023f)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the greater sand plover.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
National Recovery Plan for Eastern Bristlebird	The long-term vision of this recovery plan includes that eastern bristlebird	Threats: • Climate change.

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
(*Dasyornis brachypterus*) (Commonwealth of Australia, 2022b)	populations are genetically diverse and self-sustaining, and the species is resilient to impacts of climate change.	No explicit relevant management actions.
Conservation Advice for Gallinago hardwickii (Latham's snipe) (DCCEEW, 2024e)	Conservation advice provides actions that can be undertaken to ensure the conservation of the Latham's snipe.	Threats: • Climate change. No explicit relevant conservation actions.
Conservation Advice for *Halobaena caerulea* (blue petrel) (TSSC, 2015c)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the blue petrel.	None identified
Conservation Advice *Hirundapus caudacutus* (white-throated needletail) (TSSC, 2019b)	Conservation advice provides actions that can be undertaken to ensure the conservation of the white-throated needletail.	None identified.
Conservation Advice *Lathamus discolor* (swift parrot) (TSSC, 2016)	Conservation advice provides actions that can be undertaken to ensure the conservation of the swift parrot.	None identified.
National Recovery Plan for the *Lathamus discolour* (swift parrot) (DCCEEW, 2024i)	The long-term vision of this recovery plan is that the swift parrot population has increased in size to such an extent that the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.	Threats: • Climate variability and change. No explicit relevant management actions.
Conservation Advice for *Limosa lapponica baueri* (Alaskan bar-tailed godwit) (DCCEEW, 2024f)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the bar-tailed godwit.	Threats: • Climate change • Pollution. No explicit relevant management actions.
National Recovery Plan for the Orange-bellied Parrot (*Neophema chrysogaster*) (DELWP, 2016)	The vision of the orange-bellied parrot recovery program is to see species thrive again in the wild.	Threats: • Climate change • Barriers to migration and movement. No explicit relevant management or recovery actions.
Conservation Advice for *Neophema chrysostoma* (blue-winged parrot) (DCCEEW, 2023c)	Conservation advice provides actions that can be undertaken to ensure the conservation of the blue-winged parrot.	Threats: • Climate change. No explicit relevant conservation actions.
Conservation Advice for *Numenius madagascariensis* (far eastern curlew) (DCCEEW, 2023g)	Conservation advice provides actions that can be undertaken to ensure the conservation of the far eastern curlew.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.
Conservation Advice for *Pachyptila subantarctica* (fairy prion (southern)) (TSSC, 2015d)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the fairy prion (southern).	None identified
Gould's Petrel (*Pterodroma leucoptera leucoptera*)	This Recovery Plan describes the current understanding of the Gould's	None identified

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
Recovery Plan (NSW DEC, 2014)	petrel, reports on the implementation of the previous plan, and outlines the recovery program for the next 5 years.	
Approved Conservation Advice for *Rostratula australis* (Australian painted snipe) (DSEWPaC, 2013a)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Australian painted snipe	None identified
National Recovery Plan for the Australian Painted Snipe (Rostratula australis) (Commonwealth of Australia, 2022d)	The long-term vision of this recovery plan is that the Australian painted snipe population has increased in size to such an extent that the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.	Threats: • Deterioration of water quality • Climate variability and change. No explicit relevant management actions.
Conservation Advice for *Sternula albifrons* (little tern) (DCCEEW, 2025c)	Conservation advice provides actions that can be undertaken to ensure the conservation of the little tern.	Threats: • Climate change. No explicit relevant conservation actions.
Approved Conservation Advice for *Sternula nereis nereis* (fairy tern) (DSEWPaC, 2011)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the fairy tern.	Potential threats: • Oil spills. No explicit relevant conservation actions.
National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (Commonwealth of Australia, 2020a)	The long-term vision of this recovery plan is that the Australian fairy tern population has increased in size to such an extent that the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.	Threats: • Habitat degradation and loss of breeding habitat • Climate variability and change • Pollution. No explicit relevant management actions.
Conservation Advice *Thalassarche cauta* (shy albatross) (TSSC, 2020c)	Conservation advice provides actions that can be undertaken to ensure the conservation of the shy albatross.	Threats: • Climate change • Marine pollution (marine plastics). No explicit relevant conservation actions.
Approved Conservation Advice for *Thalassarche Chrysostoma (*grey-headed albatross) (DEWHA, 2009b)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the grey-headed albatross.	None identified. Refer to the National Recovery Plan for albatrosses and petrels (Commonwealth of Australia, 2022a)
Conservation Advice for *Thinornis rubricollis (hooded plover (eastern))* (DotE, 2014a)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the hooded plover.	Threats: • Oil spills • Entanglement and ingestion of marine debris • Climate change. No explicit relevant conservation actions.
Conservation Advice for *Tringa nebularia* (common greenshank) (DCCEEW, 2024g)	Conservation advice provides actions that can be undertaken to ensure the conservation of the common greenshank.	Threats: • Climate change • Pollution. No explicit relevant conservation actions.

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
National Recovery Plan for albatrosses and petrels (2022) (Commonwealth of Australia, 2022a)	The objective of the recovery plan is to improve the conservation status of albatrosses and petrels so that these species are on a trajectory towards no longer being threatened in Australia's jurisdiction.	Key marine threats: • Marine pollution (including oil spills, and marine debris) • Marine infrastructure interactions (including artificial lighting) • Climate variability and change. No explicit relevant management actions.
Wildlife Conservation Plan for Migratory Shorebirds – 2015 (Commonwealth of Australia, 2015b)	This plan provides a framework to guide the conservation of migratory shorebirds and their habitat in Australia and, in recognition of their migratory habits, outlines national activities to support their appreciation and conservation throughout the East Asian-Australasian Flyway.	Threats: • Habitat modification (including oil pollution) • Climate variability and change. No explicit relevant conservation actions.
Wildlife Conservation Plan for Seabirds (Commonwealth of Australia, 2020b)	This Plan aims to provide a strategic national framework for the research and management of listed marine and migratory seabirds and to outline national activities to support the conservation of listed seabirds in Australia and beyond.	Threats: • Climate variability and change • Resource extraction (including offshore petroleum facilities) • Pollution (including marine debris, light pollution, and acute pollution from oil spills). No explicit relevant conservation actions.
Cetaceans		
Conservation Advice for *Balaenoptera borealis* (Sei Whale) (TSSC, 2015a)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the sei whale.	Threats: • Climate and oceanographic variability and change • Anthropogenic noise and acoustic disturbance • Habitat degradation including pollution • Vessel strike. Conservation actions: • Continue to meet Australia's international commitments to reduce greenhouse gas (GHG) emissions and regulate the krill fishery in Antarctica Ensure all vessel strike incidents are reported in the National Vessel Strike Database.
Conservation Management Plan for the Blue Whale, 2015-2025 (Commonwealth of Australia, 2015a)	The long-term recovery plan objective for blue whales is to minimise anthropogenic threats to allow for their conservation status to improve so that they can be removed from the EPBC Act threatened species list.	Threats: • Climate variability and change • Noise interference • Habitat modification (including marine debris, infrastructure, chemical discharges) • Vessel disturbance. Management actions: • A2.3—Anthropogenic noise in BIAs will be managed such that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
		• A3.1—Continue to meet Australia's international commitments to reduce GHG emissions and regulate the krill fishery in Antarctica • A4.2—Ensure all vessel strike incidents are reported in the National Ship Strike Database. Key terms of the Conservation Management Plan (CMP) and how they have been considered in this EP are provided in Table 2-7.
Conservation Advice for *Balaenoptera physalus* (Fin Whale) (TSSC, 2015b)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the fin whale.	Threats: • Climate and oceanographic variability and change • Anthropogenic noise and acoustic disturbance • Pollution • Vessel strike. Conservation actions: • Continue to meet Australia's international commitments to reduce GHG emissions and regulate the krill fishery in Antarctica Ensure all vessel strike incidents are reported in the National Vessel Strike Database.
National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024h)	The long-term vision for the recovery of the southern right whale is that the population has increased in size to a level that the conservation status has improved, and the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.	Threats: • Anthropogenic climate change and climate variability • Entanglement • Habitat degradation (infrastructure/offshore development) • Anthropogenic underwater noise • Collision (vessel strike) • Pollution. Management actions: • A2.1—Coastal and offshore development actions are assessed according to principles of ecological sustainable development to ensure the risk of injury, auditory impairment and/or disturbance to southern right whales is minimised • A3.1—Continue to meet Australia's international commitments to address causes of climate change, including GHG emissions • A5.2—Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment • A5.3—Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that the risk of behavioural disturbance is minimised • A5.4—Ensure environmental assessments associated with underwater noise generating activities include consideration of national policy (e.g. EPBC Act Policy Statement 2.1) and guidelines related to managing anthropogenic underwater noise and implement

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
		appropriate mitigation measures to reduce risks to southern right whales to the lowest possible level • A6.1—Assess risk of vessel strike to southern right whales in BIAs • A6.3—Ensure environmental impact assessments and associated plans consider and quantify the risk of vessel strike and associated potential cumulative risks in BIAs and HCTS • A6.5—Ensure all vessel strike incidents are reported in the National Ship Strike Database managed through the Australian Marine Mammal Centre, Australian Antarctic Division.
Threatened Ecological Communities		
Giant Kelp Marine Forests of South East Australia (DWEWPaC, 2012e)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the ecological community.	Threats: • climate change. No explicit relevant management actions identified.
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (DotE, 2015a)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the ecological community.	None identified
Conservation Advice for Subtropical and Temperate Coastal Saltmarsh (DSEWPaC, 2013b)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the ecological community.	Threats: • climate change • pollution (oil spills). No explicit relevant management actions identified.
Other relevant		
Threat Abatement Plan for the impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean (Commonwealth of Australia, 2018)	The plans focus on strategic approaches to reduce the impacts of marine debris on vertebrate marine life.	Threatening process: • Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris Management actions: • Limit the amount of single use plastic material lost to the environment in Australia.

Table 2-7 – Guidance on Key terms of the Blue Whale Conservation Management Plan (September 2021) and how they are connected to this EP

Relevant Plan/Advice	Description
Recovery Plans	The Conservation Management Plan for the Blue Whale (Commonwealth of Australia, 2015a), 2015-2025 has been treated as a recovery plan (under the EPBC Act) throughout the EP.
Recovery plan actions	Actions identified in the Conservation Management Plan for the Blue Whale, 2015-2025 have been considered in the assessment of impacts and determination of acceptability of impacts to blue whale, specifically in Section 6.56.4 (underwater sound emissions).

Relevant Plan/Advice	Description
Biologically important areas	BIAs for blue whale, as provided in the Conservation Management Plan for the Blue Whale, 2015-2025, are described in Appendix 2 and Section 4.4.
Legal requirement - Action A.2.3. from the Blue Whale CMP: *"Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area"* Further, the key terms guidance (DAWE and NOPSEMA, 2021) states: *'The recovery plan requirement, Action A.2.3, applies in relation to BIAs. A whale could be displaced from a Foraging Area if impact mitigation is not implemented. This means that underwater anthropogenic noise should not:* • Stop or prevent any blue whale from foraging • Cause any blue whale to move on when foraging • Stop or prevent any blue whale from entering a Foraging Area. *It is considered that a whale is displaced from a Foraging Area if foraging behaviour is disrupted, regardless of whether the whale can continue to forage elsewhere within that Foraging Area. Mitigation measures must be implemented to reduce the risk of displacement occurring during operations where modelling indicates that behavioural disturbance within a Foraging Area may occur'*	Action A.2.3 and the DAWE and NOPSEMA key terms guidance (2021)have informed the assessment of acceptability of underwater sound emissions, described in Section 6.5. In the assessment of underwater sound emissions, Amplitude Energy has taken a precautionary approach. This is presented through the application of conservative impact thresholds for potential disturbance and injury, the application of ALARP Decision Context B, and the adoption of additional control measures to achieve ALARP and acceptability. Adaptive management approaches have been investigated and designed in consultation with government agencies, industry and scientists. The measures adopted reflect a precautionary approach; they are designed such that the risk of injury and displacement are reduced so that the foraging behaviour of any blue whale should not be impacted. Amplitude Energy has considered the seasonal presence of species in defining the schedule and limitations for this activity. The residual risks to the species are considered low (Section 6.5) and the duration of activities are limited (indicate schedule of ~50–75 days excluding downtime). As sound emissions are not expected to be significantly higher than existing shipping noise, the level of risk reduction achieved by locking the activity into a specific activity window is grossly disproportionate to the level of risk reduction achieved. This restriction could prevent the use of a suitable Vessel of Opportunity best suited for this activity. It may also result in a prolonged NPP (negating the potential for efficient removal of subsea infrastructure) where vessel availability is limited.
Definition of 'a foraging area'	The activity Operational Area is located within a possible foraging BIA. Blue whale foraging is considered throughout the assessment of potential impacts and risks to blue whales. Timeframes when blue whale foraging is more likely to occur has been defined based on contemporary literature.
Definition of 'displaced from a foraging area'	The definition of 'displacement from a foraging area' has been adopted throughout the assessment of underwater sound emissions (Section 6.5).
Definition of 'injury to Blue Whales'	Injury has been defined as permanent threshold shift (PTS) and temporary threshold shift (TTS) throughout the assessment of underwater sound emissions (Section 6.5).

2.2 State Legislation

Although the BMG infrastructure is located entirely in Commonwealth waters, the Spill EMBA intersects Victorian and NSW State waters; and the Monitoring Area intersects Victorian, NSW, and Tasmanian State waters (Figure 4-1). As such legislation relevant to these States have been described in Appendix 1.

2.3 Amplitude Energy Environment Practices and Policy

The activities covered by this EP will be planned and executed in accordance with the Amplitude Energy Management System (AEMS). As such, the Amplitude Energy Health, Safety and Environment Policy is shown in Figure 10-2. Further information regarding the implementation of this policy and related procedures are outlined in the description of the AEMS in Section 9.0.

3.0 Activity Description

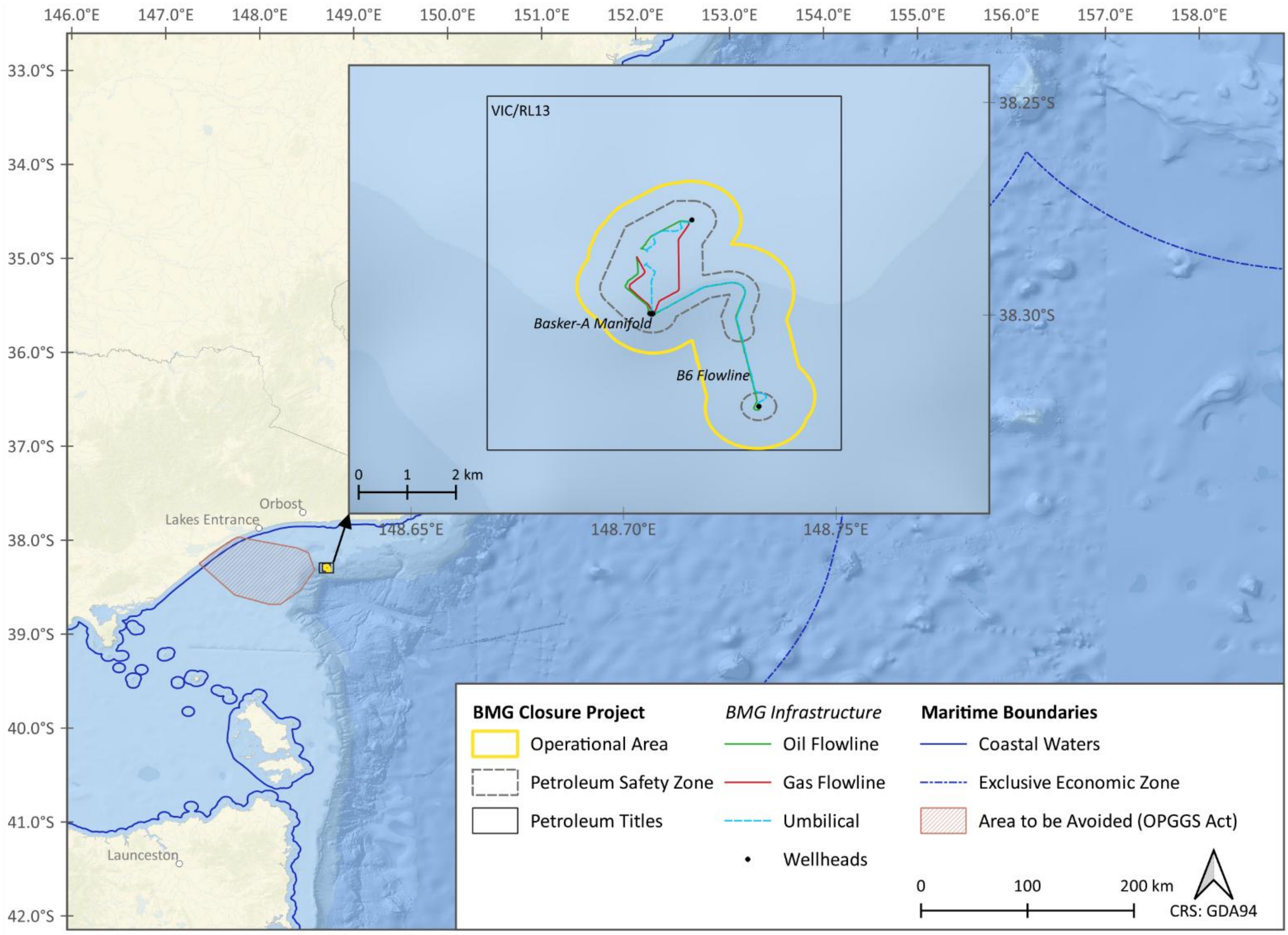
To meet the requirements of the OPGGS(E)R, this section provides a description of:

- Location and timing of the activity
- Existing infrastructure, including layout and current state
- The petroleum activity
  - Removal of any remaining subsea infrastructure from Phase 1b, except as specified in this EP
  - Phase 2 decommissioning (flowline and umbilical removal)
  - Inspection and maintenance
  - Support operations.

3.1 Activity Details

3.1.1 Operational Area

The Operational Area is the area within which petroleum activities managed under this EP will take place. The Operational Area is defined as a 1,000 m corridor centred over the BMG subsea infrastructure. The Operational Area is located within VIC/RL13 and incorporates the gazetted PSZs (Figure 3-1).



Note: The section of flowline and umbilical outside of the PSZs are trenched.

Figure 3-1 - Operational Area and Petroleum Safety Zones (see Gazette Notice A443819)

3.1.2 Activity Timing

Phase 2 decommissioning activities are planned to commence from approximately late-2027 with a duration of approximately 50–75 days (not including any weather downtime or operational delays). Normal operations are conducted 7-days/week and 24-hours/day. Decommissioning activities provided for within this EP will be completed by the end of 2030, with all post-decommissioning activities (e.g. monitoring) expected to be completed by the end of 2031. It is noted that this is out with the timings established under General Direction 824 (for Directions 2, 4, and 5), and this EP revision provides a basis for an extended window to complete the Directed actions.

Activities will be undertaken as soon as practicable within the planning window (2027 to end-2030). Within this window, exact timing is subject to the availability of a suitable Construction Support Vessel (CSV), services, and environmental windows.

Operationally, the optimum time to undertake the activity is in summer. This period typically provides the most settled weather and the largest windows within which to undertake key activities that are sensitive to sea state.

A single campaign is planned, although multiple campaigns may be required depending on factors including weather and vessel availability. Note: A single campaign will involve interim mobilisations separated by port transfers and/or offshore transfers.

Further information on planning and progress will be provided within the BMG Closure Project Annual Progress Reports published on the Amplitude Energy website: **https://amplitudeenergy.com.au/what-we-do/projects/gippsland-basin**.

Inspection and maintenance activities are undertaken on risk-based frequency (Section 3.5). While no planned inspection and maintenance activities are scheduled for the BMG infrastructure, for the purposes of the risk assessment within this EP, a vessel-based survey in the order of a week has been assessed.

3.1.3 Location

BMG subsea infrastructure is located entirely within Retention Lease VIC/RL13 in Commonwealth waters (Figure 3-1). The infrastructure is in water depths approximately 135–270 m, and approximately 50 km from the Victorian coast.

The Operational Area and BMG infrastructure occur to the east of the Area to be Avoided (ATBA) (Figure 3-1); an exclusion zone around a large proportion of the existing oil and gas facilities within the Gippsland region, detailed in Schedule 2 to the OPGGS Act.

3.1.4 Infrastructure Inventory and Overview

Appendix 6 provides a report of inventory left in field by the previous titleholder at the commencement of the NPP in 2011 and current layout of the facility according to a detailed inspection undertaken across the entire facility in 2020. Figure 3-2 and Table 3-1 lists the subsea infrastructure currently (as of May 2024) in field at BMG and identifies the elements that were removed during Phase 1, or will be removed during Phase 2. Phase 1 activities were provided for within BMG Close Project Phase 1 EP [BMG-DC-EMP-0001]. Removal of the remaining infrastructure from Phase 1b is also provided for in Phase 2; this is discussed further in Section 3.3.

The BMG subsea field was depressurised, and the flowlines were flushed and inhibited prior to entering the NPP in 2012. Throughout the production phase and monitoring completed during flushing operations, there was no evidence of hazardous levels of Naturally Occurring Radioactive Substances (NORMs) or mercury [BMG-HS-RAS-0004, 17-033-RP-001] within production equipment. Section 10.9.2 describes historical testing at the BMG facility, and contingency measures in the event contaminants are present.

Flowlines were previously flushed during the production cessation phase to ≤30 ppm oil in water (OIW), except for the B6 flowline. Whilst the B6 flowline was previously displaced to inhibited seawater; residual wax and small pockets of diesel are expected based on cessation phase reports. The Phase 1 EP provided for the disconnection of flowlines and umbilicals from the production trees and associated discharges. This Phase 2 EP provides for the discharges associated with the recovery of the equipment, and interim period between disconnection and recovery.

During Phase 1 [BMG-DC-EMP-0001] several flowlines were re-flushed where a circulation path was available. With the flushing completed as far as practicable in Phase 1, the flushed flowlines contents are between 0.1 and 30 ppm OIW, as measured at the time of flushing (see Figure 3-2). All flushed flowlines were disconnected (or cut) from the production trees in 2024 and laid on the seabed with end open. Flushing was unsuccessful for the B6 flowline during Phase 1 due to a stuck valve at the B6 PLEM; there were multiple attempts to open the valve. Bleed and lube cycles were completed to displace flowline contents to seawater at the B6 well end of the flowline; water recovered from the flowline during this exercise is estimated to contain ~250 ppm OIW, based on OIW measurements completed on the MODU. The flowline connection was cut from the B6 production tree to enable the tree to be recovered during Phase 1 activities. There were no visible traces of oil released during the cut. A flowline plug was inserted to prevent release of any fluids from the B6 flowline following laydown (Figure 3-3).

Umbilicals will not be flushed during decommissioning activities. The contents of the umbilical cores comprise Castrol Transaqua HT2 and uninhibited freshwater; the B6 umbilical also includes solvent.

Only the B6 flowline (6OF B6-BAPLEM1) and B6 umbilical sections between Umbilical Termination Assembly (UTA)-1, UTA-2, UTA-3, and UTA-4 have been deliberately trenched to below natural seabed. This action was undertaken in 2012 after cessation of the facilities, to provide access to this area for trawl fisheries. The PSZ was subsequently revoked from around the trenched sections of the B6 flowline and umbilical.

Amplitude Energy have completed numerous inspections of the BMG subsea facilities and infrastructure since acquiring VIC/RL13. Overall, the infrastructure was considered to be in good condition, with no major anomalies observed (Fugro, 2020). This is consistent with recent surveys during the 2024 P&A campaign which have informed facility integrity studies for the BAM and flowlines (Extrin, 2025; AME Offshore Solutions, 2025). Surveys also indicate that un-trenched sections of the B6 flowline have self-embedded into the seabed, and other flowlines and jumpers have become partially embedded into the mobile seabed for much of their lengths (Fugro, 2020). Average depth of the B6 flowline burials is ~0.3 m with a maximum depth of ~1.3 m below seabed in the first section (0.1 km) (Fugro, 2020).

The BMG flowlines are static flexible lines, comprised of multiple layers of steel and polymers. The steel layers are protected by both polymer layers and by sacrificial bracelet anodes. During ROV inspections in recent years, anodes observed have been active with oxide layers (Cooper Energy, 2021a), and Fugro survey (2020) shows that anode loss average is less than 42%; and reported no significant defects in pipeline coating; the steel is therefore considered to remain protected.

If layers of protection are compromised over time, steel will begin to degrade. Unprotected steel is expected to degrade over a few decades. Polymer degradation is harder to predict, and with limited ultraviolet exposure and limited or no thermal cycling could be expected to out-live the steel (Xodus, 2021b). Where the flowline and umbilical are fully buried, the anaerobic environment further reduces the degradation rate.

An expert study commissioned by Amplitude Energy recommends that integrity will not preclude recovery of the flowlines. The study considered the decommissioning program and schedule including period in between Phase 1 and Phase 2. The low temperatures and relative resistance (to corrosion) of the stainless steels within the flowlines sufficiently mitigate corrosion through to recovery operations (Extrin, 2022). A further flowline corrosion study was also undertaken to re-assess the flowline condition post Phase 1 activities. This assessment concluded that flowline sections, including gooseneck cuts and fittings, would remain structurally sound for lifting operations during the revised Phase 2 work schedule (i.e. to end of 2030) [BMG-SS-REP-4400-000; (Extrin, 2025)]. Similarly, an expert assessment was also undertaken to confirm the lifting capacity of the padeyes on the BAM. The assessment concluded that the padeyes are deemed suitable for lifting the BAM during the revised Phase 2 work schedule (i.e. to end of 2030) [BMG-SS-TFN-0060; (AME Offshore Solutions, 2025)].

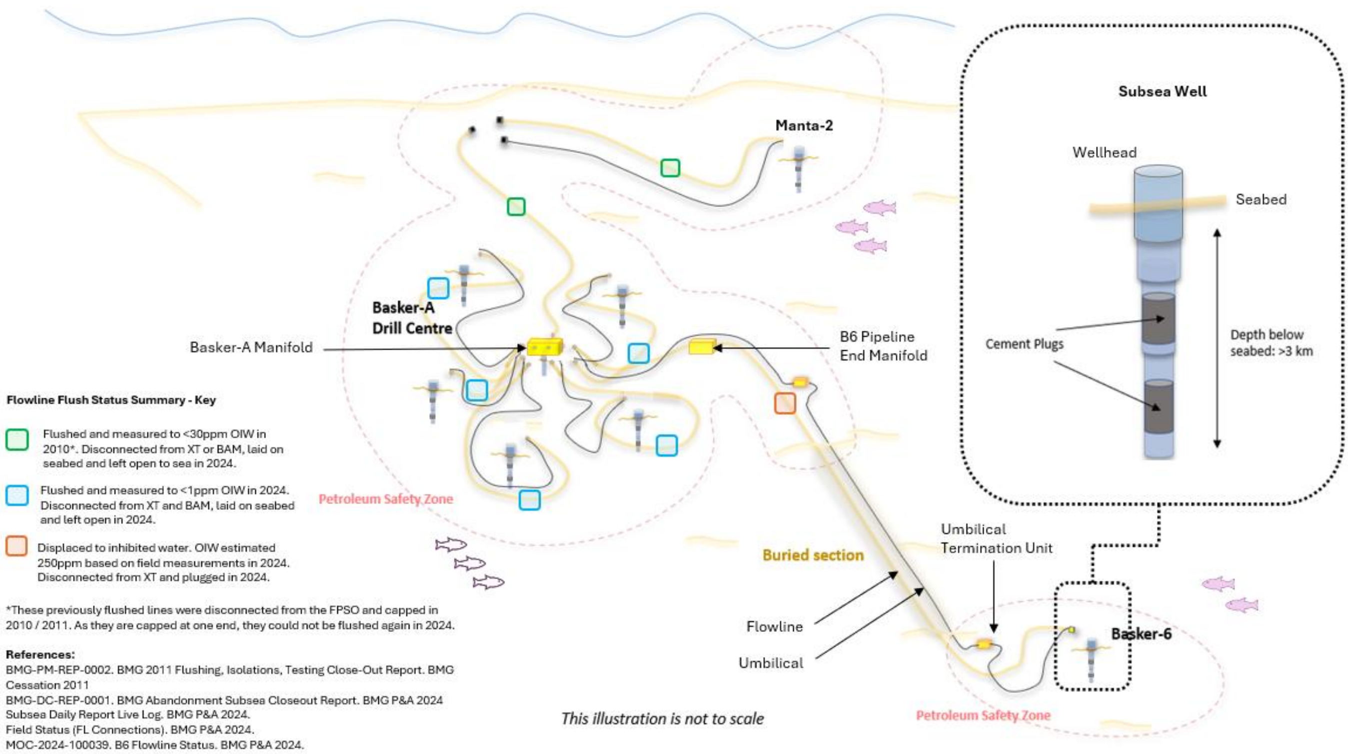


Figure 3-2 - Schematic of Current Field Layout

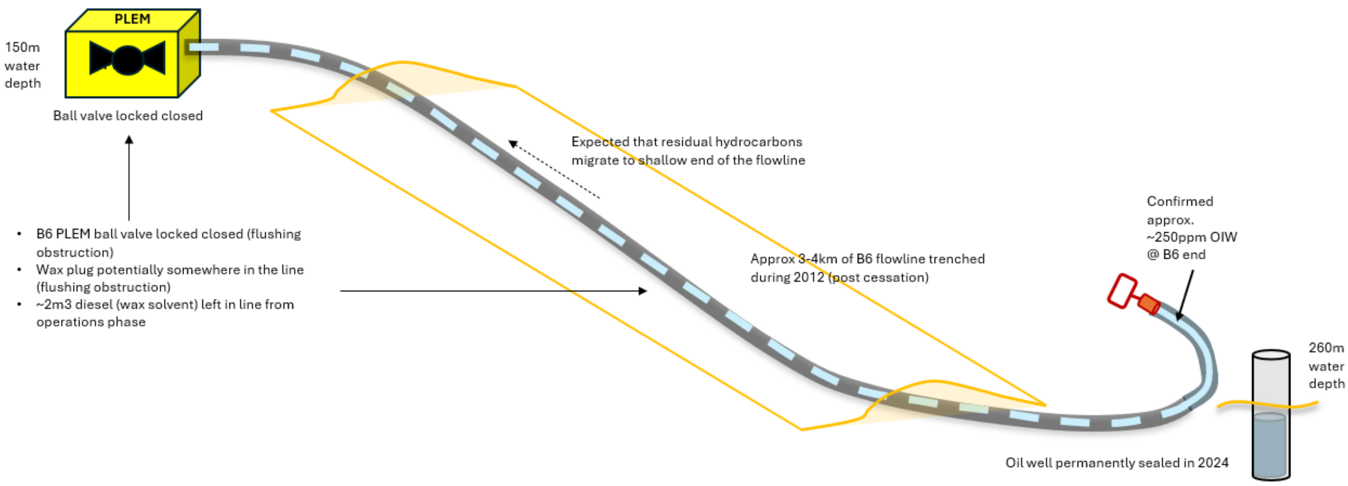


Figure 3-3 - Schematic of Current Status of B6 Flowline

Table 3-1 - BMG Infrastructure Remaining, Current State, and Details

	Dimensions					Primary Materials	Burial Status	Planned End State
	Height	Width or OD [ID]	Length	Volume Fluid	Dry Weight			
Subsea Facilities Decommissioned During Phase 1 [EP BMG-DC-EMP-0001]								
Subsea Production Wells (x7) B2, B3, B4, B5, B6ST1, B7, Manta 2A								P&A'd
Xmas Trees x 7 (B2-B7 and Manta 2A)	3–3.2 m	3.4-6 m	3.5–4.4 m	0.4 m^3 ea.	23,000–32,000 kg	Steel	–	Removed
Remaining Phase 1b Subsea Facilities Planned to be Decommissioned During Phase 2 [this EP]								
Subsea Production Well Structures								
Permanent Guide Base x 7	2.5 m	2 m	2 m	N/A	3,000 kg	Steel	–	Removed
Temporary Guide Base x 2	1.5 m	2.5 m	2.5 m	N/A	15,000 kg	Steel	Partial self-burial	Removed
Wellheads x 7	2-4 m (above seabed)	762 mm (into 508 mm)	–	N/A	1,100 kg/m	Steel	Installed partially below seabed	Removed
Major Structures								
Basker-A Manifold	5 m	11.1 m	12.9 m	5.6 m^3	64,183 kg	Steel	–	Removed
Control Modules x 5 (within the BAM)	1.6 m	2.1 m	1.5 m	0.07 m^3 ea.	2,000 kg	Steel	–	Removed
Basker-A Manifold Pile	3.5 m above seabed	Approx. 1 m OD Wall thickness: 1.5 inch (38 mm)	40 m Recover ~4 m pile section Leave in situ below seabed ~36 m	N/A	40,000 kg Recover ~4,000 kg pile section Leave in situ below seabed ~36,000 kg and associated grout. Grout: 185 bbls (37,300 kg)	Steel (pile) Grout: Cement Class HT (silica). Cement mix water included $CaCl_2$. Both components are classified PLONOR and OCNS category E.	Piled to 36 m below seabed and grouted in place.	Partial Removal Cut and recover pile at below the seabed (target depth of ~1 m below the seabed). Leave in situ ~36 m pile and associated grout below the seabed.

	Dimensions					Primary Materials	Burial Status	Planned End State
	Height	**Width or OD [ID]**	**Length**	**Volume Fluid**	**Dry Weight**			
Umbilical Flying Leads								
HFLs x 9	–	–	15–110 m (total 325 m)	<1 m^3	Per umbilical weights	Polyethylene, steel	Laid on seabed – some self-burial	Removed
EFLs x 9	–	–	15–82 m (total 482 m)	N/A	Per umbilical weights	Polyethylene, steel, copper	Laid on seabed – some self-burial	Removed
Basker and Manta FLs x 4	–	–	15–49 m (total 162 m)	<1 m^3	Per umbilical weights	Polyethylene, steel, copper	Laid on seabed – some self-burial	Removed
Auxiliary (minor) Structures								
BA PLEM1	3.9 m	4.5 m	6 m	0.9 m^3	44,800 kg	Steel	–	Removed
BAM-UTA-1	2.9 m	2.2 m	5.2 m	0.01 m^3	6,000 kg	Steel	–	Removed
B6-UTAs x 4	2.4 m	0.9 m	1.6 m	0.04 m^3 ea.	1,431 kg	Steel	–	Removed
Parking stand	6 m	6.3 m	6.3 m	N/A	>3,000 kg	Steel	–	Removed
UTA foundation (Basker & Manta) x 5	1.8 m	3.6 m	3.6 m	N/A	3,388 kg	Steel	–	Removed
M2A-UTA	2.4 m	0.9 m	1.6 m	0.01 m^3	1,431 kg	Steel	–	Removed
Well Jumpers								
Flowline Jumpers x 10	–	Various	44–100 m (total 725 m)	3.64 m^3	Various	HDPE, syntactic foam, steel	Partial self-burial (>75% of diameter)	Removed
Subsea Infrastructure Planned to be Decommissioned During Phase 2 (this EP)								
Flowlines								
6” Oil flowline BAM – FPSO	–	279.39 mm [152.4 mm]	1,450 m	26.76 m^3	93.62 kg/m	HDPE, syntactic foam, steel	Partial self-burial (>75% of diameter)	Removed
6” Gas injection line FPSO – BAM	–	220.4 mm [152.4 mm]	1,550 m	28.27 m^3	80.9 kg/m	HDPE, syntactic foam, steel	Partial self-burial (>75% of diameter)	Removed

	Dimensions					Primary Materials	Burial Status	Planned End State
	Height	**Width or OD [ID]**	**Length**	**Volume Fluid**	**Dry Weight**			
B6 Well 6" Flowline	–	279.39 mm [152.4 mm]	5,567 m	101.07 m^3	93.62 kg/m	HDPE, syntactic foam, steel	Trenched to 0.3 m. Some uncovered sections.	Removed
4" Oil Flowline M2A – FPSO	–	304.34 mm [101.6 mm]	1,360 m	11.03 m^3	105.06 kg/m	HDPE, syntactic foam, steel	Partial self-burial (>75% of diameter)	Removed
2" Gas Lift Flowline FPSO – BAM	–	105.89 mm [50.8 mm]	2,797 m	5.67 m^3	22.92 kg/m	HDPE, syntactic foam, steel	Partial self-burial (>75% of diameter)	Removed
Umbilicals								
EHU[2] FPSO to BAM-UTA	–	145.4 mm	1,750 m	4.2 m^3	36.7 kg/m (hoses filled)	Polyethylene, steel copper	Partial self-burial (>75% of diameter)	Removed
EHU B6-UTA-1 to B6-UTA-3	–	159 mm	1,135 m	3.1 m^3	38.7 kg/m (hoses filled)	Polyethylene, steel copper	Partial self-burial (>75% of diameter)	Removed
Basker-6 Umbilical (B6-UTA-3 to B6-UTA-4)	–	159 mm	4,385 m	11.8 m^3	38.66 kg/m (hoses filled)	Polyethylene, steel copper	Trenched to 0.25 m depth. Some uncovered sections	Removed
Manta 2A Umbilical	–	93.5 mm	1,900 m	1.6 m^3	14.84 kg/m (hoses filled)	Polyethylene, steel copper	Partial self-burial (>75% of diameter)	Removed
Stabilisation Materials								
Concrete Mattresses x 2	0.2 m	2.5 m	5 m	N/A	3,000 kg	Concrete, polymer coating and rope	Some self-burial	Removed
Grout Bags (multiple)	0.2 m	0.5 m	0.3 m	N/A	25 kg	Grout, polymer bag	Some self-burial	Removed

[2] Electro-hydraulic umbilical

3.2 Decommissioning (Phase 2) Project Planning Overview

The BMG Closure Project follows Amplitude Energy's project planning process (Figure 1-2); this involves the following phases:

- Assess
- Select
- Develop
- Execute.

3.2.1 Assess and Select

During these phases, Amplitude Energy reviewed various concepts and conducted studies to identify a suitable approach for decommissioning the BMG field. A summary of the studies that were completed during this phase, and their outcomes, are provided below.

3.2.1.1 Feasibility studies

Amplitude Energy engaged Atteris to conduct a feasibility study into the removal of all infrastructure. The studies indicate full removal of the flowlines and umbilicals is feasible; the reports also describe possible removal methods and alternatives to removal [17-033-RP-002; (Atteris, 2018b)].

3.2.1.2 Flowline and umbilical comparative assessment of decommissioning options

Amplitude Energy engaged Xodus Group to conduct a comparative assessment for the decommissioning of the remaining subsea infrastructure related to the BMG fields [BMG-EN-REP-0019; (Xodus, 2021c). The purpose of the study was to identify the options available to Amplitude Energy, describe each methodology to be taken through to the comparative assessment. Each option identified decommissioning costs, fishery impacts, emissions (light, sound and atmospheric) and safety considerations. Following an options screening exercise, nine discreet methodologies were retained and categorised into five key options:

- Full removal
- Major intervention
- Minor intervention
- Minimal intervention
- Leave in situ.

The comparative assessment process then involved a series of sub-assessments and workshops where each option was assessed in more detail, having regard to Environmental, Safety, Technical, Societal and Economic impacts, both positive and negative. Relevant person consultation was also undertaken and was a key consideration within the process. The comparative assessment recommended that full removal should be implemented for:

- Surface laid flexible flowlines and umbilicals
- Trenched and buried flexible flowlines and umbilicals.

The removal method of lift and cut was the preferred approach overall. However, the reverse installation (reel) methodology was also considered a viable alternative. Deburial was not expected to be necessary but was assessed.

Sub-Assessments and Studies

Flowline and umbilical environmental outcomes assessment of decommissioning options

One of the sub-assessments informing the comparative assessment was a detailed environmental outcomes assessment. This was undertaken to understand if better environmental outcomes could be achieved if full removal was not implemented.

This assessment determined that equal or better environmental outcomes are unlikely to be demonstrable for the alternative (leave in situ) decommissioning options identified.

Habitat Study undertaken by Deakin University and Australian Institute of Marine Science (AIMS)

To support the analysis of the decommissioning options, Amplitude Energy engaged Deakin University and AIMS to review historic ROV imagery between 2009–2020 and describe fish, mobile invertebrate, mammals, and epibenthic communities along flowlines and umbilicals, and around three wells and the manifold. The study identified marine communities that have come to associate with the infrastructure over its operational life. Fish and invertebrate communities observed along flowlines were quite distinct from those observed on wells/manifold, however there was also high spatial variability among the different flowlines surveyed and between the three wells and manifold (Ierodiaconou, et al., 2021).

The outcomes of this study informed the potential impact to these communities associated with removal of infrastructure decommissioning options.

Fishing type and intensity studies

To support the analysis of decommissioning options and potential impacts to commercial fisheries, Amplitude Energy engaged South East Trawl Fishing Industry Association (SETFIA) and Fishwell Consulting to review commercial fishing catch and value in the area around and including the BMG field. The study identified that although a number of fisheries can legally fish in the study area, only three fisheries were active in the period between July 2010 – June 2020 (SETFIA and Fishwell Consulting, 2021). This information was used in the comparative assessment to help understand potential impacts to fisheries and was supported further by relevant person engagement. The information gathered through undertaking these studies was a key influence in the comparative assessment outcome.

3.2.1.3 Integrity studies

As described in Section 3.1.4, integrity studies have been completed on the flowlines (Extrin, 2022; Extrin, 2025)and BAM (AME Offshore Solutions, 2025) that confirm the state of infrastructure does not preclude recovery.

3.2.2 Develop

This phase of the project was planned to commence post completion of the BMG Closure Project (Phase 1). Staging in this way is necessary as it allows lessons learned from Phase 1 to be transferred, considered in contractor tenders, engineering and final methodology. To ensure that appropriate contractors are engaged to meet the required outcome from these activities (being full removal of infrastructure), Amplitude Energy implements the Supply Chain and Procurement Management Standard (MS11; see Section 10.4).

Tenders may propose either lift and cut; reverse installation [reel], or another removal option. Detailed engineering and procedure development will follow tender award. The final methodology for removal will be defined and refined during this process. The final methodology will have regard to:

- Environmental impacts and risks – the method should achieve the EPOs and EPSs set out in this EP

- Schedule – the method/proposal should provide for decommissioning inside the timeframes set under General Direction 824 or alternate timeframes accepted under the in-force EP (Section 3.1.2)
- Safety – the method/proposal should provide for safe operations and the safe removal of equipment
- Technical and cost – the method/proposal should be practicable.

3.2.3 Execute

The offshore execution window for Phase 2 enables Amplitude Energy to complete the project planning phases with due process.

Amplitude Energy and its selected contractors will implement the activity in accordance with the detailed engineering design, procedures, and this EP.

If the planned decommissioning methodology is not successful, Amplitude Energy will review the outcomes and learnings, and revise the works program. If the activity changes, or environmental impacts and risks differ from those in this EP, the Amplitude Energy will complete a Management of Change assessment in accordance with Section 10.12 This assessment will determine if updates to this EP or resubmission to NOPSEMA is required.

3.3 Removal of Remaining Phase 1b Subsea Infrastructure

The removal of the below remaining Phase 1b subsea infrastructure is planned to be completed during BMG Closure Project Phase 2 activities:

- 7 wellheads, permanent guide bases and associated equipment such as spools, jumpers and umbilical flying leads
- BAM
- BAM pile (surface section above the seabed)
- Basker-A (BA) PLEM1
- UTAs (and x 5 UTA foundations)
- parking stands.

The condition of subsea infrastructure as found at the time will be assessed prior to removal. Structures may need to be modified subsea to facilitate removal. The seabed around structure foundations may need to be excavated or structures may need to be toppled to break sediment suction and cutting may also be required.

The wellheads/well casing and the BAM pile (steel tubulars) extend deep into the seabed and are cemented in place. The well infrastructure below the seabed must remain in place as it is part of the permanent reservoir barrier. Full removal of the BAM pile is not considered feasible. The wellheads and BAM pile are planned to be cut at or below the seabed and the cut section recovered to surface.

Cutting wellheads and the BAM pile is anticipated to take approximately 12-18 hours per location. Target depth of the cut is approximately 1 m below seabed, depending on access that can be achieved to perform the cut. An abrasive cutting tool, knife system, or external diamond wire cutters may be used. Cutting equipment will be placed on the seabed around or adjacent to the wellhead or steel tubulars to line up for the cut. Cutting will generate metal swarf and some cement cuttings at the seabed and inside the wellhead or steel pipe. Cutting may also involve subsea discharges of grit and flocculant.

Obtaining access to the inside of the BAM pile may require excavation of materials inside the pile; for example, via an ROV suction dredge. If access to the inside of the pile is not possible, it may be cut externally. For an external cut, the seabed around the pile may first require excavation (Figure 3-4, Figure 3-5). Similarly, if an internal cut for a wellhead is not feasible, then an external cut and seabed excavation may be required (Figure 3-5). Materials may be excavated from around the wellhead or BAM pile during removal; after cutting, disturbed areas are left to naturally backfill with the excavated materials; natural backfill is historically how seabed disturbances associated with this project (e.g. flowline trenching in 2012) have been allowed to recover.

The other remaining infrastructure (e.g. foundations, UTAs, jumpers, spools, flying leads, etc.) will be recovered by the crane lifting directly onto the CSV or via the use of subsea baskets (i.e. basket is deployed, infrastructure lifted into the basket, and the basket retrieved to the CSV). As-found surveys may also be undertaken to determine location and number of smaller infrastructure (e.g. flying leads, grout bags) to be retrieved prior to activities commencing. Where required, infrastructure may also be de-buried (e.g. via dredge) or cut to facilitate retrieval (e.g. flying leads may be cut prior to placement in subsea baskets).

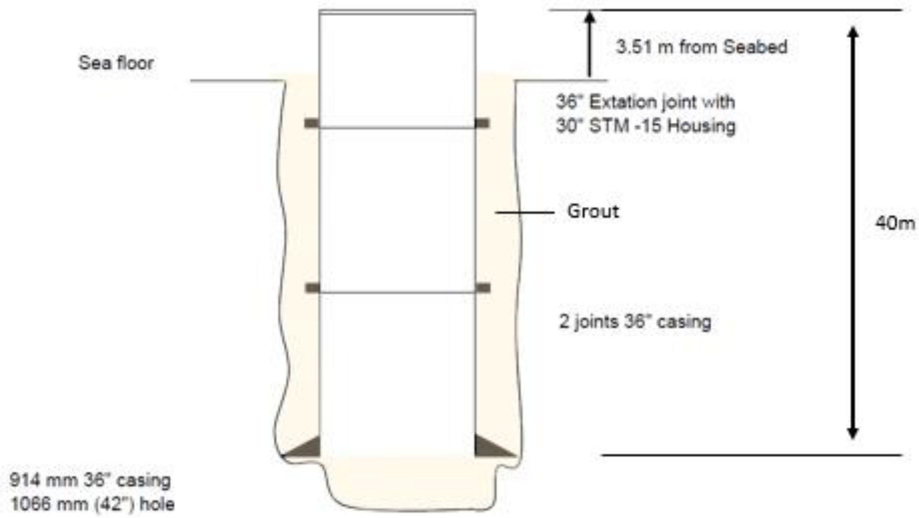


Figure 3-4 - BAM Pile Schematic

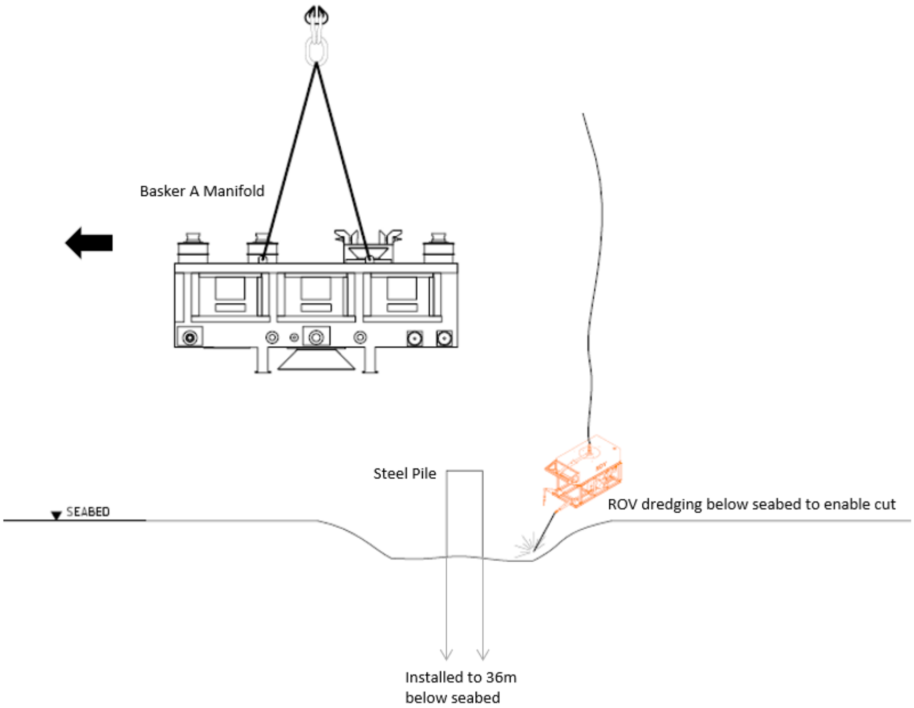


Figure 3-5 - Illustration BAM Pile Cut Preparation (External Cut Scenario), also Relevant as a Contingency for Wellhead Cutting

3.4 Phase 2 Decommissioning Activities

Phase 2 decommissioning activities involves the removal of the flowlines and umbilicals. In general terms, there are two options for recovering the flowlines and umbilicals:

- Option 1: reverse installation via “reel” of the flowlines and umbilicals
- Option 2: reverse installation via “lift and cut” (or “cut and lift”) of the flowlines and umbilicals.

Either option, a combination or both, may be used.

Amplitude Energy considered the environmental benefits and costs associated with each of these options. Screening assessments indicate the environmental impacts and risks are largely the same; reverse reel is predicted to require less vessel time offshore. Reduced vessel time offshore typically results in fewer vessel related discharges, less emissions, and shorter periods where noise levels are increased above ambient. Given both methodologies are predicted to require relatively short timeframes, the differences in impacts and risks are predicted to be marginal [BMG-EN-REP-0019; (Xodus, 2021c)].

For either option, environmental impacts and risks are considered to be manageable, and hence both options have been retained at this time, and are assessed within this EP.

Retaining flexibility as to the removal option allows Amplitude Energy to take on board learnings from Phase 1 and adapt the Phase 2 program if any additional technical challenges are identified. Information gathered during Phase 1, and the availability and capability of proposed CSVs, will feed into the planning process and may influence the removal method for Phase 2. Retaining flexibility also provides the opportunity to optimise timings and costs through collaboration with other operators in the region and/or other Amplitude Energy projects.

3.4.1 Reverse Installation (Reel)

A specialist reel-lay vessel or modified CSV with a back deck reel drive and tensioner system is required to implement a reverse reel installation activity.

Following disconnection of the flowlines and umbilicals from any termination structures (as completed during Phase 1 activities [BMG-DC-EMP-0001]), an abandon and recovery winch will be attached to an existing lift point or ROV installed lifting clamp on the end of each flowline or umbilical. Transponders may be utilised to locate the end of the flowline to enable easy recovery for reverse installation methodology. They may be deployed to identify the initial flowline end location or where a flowline is required to be cut and the end laid on the seafloor to enable efficient recovery.

The ends will be brought up on to deck through a tensioner and on to the driven storage reel. Thereafter, the tensioner will pull the flowlines and umbilicals on to deck as the vessel navigates along the flowline or umbilical route, thus allowing the equipment to be carefully recovered onto the reel. The length of flowline or umbilical that can be recovered is limited by the size and capacity of the reel, and this will depend on the selected vessel, however given the length of the flowlines and umbilicals captured in this EP, it is anticipated that two reels may be present on the vessel each with capacity to hold up to ~2,000 m of product.

As the flowline or umbilical is recovered to the vessel, a subsurface discharge will occur at the opposite end of the flowline or umbilical where it has been disconnected from subsea structures (during BMG Closure Project (Phase 1) activities [BMG-DC-EMP-0001]). The contents of these lines are described in Sections 3.1.4 and 3.7.

Once recovered, the flowline or umbilical is transferred to a suitable shore base for processing by licensed contractors.

3.4.1.1 Contingency Deburial

As detailed in Section 3.1.4, a number of surface laid flowlines and umbilicals have become partially covered by sediment. Concept studies undertaken by Xodus (2021a) indicate deburial is not required to remove these sections of the flowlines and umbilicals. However, where deemed necessary through detailed engineering, vessels will have the capability to de-bury discrete lengths of lines, or from around the foundations of any remaining structures.

The B6 flowline is currently attached to the B6 PLEM, and has a flowline plug installed at the B6 well end; both ends of the flowline are above the seabed (Figure 3-6). The flowline and umbilical at the B6 well end were disconnected during Phase 1 to enable recovery of the B6 XT. The existing trenched sections of this flowline and umbilical may require some deburial. The average depth of burial for the B6 flowline is approximately 30 cm below seabed surface, with some sections up to approximately 1.3 m below seabed surface (Figure 3-6). Consequently, if deburial is required to pull the lines free from the seabed, excavations are likely to be relatively shallow and targeted at particular sections.

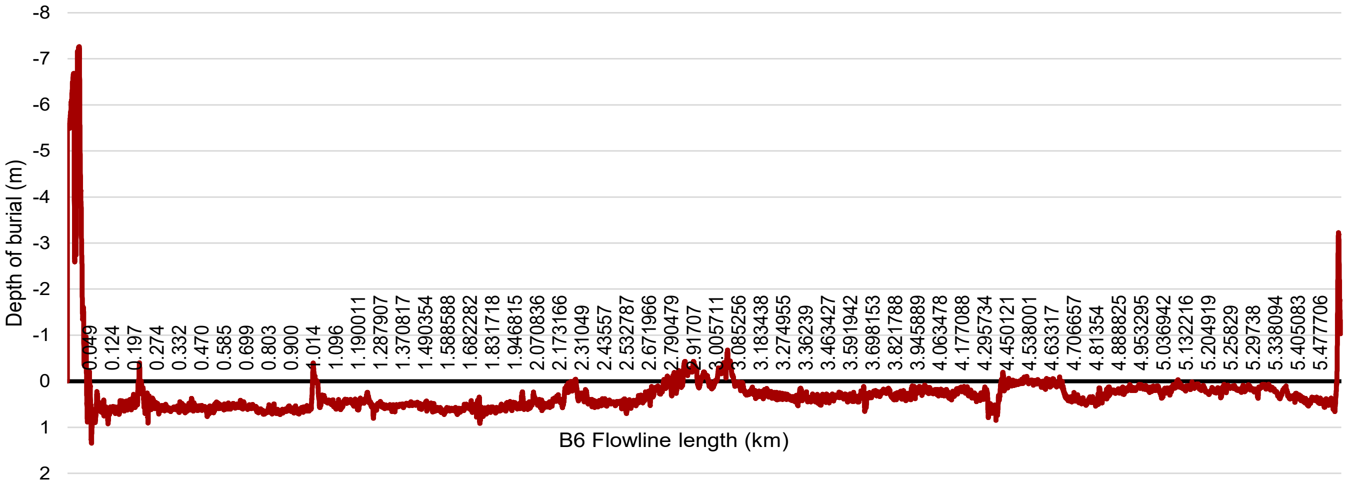


Figure 3-6 - B6 Flowline Burial Depth

If deburial is required, jetting equipment or mass flow excavation (MFE) equipment may be deployed to free the flowline or umbilical from the seabed sediment. Jetting sleds (or similar) may be deployed and supported by a remotely operated vehicle (ROV). Jetting uses high pressure water and air or water to create a trench or remove sediments by fluidising the seabed which is then dispersed into the water column. MFE works similarly, although uses different equipment. The technique utilises a T-shaped tool hanging just above the seabed, draws in water laterally and directs a high-volume, low-pressure stream directly down into seabed sediments to de-bury the flowline or umbilical. MFE can be used with or without high-pressure jets.

Given the mobile nature of seabed sediments across the Operational Area and based on recovery observed following trenching operations in 2012, any excavations would be expected to naturally backfill over time. Amplitude Energy does not plan to manually backfill disturbed areas. As detailed in Section 3.4.4, once removal activities are completed, Amplitude Energy will undertake a seabed survey to identify any remaining debris within the facility footprint. This seabed survey will be used as a baseline for future triggered monitoring activities.

3.4.2 Reverse Installation (Lift and Cut)

For a lift and cut methodology, it is assumed a CSV with an abandon and recovery winch is used. An abandon and recovery winch is attached to an existing lift point or ROV installed lifting clamp on the end of each flowline or umbilical. Each flowline or umbilical will be pulled along the deck and secured. The deck section will then be cut and moved to a storage position typically using deck corrals. The process is repeated until the equipment is fully recovered and stored in cut sections on deck. This option is slower than the reel methodology and does result in more personnel safety exposure; however, it does not require as high specification of vessel, and subsequently allows Amplitude Energy to consider vessels of opportunity.

As the flowline or umbilical is recovered to the vessel, a subsurface discharge will occur at the opposite end of the flowline or umbilical where it has been disconnected from subsea structures (during BMG Closure Project (Phase 1) activities [BMG-DC-EMP-0001]). The contents of these lines are described in Sections 3.1.4 and 3.7.

While the flowlines have been flushed and predominantly comprise uninhibited sea water (with some residual inhibited water likely remaining; see Section 3.1.4), there may also be some residual hydrocarbon wax within the main bore of the flowlines (Figure 3-7). The wax has an appearance temperature of around 35-45°C, hence should remain solid throughout the flowline recovery and offshore handling operations. Upon recovery of flowlines to the CSV, the wax could begin to liquify if ambient temperatures offshore are very high. Any residual wax will be contained either inside the flowline sections, or within vessel deck bunding. Hydrocarbon wax will be recovered and treated via vessel or project water treatment systems, or otherwise returned to shore for treatment. It is also possible that during the production phase a small amount of hydrocarbon may have migrated into and accumulated within the carcass of the flowline (Figure 3-7). Should residual hydrocarbon be present within the carcass, this may be discharged to the ocean during flowline retrieval.

For the B6 flowline, there are reported solid wax plugs and residual hydrocarbon (~250 ppm OIW) within the main bore of the flowline (Figure 3-3, Figure 3-7). Similarly to the other flowlines, it is possible that residual hydrocarbon may also be present within the carcass.

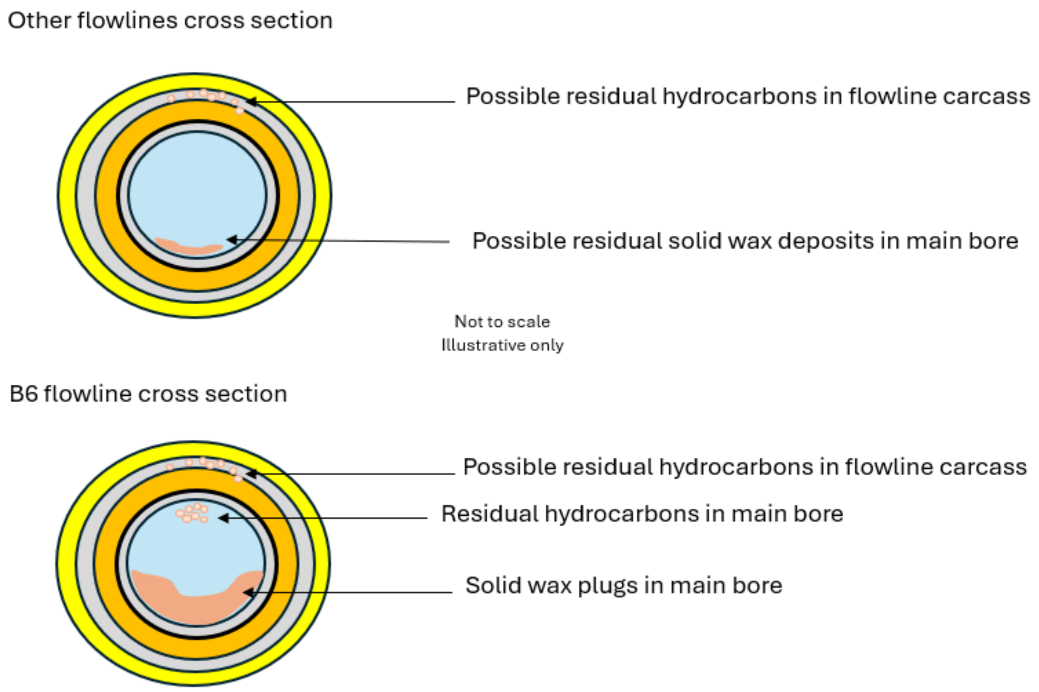


Figure 3-7 - Schematic of Possible Residual Hydrocarbons within Flowlines

3.4.2.1 Contingency Deburial

Contingency deburial activities may also be implemented for this reverse installation (lift and cut) methodology.

3.4.3 Contingency Reverse Installation (Cut and Lift)

As a contingency, Amplitude Energy may also implement a cut and lift method for flowlines and umbilicals. This would result in subsea cutting of infrastructure using an ROV and cutting tool prior to recovering the infrastructure to the vessel. Similar to reverse reel and lift and cut methods, cut and lift would result in subsea discharges (including residual hydrocarbon and/or hydrocarbon wax if present) from the flowlines and umbilicals, albeit occurring as smaller batch discharges.

3.4.4 Seabed and As-left Survey

Seabed surveys will be undertaken during the activity and may involve visual, acoustic, or magnetic techniques. Surveys could occur anywhere within the Operational Area.

Surveys are likely to be via ROV but may also include towed survey equipment from a vessel. Survey equipment may include video, magnetometer, multibeam echo sounder (MBES), side scan sonar (SSS) and/or sub-bottom profiler (SBP).

On completion of subsea infrastructure removal activities, a final seabed survey will be conducted to confirm the as-left status of the seabed. The survey will focus on the identification and reporting of anomalies on the seabed. Further information regarding making good the seabed to ensure impacts to other marine users are mitigated is provided in Section 6.3.

3.5 Inspection and Maintenance

Section 572(2) of the OPGGS Act requires a titleholder to maintain in good condition and repair all structures, equipment, and other property (hereafter collectively referred to as 'property') that is within the title area and is used in connection with the operations authorised by the title. The intent of Section 572(2) relates to ensuring that property is fit for purpose and can be removed when neither used, nor to be used, in connection with the operations.

Property maintenance activities are included within scope of this BMG Closure Project (Phase 2) EP.

An inspection and maintenance program is in place for the BMG subsea infrastructure to confirm and maintain the integrity of the subsea systems. The BMG Facilities IMP [BMG-IT-IMP-0001] details the management, monitoring, mitigation, and inspection activities determined necessary to ensure integrity is maintained for the subsea infrastructure. The IMP covers all aspects of asset lifecycle management, and has been developed around the following fundamental processes:

- Definition of system limits
- Definition of the organisation and allocation of responsibilities
- Use of standards and risk assessment for determining appropriate controls and mitigation measures to reduce risk to ALARP
- Continuous assurance and effective review of the system.

Inspections provide assurance that asset integrity is being maintained; they also proactively identify maintenance activities that may be required. Inspections will generally be undertaken by an ROV from a vessel. Inspection techniques may include visual inspections or acoustic surveys. A risk-based approach determines inspection frequency, which can typically vary between 1–5 years (the maximum interval between inspections is 5 years). Inspections typically take 4–6 hrs per structure, and 1–2 days per line.

Several inspection campaigns have been undertaken at the BMG asset since production cessation. The most recent inspection at BMG (2020) delivered the following findings, as relevant to the facilities and equipment provided for in this EP [VIC-SS-REP-4900-0001; (Fugro, 2020)]:

- No significant debris observed, and no obvious damage, distortion, or new displacement of structural or line assets, although some protective caps on structure intervention points were found to be missing or dislodged.
- No significant corrosion observed, in general anodes were estimated at less than 40% depleted and mostly less than 30% depleted (i.e. 70% remaining). All observed anodes were active, with obvious oxide layers.
- In general, cathodic protection readings on structural steel ranged from -906 mV to -992 mV, with average -955 mV indicating well protected steel. M2A had slightly lower readings (-921 mV average) than the field average, but still well protected.
- No significant scour was observed at or around structural assets.
- Flying leads between structures generally were partially buried with original/earlier, small stabilisation bags in place, lightly sand-covered but visible.
- The 6" flowline between the B6 drill centre and the main Basker-A drill centre was almost totally buried over its length with no effective spans (Figure 3-6). Likewise, the B6 umbilical from Basker-A was mostly buried,

other than at its mid-line UTA interconnections, with the only spans being the catenaries down from end fittings on its UTAs (max = 15.8 m at UTA-3 exit).

- All other flowlines and umbilicals were mostly partially buried, typically to greater than 75% of diameter, interspersed with minimal lengths of full burial and intermittent short spans.

Overall, the infrastructure was considered to be in good condition, with no major anomalies observed (Fugro, 2020). This is consistent with recent surveys during the 2024 P&A campaign which have informed facility integrity studies for the BAM and flowlines (Extrin, 2025; AME Offshore Solutions, 2025).

The detailed inspections to date have provided in-depth information to support decommissioning planning for Phase 2. Information collected on the subsea facility status during Phase 1 activities has also been captured [Report BMG-DC-REP-0001] and is actively being used in the planning of Phase 2. This information may be supplemented by additional inspections or surveys if necessitated by detailed engineering for Phase, however, this is not expected at the time of writing.

3.6 Support Operations

3.6.1 Vessel Operations

A primary CSV will be required during BMG Closure Project (Phase 2) to support the decommissioning activities, in particular carrying out heavy lift activities, and where relevant, reeling or cutting activities (refer to Sections 3.4.1, 3.4.2, and 3.4.23.4.3). Support vessels may also be in field at the same time as the CSV and assisting.

Vessels selected for the campaign will be managed in line with relevant International and Australian requirements.

Vessels may:

- Supply provisions (e.g. food, materials, equipment) and equipment to the CSV
- Be utilised to offload recovered equipment from the CSV
- Undertake inspection, survey, and preparatory activities (e.g. testing, cleaning, dismantling) with an ROV or towed survey equipment.

Vessels will undertake operations and hold position using dynamic positioning (DP). Vessels typically do not anchor inside the Operational Area.

Vessel lighting is dictated by class, safety, navigational, and working requirements. Vessels can operate 24 hours/day, and therefore will need to maintain lighting sufficient for safe operations on deck spaces.

Fuel bunkering will be undertaken at a nominated shore base or suitable wharf.

3.6.2 Helicopters

Personnel will changeout primarily at a nominated shore base or wharf directly to the vessels but could also be transferred by helicopter or support vessel. Personnel transfers may occur every 1-2 weeks depending on personnel rosters.

3.6.3 Remotely Operated Vehicles

ROVs will be deployed from the CSV and/or support vessel/s during the activity. ROVs may be used to:

- Provide a visual feed to project teams of subsea operations and conditions
- Dismantle and recover infrastructure

- Locate, record, remove equipment and debris
- Provide subsea intervention capability
- Perform seabed surveys as required (refer to Section 3.4.4).

There are no discharges or emissions of control fluids associated with the use of ROVs as they operate a closed controls system.

3.6.4 Decommissioning Tools

Decommissioning tools are likely to include standard ROV tools including manipulators, brushes, and high-pressure water jets. In addition, the activity will likely require cutting and grinding, and flow excavation (or similar) to uncover buried equipment and allow access. A summary of indicative decommissioning tools is provided within Table 3-2. The tools will be used frequently (but intermittently) throughout the activity.

Table 3-2 - Indicative List of Decommissioning Tools

Tool	Application	Duration
Mass flow excavator, suction dredge, or jetting	Deburial and burial operations	Intermittent
Grinders, circular and mechanical cutters, hydraulic shears, diamond wire saws, chop saws, subsea baskets, ROV recovery clamps, grapple hooks	Subsea equipment removal above seabed	Intermittent
Abrasive cutting tool, knife system, or external diamond wire cutters	Wellhead removal and cutting of BAM pile below the seabed via high-energy jet of water-borne abrasive particles	Continuous, 12 hrs per location
High pressure water jet	Subsea equipment cleaning	Intermittent

3.7 Summary of Disturbance, Discharges and Emissions

Table 3-3 describes the expected planned disturbance, discharges, and emissions from the activity. Environmental Aspects are described in detail in Section 6.0.

Removal of infrastructure via reverse reel, would result in a discharge of the entire line contents over a number of hours, however the cut and lift method would result in smaller discharges more frequently. As the overall volumes would be the same, Table 3-3 assumes that a reverse reel method is utilised.

Table 3-3 - Summary of Planned Disturbance, Discharges and Emissions

Activity	Planned Disturbance, Discharge or Emission	Environmental Aspect (Refer to Section 6.0)	Details (includes indicative quantities where relevant)
Phase 2 Activities			
Continued physical presence of Property (until removal).	Physical presence of structures and associated local influence on seabed, sediment movements and demersal communities.	Seabed Disturbance	Footprint will be within the existing PSZ.
Removal of remaining subsea structures from Phase 1b	Subsea well infrastructure removal will include subsea excavation and wet parking.	Seabed Disturbance	Footprint will be within the existing Operational Area.
		Seabed Disturbance	Within the existing footprint.

Activity	Planned Disturbance, Discharge or Emission	Environmental Aspect (Refer to Section 6.0)	Details (includes indicative quantities where relevant)
	Wellhead and BAM pile removal will require cutting tools. These will generate metal swarf and some cement cuttings at the seabed and inside the steel pipe. Cutting may also involve subsea discharges of grit and flocculant.	Subsea Discharge	Grit discharge: 1.7 Mt per hour (typically 3–7 hours cutting to complete per operation). Flocculant discharge: 150 L per operation. Metal swarf and cement cuttings: 0.5 Mt per operation.
		Underwater Sound Emissions	Cutting tools will generate continuous sound when in use.
	Wellhead and manifold pile removal may require excavation or suction pile dredging for access.	Seabed Disturbance	Within the existing footprint.
Removal of flowlines and subsea infrastructure	Removal of subsea flowlines and umbilicals will result in a planned subsurface discharge of infrastructure contents.	Subsea Discharge	Flowline volumes are between 5.67 m^3 and 101.7 m^3. Discharge of seawater (≤30 ppm OIW*) and some residual corrosion inhibitor chemical <650ppm. **B6 flowline OIW content is ~250 ppm.* Umbilical volumes are between 1 m^3 and 15 m^3. Discharge of Transaqua HT2^{TM} and freshwater; B6 umbilical also includes solvent.
	Contingent deburial will result in seabed disturbance and underwater sound emissions.	Seabed Disturbance	Likely only relevant to B6 umbilical and flowline. Within the existing footprint.
		Underwater Sound Emissions	Jetting / MFE equipment will generate continuous sound when in use.
	Contingent subsea cutting of infrastructure (if cut and lift is required) may result in underwater sound emissions. Additional to other removal methods, small quantities of flowline fragments (metal / plastic swarf) would be generated at the seabed. Residual hydrocarbons which may have become trapped in the carcass of the oil flowlines may also be released if flowlines are cut subsea.	Underwater Sound Emissions	Cutting tools will generate continuous sound when in use.
		Subsea Discharge	Grit, flocculant discharges, metal and plastic swarf. Residual hydrocarbons within flowline carcass.
Removal of subsea structures	Seabed excavation and wet parking.	Seabed Disturbance	Footprint will be within the existing Operational Area.
Seabed Survey & As-left Survey	Survey equipment used during seabed survey will result in underwater sound emissions.	Underwater Sound Emissions	MBES, SSS, SBPs will generate impulsive sound when in use.

Activity	Planned Disturbance, Discharge or Emission	Environmental Aspect (Refer to Section 6.0)	Details (includes indicative quantities where relevant)
Inspection and Maintenance	Contingent cleaning products to prepare equipment for recovery.	Seabed discharge	Typically, PLONOR or OCNS Category E/D products such as Calciwash are used in batches of <300 L pre application.
Support Operations			
Vessel Operations	Planned marine discharges from the vessels will include: • Sewage and grey water • Putrescible waste • Cooling water and brine • Deck draining and bilge	Vessel Discharges	For the duration of the activity (~50–75 days). Deck drainage and bilge treated in line with MARPOL requirements (≤15 ppm OIW).
	Dynamic Positioning System / thrusters	Underwater Sound Emissions	Vessels will generate continuous sound; sound levels may vary with environmental conditions and operating requirements, within defined safety parameters.
Helicopter	Helicopter will result in some level of underwater noise, particularly when at lower altitudes for landing/take-off at the CSV.	Underwater Sound Emissions	Helicopters will generate continuous sound; underwater sound levels are expected to be limited to tens of meters from the source.
ROVs	None	N/A	N/A

4.0 Description of the Environment

A detailed description of the environment is provided in Appendix 2 for all physical, ecological, and social receptors. This section provides regulatory context, a description of the EMBA, regional setting, and a summary of the key ecological and social receptors.

Threatened species recovery plans, threat abatement plans, and species conservation advices relevant to the receptors identified in this section are detailed in Table 2-6.

4.1 Regulatory Context

The OPGGS(E)R define 'environment' as the ecosystems and their constituent parts, natural and physical resources, qualities and characteristics of areas, the heritage value of places and includes the social, economic and cultural features of those matters.

In accordance with regulation 21(2) of the OPGGS(E)R, this section, Appendix 2, and Appendix 3 describe the physical setting, ecological receptors, and social receptors, of the receiving environment relevant to the described petroleum activity.

A greater level of detail is provided for certain receptors, as defined by regulation 21(3) of the OPGGS(E)R which states that relevant values and sensitivities may include any of the following:

- the world heritage values of a declared World Heritage property
- the national heritage values of a National Heritage place
- the ecological character of a declared Ramsar wetland
- the presence of a listed threatened species or listed threatened ecological community
- the presence of a listed migratory species
- any values and sensitivities that exist in, or in relation to, part or all of:
  - a Commonwealth marine area
  - a Commonwealth land.

With regards to regulation 21(3)(d) and 21(3)(e), more detail has been provided where threatened or migratory species have a spatially defined biologically important area (BIA) – as they are spatially defined areas where aggregations of individuals of a protected marine species may display biologically important behaviours such as breeding, foraging, resting, or migration.

With regards to regulation 21(3)(f) more detail has been provided for:

- KEFs as they are considered a conservation value under a Commonwealth marine area
- AMPs as they are enacted under the EPBC Act.

4.2 Environment that May be Affected

Table 4-1 and Figure 4-1 detail the Operational Area and Spill EMBA associated with the activity that are used to describe the environmental context relevant to the activity and to support the impact and risk assessments. Table 4-1 and Figure 4-1 also describe the Monitoring Area, which is an area used to inform oil spill response monitoring.

Table 4-1 - BMG Closure Project (Phase 2) specific Project Area descriptions

<table>
<tr><th>Project Area</th><th>Description</th></tr>
<tr><td>Operational Area</td><td>For the petroleum activity, the Operational Area is a 1,000 m corridor centred over the remaining BMG infrastructure (as described in Section 3.1.1). Environmental aspects such as planned operational discharges, physical presence, and seabed disturbance that occur during the petroleum activity will be within, or within the vicinity of, the Operational Area.
Appendix 3 includes the EPBC Act Protected Matters Report for the Operational Area.</td></tr>
<tr><td>Spill EMBA</td><td>The Spill EMBA is the largest spatial extent where a worst case accidental release of hydrocarbon could have an environmental consequence on the receiving environment. For this EP, the boundary of the Spill EMBA has been defined using results from the stochastic oil spill modelling for the accidental release of marine diesel oil (MDO) from a vessel collision event (Section 6.7) Hydrocarbon exposure values have been applied with consideration to NOPSEMA bulletins and information papers on oil spill thresholds (Document A1289237, last accessed 23/04/26, and document A652993, last accessed 23/04/2026).
The following exposure values:
• Shoreline oil ≥100 g/m^2
• Floating (surface) oil ≥10 g/m^2
• Dissolved oil ≥50 ppb
• Entrained oil ≥100 ppb.
The Spill EMBA does not represent the predicted coverage of any single oil spill event, nor does it depict a single plume at any given point in time. Rather, the Spill EMBA is a composite of a large number of spill scenarios modelled under differing metocean conditions.
The extent of potential socio-economic effects due to visible oil also takes into consideration lower exposure values for shoreline and surface oils:
• Shoreline oil ≥10 g/m^2
• Floating (surface) oil ≥1 g/m^2.
For this EP, these lower visible oil exposure values are within the existing extent of the Spill EMBA. See Section 6.7.2 for further detail on the spill model, exposure values, and modelling results for the different oil types. Based on the stochastic modelling results (RPS, 2021a), the Spill EMBA occurs within Commonwealth waters and extends into Victoria and NSW State waters (Figure 4-1), and within two Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Provincial Bioregions (Southeast Shelf Transition, and Southeast Transition), which are described further in Appendix 2.
Appendix 3 includes the EPBC Act Protected Matters Report for the Spill EMBA.</td></tr>
<tr><td>Monitoring Area</td><td>Hydrocarbons can be monitored to concentrations much lower than the exposure values for ecological or visual effects. The Monitoring Area (Figure 4-1) represents a planning area for operational and scientific monitoring in the unlikely event of an accidental release of hydrocarbon event. The Monitoring Area has been defined using results from the stochastic oil spill modelling for the accidental release of MDO from a vessel collision event (Section 6.7) and the following exposure values:
• Shoreline Oil – 10 g/m^2
• Surface (Floating) – 1 g/m^2
• Dissolved – 10 ppb
• Entrained – 10 ppb.
The purpose of the Monitoring Area is to inform operational and scientific monitoring arrangements, including monitoring priorities, as required under regulation 22(9) and 22(10). The Monitoring Area, is not related to the requirements under regulations 21(2) and 21(3) to describe the EMBA by the petroleum activity, and is therefore not further discussed within this section of the EP. Note: An EPBC Act PMST report for the Monitoring Area has been included in Appendix 3, and environmental values and sensitivities within the Monitoring Area are also described as part of the broader Description of the Environment [AEL-EN-EMP-0001; Appendix 2].</td></tr>
</table>

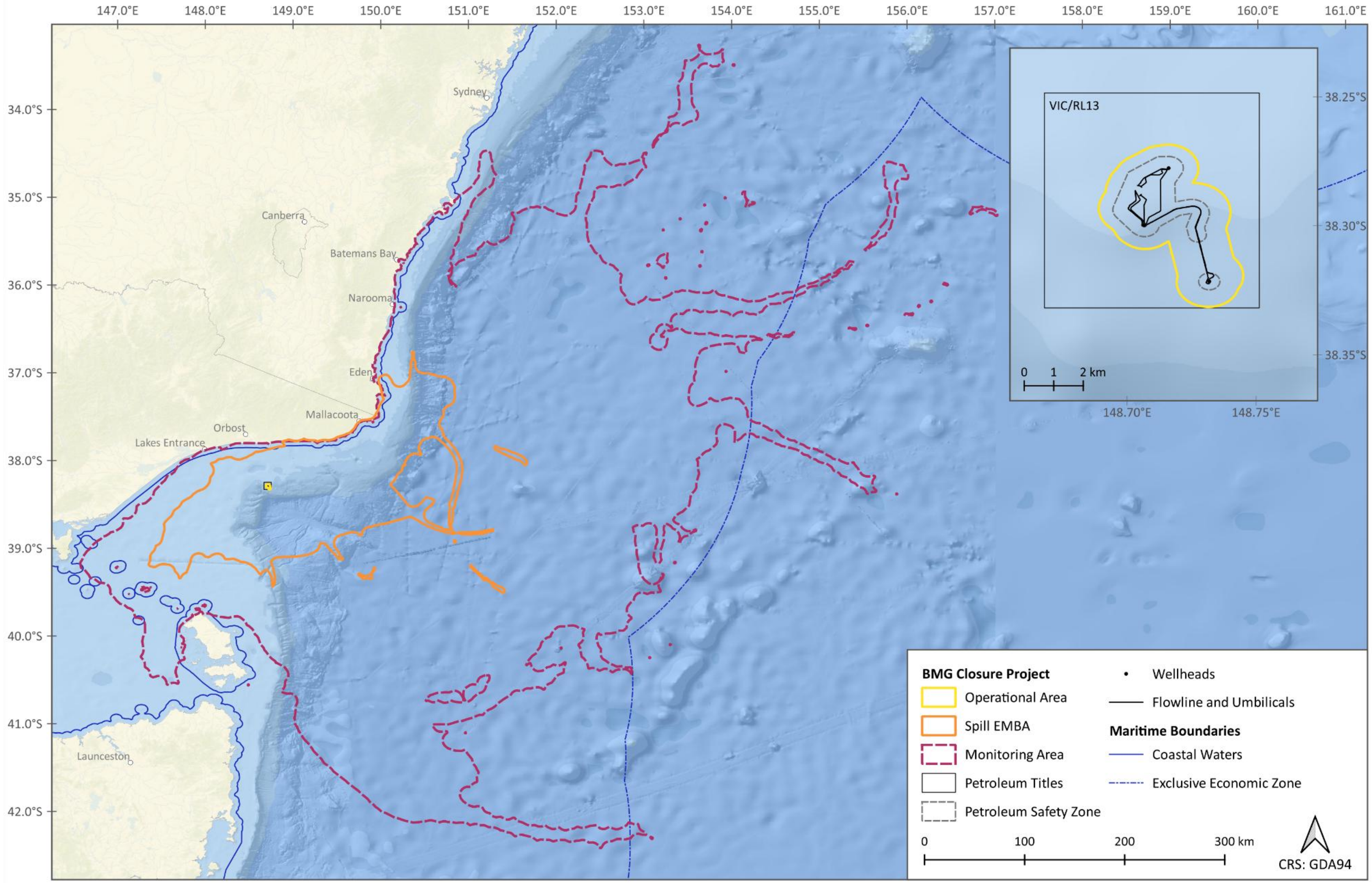


Figure 4-1 - BMG Close Project (Phase 2) Operational Area and Spill EMBA

4.3 Regional Setting

BMG infrastructure is located in Commonwealth waters off Victoria’s south-east coast in the Bass Strait.

BMG infrastructure is in water depths ranging from 135 m to 270 m within the Gippsland Basin, approximately 55 km south of Marlo and 80 km southwest of Point Hicks in Victoria. The Gippsland Basin occurs within the Commonwealth South-east Marine Bioregion and the Twofold Shelf IMCRA Meso-scale Bioregion. The continental shelf within the Twofold Shelf region has a very steep inshore profile (0–20 m), with a less steep inner (20–60 m) to mid (60–120 m) shelf profile, and a generally flatter outer shelf plain (120–160 m) southwest of Cape Howe (IMCRA, 1998). The wide shelf area is relatively featureless and flat (Santos, 2015). The sediments on Twofold Shelf are poorly sorted, with a median of 92% sand and 8% gravel; they are composed of organic material, with a median of 64.5% calcium carbonate (IMCRA, 1998). The seabed along BMG infrastructure is comprised of fine to coarse sand and areas of shell (CEE Consultants, 2003).

In 2020, Deakin University and the AIMS undertook a desktop study into the marine communities of BMG infrastructure (Ierodiaconou, et al., 2021). The study utilised historical industry ROV imagery to describe fish, mobile invertebrates, mammals, and epibenthic communities along flowlines and umbilicals, and around three wells and the manifold. The imagery was collected over multiple years of operation between 2009–2020 but was available only in high definition for flowline and umbilical surveys undertaken in 2020.

The study identified:

- a total of 15,664 mobile animals from 70 taxa were observed on ROV video collected around infrastructure during this study; these represent bony and cartilaginous fishes, marine mammals and mobile invertebrates
- epibenthic communities on the surface of flowline structures were found to be primarily sand, biofilm (thin layer of epibenthos) and shells; black corals/octocorals and encrusting sponges were observed on wells in more recent surveys
- fish assemblages present along wells and flowlines generally reflect those known to occur in the region, however many species common to the region were missing in this study, likely related to the use of industry ROV and incidental avoidance by fish
- noteworthy observations include Australian fur seals (*Arctocephalus pusillus doriferus*) (EPBC Listed threatened species), long-lived western foxfish (*Bodianus frenchii*) more typically known to occur in Western Australia and a tentative identification of handfish (*Brachionichthyidae spp.*).

Water quality is expected to be good quality and typical of the offshore marine environment. Gippsland Basin is well mixed given it is a higher-energy environment exposed to frequent storms. Average current speeds observed at BMG range between 0.18 m/s to 0.24 m/s, with maximum current speeds varying between 0.59 m/s (December) to 0.96 m/s (March) (RPS, 2021a). Monthly average sea surface temperatures vary between 14.1°C (September) to 20.5°C (March) (RPS, 2021a). Salinity is expected to be relatively consistent throughout the year ranging from 35.4-35.6 psu (RPS, 2021a).

Wave energy in this bioregion is relatively low compared to the Otway and central Bass Strait regions. Water temperatures are also generally warmer than elsewhere on the Victorian open coast due to the influence of the East Australian Current (Parks Victoria, 2003).

Upwelling zones are important for marine ecosystems due to the elevated primary and secondary productivity associated with upwelling systems (Huang & Wang, 2019). Upwelling conditions are common along the eastern and southern coasts of Australia, with a recent study identifying upwelling in the southern NSW and eastern Victoria area throughout the year inshore of BMG, with a stronger upwelling event in the autumn. The NSW upwelling system is formed of several interconnecting upwelling events, of which the closest to the Gippsland area is the KEF called East of Eden Upwelling. This KEF upwelling system is a persistent/semipersistent system that occurs continuously from austral spring to autumn, although during mid to late autumn the upwelling may be either lacking or isolated and restricted to the coast (Huang & Wang, 2019).

The coast of the Twofold Shelf Meso-scale Bioregion, where Gippsland is located, is dominated by dunes and sandy shorelines, with occasional rock outcrops; and there are extensive areas of inshore and offshore soft sediments nearshore (Barton, et al., 2012). This region also has occasional low-relief reef immediately beyond the surf zone (Parks Victoria, 2003).

4.3.1 Sediment Quality

The sediment present in the BMG fields consist of a silty fine sand above bass canyon scarp, clayey silty sand with a high proportion of shell and other carbonate fragments at the bass canyon scarp and smooth and featureless silty sand below the bass canyon scarp (CTC Marine, 2011). Fine sand size ranges between 0.02 – 0.2 mm and clay/silt particles size are less than 0.002 mm (Mohan & Prasadini, 2019). Whilst sediments are generally regarded as stable, natural backfill of trenches installed in 2012, and gradual burial of surface laid lines indicate some mobility. The sediments over the scarp are considered to be less stable, and more mobile than above and below the scarp.

During Phase 1 activities in April and May 2024 sediment samples were collected from sites located around the BAM (~100 m, ~500 m, ~3 km, and ~5 km from the BAM in a cruciform pattern), at the previous location of the FPSO plus ~300 m east and west, and a control site (~10 km from the BAM). Water depths of the sampling sites were ~124–342 m (Fathom Pacific, 2024).

The standard analytical suite for all sediment samples included moisture content, total organic carbon, particle size, metals and metalloids (aluminium, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, strontium, thorium, vanadium, and zinc), and hydrocarbons (polycyclic aromatic hydrocarbons [PAHs], total recoverable hydrocarbons [TRHs], benzene, toluene, ethylbenzene, and xylenes [BTEX]). A subset of the BAM sites were also tested for naturally occurring radioactive materials (NORM), and the FPSO sites for per and polyfluorinated alkyl substances (PFAS) and organotins.

A summary of the results from the sediment analysis presented in Fathom Pacific (2024) include:

- Particle sizes were found to vary between sites with the proportion of muds, fine sand, and shell grit varying between sites.
- All metal concentrations were below available Australia and New Zealand Guidelines (ANZG) guideline values. Several metals (beryllium, cadmium, cobalt, mercury, molybdenum, selenium, and thorium) were not detected at the limits of reporting (LoR); these LoR were below the guideline values where these exist. The concentrations of three metals (antimony, barium, and lead) were also inspected to determine if a spatial distribution pattern existed around the BAM; however, no indication of any spatial pattern was found.
- PAHs were detected at the four sites closest (~100 m) to the BAM; however, only one of the sites was at a concentration above the ANZG default guideline value (DGV). The PAH concentration did not exceed the high guideline value (GV-high). These results demonstrate that the presence of PAHs in sediments is spatially constrained to the near vicinity of the Basker-A drill centre, and well inside the PSZ.
- No TRH, BTEX, PFAS, or organotins were detected at any of the sites.
- While concentrations of NORM were detected at all sites samples (two sites ~100 m, two sites ~500 m, and the control site ~10 km from the BAM), the assessment indicated that the sediments are not currently a radiological risk to the environment and have activity concentrations within expected ranges.

Any future sampling will be undertaken as per the Infield Sediment Sampling described in Section 10.15.2, and any investigation of elevated results will be progressed in line with the Sampling and Assessment Program Decision Process (Figure 10-9).

4.4 Ecological and Social Receptors

Table 4-2 and Table 4-3 show the presence of ecological and social receptors that may occur within the Operational Area and Spill EMBA. Further descriptions and maps of these ecological and social receptors are provided in the Appendix 2.

Examples of values and sensitivities associated with each of the ecological or social receptors have been included in the tables. These values and sensitivities have been identified based on:

- presence of listed threatened and/or migratory species, or threatened ecological communities, identified in the EPBC Act protected matter searches (Appendix 3)
- presence of BIAs and habitat critical to the survival (HCTS) of protected species (Appendix 3)
- presence of important behaviours (e.g. foraging, roosting, breeding) by fauna, including those identified in the EPBC Act protected matter searches (Appendix 3)
- they provide an important link to other receptors (e.g. nursery habitat, food source)
- they provide an important human benefit (e.g. recreation and tourism, aesthetics, commercial species, economic benefit).

4.4.1 Ecological Receptors

Table 4-2 - Presence of ecological receptors within the Operational Area and Spill EMBA

<table>
<tr><th>Receptor Group</th><th>Receptor Type</th><th>Receptor Description</th><th>Values and Sensitivities</th><th colspan="2">Operational Area [3]</th><th colspan="2">Spill EMBA [4]</th></tr>
<tr><td rowspan="3">Habitat</td><td rowspan="3">Shoreline</td><td>Rocky</td><td>• Foraging habitat
• Nesting or breeding habitat
• Haul-out sites</td><td>–</td><td rowspan="3">Not present
The Operational Area does not include the coastal environment.</td><td>✓</td><td rowspan="3">Present
The coastal environment within the Spill EMBA is comprised predominately of sandy shores with sections of rocky outcrops. Each of these shoreline types has the potential to support different flora and fauna assemblage due to the different physical factors (e.g. waves, tides, light etc.) influencing the habitat, for example:
• Australian fur-seals are also known to use rocky shores for haul-out and/breeding
• Birds species may use rocky and sandy areas for roosting and breeding sites
• Marine turtles use sandy beaches for nesting
• Rocky coasts can provide a hard substrate for sessile invertebrate species (e.g. barnacles, sponges etc.) to attach to
• Artificial structures (e.g. groynes, jetties) while built for other purposes (e.g. shoreline protection, recreational activities) can also provide a hard substrate for sessile invertebrates to attach to.</td></tr>
<tr><td>Sandy</td><td>• Foraging habitat
• Nesting or breeding habitat
• Haul-out sites</td><td>–</td><td>✓</td></tr>
<tr><td>Artificial structure</td><td>Sessile invertebrates</td><td>–</td><td>✓</td></tr>
</table>

[3] Combination of an EPBC Act PMST report for the Operational Area, and characteristics of the Gippsland environmental sector described in Appendix 2, have been used to describe ecological receptors that may occur within the Operational Area.

[4] Combination of an EPBC Act PMST report for the Spill EMBA, and characteristics of the Gippsland and Bass Strait environmental sector described in Appendix 2, have been used to describe ecological receptors that may occur within the Spill EMBA.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
							Detailed existing environment descriptions of these shoreline habitats are described in Appendix 2, Section 3.1.
	Mangroves (Dominant Habitat)	Intertidal/ subtitle habitat, mangrove communities	• Nursery habitat • Breeding habitat	–	**Not present** The Operational Area does not include the coastal environment.	✓	**May be Present** Mangrove dominated habitat (>10% coverage) based on the National Intertidal-Subtidal Benthic (NISB) Habitat data exists within the Gippsland environmental sectors (Appendix 2). Mangroves have been recorded in all Australian states except Tasmania. One species, *Avicennia marina*, occurs in Victoria: typically, in inlets or estuaries (e.g. Corner Inlet). Species diversity increases as mangroves occur further to the north in NSW. Mangrove habitats along the Victorian coast are distributed in South Gippsland around the French Island National Park and Port Welshpool. Detailed existing environment descriptions of these mangrove habitats are described in Appendix 2, Section 3.2.
	Saltmarsh (Dominant Habitat)	Upper intertidal zone, Salt marsh habitat, habitat for fish and benthic communities	• Nursery habitat • Breeding habitat	–	**Not present** The Operational Area does not include the coastal environment.	✓	**May be Present** Saltmarsh habitats are widespread along the Australian coast and mostly occur in the upper intertidal zone. Saltmarsh environments are much more common in northern Australia, compared to the temperate and southern coasts (i.e. NSW, Victoria, Tasmania) (Boon, et al., 2011). Saltmarsh dominated habitat (>10% coverage) based on NISB Habitat data exists within the Gippsland environmental sectors (Appendix 2). Extensive saltmarsh occurs within the Corner Inlet-Nooramunga

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
							complex, and behind the sand dunes of Ninety Mile Beach in Gippsland (Appendix 2, Section 3.3). Detailed existing environment descriptions of these saltmarsh habitats are described in Appendix 2, Section 3.3.
	Soft Sediment	Predominantly unvegetated soft sediment substrates	Key habitat	✓	**Present** The Operational Area is located on the mid-outer continental shelf and upper slopes of the Bass Canyon. The benthic habitat within the Operational Area is expected to be largely featureless, with the seabed comprising of silty sand and limited availability of hard substrate (Appendix 2, Section 3.7). During habitat studies conducted within the Operational Area, Ierodiaconou et al (2021) described the seafloor as a region where a muddy sand biotope dominates and is quite different to the upper inner shelf. Detailed existing environment descriptions of soft sediment habitats within the Operational Area is described in Appendix 2, Section 3.7.	✓	**Present** Unvegetated soft sediments are a widespread habitat in both intertidal and subtidal areas, particularly in areas beyond the photic zone. The biodiversity and productivity of soft sediment habitat can vary depending upon depth, light, temperature, and the type of sediment present. The Gippsland Basin is composed of a series of large sediment flats, interspersed with small patches of reef, bedrock and consolidated sediment. Detailed existing environment descriptions of soft sediment habitats are described in Appendix 2, Section 3.7.
	Seagrass	Seagrass meadows (Dominant Habitat)	• Nursery habitat • Food source	–	**Not present** The Operational Area is in deep water (135 m – 270 m) and beyond the expected photic zone. Studies undertaken have not identified seagrass in the Operational Area (Ierodiaconou, et al., 2021). The closest seagrass dominated habitat is present around Lakes Entrance in nearshore waters.	✓	**Present** Seagrass dominated habitat (>5% coverage) based on NISB Habitat data within the Gippsland environmental sector (Appendix 2, Section 3.8). Seagrass generally grows in soft sediments within intertidal and shallow subtidal waters where there is sufficient light. In East Gippsland, seagrass meadows are common in sheltered bay environments or around small offshore islands.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
							Detailed existing environment descriptions of seagrass habitats are is described in Appendix 2, Section 3.8.
	Algae	Macroalgae (Dominant Habitat)	• Nursery habitat • Food source	–	**Not present** The Operational Area does not include the nearshore intertidal and tidal zones where macroalgal communities may be present (Appendix 2, Section 3.9). The Operational Area is not a dominant macroalgae habitat based on the national mapping available from OzCoasts (2015), and macroalgae was not identified in the Operational Area during recent studies (Ierodiaconou, et al., 2021).	✓	**Present** Benthic microalgae are ubiquitous in aquatic areas where sunlight reaches the sediment surface. Macroalgae communities are generally found on intertidal and shallow subtidal rocky substrates. Macroalgae dominated habitat (>5% coverage) based on NISB Habitat data occurs within the Gippsland environmental sector (Appendix 2, Section 3.8). Macroalgae occurs as both a dominant and co-dominant habitat in East Gippsland. Detailed existing environment descriptions of algae habitats are described in Appendix 2, Section 3.9.
	Coral	Hard and soft coral communities (Dominant Habitat)	• Nursery habitat • Breeding habitat	✓	**Present** The Operational Area is in water depths of 135–270 m, and beyond the photic zone; therefore, the presence of hard corals are unlikely. Soft corals can occur beyond the photic zone. During a recent study, soft corals were identified on BMG infrastructure, with black/octocorals making up 22% of the epibenthic communities at Manta-2A (Ierodiaconou, et al., 2021). Black/octocorals were not identified on the flowlines during this study (Ierodiaconou, et al., 2021).	✓	**Present** Typically, soft corals can be found at most depths throughout the continental shelf, slope and off slope regions, to well below the limit of light penetration. Soft corals (e.g. sea fans, sea whips) occur as part of mixed reef environments in waters along the East Gippsland coast and can occur in a variety of water depths. Hard coral species have been recorded in south-eastern Australia (e.g. Kent Group Marine Protected Area near Flinders Island and Wilsons Promontory National Park, Victoria). Coral dominated habitat (based on NISB Habitat data) does not occur within the Gippsland environmental sector (Appendix 2, Section 3.8). Detailed existing environment descriptions of coral habitats are described in Appendix 2, Section 3.10.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[3]		Spill EMBA[4]	
	TECs	Native plants, animals and other organisms interacting with unique habitats	• Provides habitat for flora and fauna • Coastal buffer against erosion • Nursery habitat • Breeding habitat	–	**Not present** There are no TECs located within the Operational Area (Appendix 3).	✓	**Present** TECs provide wildlife corridors or refugia for many plant and animal species, and listing a TEC provides a form of landscape or systems-level conservation (including threatened species). Nine TECs were identified in the EPBC Act PMST report for the Spill EMBA (Appendix 3). Of these, the following three TECs have marine/coastal interface: • Giant Kelp Marine Forests of South East Australia • Littoral Rainforest and Coastal Vine Thickets of Eastern Australia • Subtropical and Temperate Coastal Saltmarsh. Detailed existing environment descriptions of these TECs are described in Appendix 2, Sections 3.3, 3.5, and 3.9.
Marine Fauna	Plankton	Phytoplankton and zooplankton	Food source	✓	**Present** Phytoplankton and zooplankton are widespread throughout oceanic environments and are expected to occur within the Operational Area. Increased abundance and productivity can occur in areas of upwelling e.g. Upwelling East of Eden KEF, which intersects the Operational Area (Appendix 2, Section 3.11). Detailed existing environment descriptions of plankton within the Operational Area is described in Appendix 2, Section 3.11.	✓	**Present** Phytoplankton and zooplankton are widespread throughout oceanic environments and are expected to occur within the Spill EMBA. Increased abundance and productivity can occur in areas of upwelling, such as Upwelling East of Eden KEF (Appendix 2, Section 3.11), which intersects the Spill EMBA. Detailed existing environment descriptions of plankton are described in Appendix 2, Section 3.11.
	Marine Invertebrates	Benthic and pelagic invertebrate communities	• Food source • Commercial species	✓	**Present** A variety of marine invertebrate species may occur within the Operational Area, for example:	✓	**Present** Two listed threatened crustacean species (or species habitat), East Gippsland spiny crayfish and the Orbost spiny crayfish, were identified in the EPBC Act PMST

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]	Spill EMBA [4]
				• Studies of infauna in shallower waters of East Gippsland has indicated a high species diversity and abundance (Beaman, et al., 2005). However, epifauna is expected to be spare within the Operational Area given the water depths coverage of silty sand and limited availability of hard substrate. Infauna may also be present within the sediment profile of the Operational Area (Appendix 2, Section 3.13). • Ierodiaconou et al (2021) described invertebrate communities around the infrastructure and flowlines and concluded that differences are assemblages across the site are mostly driven by species habitat and depth preferences. • Invertebrates of commercial importance identified in the study included the Tasmanian giant crab (*Pseudocarcinus gigas*), cuttlefish (*Sepiidae spp*.), octopus (*Octopodidae spp*.), arrow squid (*Nototodarus gouldi*), and Balmain bug (Ibacus peronii) (Ierodiaconou et al, 2021). • A report prepared by SETFIA and Fishwell Consulting (2021) did not identify any fisheries which target invertebrate species (i.e. crab and rock lobster fishery) as actively fishing within the Operational Area. • The threatened marine invertebrate species, Tasmanian live-bearing seastar, is not present in the Gippsland and therefore is not expected to	report for the Spill EMBA (Appendix 3); however the presence of either species within the Spill EMBA is not considered credible[5]. Studies of infauna along the Victorian coast have shown high species diversity, particularly in East Gippsland (Heislers & Parry, 2007). Commercially important species may occur within the Spill EMBA. Detailed existing environment descriptions of marine invertebrates that may occur within the Spill EMBA are described in Appendix 2, Section 3.13.

[5] The East Gippsland spiny crayfish is typically found in river systems at elevations of 28–550 m above sea level (DCCEEW, 2023a); and the Orbost spiny crayfish is typically found in river systems at elevations of 350–950 m above sea level (DCCEEW, 2023b).

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
					be present within the Operation Area (Appendix 3). Detailed existing environment descriptions of marine invertebrates that may occur within the Operational Area are described in Appendix 2, Section 3.13.		
	Fish	Fish	Commercial species	✓	**Present** Commercial fish species may occur within the Operational Area. Given the presence of subsea infrastructure and commercial fishing operations in the vicinity, they are expected to be present. Fish species of potential commercial interest were identified by Ierodiaconou et al (2021) within the Operational Area. SETFIA and Fishwell Consulting (2021) describes several commercial fisheries as active within the Operational Area, including the Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth Trawl Sector, SESSF Shark Gillnet and Shark Hook Sectors, and SESSF Scalefish Hook Sector. Detailed existing environment descriptions of commercial fish species that may occur within the Operational Area are described in Appendix 2, Section 3.14.10.	✓	**Present** Commercial fish species may occur within the Spill EMBA. Ray finned fish are known to occur within the Spill EMBA, given the diversity of habitats and large geographical area. Species that may be present include pink ling, species of wrasse, and flathead. Detailed existing environment descriptions of commercial fish species that may be present within the Spill EMBA are described in Appendix 2, Section 3.14.
			Listed Threatened species	✓	**Present** Three listed threatened fish species were identified within the Operational Area PMST search (Appendix 3): • blue warehou (conservation dependent) • eastern gemfish (conservation dependent)	✓	**Present** Five threatened fish species (or species habitat) may occur within the Spill EMBA (Appendix 3): • Australian grayling (vulnerable) • black rockcod (vulnerable) • blue warehou (conservation dependent)

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]	Spill EMBA [4]
				• orange roughy (conservation dependant). No biologically important behaviours were associated with the presence of these species (Appendix 2). In addition, Ierodiaconou et al (2021) describes two potential species of conservation value (*Brachionichthyidae* spp., handfish; and *Bodianus frenchii*, foxfish); although these are tentative identifications unable to be verified without higher resolution imagery. Through consideration of available literature (Stuart-Smith, et al., 2020), it is concluded that the more likely species of handfish observed by Ierodiaconou et al (2021) is the Australian handfish based on recorded distributions. The Australian handfish is not EPBC listed threatened and is listed by the IUCN as 'least concern'. No EPBC listed threatened handfish species are expected to be found within the Operational Area, due to the depth (listed species are found in water depths up to 60 m) and the location.	• eastern gemfish (conservation dependent) • orange roughy (conservation dependant). No biologically important behaviours were associated with the presence of these species (Appendix 2). Detailed existing environment descriptions of threatened fish species that may be present within the Spill EMBA are described in Appendix 2, Section 3.14.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
		Sharks and Rays	Listed Threatened species	✓	**Present** <u>Threatened Species</u> Five listed threatened shark species were identified by the EPBC Act PMST as known to, likely to, or may occur within Operational Area: • dumb gulper shark (conservation dependent) • little gulper shark (conservation dependent) • school shark (conservation dependent) • whale shark (vulnerable) • white shark (vulnerable). Of these, the presence of the white shark was identified as having potential migration related behaviours within the Operational Area (Appendix 3). Ierodiaconou et al (2021) also described potential species of conservation value (*Urolophus spp.,* stingaree); although these were tentative identifications unable to be verified without higher resolution imagery.	✓	**Present** <u>Threatened Species</u> Six listed threatened shark species were identified by the EPBC PMST as known to, likely to, or may occur within the Spill EMBA: • dumb gulper shark (conservation dependent) • grey nurse shark (east coast population) (critically endangered) • little gulper shark (conservation dependent) • school shark (conservation dependent) • whale shark (vulnerable) • white shark (vulnerable). • Of these, the grey nurse shark was identified as having foraging, feeding or related behaviours within the Spill EMBA; and the white shark was identified as having breeding behaviours within the Spill EMBA (Appendix 3). There are no threatened ray species identified within the Spill EMBA (Appendix 3)
			Listed Migratory Species	✓	<u>Migratory Species</u> Six listed migratory shark species (or species habitat) are known to, likely to, or may occur within the Operational Area (Appendix 3): • grey nurse shark • oceanic whitetip shark • porbeagle • shortfin mako • whale shark • white shark.	✓	<u>Migratory Species</u> Six listed migratory shark species (or species habitat) are known to, likely to, or may occur within the Spill EMBA (Appendix 3): • grey nurse shark • oceanic whitetip shark • porbeagle • shortfin mako • whale shark
			BIAs	–		✓	
			HCTS of the species	–		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]	Spill EMBA [4]
				No listed migratory ray species were identified within the Operational Area (Appendix 3). <u>Further Information</u> Detailed existing environment descriptions of sharks and rays that may occur within the Operational Area are described in Appendix 2, Section 3.14.	• white shark. Of these, the presence of the grey nurse shark and white shark were associated with biologically important behaviours (as described above). No additional biologically important behaviours were identified for other species. One listed migratory ray species (or species habitat), the giant manta ray, is known to occur within the Spill EMBA (Appendix 3) (not linked with biologically important behaviours). <u>BIAs</u> The Spill EMBA intersects the BIAs for the following species: • grey nurse shark (Figure 4-2) • white shark (Figure 4-2). <u>HCTS of the species</u> **(May be present)** HCTS for shark species are not spatially defined. From descriptions in the recovery plans identified in Table 2-6, the Spill EMBA may intersect with HCTS for the following species: • white shark—foraging areas, aggregation areas, and sites to which white sharks return on a regular basis may represent HCTS of the species (DSEWPaC, 2013d); the Spill EMBA intersects with a foraging and breeding BIA for the white shark (Figure 4-2). <u>Further Information</u> Detailed existing environment descriptions of sharks and rays within the Spill EMBA are described in Appendix 2, Section 3.14.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[3]		Spill EMBA[4]
		Syngnathids (Pipefish, seahorse, seadragons)	Listed Marine Species	✓	**Present** Listed Marine Species 26 listed marine syngnathids may occur within the Operational Area (Appendix 3). No biologically important behaviours were associated with the presence of these species (Appendix 2). Further Information Detailed existing environment descriptions of syngnathids within the Operational Area is described in Appendix 2, Section 3.14.5.	✓	**Present** Listed Marine Species 29 listed marine syngnathids may occur within the Spill EMBA (Appendix 3). No biologically important behaviours were associated with the presence of these species (Appendix 2). Further Information Detailed existing environment descriptions of syngnathids within the Spill EMBA is described in Appendix 2, Section 3.14.5.
			Listed Threatened Species	–		–	
	Seabirds and shorebirds	Birds that live or frequent the coast or ocean	Listed Marine Species	✓	**Present** Listed Marine Species 31 seabird and shorebird species (or species habitat) are known to, likely to or may occur within the Operational Area (Appendix 3). Of these, the presence of the following 12 species: • antipodean, black-browed, Campbell, Chatham, Gibson's, northern royal, Salvin's, shy, southern royal, wandering, and white-capped albatross' • northern giant petrel were identified as having potential foraging, feeding, or related behaviours within the Operational Area (Appendix 3). The presence of one species (white-fronted tern) was identified as having potential migration behaviours within the Operational Area (Appendix 3). Threatened Species	✓	**Present** Listed Marine Species 71 seabird and shorebird species (or species habitat) are known to, likely to, or may occur within the Spill EMBA (Appendix 3). Of these, the presence of the following 16 species: • antipodean, black-browed, Buller's, Campbell, Chatham, Gibson's, northern Buller's, northern royal, Salvin's, shy, southern royal, wandering, and white-capped albatross' • flesh-footed shearwater • northern giant petrel • white-fronted tern were identified as having potential foraging, feeding, or related behaviours within the Spill EMBA (Appendix 3). The presence of the following 10 species:
			Listed Threatened Species	✓		✓	
			Listed Migratory Species	✓		✓	
			BIAs	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]	Spill EMBA [4]
				28 listed threatened bird species are known, likely, or may occur within the Operational Area. Four of these threatened species (Australian fairy tern, fairy prion (southern), Gould's petrel, and white-bellied storm-petrel (Tasman Sea)) are not listed marine species. In addition to the 12 albatross and petrel species described above, the presence of the threatened Australian fairy tern within the Operational Area was also associated with potential foraging, feeding, or related behaviours (Appendix 3). <u>Migratory Species</u> 24 listed migratory bird species are known, likely, or may occur within the Operational Area. Of these, 11 species were identified as that presence being for foraging, feeding, or related behaviours. <u>BIAs</u> The Operational Area intersects foraging BIAs for the following nine species: • antipodean albatross (Figure 4-3) • black-browed albatross (Figure 4-3) • Buller's albatross (Figure 4-4) • Campbell albatross (Figure 4-4 • common diving petrel (Figure 4-5) • Indian yellow-nosed albatross (Figure 4-5) • shy albatross (Figure 4-7) • wandering albatross (Figure 4-8) • white-faced storm petrel (Figure 4-9).	• Caspian, fairy, greater crested, little, and sooty tern • little penguin • short-tailed shearwater • silver gull • white-bellied sea-eagle • white-faced storm-petrel were identified as having potential breeding behaviours within the Spill EMBA (Appendix 3). The presence of the following 10 species: • double-banded, and red-capped plover • great knot • little curlew • pin-tailed, and Swinhoe's snipe • red-necked stint • ruddy turnstone • sanderling • whimbrel were identified as having potential roosting behaviours within the Spill EMBA (Appendix 3). <u>Threatened species</u> 53 listed threatened bird species are known to, likely to, or may occur within the Spill EMBA. Of these, 14 species were identified as having potential foraging, feeding, or related behaviours; one species as having potential breeding behaviour; and two as having potential roosting behaviours.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[3]	Spill EMBA[4]
				<u>HCTS of the species</u> HCTS for bird species are not spatially mapped. From descriptions in the recovery plans identified in Table 2-6, the Operational Area may intersect with HCTS for the following species: • Australian fairy tern—HCTS may comprise suitable habitat for where breeding or foraging is known or likely to occur, and suitable non-breeding habitat (Commonwealth of Australia, 2020a); the species distribution mapping overlaps with the Operational Area. <u>Further Information</u> Detailed existing environment descriptions of seabirds and shorebirds within the Operational Area is described in Appendix 2, Section 3.12.	17 of the listed threatened species are not listed marine species. <u>Migratory Species</u> 45 listed migratory bird species are known, likely, or may occur within the Spill EMBA. Of these, 13 species were identified as having potential foraging, feeding, or related behaviours; four species as having potential breeding behaviours; and nine as having potential roosting behaviours. <u>BIAs</u> The Spill EMBA intersects the following 13 BIAs: • antipodean albatross (Figure 4-3) • black-browed albatross (Figure 4-3) • Buller's albatross (Figure 4-4) • Campbell albatross (Figure 4-4) • common diving petrel (Figure 4-5) • Indian yellow-nosed albatross (Figure 4-5) • little penguin (Figure 4-6) • short-tailed shearwater (Figure 4-6) • shy albatross (Figure 4-7) • sooty shearwater (Figure 4-7) • wandering albatross (Figure 4-8) • wedge-tailed shearwater (Figure 4-8) • white-faced storm-petrel (Figure 4-9). <u>HCTS of the species</u> HCTS for bird species are not spatially defined. From descriptions in the recovery plans identified in Table 2-6, the Spill EMBA may intersect with HCTS for the following species:

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]	Spill EMBA [4]
					• Australian fairy tern—HCTS may comprise suitable habitat for where breeding or foraging is known or likely to occur, and suitable non-breeding habitat (Commonwealth of Australia, 2020a); the species distribution mapping overlaps with the Spill EMBA. The Spill EMBA may occur adjacent to the HCTS for the following species: • Australasian bittern—HCTS may comprise natural wetlands where the species is known or likely to occur (Commonwealth of Australia, 2022c); the mapped species distribution includes the Gippsland coast • Australian painted snipe—HCTS may comprise natural wetlands where the species is known or likely to occur (Commonwealth of Australia, 2022d); the mapped species distribution includes the Gippsland coast • eastern bristlebird—HCTS includes key biodiversity areas for the species; Nadgee (NSW) to Mallacoota Inlet (VIC) is a key biodiversity area (Commonwealth of Australia, 2022b) • orange-bellied parrot—HCTS may include foraging areas throughout the non-breeding range; the Gippsland coast is mapped as an infrequent non-breeding range (DELWP, 2016). Further Information Detailed existing environment descriptions of seabirds and shorebirds within the Spill EMBA is described in Appendix 2, Section 3.12.

<table>
<tr><th>Receptor Group</th><th>Receptor Type</th><th>Receptor Description</th><th>Values and Sensitivities</th><th colspan="2">Operational Area [3]</th><th colspan="2">Spill EMBA [4]</th></tr>
<tr><td rowspan="6"></td><td rowspan="6">Marine Reptiles</td><td rowspan="5">Turtles</td><td>Listed Marine Species</td><td>✓</td><td rowspan="5">Present
<u>Listed Marine Species</u>
Three marine turtle species (or species habitat) are likely to or may occur within the Operational Area (Appendix 3).
No biologically important behaviours were associated with the presence of these species (Appendix 2).
<u>Threatened Species</u>
All three turtle species are listed as threatened:
• green turtle (vulnerable)
• leatherback turtle (endangered)
• loggerhead turtle (endangered).
<u>Migratory Species</u>
All three turtle species are listed as migratory.
<u>Further Information</u>
Detailed existing environment descriptions of marine turtles within the Operational Area is described in Appendix 2, Section 3.15.</td><td>✓</td><td rowspan="5">Present
<u>Listed Marine Species</u>
Five marine turtle species (or species habitat) are known or likely to occur within the Spill EMBA (Appendix 3).
Of these, three species (green, hawksbill, and leatherback turtles) were identified as having potential foraging, feeding, or related behaviours within the Spill EMBA. One species (loggerhead turtle) was identified as having potential breeding behaviours within the Spill EMBA. These behaviours are not linked to BIAs for these species.
<u>Threatened Species</u>
All five turtle species are listed as threatened:
• flatback turtle (vulnerable)
• green turtle (vulnerable)
• hawksbill turtle (vulnerable)
• leatherback turtle (endangered)
• loggerhead turtle (endangered).
<u>Migratory Species</u>
All five turtle species are listed as migratory.
<u>Further Information</u>
Detailed existing environment descriptions of marine turtles within the Spill EMBA is described in Appendix 2, Section 3.15.</td></tr>
<tr><td>Listed Threatened Species</td><td>✓</td><td>✓</td></tr>
<tr><td>Listed Migratory Species</td><td>✓</td><td>✓</td></tr>
<tr><td>BIAs</td><td>–</td><td>–</td></tr>
<tr><td>HCTS of the species</td><td>–</td><td>–</td></tr>
<tr><td>Sea Snakes</td><td>Listed Threatened Species</td><td>–</td><td>Not present
No sea snake species were identified within the Operational Area (Appendix 3).</td><td>✓</td><td>Not present
No sea snake species were identified within the Spill EMBA (Appendix 3).</td></tr>
</table>

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
	Marine Mammals	Seals and Sealions (Pinnipeds)	Listed Marine Species	✓	**Present** Listed Marine Species Two pinniped species (or species habitat) may occur within the Operational Area (Appendix 3): • long-nosed fur-seal • Australian fur-seal. No biologically important behaviours were associated with the presence of these species (Appendix 2). Sightings of pinnipeds have occurred at the BMG infrastructure, including groups of seals around vessels during the 2023/24 P&A program, and a sighting of an Australian fur seal foraging around a BMG flowline during an offshore inspection (Ierodiaconou, et al., 2021). Further Information Detailed existing environment descriptions of pinnipeds within the Spill EMBA is described in Appendix 2, Section 3.16.1.	✓	**Present** Listed Marine Species Two pinniped species (or species habitat) are known to or may occur within the Spill EMBA (Appendix 3): • Australian fur-seal • long-nosed fur-seal. The Australian fur-seal was identified as potentially having biologically important behaviours (breeding) within the Spill EMBA. Further Information Detailed existing environment descriptions of pinnipeds within the Spill EMBA is described in Appendix 2, Section 3.16.1.
			Listed Threatened Species	–		–	
			Listed Migratory Species	–		–	
			BIAs	–		–	
			HCTS of the species	–		–	
		Dugong	Listed Marine Species	–	**Not present** No dugong species were identified within the Operational Area EPBC Act PMST report (Appendix 3).	–	**Not present** No dugong species were identified within the Operational Area EPBC Act PMST report (Appendix 3).
			Listed Threatened Species	–		–	
			Listed Migratory Species	–		–	
			BIAs	–		–	
			HCTS of the species	–		–	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[3]		Spill EMBA[4]	
		Whales	Listed Cetacean Species	✓	**Present** Listed Cetacean Species 19 whale species (or species habitat) are known to, likely to, or may occur within the Operational Area (Appendix 3). Of these, three species (fin, pygmy right, and sei whales) were identified as potentially having foraging, feeding, or related behaviours within the Operational Area. These behaviours are not linked to BIAs for these species. Several beaked whales were listed as 'species or habitat may occur' within the Operational Area; these were: • Arnoux's beaked whale • Andrews beaked whale • Blainville's beaked whale • Hector's beaked whale • Strap-toothed beak whale* • Trues beaked whale* • Cuvier's beaked whale* **Listed cetacean, no other listing advice or conservation advice. The Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (2018) is currently identified by DCCEEW as relevant for the **Blaineville's beaked whale** and **Cuvier's beaked whale** only.* Listed Threatened Species Four listed threatened whales species are known to, or likely to, occur within the Operational Area:	✓	**Present** Listed Cetacean Species 23 whale species (or species habitat) are known to, likely to, or may occur within the Spill EMBA (Appendix 3). Of these, four species (fin, humpback, pygmy right, and sei whales) were identified as potentially having foraging, feeding or related behaviours. These behaviours are not linked to BIAs for these species. Listed Threatened Species Four listed threatened whale species are known or likely to occur within the Spill EMBA: • blue whale (endangered) • fin whale (vulnerable) • sei whale (vulnerable) • southern right whale (endangered). Listed Migratory Species Nine listed migratory whale species are known to, likely to, or may occur within the Operational Area: • Antarctic minke whale • blue whale • Bryde's whale • fin whale • humpback whale • pygmy right whale • sei whale • southern right whale • sperm whale.
			Listed Threatened Species	✓		✓	
			Listed Migratory Species	✓		✓	
			BIAs	✓		✓	
			HCTS of the species	–		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]	Spill EMBA [4]
				• blue whale (endangered) • fin whale (vulnerable) • sei whale (vulnerable) • southern right whale (endangered). Listed Migratory Species Nine listed migratory whale species are known to, likely to, or may occur within the Operational Area: • Antarctic minke whale • blue whale • Bryde's whale • fin whale • humpback whale • pygmy right whale • sei whale • southern right whale • sperm whale. BIAs The Operational Area intersects with BIAs for the following species: • pygmy blue whale (Figure 4-11) • southern right whale (Figure 4-11). The possible foraging BIA for the pygmy blue whale is described as an area where "evidence for feeding is based on limited direct observations or through indirect evidence, such as occurrence of krill in close proximity of whales, or satellite tagged whales showing circling tracks" (Commonwealth of Australia, 2015a). Previous advice has indicated that if blue whales are sighted within the Gippsland	BIAs The Spill EMBA intersects with BIAs for the following species: • humpback whale (Figure 4-10) • pygmy blue whale (Figure 4-11) • southern right whale (Figure 4-11). HCTS of the species The Spill EMBA intersects with HCTS of the species for: • southern right whale. The National Recovery Plan for the Southern Right Whale (DCCEEW, 2024h) identifies HCTS for southern right whales as all reproductive BIAs (see Figure 4-11) across the species range. Further Information Detailed existing environment descriptions of whales within the Spill EMBA is described in Appendix 2, Section 3.16.2.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[3]		Spill EMBA[4]
					region it would be reasonable to assume that they are foraging (P. Gill, pers. comm., July 2021). Based on their migration patterns and acoustic detection of blue whale within the Bass Strait (McCauley, et al., 2018), blue whales may be more likely to be moving through the region in April, May and June. Sightings data during a 2020 offshore seismic survey indicated presence within the region in June (CGG Services, pers. comm.). However, numbers of blue whales are expected to be low in the Gippsland region at any time of year, with the Gippsland being outside of predominant feeding grounds for any population of blue whales (Barlow, et al., 2023). The migration BIA for the southern right whales are areas known, or likely, to be used for movement between regions that support biologically important behaviours (DCCEEW, 2024h). Further Information Detailed existing environment descriptions of whales within the Operational Area is described in Appendix 2, Section 3.16.2.		
		Dolphins	Listed Cetacean Species	✓	**Present** Listed Cetacean Species Nine dolphin species (or species habitat) are likely to or may occur within the Operational Area. No biologically important behaviours were associated with the presence of these species (Appendix 2). Listed Migratory Species Two listed migratory dolphin species are likely to occur within the Operational Area:	✓	**Present** Listed Cetacean Species Ten dolphin species (or species habitat) are likely to or may occur within the Spill EMBA (Appendix 3). No biologically important behaviours were associated with the presence of these species (Appendix 2). Listed Migratory Species Two listed migratory dolphin species are likely to occur within the Spill EMBA: • dusky dolphin
			Listed Threatened Species	–		–	
			Listed Migratory Species	✓		✓	
			BIAs	–		✓	
			HCTS of the species	–		–	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [3]		Spill EMBA [4]	
					• dusky dolphin • killer whale. Further Information Detailed existing environment descriptions of marine dolphins within the Operational Area is described in Appendix 2, Section 3.16.3.		• killer whale. BIAs The Spill EMBA intersects with BIAs for the following species: • Indo-Pacific/spotted bottlenose dolphin (Figure 4-10). Further Information Detailed existing environment descriptions of marine dolphins within the Spill EMBA is described in Appendix 2, Section 3.16.3.
	Invasive Marine Species (IMS)	Established and Exotic	Introduced marine species	✓	**Present** Analysis of high resolution ROV footage did not identify any invasive species on or around the BMG subsea infrastructure (Ierodiaconou, et al., 2021).	✓	**Present** Multiple IMS are identified as established within Victorian waters. The introduced conical New Zealand screw shell (*Maoricolpus roseus*) is considered somewhat widespread in the Gippsland area (Appendix 2, Section 3.18) and has also been observed within the Patricia Baleen pipeline corridor, generally in water depths greater than 40 m (Appendix 2, Sections 3.7 and 3.13).

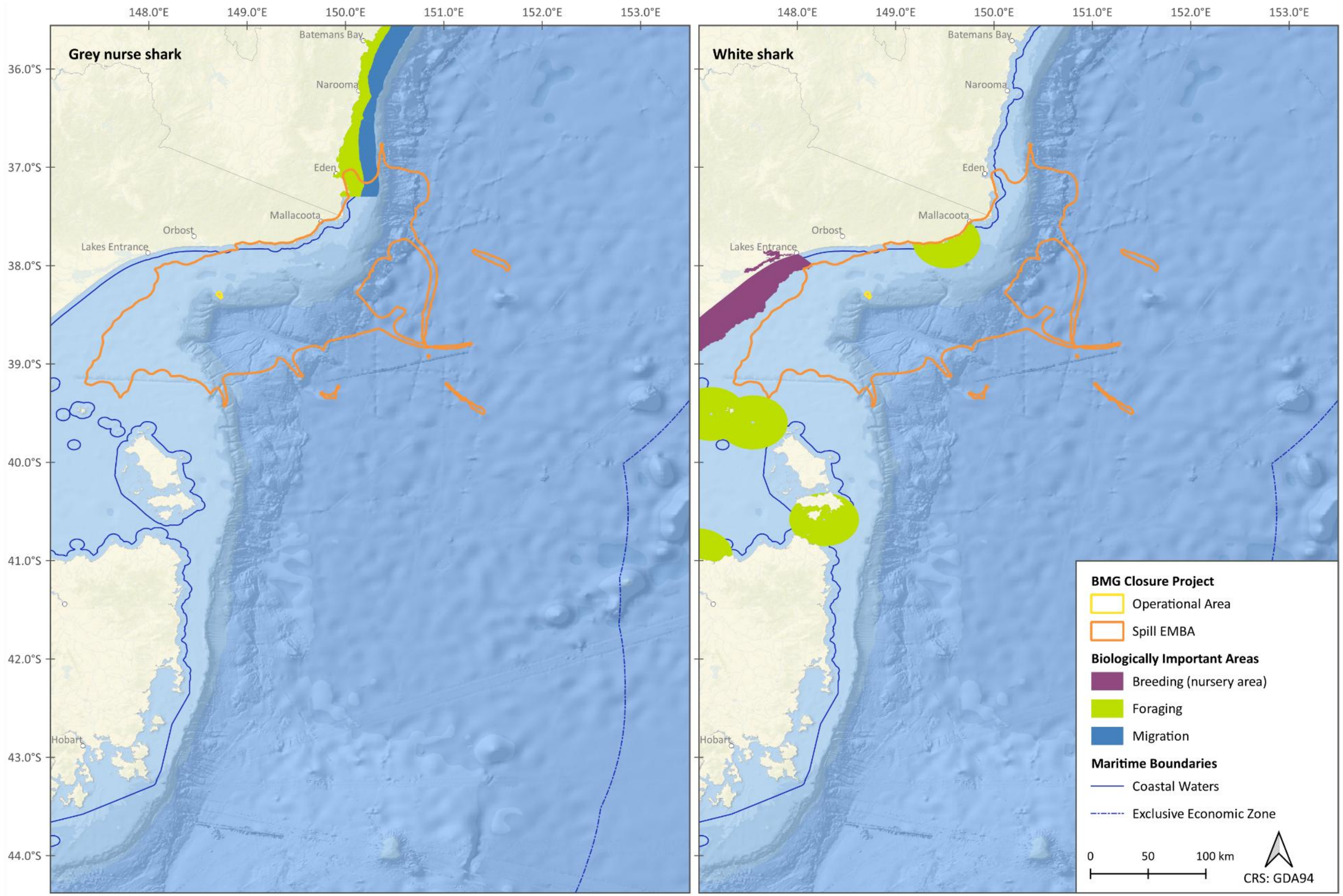


Figure 4-2 - BIAs for Grey Nurse Shark (left) and White Shark (right)

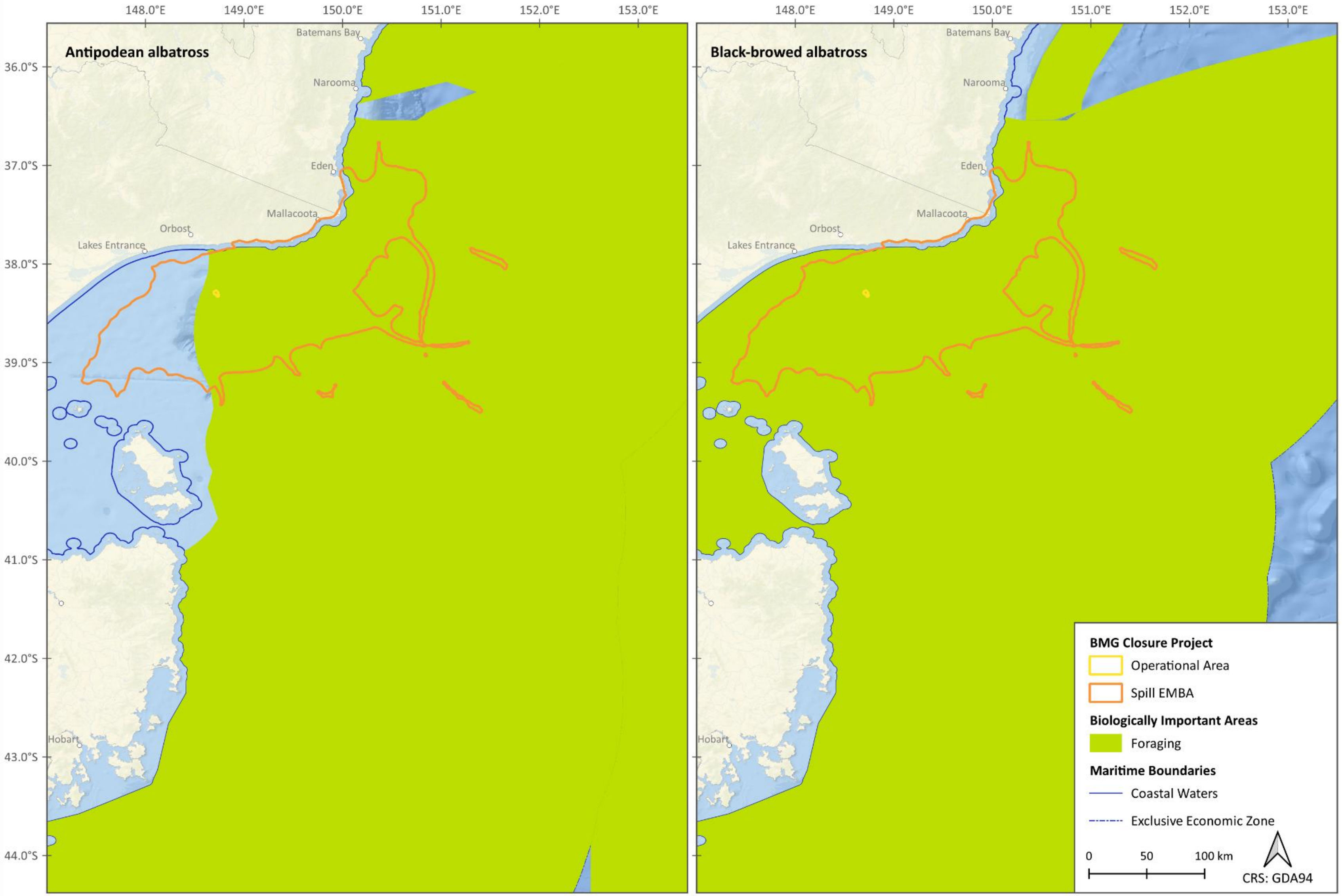


Figure 4-3 - BIAs for Antipodean Albatross (left) and Black-Browed Albatross (right)

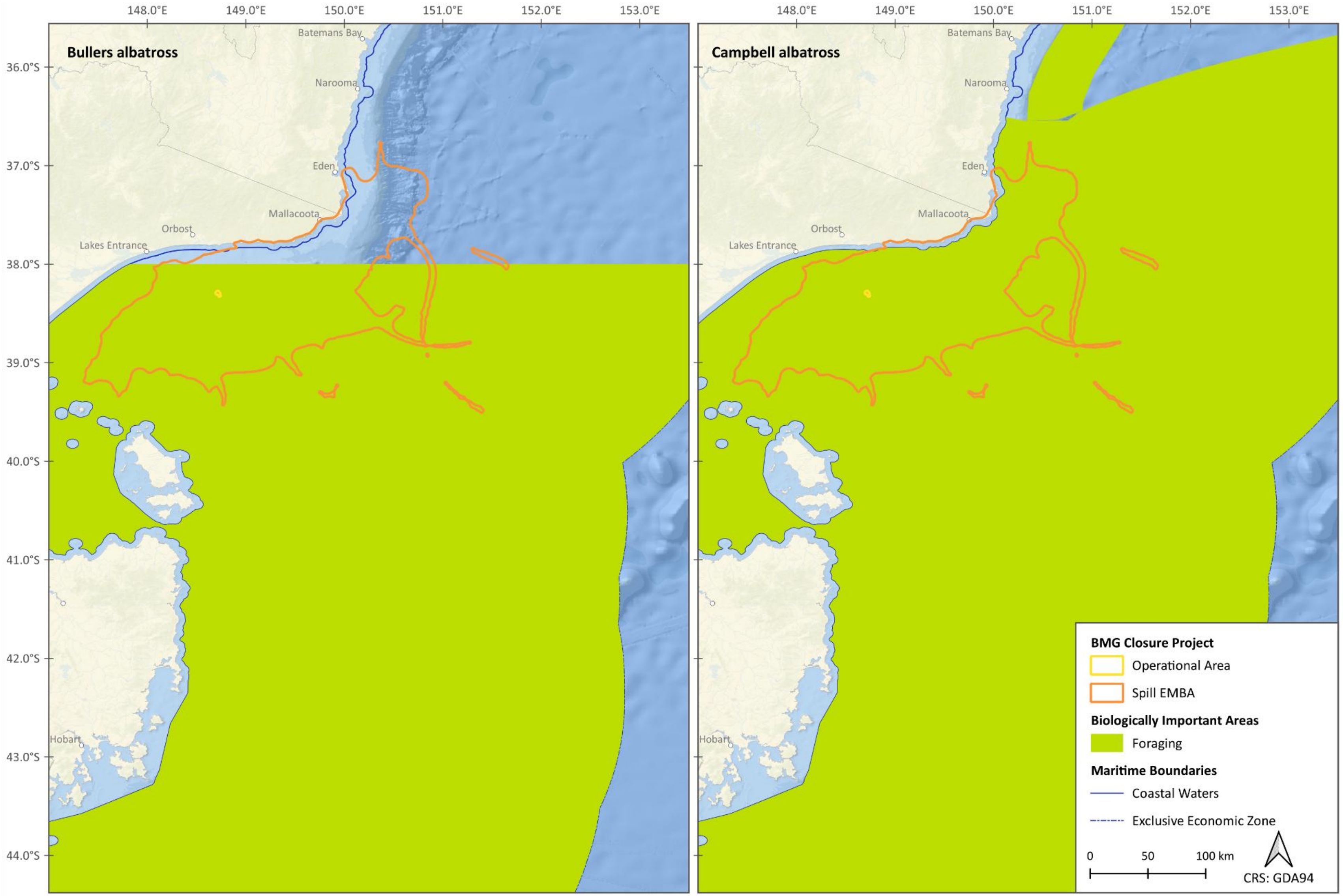


Figure 4-4 - BIAs for Bullers Albatross (left) and Campbell Albatross (right)

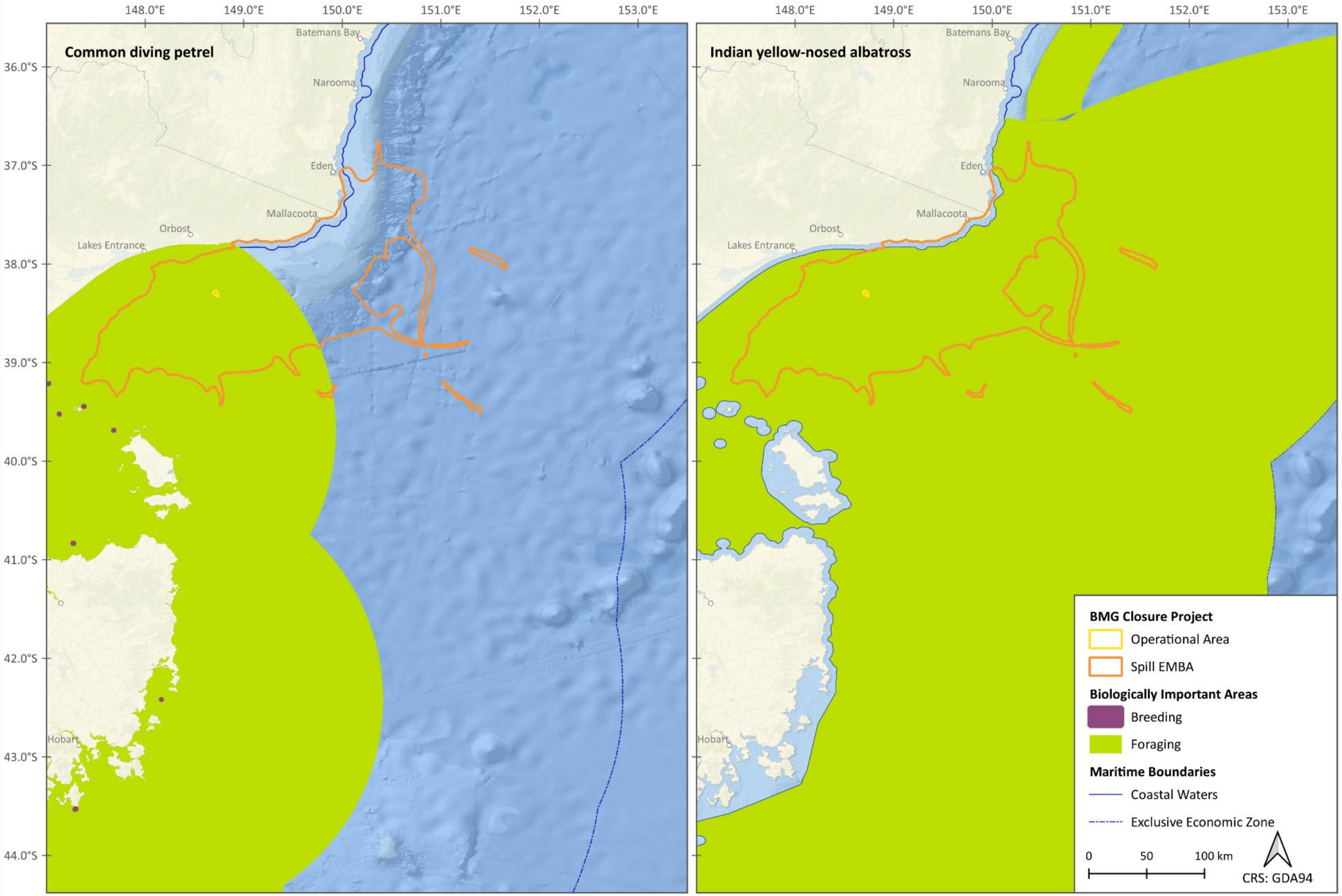


Figure 4-5 - BIAs for Common Diving Petrel (left) and Indian Yellow-nosed Albatross (right)

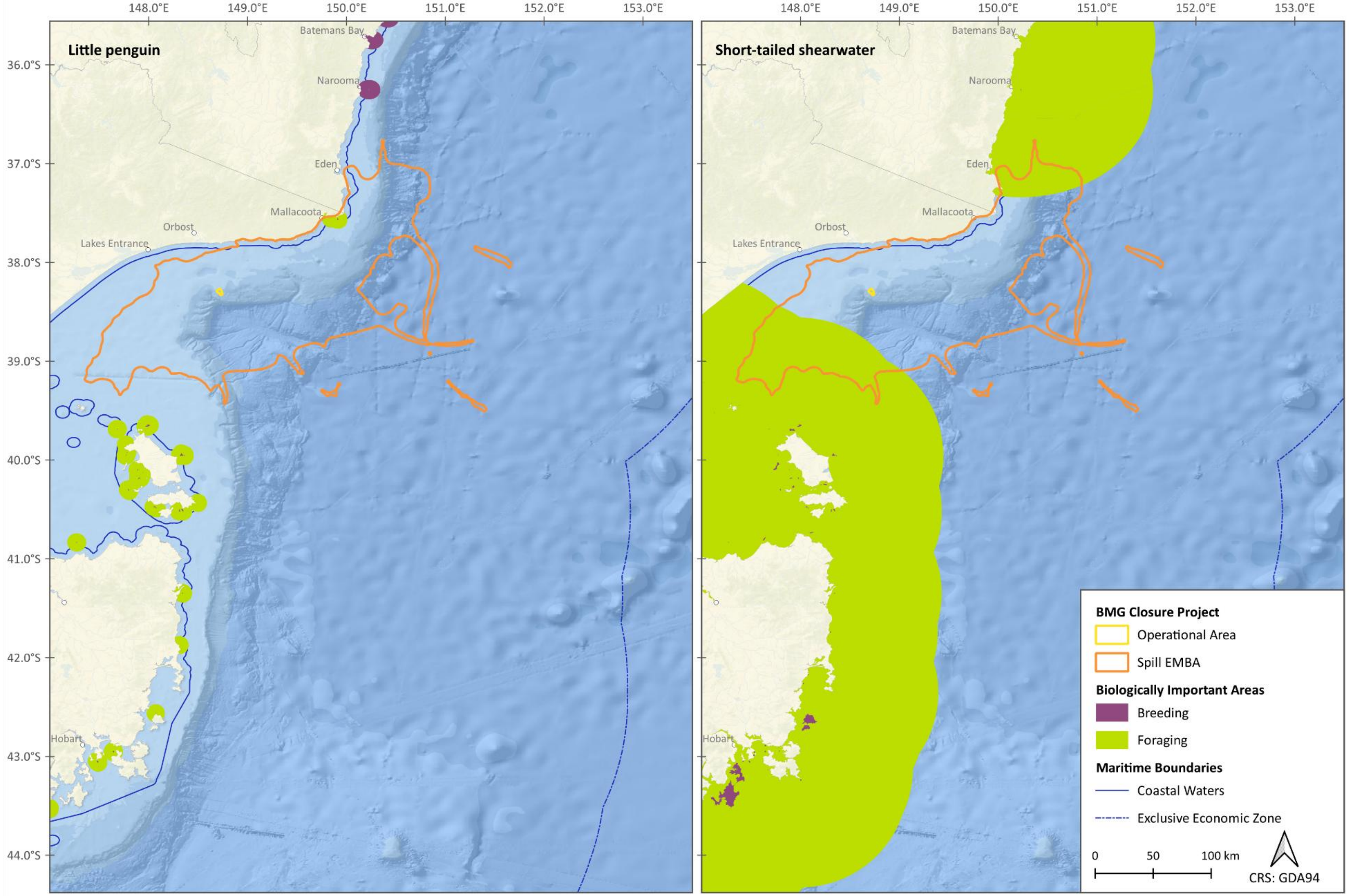


Figure 4-6 - BIAs for Little Penguin (left) and Short-tailed Shearwater (right)

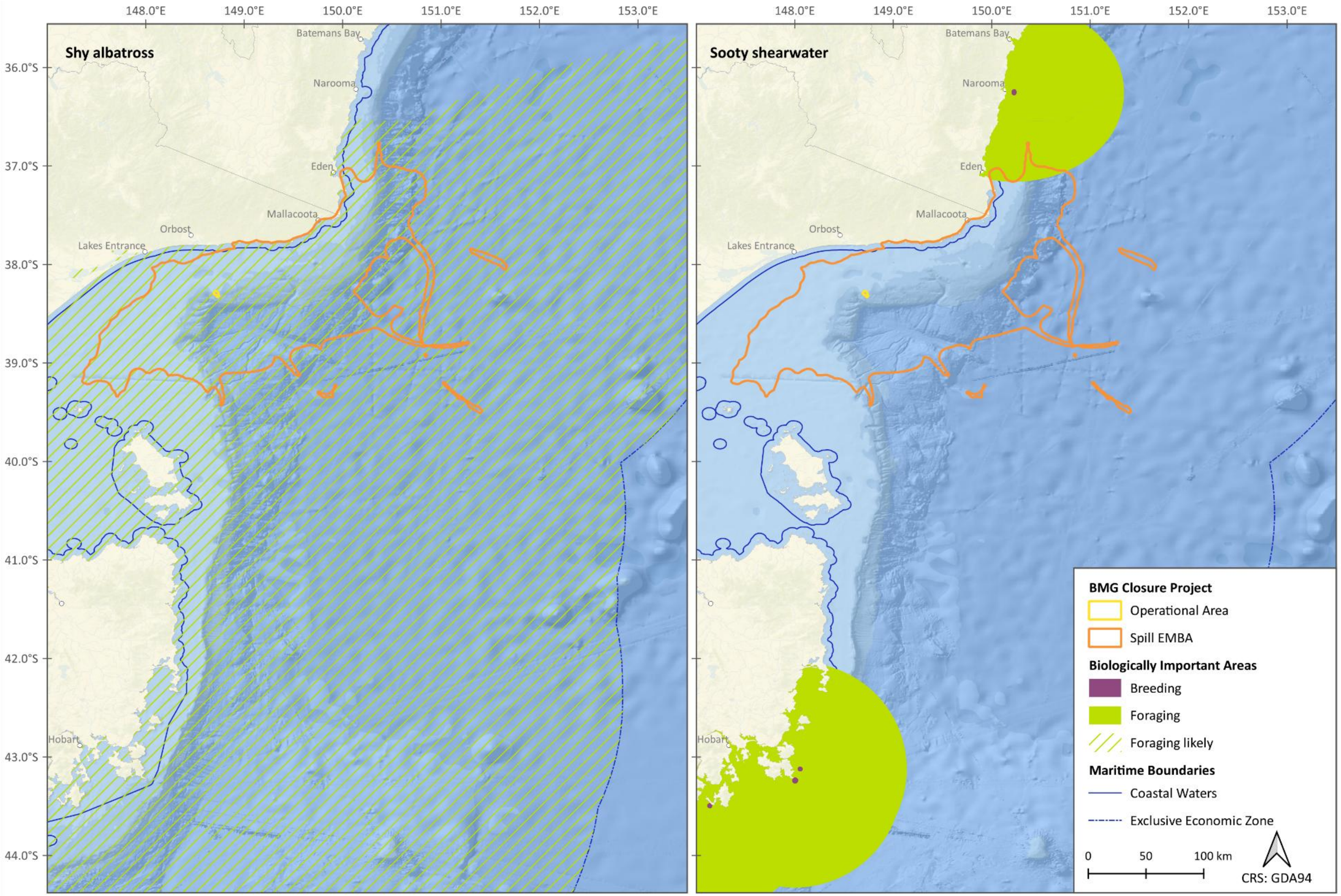


Figure 4-7 - BIAs for Shy Albatross (left) and Sooty Shearwater (right)

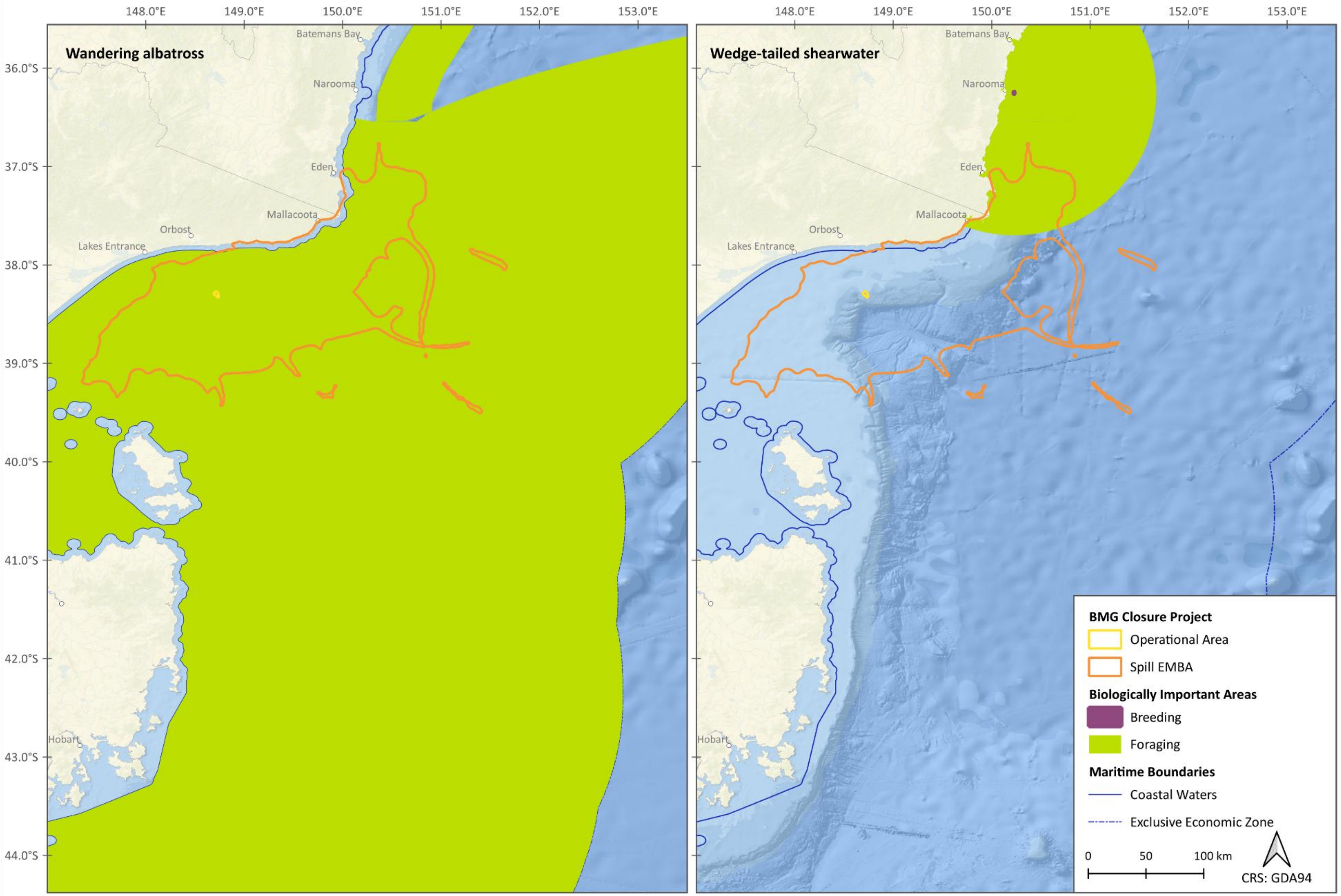


Figure 4-8 - BIAs for Wandering Albatross (left) and Wedge-tailed Shearwater (right)

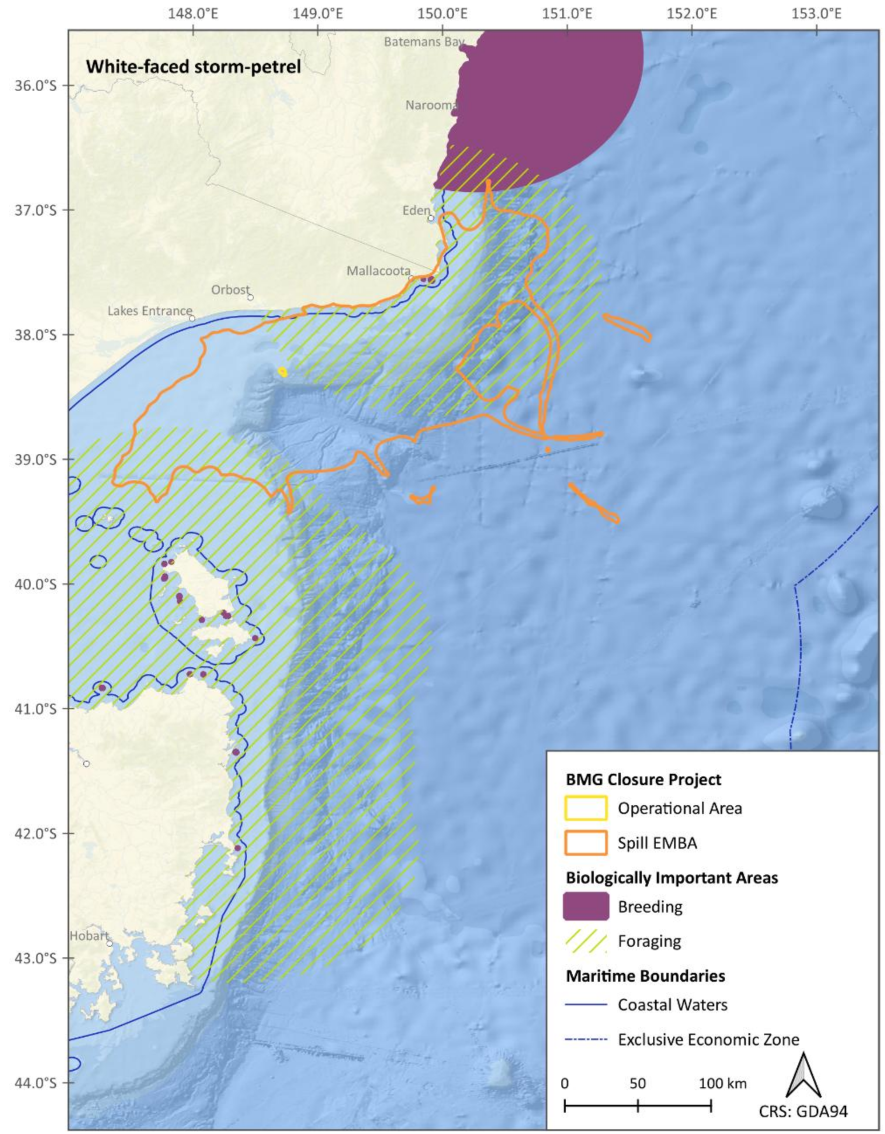


Figure 4-9 - BIAs for White-faced Storm-petrel

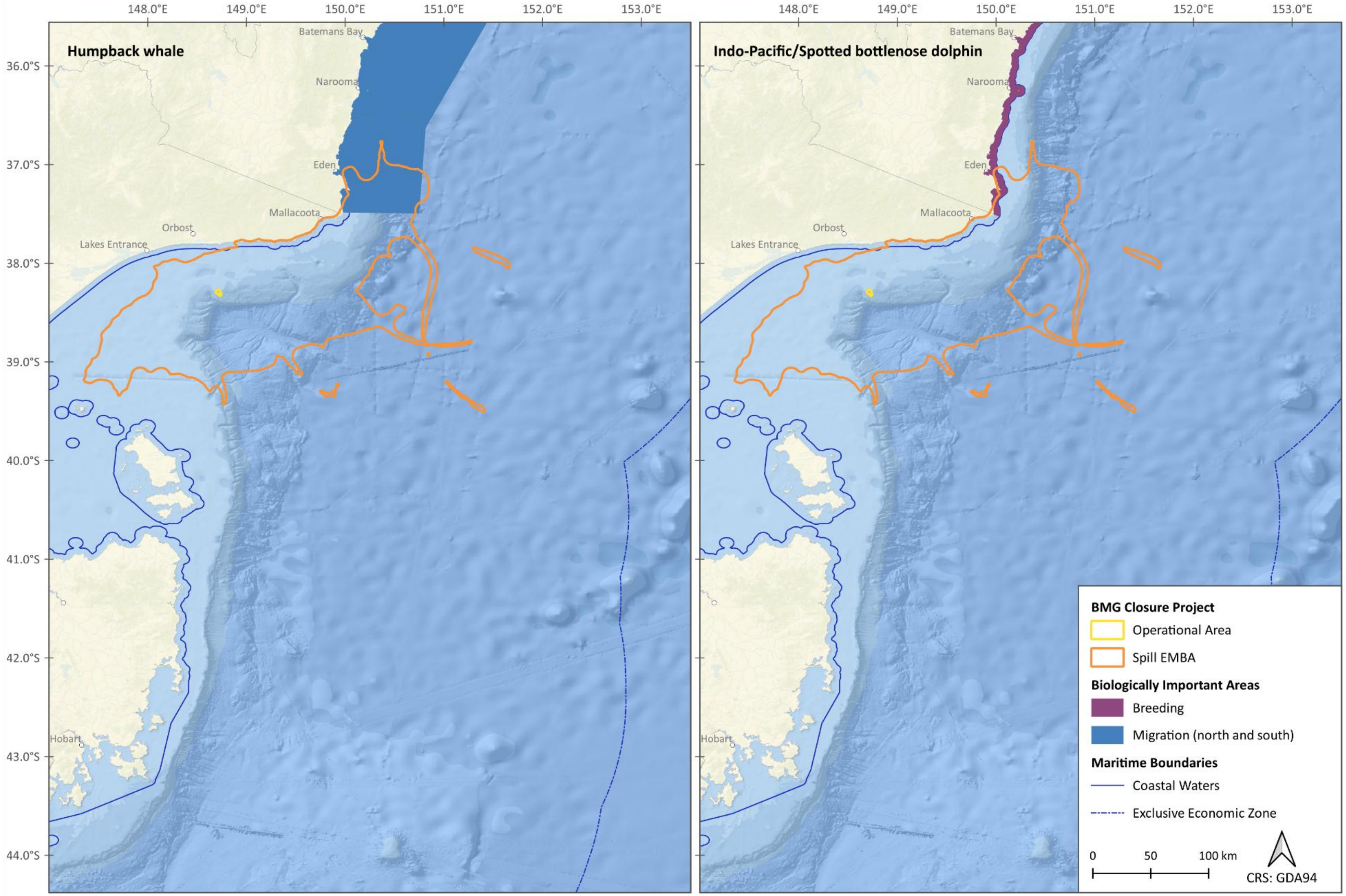


Figure 4-10 - BIAs for Humpback Whale (left) and Indo-Pacific/Spotted Bottlenose Dolphin (right)

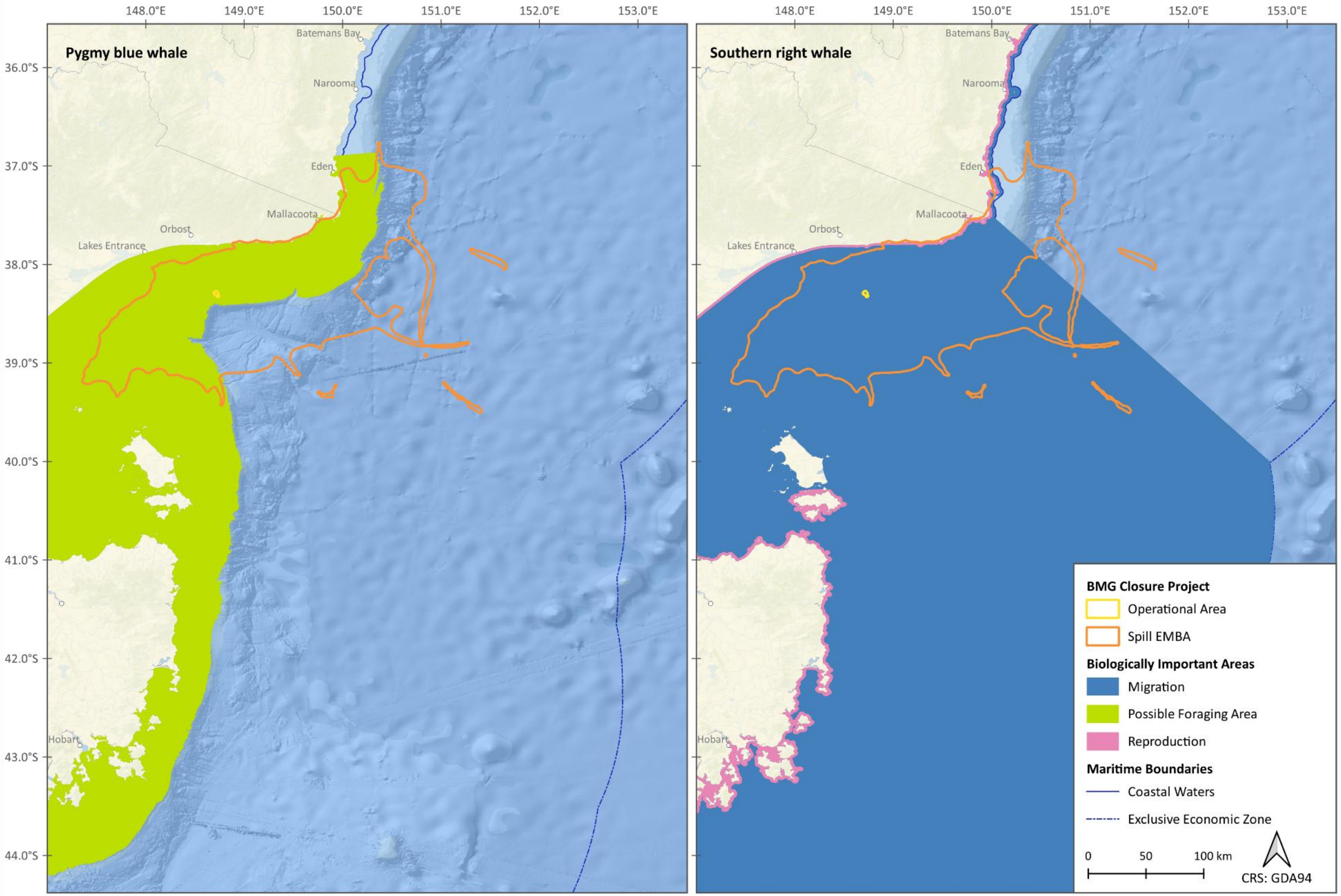


Figure 4-11 - BIAs for Pygmy Blue Whale (left) and Southern Right Whale (right)

4.4.2 Social Receptors

Table 4-3 - Presence of Social Receptors within the Operational Area and EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[6]		Spill EMBA[7]	
Socio-ecological System	Commonwealth Marine Area	KEFs	High productivity (includes episodic productivity)	✓	**Present** The Operational intersects the Upwelling East of Eden KEF (Figure 4-12). The Upwelling East of Eden KEF is an area of episodic upwelling known for high productivity and aggregations of marine life, including blue whales, humpback whales, seals, sharks and seabirds (Appendix 2, Section 4.6). Detailed existing environment descriptions of KEFs are described in Appendix 2, Section 4.6.	✓	**Present** The Spill EMBA intersects two KEFs (Appendix 3): • Big Horseshoe Canyon • Upwelling East of Eden (Figure 4-12). There are three other KEFs known to occur in the South-East Marine Region, but shapefiles are not available that spatially define these KEFs (DotE, 2015b) . Two of these KEFs may also intersect with the Spill EMBA: • Bass Cascade • Shelf rocky reefs and hard substrates. Detailed existing environment descriptions of KEFs are in Appendix 2, Section 4.6.
			Aggregations of marine life	✓		✓	
			High biodiversity	✓		✓	
			High level of endemism	–		–	
			Unique Habitat	–		–	
		AMPs	• Aggregations of marine life • High productivity and biodiversity • Unique habitat	–	**Not Present** No AMPs were identified within the Operational Area (Appendix 3).	✓	**Present** The Spill EMBA intersects with one AMP: • East Gippsland (Figure 4-12). Detailed existing environment descriptions of these AMPS within the Spill EMBA is described in Appendix 2, Section 4.3.

[6] Combination of an EPBC Act PMST report for the Operational Area, and characteristics of the Gippsland environmental sector described in Appendix 2, have been used to describe social receptors that may occur within the Operational Area.

[7] Combination of an EPBC Act PMST report for the Spill EMBA area, and characteristics of the Gippsland and Bass Strait environmental sectors described in Appendix 2, have been used to describe social receptors that may occur within the Spill EMBA.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
	State Parks and Reserves	Marine Protected Areas	• Aggregations of marine life • High productivity • Biodiversity	–	**Not Present** The Operational Area does not overlap any State marine protected areas (Appendix 3).	✓	**Present** The Spill EMBA intersects two State marine protected areas: • Cape Howe Marine National Park (VIC) • Point Hicks Marine National Park (VIC). Detailed existing environment descriptions of these marine protected areas are within in Appendix 2, Section 4.5.1.
		Terrestrial Protected Areas	• Aggregations of terrestrial life • High productivity • Biodiversity	–	**Not present** The Operational Area does not intersect coastal or onshore environment.	✓	**Present** The Spill EMBA intersects with two State terrestrial protected areas: • Cape Conran Coastal Park (VIC) • Croajingolong National Park (VIC). Detailed existing environment descriptions of Terrestrial Protected Areas within the Spill EMBA is described in Appendix 2, Section 4.5.2.
	Wetlands	Ramsar wetlands (International Importance)	Aggregation, foraging and nursery habitat for marine life	–	**Not present** The Operational Area does not intersect coastal or onshore environments.	–	**Not present** The Spill EMBA does not intersect with any Ramsar wetlands (Appendix 3).
		Nationally Importance Wetlands	Aggregation, foraging and nursery habitat for marine life	–	**Not present** The Operational Area does not intersect coastal or onshore environments.	✓	**Present** The Spill EMBA intersects six nationally important marine and coastal zone wetlands: • Nadgee Lake and tributary wetlands (NSW) • Mallacoota Inlet wetlands (VIC) • Benedore River (VIC) • Thurra River (VIC) • Tamboon Inlet wetlands (VIC)

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
							• Sydenham Inlet wetlands (VIC). Detailed existing environment descriptions of these National Important Wetlands are described in Appendix 2, Section 4.4.2.
	Heritage	Underwater Heritage	Historic significance	–	**Not present** One historic shipwreck, the *Result* (shipwreck identification number 6550), which was shipwrecked in 1880 recorded to have occurred within the Bass Strait, in the vicinity BMG at latitude -38.29, longitude 148.71. Note, on further enquiry with DCCEEW, the location of this shipwreck has been confirmed as unknown and is therefore considered to be no more likely to be near BMG than anywhere else off the coast of Victoria. No other underwater cultural heritage (e.g. aircraft, artefacts, etc.) as protected under the *Underwater Cultural Heritage Act 2018* (Cth) were identified within the Operational Area.	✓	**Present** Several historic shipwrecks were identified within the Spill EMBA. A UCH protection zone for the *SS Federal* also occurs within the Spill EMBA. Detailed existing environment descriptions of the present underwater shipwrecks within the Spill EMBA is described in Appendix 2, Section 5.6.2.
		Cultural	• World Heritage Properties • Commonwealth Heritage Places • National Heritage Places	–	**Not present** The Operational Area does not overlap any World Heritage Properties, Commonwealth Heritage Places or National Heritage Places (Appendix 3).	–	**Not present** The EMBA does not overlap any World Heritage or National Heritage Places (Appendix 3). The PMST report for the Spill EMBA did identify one Commonwealth Heritage Place, the Gabo Island Lighthouse. However, while Gabo Island is within the Spill EMBA, the lighthouse itself does not have a marine/coastal interface, and as such is not considered to be within the EMBA by hydrocarbon. Detailed existing environment descriptions of the culture heritage places with a marine or coastal interface are described in Appendix 2, Section 5.6.3.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
		First Nations	Indigenous use or connection	✓	**Present** Sea Country is not distinguishable from land-based Country to First Nations Peoples. Water is of particular cultural significance to First Nations Peoples as an integral part of songs, ceremonies, and other activities. Research by Holdgate et al. (2003) indicates the offshore Gippsland area was subject to a maximum sea-level fall of ~120 m below present, which indicates the BMG infrastructure area would have been submerged by a minimum of ~15–150 m in the past (current water depth range is ~135–270 m). Therefore, it is unlikely any tangible First Nations cultural heritage sites would exist within the Operational Area. During consultation in preparation of Revision 3 of this EP (accepted 13/2/24) with the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC), the potential to use existing geophysical data to better map the shallow offshore areas was discussed with an aim of improving submerged archaeological knowledge, but the existence of any known submerged tangible cultural heritage sites was not raised. During more recent consultation with GLaWAC, a request to share any data on local species and the seabed was discussed for the purpose of supporting their Sea Country IPA planning, and a relevant paper (Ierodiaconou, et al., 2021) was shared accordingly. No Indigenous protected areas (IPAs) or Native Titles were identified within the Operational Area.	✓	**Present** The coastal area of southeast Australia was amongst the most densely populated regions of pre-colonial Australia. Through cultural traditions, First Nations Peoples maintain their connection to their ancestral lands and waters. The Gunaikurnai are recognised as the Traditional Custodians of the lands and waters within the greater Gippsland region. The Gunaikurnai People have an approved non-exclusive Native Title area extending from West Gippsland in Warragul, east to the Snowy River and north to the Great Dividing Range; and 200 m offshore. The GunaiKurnai People are represented by the GLaWAC. The coastal area in East Gippsland Shire to the east of the Gunaikurnai RAP has not been the subject of a successful Native Title claim or RAP application to date, so no such formally recognised organisations are present in this area. However, anecdotally, numerous small clans of Traditional Owners are known to be present in the area. No existing IPAs were identified within the EMBA, however, the GLaWAC have commenced the process of establishing a Sea Country IPA along the entire Gippsland Coast from Nanjet to Mallacoota. The local First Nations peoples spiritual connection, and practical symbiotic relationship with marine mammals has been shared by local knowledge holders. Detailed existing environment descriptions of the Indigenous heritage within the Spill EMBA is described in Appendix 2,, Section 5.6.1.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
					Detailed existing environment descriptions of the Indigenous heritage is described in Appendix 2, Section 5.6.1.		
Socio-ecological System	Commercial Fisheries	Commonwealth managed	Economic benefit	✓	**Present** Fishing effort over a five-year period (2020–2024) (ABARES, 2025) was recorded within the 1 degree (~60 nm) graticular block that overlaps the Operational Area for the following Commonwealth managed commercial fisheries: • Bass Strait Central Zone Scallop Fishery (Figure 4-13) • Small Pelagic Fishery (Figure 4-14) • Southern Squid Jig Fishery (Figure 4-15) • SESSF (Figure 4-16, Figure 4-17, Figure 4-18). Note: As shown in the figures, except for some of the sectors of the SESSF, the relative intensity shading representing fishing effort is outside of the Operational Area. According to a study undertaken by SETFIA and Fishwell Consulting (2021), though multiple different fisheries have rights to fish around BMG, it is only the SESSF managed fisheries that actively fish around BMG infrastructure. Detailed existing environment descriptions of the Commonwealth fisheries that may be active within the Operational Area are described Appendix 2, Section 5.1.1.	✓	**Present** The Spill EMBA overlaps with seven Commonwealth managed fisheries, of which the following six have reporting fishing effort over the previous five-year (2020-2024) period within the Spill EMBA: • Bass Strait Central Zone Scallop Fishery (Figure 4-13) • Eastern Tuna and Billfish Fishery (Figure 4-13) • Southern Bluefin Tuna Fishery (Figure 4-14) • Small Pelagic Fishery (Figure 4-14) • Southern Squid Jig Fishery (Figure 4-15) • SESSF (Figure 4-16, Figure 4-17, Figure 4-18). Detailed existing environment descriptions of the Commonwealth fisheries within the Spill EMBA is described Appendix 2, Section 5.1.1.
		State Managed – Victoria	Economic benefit	✓	**Present** The management areas for several Victorian State-managed commercial fisheries intersect with the Gippsland environmental sector (Section 5.1.2 of	✓	**Present** The management areas for several State (Victoria, NSW, and Tasmania) commercial fisheries intersect with the Gippsland and Bass Strait environmental sectors
		State Managed – NSW		–		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
		State Managed – Tasmania		–	Appendix 2). However, a previous review of commercial fishing catch data within the vicinity of BMG indicates that no State-managed fisheries are active (SETFIA and Fishwell Consulting, 2021). Note: The existing PSZ around the remaining BMG infrastructure would preclude fishing activity within the direct area. Detailed existing environment descriptions of the State fisheries that may be active within the broader vicinity of Operational Area (and Gippsland environmental sector) are described Appendix 2, Section 5.1.2.	✓	(Appendix 2) and overlap the Spill EMBA. Detailed existing environment descriptions of the State fisheries that may occur within the Spill EMBA are described Appendix 2, Section 5.1.2.
	Recreational Fisheries	State-managed	• Community • Recreation	✓	**Present** Most recreational fishing typically occurs in nearshore coastal waters (shore or inshore vessels) and within bays and estuaries. Recreational fishing activity is expected to be minimal in the Operational Area. Note, the existing PSZ around operational infrastructure would preclude fishing activity within the direct area. Detailed existing environment descriptions of the recreational fisheries within the Operational Area is described Appendix 2,, Section 5.2.	✓	**Present** Most recreational fishing typically occurs in nearshore coastal waters, and within bays and estuaries; offshore (>5 km) fishing only accounts for approximately 4% of recreational fishing activity in Australia. The East Gippsland waters have a moderate fishing intensity (relative to other areas within the South-East Marine Region). Detailed existing environment descriptions of the recreational fisheries within the Spill EMBA is described Appendix 2,, Section 5.2.
	Recreation and Tourism	Victoria	• Economic benefit • Community • Recreation	–	**Not present** Marine-based recreation and tourism is unlikely to occur within the Operational Area, given approximately distance (50 km) offshore, existing PSZs and water depths ranging between 135 m to 270 m.	✓	**Present** The Australian coast provides a diverse range of recreation and tourism opportunities, including scuba diving, charter boat cruises, and surfing. In East Gippsland, primary tourist locations include Marlo, Cape Conran, Lakes Entrance and Mallacoota. The area

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
							is renowned for its nature-based tourism, recreational fishing and water sports. Detailed existing environment descriptions of recreation and tourism that may occur within the Spill EMBA is described Appendix 2, Section 5.4.
	Coastal Settlements	Victoria	• Economic benefit • Community engagement • Recreation	–	**Not present** The Operational Area does not intersect coastal and onshore environments.	✓	**Present** The communities of Lakes Entrance, Mallacoota and Marlo (within the Shire of East Gippsland) are the closest coastal settlements to the BMG assets. Other coastal communities, such as Eden (NSW) are also important towns which support several communities. The closest heavily populated urban areas to the Spill EMBA are Melbourne and Sydney. Detailed existing environment descriptions of coastal settlements are in Appendix 2, Section 5.3.
	Industry	Shipping	• Community engagement • Economic benefit	✓	**Present** The south-eastern coast is one of Australia's busiest in terms of shipping activity and volumes. However, the BMG assets do not coincide with major routes with higher volumes of traffic located to the south of the infrastructure. Detailed existing environment descriptions of shipping within the Operational Area is described Appendix 2, Section 5.5.	✓	**Present** The south-eastern coast is one of Australia's busiest in terms of shipping activity and volumes. There are several local ports adjacent to the Spill EMBA, such as Eden and Gippsland Lakes, which support commercial and recreational fishing industries. Detailed existing environment descriptions of shipping within the Spill EMBA is described Appendix 2, Section 5.5.
		Energy Development Areas	Economic benefit	–	**Not Present** The petroleum activity is within Amplitude Energy's VIC/RL13 permit and incorporates the gazetted PSZs (Figure 3-1).	✓	**Present** Petroleum infrastructure in Gippsland Basin is well developed, with a network of pipelines transporting hydrocarbons produced offshore to onshore petroleum processing facilities at Longford and Orbost. Oil and gas development, operation, and decommissioning projects

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area [6]		Spill EMBA [7]	
							are ongoing within the Gippsland region; Table 4-5 describes those within proximity to BMG. The ATBA under the OPGGS Act occurs to the east of the Operational Area (Figure 3-1) bus is within the Spill EMBA. The Gippsland and Bass Strait regions were identified as priority areas for offshore wind development. There are two declared Offshore Renewable Energy Infrastructure Areas (OEI-01-2022 Part 1 and Part 2) that intersect with the Spill EMBA. Within these two zones, there are eight active feasibility licences. Detailed existing environment descriptions of energy development areas within the Spill EMBA is described Appendix 2, Sections 5.5.2 and 5.5.3.
		Submarine Cables and Pipelines	• Economic benefit • National utilities	–	**Not present** No cables or pipelines occur within the Operational Area	✓	**Present** The Indigo Central submarine cable is present within the Spill EMBA. There are other submarine cables (e.g. the Syndey-Melbourne-Adelaide-Perth) have been proposed or are in development, that may also intersect with the Spill EMBA. Detailed existing environment descriptions of the submarine cables and pipelines that may occur within the Spill EMBA are described Appendix 2, Section 5.5.4.
		Defence	Protection and surveillance	–	**Not present** There are no military areas within the Operational Area.	✓	**Present** The Australian Defence Force conducts a range of training, research activities, and preparatory operations. The closest major base to the BMG assets is the multi-purpose wharf at Twofold Bay; and closest primary training ground is the East Australia Exercise Area in southern NSW.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[6]		Spill EMBA[7]	
							Detailed existing environment descriptions of defence areas within the Spill EMBA is described Appendix 2, Section 5.5.5.

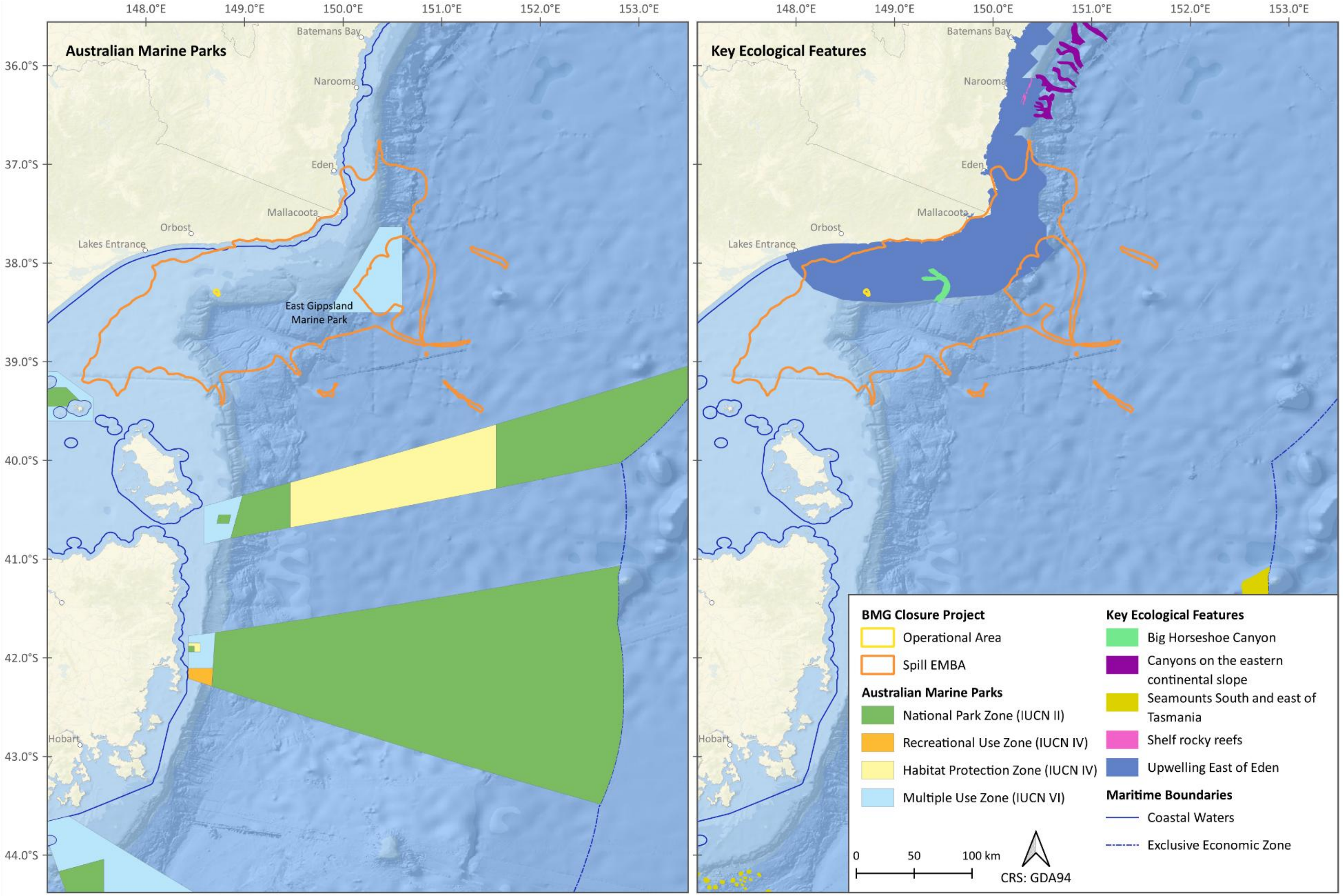


Figure 4-12 - Australian Marine Parks (left) and Key Ecological Features (right)

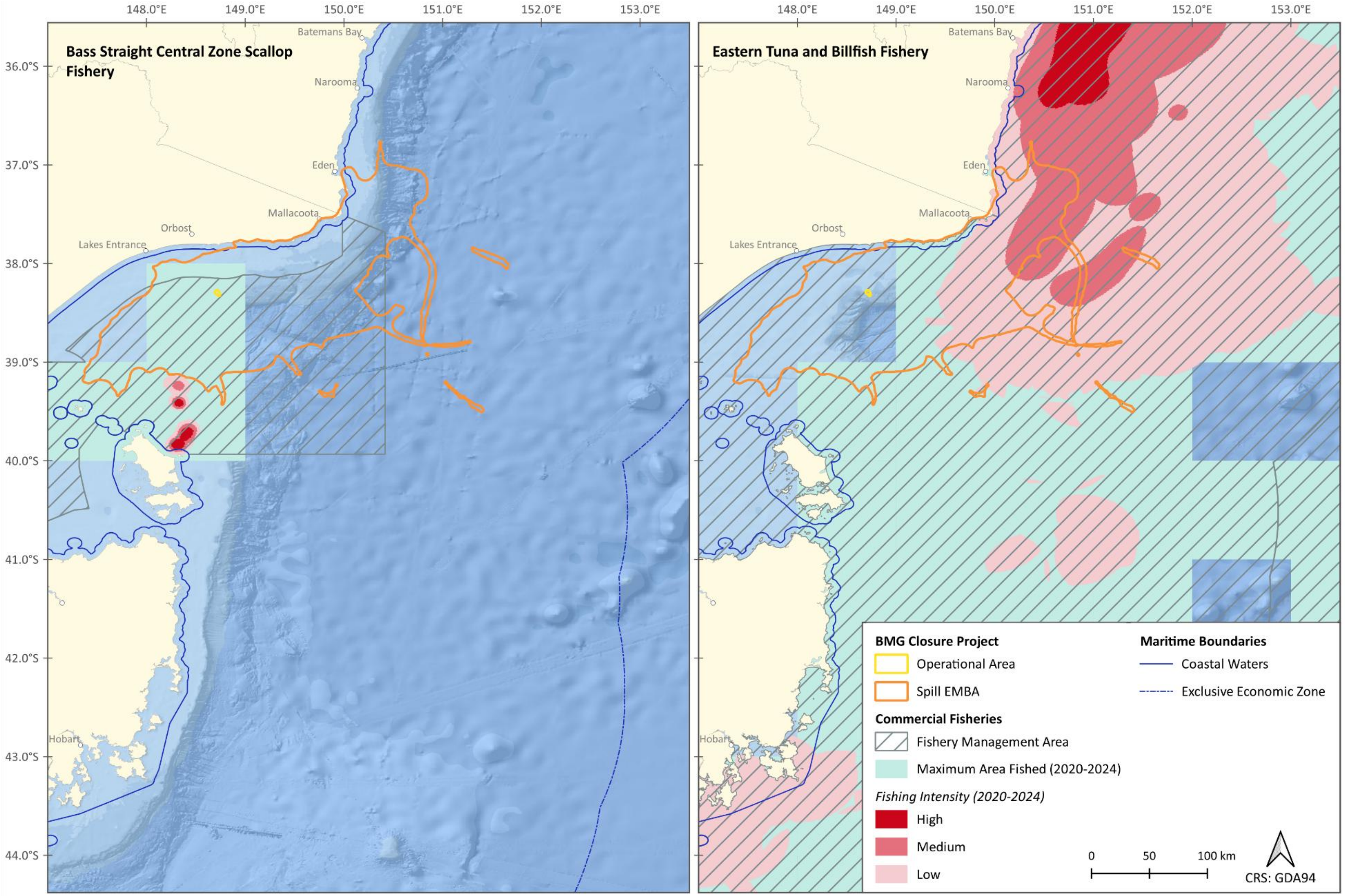


Figure 4-13 - Maximum Area Fished and Relative Fishing Intensity for Bass Straight Central Zone Scallop Fishery (left) and Eastern Tuna and Billfish Fishery (right)

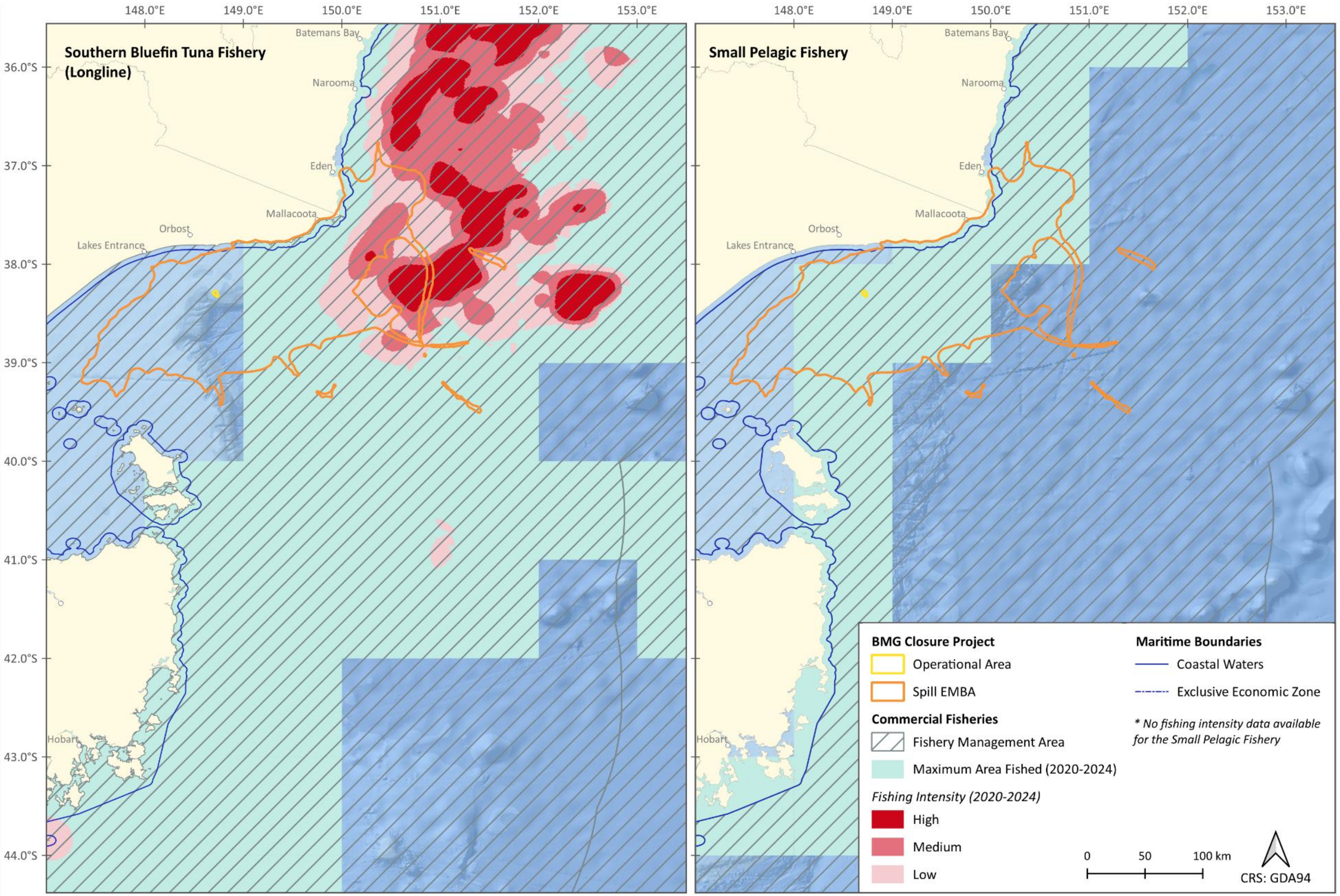


Figure 4-14 - Maximum Area Fished and Relative Fishing Intensity for Southern Bluefin Tuna Fishery (left) and Small Pelagic Fishery (right)

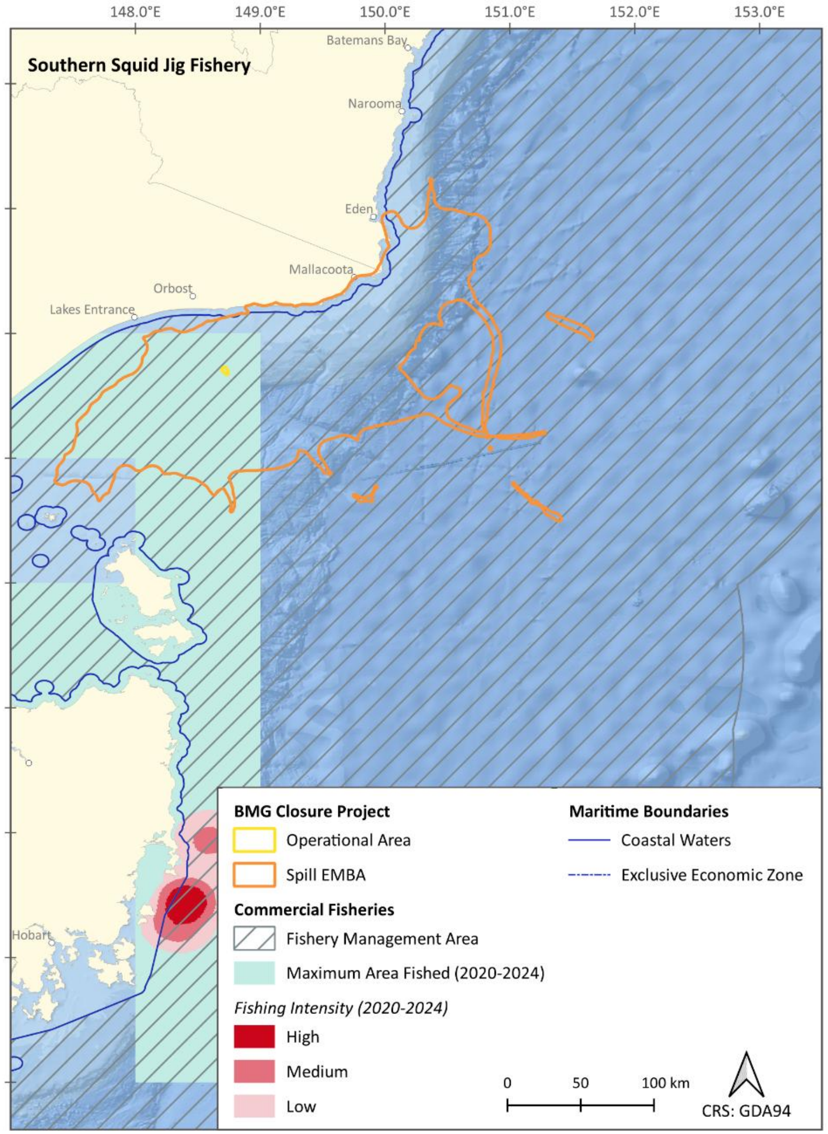


Figure 4-15 - Maximum Area Fished and Relative Fishing Intensity for Southern Squid Jig Fishery

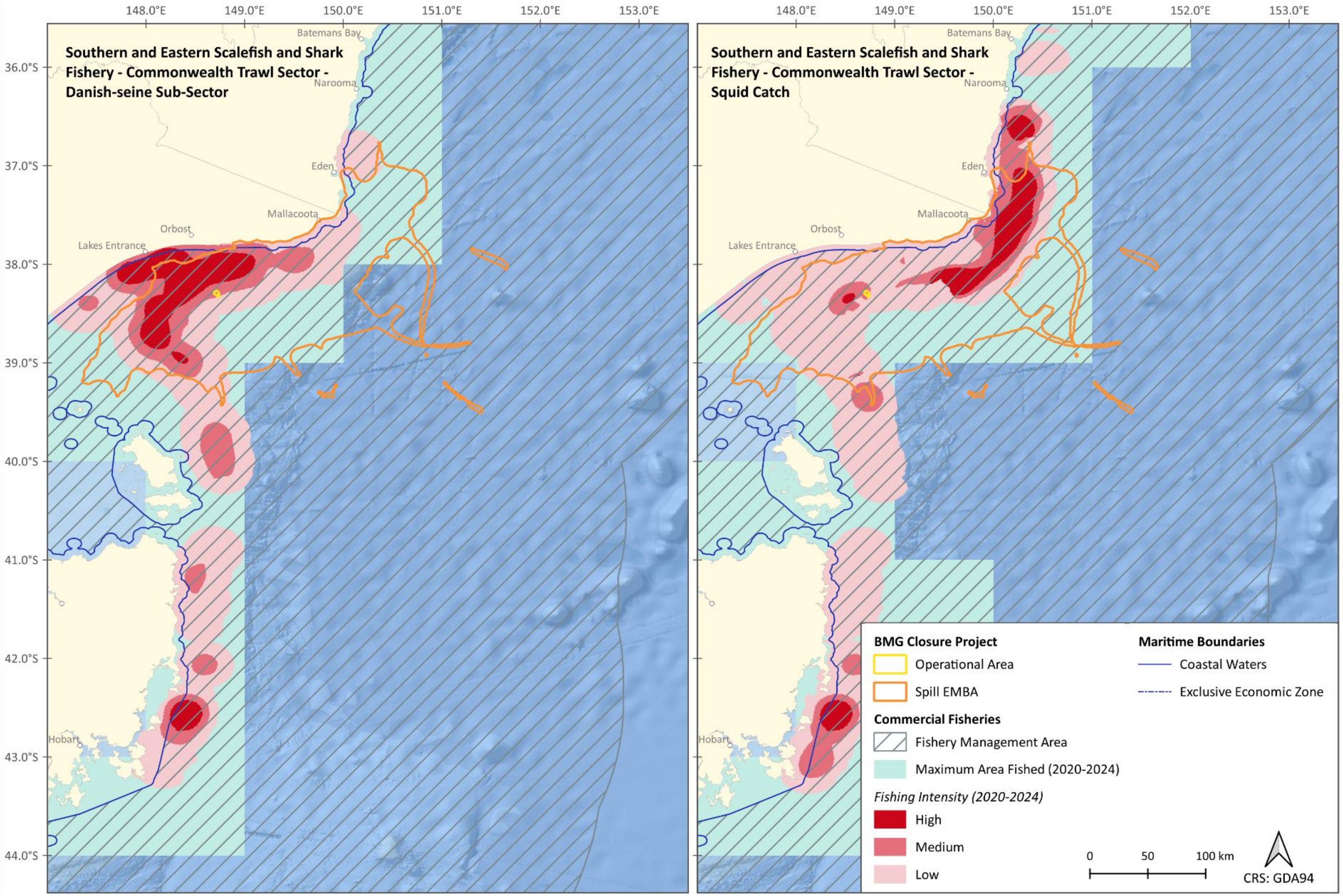


Figure 4-16 - Maximum Area Fished and Relative Fishing Intensity for Southern and Eastern Scalefish and Shark Fishery – Commonwealth Trawl Sector – Danish-seine Sub-Sector (left) and Squid Catch (right)

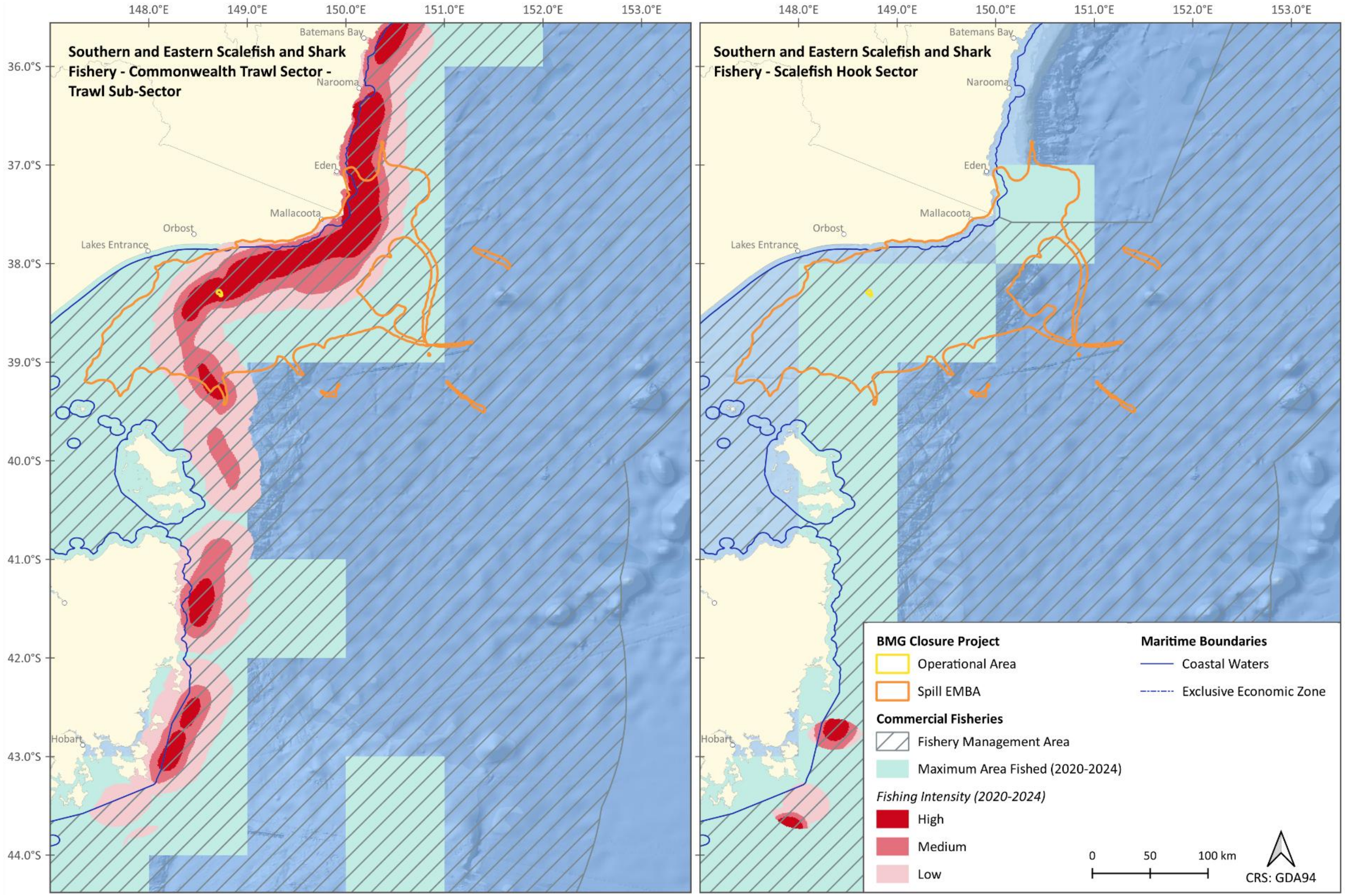


Figure 4-17 - Maximum Area Fished and Relative Fishing Intensity for Southern and Eastern Scalefish and Shark Fishery – Commonwealth Trawl Sector – Trawl Sub-Sector (left) and Scalefish Hook Sector (right)

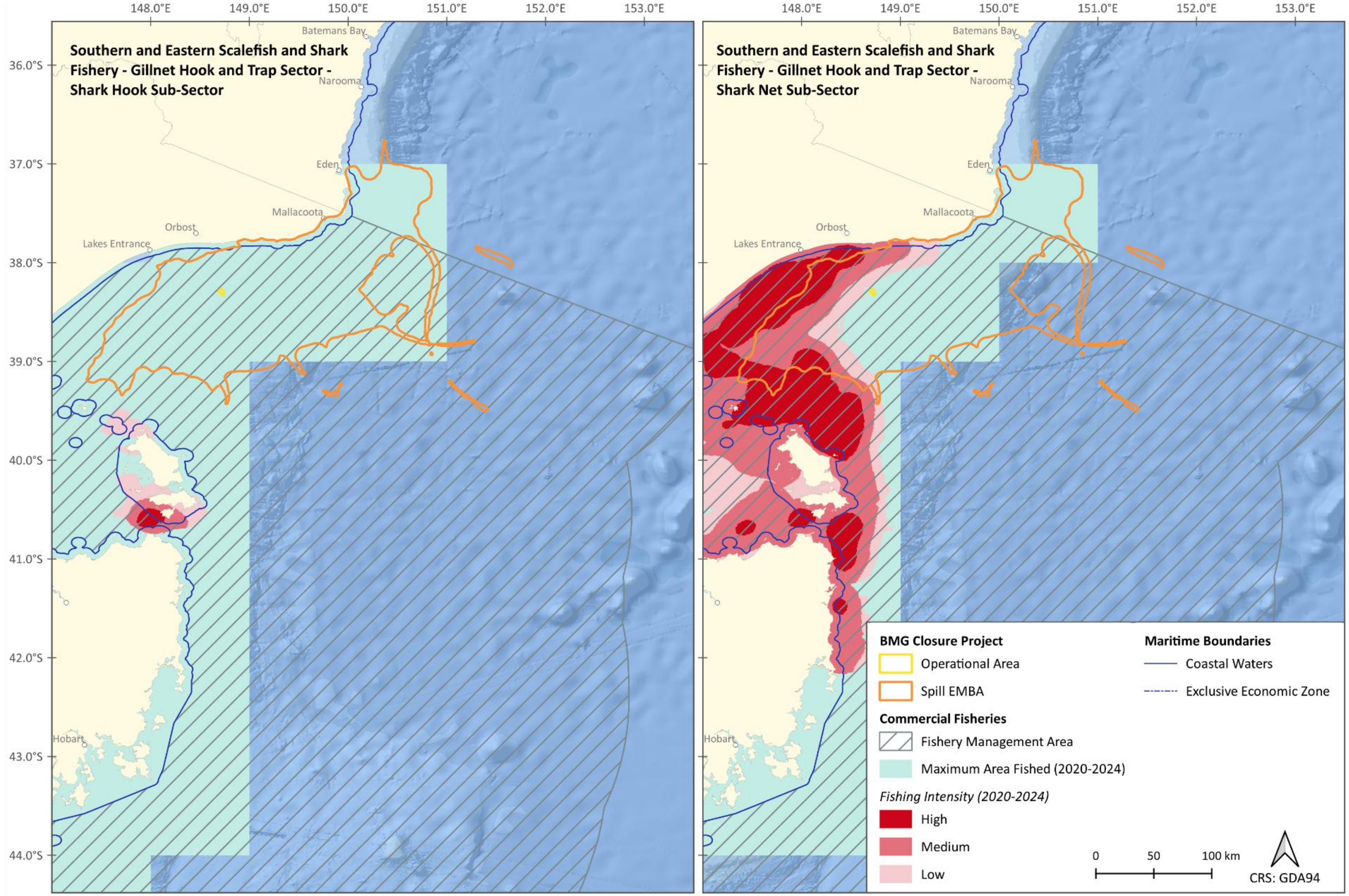


Figure 4-18 - Maximum Area Fished and Relative Fishing Intensity for Southern and Eastern Scalefish and Shark Fishery – Gillnet Hook and Trap Sector – Shark Hook Sub-Sector (left) and Shark Net Sub-Sector (right)

Table 4-4 - Seasonality of Key Sensitivities within the Gippsland Region

<table>
<tr><th>Key Sensitivity</th><th>Significance Status</th><th>Presence</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sept</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td colspan="15">Marine megafauna</td></tr>
<tr><td>White shark</td><td>LT (V), BIA (f)</td><td>Seasonal</td><td></td><td></td><td colspan="8">Distribution (low density)</td><td></td><td></td></tr>
<tr><td>Whale shark</td><td>LT (V)</td><td>Occasional</td><td colspan="12">Species or species habitat may occur</td></tr>
<tr><td>Loggerhead turtle</td><td>LT (E)</td><td>Occasional</td><td colspan="12">Species or species habitat likely to occur</td></tr>
<tr><td>Green turtle</td><td>LT (V)</td><td>Occasional</td><td colspan="12">Species or species habitat likely to occur</td></tr>
<tr><td>Leatherback turtle</td><td>LT (E)</td><td>Occasional</td><td colspan="12">Species or species habitat likely to occur</td></tr>
<tr><td>Sei whale</td><td>LT (V)</td><td>Seasonal</td><td colspan="5">Foraging likely to occur (Dec–May)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Blue whale</td><td>LT (E), BIA (pf)[8]</td><td>Vagrant</td><td></td><td></td><td></td><td colspan="3">Not commonly detected in the region; more likely window of occurrence Apr–June</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Fin whale</td><td>LT (V)</td><td>Seasonal</td><td colspan="5">Foraging likely to occur (Dec–May)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Southern right whale</td><td>LT (E), BIA (m)[8] (r)</td><td>Seasonal</td><td></td><td></td><td></td><td colspan="2">Migration</td><td></td><td></td><td></td><td colspan="3">Migration</td><td></td></tr>
<tr><td colspan="15">Seabirds and shorebirds</td></tr>
<tr><td>Antipodean albatross</td><td>LT (V), BIA (f)[8]</td><td>Transitory</td><td colspan="12">Foraging known to occur all year</td></tr>
<tr><td>Australian fairy tern</td><td>LT (V)</td><td>Transitory</td><td colspan="12">Foraging, feeding or related behaviour likely to occur</td></tr>
<tr><td>Black-browed albatross</td><td>LT (V), BIA (f)[8]</td><td>Seasonal</td><td></td><td></td><td></td><td colspan="6">Present – Foraging BIA</td><td></td><td></td><td></td></tr>
<tr><td>Blue petrel</td><td>LT (V)</td><td>Seasonal</td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="3">Species may occur</td><td></td><td></td><td></td></tr>
<tr><td>Buller’s albatross</td><td>LT (V), BIA (f)[8]</td><td>Seasonal</td><td colspan="4">Foraging BIA and species may occur</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Campbell albatross</td><td>LT (V), BIA (f)[8]</td><td>Seasonal</td><td colspan="12">Foraging BIA and species may to occur</td></tr>
<tr><td>Chatham albatross</td><td>LT (E)</td><td>Transitory</td><td colspan="12">Foraging BIA and species may occur</td></tr>
<tr><td>Common diving petrel</td><td>BIA (f)[8]</td><td>Transitory</td><td colspan="12">Present year-round – foraging BIA</td></tr>
<tr><td>Curlew sandpiper</td><td>LT (CE)</td><td>Seasonal</td><td colspan="3"></td><td></td><td></td><td></td><td></td><td></td><td colspan="4">May occur Sept – Mar</td></tr>
</table>

[8] BIA also occurs within the Operational Area.

Key Sensitivity	Significance Status	Presence	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Eastern curlew	LT (CE)	Transitory	Species or species habitat may occur											
Fairy prion	LT (V)	Seasonal				Species or species habitat may occur								
Gibson’s albatross	LT (V)	Transitory	Species or species habitat likely to occur											
Gould’s petrel	LT (E)	Seasonal	Species or species habitat may occur											
Grey-headed albatross	LT (E)	Seasonal	Species may occur									Species may occur		
Indian yellow-nosed albatross	LT (V), BIA (f)[8]	Seasonal			Foraging BIA, birds present Mar–Jun									
Northern giant petrel	LT (V)	Seasonal					Species or species habitat may occur (May–Oct)							
Northern royal albatross	LT (E)	Transitory	Species or species habitat likely to occur											
Red knot	LT (V)	Seasonal	Species or species habitat likely to occur							Arrive late-Aug and leave by late-Apr				
Salvin’s albatross	LT (V)	Seasonal				Species or species habitat likely to occur (Apr–Aug)								
Shy albatross	LT (E), BIA (fl)[8]	Transitory	Species or species habitat likely to occur, Foraging BIA											
Sooty albatross	LT (V)	Transitory	Species or species habitat likely to occur											
Southern giant petrel	LT (E)	Seasonal				Species or species habitat may occur								
Southern royal albatross	LT (V)	Transitory	Species or species habitat likely to occur											
Wandering albatross	LT (V), BIA(f)[8]	Transitory	Species or species habitat likely to occur, Foraging BIA											
White-bellied storm petrel	LT (V)	Transitory	Species or species habitat likely to occur											
White-capped albatross	LT (V)	Transitory	Species or species habitat likely to occur											
White-faced storm petrel	BIA(f)(b)	Seasonal	Foraging BIA during breeding season			Migrates to tropical and subtropical locations in non-breeding season					Foraging BIA during breeding season			
Conservation														
Upwelling East of Eden	N/A	Sporadic												
Social Receptors														
Southern and Eastern Scalefish and Shark Fishery	N/A	Boats present throughout the year	Active commercial fishers											
Legend		Threatened status:						Type of BIA:						

Key Sensitivity	Significance Status	Presence	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Significance Status: LT – Listed Threatened BIA – Biologically Important Area	(V) – Vulnerable (E) – Endangered (CE) – Critically endangered	(b) – breeding (f) – foraging (fl) – foraging likely (pf) – possible foraging (m) – migration (r) – reproduction
Data Sources EPBC Act PMST Reports (Appendix 3) Description of the Environment [AEL-EN-EMP-0001; Appendix 2] Species Profile and Threats Database (DCCEEW, 2025b)	Definitions Seasonal – presence is seasonal i.e. based on overwintering or breeding seasons Transitory – presence is likely to be due to species moving through the area on transit to another location Occasional – presence has been recorded	

Table 4-5 - Approved and Proposed Petroleum Activities within ~30 km of the Operational Area (as at end-March 2026)

Operator	EP Name	EP Status	Indicative Location	Indicative Timing	Petroleum Activity	Potential for interaction with BMG Phase 2
Amplitude Energy	Gippsland Offshore Operations	Accepted	VIC/RL16, VIC/L32	Ongoing	• NPP for Patricia Baleen • Ongoing operations for Sole • IMR	Possible (unlikely) interaction: • Potential for temporal overlap in activities from late-2027 • ~20–30 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel sources from both activities.
Emperor Energy	Judith-2 Exploration Drilling	Under assessment	VIC/P47	Between January 2026 to December 2027	• Geophysical and geotechnical surveys • Exploration drilling	Possible (unlikely) interaction: • Potential for temporal overlap in activities in late-2027 • ~15–20 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel/MODU sources from both activities.

Operator	EP Name	EP Status	Indicative Location	Indicative Timing	Petroleum Activity	Potential for interaction with BMG Phase 2
Esso Australia	Gippsland Basin Decommissioning Campaign #1 Execution	Under assessment	VIC/L2, VIC/L5, VIC/L7, VIC/L11, VIC/L13, VIC/L14, VIC/L15, VIC/L17	Between Q3 2026 and Q1 2028	• Decommissioning (removal of platform topsides and jackets) at the following facilities: Kingfish A, Kingfish B, West Kingfish, Mackerel, Flounder, Fortescue, Whiting, Dolphin, Perch, Bream A, Bream B, Halibut and Cobia	Possible (unlikely) interaction: • Potential for temporal overlap in activities from late-2027 to end Q1 2028 • ~10 km to >30 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel sources from both activities and location of both activities at the time.
Esso Australia	Gippsland Basin Decommissioning Campaign #1A Execution	Under assessment	VIC/L1, VIC/L2, VIC/L5, VIC/L7, VIC/L11, VIC/L13, VIC/L14, VIC/L15, VIC/L17, VIC/L18,	Between 2028 and 2031	• Decommissioning (removal of umbilicals, flexibles and associated subsea property)	Possible (unlikely) interaction: • Potential for temporal overlap in activities from late-2027 onwards • ~10 km to >30 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel sources from both activities and location of both activities at the time.
Esso Australia	Jack-Up Turrum Phase 3 Drilling	Accepted	VIC/L3	Between Q3 2025 and end-2027	• Production drilling	Not expected: • Activities commenced December 2025 • Based on estimated duration of ~300 days in the EP, activities are expected to be complete by late-2026; therefore, no potential for interaction with BMG Phase 2.
Esso Australia	Gippsland Basin Geophysical and Geotechnical Investigations	Accepted	VIC/L1, VIC/RL1, VIC/L2, VIC/L3, VIC/L4, VIC/L5, VIC/L6, VIC/L7, VIC/L8, VIC/L9, VIC/L10, VIC/L11, VIC/L13, VIC/L14, VIC/L15, VIC/L16, VIC/L17, VIC/L18,	5-year EP period (2025–2030)	• Geophysical and geotechnical surveys	Possible (unlikely) interaction: • Potential for temporal overlap in activities from late-2027 • ~10 km to >30 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel sources from both activities and location of both activities at the time.

Operator	EP Name	EP Status	Indicative Location	Indicative Timing	Petroleum Activity	Potential for interaction with BMG Phase 2
			VIC/L19, VICL20, VIC/L25			
Esso Australia	Jack-Up Rig Kipper Stage 1B Drilling	Accepted	VIC/L25	Between 2025 and end-2027	• Production drilling	Not expected: • Activities commenced June 2025 • Based on estimated duration of ~90 days in the EP, activities are expected to be complete; therefore, no potential for interaction with BMG Phase 2
Esso Australia	Jack-Up Rig Plug and Abandonment	Accepted	VIC/L1, VIC/RL1, VIC/L3, VIC/L5, VIC/L9, VIC/L13, VIC/L14, VIC/L15, and VIC/L17	Between Q4 2024 and end-2026	• P&A • Removal of subsea trees and wellheads	Not expected: • Activities commenced October 2024 • Based on estimated duration of ~12–16 months in the EP, activities are expected to be completed early-2026; therefore, no potential for interaction with BMG Phase 2
Esso Australia	Gudgeon-1 and Terakihi-1 Plug and Abandonment	Accepted	VIC/L6, VIC/L20	Between Q4 2023 and Q2 2024	• P&A • Removal of wellheads	Not expected: • Activities commenced May 2024 • Based on estimated duration of ~60 days in the EP, activities are expected to be complete; therefore, no potential for interaction with BMG Phase 2
Esso Australia	Bass Strait Producing	Accepted (a 5-yearly revision is currently under assessment)	VIC/L1, VIC/L2, VIC/L3, VIC/L4, VIC/L9, VIC/L10, VIC/L25.	Ongoing	• Ongoing operations (platform, subsea facilities, pipelines) • IMR and well workovers	Possible (unlikely) interaction: • Potential for temporal overlap in activities from late-2027 • ~10 km to >30 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel sources from both activities and location of both activities at the time.
Esso Australia	Bass Strait Non-Producing	Under assessment	VIC/L1, VIC/L2, VIC/L5, VIC/L6,	Ongoing	• Non-production phase for platforms and subsea facilities	Possible (unlikely) interaction:

Operator	EP Name	EP Status	Indicative Location	Indicative Timing	Petroleum Activity	Potential for interaction with BMG Phase 2
			VIC/L7, VIC/L8, VIC/L9, VIC/L10, VIC/L11, VIC/L13, VIC/L14, VIC/L15, VIC/L17, VIC/L18, VIC/L19, VIC/L20, VIC/RL1		• IMR and well workovers	• Potential for temporal overlap in activities from late-2027 • ~10 km to >30 km from Operational Area, therefore potential spatial overlap from underwater sound emissions depending on vessel sources from both activities and location of both activities at the time.

5.0 Environmental Impact and Risk Assessment Methodology

In accordance with regulation 21(5) of the OPGGS(E)R, an EP must detail the environmental impacts and risks associated with the activity. The EP also comprises an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk.

This EP provides the environmental impact and risk evaluation for the BMG Closure Project (Phase 2) activities, by adopting the Amplitude Energy Risk Management Protocol [CMS-RM-PRO-0001]. This Protocol is consistent with the approach outlined in ISO 14001:2015 (Environmental Management Systems), ISO 31000:2018 (Risk Management – Guidelines) and HB 203:2012 (Managing Environmental-related Risk).

Figure 5-1 provides the six-step process adopted for the evaluation of impacts and risks associated with the activity, this process is integrated into the Amplitude Energy risk assessment methodology.

Figure 5-1 - AEMS Risk Management Protocol – Six Step Process

Further details of the environmental impact and risk assessment methodology are provided in the following sections, including criteria for assessment and risk ratings.

A Risk Register is 'the managed repository of key risk information maintained by each Business Area'. It is a living part of risk management that is continually reviewed and updated. In accordance with the AEMS Risk Management Protocol, each Business Area must maintain a Risk Register and conduct risk management as an integral activity within all business processes to help manage uncertainty in achieving objectives and to aid in decision making. Section 6.0 expands on the project risk register, showing all identified risks, impacts, preventative and mitigative controls.

5.1 Definitions

In this section, Amplitude Energy has provided a list of terminology and definitions that will be meet the requirements of regulation 21(5) of the OPGGS(E)R:

- **Activity**: An activity refers to a component or task within a project which results in one or more environmental aspects.

- **Aspect**: An environmental aspect is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental aspects can cause environmental impacts or may create a risk to one or more environmental receptors.
- **Consequence:** The consequence of an impact (or risk event) is the outcome of the event on affected receptors. Consequence can be positive or negative.
- **Impact:** An environmental impact is a change to one or more environmental receptors that is caused either partly or entirely by one or more environmental aspects. An impact is something which is certain to occur. An environmental aspect can have either a direct impact on the environment or contribute only partially or indirectly to a larger environmental change. An environmental aspect may result in a change which puts one or more receptors at risk of being impacted. The relationship between environmental aspects and environmental impacts is one of cause and effect. The term 'impact' is associated with planned activities and known outcomes.
- **Likelihood:** The likelihood (or probability) of the consequence occurring. Likelihood only applies to risk and risk events.
- **Residual risk:** Residual risk is the risk remaining after additional control measures have been applied (i.e. after impact or risk treatment).
- **Risk:** An environmental risk (or risk event) is a change which could occur to one or more environmental receptors, caused either partly or entirely by one or more environmental aspects. A risk event has a degree of likelihood, it is not certain to occur. The term 'risk' is associated with planned and unplanned activities where the change elicited on or by a particular receptor is uncertain.
- **Risk severity:** The risk severity level is determined from the point on the risk matrix where the consequence intersects the likelihood.

5.2 Risk Management Process Steps

This section provides a detailed overview of the risk management process steps.

5.2.1 Establish the Context

All components of the petroleum activity relevant to this scope were identified and described in Section 3.0 of this EP.

After describing the petroleum activity, an assessment was carried out to identify aspects. The relevant person consultation outcomes, undertaken over several years, also contributed to aspect identification. The environmental aspects identified for the petroleum activity are detailed in Section 3.0 and Table 6-1.

5.2.2 Risk Identification

Risk identification involved the documentation of risks as they relate to the context established in Step 1 (Section 5.2.1). An Environmental Workshop (ENVID) was held to identify environmental impacts and risks associated with the petroleum activity. The workshop was attended by environmental consultants and project personnel spanning well engineering, subsea and HSEC disciplines.

Cumulative impacts associated with the activity and adjacent activities were also considered. NOPSEMA provide a definition of cumulative impacts within the Environment Plan decision making guideline (NOPSEMA, 2024a) as:

"*In the context of offshore petroleum activities, cumulative environmental impacts are successive, additive or synergistic impacts of collectively significant activities or projects with material impacts on the environment that have the potential to accumulate over temporal and spatial scales*".

As described in Section 4.4.2, both Amplitude Energy and other oil and gas titleholders are currently operating within Commonwealth waters in the Gippsland Basin, with other titleholders also proposing upcoming activities. The NOPSEMA **Environment Plan website** was used to identify existing activities and reasonably foreseeable future projects through approved and under assessment published EPs.

5.2.3 Risk Analysis

All impacts and risks identified during the ENVID were analysed. Impact and risk analysis requires a level of consequence to be assessed for each impact or risk event. For each risk event, the likelihood of occurrence is determined.

Impacts and risks are evaluated using the Amplitude Energy Risk Matrix, which includes:

- A six-level likelihood table to assess the probability of risk occurrence
- A five-level consequences table to assess the risk impact against business objectives (Table 5-1)
- A matrix of likelihood versus consequence that defines four levels of risk severity and allows a risk to be assessed and plotted
  - The outcome of the plotted risks is termed a 'Heat Map' and provides a graphic representation of the risks, their respective severities and likelihood
- A four-level risk severity table that defines the actions and escalation required for risks at different severity levels.

The Amplitude Energy Risk Matrix is provided in Table 5-2.

Table 5-1 - Consequence Assessment Criteria

Consequence Level	Environmental Consequence Description
1	Minor local impacts or disturbances to flora/fauna, nil to negligible remedial/recovery works on land/water systems.
2	Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks.
3	Localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function; remedial, recovery work to land/water systems over months/year.
4	Extensive medium to long-term impact on highly valued ecosystems, species populations or habitats; remedial, recovery work to land/water systems over 1 – 10 years.
5	Severe long-term impact on highly valued ecosystems, species, or habitats. Significant remedial/recovery work to land/water systems over decades.

The Risk Severity can be:

- **Extreme (red):** Inherent risk at this level is not within the Company's risk appetite. Activity cannot proceed until the Managing Director approves treatment plans that eliminates or reduces Health, Safety and Environment risks to ALARP and reduce risks in other categories in line with the Company's risk appetite. The Board must be informed of the risk and its treatment.
- **High (orange):** Inherent risk at this level requires the respective ELT Member to approve the treatment plans before the activity proceeds. Treatment plans are required to eliminate or reduce Health, Safety and Environment risks to ALARP and reduce risks in other categories in line with the Company's risk appetite The Managing Director and the Board must be informed of the risk and its treatment.
- **Moderate (yellow):** Inherent risks at this level may be acceptable if they are in line with the Company's risk appetite. Except for Health, Safety and Environment risks which must be eliminated or demonstrated as

reduced ALARP. Appropriate Managers or Functional Leaders must approve treatment plans and risks should be reported during regular reporting.

- **Low (green):** This level of risk is broadly acceptable; however, Health, Safety and Environment risks must be eliminated or demonstrated as reduced ALARP with treatment plans approved by assigned persons. For risks in other categories, as a minimum, a review of existing control measures should occur, and the risk should be regularly monitored for deterioration.

Note: Key descriptor words relating to duration, spatial extent and magnitude from these definitions, are used within the risk management process for consideration of all elements of the environment, including ecological and social receptors. These receptors are identified within the existing environment section and integrated into the risk assessment through activity-aspect interaction scoping.

Table 5-2 - Amplitude Energy qualitative risk matrix

LIKELIHOOD						CONSEQUENCE				
Rating	Level	Qualitative			Quantitative					
		Probability	Time Period	Description		1	2	3	4	5
A	Almost certain	>80%	More than once a year	Expected to occur in most circumstances and/or more than once a year, or repeatedly during the activity.	$>10^{-2}$	Moderate	Moderate	High	Extreme	Extreme
B	Likely	>50%	Every 1–2 years	Not certain to happen but an additional factor may result in an occurrence. Expected to occur from time to time during the activity.	$\leq10^{-2}$	Low	Moderate	Moderate	High	Extreme
C	Possible	>20%	Every 4–5 years	Could happen when additional factors are present. Easy to postulate a scenario for the occurrence but considered doubtful. Expected to occur once during the activity.	$\leq10^{-3}$	Low	Moderate	Moderate	High	High
D	Unlikely	>5%	Every 5–20 years	A rare combination of factors would be required for an occurrence. Conceivable and could occur at some time. Could occur during the activity.	$\leq10^{-4}$	Low	Low	Moderate	Moderate	High
E	Remote	>1%	Every 20–100 years	A freak combination of factors would be required for an occurrence. Not expected to occur during the activity. Occur in exceptional circumstances.	$\leq10^{-5}$	Low	Low	Moderate	Moderate	High
F	Hypothetical	<1%	Not in 100 years	Generally considered hypothetical or non-credible.	$\leq10^{-6}$	Low	Low	Low	Low	Moderate

5.2.4 Risk Evaluation

5.2.4.1 Identify and Evaluate Controls

Controls are any measures exercised that modify the impact or risk. Controls act on an impact cause to reduce the consequence of the impact. Controls that act on the risk cause to reduce the likelihood of the risk occurring are termed preventative controls. Reactive controls are those that modify the consequence once the risk event has occurred. For each risk, all controls should be captured.

Risk evaluation requires each control to be assessed for its effectiveness in managing the risk causes and consequences. This may be different from the effectiveness of the control to deliver its original designed purpose.

5.2.4.2 Determine ALARP Status

The ALARP status of each impact and risk is assessed based on the sufficiency of the controls already established and the opportunity for new controls to be implemented. A cross-functional team is assembled to ensure the risks and controls are assessed from different perspectives and to identify the possibility of additional controls that can reduce the risk. If no additional realistic and feasible controls are identified for the risk, then it is considered ALARP.

In alignment with NOPSEMA's ALARP Guidance Note (N-04300-GN0166; (NOPSEMA, 2025b)), Amplitude Energy have adapted the approach developed by Oil and Gas UK (OGUK) (formerly UKOOA) (OGUK, 2014) for use in an environmental context to determine the assessment technique required to demonstrate that potential impacts and risks are ALARP (Figure 5-2).

Specifically, the framework considers impact consequence and several guiding factors:

- Activity type
- Risk and uncertainty
- Stakeholder influence.

A **Type A** decision is made if the risk is relatively well understood, the potential impacts are low, activities are well practised, and there are no conflicts with company values, no partner interests and no significant media interests. However, if good practice is not sufficiently well defined, additional assessment may be required.

A **Type B** decision is made if there is greater uncertainty or complexity around the activity and/or risk, the potential impact is moderate, and there are no conflict with company values, although there may be some partner interest, some persons may object, and it may attract local media attention. In this instance, established good practice is not considered sufficient and further assessment is required to support the decision and ensure the risk is ALARP.

A **Type C** decision typically involves sufficient complexity, high potential impact, uncertainty, or stakeholder influence to require a precautionary approach. In this case, relevant good practice still must be met but additional assessment is required, and the precautionary approach is applied for those controls that only have a marginal cost benefit. In accordance with the regulatory requirement to demonstrate that environmental impacts and risks are ALARP, Amplitude Energy has considered the above decision context in determining the level of assessment required. This is applied to each aspect described in Section 6.0.

The assessment techniques considered include:

- Good practice
- Engineering risk assessment
- Precautionary approach.

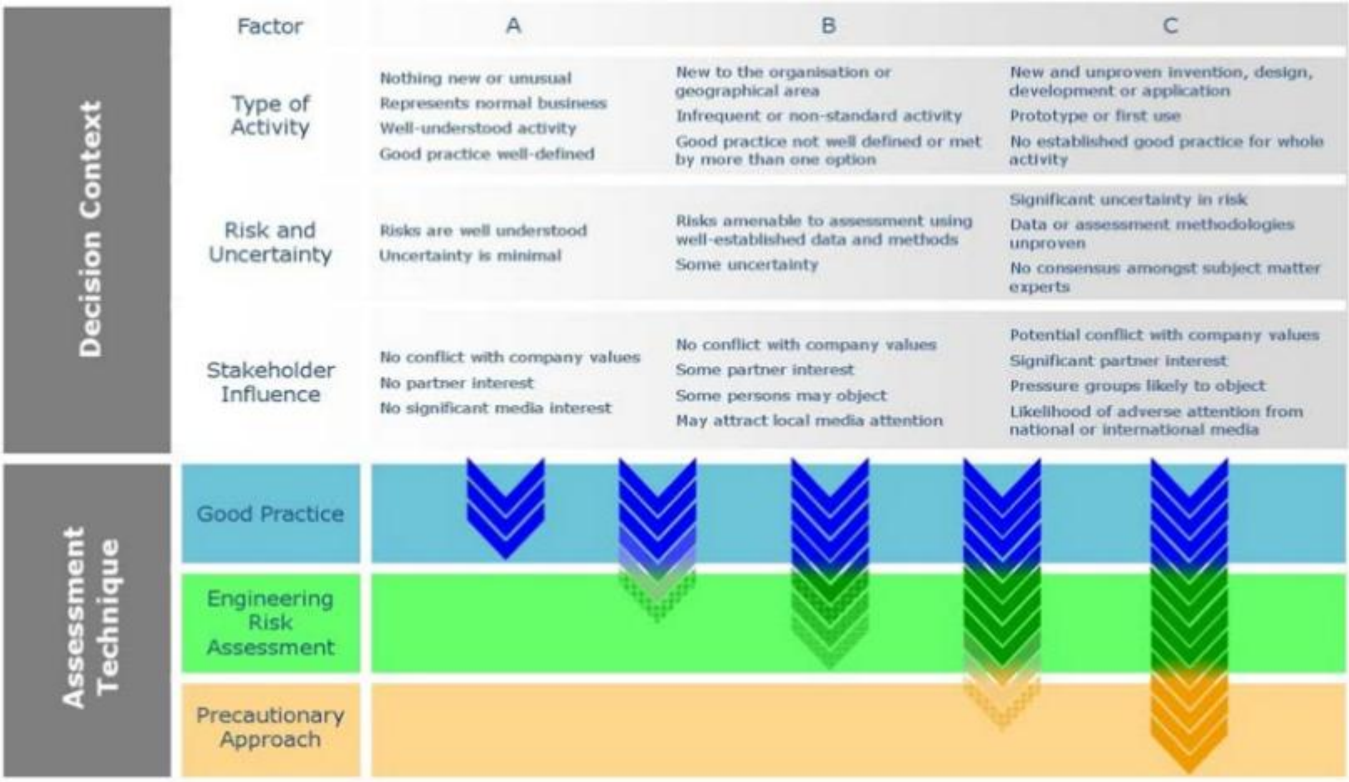


Figure 5-2 - ALARP risk related Decision Support Framework (Source: OGUK (2014))

Good Practice

OGUK (2014) defines ‘Good Practice’ as the recognised risk management practices and measures that are used by competent organisations to manage well-understood hazards arising from their activities.

‘Good Practice’ can also be used as the generic term for those measures that are recognised as satisfying the law.

For this EP, sources of good practice include:

- Requirements from Australian legislation and regulations
- Relevant Australian policies
- Relevant Australian Government guidance
- Relevant industry standards
- Relevant international conventions
- Industry learnings and associated continuous improvement.

If the ALARP technique determines the controls to be ‘Good Practice’, further assessment (‘Engineering Risk Assessment’) is not required to identify additional controls. However, additional controls that provide a suitable environmental benefit for an insignificant cost may be identified.

Engineering Risk Assessment

All potential impacts and risks that require further assessment are subject to an ‘Engineering Risk Assessment’.

Based on the various approaches recommended in OGUK (2014), Amplitude Energy believes the methodology most suited to this activity is a comparative assessment of risks, costs, and environmental benefit. A cost–benefit analysis should show the balance between the risk benefit (or environmental benefit) and the cost of implementing the identified measure, with differentiation required such that the benefit of the risk reduction measure can be seen and the reason for the benefit understood.

Precautionary Approach

OGUK (2014) state that if the assessment, considering all available engineering and scientific evidence, is insufficient, inconclusive, or uncertain, then a precautionary approach to hazard management is needed. A precautionary approach will mean that uncertain analysis is replaced by conservative assumptions that will result in control measures being more likely to be implemented.

That is, environmental considerations are expected to take precedence over economic considerations, meaning that a control measure that may reduce environmental impact is more likely to be implemented. In this decision context, the decision could have significant economic consequences to an organisation.

5.2.4.3 Evaluate the Acceptability of the Potential Impact and Risk

Amplitude Energy considers a range of factors when evaluating the acceptability of environmental impacts or risks associated with its activities. This evaluation is based on NOPSEMA's guidance note for EP Content Requirement (N04750-GN1344; (NOPSEMA, 2025a)) and guideline for EP decision making (N-04750-GL1721; (NOPSEMA, 2024a)).

The acceptability evaluation for each aspect associated with this activity is undertaken in accordance with Table 5-3.

Table 5-3 - Amplitude Energy Acceptability Evaluation

Factor	Criteria/Test
Amplitude Energy Risk Management Protocol	Is the risk severity Extreme (i.e. inherent risk not within Company's risk appetite), or High (i.e. requires involvement from the Managing Director to approve the treatment plan)?
Principles of ESD	Is there the potential to affect biological diversity and ecological integrity? (Consequence Level 4 and 5) Do activities have the potential to result in serious or irreversible environmental damage? If yes: Is there significant scientific uncertainty associated with aspect? If yes: Has the precautionary principle been applied to the aspect?
Legislative and Other Requirements	Are there any good practice control measures which have not been adopted, including those identified in relevant EPBC listed species recovery plans or approved conservation advices? If no, have alternate control measures been adopted that provide equal or better levels of protection?
Internal Context	Is the impact or risk provided for within AEMS Standards and Processes? If no, what additional provisions will be made?
External Context	Are there any objections and claims regarding this aspect which have not been resolved? If yes, is there anything which precludes reaching a resolution?

5.2.4.4 Principles of ESD and precautionary principle

The principles of ESD are considered in Table 5-4 in relation to acceptability evaluations.

Under the EPBC Act, the Minister must also take into account the precautionary principle in determining whether or not to approve the taking of an action. The precautionary principle (section 391(2) of the EPBC Act) is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there may be threats of serious or irreversible environmental damage.

Table 5-4 - Principles of ESD

ESD	Principle	Relevance to Acceptability
A	Decision making processes should effectively integrate both long term and short term economic, environmental, social, and equitable considerations.	Amplitude Energy's impact and risk assessment process integrates long-term and short-term economic, environmental, social, and equitable considerations. This is demonstrated through the Risk Matrix (Table 5-2), which includes provision for understanding the long-term and short-term impacts associated with its activities, and the ALARP process, which balances the economic cost against environmental benefit. As this principle is inherently met by applying the EP assessment process, it is not considered separately for each evaluation.
B	If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	An evaluation is completed to determine if the activity will result in serious or irreversible environmental damage. If yes, an assessment is completed to determine if there is significant uncertainty in the evaluation.
C	The principle of inter-generational equity—that the present generation should ensure that the health, diversity, and productivity of the environment is maintained or enhanced for the benefit of future generations.	The risk assessment methodology ensures that impacts and risks are reduced to levels that are considered ALARP. Where the potential impacts and risk are determined to be serious or irreversible the precautionary principle is implemented to ensure the environment is maintained for the benefit of future generations.
D	The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.	An assessment is completed to determine if there is a potential to impact biological diversity and ecological integrity.
E	Improved valuation, pricing and incentive mechanisms should be promoted.	Not considered relevant for petroleum activity acceptability demonstrations.

5.2.5 Risk Monitoring, Review and Record

Risks, risk treatments and controls require continual monitoring and review to determine whether assumptions and decisions remain valid. The risk environment and risk continually change, and treatment plans can also alter the risk. Stakeholders (which may be internal and external to the company) need to be consulted and kept informed.

The monitor, review and recording activities provide assurance that:

- Emerging risks are identified, and existing risks remain relevant and managed
- Controls continue to be effective and efficient in design and operation
- Controls required for the risk to be ALARP are effectively implemented and operating as expected
- Risk management objectives remain appropriate and are supported by effective treatment activities
- The process for managing risk is operating effectively and efficiently
- Information on risk changes and treatment activities are documented
- Stakeholders are consulted and informed regularly of risk management progress and performance.

Additional aspects of monitoring and review are described in the Implementation Strategy in Section 9.0 of this EP include:

- Analysing and lessons learnt from events (including near-misses), changes, trends, successes and failures
- Detecting changes in the external and internal context (e.g. new conservation plans issued)
- Chemical selection and discharge process.

6.0 Risk and Impact Evaluation

To meet the requirements of regulations 21(5), 21(6), and 21(7) of the OPGGS(E)R, this section evaluates the impacts and risks associated with the petroleum activity appropriate to the nature and scale of each impact and risk and details the control measures that are used to reduce the risks to ALARP and an acceptable level.

Environmental performance outcomes (EPOs), environmental performance standards (EPSs), and measurement criteria have been developed, described, and summarised in Section 8.0.

6.1 Impact and Risk Scoping

Interactions between activities and aspects are shown in Table 6-1. Where no disturbance, discharge, or emission has been identified in Section 3.0, then no planned interactions are shown. If no planned or unplanned aspects are identified for an activity, then no impacts or risks are identified, and these are not included in the subsequent section.

Impacts and risks resulting from each of these identified interactions were discussed at the project ENVID and analysed further outside of the workshop where necessary to reduce uncertainty. The outcomes of this process, including consequence and likelihood evaluation, control measures identified, risk ranking, and ALARP and acceptability determination, are provided in the following sections.

Within this section, impacts are framed as either a “lower order impact” or a “higher order impact”. All impacts are evaluated at the lower level until one or more factors trigger the impact to be evaluated at a higher level. These factors are:

- Uncertainty or complexity in the impact or risk assessment which requires further analysis or discussion, for example where modelling is required to understand the nature and scale of an impact
- ALARP decision context B and above (refer to Section 5.2.4)
- Residual risk severity moderate and above (refer to Sections 5.2.4)
- Stakeholder concerns.

Higher order impacts require a higher order of evaluation, as described in the NOPSEMA Environment Plan decision making guideline [N-04750-GL1721; (NOPSEMA, 2024a)].

Impacts and risks determined to be lower order are presented in Section 6.2, whilst higher order impacts and risks are evaluated in more detail in Section 6.3 onwards. The differentiation between higher and lower order impacts and risks is colour coded in Table 6-1.

Table 6-1 - Activity – Aspect Interactions

	ASPECT												
ACTIVITY	**Physical Presence**		**Planned Emissions**			**Planned Discharges**		**Unplanned Interactions**				**Accidental Releases**	
Lower Order Impacts and Risks - yellow **Higher Order Impacts and Risks - blue**	Displacement of other marine users	Seabed Disturbance	Light Emissions	Underwater Sound Emissions	Atmospheric Emissions	Subsea Discharge	Routine Vessel Discharge	Marine Fauna Interaction	Introduction, Establishment and Spread of IMS	Dropped Object	Waste (Hazardous and Non-hazardous)	LoC – Minor	LoC – Vessel Collision
Phase 2 Activities													
Contingency removal of subsea structures		X		X		X				X			
Reverse installation (Reel)		X		X		X				X			
Reverse installation (Lift and Cut)		X		X		X				X			
Seabed and as-left survey				X									
Inspection and Maintenance													
Inspections and maintenance				X									
Support Operations													
Vessel operations	X		X	X	X		X	X	X	X	X	X	X
Helicopters				X									

6.2 Lower Order Impact Evaluations

6.2.1 Planned Activities

Table 6-2 - Lower Order Planned Activities Impact and Risk Evaluation

Aspect	Predicted Impacts	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
Physical Presence								
Displacement of other Marine Users • Vessel operations • Property left in situ.	Changes to the functions, interests and activities of other marine users.	**Commercial Fisheries (State and Commonwealth)** For the duration of the activity (~50–75 days, single or split campaign), other marine users will be temporarily displaced from the sea area surrounding the activity by the presence of a 500 m exclusion zone around the CSV (requested via a Notice to Mariners). This exclusion zone is similar in size to the existing gazetted PSZs (300–500 m) around the BMG infrastructure; but will move with the CSV during the activity. Full removal of the existing wells and BAM pile below seabed level is not feasible. However, Amplitude Energy plan cut the wellheads and BAM pile at or below the seabed (with a target of ~1 m below the seabed) and recover the cut section to surface. State and Commonwealth commercial fisheries have been identified to be the main marine users within the Operational Area. There are several Commonwealth and State commercial fisheries with management areas that overlap with the Operational Area; of these it is expected that only Commonwealth SESSF may have active fishing effort in the area (refer to Section 4.4.2). There may be some trawl fishing in the vicinity of the Operational Area, but not within the existing PSZs. Although SESSF Commonwealth Trawl Sector has the potential to interact with the seabed, the BAM pile and wellheads will be cut at or below the seabed such that following the removal of the structures (and revocation of the PSZ) interaction with the commercial fisheries is not expected to occur. In the event that removal of the wellheads and/or BAM pile at or below the seabed is demonstrated to not be reasonably practicable (e.g. if internal cutting is not technically feasible and other methods such as diamond wire saw cannot get below the seabed), up to ~0.5 m of a wellhead or BAM pile may be left in situ. However, this is considered a worst-case scenario as cuts made with a diamond wire saw would aim for the infrastructure to be removed as close as reasonably practicable to the seabed, using excavation techniques where possible to allow cut below the seabed (see Figure 3-5). Depending on the height above the seabed, the presence of any remaining infrastructure may present a snagging hazard for trawl equipment. Any residual hazard of this nature would be addressed through consultation with relevant persons, and the Fisheries Damages Protocol which are well established control measures. Natural degradation of any remnants will occur over time, at an estimated rate for steel exposed to seawater of 0.2 mm/year (refer to Section 6.3.4.3). During prior relevant person consultation, concerns were raised by commercial fisheries around in situ decommissioning concepts. This feedback was factored into Amplitude Energy's decommissioning approach; as Amplitude Energy is planning to remove all infrastructure above the seabed, these concerns have been addressed. Given the temporary safety exclusion zone during the offshore campaign is small in comparison to the larger fishing grounds of the region and no significant impact to commercial operations is expected, the consequence of impacts to commercial fisheries will be Level 1.	Level 1	A	**C14**: Marine exclusion and caution zones. **C15**: Pre-start notifications. **C16**: Marine Order 27: Safety of navigation and radio equipment. **C17**: As-left seabed survey. **C18**: Ongoing consultation. **C19**: Fisheries Damages Protocol. **C2**: Wet parking restricted to within the PSZs. **C29**: All well heads and the manifold pile will be cut at or below the seabed. **C34**: Adaptive management for wellhead and BAM pile end states.	N/A	N/A	Acceptable, based on: • Impacts well understood • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented • Legislative and other requirements have been identified and met: – OPGGS Act – *Navigation Act 2012* • AEMS Standards and Processes have been identified • Concerns were raised during previous relevant persons consultation around in situ decommissioning concepts; however, as Amplitude Energy is planning to remove all infrastructure above the seabed, these concerns have been addressed • No objections or claims have been raised by relevant persons.
		Shipping The Operational Area does not coincide with major shipping routes (refer to Section 4.4.2). Therefore, it is expected that a relatively small number of shipping vessels may be encountered	Level 1					

Aspect	Predicted Impacts	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		nearby the Operational Area during the activity, with the most credible impact to shipping being minor deviations around the CSV 500 m safety exclusion zone. Historically Amplitude Energy have not experienced interactions with shipping whilst implementing petroleum activities in this area. Given the Operational Area is not within major shipping routes, the consequence of any impacts to the shipping industry will be Level 1.						
		Recreational Fishers and Tourism East Gippsland waters have a moderate recreational fishing intensity, but recreational fishers and tourism operators are not expected to be present within the Operational Area due to the distance off the Victorian coast (~50 km) and the water depth range (135 m-270 m) of the Operational Area being undesirable for recreational activities. Recreational sailing boats may occasionally pass through the Gippsland region in the vicinity of the Operational Area. No concerns were raised during the relevant person consultation. Interactions with divers and swimmers have not been considered due to lack of appropriate sites within the Operational Area the water depth and distance from shore. As recreational fishers and tourism activities are not expected to be present within the Operational Area, the consequence of any impacts will be Level 1.	Level 1					
		Energy Development Area The Gippsland Basin is one of Australia's major hydrocarbon provinces, having continually produced oil and gas since the late 1960s (Geoscience Australia, 2022). The Operational Area is outside of the ATBA and associated major infrastructure with no overlap of other Titleholder petroleum activities. The activities at BMG are therefore expected to be of no consequence to other offshore oil and gas activities.	N/A					
Planned emissions								
Light Emissions • Vessel operations.	Change in ambient light.	**Ambient light,** Sources of light from the activity include navigation and safety lighting from the CSV and any other vessels (continuous source for the ~50–75 day duration of the activity). Light emissions will result in a change in ambient light within the vicinity of the vessel/s, with a Level 1 consequence within that area.	Level 1	A	None identified.	N/A	N/A	Acceptable, based on: • Impacts well understood • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Legislative and other requirements have been identified and met: – National Light Pollution Guidelines for Wildlife (DCCEEW, 2023h) – EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia, 2017a) • Activity will not impact the recovery of EPBC Act listed threatened species as per: – National Recovery Plan for albatrosses and petrels (2022) (Commonwealth of Australia, 2022a)
	Change in fauna behaviour (attraction, disorientation).	**Marine turtles, Seabirds and migratory shorebirds** Light emissions may result in a localised change to marine fauna behaviour. Marine species with the greatest sensitivity to light are marine turtles, seabirds, and migratory shorebirds. The National Light Pollution Guidelines for Wildlife (DCCEEW, 2023h) has been reviewed and light sensitive species have been identified. The purpose of the guideline is to provide a framework for assessing and managing the adverse impacts on marine fauna from artificial lighting. Given the absence of BIAs and HCTS of marine turtles, this assessment has focused on seabirds and migratory shorebirds. The guidelines indicate that observed effects of sky glow on fledgling seabirds grounded in response to artificial light can occur up to 15 km away (DCCEEW, 2023h). The Operational Area is ~50 km from the coast, and, for the purposes of this risk assessment, Amplitude Energy have assessed an area of 15 km around the entire Operational Area. The PMST report (Appendix 3) for the Activities EMBA identified 35 threatened, migratory, and/or marine EPBC listed bird species that could potentially occur within the area. Ten bird species have been identified having foraging BIAs that are potentially exposed to changes in ambient light levels (antipodean albatross, black-browed albatross, Bullers albatross, Campbell albatross, common diving petrel, Indian yellow-nosed albatross, short-tailed shearwater, shy albatross, wandering albatross, white-faced storm-petrel). No key nesting, roosting, or resting areas were identified to be associated with these species. HCTS for bird species are not spatially	Level 1					

Aspect	Predicted Impacts	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		defined; however, from descriptions in the recovery plan (Commonwealth of Australia, 2020a) the Activities EMBA may intersect with HCTS for the Australian fairy tern (see also Section 4.4.1). Artificial light was not identified as a threat within the recovery plan for the Australian fairy tern (Table 2-6). No shoreline habitat occurs within this 15 km buffer around the Operational Area (coast is approximately 35 km beyond the edge of the buffer which exceeds the typical offshore range for fairy terns), as such whilst interactions between vessels and individual seabirds that may be migrating or foraging, nesting or fledgling seabirds are not likely to be affected.. Consequently, the impact of changes to ambient light levels to marine turtles, seabirds and migratory shorebirds was evaluated as Level 1.						– Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (NSW DEC, 2014) – National Recovery Plan for the Australian Fairy Tern (*Sternula nereis nereis*) (Commonwealth of Australia, 2020a) • AEMS Standards and Processes have been identified. • No objections or claims were raised by relevant persons regarding light emissions.
		Plankton and Fish The National Light Pollution Guidelines for Wildlife (DCCEEW, 2023h) does not identify plankton and fish as sensitive to light emissions. Consequently, it is concluded that the consequence or impact of light emissions to plankton and fish will be Level 1.	Level 1					
Atmospheric Emissions • Vessel operations • Helicopter operations.	Change in air quality.	**Ambient air quality** Atmospheric emissions will be generated by power generation by the CSV and any other vessels/helicopters required throughout the ~50–75 day duration of the activity. The use of fuel (specifically marine-grade diesel) to power engines, generators, and mobile and fixed plant (e.g. ROV, back-deck crane, generator) will result in emission of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHG such as sulphur oxides (SO_X) and nitrous oxides (NO_X). GHG emissions and non-GHG emissions are emitted into the atmosphere during continued operations of the vessel engines, helicopters, generators, and equipment. Emissions will be small in quantity and will dissipate quickly into the surrounding atmosphere, therefore any localised reduction in air quality is not expected to result in any measurable effect. Consequently, impacts to marine fauna and social receptors (e.g. commercial fisheries) from atmospheric emissions are not expected, and have not been evaluated further. Given the localised and temporary nature of the change in air quality, the consequence of the impacts will be Level 1.	Level 1	A	**C1**: Planned Maintenance System. **C6**: AMSA Discharge Standards.	N/A	N/A	Acceptable, based on: • Impacts well understood • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented • Legislative and other requirements have been identified and met: – Marine Order 97 (Marine pollution prevention – air pollution) 2022 • AEMS Standards and Processes have been identified • No objections or claims have been raised by relevant persons.
	Reduction of the global carbon budget.	**Reduction to the global carbon budget** The use of fuel to power engines, generators and any mobile or fixed plant will result in the direct emissions of GHG such as CO_2, CH_4, and N_2O. While these emissions add to the total GHG load in the atmosphere, they are negligible on a state, national and global scale, and consequently represent a negligible reduction in the global carbon budget. Given the negligible amount of GHG generated and the associated negligible reduction in global carbon budget, the consequence of the impacts will be Level 1.	Level 1					
Planned Discharges								
Routine Vessel Discharges • Vessel operations.	Change in water quality.	**Ambient water quality** Routine vessel discharges include: • Cooling water – seawater is used as a heat exchange medium for the cooling of machinery engines. The seawater goes through a heat exchanger that transfers heat from the vessel engines and machinery to the seawater. Once the seawater goes through the system it is discharged back into the ocean. • Brine – brine is generated from the water supply system. Brine is discharged to the open ocean at a salinity of approximately 10% higher than seawater. The volume of discharge is dependent on the amount of people on board the vessel that require fresh (or potable) water.	Level 1	A	**C1**: Planned Maintenance System. **C6**: AMSA Discharge Standards.	N/A	N/A	Acceptable, based on: • Impacts well understood • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented

<table>
<tr><th>Aspect</th><th>Predicted Impacts</th><th>Consequence Evaluation</th><th>Consequence Level</th><th>ALARP Decision Context</th><th>Control Measures</th><th>Likelihood</th><th>Residual Risk (Severity)</th><th>Acceptability Outcome</th></tr>
<tr><td rowspan="2"></td><td></td><td>Sewage and grey water – the volume of sewage and grey water discharge is dependent on the number of people on board the CSV and other vessels. Approximately 0.04 m³ and 0.45 m³ of sewage/grey water will be generated per person, per day (EMSA, 2016).
Putrescible waste – food waste will be generated on board the CSV and vessels, approximately 1–2 kg of putrescible waste per person, per day is estimated (NERA, 2018).
Deck drainage and bilge –may comprise of water, particulate matter, residual chemicals and oils caught in bunds and on deck. Contaminated water, directed to an oily water treatment system, is treated to a concentration of 15 ppm (or less) OIW before discharge.
Routine vessel discharges will result in localised impact on water quality from increased temperature, salinity, nutrients, and chemical toxicity. Planned vessel discharges would be of low volume during in-water activities of short duration (up to ~50–75 days).
Increased temperature and salinity
Modelling of continuous wastewater discharges (including cooling water) undertaken by Woodside for its Torosa South-1 drilling program in the Scott Reef complex found that discharge water temperature decreases quickly as it mixes with the receiving waters, with the discharge water temperature being <1°C above ambient within 100 m (horizontally) of the discharge point, and 10 m vertically (Woodside, 2014). Brine water will sink through the water column where it will be rapidly mixed with receiving waters and dispersed by ocean currents. As such, temperature and salinity impacts are expected to be limited to the source of the discharge where concentrations are highest.
Chemical toxicity
Release of scale inhibitors and biocides into the environment have the potential to result in acute and chronic toxicity to marine fauna. Standard marine vessel discharges typically use these chemicals in low concentrations, which upon discharge, rapidly dilute to below PNEC.
Temporary and localised reduction in water quality (nutrients and biochemical oxygen demand)
Monitoring of sewage discharges for another offshore project (Woodside, 2014) determined that a 10 m³ sewage discharge reduced to ~1% of its original concentration within 50 m of the discharge location. In addition, monitoring at distances 50, 100, and 200 m downstream of the platform and at five different water depths confirmed that discharges were rapidly diluted and elevations in water quality monitoring parameters (e.g. total nitrogen, total phosphorous, and selected metals) were not recorded above background levels at any station. During the Activity, the amount of sewage and grey water to be discharged per day will be significantly lower than 10 m³.
Open marine waters are typically influenced by regional wind and large-scale current patterns resulting in the rapid mixing of surface and near surface waters and the low volume discharges, thus it is expected that any planned operational discharges would disperse quickly over a small area. Therefore, the consequence of impacts to water quality will be Level 1.</td><td></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">Legislative and other requirements have been identified and met:
Marine Order 91 – Marine pollution prevention – oil (as relevant to vessel class)
Marine Order 95 – Marine pollution prevention – garbage (as appropriate to vessel class)
Marine Order 96 – Marine pollution prevention – sewage (as appropriate to vessel class)
Activity will not impact on the values and functions of the Upwelling East of Eden KEF
AEMS Standards and Processes have been identified
No objections or claims have been raised by relevant persons.</td></tr>
<tr><td>Injury/mortality</td><td>Plankton
Mortality rates for plankton are naturally high with distribution often patchy and linked to localised and seasonal productivity that produces sporadic bursts in phytoplankton and zooplankton populations (DEWHA, 2008).
The Operational Area is located within the Upwelling East of Eden KEF, an area of episodic upwelling known for high productivity.
A change in water quality as a result of routine vessel discharges is unlikely to lead to injury or mortality of plankton at a measurable level and will not result in a change in the viability of the population or ecosystem (such as the Upwelling East of Eden KEF). Therefore, the consequence of any impacts to plankton from planned surface operational discharges have been evaluated as Level 1.</td><td>Level 1</td></tr>
</table>

Aspect	Predicted Impacts	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		Impacts to larger marine fauna (such as fish, seabirds, marine mammals and marine reptiles) are not expected.						

6.2.2 Unplanned Events

Table 6-3 - Lower Order Unplanned Events Risk Evaluation

Aspect	Predicted Risks	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
Unplanned Interaction								
Marine Fauna Interaction • Vessel operations.	Change in fauna behaviour (avoidance). Injury/mortality.	**Marine mammals, marine reptiles, fish** Marine fauna interactions could occur as a result of movement of vessels within the Operational Area. Interactions could cause a change in marine fauna behaviour or injury/mortality. Megafauna that are within the surface waters and breach often are most at risk from marine fauna interactions within the Operational Area. Cetaceans are naturally inquisitive marine mammals that are often attracted to offshore vessels, however, the reaction of whales to the approach of a vessel is variable. Some species remain motionless when in the vicinity of a vessel, while others are curious and often approach ships that have stopped or are slow moving, although they generally do not approach, and sometimes avoid, faster moving ships (Richardson, et al., 1995). Amplitude Energy has observed several large baleen whales during previous installation campaigns in the Gippsland area, which appeared in the vicinity for a short time before moving on. All observations are reported to the Australian Marine Mammal Centre. Collisions between larger vessels with reduced manoeuvrability and large, slow-moving cetaceans occur more frequently where high vessel traffic and cetacean habitat occurs (Whale and Dolphin Conservation Society, 2003). Laist et al. (2001) identified that larger vessels with reduced manoeuvrability moving in excess of 10 knots may cause fatal or severe injuries to cetaceans, with the most severe injuries caused by vessels such as tankers travelling faster than 14 knots and with limited manoeuvrability. Vessels used to support these activities would typically travel at economy speeds (or lower) when conducting activities within the scope of this EP, inside the Operational Area. EPBC Act listed threatened marine megafauna that may occur in the Operational Area, and which may be at risk of surface interactions includes: • Five shark species: dumb gulper shark (conservation dependent), little gulper shark (conservation dependent), school shark (conservation dependent), whale shark (vulnerable), and white shark (vulnerable). No BIAs or HCTS for these species have been identified within the Operational Area (Section 4.4.1). • Three marine turtle species: green turtle (vulnerable), leatherback turtle (endangered), and loggerhead turtle (endangered). No BIAs or HCTS for these species have been identified within the Operational Area (Section 4.4.1). • Four whale species: blue whale (endangered), fin whale (vulnerable), sei whale (vulnerable), and southern right whale (endangered). Of these species only two have BIAs within the Operational Area: possible foraging BIA for the pygmy blue whale and a migration BIA for the southern right whale. No HCTS of these species have been identified within the Operational Area (Section 4.4.1). The Operational Area has no EPBC Act listed threatened species presence or BIAs for pinnipeds, dugongs or dolphins. The Australian fur seal has previously been observed in the area during routine inspections (Ierodiaconou, et al., 2021). The following recovery plans and conservation advices for marine megafauna that may be present within the Operational Area identify vessel strike as a threat (Table 2-6): • Conservation Advice *Rhincodon typus* (whale shark) (TSSC, 2015e) • Approved Conservation Advice for Dermochelys coriacea (Leatherback Turtle) (DEWHA, 2009a) • Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d)	Level 2	A	**C10**: EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans. Caution zone extended to 500 m between whales and project vessels.	Impact is conceivable and could occur, however it would require a rare combination of factors and is therefore considered Unlikely (D).	Low	Acceptable, based on: • Impacts well understood • Residual risk (severity) is Low • Consequence is Level 2, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented • Legislative and other requirements have been identified and met: – EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans – National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia, 2017c) – Section 229 of the EPBC Act • Activity will not impact the recovery of marine megafauna species as per: – Conservation Advice *Rhincodon typus* (whale shark) (TSSC, 2015e) – Recovery Plan for the White Shark (Carcharodon carcharias) (DSEWPaC, 2013d) – Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle) (DEWHA, 2009a) – Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d) – Conservation Management Plan for the Blue Whale, 2015-2025 (Commonwealth of Australia, 2015a) – Conservation Advice for the Fin Whale (TSSC, 2015b) – Conservation Advice for the Sei Whale (TSSC, 2015a) – National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024h)

Aspect	Predicted Risks	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		• Conservation Management Plan for the Blue Whale (Commonwealth of Australia, 2015a) • Conservation Advice for the Fin Whale (TSSC, 2015b) • Conservation Advice for the Sei Whale (TSSC, 2015a) • National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024h). The occurrence of physical interactions with marine fauna is very low with no incidents occurring during Amplitude Energy activities in the region including previous construction campaigns for the Sole development through 2018 and 2019. If an incident occurred, it would be restricted to individual fauna and not have expected to have impacts to population levels. The consequence of an impact is therefore predicted to be Level 2, as short-term impacts to species or habitats of recognised conservation value, not affecting local ecosystem function.						• AEMS Standards and Processes have been identified • No objections or claims have been raised by relevant persons.
Waste (Hazardous and Non-hazardous) • Vessel operations.	Change in water quality. Change in fauna behaviour. Injury/mortality.	**Seabirds and Migratory Shorebirds, Marine Turtles and Marine Mammals** The handling and storage of materials and waste on board the CSV and vessels has the potential for accidental over-boarding of hazardous/non-hazardous materials and waste. Small quantities of hazardous/non-hazardous materials (solids and liquids) will be used, and wastes created, handled, and stored on board until transferred to port facilities for disposal at licensed onshore facilities. However, accidental releases to sea are a possibility, such as in rough ocean conditions when items may be dislodged from the back deck. Waste accidently released to the marine environment can cause a change in fauna behaviour, a change in water quality, and may lead to injury or death to individual marine fauna through ingestion or entanglement. The following threat abatement plans, recovery plans, conservation advices, or wildlife conservation plans (relevant to marine fauna that may be present within the Operational Area) identify marine debris as a threat (Table 2-6): • Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (Commonwealth of Australia, 2018) • Conservation Advice *Rhincodon typus* (whale shark) (TSSC, 2015e) • Approved Conservation Advice for Dermochelys coriacea (Leatherback Turtle) (DEWHA, 2009a) • Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d) • Conservation Advice *Thalassarche cauta* (shy albatross) (TSSC, 2020c) • National Recovery Plan for albatrosses and petrels (2022) (Commonwealth of Australia, 2022a) Wildlife Conservation Plan for Seabirds (Commonwealth of Australia, 2020b) • Conservation Management Plan for the Blue Whale, 2015-2025 (Commonwealth of Australia, 2015a) • National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024h). The TSSC (2022) reports that there have been 104 records of cetaceans in Australian waters impacted by plastic debris through entanglement or ingestion since 1998 (humpback whales being the main species). The Threat Abatement Plan (2018) suggests that most marine plastic debris are associated with shipping and fishery activities (e.g. fishing gear, balloons and plastic bags). Waste will be handled in accordance with AMSA Discharge Standards and respective vessel Garbage Management Plans. Given this, and the limited impacts expected should waste be accidentally discharged, the consequence of any impacts from marine pollution will be Level 1.	Level 1	A	**C6**: AMSA Discharge Standards. **C7**: Garbage Management Plan.	Impact is conceivable and could occur, however it would require a rare combination of factors and is therefore considered Unlikely (D).	Low	Acceptable, based on: • Impacts well understood • Residual risk (severity) is Low • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented • Legislative and other requirements have been identified and met: – Marine Order 95 – Marine pollution prevention – garbage (as appropriate to vessel class) – *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*. – *Navigation Act 2012* – Chapter 4 (Prevention of Pollution). • Activity will not impact the recovery of EPBC Act listed threatened species as per: – Conservation Advice *Rhincodon typus* (whale shark) (TSSC, 2015e) – Approved Conservation Advice for Dermochelys coriacea (Leatherback Turtle) (DEWHA, 2009a) – Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d) – Conservation Advice *Thalassarche cauta* (shy albatross) (TSSC, 2020c) – National Recovery Plan for albatrosses and petrels (2022) (Commonwealth of Australia, 2022a) Wildlife Conservation Plan for Seabirds (Commonwealth of Australia, 2020b)

Aspect	Predicted Risks	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
								– Conservation Management Plan for the Blue Whale, 2015-2025 (Commonwealth of Australia, 2015a) – National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024h). • AEMS Standards and Processes have been identified. • No objections or claims have been raised by relevant persons.
Dropped Object • Removal of subsea structures • Reverse installation (Reel) • Reverse installation (Lift and Cut, or Cut and Lift) • Vessel operations • ROV operations.	Change in habitat. Injury/mortality.	**Benthic Habitats, Birds, Marine Turtles and Marine Mammals** Activities on board the CSV or other vessels may result in the accidental release of an object (e.g. equipment) overboard. Similarly, activities at the seabed such as those conducted by ROV can result in tools and equipment being dropped. The removal of the flowlines and umbilicals from the seabed also presents a dropped object risk during recovery to surface. Objects that have the potential to be accidentally dropped overboard include: • Personal protective gear (e.g. glasses, gloves, hard hats) • Small tools (e.g. spanners) • Hardware fixtures (e.g. riser hose clamp) • Lifting equipment • Infrastructure being recovered from seabed. Dropped objects can cause smothering of benthic habitats as well as injury or death to marine fauna or seabirds through ingestion or entanglement (e.g. polymer rope entangling marine fauna or smaller plastic fragments or being ingested). Where practicable, dropped objects will be recovered and therefore impacts are expected to be temporary in nature. However, in some instances where it is unsafe to retrieve or impossible to find, objects may remain overboard. If individual dropped objects are unable to be recovered, the impact would be expected to be localised, and would be unlikely to have a discernible effect on benthic habitat or populations. The following threat abatement plans, recovery plans, conservation advices, or wildlife conservation plans (relevant to marine fauna that may be present within the Operational Area) identify marine debris as a threat (Table 2-6): • Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (Commonwealth of Australia, 2018) • Conservation Advice *Rhincodon typus* (whale shark) (TSSC, 2015e) • Approved Conservation Advice for Dermochelys coriacea (Leatherback Turtle) (DEWHA, 2009a) • Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d) • Conservation Advice *Thalassarche cauta* (shy albatross) (TSSC, 2020c) • National Recovery Plan for albatrosses and petrels (2022) (Commonwealth of Australia, 2022a) Wildlife Conservation Plan for Seabirds (Commonwealth of Australia, 2020b) • Conservation Management Plan for the Blue Whale, 2015-2025 (Commonwealth of Australia, 2015a) • National Recovery Plan for the Southern Right Whale *Eubalaena australis* (DCCEEW, 2024h). Temporary or permanent loss of dropped objects is not expected to have a significant environmental impact, though could result in local disturbance to benthic communities. The consequence of any impacts from dropped objects are assessed as Level 2.	Level 2	A	**C17**: As-left seabed survey **C8**: NOPSEMA accepted safety cases **C11**: Equipment deployment, transfer, and recovery procedures **C7**: Garbage Management Plans	Impact is conceivable and could occur, however it would require a rare combination of factors and is therefore considered Unlikely (D).	Low	Acceptable, based on: • Impacts well understood • Residual risk (severity) is Low • Consequence is Level 2, therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented • Legislative and other requirements have been identified and met: – SOLAS Chapters VI and VII, in relation to a Cargo Securing Manual – OPGGS Act 2006: Section 280(2) – No interference with seabed to a greater extent than is necessary for the exercise of the rights conferred by titles granted – OPGGS Act 2006: Section 280(2) - Schedule 3 Occupational health and safety and OPGGS (Safety) Regulations 2024 • Activity will not impact the recovery of EPBC listed species • AEMS Standards and Processes have been identified • No objections or claims have been raised by relevant persons.

Aspect	Predicted Risks	Consequence Evaluation	Consequence Level	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
Accidental Release								
Loss of Containment Accidental release: • LoC – minor. Cause of Aspect: • Reverse installation (Lift and Cut, or Cut and Lift) • Vessel operations • ROV operations.	Change in water quality.	**Ambient water quality** Minor LoC scenarios include: • Hydraulic line failure (~1 m^3) • Consumables onboard the vessel (paints, chemicals etc) • Release of residual wax from within flowlines • Subsea release of retained diesel within B6 flowline during retrieval (~2 m^3). Hydraulic line failure is associated with small volume spill events – with a credible volume based upon the loss of an intermediate bulk container ~1 m^3. There may be some residual hydrocarbon wax within the main bore of the flowlines. As described in Section 3.4.2, the wax has an appearance temperature of around 35-45°C and is therefore expected to remain solid throughout the flowline recovery and offshore handling operations. The B6 flowline has a residual volume of ~1 - 2 m^3 of diesel which was used during the operational phase as a solvent to manage wax accumulated in the flowline. Any potential change to water quality is defined as a Level 1 consequence. The offshore environment within the Operational Area would cause any minor spill events to rapidly disperse resulting in minor local impacts. This assessment considers any indirect impacts to species arising from theoretical exposure would also be negligible given the limited exposure duration and extent due to rapid dispersion and return to ambient conditions post event.	Level 1	A	**C1**: Planned Maintenance System. **C23**: Vessel compliant with MARPOL Annex I, as appropriate to class (i.e. SMPEP or equivalent). **C31**: Containment/bunding used on vessels during flowline retrieval. **C32**: Flowline plugs to be installed prior to removal of B6 flowline. **C33**: Infield visual monitoring of B6 flowline during removal.	Impact is conceivable and could occur, however it would require a rare combination of factors and is therefore considered Unlikely (D).	Low	Acceptable, based on: • Impacts well understood • Residual risk (severity) is Low • Consequence is Level 1 , therefore no potential to affect biological diversity and ecological integrity • Activity will not result in serious or irreversible damage • Good practice controls defined and implemented • Legislative and other requirements have been identified and met: • AMSA's Marine Order Part 91 (Marine pollution prevention – oil Marine)Activity will not impact the recovery of EPBC listed species • AEMS Standards and Processes have been identified • No objections or claims have been raised by relevant persons.

6.3 Seabed Disturbance

6.3.1 Cause of Aspect

Seabed disturbance will occur as a result of the following activities:

- Physical presence of subsea structures (until removal during Phase 2)
- Removal of remaining Phase 1b subsea structures
- Reverse installation (reel)
- Reverse installation (lift and cut, or cut and lift)
- Legacy environmental impacts from historic BMG project impacts
- Leave property in situ at or below the seabed.
- Contingency long-term physical presence of up to ~0.5 m wellhead or BAM pile remnant above surrounding terrain, in the unlikely event that removal of these components at or below the seabed cannot be executed as planned.

6.3.2 Aspect Characterisation

For the BMG Closure Project, seabed disturbance is evaluated within this EP as if it were a higher order impact to provide further analysis to better demonstrate the nature and scale of the potential impacts, and to specifically address any legacy impacts associated with activities that occurred prior to those within scope of this EP. To understand the activities that have resulted in seabed disturbance over the course of the BMG Development (including those proposed under the decommissioning phase), an aspect (source) assessment has been completed in Table 6-4.

Section 3.7 summarises planned disturbances associated with Phase 2 activities. The following table (Table 6-4) describes discharges when they are associated with seabed disturbance/interaction throughout the BMG Project.

Table 6-4 - Summary of Seabed Disturbance/Interaction over the Course of the BMG Project

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
Construction	Well construction	Yes	During the BMG well construction, drill cuttings and fluids were discharged into the field similar to all other offshore drilling programs. The Well Operations Management Plan (Cooper Energy, 2016) identifies the following fluid systems were used in well construction: • Conductor and surface hole (seawater and gel sweeps) • 12¼" intermediate hole (8% KCl / PHPA / Glycol, WBM) • 8½" production hole to TD (6% KCl / PHPA, WBM) • Completion brine (8.9 ppg filtered, inhibited KCl brine (with 1.3%vol Safe-Cor and 0.2 ppb OS-1)) A breakdown of the fluid components is derived from historical well construction reports, and is provided in Section 6.4.2.2 of the BMG Closure Project (Phase 1) EP. The fluids included: • Sodium Chloride | E and PLONOR • Hydrosure 0-3670 | Gold (No SUB) • KCL brine based WBM – Barite | E – Soda Ash | E – Caustic Soda | E – Defoam A | None – Duo-Vis | Gold – Glute 25 | None – Glydrill LC | Gold – Glydrill MC | Gold – Potassium Chloride (KCl) | E PLONOR – Polyplus Dry | N/a – Potassium Hydroxide | E – Polypac UL | E – OS-1 | None The Phase 1 P&A fluids also include the brines and treatment chemicals outlined in the Phase 1 EP [BMG-DC-EMP-0001].	No	The EP for construction of the initial Basker-Manta wells approved at the time under the *Petroleum (Submerged Lands) Act 1967*, ranked the potential impact of these discharges as minimal impact (1) indicating the potential for long-term seabed contamination was not expected. This is consistent with subsequently approved infill drilling EPs being the Basker-6 drilling program (2008) and Basker Manta Ocean Patriot Drilling Campaign (2009). Both these EPs ranked the potential impact from these discharges as minimal (1). These EPs also described that the discharges were highly unlikely to cause any significant alteration of sediment characteristics either physically or chemically. Since well construction, Amplitude Energy has completed multiple subsea ROV surveys. These surveys indicate that the physical environment has recovered with no obvious cuttings piles remaining; this is as expected / assessed in earlier development EPs which anticipated minimal impacts due to the nature of the discharges and the high energy receiving environment. Records confirm that all production wells were drilled in the BMG field with water-based fluids. These fluids are mainly comprised of products with low ecotoxicity, and which are designed to be discharged and dispersible with seawater. As such, the potential for long-term seabed contamination is not expected.
	Installation of moorings, flowlines etc.,	Yes	During the installation of subsea infrastructure including: • Flowlines • Umbilicals • Manifolds and structures • Moorings. These activities resulted in an interaction with the seabed. This physical interaction included both the physical footprint of the infrastructure but also trenching of the B6 flowline and umbilical. The trench created was open and naturally backfilled over time. The reason for trenching this section was to mitigate impacts to commercial fisheries, allowing them to trawl without the risks of fishing equipment snagging on the B6 flowline and umbilical. Since trenching was completed, fisheries have proceeded to trawl the area between the PSZs, as reported by SETFIA and Fishwell Consulting (2021). There have been no reports of hook-ups at this trenched section.	No	Although the installation of subsea infrastructure will result in an interaction with the seabed, the physical interaction itself does not have the characteristics to cause a long-term contamination of the seabed. Physical changes due to trenching have recovered naturally over time with fisheries being active along trenched sections without incident for over 10-years. The EP for Full Field Development [09/HSEQ/ENV/PL02] described the discharges from flowline commissioning. The lines were hydrotested with chemically inhibited seawater (comprising biocide, oxygen scavenger and dye chemicals). Reporting describes the commissioning fluids (~50 m^3) were routed to the slops tank onboard the Crystal Ocean FPSO with no discharge to the environment. However, it is commonplace for hydrotest fluids to be discharged; such discharges would typically be assessed as impact Level 1, with no long-term impacts, attributable to fluids and associated chemicals quickly dispersing to no effect levels. As such the potential for long-term seabed contamination associated with this activity is not expected.

<table>
<tr><th>Development Phase</th><th>Activity</th><th>Interaction with the Seabed?</th><th>Description</th><th>Potential for Long-term Seabed Contamination?</th><th>Rationale</th></tr>
<tr><td></td><td></td><td></td><td>During flowline installation, hydrostatic testing was required to test infrastructure integrity prior to operations. Reports indicate no discharges to the environment occurred from these activities; however it is commonplace for hydrotest fluids to be discharged.</td><td></td><td></td></tr>
<tr><td>Operation</td><td>Processing of BMG fluids on the Crystal Ocean FPSO (and Basker Spirit when required) and discharge of Produced Water (PW)</td><td>Unexpected</td><td>The Crystal Ocean FPSO was moored in 170 m water depth.

PW discharge plumes are typically highly buoyant, and as such will rapidly rise and mix upon release into the marine environment. As such, it is expected that only semi-solid and solid constituents of the PW discharge stream would result in an interaction with the seabed in the event the solids settle on the seafloor.

As such the focus of this assessment was on the potential for NORMS, heavy metals and total dissolved solids (TDS) to interact with the seafloor.</td><td>No</td><td>Samples onboard the Crystal Ocean FPSO were taken in 2011 and verified that the PW stream would not have comprised NORMS above prescribed radioactive limits (Australian Radiation Services Pty Ltd, 2011). Throughout the production phase and cessation flushing operations, there was no evidence of mercury above hazardous thresholds (Atteris, 2018a).

The EP for Full Field Development [09/HSEQ/ENV/PL02] described the PW discharges during the operational phase of the activity. A breakdown of the PW composition is provided (see table below).
<table>
<tr><th>Parameter</th><th>Units</th><th>Results</th></tr>
<tr><td>Cations</td><td></td><td></td></tr>
<tr><td>Calcium (Ca)</td><td>mg/L</td><td>200</td></tr>
<tr><td>Magnesium (Mg)</td><td>mg/L</td><td>130</td></tr>
<tr><td>Sodium (Na)</td><td>mg/L</td><td>11000</td></tr>
<tr><td>Potassium (K)</td><td>mg/L</td><td>5100</td></tr>
<tr><td>Anions</td><td></td><td></td></tr>
<tr><td>Hydroxide (OH)</td><td>mg/L</td><td><1</td></tr>
<tr><td>Carbonate (CO_3)</td><td>mg/L</td><td><1</td></tr>
<tr><td>Bicarbonate (HCO_3)</td><td>mg/L</td><td>1400</td></tr>
<tr><td>Sulphate (SO_4)</td><td>mg/L</td><td>480</td></tr>
<tr><td>Chloride (Cl)</td><td>mg/L</td><td>18000</td></tr>
<tr><td>Nitrate (NO_3)</td><td>mg/L</td><td><0.1</td></tr>
<tr><td>Derived and Other Data:</td><td></td><td></td></tr>
<tr><td>Total Dissolved Solids (Calculated)</td><td>mg/L</td><td>36000</td></tr>
<tr><td>Total Hardness as $CaCO_3$</td><td>mg/L</td><td>1000</td></tr>
<tr><td>Total Alkalinity as $CaCO_3$</td><td>mg/L</td><td>1200</td></tr>
<tr><td>pH at Measured temp</td><td></td><td>7.0</td></tr>
<tr><td>Measured temp</td><td>°C</td><td>21.2</td></tr>
<tr><td>Electrical Conductivity</td><td>µS/cm</td><td>57000</td></tr>
</table>
Calculated TDS indicates that the PW TDS was likely to have been similar to surrounding ambient seawater levels.

Modelling undertaken for the Tuna Platform located ~27 km north west from the Operational Area in a water depth of ~60 m, suggest that due to the high buoyancy of PW and high energy environment a direct interaction with the seabed would not be expected (Esso, 2021)). This is expected to be similar to historic BMG discharges as:
• The subsea currents in the modelling are comparable to the Operational Area, ~0.2-0.3 m/s and ~0.1-0.6 m/s respectively
• The PW discharged from the Tuna Platform is in the order of ~2500-4000 m^3/day whilst historic BMG discharges were in the order of ~500 m^3/day
• The BMG PW discharges occurred at the Crystal Ocean FPSO located in ~170 m water depth, much deeper than those modelled at the Tuna Platform (~60 m)</td></tr>
</table>

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
					• Benthic sediments at both locations are comparable with (Esso, 2021) indicating the sediments are unconsolidated comprising slightly muddy, muddy and gravelly sand. As the discharges volumes were at least five times larger at the Tuna Platform and as PW discharges from the Crystal Ocean FPSO are located in much deeper waters, the outcome from modelling for PW discharges at the Tuna Platform are expected to provide a conservative proxy for historic BMG PW discharges, and indicating direct interaction with the seabed would not have been expected. Sediment monitoring undertaken for the comparable operations in the Tuna Platform determined no PAHs were detected; and occurrences of metals/metalloids were isolated, indicating that levels of contamination remained negligible (Esso, 2021). Neff et al. (2011) suggest this is consistent with other facilities, as they show that natural dispersion processes appear to control the concentrations of potential contaminants from PW in sediments to slightly above background concentrations. As no NORMS (above prescribed limits) or heavy metals such as mercury were present at hazardous levels in the PW stream, the potential for these to bind to the solids causing a longer-term bioaccumulation risk is considered negligible. Dissolved oils generally have a high toxicity, due to constituents such as BTEX and PAHs. While BTEX may be a more abundant component of the oil in PW, it is highly volatile, and is typically rapidly lost either during treatment, initial mixing or through volatilisation once at water surface. Conversely, PAHs, due to their semi-soluble and not highly volatile nature, can persist in the environment long enough for prolonged exposure to occur. Where prolonged exposure to fauna occurs, there is the potential for fauna to bioaccumulate metals, phenols, and hydrocarbons from the ambient water, their food, or bottom sediments. A review of historic monthly reports between 2006 and 2009 identified that at times, OIW concentrations were above discharge limits. This was managed by holding PW offshore and treating via the addition of chemicals and heat prior to discharge. However, in some instances, achieving 30 mg/L OIW was not possible. As such between November 2007 and January 2008 an exemption was sought to enable discharges of 500 m^3/day with OIW concentrations of up to 150 mg/L. For the remainder of operations, the OIW discharge limits were achieved. Monitoring of the Tuna Platform PW discharges (treated to 30 mg/L OIW) determined that all constituents (metals, TRH and PAH) were below ANZEC 99% criteria from all samples taken between 59 m and 1,574 m of the discharge source. The monitoring undertaken by Esso Australia Resources Pty Ltd in 2018 (Esso, 2021) observed that PAHs were not present either in waters or sediments above relevant guideline criteria indicating the potential for bioaccumulation is low. Although TRH and PAHs can potentially result in sub-lethal and lethal effects (if both a duration and exposure above a required threshold is met), it is considered unlikely to have occurred within the vicinity of the Crystal Ocean FPSO given the water depths, mixing potential and observations from similar monitoring programs in the region. The EP for Full Field Development (09/HSEQ/ENV/PL02), approved under the legislation at the time, ranked the potential impact of these discharges as minimal impact (1). As detailed above, modelling conducted for a similar operation in the region by Esso Australia Resources Pty Ltd (cited in Esso (2021)) indicates no direct interaction with the seabed is expected, and monitoring (water and sediments) verify negligible contamination has occurred. Approval for this activity was provided in 2021 indicating that regulator expectations regarding the potential for seabed contamination from PW discharges are consistent with historical BMG approval documentation. Other oily water discharges common to the region include treated vessel bilge; these are limited to 15 mg/l OIW and apply to all vessels, including those operating in field,

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
					and other marine users such as fisheries and shipping which have been operating extensively throughout the region for decades. Given the location of BMG, water depths and available information for TDS, PAH and heavy metals sampling results from comparable activities, the activity is not expected to have caused long-term contamination of the seabed.
	Operation of flowlines, umbilicals and subsea control modules	No	A review of all monthly reports during operations did not identify any subsea releases of crude from infrastructure during operations. Consequently, no unplanned releases were identified as having the potential to cause long-term contamination during the operations phase. Subsea production equipment is managed and operated through the use of open loop hydraulic systems. This means that during the operations phase, valve actuation results in a small release of hydraulic control fluid (each movement). Actuated valves were located on the wellheads and manifolds. As detailed in the previous revision Gippsland Offshore Operations EP [VIC-EN-EMP-0002], the system utilised a water based hydraulic control fluid, Transaqua HT2. Each valve actuation can result in the release of a couple of litres to the marine environment. Previously completed fluid dispersion modelling for subsea releases of control fluids indicate that in similar water depths with a similar product the residence time or plume persistence was estimated to be in the order of ~18 minutes (BP, 2013). This fluid has a density less than seawater, and is dispersible, thus is expected to rise and disperse upon release. The majority of the product is low toxicity, biodegradable and non-bioaccumulative. Given the limited potential for interaction with the seabed from this historic discharge, contamination of the seabed during Operations is not expected.	No	As no interaction with the seabed was identified for this activity, it was not considered as having the potential to cause long-term contamination of the seabed.
	Cessation of operations	No	Prior to entering the NPP, all gas was vented from pipework, flowlines were flushed with discharges brought to the surface treated (to remove hydrocarbons to be below 30 mg/L and discharged at the surface. Individual discharge volumes ranged in quantity from <3 m^3 to 33 m^3. None of these discharges would have been expected to result in any seabed interaction given the water depth and dynamic nature of the marine environment.	No	As no interaction with the seabed was identified for this activity, it was considered as not having the potential to cause long-term contamination of the seabed.
	Unplanned release of hydrocarbons	No	A number of small spills of hydrocarbons occurred. The largest spill was reported in 2007. A light crude spill in the order of 40 L was released to the sea, which activated a Level 1 response. Due to the characteristics of light crude oils, all impacts were limited to surface waters.	No	As no interaction with the seabed was identified for these discharges, it was not considered as having the potential to cause long-term contamination of the seabed, thus has not been considered further.
NPP	No activities identified with the potential to interact with the seabed				
Decommissioning	Phase 1 and Phase 2 subsea cutting of infrastructure	Yes	Cutting tools required to remove structures cemented into the seabed or to cut flowlines / umbilicals during removal activities will generate grit, flocculant, cement cuttings, metal and plastic swarf at the seabed and inside the flowlines (Section 3.7). These solids will be discharged to the marine environment in the vicinity of the cutting activity resulting in localised seabed disturbance. All disturbance will be within the existing infrastructure footprint.	No	The BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001] was accepted by NOPSEMA in April 2022. This EP considered seabed disturbance associated with the range of activities including subsea cuttings and subsequent releases. The EP assessed the potential impacts to seabed as being a Level 2 consequence defined as localised short-term impacts with recovery over days and weeks. Although subsea cutting of infrastructure may result in an interaction with the seabed, these interactions do not have the characteristics to cause a long-term contamination of the seabed.
	Phase 1 discharges	Potentially	A number of discharges are associated with the Phase 1 Closure Project. Specifically, the following: • Facility (re)cleaning and preparation for decommissioning – Liquid scale dissolver / calci-wash used for equipment cleaning. • Well abandonment – Inhibited seawater behind tree cap • Well intervention and suspension – Line contents from cutting or disconnection of the flowline jumpers, flowlines, electrical and hydraulic leads	No	The BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001] was accepted by NOPSEMA in April 2022. This EP considered planned discharges (and potential interaction with the seabed) for the range of discharges including cementing and flocculants. The EP assessed the potential impacts to seabed as being a Level 1 consequence defined as minor local impacts with nil to negligible remedial works. Although planned discharges from Phase 1 activities may result in an interaction with the seabed, these interactions do not have the characteristics to cause a long-term contamination of the seabed.

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
			• Restoring cap rock – Control fluids from testing and operation of the pressure control equipment • Cementing • Flocculant (this is a Phase 1b related discharge that will occur under the Phase 2 EP activity scope).		
		No	A number of surface discharges are associated with the Phase 1 Closure Project. Specifically, the following: • Well intervention and suspension: – Trapped gas within the subsea tree – Actuation of tree valves – Downhole safety valve function – Pressure control equipment function testing – Riser flush with MEG prior to opening well, on well entry/exit. – Downhole discharges from flowline flushing, with no discharges to the marine environment; however, if bullheading is obstructed, fluid will be return to the MOU fluids handling package – Surface returns of incumbent liquid and gas from tubing and annular spaces • Restoring cap rock – Well kill and clean-up fluid (brines, seawater, viscous pills) – Lost circulation material – Fluids circulated to storage tank • Cementing – Cement spacer fluid and/or cement contaminated with incumbent well fluids (e.g. Mud / brine) will be discharged at the surface. – Cement tank washing – Cement slurry returns from well (contingency) – Dry bulk transfer losses	No	As no interaction with the seabed was identified for these discharges, it was . considered as not having the potential to cause long-term contamination of the seabed. ..
	Deburial of flowlines and umbilicals (Phase 2)	Yes	All flowlines and umbilicals will be retrieved as planned under this EP. Information gathered during Phase 1 of the BMG Closure Project and studies conducted for Amplitude Energy have been used to engineer alternate removal methods. If deburial of flowlines, umbilicals or any other infrastructure from the seabed sediment is required, the use of jetting equipment or MFE equipment will result also result in seabed disturbance. As high-pressure water / air is used to de-bury (or clean) the infrastructure, this will create an initial upwards / sideways plume within the Operational Area, then settling of suspended sediment around the infrastructure which will then continue to shift and over time according to natural currents near seabed.	No	Although the deburial of flowlines and umbilicals will result in an interaction with the seabed, these interactions do not have the characteristics to cause a long-term contamination of the seabed. A study completed by the AIMS and Deakin University (Ierodiaconou, et al., 2021), reviewed the benthic habitat and marine communities present within the Operational Area. The study identified that ~41% of flowlines in quadrats were classed as 'buried'. With the exception of the B6 flowline, no other lines were intentionally buried indicating the prevalence for sediments to naturally shift and redistribute throughout the Operational Area over time (Ierodiaconou, et al., 2021). Given the dispersion and movement of sediments over time and the characteristics of the seabed, any short-term changes to the benthic environmental due to suspension of sediments does not have the potential to cause long-term seabed contamination.
	Wet parking of equipment and infrastructure	Yes	During decommissioning activities, some infrastructure (i.e. flowlines and umbilicals) may be temporarily wet parked on the seabed to be retrieved later in the campaign, prior to the completion of activities within the scope of this EP. The remaining Phase 1b infrastructure will be removed within the scope of this Phase 2 EP. Wet parking will occur within the Operational Area, and the footprint of wet parked infrastructure will be no larger than the infrastructure itself (Table 3-).	No	Although the wet parking of equipment and infrastructure will result in an interaction with the seabed, these interactions do not have the characteristics to cause a long-term contamination of the seabed.

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
	Leave property in situ	Yes	The wellheads and the BAM pile (steel tubulars) extend deep into the seabed and are cemented in place. Full removal of the manifold pile is not considered feasible. The wellheads and manifold pile are planned to be cut at or below the seabed (target of ~1 m below the seabed) and the cut section recovered to surface. Total recovery of pile section will be ~4 m, as described in Table 3-.	No	The well infrastructure below the seabed must remain in place as it is part of the permanent reservoir barrier. Although degradation of the BAM pile may occur when the infrastructure is left in situ, marine corrosion studies have shown that for metal structures such as piles, corrosion is likely to be a relatively slow process, occurring at about 0.2 mm/year (Melchers, 2005). Corrosion rates are usually higher in warm surface waters than in cold deep waters (Guedes, et al., 2011). Iron corrosion may lead to iron enrichment on the small benthic biota at the seafloor (Soltwedel, et al., 2023) surrounding the infrastructure. Changes to seafloor, macro- and megafaunal assemblages may occur due to this enrichment, however, Taylor et al. (2014) identified that potential disturbance will be mild with very local scale effects (<10 m from the disturbance source). Given the limited quantity of steel to be left in situ, at or below seabed any effects associated with iron enrichment are expected to be localised.
Supporting operations	Vessel activities	No	A number of surface discharges were associated with historic vessel operations (Crystal Ocean FPSO, Basker Spirit, supporting vessels). These discharges included: • Cooling water – seawater was used as a heat exchange medium for the cooling of machinery engines. The seawater goes through a heat exchanger that transfers heat from the vessel engines and machinery to the seawater. Amplitude Energy understands that cooling water discharges mix rapidly with the receiving waters, with vertical mixing limited to surface waters (Woodside, 2014). • Brine – brine is generated from the water supply system. Brine is discharged to the open ocean at a salinity of approximately 10% higher than seawater. On discharges brine will sink through the water column where it is known to rapidly mix within the receiving surface waters and more widely dispersed by ocean currents. • Sewage and greywater – discharges of sewage and greywater are known rapidly disperse with monitoring of similar discharges indicating background levels were not exceeded at depth with vertical mixing limited to surface waters (Woodside, 2014). • Putrescible waste – due to the rapid consumption of this food waste by scavenging fauna, and physical and microbial breakdown, with all impacts limited to surface waters. • Deck drainage and bilge – contaminated water, directed to an oily water treatment system, is treated to a concentration of 15 ppm (or less) OIW before discharge. Historic deck drainage and bilge discharges were intermittent are expected to have readily diluted and disperse under the action of waves and currents in surface waters.	No	As no interaction with the seabed was identified for these discharges, it was not considered as having the potential to cause long-term contamination of the seabed.
Emergency responses	Oil spill response	No	Historic operations did not implement chemical dispersion as a response to any spill events. The largest spill reported was 40 L (0.4 m^3), activating a Level 1 response. Level 1 response activation requires onsite resources (e.g. surveillance and monitoring) and/or activation of SOPEP/SMPEP.	No	No discernible interaction with the seabed expected given surface release in deep water.
	Fire emergency response	No	Testing of fire-fighting deluge systems onboard vessels were undertaken during the BMG operation. Although residual discharges of aqueous film forming foams (AFFFs) to sea have not been detected within historic vessel operations reports, testing the system has the potential to lead to a surface release of fire-fighting foams offshore. In their diluted form (i.e. as applied in the event of a fire or test), fire-fighting foams are generally considered to have a relatively low toxicity to aquatic species (Schaefer, 2013; IFSEC Global, 2008) and further dilution of the foam mixtures in dispersive aquatic environments may then occur before there is any substantial demand for dissolved oxygen (ANSUL, 2007). If discharges occurred and comprised AFFF, settlement to the seabed in the vicinity of the operational area would be expected to be low.	No	No identified discharge of AFFF during development or operations. If discharge did occur, then it is considered unlikely that AFFF components would settle out in significant quantities within the operational area but would become quickly dispersed to very low concentrations. As no interaction with the seabed was identified for this type of discharges, it was not considered as having the potential to cause long-term contamination of the seabed.

6.3.3 Predicted Environmental Impacts and Risk Events

Potential impacts from seabed disturbance are:

- Change in benthic habitat.

Potential risk events associated with change in sediment and water quality arising from seabed disturbance are:

- Impacts to benthic and demersal invertebrate communities
- Indirect impacts to marine habitats
- Impacts to fish and commercial fisheries
- Impacts to cultural heritage values.

6.3.4 Impact and Risk Evaluation

6.3.4.1 Impact: Change to benthic habitat

Inherent Consequence Evaluation

Making good the seabed at the BMG site involves the removal of property; this causes temporary disturbance, but ultimately allows the seabed to return to its pre-use state. Prior to BMG being installed, the seabed was regularly trawled. Trawling has continued around the BMG PSZs inside VIC/RL13 throughout the lifetime of the BMG facilities. The pre-use state of the seabed is therefore not its natural state, and is not undisturbed, but is subject to regular change by bottom trawling.

Direct impacts associated with the activities covered in this EP are expected to be limited. The removal of infrastructure will result in direct impacts to the seafloor and any wet storing of equipment will be temporary in a location immediately adjacent to the existing footprint, and within the Operational Area.

Following removal of equipment, sand and silt will begin to fill the area as currents naturally redisperse the seabed sediments; recolonization would also be expected to occur. This could take months but is unlikely to have lasting effects. Such recovery has been observed following the trenching of the B6 flowlines and umbilical in 2012. Subsequent surveys have shown the flowline trenches have naturally backfilled and previously disturbed areas supporting species typical of the region (Fugro, 2020; Ierodiaconou, et al., 2021) (see also Figure 6-1, Figure 6-2, and Figure 6-3).

If infrastructure is in place for an extended period of time, there is the potential for continued seabed scouring as the currents erode sediments around the structures. Any such impacts will be limited to the immediate vicinity of the infrastructure and include physical modification to the seabed and localised disturbance to soft sediments. From analysis of historical ROV footage within the BMG field, such scouring can in itself provide habitat, hence the temporary impacts (whilst the infrastructure remains) are not necessarily negative (for example, see Figure 6-4). However, upon completion of BMG Closure Project (Phase 2) activities, no infrastructure will be left in situ; any existing seabed scouring will be left to naturally backfill. Associated impacts from seabed scouring will be temporary.

Figure 6-1 - Image from 2020 GVI showing the B6 Oil flowline transitioning from above to below the seabed (Ierodiaconou, et al., 2021)

Figure 6-2 - Image from 2020 GVI showing seabed above the B6 umbilical which was mechanically trenched in 2012. The trench was left to naturally backfill (Ierodiaconou, et al., 2021)

Figure 6-3 - Image from 2020 GVI showing seabed above the B6 oil flowline which was mechanically trenched in 2012. The trench was left to naturally backfill (Ierodiaconou, et al., 2021)

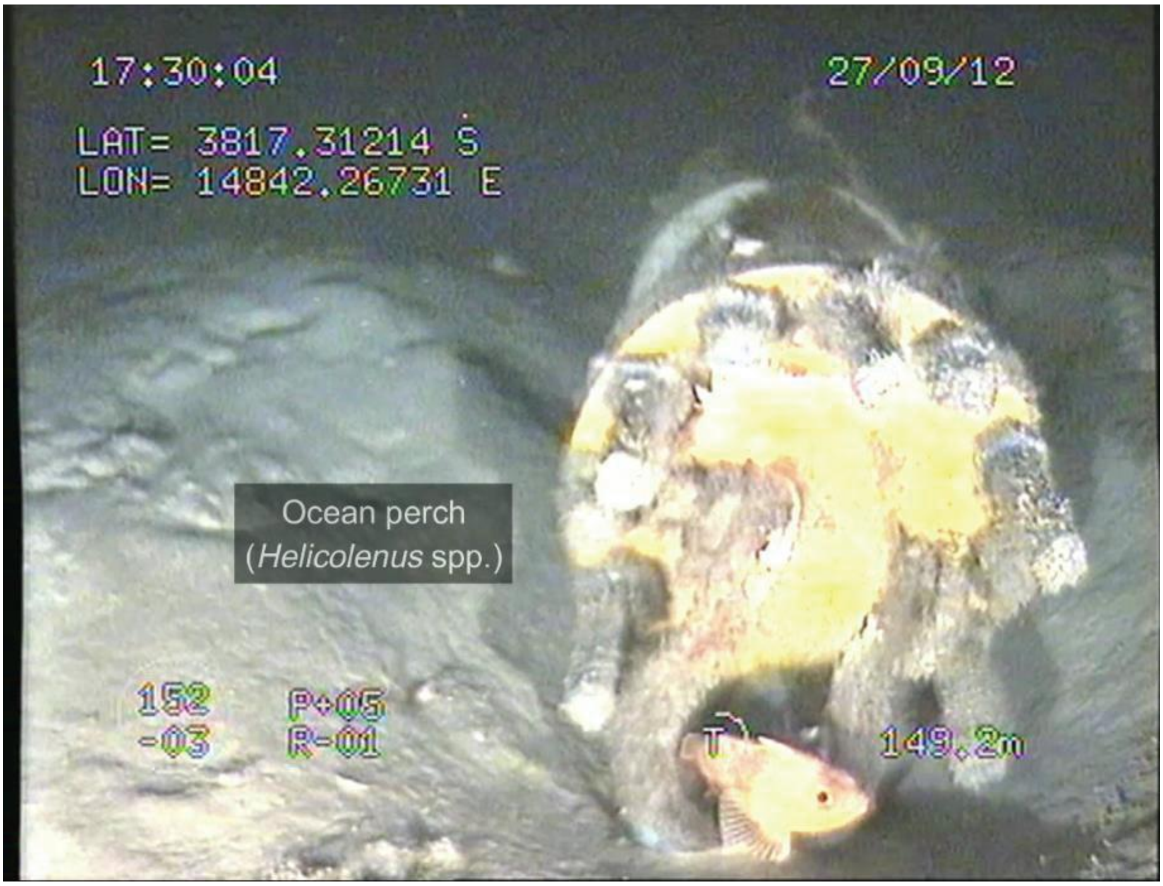


Figure 6-4 - Image showing some localised scour around flowline midline end point, showing ocean perch within (Ierodiaconou, et al., 2021)

Given the localised and recoverable nature of seabed disturbance within the Operational Area, this impact has been evaluated as **Level 1**. Upon completion of the activity, the seabed within the Operational Area will return to use by fisheries and would be expected to be regularly modified through bottom trawling. No remedial or recovery work is expected, unless by exception, upon alert of a claim by a fishing vessel operating in the area.

Should contingent deburial be required, the use of a mass flow excavator has the potential to cause an impact that is larger than removal without deburial. Within the Operational Area, the receptors sensitive to turbidity and smothering include seabed habitats and fish (CEDA, 2020). As described in Section 4.3.1, the seabed of the Operational Area comprises silty fine sand and sand. Habitat studies conducted in the Operation Area (Ierodiaconou, et al., 2021) identified the area as largely featureless with limited availability of hard substrate, and the soft sediment benthic habitat is moderately abundant in the region.

Based upon deburial of a 3 km section of flowline buried on average 0.5 m below the seabed surface, the mass quantity of sediments disturbed is estimated to be in the order of 1,500 m^3. Using Stokes equation to calculate the fall velocity for sediments, it is expected that increased turbidity could occur within ~16 km of the activity. A review of modelling conducted for similar activities indicate that suspended sediments would likely be expected within 16-18 km of the activity location (SmartWind, 2013; ConocoPhilips, 2019). Specifically, the modelling predicts sedimentary deposition would be experienced within hundreds of metres of the activity, indicating that deposition impacts would be localised to the seabed surrounding the activity. On this basis, using a calculated settling velocity provides a suitable mechanism for understanding the extent of potential impact associated with this activity given the conservatism within the inputs. The majority of sediments would be expected to settle within approximately 1 km of the activity. Mechanical trenching of the B6 flowline and umbilical during 2012 would indicate a smaller footprint from trenching activities, with most deposition occurring either side of the trench.

Although one KEF (Upwelling East of Eden) was identified in the area the benthic environment is considered homogenous with habitat limited to soft sediment communities. No TECs were identified within this area of exposure. Surface sediments are mobile, and studies indicate some mobilisation from natural influences, and from trawl fishing; relative intensity of seabed trawl fishing is high around and beyond BMG (SETFIA and Fishwell Consulting, 2021). As such impacts to benthic habitats from turbidity and smothering is expected to result in Minor (1) impacts that rapidly recover on completion of the activity.

6.3.4.2 Risk Event: Benthic and demersal communities

Inherent Consequence Evaluation

The deburial of linear infrastructure would result in suspension of sediments which, given the Gippsland Basin is well mixed high energy environment, could result in localised short-term impacts in and around the existing disturbance footprint.

As identified in Table 4-, benthic and demersal communities within the Operational Area are characterised by a soft sediment and shell/rubble seabed, infauna communities, and sparse epibiotic communities (typically sponges) and located beyond photic zone (approximately 135 m to 270 m). Site specific surveys indicate the Operational Area to be largely featureless, dominated by a mix of sand and pebble/gravel (Ierodiaconou, et al., 2021); characteristics that are widespread throughout the Gippsland region.

Epifauna communities are expected to be sparse compared to nearshore regions due to occurrence of silty sands and limited availability of hard substrates (subsea equipment excepted). Epibenthic communities are expected to consist primarily of sand, biofilm (thin layer of epibenthos), burrowing infauna and shells, with the presence of occasional black corals/octocorals and encrusting sponges associated with subsea infrastructure and limited areas of hard substrate (Ierodiaconou, et al., 2021).

A study of marine communities of Amplitude Energy offshore infrastructure, undertaken by Deakin University and the AIMS in 2021 (Ierodiaconou, et al., 2021), utilised current and historic ROV imagery from infrastructure inspections; findings included:

- Species observed on and around the infrastructure were considered representative of the region
- Invertebrate taxa were identified from four phyla with Arthropoda and Cnidaria dominating the assemblages
- Wells had comparatively low numbers of invertebrates compared to flowlines, with 27 individuals observed from eight taxa across all wells and years
- Infauna burrows were observed beside all flowlines, generally in low densities
- Cover was predominantly biotic for all wells, dominated by biofilm. Black/octocorals, bryozoans and ascidians were also observed on structures
- Communities observed on flowlines and umbilicals varied in productivity and diversity across the field, likely due to physical (flowline position, distance to structures, depth) and biotic factors (benthic cover).
- In general, flowlines had higher fish species richness than the wells and manifold but supported a lower density of fish
- Handfish (*Brachionichthyidae spp*.) and stingaree (*Urolophus spp.)* were observed on sediment which had backfilled over flowlines, although species identification has not been possible.

Handfish are relatively small (60–151 mm) marine fishes with distributions restricted to the temperate waters of south-eastern Australia, predominantly concentrated in Tasmania (Last & Gledhill, 2009). They are demersal, generally cryptic in nature. Lacking a swim bladder, they prefer to use their ‘hands’ to ‘walk’ across the sea floor, rather than swim (although can do so over short distances when disturbed).

The images captured of the handfish were done so by ROV camera flying over the known flowline routes. These sections of flowlines were trenched and buried in 2012 (or have been naturally buried since installation). The specimens observed at BMG were all seen on areas of seabed covering the B6 EHU and B6 Oil Flowline (Figure 6-5). The seabed appears sandy/shell/silty/muddy. There is evidence of infauna (burrows/mounds) and epifauna. It is no longer obvious that the seabed was trenched, or that a flowline is buried beneath. Whilst detailed footage was taken (and analysed by Deakin University) of exposed sections of flowlines at similar depths; no specimens were observed on or around the exposed flowlines. This may indicate that the handfish specimens are not interacting with the flowline directly. The specimens observed were at least 200 m from the well centres.

Figure 6-5 - Suspected handfish sighting (Ierodiaconou, et al., 2021)

Based on recorded distributions (Stuart-Smith, et al., 2020), the more likely explanation as to what species of handfish were observed around BMG is the Australian handfish. This species is not EPBC Act listed threatened and is listed by the IUCN as 'least concern'. No listed threatened handfish species are expected to be found within the Operational Area, due to the depth (listed species are found in water depths up to 60 m) and the location (listed species are located around Tasmania only).

Any disturbance to benthic habitats and communities associated with the removal of infrastructure is expected to be localised and likely to recover over a short period. Kukert (1991) showed that approximately 50% of the macrofauna on the bathyal sea floor were able to burrow back to the surface through 4-10 cm of rapidly deposited sediment. Dernie et al. (2003) conducted a study that showed the full recovery of soft sediment assemblages from physical disturbance could take between 64 and 208 days. Mobile invertebrates are generally less vulnerable than sessile taxa to sedimentation, as they can move to areas with less sediment accumulation or by more efficiently physically removing particles (Fraser, et al., 2017). Sessile invertebrates are particularly vulnerable to sedimentation because they are generally unable to reorientate themselves to mitigate a build-up of particulates. However, some sessile taxa, including species of sponges and bivalves, have the capacity to filter out or to physically remove particulates (Roberts, et al., 2006; Pineda, et al., 2016).

Sediment-burrowing infauna and surface epifauna invertebrates (particularly filter feeders) which inhabit the seabed directly around subsea infrastructure locations and on infrastructure are expected to be most impacted by seabed disturbance activities. The sensitivity of such infauna and epibenthic communities to smothering, change in benthic habitat, and change in water quality are expected to be low given physical changes are expected to be temporary and localised recovering within weeks, as such consequence of seabed disturbance on benthic and demersal communities is expected to be **Level 2**. While changes in water quality (i.e. increased turbidity) are expected to recover within days, as such **Level 1** consequence has been assigned.

Inherent Likelihood

Given the nature of this activity, the inherent likelihood of a Level 2 consequence occurring is **Possible**.

Inherent Risk Severity

The inherent risk severity of impacting benthic and demersal invertebrate communities is considered **Moderate**.

6.3.4.3 Risk Event: Indirect impacts to marine habitats

Inherent Consequence Evaluation

As the BAM pile will remain in situ, over time, it will corrode.

As identified in Table 4-, benthic and demersal communities within the Operational Area are characterised by a soft sediment and shell/rubble seabed, infauna communities, and sparse epibiotic communities (typically sponges) and located beyond photic zone (approximately 135 m to 270 m). Site specific surveys indicate the Operational Area to be largely featureless, dominated by a mix of sand and pebble/gravel (Ierodiaconou, et al., 2021); characteristics that are widespread throughout the Gippsland region.

Marine corrosion studies have shown that for metal structures used in the petroleum industry, corrosion is likely to be a relatively slow process, occurring at about 0.2 mm/year (Melchers, 2005). Over long-time scales, corrosion of steel structures may contribute to an increase in breakdown products (mostly iron compounds) in the sediments surrounding the infrastructure. Iron compounds generally have nil to very low toxicity to marine organisms (Svobodová, et al., 1993) and any build up in the sediments surrounding the manifold pile through ongoing deposition would be counteracted by gradual dissipation as a result of local sediment movements.

Iron corrosion may lead to iron enrichment on the small benthic biota (bacteria, meiofauna) at the deep seafloor (Soltwedel, et al., 2023) surrounding the well infrastructure. Changes to seafloor, macro- and megafaunal assemblages may occur due to this enrichment. Although studies of phytoplankton have identified iron as one of the key controls on phytoplankton growth (Andrew, et al., 2019), faunal assemblages near structural steel (such as the manifold pile) have been identified as differed significantly from regional assemblages.

Soltwedel et al (Soltwedel, et al., 2023) stated that local enrichment of deep-sea sediments by metallic (e.g. iron) and corroding structures affects the diversity of the small benthic biota at short distances from the sources; Taylor et al. (2014) also identified a mild disturbance with very local scale effects (<10 m from the disturbance source).

In the event that removal of the wellheads and/or BAM pile at or below the seabed is demonstrated to not be reasonably practicable (e.g. if internal cutting is not technically feasible and other methods such as diamond wire saw cannot get below the seabed), up to ~0.5 m of a wellhead or BAM pile may be left in situ. However, this is considered a worst-case scenario as cuts made with a diamond wire saw would aim for the infrastructure to be removed as close as reasonably practicable to the seabed, using excavation techniques where possible to allow cut below the seabed (see Figure 3-5). Assuming a linear vertical degradation rate of 0.2 mm/year (refer to Section 6.3.4.3) for offshore steel infrastructure, residual steel stumps (0.5 m height) would be expected to degrade within ~150 years.

Given the likely slow-release rate (about 0.2 mm/year), the low toxicity of iron, rapid dilution of the open ocean environment and highly localised changes to faunal assemblages (<10 from the manifold pile or wellhead remnants), it is likely that any impacts to marine habitats or benthic communities would be limited to the immediate vicinity of these components, with no significant impacts expected to the values and sensitivities identified in Section 4.4. As such, consequence of seabed disturbance on marine habitats is expected to be **Level 1**.

Inherent Likelihood

Given the nature of this activity, the inherent likelihood of a Level 1 consequence occurring is **Likely**.

Inherent Risk Severity

The inherent risk severity of impacting benthic and demersal invertebrate communities is considered **Low**.

6.3.4.4 Risk Event: Commercial fisheries

Inherent Consequence Evaluation

According to a study undertaken by SETFIA and Fishwell Consulting (2021), although multiple different commercial fisheries have rights to fish around BMG, it is only the SESSF Commonwealth-managed fisheries that are likely to actively fish around BMG; these include:

- SESSF Commonwealth Trawl Sector
- SESSF Gillnet Hook and Trap Sector
- SESSF Scalefish Hook Sector.

As the BMG infrastructure does not provide significant habitat targeted by commercial fisheries, and as commercial fisheries have been unable to fish within the existing PSZ, direct impacts to fish and commercial fisheries arising from the removal of infrastructure and benthic disturbance are expected to be limited.

To help inform the identified decommissioning philosophy, detailed studies of commercial fishing operations around the BMG field were completed by SETFIA and Fishwell Consulting in 2012 and 2021, and an additional study is also being developed by SETFIA in 2026. These studies indicated that the SESSF (Commonwealth Trawl Sector) fishery had the highest risk of interaction due to the trawling methods used (SETFIA and Fishwell Consulting, 2012; SETFIA and Fishwell Consulting, 2021; SETFIA, 2026). Based upon the planned removal of all infrastructure, the long-term snag risk to fisheries from property is eliminated. Disturbances to the seabed during decommissioning could result in small depressions in the seabed which will backfill and be modified over time by trawling.

During the early planning phase of the project, Amplitude Energy engaged with relevant commercial fisheries and presented various options ranging from leaving the infrastructure in situ to full removal. Given that fisheries preference is for full removal, any impacts from these decommissioning activities are expected to result in only short-term consequences. Longer term impacts would have been present from leaving in situ (such as snagging risk for trawling equipment) however these have been mitigated through the option for full removal of flowlines, umbilicals, and other subsea property above the seabed.

In the event that removal of the wellheads and/or BAM pile at or below the seabed is demonstrated to not be reasonably practicable (e.g. if internal cutting is not technically feasible and other methods such as diamond wire saw cannot get below the seabed), up to ~0.5 m of a wellhead or BAM pile may be left in situ. However, this is considered a worst-case scenario as cuts made with a diamond wire saw would aim for the infrastructure to be removed as close as reasonably practicable to the seabed, using excavation techniques where possible to allow cut below the seabed (see Figure 3-5). Depending on the height above the seabed, the presence of any remaining infrastructure may present a snagging hazard for trawl equipment. Any residual hazard of this nature would be addressed through consultation with relevant persons, and the Fisheries Damages Protocol which are well established control measures. Assuming a linear vertical degradation rate of 0.2 mm/year (refer to Section 6.3.4.3) for offshore steel infrastructure, residual steel stumps (0.5 m height) would be expected to degrade within ~150 years, eventually removing the hazard.

The operator of the BMG field at the time trenched the B6 flowline and umbilical to enable fishery operators to continue to trawl in this area following cessation of production in 2012. No objections or claims have been received regarding interactions with these trenches. This is most likely due to the mobile nature of sediments and dynamic nature of the environment at this location resulting in subsea resulting in natural seabed levels recovering rapidly.

During deburial activities, there is the potential for sedimentation to impact soft sediment communities within the vicinity of the Operational Area. Seabed disturbance is not uncommon given the area has historically been trawled. The seabed is predominantly soft, mobile sediment that will redistribute over time. Commercially fished species are known to occur within the Operational Area (Ierodiaconou, et al., 2021), however any impacts to these species and subsequent fishery are expected to be minor. As such, the consequence of this impact is evaluated as **Level 1**.

Indirect impacts to commercial fisheries have been identified as potentially resulting from seabed contamination events. Where contamination of the seabed occurs, there is the potential for contamination of targeted commercial fisheries through bioaccumulation of contaminates as they work through the trophic ecosystem. The BMG facility was constructed prior in 2005 and was operated until 2011. Since 2011 no additional petroleum activities have occurred. As detailed in Table 6-4, Amplitude Energy has reviewed historic interactions with the seabed to understand the potential for contamination events and subsequent pathways for impacts to future use. This analysis identified that over the course of the asset life, no specific pathways for seabed contamination have been identified.

As such, Amplitude Energy does not believe that the conditions exist where the petroleum activities at BMG have or will have significant adverse impacts on the future use of the area.

Inherent Likelihood

Given the nature of this activity, the inherent likelihood of a Level 2 consequence occurring is **Unlikely**.

Inherent Risk Severity

The inherent risk severity of impacting benthic and demersal invertebrate communities is considered **Low**.

6.3.4.5 Risk Event: Cultural heritage values

Inherent Consequence Evaluation

As identified in Section 4.4.2, no World Heritage Properties, Commonwealth Heritage Places, or National Heritage Places were identified within the Operational Area. One potential historic shipwreck was identified within the Operational Area; however, DCCEEW confirmed that its location is actually unknown. Historical and recent surveys have not identified shipwrecks within the Operational Area.

Specific artefacts of First Nations and Indigenous cultural heritage are not expected within the BMG Operational Area. Analysis of sea-level changes over the Holocene indicates sea levels, at their lowest, dropped to around 120 m below current levels during previous glacial maxima (Holdgate, et al., 2003). Preserved fluvial features were identified to extend to approximately 95 m below current sea level. The BMG Operational Area is in water depths 135-270 m and, based on published information, this area has likely remained submerged through previous glacial maxima. Sedimentation rates during the Holocene are reported by Mitchel, Holdgate and Wallace (2007)as approximately 77 mm/ky in the inner shelf, indicating significant sediment deposition in the region. As such, direct impacts to seabed cultural heritage values are not expected.

Indirect impacts to intangible First Nations cultural values have the potential to occur where the activity causes change within the environment. Impacts within the marine environment, including physical and biological aspects (and which may manifest in impacts to cultural heritage values) are expected to be localised and/or temporary in nature. Where particular impacts to intangible cultural values are identified, these will be assessed in accordance with Section 10.13.

Given no known First Nations cultural heritage sites or artefacts have been identified during the BMG Development, the consequence of this risk is evaluated as **Level 1**.

Inherent Likelihood

The inherent likelihood of a Level 1 consequence occurring is considered **Remote**.

Inherent Risk Severity

The inherent risk severity of impacting cultural heritage values is considered **Low**.

6.3.5 Control Measures, ALARP and Acceptability Assessment

Table 6-5 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to seabed disturbance.

Table 6-5 - Seabed Disturbance ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context: Type B** Seabed disturbance in the BMG field has been a common an occurrence due to ongoing presence of both development activities and commercial fishing; ROV inspection has provided evidence of seabed recovery following historical cessation and NPP preparation activities within the BMG field. The area of impact, and therefore the scale of the impact, is expected to be small, and the species present associated with the seabed expected to recover. Given this, Amplitude Energy believes ALARP Decision Context A should apply. However, given Directions 4 and 5 (from General Direction 824), seabed disturbance has been evaluated within this EP as if it were a higher order impact to provide a mechanism for analysing the cost and environmental benefits associated with implementing additional controls to ensure that Amplitude Energy make good the seabed prior to completing activities covered in this EP.					
Control Measure	**Source of good practice control measures**					
C1: Planned Maintenance System	Critical equipment on vessels will be maintained in accordance with preventative maintenance system.					
C3: Positioning Technology	Use of positioning technology to position equipment on the seabed with accuracy will reduce seabed disturbance.					
C2: Wet parking restricted to within the existing PSZs	All infrastructure requiring wet parking will be limited to identified planned areas inside existing PSZs.					
C27: Sea Dumping Permits	Sea Dumping permits are obtained prior to sea dumping, and permit requirements are fulfilled. A sea dumping permit is required for the infrastructure to remain in situ on the seabed prior to relinquishment of the petroleum title.					
C29: All wellheads and the BAM pile will be cut at or below the seabed	Base case for BMG Phase 2 is removal at or below the seabed for the wellheads and BAM pile.					
Control Measures Considered	**Related Risk Event**	**Benefit**	**Recognised Good Practice?**	**Sacrifice**	**Introduced Risks**	**Conclusion**
Conduct infield sediment sampling.	Seabed contamination	As detailed in Table 6-4, no source receptor pathways have been identified for contaminants. Titleholders of VIC/RL13 permit have completed many surveys over the course of the BMG Development including visual ROV surveys and MBES. These surveys indicate that sediments	No. However, standard practice for onshore is to assess land for acceptability for future proposed land use through a combination of contamination screening and sampling.	Cost to complete a seabed sampling program. On the basis that a vessel suitable of carrying out seabed samples cost of $50,000 per day, and on the assumption that a sampling program	Additional vessel movements, HSE risks, and further seabed disturbance, will be introduced through the implementation of this control.	**Implement.** Rationale: Sampling undertaken at other more extensive offshore operations have not identified contamination levels above threshold. The activities undertaken during the BMG Development are not expected to result in

		are mobile and due to the lack of exposure pathways, a subsea monitoring program is unlikely to identify the presence of seabed contamination above ambient levels. The mobile nature of sediments also poses significant limitations to infield monitoring. Tracing contamination back to a source may be difficult given the potential for influence from other events and activities that may have occurred outside of the Operational Area, along with absence of BMG operations for a period of nearly 10 years. During the life of the asset, there is no evidence to suggest seabed contamination existed, nor that it has impacted on receptors. As such the environmental benefit of collecting infield seabed quality data is considered incidental given the lack of source receptor pathways and associated low risk.	Initial assessments of historical activities and discharges at the offshore BMG site indicate a low risk of contamination. Sampling would provide confirmation.	may take up to 5 days including mobilisation and demobilisation, with an additional cost for laboratory, analysis and report writing, the cost of implementing this control is estimated to be in the order of $350,000.		long-term contamination of the seabed, sampling information which confirms no seabed contamination, does not currently exist. Through collecting and analysis of sediment samples, Amplitude Energy can remove any uncertainty associated with long-term contamination associated with BMG activities and as such have decided to implement this control measure. By integrating a sampling activity into offshore decommissioning works, the cost of this control can be reduced such that it is not grossly disproportionate to the risk reduction achieved. Integrated via **C4**: Sediment sampling and sediment sampling program described in Section 10.15.2.
Conduct annual seabed surveys to monitor recovery of seabed disturbance arising from deburial activities.	Seabed Disturbance	Amplitude Energy understand that removal activities will disturb the seabed. These modifications have the potential to influence how	No. It is standard practice to conduct an "as left" or final seabed survey upon	There will be a cost to complete annual (or regular) seabed surveys. Based upon the previous seabed	Additional vessel movements and HSE risks will be introduced through	**Rejected** Rationale: The physical environment and mobile nature of sediments in this

		fishing gear interacts with the seabed until the seabed recovers. Conducting annual seabed surveys could confirm seabed recovery rates. These surveys would be in addition to the seabed and as-left survey (detailed in Section 3.4.4). As the Operational Area comprises mobile sediments with existing trenches observed to recover through the natural sedimentation of the surrounding seabed, the environmental benefit of implementing this control is limited.	completion of the activity (as detailed in Section 3.4.4). In addition to this, Amplitude Energy plan to implement an event driven survey effort (refer to control measure below).	survey, each survey comprising an ROV and MBES component is estimated to cost approximately $1,000,000.	the implementation of this control.	region (and experience from historic surveys) indicate recovery will occur rapidly. The seabed will continue to be modified by active trawl fishing in the area. This control is considered to result in costs that are grossly disproportionate to the level of risk reduction achieved.
Prior to the relinquishment of VIC/RL13, whilst Amplitude Energy remains Titleholder, Amplitude Energy will address objections and claims from relevant persons, including through the application of its Fisheries Damages Protocol and/or investigative survey at the BMG site.	Seabed Disturbance	Amplitude Energy understand that fisheries utilising trawling methodologies have the potential to be impacted by anomalies on the seabed, which may create a snag risk. Full removal of property eliminates the snag risk to fisheries. Debris surveys shall be undertaken which will provide further assurance of a clear seabed. In addition, maintaining a Fisheries Damages Protocol provides a means of addressing and validating claims of residual	No. It is standard practice to conduct an "as built" or final seabed survey upon completion of the activity (as detailed in Section 3.4.4).	There will be a cost to maintain the Fisheries Damages Protocol; this is considered administrative and proportional. Should further investigation offshore be required, a geographically discrete reactive survey may exceed $500,000, depending on the vessel and equipment spread	Additional vessel movements and HSE risks will be introduced through the implementation of this control.	**Implement** Rationale: This control measure aligns well with existing control measures for ongoing consultation and plans for future activities. Integrated via **C19**: Fisheries Damages Protocol, and provision for seabed surveys where supported by a valid claim.

		snag risks, should they be made. The benefit of this control is that it provides a mechanism linked to permit duration for objections and claims to be addressed.		necessary to address the validated claim.		
If removal of the wellheads and/or BAM pile at or below the seabed as planned cannot be executed, then implement an alternate end state where remnants (up to ~0.5 m above surrounding terrain) can remain in situ.	Commercial fisheries. Indirect impacts to marine habitats	Removal of wellheads and BAM pile at or below the seabed eliminates any potential interactions with commercial trawl fishers, and any slow degradation and release of material to the ocean over time. However, if reasonable attempts at removal at or below the seabed have been unsuccessful, then the presence of a small remnant (up to ~0.5 m) above the seabed of the wellhead or BAM pile may need to be left in situ. Any potential remaining infrastructure (of up to ~0.5 m height) left in situ is expected to eventually degrade into seabed sediments over ~150 years (Section 6.3.4.1) Amplitude Energy considers reasonable attempts to include that: • Multiple cut attempts have been made	In scenarios where it has been demonstrated that removal at or below the seabed is not technically feasible or has been demonstrated as not practicable, then yes, leaving part of a structure in situ above the surrounding terrain has been done previously within the industry.	There will be a cost associated with additional relevant persons consultation and risk treatment plan. If a credible snag risk remains, then there may also be additional costs for risk treatment.	Additional vessel movements, HSE risks, and further seabed disturbance, may be introduced through the implementation of this control.	**Implement.** Rationale: Base case for BMG Phase 2 is removal at or below the seabed for the wellheads and BAM pile. However, if reasonable attempts have demonstrated that this is not technically feasible, then an adaptive management process that provides for an alternate end state will be implemented. Amplitude Energy acknowledges the potential for in situ infrastructure to introduce a snagging risk to commercial trawl fisheries, and in the event the removal at or below the seabed was demonstrated as not reasonably practicable, would re-engage with the trawl fisheries to determine if a credible risk existed and what, if any, appropriate additional risk treatment actions are needed.

		• Multiple cut methods have been tried The cost, effort, and potential environment or safety risks of continued attempts has become grossly disproportionate to the benefit of removing the wellheads and/or BAM pile.				Amplitude Energy would also re-engage with DCCEEW to confirm that any requirements within permits granted under the *Environmental Protection (Sea Dumping) Act 1981* are still being met, or permits revised or sought as necessary, prior to Title relinquishment. Integrated via **C34**: Adaptive management for wellhead and BAM pile end states.

Impact and Risk Summary	
Residual Impact Consequence	Level 1 – Localised short-term impacts to benthic habitat with no remedial actions or recovery required.
Residual Risk Consequence	Level 2 – Temporary and localised impacts or disturbances to benthic marine fauna, with recovery in weeks.
Residual Risk Likelihood	Unlikely – With the controls in place it is considered unlikely that short-term impacts to species or habitats would occur.
Residual Risk Severity	Low
Demonstration of Acceptability	
Principles of ESD	Seabed disturbance is evaluated as having Level 2 consequence which is not considered as having the potential to result in serious or irreversible environmental damage. The seabed within the region and around BMG is well characterised. The nature of seabed sediments is mobile and as such it is expected to naturally backfill over time. Potential impacts arising from leaving the BAM pile in situ (below seabed portion only) are expected to be highly localised and limited. Amplitude Energy will survey and sample sediments to demonstrate no long-term impacts associated with activities from BMG project will occur (Section 10.15.2). Therefore, impacts and risks to seabed arising from Phase 2 activities are not considered to have the potential to affect intergenerational equity nor effects to the health, diversity and productivity of the environment over generational timeframes.
Legislative and conventions	No legislation or conventions relevant to these impacts.
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09)

	• Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05) Activities will be undertaken in accordance with the Implementation Strategy (Section 9.0).
External context	Previous consultation with DCCEEW Sea Dumping Section indicates a Sea Dumping Permit is required to leave the un-retrievable portion of the BAM pile below the seabed. A sea dumping permit was issued for the planned work for the BAM pile (SD2023-4052), and any need reapply, or apply for new sea dumping permits is addressed within Section 8.0 as performance standard **C27**: Sea Dumping Permits. An objection was raised during relevant persons consultation regarding the removal of infrastructure, citing that the presence of this infrastructure provided ecosystem benefits. Amplitude Energy acknowledged the concern, however noted that the decision for removal of all infrastructure above the seabed was supported by a comparative assessment process.
Acceptability Outcome	**Acceptable**

6.4 Planned Discharges

6.4.1 Cause of Aspect

Discharges will occur as a result of:

- Cleaning of structures during IMR or removal activities.
- Swarf will be generated by subsea cutting, during the following activities:
  - Removal of remaining Phase 1b subsea structures
  - Reverse installation (lift and cut, or contingency cut and lift) method for flowline and umbilical removal
- Flowline and umbilical contents will be discharged during the following activities:
  - Preparing Phase 1b subsea structures for recovery (e.g. BAM, B6 PLEM)
  - Reverse installation (reel)
  - Reverse installation (lift and cut or cut and lift).

6.4.2 Aspect Characterisation

The type of fluids and discharges, and the expected discharge volumes are described Section 3.0 with further detail on constituents and discharge scenarios below. The chemicals described include those that are incumbent in the subsea infrastructure, and examples of products that may be used during the campaign. These discharges are typical of offshore petroleum activities. Examples of similar discharges can be found in every offshore project today and have occurred as part of the construction and partial deconstruction of the BMG facilities between 2005 and 2011 (ROC, 2010) and BMG Closure Project (Phase 1) activities in 2024. Planned discharges in the offshore environment are typically assessed as resulting in lower order impacts and accepted as either Minor or Negligible. For the BMG Closure Project, planned discharges are evaluated within this EP as if it were a higher order impact to provide further analysis to better demonstrate the nature and scale of the potential impacts.

For the activities identified above, the following sections describe and analyse a nominal discharge scenario using conservative volumes and known, anticipated or proxy chemicals. The analysis will consider the nature and extent of each discharge. The following metocean characteristics apply at the BMG location (RPS, 2021b)

- Wind and wave action are high in the region; wind speed averaged by month is a minimum 14 knots but is frequently higher; significant wave heights at BMG exceed 1 m over 65% of the year; as a result, surface waters are well mixed
- Surface currents are typically strong, ranging between 0.18 m/s and 0.96 m/s
- Subsea currents are lower (though still strong), ranging between 0.10 m/s and 0.65 m/s
- Thermoclines and haloclines are more apparent during summer indicating mixing may be less than in at other times of the year. Through winter and autumn temperature and salinity varies little from surface to seabed indicating the water column would be well mixed.

Quantitative discharge assessments have been undertaken to help characterise the environmental fate and effects. Discharge calculations consider chemical quantities (based on treatment rate unless otherwise stated) at the point of discharge, toxicities, dilution in the near vicinity of the discharge and the effect of current in dispersing the discharge (i.e. the Osborne Adams methodology[9]). Sensitivity testing is shown for select scenarios whereby a range of reduced mixing zones (0 m to 500 m) from the point of discharge are considered.

[9] The Osborne-Adams assessment was jointly developed by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and Marine Scotland. The assessment compares the rate of discharge of a chemical subsea with the rate of water column refreshment and in doing so provides a high-level screen for

A summary of the planned (including occasional and non-routine) discharges associated with Phase 2 activities is provided in Section 3.7. The following sections will describe the discharges associated with each aspect characterisation. Discharges of cleaning products such as Calciwash was assessed as part of the BMG Phase 1 EP; the products are typically PLONOR (pose little or no risk) or OCNS C or D. Discharge assessments described in the BMG Phase 1 EP assessments show these types of discharge do not exceed predicted no effect (PNEC) concentrations beyond the very near vicinity of their application point, and that any exceedance is short term as the products are degradable and dispersible.

6.4.2.1 Subsea cutting

A summary of the planned discharges and chemical details associated with subsea cutting activities is provided in Table 6-6. Using the methodology detailed in Section 6.4.2, analysis of flocculant discharge into the water column during use at low current (0.1 m/s) and limited mixing (30 m column), indicates that PNEC levels would not be exceeded beyond 1 m of the cutting activity (Figure 6-6).

Table 6-6 - Nature and Scale of Discharges – Subsea Cutting

		Known or proxy chemical details					
Planned discharge	**Discharge volumes**	**Chemical**	**Function**	**OCNS or HQ**	**Treatment rate**	**LC_{50} (product or WC component)**	**% of Product**
Removal of remaining Phase 1b subsea structures: Cutting tools required to remove wellheads and BAM pile will generate metal swarf and some cement cuttings at the seabed and inside the steel pipe. Cutting may also involve subsea discharges of grit and flocculant.	Grit: 1.7 Mt per hour (typically 3–7 hours cutting to complete per operation). Flocculant: 150 L per operation Metal swarf and cement cuttings: 0.5 Mt per operation.	Proxy 1	Flocc-ulant	N/A	–	>1,000 mg/L	100
Reverse installation operations (contingency cut and lift methodology): Cutting tools required to cut and remove flowline and umbilicals will generate metal and plastic swarf.	Metal and plastic swarf from cutting the B6 flowline: ~56 kg for the B6 flowline.						

whether the release is of environmental concern. An acceptable discharge is one where the time taken to completely refresh the 500 m radius water column is shorter than the time taken to discharge sufficient chemical to exceed PEC/PNEC = 1 in the 500 m radius column unless there are other local environmental sensitivities. The detailed methodology is described by Xodus (Xodus, 2021b).

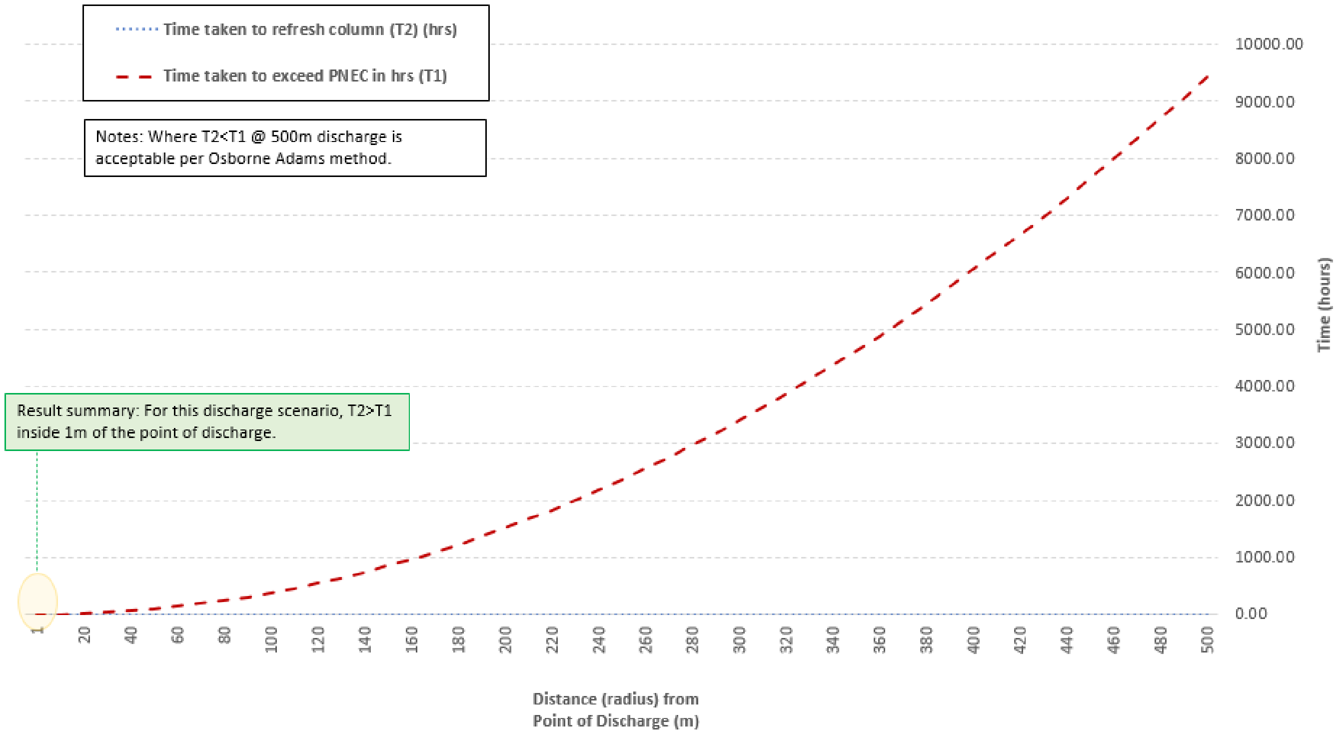


Figure 6-6 - Discharge analysis – flocculant (assume limited mixing, low current)

6.4.2.2 Removal of Subsea Infrastructure – Flowline and Umbilical Removal

A summary of the planned discharges and inventory details associated with flowline and umbilical removal is provided in Table 6-7.

Discharges during the removal of the flowlines and umbilicals will be minimal. The following assessment will focus on chemical discharges identified as having potential toxicity effects. Using the methodology detailed in Section 6.4.2, the following scenarios were further investigated:

- Release of corrosion inhibitor
- Release of pour point depressant (PPD) during disconnection
- Full release of flowline content during reverse reel recovery.

Table 6-7 - Nature and Scale of Discharges – Flowline and Umbilical Removal

<table>
<tr><th>Planned Discharge</th><th>Discharge Volumes</th><th colspan="6">Known or Proxy Chemical Details</th></tr>
<tr><td rowspan="4">During Phase 1, a ROV cut or disconnected the flowline jumpers, flowlines, umbilicals, and associated electrical and hydraulic leads from the subsea tree and lay them on the seabed. Once lines are disconnected, small quantities of line contents will begin to disperse into the sea. Umbilicals and associated jumpers will be cut if attempts to disconnect are unsuccessful. If disconnection of umbilicals and jumpers is successful, then contents will not be entirely displaced as the line ends are self-sealing.</td><td rowspan="4">Flowline volumes are between 5.67 m^3 and 101.7 m^3.

Assume 10% volume discharge (~0.5–10 m^3) when cut (considered conservative as flowlines not at pressure).</td><td colspan="6">Discharge of water with ≤30 ppm OIW*, water treated with inhibitor chemical @650 ppm and gas.

*The OIW content of the B6 flowline is estimated at ~250 ppm. A flowline plug was installed during Phase 1 activities to prevent release of fluids from the B6 flowline (Section 3.1.4). However, for risk assessment purposes, a 10% release from the B6 flowline is evaluated.

Incumbent flowlines were re-flushed or cycled through a bleed and lube process during the Phase 1 activities (Section 3.1.4). No treated water (i.e. corrosion inhibitor) was used during Phase 1. The incumbent corrosion inhibitor @650 ppm is used as a proxy for discharge assessment purposes; this is considered a conservative approach to inform the risk assessment.

The Amplitude Energy Offshore Chemical Assessment Procedure was implemented for the selection of chemicals for use and discharge during the BMG Closure Project (Phase 1) campaign, ensuring discharges remain within acceptable levels described within this EP during BMG Closure Project (Phase 2) activities.</td></tr>
<tr><td>Chemical</td><td>Function</td><td>OCNS or HQ</td><td>Treatment rate</td><td>LC$_{50}$ (product or WC component)</td><td>% of Product</td></tr>
<tr><td>Proxy 1

PPD / Solvent</td><td>Asphaltene Inhibitor / Wax dissolution</td><td>Silver (No SUB) / N/A</td><td>≤30ppm after treatment (flushing) undertaken in Phase 1.

~250 ppm for the B6 flowline.</td><td>1 - 51 mg/L</td><td>100</td></tr>
<tr><td>Hydrosure 0-3670</td><td>Corrosion inhibitor</td><td>Gold (No SUB)</td><td>650 ppm</td><td>0.016 mg/l</td><td>30</td></tr>
</table>

<table>
<tr><th>Planned Discharge</th><th>Discharge Volumes</th><th>Known or Proxy Chemical Details</th></tr>
<tr><td></td><td>Umbilical volumes are between 1.6 m^3 and 11.8 m^3 (total combined volume of cores).
Assume 10% volume discharge (~0.2–1.2 m^3) from each core if cut (considered conservative as umbilical cores not at pressure).</td><td>Umbilicals will not be flushed during decommissioning activities. Discharge of umbilical cores is of control fluid Castrol Transaqua HT2 and uninhibited freshwater. B6 umbilical also contains solvent (Proxy 1 above, see above).
<table>
<tr><th>Chemical</th><th>Function</th><th>OCNS or HQ</th><th>Treatment rate</th><th>LC_{50} (product or WC component)</th><th>% of Product</th></tr>
<tr><td>Castrol Transaqua HT2 (2021)</td><td>Control Fluid (incumbent)</td><td>B (SUB) (recategorised from D in 2021)</td><td>N/A</td><td>4.14 mg/L</td><td>0.5</td></tr>
</table></td></tr>
<tr><td>During Phase 2 activities, the contents of the flowlines and umbilicals will be discharged to the environment.</td><td>This will either result in:
Smaller instantaneous releases at ~20 m intervals along the alignment if it is a cut subsea then lift method is used; or
Longer release of the entire contents at the flowline and umbilical end as the flowline/umbilical is lifted onto the vessel</td><td>Refer to the chemicals and toxicities above.</td></tr>
<tr><td>In the event that flowlines are cut subsea to facilitate removal, minor quantities of hydrocarbons may be released, if they have accumulated within the flowline carcass during the production phase.</td><td>A release of ~<0.3 L (on average) per 20 m section recovered. Occasional releases in the order of ~10 L depending on if and how oil may have accumulated within the flowline structure.</td><td>Basker Light Crude (Group 2) hydrocarbons have the potential to be released.
The persistent (waxy) component of the crude has a low appearance temperature and would be expected to be retained within the flowline given the low temperatures subsea in the Bass Strait [BMG-DC-EMP-0001]. Lighter hydrocarbon components, if released, would be expected to disperse rapidly through the water column.
RPS (2021a) report the following exposure values for hydrocarbons, for use within impact assessment, and which are considered relevant to minor releases subsea:
<table>
<tr><th colspan="2">Exposure levels (potential for impact)</th></tr>
<tr><td colspan="2">In-water – Dissolved</td></tr>
<tr><td>Low</td><td>10 ppb</td></tr>
<tr><td>Moderate</td><td>50 ppb</td></tr>
<tr><td>High</td><td>400 ppb</td></tr>
<tr><td colspan="2">In-water – Entrained</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Planned Discharge</th><th>Discharge Volumes</th><th colspan="6">Known or Proxy Chemical Details</th></tr>
<tr><td rowspan="3"></td><td rowspan="3"></td><td colspan="3">Low</td><td colspan="3">10 ppb</td></tr>
<tr><td colspan="3">Moderate</td><td colspan="3">100 ppb</td></tr>
<tr><td colspan="3">High</td><td colspan="3">1,000 ppb</td></tr>
<tr><td rowspan="3">In the event that the B6 flowline is cut subsea to facilitate removal, minor quantities of hydrocarbons may be released as complete flushing of the flowline has not been possible (historically or during Phase 1) due to technical issues.</td><td rowspan="3">B6 flowline volumes is 101.7 m^3.
Assume 1% volume discharge (~1 m^3) per cut (considered conservative as flowlines not at pressure). Depending on retrieval method, required number of planned cuts may vary. Estimates at the current stage of engineering indicate six (6) cuts may be required. For assessment purposes 10 cuts have been assumed.</td><td colspan="6">Discharge of water with ~250 ppm OIW.</td></tr>
<tr><td>Chemical</td><td>Function</td><td>OCNS or HQ</td><td>Treatment rate</td><td>LC_{50} (product or WC component)</td><td>% of Product</td></tr>
<tr><td>Proxy 2
Diesel</td><td>N/A</td><td>N/A</td><td>250 ppm</td><td>21 mg/L</td><td>100</td></tr>
</table>

Release of corrosion inhibitor and PPD during disconnection

Conservatively, it is assumed 10% loss from the lines at the time of initial disconnection over a period of 2 hours. Mixing is assumed to be limited to 30 m water column above the seabed; this is considered conservative as waters in the area are generally well mixed. A current speed of 0.1 m/s has been applied to seabed discharge scenarios. Discharges analyses are shown in Figure 6-7 and Figure 6-8.

Note: The quantitative discharge assessments for the disconnection of the flowline were based on a corrosion inhibitor dosing @ 650 ppm and PPD @ 1,000 ppm[10]. Where flowlines have been flushed (historically and/or during Phase 1) to ≤30 ppm OIW, or for B6 flowline that may contain concentrations at ~250 ppm, this discharge assessment presents a conservative approach to informing the risk assessment as the mixing zone for ≤30 ppm to ~250 ppm OIW would be well inside the PNEC radius determined for 1,000 ppm discharge.

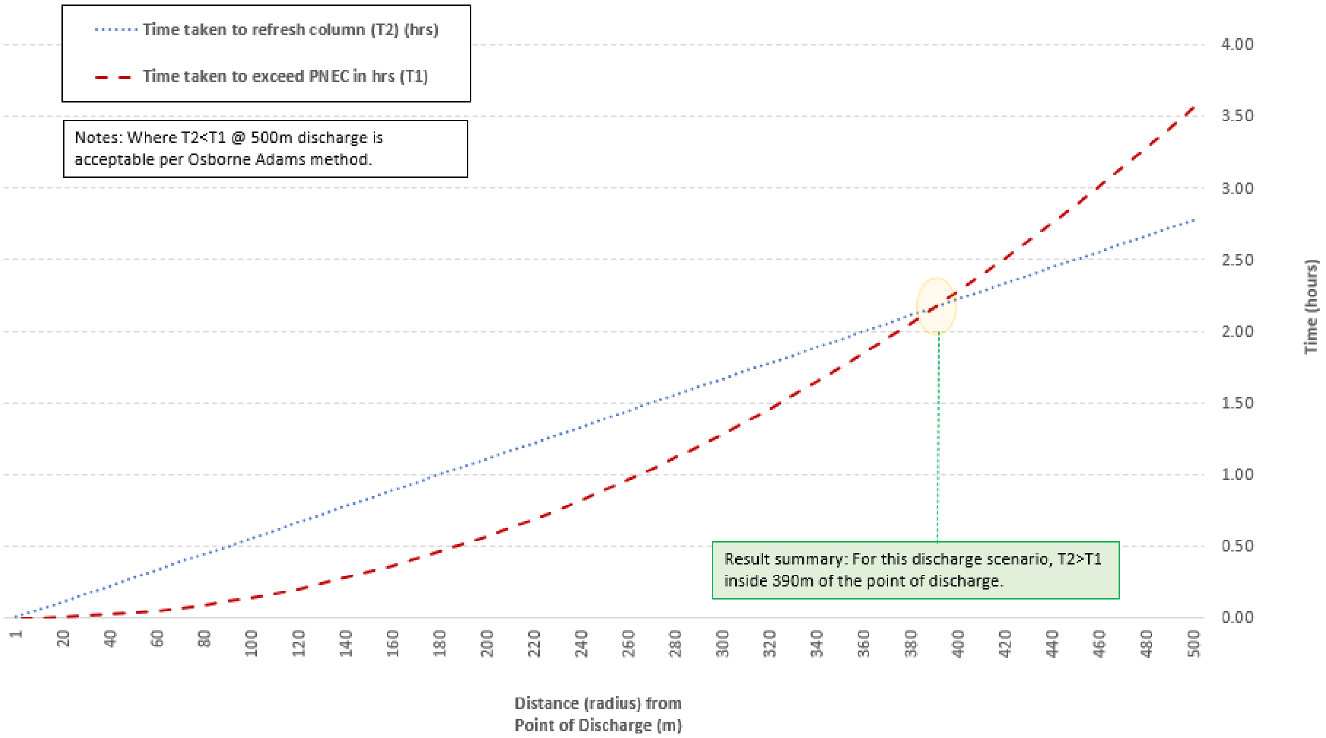


Figure 6-7 - Discharge analysis – corrosion inhibitor; flowline disconnected (assume limited mixing, low current)

[10] 1,000 ppm is a nominal treatment rate for risk assessment purposes. This is conservative noting only traces of PPD may remain from the production phase following displacement of the flowline to inhibited water in 2009.

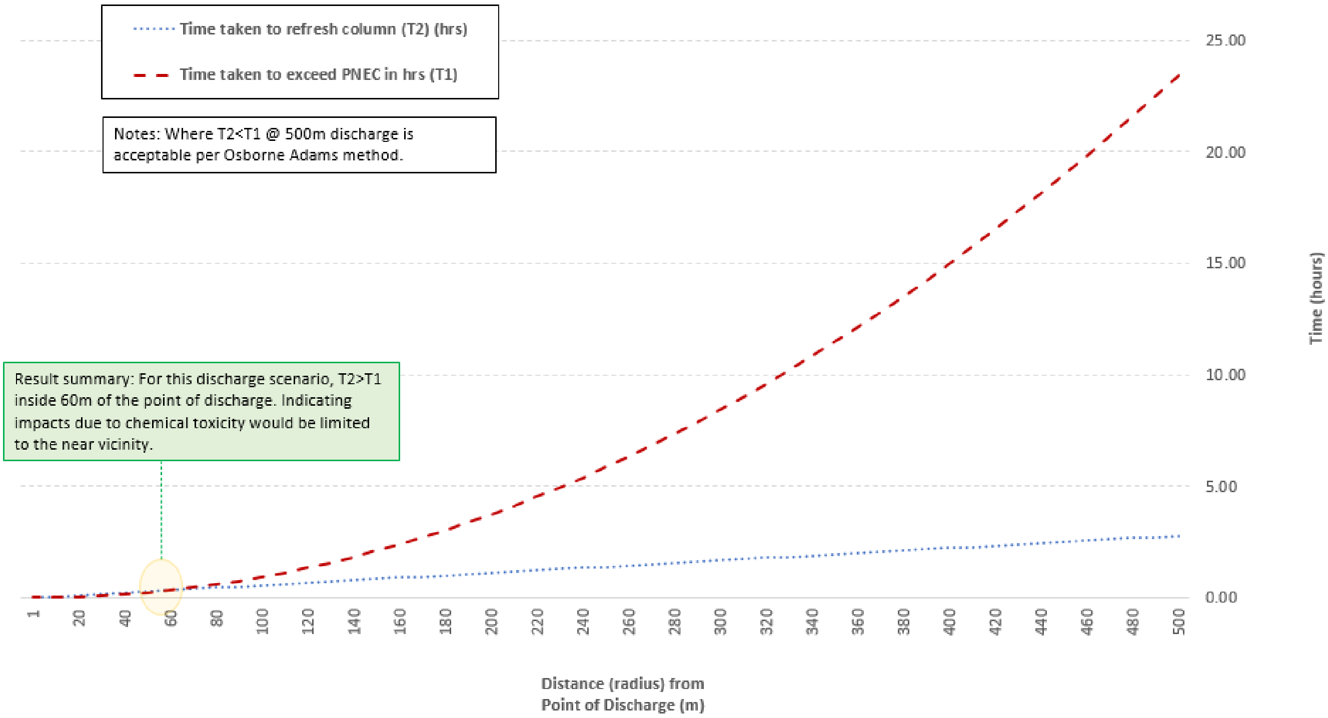


Figure 6-8 -Discharge analysis – PPD umbilical disconnected (assume limited mixing, low current)

Full release of flowline and umbilical contents during recovery

When the flowlines and umbilicals are removed, contents will be displaced to sea through the process of lifting through the water column. A study undertaken by Xodus in 2021 assessed the potential impacts of displacing the full volume of the B6 umbilical subsea during reverse installation - removal via reverse reel, which would result in a discharge of contents over several hours. Other removal methods such as a cut and lift method would result in smaller discharges which would be similar in nature to the planned disconnect scenarios above.

The reverse reel assessment, which uses the B6 umbilical as a worst case, indicates that PNEC levels of chemical are not exceeded beyond 500 m of the discharge location (Xodus, 2021b). Further quantitative sensitivity analysis indicates PNEC exceedance is limited to the near vicinity of the discharge for all chemicals including PPD and Castrol Transaqua HT2 (both @ 1000,000 ppm (neat)) within umbilicals (Figure 6-9 and Figure 6-10) during reverse reel recovery, as a single continuous release.

Reverse reel recovery of the flowlines has also been assessed assuming corrosion inhibitor (@650 ppm) mixed with seawater and residual solvent (B6 only) released from the flowlines as a single continuous release. As shown in Figure 6-11 and Figure 6-12, the chemical with the quickest time to exceed PNEC (i.e. with the highest potential for impact (though still negligible) in the water column is the corrosion inhibitor owing to the high toxicity of a minor component.

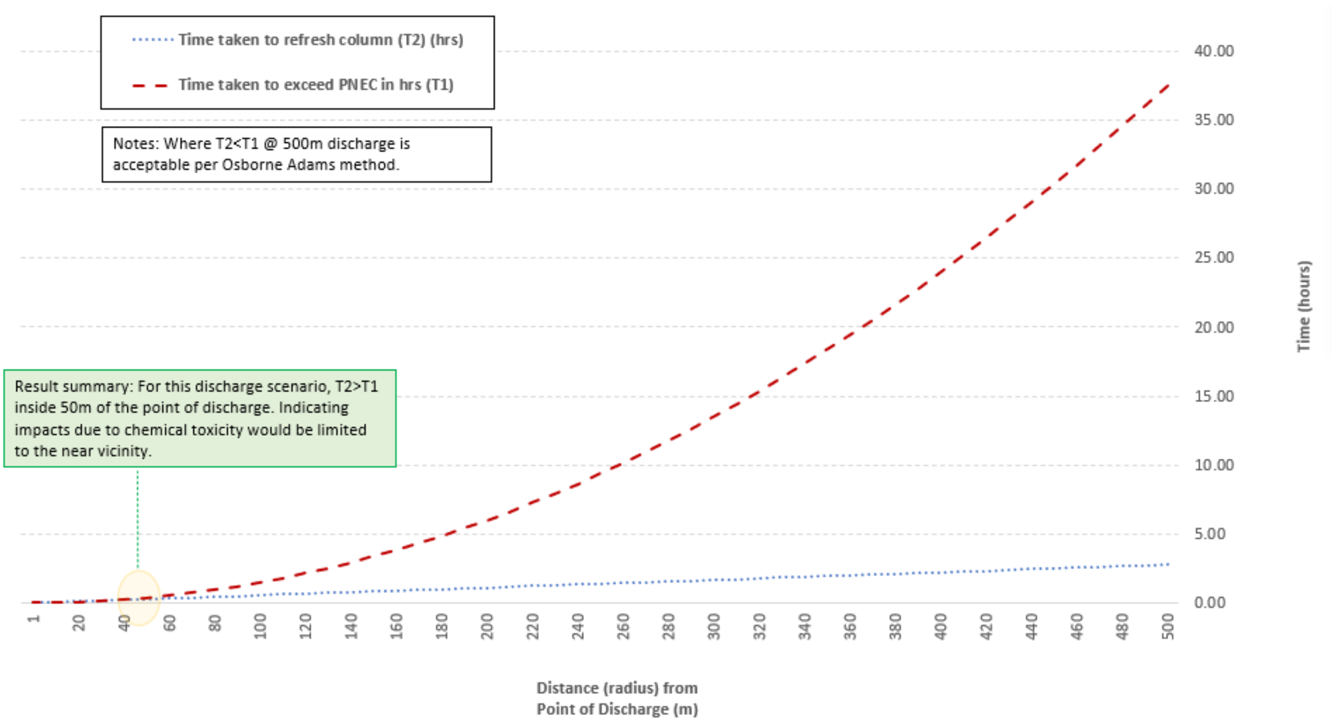


Figure 6-9 - Discharge analysis – PPD release B6 during umbilical reverse-reel (assume limited mixing, low current)

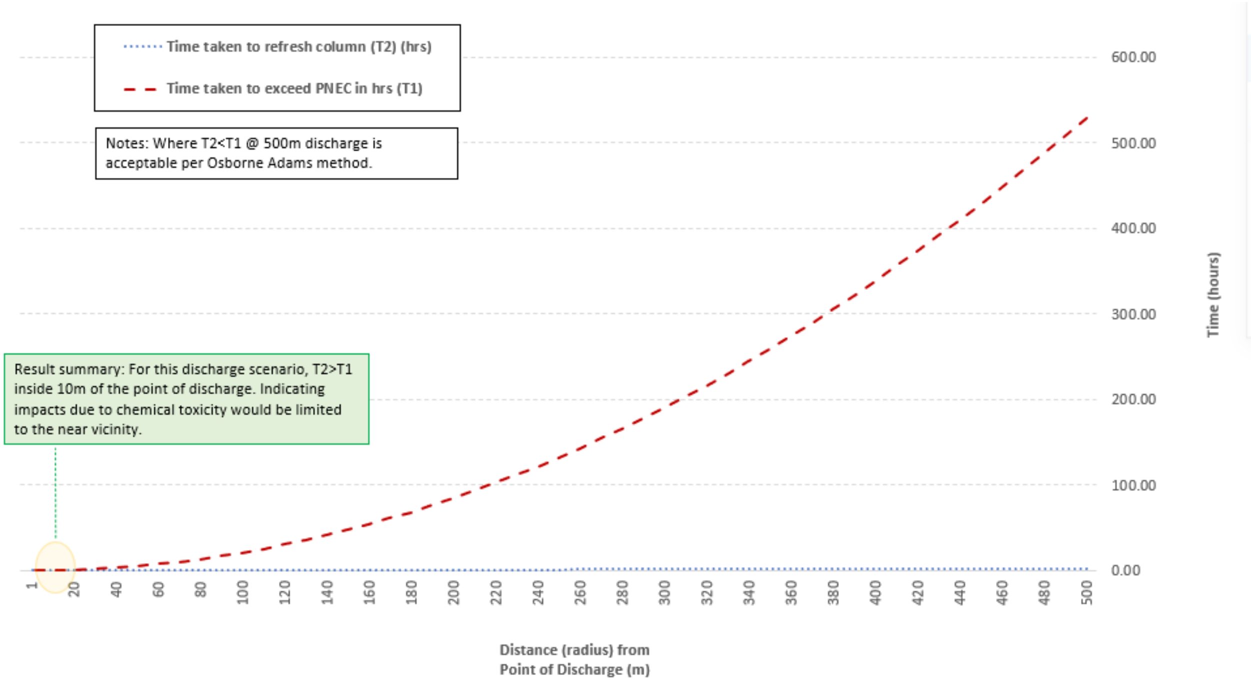


Figure 6-10 - Discharge analysis – Transaqua B6 during umbilical reverse-reel (assume limited mixing, low current)

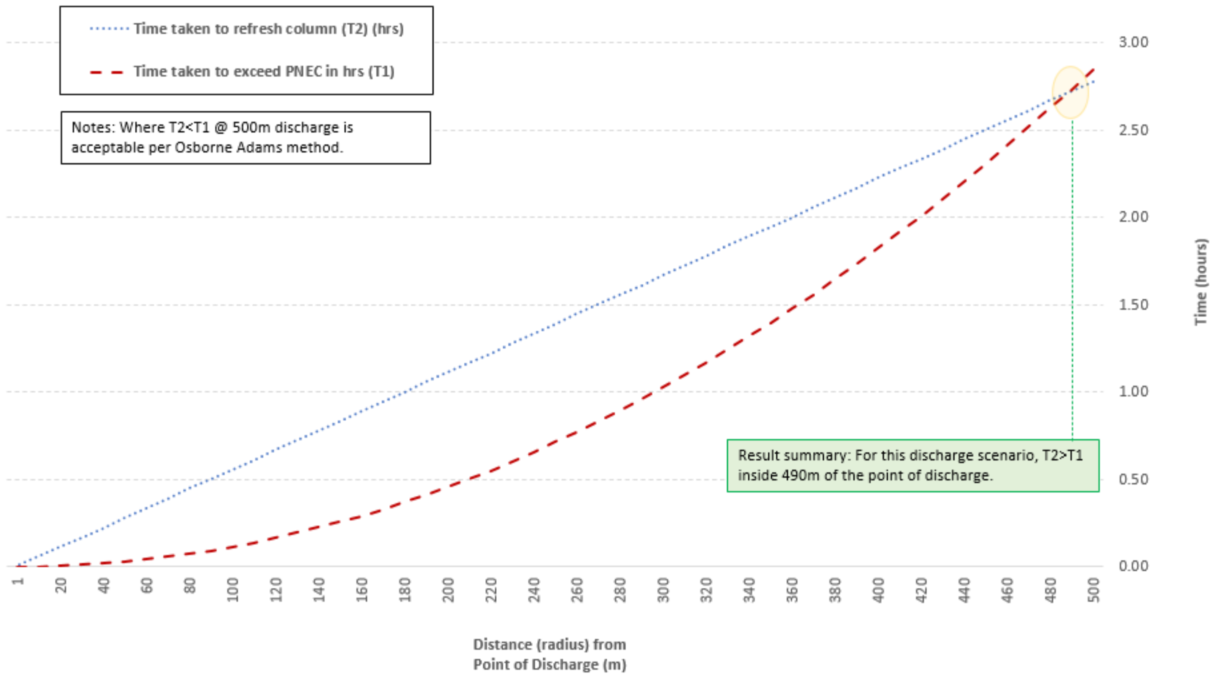


Figure 6-11 - Discharge analysis - corrosion inhibitor flowline reverse-reel (assume limited mixing, low current)

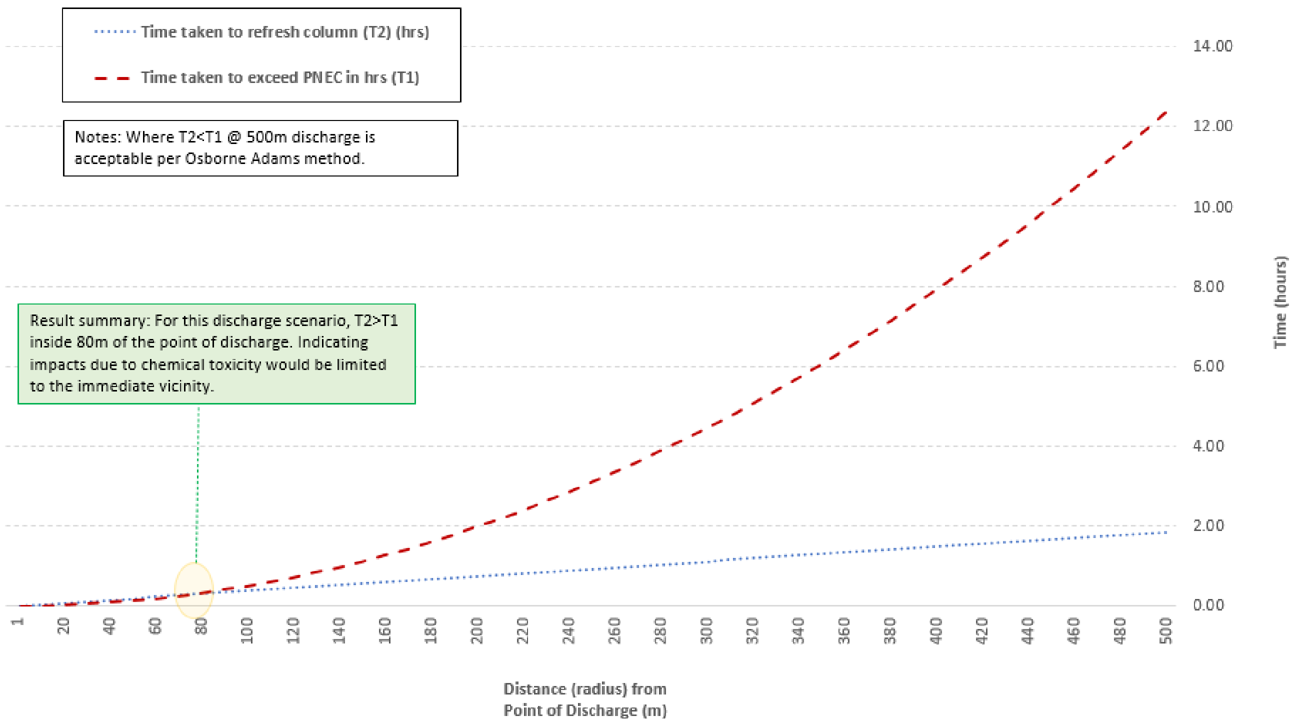


Figure 6-12 - Discharge analysis - corrosion inhibitor flowline reverse-reel (assume full mixing, average current)

Minor release of hydrocarbons during dismantling and recovery of oil flowlines

Flowlines may be cut subsea to facilitate removal. It is possible minor quantities of hydrocarbons may be released when the oil flowlines are cut, if they have accumulated within the flowline carcass during the production phase. These releases, if they occur, would be expected to be minor and occasional.

A discharge assessment (Figure 6-13) indicates releases would be expected to disperse to levels below the 10 ppb exposure values for dissolved and entrained hydrocarbons within the near vicinity of the release point, within a water column of 130 m (shallowest depth in field). For assessment purposes, a conservative volume of 10 litres has been assumed for the release volume.

Note: The quantitative discharge assessments for the minor release of residual oil from the flowline carcass during cut and recovery of the flowlines were based on 10 L (0.01 m^3) release @1,000,000 ppm (neat).

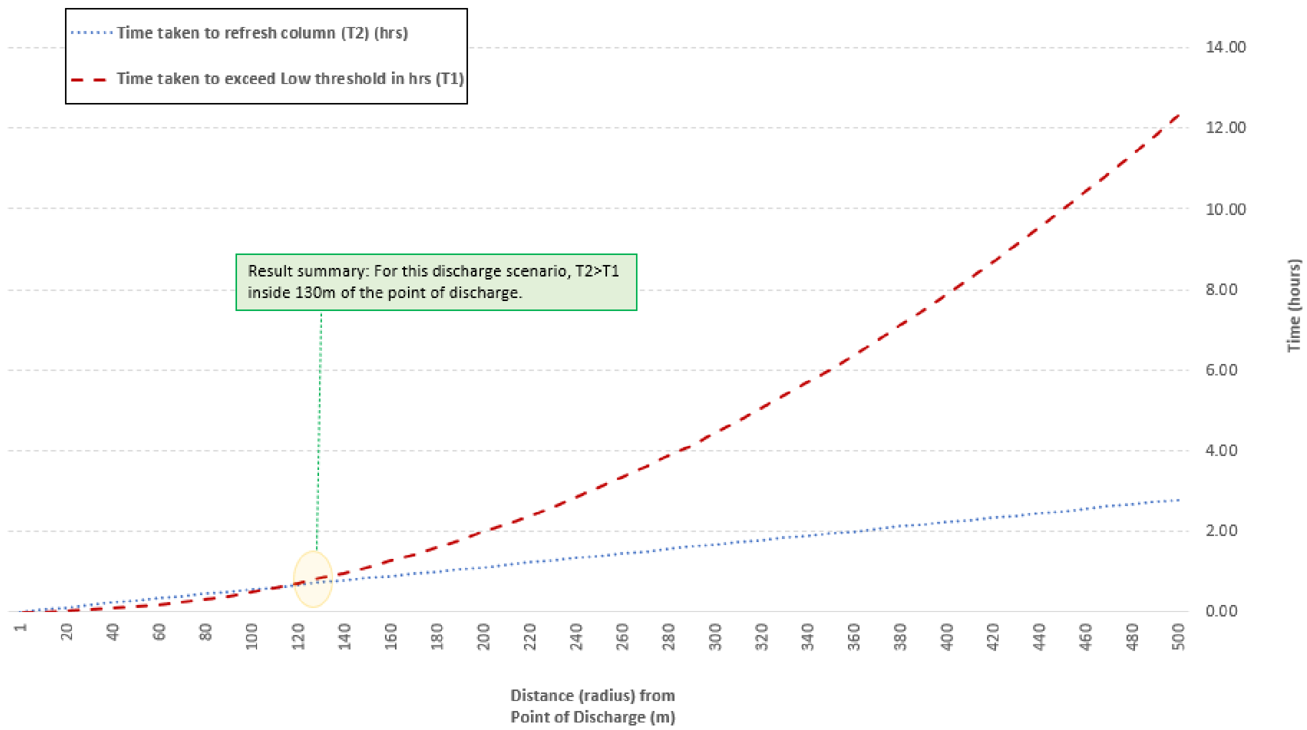


Figure 6-13 - Discharge analysis – hydrocarbons subsea cut scenario (assume full mixing, low current)

Minor release of hydrocarbons during dismantling and recovery of the B6 flowline

The B6 flowline may be cut subsea to facilitate removal. Conservatively, it is assumed 1% loss from the flowline (per cut) is released to the ocean. These releases, if they occur, would be expected to be occasional and for a short duration. Mixing is assumed to be limited to 30 m water column above the seabed; this is considered conservative as waters in the area are generally well mixed. A current speed of 0.1 m/s has been applied to seabed discharge scenarios.

The discharge analysis in Figure 6-14 indicates the release of oily water from the B6 flowline would be expected to disperse to levels below the LC_{50} value within the immediate vicinity (~1 m) of the release point.

Given the uncertainty relating to the OIW concentration within the B6 flowline, additional sensitivity testing of higher OIW concentrations were also investigated. These analyses indicated that even if the OIW concentration was 100-fold higher (25,000 ppm) than the estimated incumbent concentration, the PNEC is not exceeded beyond ~70 m from the release point (Figure 6-15).

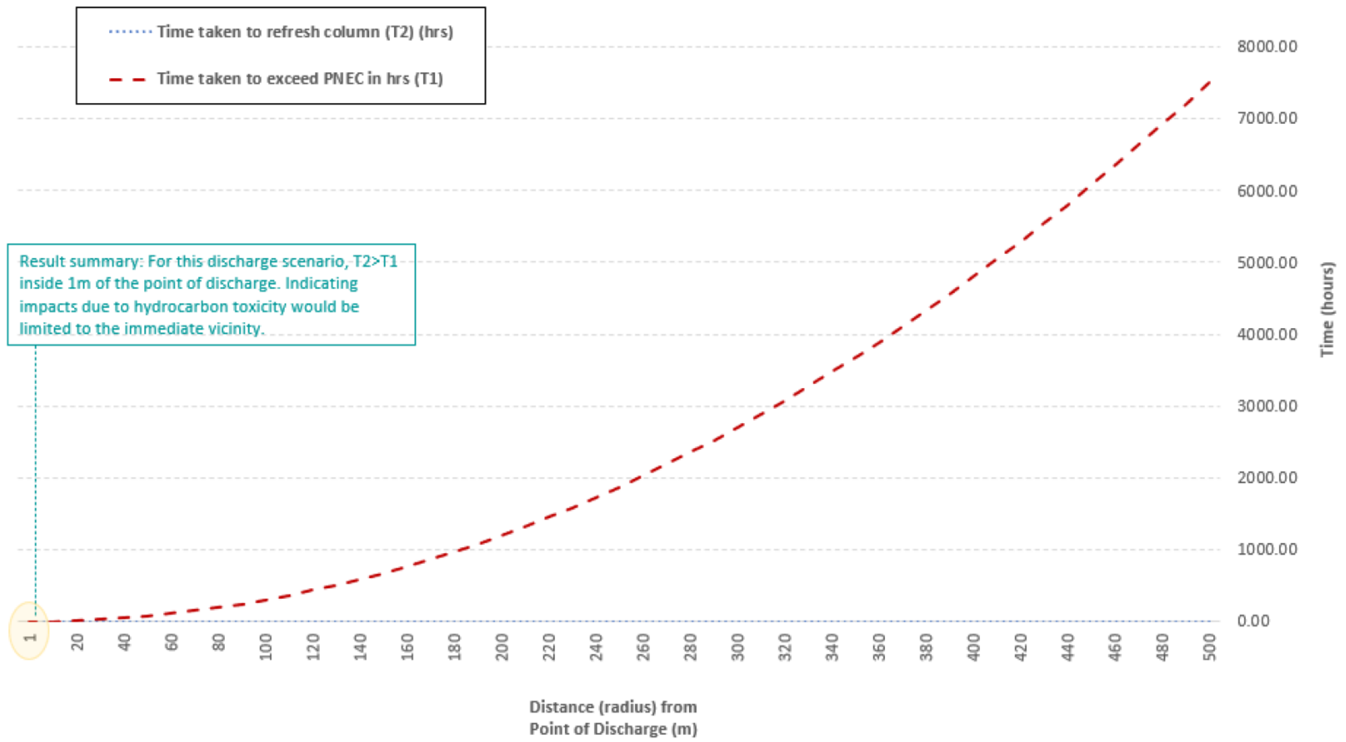


Figure 6-14 - Discharge Analysis -Hydrocarbons Subsea Cut of B6 Flowline Scenario (assume full mixing, low current)

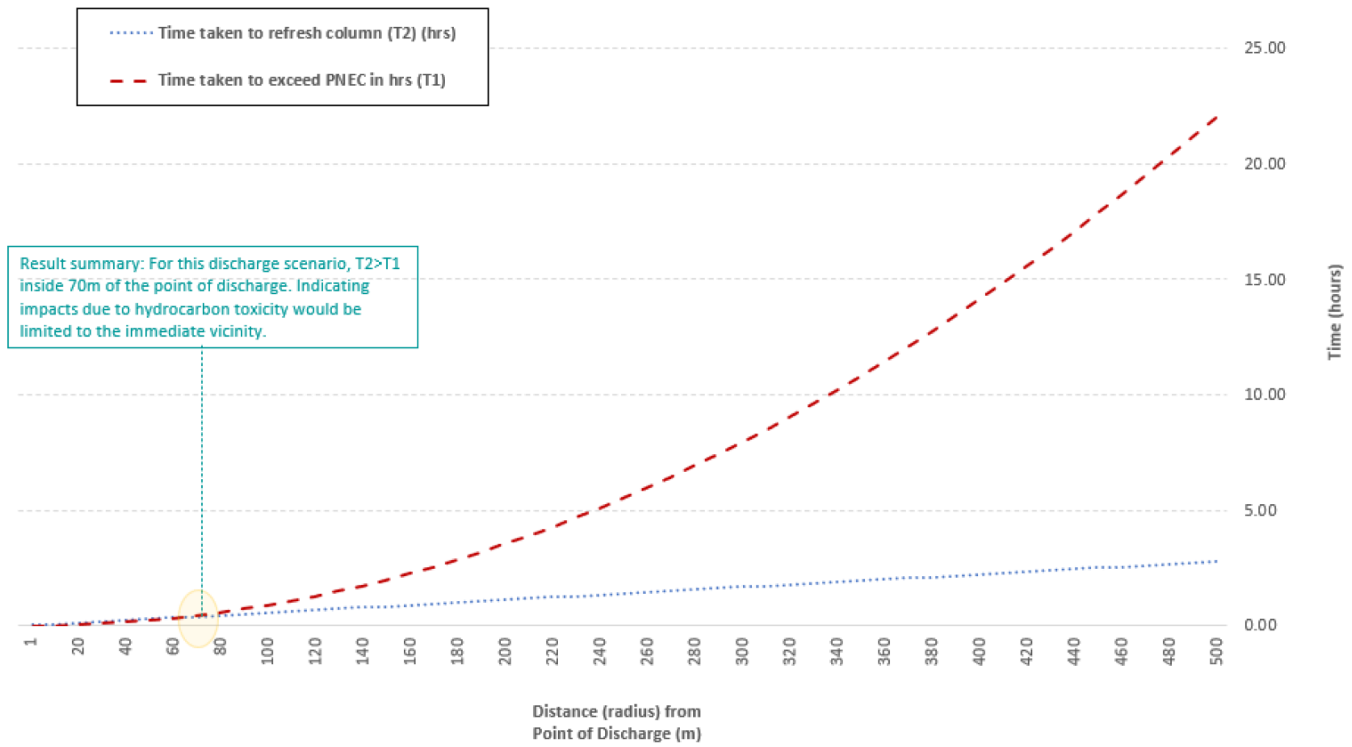


Figure 6-15 - Sensitivity Testing - Hydrocarbons (100-fold) Subsea Cut of B6 Flowline Scenario (assume full mixing, low current)

6.4.3 Predicted Environmental Impacts and Risk Events

Potential impacts of planned discharges are:

- Change in ambient water quality.

Potential risk events associated with change in water quality from planned discharges are:

- Acute and chronic toxicity to marine fauna arising from changes to ambient water quality.

6.4.4 Impact and Risk Evaluation

6.4.4.1 Subsea Cutting

Impact: Change in ambient water quality

Inherent Consequence Evaluation

Analysis of flocculant discharge into the water column during use at low current (0.1 m/s) and limited mixing (30 m column), indicates that PNEC levels would not be exceeded beyond ~1 m of the cutting activity. Particulates have the potential for physical impacts including clogging of gills or feeding apparatus, however elevated suspended solids would be temporary and highly localised during cutting activities, with most materials expected to remain below the seabed. Small quantities may be suspended above the seabed; surveys at BMG over the past decade show soft shifting sediments around the infrastructure; solids that settle on the seabed would be dispersed over time and are not expected to impact demersal fauna beyond the usual shifting and dispersion of sediments.

The discharge of cutting materials including flocculant is expected to result in a very short exposure of increased turbidity such that potential impacts would be expected to be localised and short-term, therefore the consequence of impacts to water quality and marine life will be **Level 1**.

6.4.4.2 Removal of Subsea Infrastructure – Flowline and Umbilical Removal

Impact: Change in ambient water quality

Inherent Consequence Evaluation

As described in the discharge characterisation above, analysis of chemical discharges into the water column indicates that PNEC levels could be exceeded between approximately 1 m to 490 m during the discharge activity. The discharges are expected to result in a very short exposure within the Operational Area such that potential impacts would be expected to be localised and short-term, therefore impacts to water quality are considered to be **Level 1**.

Risk Event: Acute and chronic toxicity to marine fauna arising from changes to ambient water quality

Inherent Consequence Evaluation

Removal of subsea structures – Flowline discharge:

Quantitative discharge assessments for corrosion inhibitor @650 ppm and PPD (solvent) @1000 ppm[11] indicate chemical PNECs are not exceeded for any chemicals beyond a 500 m radius of the discharge. The chemical with the higher potential to exceed PNEC in the water column is the corrosion inhibitor owing to the high toxicity of a minor component. A discharge analysis (Figure 6-7) indicates the PNEC of the corrosion inhibitor could be exceeded within ~390 m during the release location; acute toxicity would be limited to within the immediate vicinity of the discharge point.

[11] 1,000 ppm is a nominal treatment rate for assessment purposes. This is conservative noting only traces of PPD may remain from the production phase following displacement of the flowline to inhibited water in 2009. It follows that the displacement of ≤30 ppm or ~250 ppm PPD is well inside the PNEC radius determined for 1,000 ppm.

Removal of subsea structures – Umbilical discharge:

Quantitative discharge assessments for control fluid and PPD indicate chemical PNECs are not exceeded for any chemicals beyond a 500 m radius of the discharge. The chemical with the quickest time to exceed PNEC in the water column is the PPD owing to the higher overall toxicity of the PPD compared to the control fluid. A sensitivity analysis (Figure 6-8) indicates the PNEC of the PPD chemical could be exceeded within ~60 m during the discharge; acute toxicity would be limited to within the immediate vicinity of the discharge point.

Reverse installation activities - Discharges at removal

A discharge analysis (Figure 6-11) indicates the PNEC of the corrosion inhibitor could be exceeded within ~490 m during the discharge at low current speed (0.1 m/s) and limited mixing (30 m column); acute toxicity would be limited to within the near vicinity of the discharge point. Further analysis has been conducted assuming mixing through the full water column (taken as 130 m) and increased current speed (to 0.15 m/s); this remains conservative noting maximum current speeds at depth can reach 0.65 m/s. The sensitivity analysis shows the PNEC of the corrosion inhibitor is not exceeded beyond ~80 m during the discharge (Figure 6-12).

Similarly, quantitative discharge analysis for the B6 umbilical discharge assessment indicates PNEC exceedance is limited to the near vicinity (~10–50 m) of the discharge for all chemicals including PPD and Castrol Transaqua HT (Figure 6-9, Figure 6-10).

Subsea cutting of oil flowlines – potential hydrocarbon releases

Quantitative discharge assessments for potential releases of hydrocarbons accumulated within the carcass of the oil flowlines indicate that 10 ppb dissolved or entrained oil thresholds could be exceeded within approximately 130 m of the release point, assuming low current speed (0.1 m/s) and rising and dispersing through a water column of 130 m. This relates to the 10 L volume release scenario shown in Figure 6-13. Smaller releases would disperse to below low impact thresholds closer to the release point.

Subsea cutting of the B6 oil flowline – potential oily water releases

A discharge analysis (Figure 6-14) indicates the PNEC could be exceeded within ~1 m of the release location; acute toxicity would be limited to within the immediate vicinity of the discharge point. Additional sensitivity testing of higher OIW concentrations indicated that the PNEC would still be met well within the 500 m radius of the discharge location.

The PMST report (Appendix 3) for the Operational Area, identifies that several marine species listed as threatened and/or migratory under the EPBC Act have the potential to be present. However, these species are not expected to be exposed for extended periods of time to the discharges given their transient nature and the lack of sedentary marine fauna behaviours in the Operational Area.

Therefore, the consequence level assigned to flowline and umbilical discharges is **Level 1** i.e. minor local impacts or disturbances to flora/fauna, nil to negligible remedial / recovery works on land / water systems.

Inherent Likelihood

The inherent likelihood of these consequences occurring is considered **Unlikely**.

Inherent Risk Severity

The inherent risk severity of discharges causing acute and chronic toxicity is considered **Low**.

6.4.5 Control Measures, ALARP and Acceptability Assessment

Table 6-8 provides a summary of the control measures and ALARP and acceptability assessment relevant to project discharges during the BMG Closure Project (Phase 2) activities; with discharges during contingency activities also considered.

Table 6-8 - Project Planned Discharges, ALARP and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context: A** Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.					
Control Measures Considered	**Related Risk Event**	**Benefit**	**Recognised Good Practice?**	**Sacrifice**	**Introduced Risks**	**Conclusion**
Chemical Use and Discharge (Disconnect from remaining Phase 1b subsea infrastructure)						
Attempt to disconnect umbilicals prior to cutting during removal from structures.	Negligible Impact. Discharges from: Umbilicals and flying leads – contents include freshwater and control fluids which was designed for and accepted for discharge during production phase. B6 umbilical also contains PPD which would disperse to PNEC levels in near vicinity of release.	Avoids discharging fluids where practicable. Minimises negligible impacts.	Yes. Considered good practice.	Minor costs, not expected to be a critical path activity for the project.	Minor surface HSEC risks. Umbilical contents are chemicals and water only; no risk of trapped gas.	**Implement** Rationale: negligible environmental benefit coupled with operational benefit of limiting HSE operational risks at surface. Costs are not grossly disproportionate to the benefit. Integrated via **C11**: Equipment deployment, transfer, and recovery procedures.
Apply Amplitude Energy Chemical Assessment Process	Negligible Impact. Discharge of clean-up and inhibitor chemicals.	Drives preferential selection of chemicals with lower Ecotox profile.	Yes. Method accepted, leverages international best practice OCNS. Applied for all prior campaigns.	Integrated into project planning.	Chemicals with higher efficacy or lower cost rejected where they do not have an acceptable EcoTox profile or sufficient information for assessment.	**Implement** Rationale: provides benefit and increased confidence of contents off critical path for the project. Costs are not grossly disproportionate to the benefit. Integrated via **C9**: Amplitude Energy Offshore Chemical

ALARP Decision Context and Justification	**ALARP Decision Context: A** Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.					
						Assessment Procedure [CMS-EN-PCD-0004].
Record all activity chemical discharges	Negligible Impact. Discharge of clean-up and inhibitor chemicals.	Verification of information used during the planning cycle for the characterisation, assessment, and management of impacts.	Yes. Applied during previous campaigns.	Already considered as part of the implementation phase.	None	**Implement** Rationale: provides assurance as to quantities of fluids discharged which feeds into project review, lessons learned and assessment considerations for future projects. Costs are not grossly disproportionate to the benefit. Integrated via **C9**: Amplitude Energy Offshore Chemical Assessment Procedure [CMS-EN-PCD-0004].
Chemical Discharges during BMG Closure Project (Phase 2) Decommissioning Activities						
Leave flowlines flushed with seawater only at end of BMG Closure Project (Phase 1)	Negligible Impact. Discharge of treated water from flowlines assume corrosion inhibitor at 650 ppm (LC_{50} 0.016 mg/L for worst case component) during Phase 2). Disperses before PNEC levels exceeded within 500 m; short term discharge.	Flushing with untreated seawater eliminates negligible impacts associated with discharge of treated seawater during BMG Closure Project (Phase 2).	Seawater is commonly used and may be supplemented with inhibitor chemicals depending on metallurgy of the flowline, length of time being left in	Offline work scope	Flowlines and umbilicals – possible increased corrosion which may limit options (would not rule out all) for full removal. Associated regulatory/legal risk.	**Implement** Integrity/corrosion studies confirmed that leaving flowlines filled with seawater only would not preclude full removal. During Phase 1 [BMG-DC-EMP-0001] all flowlines were re-flushed or cycled through a bleed and lube process to displace the incumbent treated

ALARP Decision Context and Justification	**ALARP Decision Context: A** Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.					
			place and subsequent use.			water with uninhibited water. The flowline contents now comprise uninhibited sea water, with some residual inhibited water likely remaining (Section 3.1.4). Rationale: provides benefit and increased confidence of contents off critical path for the project. Costs are not grossly disproportionate to the benefit. Integrated via **C26** Phase 1 Flowline Flushing Integrity Provisions.
Cap flowlines and umbilicals with pressure retaining caps to retain all fluids during removal (reverse reel option for removal)	As above	No chemical discharge during removal (no impact)	No. Similar projects using only environmental plugs	Nominal $30 K per cap to design, fabricate and install. Provision for 2 x caps per flowline / umbilical - total $540 K.	Adding pressure retaining caps creates a HSE risk at surface during recovery associated with trapped pressure. May limit the options for removal. Significant increase in weight (because retaining all line contents) requiring larger vessel / crane if reeling up. If cutting	**Reject** Rationale: during BMG Closure Project (Phase 1) flowline contents will be treated and tested to confirm contents are acceptable for discharge. Umbilicals are filled with Transaqua HT2™ and PPD (B6 only) with discharge analysis indicating PNEC are achieved inside 50 m of the release location.

ALARP Decision Context and Justification	**ALARP Decision Context: A** Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.					
					lines into sections subsea, then pressure retaining caps are obsolete.	As such, resultant discharges are assessed as negligible impact. Significant additional cost and operational HSE risk associated with recovering full flowlines in BMG Closure Project (Phase 2). Costs/risks are considered to be grossly disproportionate to the benefit.
Plug B6 flowline to retain all fluids during removal (reverse reel, lift and cut, cut and lift options)	Negligible Impact. Discharge small volumes (~1 m^3) with OIW at ~250 ppm. Disperses within immediate vicinity (~1 m) of release location.	No oily water discharge during removal (no impact).	Dependent on discharge source and risk.	Minor costs, not expected to be a critical path activity for the project.	Minor risk during retrieval of dislodging plug, resulting in fluid discharge and repeated operational tasks to reinstall plug.	**Implement** Rationale: Provides assurance as to quantities of fluids discharged. Costs are not grossly disproportionate to the benefit. Integrated via **C32**: Flowline plugs to be installed prior to removal of B6 flowline.
Flush B6 flowline and displace to untreated seawater (and confirm ≤30 ppm OIW) prior to removal.	Discharge of flowline fluids including OIW at estimated ~250 ppm and ~2 m^3 diesel/solvent introduced prior to 2009 isolation.	Ensure flowlines flushed to defined level of OIW.	Yes. Standard practice to flush flowlines to ensure known level of oil.	Increased cost (~$5M) for additional campaign time, specialised vessel/equipment, and fluid treatment and storage	Minor surface HSEC risks. Disposal requirement for oily water. There are known blockages in the B6 flowline. These include at least partial	**Reject** Rationale: Previous attempts at flushing the B6 flowline have not been successful due to the stuck valve at the B6 PLEM and known blockages within the flowline. To flush the flowline, these blockages would require

<table>
<tr><td>ALARP Decision Context and Justification</td><td colspan="6">ALARP Decision Context: A
Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence.
Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks.
Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.</td></tr>
<tr><td></td><td></td><td></td><td></td><td>required for Phase 2 campaign.</td><td>blockages of hydrocarbon wax. To flush the flowline clean would require dissolving these hydrocarbon blockages, which would require solvent, such as diesel or other hydrocarbon derivatives. This would add larger volumes of chemical / hydrocarbons to the flowline, with no guarantee of success, though would increase the potential impacts and risks of a spill by increasing the hydrocarbon inventory within the flowline during Phase-2 decommissioning</td><td>treatment with solvent such as diesel. This had limited success in the operations phase, and resulted in the status of having a flowline containing a mix of seawater and hydrocarbons. Attempting to clear the blockages and flush the flowline again carries a real risk of increasing the spill risk during the flushing activity itself, and during recovery of the flowline.
Based on assessment of discharges the estimated mixing zones to reduce oil and chemical constituents from the flowline to below PNECs are less than 500 m radius. This is true for both a reverse reel (full flowline content released) or the lift and cut/cut and lift options that produce smaller intermittent discharges.
Therefore, attempted re-flushing is likely to result in limited net environmental</td></tr>
</table>

ALARP Decision Context and Justification	**ALARP Decision Context: A** Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.					
						benefit at best, and at worst, an increase spill risk. There are also additional operational costs and HSE risks from attempting to flush the flowline, and of carrying and transferring solvents.
Visual observations during B6 flowline recovery.	N/A	Visual confirmation of retrieval to confirm presence of any hydrocarbon release.	Dependent on discharge source and risk.	Negligible. ROV with camera would be part of offshore campaign, and visual observations of water surface can be done from vessel.	None.	**Implement.** Rationale: Provides assurance as to whether hydrocarbon was released during B6 flowline recovery. Costs are not grossly disproportionate to the benefit. Integrated via **C33**: Infield visual monitoring of B6 during flowline removal.
Impact and Risk Summary						
Residual Impact Consequence	Level 1: Minor local impacts or disturbances to flora / fauna, nil to negligible remedial / recovery works on land / water systems					
Residual Risk Consequence	Level 1: Minor local impacts or disturbances to flora / fauna, nil to negligible remedial / recovery works on land / water systems					
Residual Risk Likelihood	Unlikely					
Residual Risk Severity	Low					
Demonstration of Acceptability						
Principles of ESD	Planned discharges are assessed as Level 1 consequence which is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.					

ALARP Decision Context and Justification	**ALARP Decision Context: A** Project discharges are a common, well-practiced activity within the offshore industry both nationally and internationally; for this project the chemical discharges have been characterised and assessed as Level 1 consequence. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Level 1 consequence, Amplitude Energy believes ALARP Decision Context A should apply. Good practice control measures are outlined below. These control measures consider the discharges during decommissioning.
Legislative and conventions	The proposed activities align with the requirements of the: • OPGGS Act 2006 (Cwlth) [S13(5) Risk assessment to ALARP]
Internal context	The environmental controls proposed reflects the Amplitude Energy HSE Policy goals of utilising best practice and standards to eliminate or minimise impacts and risks to the environment and community to a level which is ALARP. Relevant management system processes adopted to implement and manage hazards to ALARP include: • MS03 – Risk Management • MS09 - Health, Safety and Environment Management • MS11 – Supply Chain and Procurement Management. Activities will be undertaken in accordance with the Implementation Strategy (Section 9.0).
External context	No relevant person objections or claims have been received regarding planned discharges.
Acceptability Outcome	**Acceptable**

6.5 Underwater Sound Emissions

6.5.1 Cause of Aspect

Underwater sound emissions will occur as a result of the following activities:

- Removal of remaining Phase 1b subsea infrastructure
- Reverse installation (reel) and reverse installation (lift and cut or cut and lift)
- Seabed and as-left survey
- Inspections and maintenance
- Support operations (vessels, helicopters).

Most of these activities will generate continuous sound[12], except for some survey or positioning equipment (e.g. SBP) which emit impulsive sound. Some sound sources, such as the vessels, will be continual throughout the duration of the activity (i.e. approximately 50–75 days for decommissioning [Section 3.1.2], and approximately one week for inspection and maintenance [Section 3.5] if required); however, the location of the vessels will vary within the Operational Area. Other sound sources, such as cutting tools, positioning or survey equipment, will be used intermittently and only for a short duration (e.g. hours).

6.5.2 Aspect Characterisation

6.5.2.1 Continuous Sound

Acoustic Modelling

Amplitude Energy commissioned JASCO Applied Sciences to conduct acoustic modelling to inform the impact and risk assessment associated with underwater sound exposure from the petroleum activity. Given that vessels for the Phase 2 decommissioning scope are not yet confirmed, several scenarios based on different types of vessels have been incorporated into the risk assessment:

- multipurpose support vessels (MSV) (Muellenmeister, et al., 2026)
- platform supply vessel (PSV) and/or ROV vessel (these two vessels are based on same source specifications) and a DP3 semisubmersible vessel (Connell & Koessler, 2024)[13].

Modelling for an ROV operating a cutting tool was also undertaken (Connell & Koessler, 2024; Muellenmeister, et al., 2026). Different combinations of activities were modelled at different locations (Table 6-9).

The modelling was undertaken to assist in understanding the potential acoustic impact on receptors including marine mammals (cetaceans and otariid seals), turtles, and fish (including eggs and larvae). Estimated underwater acoustic levels are presented as sound pressure levels (SPL) and accumulated sound exposure levels (SEL_{24h}) as appropriate for different noise effect criteria. These modelling studies are provided in Appendix 7.

[12] The use of 'continuous sound' within this EP refers to non-impulsive sounds.

[13] This is an updated version of the 2021 modelling (Connell, et al., 2021) that was presented in the current in-force version of this EP (Revision 3). The broadband source levels and source level spectra have been revised by JASCO Applied Sciences for the vessels used in the modelling based on more recent analogue data.

Table 6-9 - Acoustic modelling scenarios

Scenario	Location	Modelled water depth	Source depth	Description
2024 Modelling (Connell & Koessler, 2024)				
A1	Basker-A	193.5 m[14]	15.3 m	DP3 vessel under DP
B1	Manta-2A	132.0 m	15.3 m	DP3 vessel under DP
A2	Basker-A	193.5 m	6.2 m	PSV under DP during resupply
B2	Manta-2A	132.2 m	6.2 m	PSV under DP during resupply
A3	Basker-A	193.5 m	15.3 m (DP3), 6.2 m (PSV)	DP3 vessel under DP and PSV under DP during resupply
B3	Manta-2A	132.2 m	15.3 m (DP3), 6.2 m (PSV)	DP3 vessel under DP and PSV under DP during resupply
A4	Basker-6	259.0 m	6.2 m	ROV vessel under DP
B4	Basker-A	193.5 m	6.2 m	ROV vessel under DP
A5	Basker-6	259.0 m	6.2 m (vessel), 254 m (cutter)	ROV vessel under DP with ROV at seafloor cutting
B5	Basker-A	193.5 m	6.2 m (vessel), 188.5 m (cutter)	ROV vessel under DP with ROV at seafloor cutting
2026 Modelling (Muellenmeister, et al., 2026)				
5	Sole	123.0 m	4.4 m (vessel), 118.0 m (cutter)	MSV under DP with ROV at seafloor cutting
6	Sole	123.0 m	4.4 m (vessel), 1.5 m (vessel), 118.0 m (cutter)	2 x MSVs under DP with ROV at seafloor cutting

The source characteristics for the DP3 semisubmersible, PSV, ROV vessel, and ROV cutting tools described by Connell and Koessler (2024); and the source characteristics from the MSV and ROV cutting tools from Muellenmeister et al (2026) are shown in Table 6-10. In addition, sound characteristics for jetting or MFE equipment, and helicopters, as determined from published literature are also shown in Table 6-10.

The vessel(s) for the Phase 2 decommissioning activities will be selected as part of a tender process as planning progresses. The Phase 2 vessel specifications are expected to be analogous to those considered by Connell and Koessler (2024) and Muellenmeister et al (2026) , whose modelling accounted for a range of vessels. As such the modelling is considered appropriate to inform the impact and risk assessment for the Phase 2 activities.

The acoustic modelling incorporated the sounds emitted from a diamond wire saw operated via an ROV (Connell & Koessler, 2024; Muellenmeister, et al., 2026). While the jetting or MFE equipment has not been directly modelled, given the similar SPL levels between the sources, the modelling of the ROV cutter is considered appropriate to inform the impact and risk assessment for the Phase 2 activities.

Empirical estimations of the effect ranges from survey equipment (e.g. MBES, SSS) were also provided by JASCO (Koessler & Quijano, 2025).

Helicopter operation produces underwater sounds for brief periods when the helicopter is directly overhead (Richardson, et al., 1995). Sound emitted from helicopter operations is typically below 500 Hz. Richardson et al (1995) reports figures for a Bell 214 helicopter (stated to be one of the loudest) being audible in the air for four minutes before it passed over underwater hydrophones, but detectable underwater for only 38 seconds at 3 m depth and 11 seconds at 18 m depth. In the absence of modelling, the estimates of SPL from helicopter operations (149–162 dB re 1 µPa) (Richardson, et al., 1995) has been used for the purposes of impact and risk assessment. Given the nature of helicopter operations (i.e. crew transfers; Section 3.6.2) covered under this EP,

[14] Survey data from Amplitude Energy demonstrates that actual water depth at Basker-A is ~155 m; however no usable bathymetry with this depth exists, and as such the 193.5 m value has been used within the model.

exposure to sound from this source for an extended period (e.g. 12 or 24 hours) is not credible, and as such, comparison against the cumulative sound exposure level criterions is not relevant.

Table 6-10 - Continuous sound source levels

Emission Source	Source Sound Level[15]	Modelling Reference
DP3 Semisubmersible Vessel	Broadband SPL: 185.0 dB re 1 µPa	(Connell & Koessler, 2024)
MSV 1	Broadband SPL: 185.5 dB re 1 µPa	(Muellenmeister, et al., 2026)
MSV 2	Broadband SPL: 159.8 dB re 1 µPa	(Muellenmeister, et al., 2026)
PSV / ROV Vessel	Broadband SPL: 181.2 dB re 1 µPa	(Connell & Koessler, 2024)
ROV cutter	Broadband SPL: 161.4 dB re 1 µPa	(Connell & Koessler, 2024) (Muellenmeister, et al., 2026)
Jetting equipment	SPL: 123 dB re 1 µPa @ 160 m	(Nedwell, et al., 2003)
MFE equipment	SPL: 162 dB re 1 µPa @ 1 m	(Xodus, 2017)
MBES	SPL: 218–224 dB re 1 µPa @ 1 m	(Koessler & Quijano, 2025)
Side scan sonar	SPL: 201–205 dB re 1 µPa @ 1 m	(Koessler & Quijano, 2025)
Helicopter	SPL: 162 dB re 1 µPa	(Richardson, et al., 1995)

Noise effect criteria

Different species groups perceive and respond to sound differently, and so a variety of exposure criteria for the different types of impacts and species groups are considered. The noise effect criteria used within the modelling studies was based on the available science at the time the modelling was completed. The noise effect criteria used in Connell and Koessler (2024) and shown in Table 6-11, are:

- Frequency-weighted accumulated sound exposure levels (SEL_{24h}) from Southall et al. (2019) for the onset of PTS[16] and TTS[17] in marine mammals
- Un-weighted SPL for behavioural threshold for marine mammals based on the US National Oceanic and Atmospheric Administration (NOAA) (2019)
- Frequency-weighted accumulated sound exposure levels (SEL_{24h}) from Finneran et al. (2017) for the onset of PTS and TTS in marine turtles
- Sound exposure guidelines for fish, fish eggs, and larvae (Popper, et al., 2014).

The noise effect criteria used in Muellenmeister et al (2026) and shown in Table 6-11 are:

- Frequency-weighted accumulated SEL_{24h} from US National Marine Fisheries Service (NMFS) (2024) for the onset of auditory injury (A-INJ) and TTS in marine mammals
- Un-weighted SPL for behavioural threshold for marine mammals based on NOAA (2024)
- Frequency-weighted accumulated SEL_{24h} from Accomando et al. (2025)for the onset of A-INJ and TTS in marine turtles
- Sound exposure guidelines for fish, fish eggs, and larvae (Popper, et al., 2014).

[15] Broadband SPL calculated over 10 Hz to 25 kHz range.

[16] PTS is a physical injury to an animal's hearing organs.

[17] TTS is a temporary reduction in an animal's hearing sensitivity as the result of receptor hair cells in the cochlea becoming fatigued.

The modelling in Muellenmeister et al (2026) is based on more contemporary effect criteria and auditory weighting curves for marine mammals compared to the Connell and Koessler (2024). The difference between Southall et al. (2019) and NMFS (2024) include:

- revised generalised hearing ranges for marine mammal functional hearing groups
- revised auditory weighting functions
- use of the term 'auditory injury', which includes, but is not limited to, PTS
- revised effect criteria for the onset of TTS and A-INJ.

The greatest change in auditory weighting functions was for high frequency cetaceans with the revised function showing increased sensitivity to lower frequency (<10 kHz) sounds. For low frequency cetaceans the effect criteria decreased by 2 dB, while for high and very high frequency cetaceans they increased by 3 dB and 8 dB respectively. Where effect criteria have become more conservative (therefore greater ensonified distances expected), these have been highlighted in **bold** in Table 6-11. However, it is the combined effect of both the revised auditory weighting functions and revised effect criteria, in comparison to the sound characteristics of the source (e.g. the vessels) that will determine the magnitude and direction of any change in predicted ensonified distance resulting from the updated NMFS (2024) technical guidance. For example, a CMST analysis of several vessel types suggested a potential increase in ensonified distance by a factor of ~1.3 and ~2.8 for low and high frequency cetaceans respectively; and a potential decrease by a factor of ~0.6 for very high frequency cetaceans (CMST (2025) as cited in CAPL (2025)). It is noted that these factors are dependent on the source spectra of the vessels within scope of the study.

Note: It is also acknowledged that the 2025 updated criteria from the US Navy (Accomando, et al., 2025) separates cetaceans into four hearing groups compared to the three groups within NMFS (2024). The US Navy sub-divides the mysticete species into two hearing groups: the 'very low frequency cetaceans' (Balaenidae and Balaenopteridae) and the 'low frequency cetaceans' (other mysticetes such as humpback and sei whales). While the effect criteria are the same for both groups, the auditory weighting curves differ. The auditory weighting curve for the US Navy's very low frequence cetacean group is the same as the low frequency cetacean group from the NMFS. For the key species within the risk assessment for this EP, the pygmy blue whale and southern right whale, both are within the US Navy's very low frequency grouping. However, since the auditory weighting curves and effect criteria are the same for these two species between the 2024 NMFS and 2025 US Navy criteria, revising modelling to account for the more recent hearing groups in the US Navy (Accomando, et al., 2025) was not considered as necessary to inform the risk assessment in this EP.

Commonwealth guidance has defined "injury to blue whales" as both PTS and TTS hearing impairment, as well as any other form of physical harm arising from anthropogenic sources of underwater sound (Table 2-7).

Numerous studies on marine mammal behavioural responses to sound exposure have not resulted in consensus in the scientific community regarding the appropriate metric for assessing behavioural reactions (Connell, et al., 2021; Connell & Koessler, 2024; Muellenmeister, et al., 2026).

The NOAA (NOAA, 2019; NOAA, 2024) behavioural threshold was derived based on studies examining behavioural responses to drilling and dredging (NOAA, 2018), referring to Malme et al. (1983), Malme et al. (1984), and Malme et al. (1986), which were considered in Southall et al (2007). Malme et al. (1986) found that playback of drillship sound did not produce clear evidence of disturbance or avoidance for levels below an SPL of 110 dB re 1 µPa, however, possible avoidance occurred for exposure levels approaching 119 dB re 1 µPa. Malme et al. (1984) determined that measurable reactions usually consisted of rather subtle short-term changes in speed and/or heading of the whale(s) under observation.

Previous literature reviews (e.g. Southall et al. (2007)) identified varying responses for most marine mammals between SPLs of 140–180 dB re 1 µPa. For low frequency whales (e.g. blue, fin, sei, southern right) the data indicated no or very limited responses at a received level of 90–120 dB re 1 µPa, with an increasing probability of avoidance and behavioural effects from 120–160 dB re 1 µPa. With regard to an exploration drilling program within the Otway Basin, advice provided by Brandon Southall to Beach Energy when asked "what, in your opinion, for this particular project, could be the sound levels which could cause effects starting at 'response' and ending at 'disturbance/displacement' for blue whales, and thus displace them from food" responded that based on studies on feeding blue whales off California the response change points were in the 130–140 dB re 1 µPa range (Beach Energy, 2020). Therefore, the NOAA (NOAA, 2019; NOAA, 2024) behavioural threshold for marine mammals of a SPL at 120 dB re 1 µPa is likely to represent a conservative threshold.

During 2023 and 2024 Amplitude Energy completed inspection, maintenance, and decommissioning activities in the Gippsland region. Modelling indicated that behavioural threshold for marine mammals may be received at distances of >5 km from the project vessels whilst DP was active (Connell & Koessler, 2024). Over the course of ~280 days of infield and in-transit activities there were 525 baleen whale sightings recorded by marine mammal observers on board the vessels. Most of these sightings were of humpback whales undertaking their southerly migration, including adults with calves (Figure 6-16). There were also high numbers of pilot whales (categorised under 'toothed whales') observed throughout the activity (Figure 6-16). Whales were observed at distances between ~0.05 km and ~6.2 km from the vessel. Behaviours observed include fast and slow travel, milling and surface active (e.g. fin slapping and breaching), with the majority being surface active and slow travel within ~3 km of the vessel (Figure 6-17). The whales that were observed were not noticeably disturbed by the underwater sound generated by the activity; this may be another indicator that the behavioural threshold for marine mammals is highly conservative.

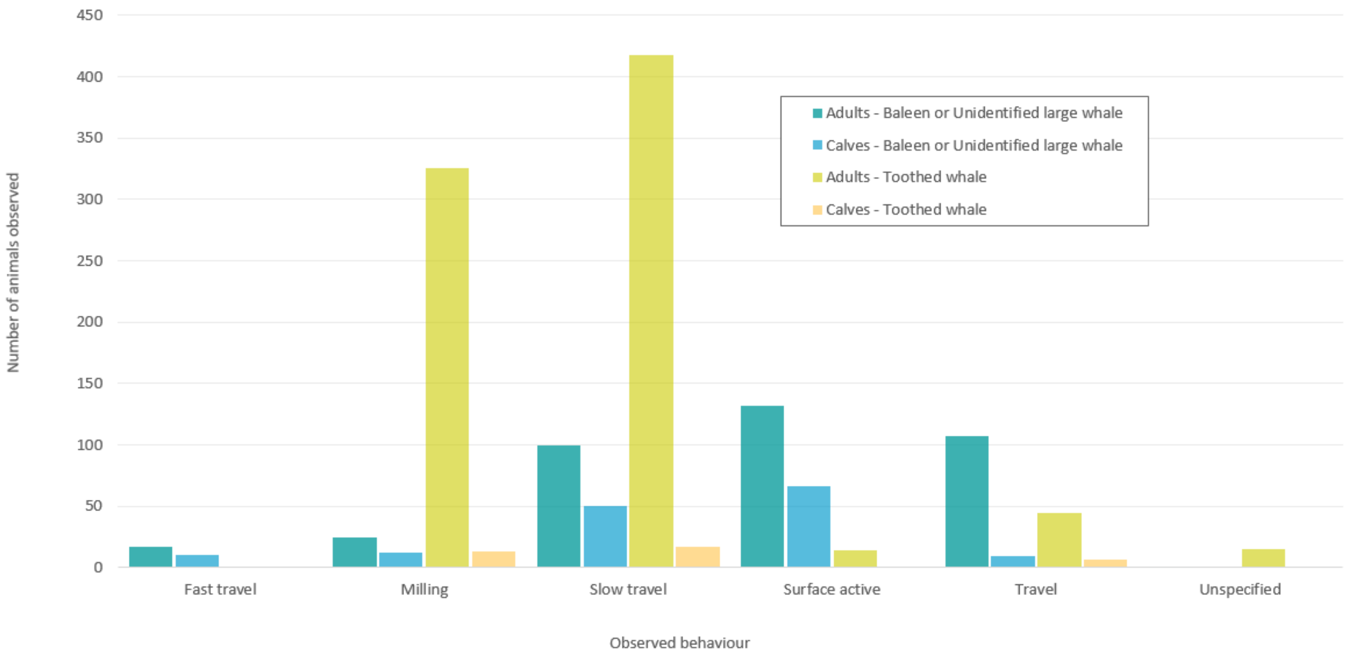


Figure 6-16 - Whale Observations and Behaviour during BMG Closure Project (Phase-1), Offshore Gippsland 2023-2024

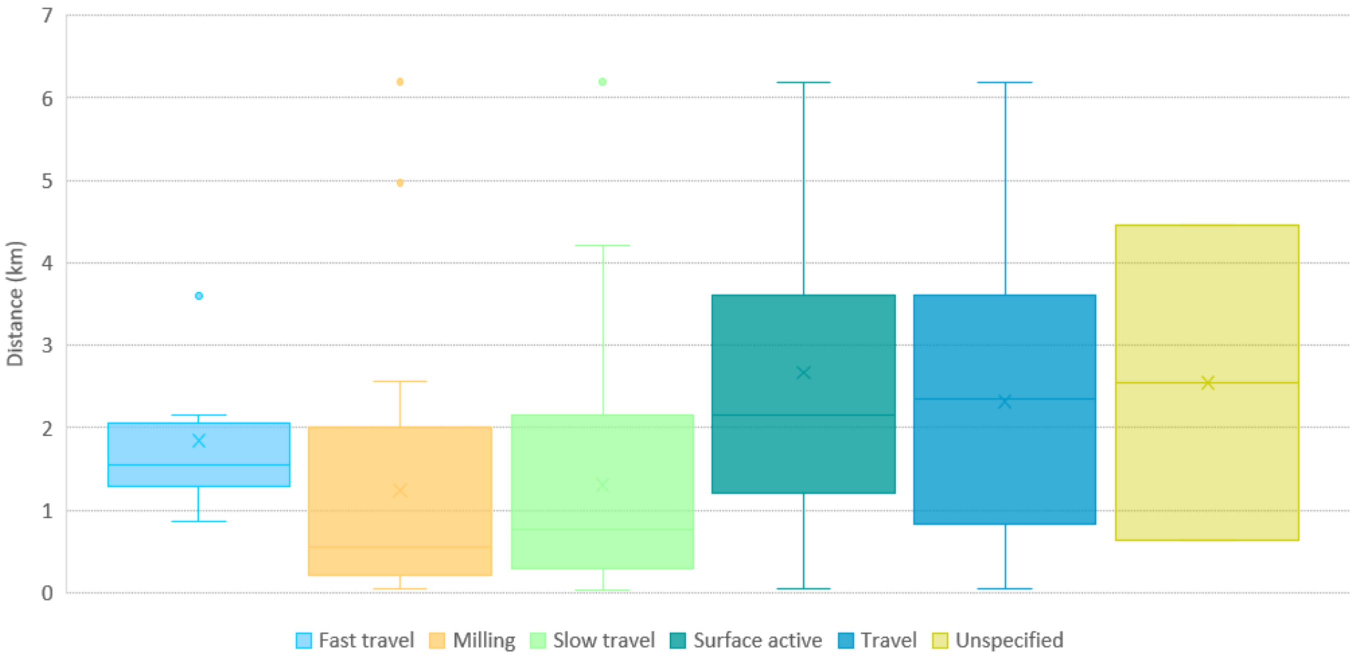


Figure 6-17 - Whale Observations and Behaviour (with Distance from Vessel) during BMG Closure Project (Phase-1), Offshore Gippsland 2023-2024

Table 6-11 - Noise effect criteria for continuous sound

Receptor	Behavioural	Impairment			Injury	
		Masking	**Temporary threshold shift**	**Recoverable injury**	**Permanent threshold shift**	**Mortality or potential mortal injury**
Low-frequency cetaceans	SPL: 120 dB re 1 µPa	N/A	SEL$_{24h}$: 179 dB re 1 µPa^{2}s	N/A	SEL$_{24h}$: 199 dB re 1 µPa^{2}s	N/A
**Revised NMFS 2024 criteria*			**SEL$_{24h}$: 177 dB re 1 µPa^{2}s**		**SEL$_{24h}$: 197 dB re 1 µPa^{2}s**	
High-frequency cetaceans		N/A	SEL$_{24h}$: 178 dB re 1 µPa^{2}s	N/A	SEL$_{24h}$: 198 dB re 1 µPa^{2}s	N/A
**Revised NMFS 2024 criteria*			SEL$_{24h}$: 181 dB re 1 µPa^{2}s		SEL$_{24h}$: 201 dB re 1 µPa^{2}s	
Very High-frequency cetaceans		N/A	SEL$_{24h}$: 153 dB re 1 µPa^{2}s	N/A	SEL$_{24h}$: 173 dB re 1 µPa^{2}s	N/A
**Revised NMFS 2024 criteria*			SEL$_{24h}$: 161 dB re 1 µPa^{2}s		SEL$_{24h}$: 181 dB re 1 µPa^{2}s	
Otariid seals		N/A	SEL$_{24h}$: 199 dB re 1 µPa^{2}s	N/A	SEL$_{24h}$: 219 dB re 1 µPa^{2}s	N/A
**Revised NMFS 2024 criteria*			**SEL$_{24h}$: 179 dB re 1 µPa^{2}s**		**SEL$_{24h}$: 199 dB re 1 µPa^{2}s**	
Turtles	(N) High (I) Moderate (F) Low	N/A	SEL$_{24h}$: 200 dB re 1 µPa^{2}s	N/A	SEL$_{24h}$: 220 dB re 1 µPa^{2}s	N/A
**Revised US Navy 2025 criteria*			**SEL$_{24h}$: 178 dB re 1 µPa^{2}s**		**SEL$_{24h}$: 198 dB re 1 µPa^{2}s**	
Fish (no swim bladder)	(N) Moderate (I) Moderate (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	N/A	(N) Low (I) Low (F) Low
Fish (swim bladder not involved in hearing)	(N) Moderate (I) Moderate (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	N/A	(N) Low (I) Low (F) Low
Fish (swim bladder involved in hearing)	(N) High (I) Moderate (F) Low	(N) High (I) High (F) High	SPL: 158 dB re 1 µPa for 12 hours	SPL: 170 dB re 1 µPa for 48 hours	N/A	(N) Low (I) Low (F) Low
Fish eggs and fish larvae (also relevant to plankton)	(N) Moderate (I) Moderate (F) Low	(N) High (I) Moderate (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	N/A	(N) Low (I) Low (F) Low

Relative risk (high, moderate, low) is given for fauna at three distances from the source (near [N] = tens of metres, intermediate [I] = hundreds of metres, and far [F] = thousands of metres).

Modelling outputs

The maximum-over-depth sound fields for all modelled scenarios (Table 6-9) are presented in Table 6-13, Table 6-13, and Table 6-14,as the maximum horizontal distance (R_{max}) from the source to each noise effect threshold.

Variations in bathymetry generally had the most noticeable effect on the sound field footprints (Connell & Koessler, 2024). The bias of isopleths to the west of the modelled sites (all of which occur on the continental shelf break and upper section of the slope) is likely due to the presence of a sub-marine canyon and associated variations in bathymetry. Comparing the distances to isopleths for the same type of scenario (e.g. a vessel under DP; model scenarios A2, A4, B2, and B4), indicated that for this location and activity, the distance to noise effect criteria decreases as water depth increases. The inclusion of the ROV cutter as an individual source did not significantly influence the extent of ensonification or predicted radii for the relevant SPL or SEL_{24} metrics. While the cutter is quiet in contrast to the vessel, and as such does not influence the broadband sound levels, it does increase the sound levels in the hearing range of high-frequency cetaceans.

While the source levels for the DP3 semisubmersible and MSV were similar (Table 6-10), the predicted R_{max} distance to the different effect criteria varied (Table 6-13, Table 6-13, and Table 6-14). This is likely a combination of the differences in water depth and the change in auditory weighting curves and effect criteria between the two sets of modelling.

As vessel/s have not yet been selected for the Phase 2 campaign, the range of predicted ensonifed areas from all modelling scenarios has been carried into the risk assessment. The larger of the vessels (the DP3 semisubmersible and MSV) are considered to be at the larger end of the vessels likely to be considered appropriate for the Phase 2 scope and therefore provide a conservative basis for the assessment.

Table 6-12 - Modelled maximum horizontal distances (R_{max}) from any modelling scenario for the MSV to reach noise effect criteria (Muellenmeister, et al., 2026)

Receptor	Behavioural	Temporary threshold shift	Recoverable injury	Auditory injury
Low-frequency cetaceans	SPL: 8.57 km	SEL_{24h}: 2.76 km	N/A	SEL_{24h}: 0.51 km
High-frequency cetaceans		SEL_{24h}: 0.51 km	N/A	SEL_{24h}: —
Very High-frequency cetaceans		SEL_{24h}: 0.80 km	N/A	SEL_{24h}: 0.51km
Otariid seals		SEL_{24h}: 0.51 km	N/A	SEL_{24h}: —
Turtles	N/A	SEL_{24h}: 1.95 km	N/A	SEL_{24h}: 0.51 km
Fish (swim bladder involved in hearing)	N/A	SPL (for 12 hours): 0.04 km	SPL (for 48 hours): —	N/A

A dash indicates the level was not reached within the limits of the modelling resolution (20 m).

Using results from Muellenmeister, et al. 2026, adjustments for more recent NMFS 2024 effect criteria[18] are shown alongside the modelled results from Connel & Koessler (2024) in Table 6-13 and Table 6-14.

[18] The adjustments are calculated using the proportional difference between the behavioural (SPL) ensonified distance and the corresponding SEL_{24h} for each receptor group described in Muellenmeister et al. (2026). These adjustments result in an increase in the potential ensonified distances for TTS (all cases) and PTS (some cases). These proportional adjustments are larger in magnitude, and all increase the estimated ensonified distance, compared to studies with predicted adjustments that also considered the vessel source spectra. Therefore, these proportional adjustments are considered conservative and for assessment purposes.

Table 6-13 - Modelled maximum horizontal distances (R_{max}) from any modelling scenario for the DP3 semisubmersible to reach noise effect criteria (Connell & Koessler, 2024).

Receptor	Behavioural	Temporary threshold shift	TTS adjusted for NMFS 2024[19]	Recoverable injury	Permanent threshold shift	PTS adjusted for NMFS 2024
Low-frequency cetaceans	SPL: 15.7 km	SEL_{24h}: 2.09 km	SEL_{24h}: 5.06 km	N/A	SEL_{24h}: 0.08 km	SEL_{24h}: 0.93
High-frequency cetaceans		SEL_{24h}: 0.04 km	SEL_{24h}: 0.93 km	N/A	SEL_{24h}: 0.02 km	SEL_{24h}: 0.93
Very High-frequency cetaceans		SEL_{24h}: 0.67 km	SEL_{24h}: 1.47 km	N/A	SEL_{24h}: 0.05 km	SEL_{24h}: 0.93 km
Otariid seals		SEL_{24h}: 0.03 km	SEL_{24h}: 0.93 km	N/A	SEL_{24h}: —	SEL_{24h}: —
Turtles	N/A	SEL_{24h}: 0.07 km	SEL_{24h}: 3.57 km	N/A	SEL_{24h}: 0.02 km	SEL_{24h}: 0.93 km
Fish (swim bladder involved in hearing)	N/A	SPL (for 12 hours): 0.04 km	N/A	SPL (for 48 hours): 0.02 km	N/A	N/A

A dash indicates the level was not reached within the limits of the modelling resolution (20 m).

Table 6-14 - Modelled maximum horizontal distances (R_{max}) from any modelling scenario for the PSV/ROV Vessel (with and without the ROV cutting) to reach noise effect criteria (Connell & Koessler, 2024).

Receptor	Behavioural	Temporary threshold shift	TTS adjusted for NMFS 2024[19]	Recoverable injury	Permanent threshold shift	PTS adjusted for NMFS 2024
Low-frequency cetaceans	SPL: 5.14 km	SEL_{24h}: 0.75 km	SEL_{24h}: 1.66 km	N/A	SEL_{24h}: 0.04 km	SEL_{24h}: 0.31 km
High-frequency cetaceans		SEL_{24h}: 0.05 km	SEL_{24h}: 0.31 km	N/A	SEL_{24h}: 0.02 km	SEL_{24h}: 0.31 km
Very High-frequency cetaceans		SEL_{24h}: 0.94 km	SEL_{24h}: 0.48 km	N/A	SEL_{24h}: 0.06 km	SEL_{24h}: 0.31 km
Otariid seals		SEL_{24h}: 0.02 km	SEL_{24h}: 0.31 km	N/A	SEL_{24h}: —	SEL_{24h}: —
Turtles	N/A	SEL_{24h}: 0.036 km	SEL_{24h}: 1.17 km	N/A	SEL_{24h}: —	SEL_{24h}: 0.31 km
Fish (swim bladder involved in hearing)	N/A	SPL (for 12 hours): 0.02 km	N/A	SPL (for 48 hours): 0.02 km	N/A	N/A

A dash indicates the level was not reached within the limits of the modelling resolution (20 m).

Results from the empirical estimations of the effect ranges from survey equipment (MBES and SSS) are shown in Table 6-15. Due to the frequency-dependent hearing sensitivities of marine mammals and turtles, the sound produced by the MBES and SSS equipment considered are mostly relevant to high-frequency and very-high-frequency cetaceans (Koessler & Quijano, 2025). In addition, Popper et al. (2014) states that "low (0-1 kHz), and possibly mid (1 kHz-10 kHz), frequency sonars are most relevant to fishes and sea turtles because of the low frequency hearing ranges of these animals". Therefore, no effects are predicted for low-frequency cetaceans, fish, and turtles from the considered MBES or SSS equipment (Koessler & Quijano, 2025).

Table 6-15 - Maximum horizontal distances from modelled MBES and SSS sources to reach noise effect criteria

Receptor	Behavioural	Temporary threshold shift	Recoverable injury	Auditory injury
Low-frequency cetaceans	SPL: 1.2 km	SEL_{24h}: —	N/A	SEL_{24h}: —
High-frequency cetaceans		SEL_{24h}: 0.06 km	N/A	SEL_{24h}: 0.004 km
Very High-frequency cetaceans		SEL_{24h}: 0.47 km	N/A	SEL_{24h}: 0.12 km
Otariid seals		SEL_{24h}: —	N/A	SEL_{24h}: —
Turtles	N/A	SEL_{24h}: —	N/A	SEL_{24h}: —

[19] TTS and PTS estimates for Turtles adjusted for Accomando et al. (2025) using the proportional difference between the LF Cetacean SEL24h and Turtle SEL24h reported in Muellenmeister, et al., 2026. A study conducted by CMST (2025) as cited in CAPL (2025) suggested scaling factors of 7 – 10 times accounting for the differences between the thresholds and weightings moving from Finneran et al. (2017) to Accomando et al. (2025). The estimates presented in this EP have an equivalent scaling factor of ~30 and are therefore considered conservative for assessment purposes.

Receptor	Behavioural	Temporary threshold shift	Recoverable injury	Auditory injury
Fish (swim bladder involved in hearing)	N/A	SPL (for 12 hours): —	SPL (for 48 hours): —	N/A

6.5.2.2 Impulsive sound

Acoustic modelling

Amplitude Energy commissioned JASCO Applied Sciences to provide empirical estimations of the effect ranges from survey equipment (SBPs) and positioning equipment (ultra-short baseline; USBL). The source characteristics determined from the literature review and used the subsequent impact and risk assessment are shown in Table 6-16.

Table 6-16 - Positioning and survey equipment source frequencies and sound levels

Emission Source	Source Sound Level	Modelling Reference
SBP (transducer)	178–179 dB re 1 µPa @ 1 m	(Koessler & Quijano, 2025)
SBP (boomer)	205 dB re 1 µPa @ 1 m	(Koessler & Quijano, 2025)
USBL	204 dB re 1 µPa @ 1 m	(Koessler & Quijano, 2025)

Noise effect criteria

Different species groups perceive and respond to sound differently, and so a variety of exposure criteria for the different types of impacts and species groups are considered. The following noise effect thresholds (Table 6-17), based on available science at the time of the modelling, have been used in the impact and risk assessment:

- Peak pressure levels (PK) and frequency-weighted accumulated SEL_{24h} from the US NMFS Technical Guidance (NMFS, 2024) for the onset of A-INJ and TTS in marine mammals
- Marine mammal behavioural threshold based on the NOAA (2019) criterion for marine mammals of 160 dB re 1 µPa (SPL) for impulsive sound sources
- PK and frequency-weighted accumulated SEL_{24h} from Accomando et al. (2025) for the onset of A-INJ and TTS in marine turtles
- marine turtle behavioural response threshold of 166 dB re 1 µPa (SPL) (Commonwealth of Australia, 2017d) as applied by the US NMFS, along with a sound level associated with behavioural disturbance 175 dB re 1 µPa (SPL) (McCauley, et al., 2000)
- sound exposure guidelines for fish, fish eggs and larvae (Popper, et al., 2014).

Recent Commonwealth guidance has defined “injury to Blue Whales” as both PTS and TTS hearing impairment, as well as any other form of physical harm arising from anthropogenic sources of underwater noise (Table 2-7).

Table 6-17 - Noise effect criteria for impulsive sound

Receptor	**Behavioural**	**Impairment**			**Injury**	
		Masking	**Temporary threshold shift**	**Recoverable injury**	**Auditory injury**	**Mortality or potential mortal injury**
Low-frequency cetaceans	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 168 dB re 1 μPa^2s PK: 216 dB re 1 µPa	N/A	SEL_{24h}: 183 dB re 1 μPa^2s PK: 222 dB re 1 µPa	N/A
Mid-frequency cetaceans	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 178 dB re 1 μPa^2s PK: 224 dB re 1 µPa	N/A	SEL_{24h}: 193 dB re 1 μPa^2s PK: 230 dB re 1 µPa	N/A
High-frequency cetaceans	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 144 dB re 1 μPa^2s PK: 196 dB re 1 µPa	N/A	SEL_{24h}: 159 dB re 1 μPa^2s PK: 202 dB re 1 µPa	N/A
Otariid seals	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 170 dB re 1 μPa^2s PK: 224 dB re 1 µPa	N/A	SEL_{24h}: 185 dB re 1 μPa^2s PK: 230 dB re 1 µPa	N/A
Turtles	SPL: 166 dB re 1 µPa SPL: 175 dB re 1 µPa	N/A	SEL_{24h}: 169 dB re 1 μPa^2s PK: 224 dB re 1 µPa	N/A	SEL_{24h}: 184 dB re 1 μPa^2s PK: 230 dB re 1 µPa	N/A
Fish (no swim bladder)	(N) High (I) Moderate (F) Low	(N) Low (I) Low (F) Low	SEL_{24h}: >>186 dB re 1 μPa^2s	SEL_{24h}: >216 dB re 1 μPa^2s PK: >213 dB re 1 µPa	N/A	SEL_{24h}: >219 dB re 1 μPa^2s PK: >213 dB re 1 µPa
Fish (swim bladder not involved in hearing)	(N) High (I) Moderate (F) Low	(N) Low (I) Low (F) Low	SEL_{24h}: >>186 dB re 1 μPa^2s	SEL_{24h}: 203 dB re 1 μPa^2s PK: >207 dB re 1 µPa	N/A	SEL_{24h}: 210 dB re 1 μPa^2s PK: >207 dB re 1 µPa
Fish (swim bladder involved in hearing)	(N) High (I) High (F) Moderate	(N) Low (I) Low (F) Moderate	SEL_{24h}: 186 dB re 1 μPa^2s	SEL_{24h}: 203 dB re 1 μPa^2s PK: >207 dB re 1 µPa	N/A	SEL_{24h}: 207 dB re 1 μPa^2s PK: >207 dB re 1 µPa
Fish eggs and fish larvae (also relevant to plankton)	(N) Moderate (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) Moderate (I) Low (F) Low	N/A	SEL_{24h}: >210 dB re 1 μPa^2s PK: >207 dB re 1 µPa

Relative risk (high, moderate, low) is given for fauna at three distances from the source (near [N] = tens of metres, intermediate [I] = hundreds of metres, and far [F] = thousands of metres).

Modelling outputs

Results from the empirical estimations of the effect ranges from survey and positioning equipment (SBPs and USBL) are shown in Table 6-18.

Table 6-18 -Estimated maximum horizontal distance from SBPs and USBL sources to reach noise effect criteria

Receptor	Behavioural	Temporary threshold shift	Recoverable injury	Auditory injury	Mortality or potential mortal injury
Low-frequency cetaceans	SPL: 178 m	SEL_{24h}: 24 m PK: —	N/A	SEL_{24h}: — PK: —	
High-frequency cetaceans		SEL_{24h}: 2 m PK: —	N/A	SEL_{24h}: — PK: —	
Very High-frequency cetaceans		SEL_{24h}: 513 m PK: 6 m	N/A	SEL_{24h}: 17 m PK: 3 m	
Otariid seals		SEL_{24h}: 9 m PK: —	N/A	SEL_{24h}: — PK: —	
Turtles	SPL: 89 m	SEL_{24h}: — PK: —	N/A	SEL_{24h}: — PK: —	
Fish (swim bladder involved in hearing)	N/A	SEL_{24h}: — PK: —	SEL_{24h}: — PK: —	N/A	SEL_{24h}: — PK: —

6.5.3 Predicted Environmental Impacts and Risk Events

Potential impacts of underwater sound emissions are:

- Change in ambient sound.

Potential risk events associated with underwater sound emissions are:

- Behavioural changes to marine fauna
- Auditory impairments (masking, TTS, recoverable injury) or auditory injuries (mortality or potential mortal injuries, PTS) to marine fauna.

6.5.4 Impact and Risk Evaluation

6.5.4.1 Continuous Sound

Impact: Change in Ambient Sound

Inherent Consequence Evaluation

Ambient underwater sound is the level of sound which exists in the environment without the presence of the activity. Since 2009 (paused 2017–2018 due to unconfirmed funding), the Integrated Marine Observing System (IMOS) has been recording underwater sound south of Portland, Victoria (38°32.5'S, 115°0.1'E). Sound sources identified in recordings include blue and fin whales at frequencies below 100 Hz, ships at 20–200 Hz, and fish at 1–2 kHz (Erbe, et al., 2016). In the Gippsland Basin, primary contributors to background sound levels were wind, rain, and current- and wave-associated sound at low frequencies under 2 kHz (Przeslawski, et al., 2016). Biological sound sources, including dolphin vocalisations, were also recorded (Przeslawski, et al., 2016). Ambient underwater sound levels in the Gippsland Basin within the 100–500 Hz frequency range varied depending on recording location between 89.2–109.9 dB re 1 µPa^2/Hz, likely due to a varied increase in distance from shipping activity, and water depth.

Underwater modelling for the activity (Connell & Koessler, 2024; Muellenmeister, et al., 2026) indicated that sound at an SPL of 110 dB re 1 µPa would extend 18.7–59.7 km from the source for each of the modelling scenarios in Table 6-9.

Given the short duration (i.e. approximately ~50–75 days for decommissioning, or 7 days for inspection and maintenance) of Phase 2 activities, and localised extent of change (e.g. up to ~60 km for an SPL of 110 dB re 1 µPa), the consequence of this impact has been evaluated as **Level 1**, as underwater sound will return to existing ambient levels following completion of the activity with no remedial or recovery work required.

Risk Event: Behavioural Changes (Marine Mammals)

Inherent Consequence Evaluation

While the estimates of SPL for helicopters are above the noise effect criteria for behavioural disturbance to marine mammals, the spatial and temporal extent of the potential exposure to underwater sound from helicopters is limited (e.g. 38 seconds at 3 m depth, and 11 seconds at 18 m depth; (Richardson, et al., 1995)). Helicopter operations, if they occur, would be infrequent during the activity (Section 3.6.2). As such, behavioural changes to marine mammals from helicopters is not considered a credible risk and has not been evaluated further.

Acoustic modelling indicated that the R_{max} from the source (e.g. vessels on DP) to SPL behavioural noise effect criteria for all marine mammals was up to 15.7 km (Table 6-13, Table 6-13, Table 6-14, Table 6-15).

The PMST report (Appendix 3) for a 16 km buffer around the Operational Area (the Activities EMBA), identifies that several marine mammal species listed as threatened and/or migratory under the EPBC Act have the potential to be present, including:

- blue whale (endangered, migratory)
- fin whale (vulnerable, migratory)
- sei whale (vulnerable, migratory)
- southern right whale (endangered, migratory)
- Antarctic minke whale, Bryde’s whale, dusky dolphin, humpback whale, killer whale, pygmy right whale, sperm whale (migratory).

Of all the cetacean species that may occur within the ensonified area (Appendix 3), the following species were identified within the PMST report as undertaking a biologically important behaviour[20]:

- fin whale, pygmy right whale, sei whale (foraging, feeding or related behaviour likely to occur within area).

In addition, a ‘possible foraging area’ BIA for the pygmy blue whale, and a ‘migration’ BIA for the southern right whale also overlaps with the predicted ensonified area for behavioural disturbance. No HCTS of these species were identified within the predicted ensonified area.

Low-frequency cetaceans are represented by the mysticetes (baleen whales), specialised in hearing low frequencies, and include sei, blue, fin, southern right, minke, Bryde’s, pygmy right, and humpback whales. High-frequency cetaceans are represented by most odontocetes (toothed whales) and dolphins, specialised in hearing mid frequencies, and include beaked whales, the dusky dolphin, killer whale, and sperm whale. Several high frequency cetaceans may occur within the ensonified area, though there are no BIA’s or biologically important behaviours for these species identified in either the Operational Area or Activity EMBA (which includes the

[20] Biologically important behaviours are those such as breeding, foraging, resting, or migration.

potentially ensonified area). Very High-frequency cetaceans are represented by a subset of odontocetes (toothed whales) and dolphins, specialised in hearing high frequencies. Limited very high-frequency cetaceans' species are expected to occur with the Gippsland region; the PMST report (Appendix 3) indicates that two species (pygmy sperm whale, dwarf sperm whale) may occur within the ensonified area, but no BIAs or biologically important behaviours have been identified. However, the presence of these species within the vicinity of BMG (135–270 m water depths) is not considered likely, as both are oceanic species (typically occurring either at or beyond the edge of the continental shelf), and the Australian distribution is not considered to be abundant as historic sightings or standings are rare (DCCEEW, 2025b).

The long-nosed fur-seal and the Australian fur-seal are both listed marine species under the EPBC Act (but are not listed as threatened or migratory), that may have a presence within the ensonified area (Appendix 3). No BIA, HCTS, or biologically important behaviours were identified with the potential presence of these seal species. As described in Section 4.4.14.4.1, anecdotal sightings of pinnipeds have occurred at the BMG infrastructure, including a sighting of an Australian fur seal foraging around a BMG flowline during an offshore inspection (Ierodiaconou, et al., 2021).

Given the predominance of low-frequency cetaceans, and that either BIAs and/or biologically important behaviours have been identified for species within this hearing group within the predicted ensonified area for behavioural disturbance, this consequence evaluation is focussed on these species.

Blue Whales

Australia has two known seasonal feeding aggregation locations, that are supported by upwelling systems, for pygmy blue whales (Commonwealth of Australia, 2015a). The Bonney Upwelling is the closest known seasonal feeding area for blue whales (Commonwealth of Australia, 2015a; Gill, et al., 2011; McCauley, et al., 2018); however, this feature is located approximately 300 km from the activity location. Outside of the recognised feeding areas, possible foraging areas for pygmy blue whale include the Bass Strait, and diving and presumably feeding at depth off the west coast of Tasmania (Commonwealth of Australia, 2015a).

Typically, blue whales migrate between breeding grounds at lower latitudes where mating and calving take place in the winter, to feeding grounds at higher latitudes where foraging occurs in the summer (Commonwealth of Australia, 2015a). As identified in Section 4.4.1, the BMG infrastructure occurs within a 'possible foraging area' BIA. The pygmy blue whale 'possible foraging area' has been defined where "*evidence for feeding is based on limited direct observations or through indirect evidence, such as occurrence of krill in close proximity of whales, or satellite tagged whales showing circling tracks. Blue whales travel through on a seasonal basis, possibly as part of their migratory route*" (Commonwealth of Australia, 2015a). The possible foraging area, as delineated within the CMP (Commonwealth of Australia, 2015a), is extensive (~181,406 km^2), encompassing all of central and eastern Bass Strait (Figure 4-11). Current and future activities within this region include fishing, shipping, oil and gas, utilities, offshore wind, and other renewable energy projects.

Three groups of blue whales – Indo-Australian pygmy blue, Tasman-Pacific pygmy blue, and Antarctic blue, have been recorded acoustically in the Bass Strait (McCauley, et al., 2018), with scientists now considering the Bass Strait to be the boundary between the East Indian Ocean and New Zealand sub-populations. No Indo-Australian pygmy blues have been recorded on Australia's east coast (Balcazar, et al., 2015) or in New Zealand, where Tasman-Pacific (NZ subpopulation) pygmy blue whales gather to forage in the South Taranaki Bight west of Cook Strait (Barlow, et al., 2018).

Acoustic detections of Tasman-Pacific pygmy blue whales and Antarctic blue whales have been recorded in the Bass Strait and offshore eastern Australia between April and June (Balcazar, et al., 2015; McCauley, et al., 2018). Based on current knowledge of patterns of behaviour elsewhere, it can be assumed that if blue whales are sighted, they are most likely foraging (P. Gill, pers. comm., July 2021), potentially whilst moving between seasonal feeding grounds to the south and breeding grounds to the north (Appendix 2).

Sightings of blue whales in the Gippsland region have been reported in June 2020 during offshore seismic survey (CGG Services, pers. comm.) (Appendix 2). The Atlas of Living Australia (ALA) holds <10 sightings records since the

1970s; the ALA data quality test notes multiple deficiencies for each sighting such as missing collection dates, hence these sightings are considered less reliable than contemporary acoustic detections. All of the above sightings were over 40 km from BMG. Based on historical catch data (Commonwealth of Australia, 2015a), the low sightings may in part be a function of lower levels of monitoring compared to other regions such as the Otway. Studies published in 2023, and which review in detail the existing records base, indicate that the recent historical acoustic records of Tasman-Pacific pygmy blue whales in the Gippsland are considered to be vagrant individuals from the NZ pygmy blue whale population. Sightings of Antarctic blues are expected to be of those on migration to/from breeding grounds at lower latitudes. Overall numbers of blue whales are expected to be low in the Gippsland region at any time of year, with the Gippsland being outside of predominant feeding grounds for any population of blue whales (Barlow, et al., 2023).

Foraging behaviours are dependent upon availability of food sources (e.g. patches of krill), which are not uniformly distributed. Primary and secondary productivity in the Gippsland region is linked to upwelling systems; the closest of which is an interconnected system of upwelling areas along the NSW coastline. The Gippsland region is outside of the area of high upwelling frequency (Huang & Wang, 2019), and primary productivity is expected to be low overall. Therefore, given the episodic nature of upwelling and productivity in the Gippsland region, and the particularly low frequency of upwelling near to the shelf and near to BMG infrastructure (Figure 6-18), limited food sources for opportunistic foraging are expected to be present within the vicinity of the Phase 2 activity.

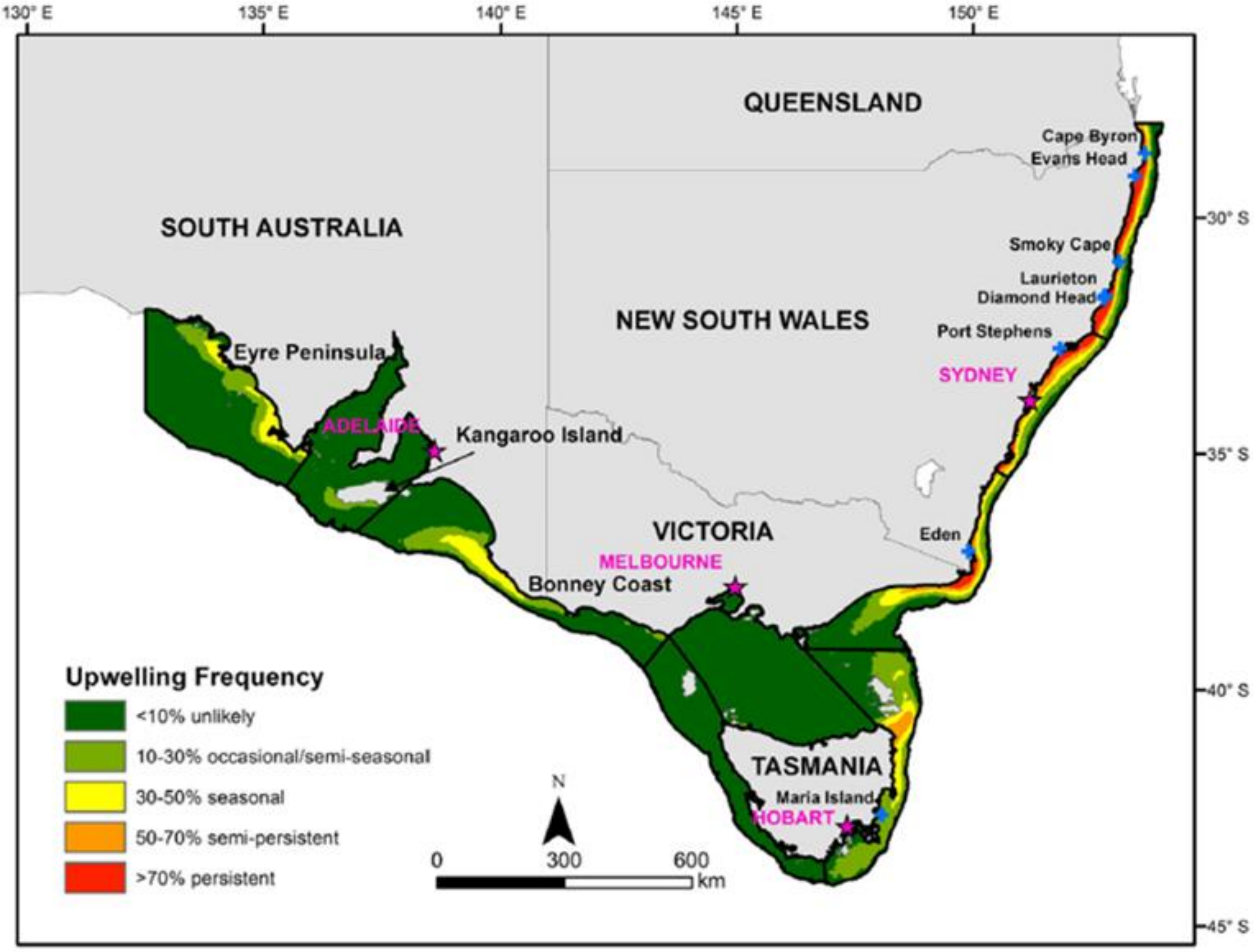


Figure 6-18 - Upwelling Frequency in the Bass Straight (Huang & Wang, 2019)

The CMP for the blue whale (Commonwealth of Australia, 2015a) Action A.2.3 details that "*anthropogenic noise in BIAs will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area*". Displacement from a foraging area, consistent with Australian Government guidance on key terms within the CMP is defined and discussed within Table 2-7.

Following the hierarchy of controls, where practicable the risk will be eliminated. However, it is considered that the CMP and guidance on key terms rationalises that risk elimination is not practicable for all vessel activities in the south east, such as shipping, ferries, research vessels and industry vessels, most of which would have the potential to displace a whale based on typical vessel sound source levels. The guidance on key terms therefore refers to risk reduction, rather than elimination.

The CMP assesses the threat from shipping and industrial noise, including impacts from masking, injury and displacement, as a minor consequence which is defined "*as individuals are affected but no affect at a population level*". The CMP acknowledges that "*given the behavioural impacts of noise on pygmy blue whales are largely unknown, a precautionary approach has been taken regarding assignation of possible consequences*"; hence even the minor consequence to individuals is considered a precautionary assessment in the CMP. Given no population level effects are predicted from shipping and industry noise it follows that Action A.2.3 may not be needed to achieve the CMP objective which is ultimately aimed at population recovery: "*to minimise anthropogenic threats to allow for their conservation status to improve so that they can be removed from the EPBC Act threatened species list*". Though shipping and industry has been present offshore southeast Australia (and within blue whale BIAs) for decades, estimates indicate blue whale populations are recovering (Branch, et al., 2007; Balcazar, et al., 2015; McCauley, et al., 2018), albeit at a slower rate compared to other species such as the humpback whale (Noad, et al., 2019; TSSC, 2022).

Southern Right Whales

In Australian coastal waters, southern right whales occur seasonally in all State coastal waters (DCCEEW, 2024h). Two populations of southern right whale occur in Australian waters: the western and eastern; however, the geographical boundary between these populations is unclear (DCCEEW, 2024h). The eastern population comprises the coastal waters of Victoria, Tasmania, New South Wales, and Queensland (DCCEEW, 2024h).

In coastal areas, southern right whales generally tend to be distinctly clumped in aggregation areas (DSEWPaC, 2012b) where they calve and nurse from May to October with peak period of abundance typically in late-July and August (DCCEEW, 2024h). Calving typically occurs in shallow coastal waters; preferred calving and nursing areas are in waters <10 m depth and within 1 km of the coast (DSEWPaC, 2012b; DCCEEW, 2024h). Breeding aggregations of southern right whale occur over a wide environmental range across the entire Southern Australian coast (DCCEEW, 2024h). There are no established or emerging aggregation areas on the Gippsland coast, though the recently defined reproduction BIA does also extend along this stretch of coast (Figure 4-11). This reproduction BIA is ~48 km north of the Operational Area (i.e. the reproduction BIA is well beyond the potential ensonified area from the Phase 2 activities).

Southern right whales are capital breeders, and the female reproductive cycle is closely linked to their migratory cycle (DCCEEW, 2024h). During the Austral-summer, southern right whales are thought to migrate away from coastal waters to feed (Mackay, et al., 2020). Differences in movement patterns were observed in tagged southern right whales during migration, possibly linked to the availability and distribution of prey when each individual whale was tagged (Mackay, et al., 2020). Southern right whales build up energy stores on high latitude feeding grounds, observed in the region of the Subtropical Front, between 41–44°S (i.e. well beyond the potential ensonified area from the Phase 2 activities), during January and December (DCCEEW, 2024h). Feeding activities have not been observed in coastal Australian waters (DCCEEW, 2024h) and therefore are not expected in the Gippsland region. These energy stores are then relied upon while in their breeding/calving grounds to enable lactation during a time that they do not feed (Lockyer, 2007).

The area that could be ensonified by Phase 2 vessel activities overlaps within the migration BIA (Figure 4-11) for the southern right whale. The migration BIA includes all water offshore Victoria, encompassing offshore movement routes along the southern coasts of Australia (DCCEEW, 2024h). These migration BIAs are described as "*areas known, or likely, to be used for movement between regions that support biologically important behaviours. This includes the movement of whales along the coast and the movement from offshore areas, including foraging areas, to nearshore and coastal areas*" (DCCEEW, 2024h). There is the potential for southern right whales to be transiting through the area offshore Victoria during from May to October with peak period of abundance typically in late-July and August as they move to and from coastal aggregation areas.

The National Recovery Plan for the Southern Right Whale (DCCEEW, 2024h) assesses the threat from anthropogenic underwater noise (vessel noise), as a minor consequence which is defined "*individuals are affected but not affect at population level*". The National Recovery Plan acknowledges that "*given the behavioural impacts of noise on southern right whales are largely unknown, a precautionary approach is applied regarding the assignation of possible consequences*". Assess and address impacts to southern right whales from anthropogenic underwater noise was identified as management action under the Recovery Plan (Table 2-6).

Underwater sound from vessels could elicit a behavioural response, such as avoidance. This could increase the energy requirements of whales at a time when their energy budgets are reduced. The activities are not of the nature or scale that could present a barrier to migration and the sound from the vessels would not be expected to significantly alter overall migration distances, which can be multiple thousands of kilometres during the reproduction season (Watson, et al., 2021).

Potential increase in stress levels and vocal adaptation in response to increased background noise from shipping, is inferred from studies of right whales in the northern hemisphere (Parks, et al., 2010; Rolland, et al., 2012). Further, although shipping and industry has been present offshore south-east Australia (and within southern right whale BIAs) for decades, recent estimates of the eastern population size indicate a 4.7% increase per year for mother-calf pairs for the eastern population (Stamation, et al., 2020; Smith, et al., 2022).

Sei whales are primarily found in deep water oceanic habitats and are thought to complete long annual seasonal migrations from subpolar summer feeding grounds to lower latitude winter breeding grounds (TSSC, 2015a). In Australian waters, sei whales have been infrequently recorded off Tasmania, New South Wales, Queensland, the Great Australian Bight, Northern Territory and Western Australia (TSSC, 2015a). Sightings of sei whales includes areas such as the Bonney Upwelling, where opportunistic feeding has been observed between November and May (TSSC, 2015a). The conservation advice for sei whales assesses the threat of anthropogenic noise and acoustic disturbance as minor, with the extent over which the threat may operate as moderate-large (TSSC, 2015a). No specific management action for managing underwater sound emissions is defined in the conservation advice.

Fin whales are generally thought to undertake long annual migrations from higher latitude summer feeding grounds to lower latitude winter breeding grounds; however, the full extent of their distribution in Australian waters is uncertain (TSSC, 2015b). Fin whales have been sighted inshore in the proximity of the Bonney Upwelling, along the continental shelf in summer and autumn months (TSSC, 2015b). The conservation advice for sei whales assesses the threat of anthropogenic noise and acoustic disturbance as minor, with the extent over which the threat may operate as moderate-large (TSSC, 2015b). No specific management action for managing underwater sound emissions is defined in the conservation advice.

There is no evidence of large-scale movements of the Australian pygmy right whales (DCCEEW, 2025b). Pygmy right whales have primarily been recorded in areas associated with upwellings and with high zooplankton abundance (DCCEEW, 2025b). Few or no records are available for NSW, eastern Victoria, and the northern part of the Great Australian Bight (DCCEEW, 2025b).

Although foraging was identified as a biologically important behaviour within the PMST report (Appendix 3.4) for sei, fin, and pygmy right whales, limited food sources are expected to be present within the vicinity of the predicted ensonified area for behavioural disturbance. Upwelling and productivity in the Gippsland region have been shown to be episodic, and of particularly low frequency near to the shelf edge, and near to BMG infrastructure (Figure 6-18). As such, given the limited food sources for opportunistic foraging in the vicinity of the Phase 2 activity, any behavioural disturbances resulting from underwater sound is not expected to significantly impact the foraging success of any cetacean species.

Given the short duration (i.e. approximately ~50–75 days for decommissioning, or 7 days for inspection and maintenance) of Phase 2 activities, and localised extent of potential behavioural changes (e.g. up to ~15.9 km from a vessel), the consequence of this risk has been evaluated as **Level 2**, as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Unlikely**.

Inherent Risk Severity

The inherent risk severity of continuous underwater sounds causing behavioural changes to marine mammals is considered **Low**.

Risk Event: TTS and PTS (Marine Mammals)

Inherent Consequence Evaluation

Acoustic modelling indicated that the PTS/A-INJ SEL_{24h} noise effect criteria were not predicted to be reached for otariid seals (Table 6-13, Table 6-13, Table 6-14, Table 6-15), and as such, the risk of auditory injury to otariid seals is not considered credible and has not been evaluated further. TTS onset may occur within distances of 0.93 km of the sound source (Table 6-13, Table 6-13, Table 6-14, Table 6-15), noting that the seal would need to remain within close proximity to the sound source (and under the water) long enough for the sound accumulation criteria to be met. Given seals are highly mobile and spend a large amount of their time at the surface, breathing, resting / thermoregulating and socialising, the small distances associated with TTS (up to ~930 m) from the vessel/s and extended durations required for SEL to manifest (up to 24 hours), TTS in seals is not considered credible.

Acoustic modelling[21] indicated that the R_{max} from the source (e.g. vessels on DP) to PTS/A-INJ SEL_{24h} noise effect criteria was up to 0.93 km for low-frequency and very high-frequency cetaceans respectively; and was not predicted to be exceeded for high-frequency cetaceans (Table 6-13, Table 6-13, Table 6-14, Table 6-15). The SEL_{24h} is a cumulative metric that assumes a receptor is consistently exposed to the relevant noise effect criteria for a 24-hour period. Specifically for cetaceans, this requires them to remain within ~20–930 m of the vessel/s for at least a 24-hour period before auditory injury may occur. It is noted that the onset of these A-INJ (or PTS) effects may also be reached by shorter durations of exposure at higher sound levels; however, given the small distances this is not considered likely. Given that cetaceans (if present) are expected to be transitory through the area, the risk of auditory injury (A-INJ or PTS) to cetaceans is not considered credible and has not been evaluated further.

Acoustic modelling[22] indicated that the R_{max} from the source (e.g. vessels on DP) to the TTS SEL_{24h} noise effect criteria was up to 5.06 km, 0.93 km, and 1.47 km for low-frequency, high-frequency, and very high-frequency cetaceans respectively (Table 6-13, Table 6-13, Table 6-14, Table 6-15).

Specifically for high-frequency cetaceans, this requires them to remain within ~930 m of the vessel for at least a 24-hour period before TTS auditory impairments may occur. It is noted that the onset of these TTS effects may also be reached by shorter durations of exposure at higher sound levels; however, given the small distances this is not considered likely. Given that high-frequency cetaceans (if present) are expected to be transitory through the area, the risk of auditory impairment (TTS) is not considered credible, and has not been evaluated further.

Similarly for low-frequency and very high-frequency cetaceans, this requires them to remain within ~5.06 km or ~1.47 km of the vessel for at least a 24-hour period before TTS auditory impairment may occur. Some low-frequency cetacean species with BIAs and/or biologically important behaviours (i.e. foraging), have been identified as having the potential to occur within the predicted ensonified area for TTS: sei, blue, fin, southern right, and pygmy right whales. No very high-frequency cetaceans with BIAs and/or biologically important

[21] Including adjustments for NMFS 2024 described in Section 6.5.2.1 (modelling outputs)

[22] Including adjustments for NMFS 2024 described in Section 6.5.2.1 (modelling outputs)

behaviours were identified. As described above, there is no indication of a sufficient food source being discretely available in the vicinity of the Phase 2 activities. There are no important behaviours identified which might restrict cetaceans to the near vicinity of the vessel for prolonged periods. Though foraging behaviours in the area are possible, behavioural studies indicate wide ranging movements while foraging:

- If present, blue whales would be expected to be on migration through the Gippsland region and not exposed to activity noise for long enough for TTS onset. Blue whales have been recorded swimming at mean speeds of 2.8 km/hr +/- 2.2 km/hr whilst migrating and foraging (Owen, et al., 2016) or faster (Möller, et al., 2020). Humpback whales have been reported as swimming at mean speeds of circa 2.5 km/h – 4 km/h during migration (Noad, et al., 2019). Accounting for these range of swimming speeds, a whale would be expected to move through any TTS zone associated with the project well before TTS onset.
- A type of foraging behaviour (observed in tagged blue whales) involving area restricted searches was reported by Owen et al. (2016) as occurring out at the 1,000 m isobath, across an area of 220 km^2. BMG is located in water depths <300 m, with maximum project TTS contours covering an area of <4 km^2. Therefore, area restricted searches, if any, could be expected to occur outside and/or well beyond any project TTS contour, which would preclude TTS onset.
- If whales were to interrupt their foraging/migration within the TTS zone to feed on a discrete patch of krill for >24 hours, the movement of plankton (and therefore krill) with the currents would move the feeding zone passively through the TTS zone before TTS onset. Minimum average currents in the surface 50 m at BMG are around 0.18 m/s. A discrete patch of krill moving with the plankton (and therefore the current) would move at 648 m/h, moving through the TTS zone well before TTS onset.
- Whilst sperm whales may occur in the region, they generally occur in deeper water, and are recorded as covering distances >20km / day whilst foraging, and greater distances when in transit (Wild, et al., 2024). Beaked whales can show regional site fidelity, but are also generally associated with slop/canyon features and deep foraging behaviour (Foley, et al., 2021), and therefore sustained residence within the vicinity of BMG (150 m -270 m deep is not expected) Local sightings data show sperm whale sightings consistent with reported habitat preference; in 2023/2024 BMG during vessel transits to and from the BMG P&A campaign, sperm whales (presumed foraging and deep diving) were only observed over the continental slope in waters >1,000 m deep, in an area of the Bass Canyon approximately 30 km south BMG (Figure 6-19).
- No beaked whales were among the 884 detections made during the BMG P&A campaign; these detections comprised an estimated total of 31,415 individual animals. Seven marine mammal species were validated with a certain species identification rating:
  - humpback whale
  - sperm whale
  - false killer whale
  - Risso’s dolphin
  - short-beaked common dolphin
  - bottlenose dolphin
  - striped dolphin.

  There were several sightings that could not be classified with certainty and were classified to morphospecies level; these included minke whale, pilot whales, unidentified whales, unidentified dolphin and unidentified blackfish. None of the sightings involved the same individual animals near the project vessels for extended periods (more than a few hours); typical behaviours are shown in Figure 6-17. No animals were therefore considered at risk of either TTS or PTS.'

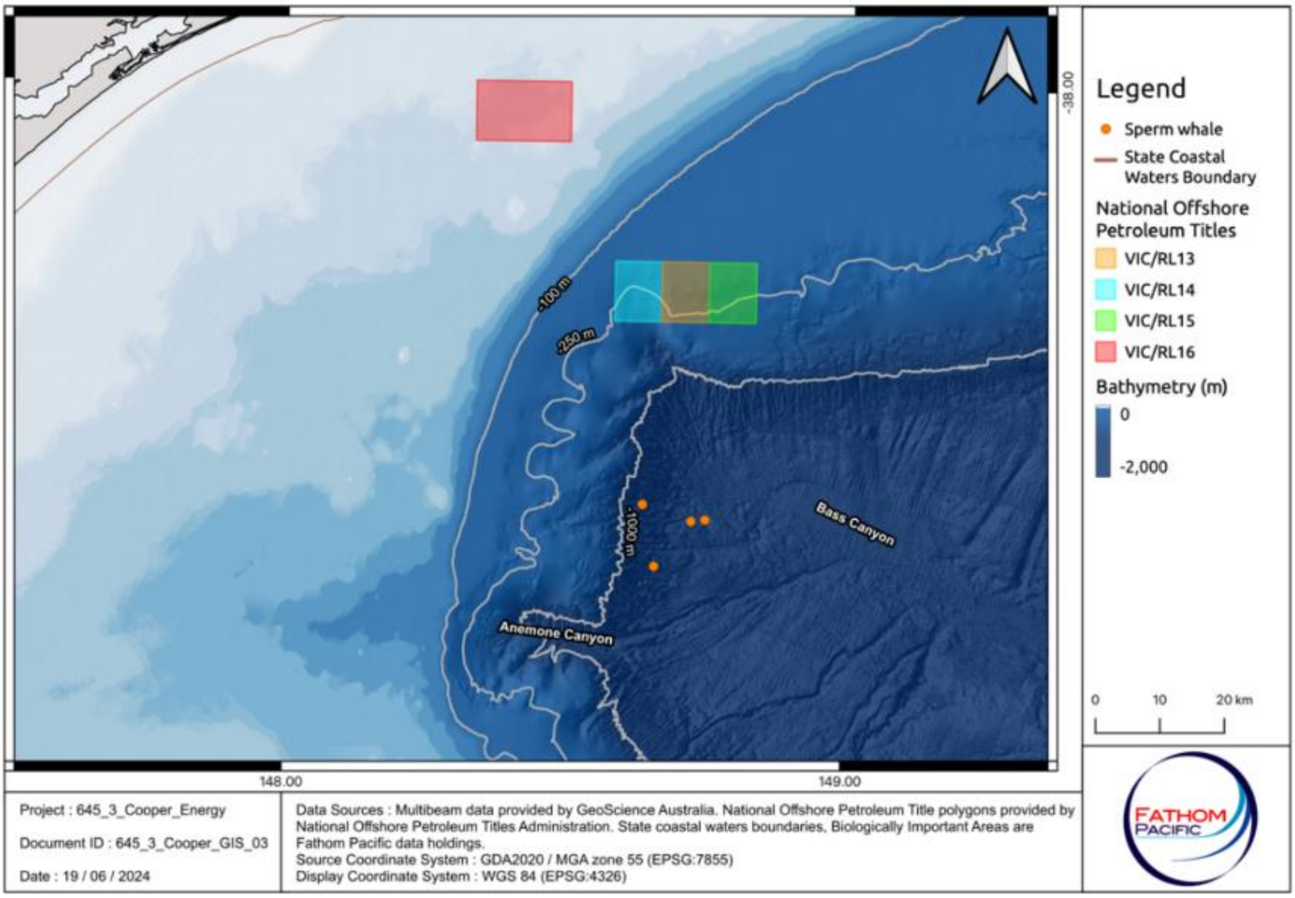


Figure 6-19 - All sperm whale detections during the BMG P&A campaign 2023-2024.

The evidence suggests that the presence of any cetacean species for extended (≥24 hour) periods, and consistently within proximity (<5.06 km) to the vessels, is not credible. Therefore, the risk of auditory impairment or injury to marine mammals is not considered credible and has not been evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

Risk Event: Behavioural Changes (Turtles)

Inherent Consequence Evaluation

Continuous sound sources have been identified as high risk of causing behavioural disturbance to turtles within the near (tens of metres), and a moderate risk within the intermediate (hundreds of metres), vicinity of a sound (Table 6-11). This risk reduces to low within the far (thousands of metres) vicinity of a sound (Table 6-11).

The PMST report (Appendix 3) for the Operational Area, identifies that marine turtle species listed as threatened and/or migratory under the EPBC Act have the potential to present, including:

- loggerhead turtle, leatherback turtle (endangered, migratory)
- green turtle, hawksbill turtle (vulnerable, migratory).

No BIAs or HCTS for these species occur within the predicted ensonified area for behavioural changes for marine turtles.

Given the short duration (i.e. approximately ~50–75 days for decommissioning, or 7 days for inspection and maintenance) of Phase 2 activities, and localised extent of potential behavioural changes (e.g. up to hundreds of metres from a vessel), the consequence of this risk has been evaluated as **Level 2**, as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Unlikely**.

Inherent Risk Severity

The inherent risk severity of continuous underwater sounds causing behavioural changes to turtles is considered **Low**.

Risk Event: TTS and PTS (Turtles)

Inherent Consequence Evaluation

Acoustic modelling indicated that the R_{max} from the source (e.g. vessels on DP) to the TTS and PTS/A-INJ SEL_{24h} noise effect criteria was up to 3.57 km (TTS) and 0.93 km (PTS) for turtles (Table 6-13, Table 6-13, Table 6-14, Table 6-15).

Note that the SEL_{24h} is a cumulative metric that assumes a receptor is consistently exposed to the relevant noise effect criteria for a 24-hour period. Specifically for marine turtles, this requires them to remain within ~0.93 km of the vessel/s for at least a 24-hour period before auditory injury may occur. It is noted that the onset of these PTS/A-INJ effects may also be reached by shorter durations of exposure at higher sound levels; however, given that marine turtles (if present) are expected to be transitory through the area, the risk of auditory injury is not considered credible, and has not been evaluated further.

Similarly this requires marine turtles to remain within ~3.57 km of the vessel for at least a 24-hour period before TTS auditory impairment may occur. Given that no biologically important behaviours (e.g. foraging), BIAs or HCTS for turtle species has been identified within the Operational Area, and that the Operational Area is ~50 km from the coast, in water depths of 135–270 m, and with largely featureless benthic habitat, there is no indication that turtles would aggregate for extended periods within the Operational Area. As such, the risk of auditory impairment is not considered credible, and has not been evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

Risk Event: Behavioural Changes (Fish, including Eggs and Larvae)

Inherent Consequence Evaluation

Continuous sound sources have been identified as medium risk of causing behavioural disturbance to fish with no swim bladders, or those with bladders not involved in hearing, or to fish eggs or larvae, within the near (tens of metres) and intermediate (hundreds of metres) vicinity of a sound (Table 6-11). Continuous sound sources have been identified as high risk of causing behavioural disturbance to fish with swim bladders involved in hearing within the near (tens of metres), and a medium risk within the intermediate (hundreds of metres) vicinity of a sound (Table 6-11).

The PMST report (Appendix 3) for the Operational Area, identifies that fish and shark species listed as threatened and/or migratory under the EPBC Act have the potential to present, including:

- white shark, whale shark (vulnerable, migratory)

- grey nurse shark, oceanic whitetip shark, shortfin mako shark, porbeagle (migratory)
- harrison's dogfish, little gulper shark, school shark, orange roughy, eastern gemfish, blue warehou, (conservation dependant).

No BIAs or HCTS for fish or shark species have been identified within the Operational Area (4.4.1). All listed fish species are expected to be transiting through the area; no areas of known aggregation within or around the ensonified area have been identified. No habitats likely to support site-attached (listed) fish have been identified within the Operational Area (Section 4.0).

Limited research has been conducted on shark responses to sound. Myrberg (2001) stated that sharks differ from bony fish in that they have no accessory organs of hearing such as a swim bladder and therefore are unlikely to respond to acoustic pressure. Klimley and Myrberg (1979) established that an individual shark may suddenly turn and withdraw from a sound source of high intensity (more than 20 dB above broadband ambient SPL) when approaching within 10 m of the sound source. Thus, any potential impacts are likely to be within tens of metres of vessel operations.

Given the short duration (i.e. approximately ~50–75 days for decommissioning, or 7 days for inspection and maintenance) of Phase 2 activities, and localised extent of potential behavioural changes (e.g. up to hundreds of metres from a vessel), the consequence of this risk has been evaluated as **Level 2**, as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

The Operational Area also overlaps with management areas for several Commonwealth and State managed commercial fisheries; however, the Commonwealth SESSF is the only one expected to have active fishing effort within the immediate vicinity of the Operational Area (Section 4.0). However, given that behavioural disturbances to fish are expected only up to hundreds of metres of the vicinity of a sound (Table 6-11), and that this is substantially within the exclusion zones distance to the CSV and the existing gazetted PSZs around the BMG infrastructure, the risk of indirectly impacting commercial fisheries from underwater sound emissions is not considered credible, and has not been evaluated further.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Unlikely**.

Inherent Risk Severity

The inherent risk severity of continuous underwater sounds causing behavioural changes to fish is considered **Low**.

Risk Event: Masking, TTS, Recoverable Injury, Mortality or Potential Mortal Injury (Fish, including Eggs and Larvae)

Inherent Consequence Evaluation

Continuous sound sources have been identified as low risk of causing recoverable injury, or mortality and potential mortal injury, to fish with no swim bladders, or those with bladders not involved in hearing, or to fish eggs or larvae, within all distances of the sound source (Table 6-11). The recoverable injury 48-hour SPL noise effect criteria for fish with a swim bladder involved in hearing was up to 0.02 km distance from a sound source (Table 6-13, Table 6-13, Table 6-14, Table 6-15). These results indicates that fish are required to remain within <20 m of the vessel for at least a 48-hour period before recoverable injury effect may occur. Given that fish are expected to be transitory through the area, the risk of recoverable injury to fish with swim bladders involved in hearing is not considered credible, and has not been evaluated further.

Continuous sound sources have been identified as a moderate risk of causing TTS within the near (tens of metres) vicinity of a sound source for all fish with no swim bladders, or those with bladders not involved in hearing; at distances further away, this risk reduces to low (Table 6-11). Acoustic modelling indicated that the R_{max} from the source (e.g. vessels on DP) to the TTS 12-hour SPL noise effect criteria was up to 0.04 km for fish with a swim bladder involved in hearing (Table 6-13, Table 6-13, Table 6-14, Table 6-15). These results indicates that fish are required to remain within ~40 m of the sound source for at least a 12-hour period before TTS auditory impairments may occur. Given that fish are expected to be transitory through the area, the risk of auditory impairment is not considered credible, and has not been evaluated further.

Continuous sound sources have been identified as a moderate to high risk of causing masking within the near (tens of metres) and intermediate (hundreds of metres) vicinity of a sound source for all fish groups (Table 6-11). As identified above 6.5.4.1, some EPBC Act listed threatened and/or migratory species, have been identified as potentially being present within the Operational Area, and therefore may be present within the predicted ensonified area for masking.

Given the short duration (i.e. approximately ~50–75 days for decommissioning, or 7 days for inspection and maintenance) of Phase 2 activities, and localised extent of potential masking (e.g. up to hundreds of metres from a vessel), the consequence of this risk has been evaluated as **Level 2**, as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Unlikely**.

Inherent Risk Severity

The inherent risk severity of continuous underwater sounds causing behavioural changes to marine mammals is considered **Low**.

6.5.4.2 Impulsive Sound

Impact: Change in Ambient Sound

Inherent Consequence Evaluation

Ambient underwater sound is the level of sound which exists in the environment without the presence of the activity. Since 2009 (paused 2017–2018 due to unconfirmed funding), the Integrated Marine Observing System (IMOS) has been recording underwater sound south of Portland, Victoria (38°32.5’S, 115°0.1’E). Sound sources identified in recordings include blue and fin whales at frequencies below 100 Hz, ship noise at 20–200 Hz, and fish at 1–2 kHz (Erbe, et al., 2016). In the Gippsland Basin, primary contributors to background sound levels were wind, rain, and current- and wave-associated sound at low frequencies under 2 kHz (Przeslawski, et al., 2016). Biological sound sources, including dolphin vocalisations, were also recorded (Przeslawski, et al., 2016). Ambient underwater sound levels in the Gippsland Basin within the 100–500 Hz frequency range varied depending on recording location between 89.2–109.9 dB re 1 µPa^2/Hz, likely due to a varied increase in distance from shipping activity, and water depth.

Empirical estimates of impulsive underwater sounds associated with the activity (Koessler & Quijano, 2025) indicated that sound at an SPL of 160 dB re 1 µPa may extend up to ~178 m from the source (Table 6-18).

Given the infrequent and short duration (e.g. hours to days) of use of any of the positioning or survey equipment, and the very localised extent of change (e.g. up to ~130 m), the consequence of this impact has been evaluated as **Level 1**, as underwater sound will return to existing ambient levels following completion of the activity with no remedial or recovery work required.

Risk Event: Behavioural Changes (Marine Mammals)

Inherent Consequence Evaluation

Empirical estimates indicated that the maximum distance from an equipment sound source to the SPL behavioural noise effect criteria for all marine mammals was ~178 m (Table 6-18); well within the potential effect distances associated with continuous vessel noise. This distance was associated with the use of boomer type

SBPs. Other equipment was predicted to have smaller exposure areas (e.g. ~151 m from USBL positioning equipment, <10 m from transducer type SBPs) (Koessler & Quijano, 2025).

The PMST report (Appendix 3) for the Operational Area, identifies that several marine mammal species listed as threatened and/or migratory under the EPBC Act have the potential to be present, including:

- blue whale (endangered, migratory)
- fin whale (vulnerable, migratory)
- sei whale (vulnerable, migratory)
- southern right whale (endangered, migratory)
- Antarctic minke whale, Bryde's whale, dusky dolphin, humpback whale, killer whale, pygmy right whale, sperm whale (migratory).

Of all the cetacean species that may occur within the ensonified area (Appendix 3), the following species were identified within the PMST report as undertaking a biologically important behaviour:

- fin whale, pygmy right whale, sei whale (foraging, feeding or related behaviour likely to occur within area).

In addition, a 'possible foraging area' BIA for the pygmy blue whale, and a 'migration' BIA for the southern right whale also overlaps with the predicted ensonified area for behavioural disturbance. No HCTS of these species were identified within the predicted ensonified area.

Several high frequency cetaceans including beaked whales may occur within the ensonified area, though there are no BIA's or biologically important behaviours for these species identified in either the operational area or activity EMBA (which includes the potentially ensonified area).

Given the infrequent and short duration (e.g. hours to days) of use of any of the positioning or survey equipment, and the very limited spatial area (e.g. up to ~130 m) of exposure to impulsive sounds above behavioural thresholds, the consequence of this risk event has been evaluated as **Level 2,** as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Remote**.

Inherent Risk Severity

The inherent risk severity of impulsive underwater sound causing behavioural changes to marine mammals is considered **Low**.

Risk Event: TTS and PTS (Marine Mammals)

Inherent Consequence Evaluation

Empirical estimates indicated that the SEL_{24h} and PK noise effect criteria for TTS or A-INJ for all marine mammal groups (i.e. low-frequency cetaceans, high-frequency cetaceans, very high-frequency cetaceans, or otariid seals) was either not predicted to be reached or occurred within small distances (~2–513 m) (Table 6-18). Given the transitory nature of marine mammals, the small ensonified area (up to ~513 m) from the vessel/s and the extended durations (e.g. up to 24 hours) or exposure required for this accumulated sound criterion to be reached, this is not considered credible. As such, auditory impairments or auditory injuries to marine mammals from impulsive sound from positioning or SBP survey equipment is not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

Risk Event: Behavioural Changes (Turtles)

Inherent Consequence Evaluation

Empirical estimates indicated that the maximum distance from an equipment sound source to the SPL behavioural noise effect criteria for marine turtles was up to ~89 m (Table 6-18). As per the discussion above for marine mammals, this distance varied with equipment source). This is consistent with the relative risk criteria from Popper et al (2014) that suggest that behavioural changes (e.g. avoidance, diving) would only be expected for individuals near the source (high risk of behavioural impacts within tens of metres of source and moderate risk of behavioural impacts within hundreds of metres of the source) (McPherson & Koessler, 2021).

The PMST report (Appendix 3) for the Operational Area, identifies that marine turtle species listed as threatened and/or migratory under the EPBC Act have the potential to present, including:

- loggerhead turtle, leatherback turtle (endangered, migratory)
- green turtle, hawksbill turtle (vulnerable, migratory).

No BIAs or HCTS of these species occurs within the Operational Area or predicted ensonified area for behavioural changes for marine turtles.

Given the infrequent and short duration (e.g. hours to days) of use of any of the positioning or survey equipment, and the very limited spatial area (e.g. up to ~89 m) of exposure to impulsive sounds above behavioural thresholds, the consequence of this risk event has been evaluated as **Level 2,** as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Remote**.

Inherent Risk Severity

The inherent risk severity of impulsive underwater sound causing behavioural changes to turtles is considered **Low**.

Risk Event: TTS and PTS (Turtles)

Inherent Consequence Evaluation

Empirical estimates indicated that both the PK and SEL_{24h} noise effect criteria for TTS or A-INJ for marine turtles was not predicted to be reached (Table 6-18), and as such, the risk of auditory impairment or injury to marine turtles is not considered credible and has not been evaluated further.

Inherent Likelihood

N/A

Inherent Risk Severity

N/A.

Risk Event: Behavioural Changes (Fish, including Eggs and Larvae)

Inherent Consequence Evaluation

Impulsive sound sources have been identified as a high risk of causing behavioural disturbance to fish with no swim bladder, and fish with swim bladder not involved in hearing, within the near (tens of metres) vicinity of a sound, and a moderate risk within the intermediate (hundreds of metres) vicinity of a sound (Table 6-17). For fish with swim bladder involved in hearing, impulsive sound sources have been identified as a high risk within the near (tens of metres) intermediate (hundreds of metres) vicinity of a sound (Table 6-17). Impulsive sound sources have been identified as a moderate risk of causing behavioural disturbance to fish eggs and larvae within the near (tens of metres) vicinity of a sound; this reduces to a low risk beyond this distance (Table 6-17).

The PMST report (Appendix 3) for the Operational Area, identifies that fish and shark species listed as threatened and/or migratory under the EPBC Act have the potential to present, including:

- white shark, whale shark (vulnerable, migratory)
- grey nurse shark, oceanic whitetip shark, shortfin mako shark, porbeagle (migratory)
- harrison's dogfish, little gulper shark, school shark, orange roughy, eastern gemfish, blue warehou, (conservation dependant).

No BIAs or HCTS for fish or shark species have been identified within the Operational Area (4.4.1). All listed fish species, if present, are expected to be transiting through the area. No areas of known aggregation within or around the ensonified area have been identified. No habitats likely to support listed site-attached fish have been identified within the Operational Area (Section 4.0). Other demersal species are known to occur within the area, including commercial species; these have been observed on and around BMG infrastructure (Ierodiaconou, et al., 2021); their behaviour may be affected in the near vicinity of impulsive sound sources.

Given the infrequent and short duration (e.g. hours to days) of use of any of the positioning or survey equipment, and the very limited spatial area (e.g. hundreds of metres) of exposure to impulsive sounds above behavioural thresholds, the consequence of this risk event has been evaluated as **Level 2,** as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Remote**.

Inherent Risk Severity

The inherent risk severity of impulsive underwater sound causing behavioural changes to fish is considered **Low**.

Risk Event: Masking, TTS, Recoverable Injury, Mortality or Potential Mortal Injury (Fish, including Eggs and Larvae)

Inherent Consequence Evaluation

Based on the relative risk criteria from Popper et al (2014), there is a low risk of masking for all fish groups, apart from those with a swim bladder involved in hearing, which have a moderate risk at a far (thousands of metres) distances of the sound source (Koessler & Quijano, 2025; Popper, et al., 2014).

Where quantitative effect criteria exist, the empirical estimates indicated that both the PK and SEL_{24h} noise effect criteria for TTS, recoverable injury, or mortality or potential mortal injury were not predicted to be reached (Table 6-18), and as such, the risk of these types of auditory impairment or injury to fish with and without swim bladders is not considered credible and has not been evaluated further.

Given the infrequent and short duration (e.g. hours to days) of use of any of the positioning or survey equipment, and the very limited spatial area (e.g. metres) of exposure to impulsive sounds above auditory impairments thresholds, the consequence of this risk event has been evaluated as **Level 2**, as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Remote**.

Inherent Risk Severity

The inherent risk severity of impulsive underwater sound causing auditory impairment or injury to fish is considered **Low**.

6.5.4.3 Cumulative Impacts

Risk Event: Cumulative impacts from concurrent activities

Inherent Consequence Evaluation

Underwater sound emissions from the BMG Phase 2 Closure activities are expected to occur for ~50–75 days indicatively commencing from late-2027 (Section 3.1.2).

As identified in Table 4-5, there is the potential for underwater sound emissions from adjacent petroleum activities to overlap with those of BMG. However, as noted in Table 4-5 this is dependent on a temporal overlap in activities occurring and the sound sources of the respective vessels.

The screening in Table 4-5 was based on an ~30 km buffer around the Operational Area, this is approximately twice the predicted maximum horizontal distance for the marine mammal behavioural disturbance from continuous underwater sound emissions (Sections 6.5.2.1 and 6.5.4.1). Even if concurrent activities did occur, any overlap in ensonifed areas above the marine mammal behavioural disturbance effect criteria is expected to be spatially limited given the distance of adjacent petroleum activities from BMG. Therefore, the consequence of this cumulative risk has been evaluated as no greater than **Level 2** (i.e. no greater than the consequence of the risk of behavioural disturbance to marine mammals from BMG activities only), whereby underwater sound generated by concurrent activities may result in localised short-term behavioural effects to some marine mammals species of conservation value but not affecting local ecosystem function.

The risk of overlapping ensonified areas for concurrent activities resulting in behavioural risk to other marine fauna groups, or auditory impairment or injury to any fauna group is not considered credible given the predicted ensonified areas from BMG Phase 2 activities and the distance to adjacent petroleum activities identified in Table 4-5. Therefore, the potential for cumulative impacts from concurrent activities for these fauna groups and effects is not considered credible and has not been evaluated further.

Inherent Likelihood

The inherent likelihood of this consequence occurring is considered **Unlikely**.

Inherent Risk Severity

The inherent risk severity of cumulative impacts from concurrent activities is considered **Low**.

6.5.5 Control Measures, ALARP and Acceptability Assessment

Table 6-19 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to underwater sound emissions.

A detailed assessment has been undertaken and as part of Amplitude Energy's prior relevant person engagement for the project, Amplitude Energy sought advice from the Australian Antarctic Division (AAD) on measures implemented or considered by the AAD for voyages into sensitive areas; suggestions from the AAD are incorporated into the additional control measures assessed in Table 6-19 and Table 6-20.

Table 6-19 - Underwater sound emissions ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	ALARP Decision Context: Type A Impacts from sound emissions are relatively well understood, however there is the potential for uncertainty in relation to the level of impact. Activities are well practised, and there are no conflicts with company values, no partner interests, and no significant media interests. Because the potential impacts to marine fauna of conservation value are evaluated as Level 2, Amplitude Energy believes ALARP Decision Context A should apply. ALARP Decision Context: Type B ALARP decision context B has been applied in relation to blue whales and southern right whales because there is a residual (low) risk in relation to behavioural disturbance to these species within a BIA. The CMP for blue whales and the National Recovery Plan for southern right whale suggest that at certain times of year (i.e. when present within a BIA) and for certain activities, additional and/or adaptive mitigation actions may be required in keeping with a precautionary approach (refer to specific actions in Table 2-7). Further controls to manage these residual risks have been considered and several additional controls have been adopted. The adopted controls ensure the project environmental outcomes can be met and are not inconsistent with the objectives and relevant actions of the species recovery plan.
Control Measures	**Sources of good practice control measures**
C10: EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans	EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans describes strategies to ensure whales and dolphins are not harmed during offshore interactions with vessels. All vessels will adhere to EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans in relation to distances to cetaceans. These regulations stipulate a caution zone of 300 m, which will be increased to 500 m for the duration of the activity to enhance the buffer between whales and project vessels. Helicopters will adhere to EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans in relation to distances to cetaceans. *Risk event addressed: Behavioural changes*
C1: Planned Maintenance System	Power generation and propulsion systems on the CSV and other vessels will be operated in accordance with manufacturer's instructions and ongoing maintenance to ensure efficient operation. *Risk event addressed: Behavioural changes*
C12: Underwater noise characterisation	As the vessel to be used for these activities has not yet been selected, Amplitude Energy have selected an analogous source level to provide an indication of the potential impact ranges from the types of vessels required to complete the activities detailed in this EP. When the vessel is selected for use, Amplitude Energy will review the vessel attributes against those used in the aspect characterisation in this EP.

Additional controls adopted	
C13: Whale Disturbance Risk Management Procedure	The impact and risk assessment has shown the potential for interaction between whales and the activity, with some uncertainty around the likelihood if impacts. This uncertainty is addressed through the implementation adaptive management measures detailed in the Offshore Victoria Whale Disturbance Risk Management Procedure [CMS-EN-PCD-0006]. The measures provide assurance of protecting all whale species, with particular focus on blue whales and the requirements set by the blue whale CMP Action A.2.3 and the southern right whale recovery plan Action A5.2 and A5.3 (Table 2-7). The Whale Disturbance Risk Management Procedure provides details on level of whale observation effort, triggers for actions, and the actions to be taken to avoid injuring all whales, including high frequency cetaceans (and beaked whales), and prevent behavioural disturbance to endangered whale species (blue whales and southern right whales), and prevent displacement of a foraging blue whale. These adopted measures (as detailed in Section 10.11) are applicable during the seasonal presence of blue whales and southern right whales within the Gippsland region (Table 4-4). For vessels operating with DP adopted measures include: • Dedicated marine mammal observer (MMO) offshore • DP prestart observation and shutdown triggers • Conditions for operating DP at night • Defined risk review triggers *Risk event addressed: Behavioural changes, TTS and PTS/A-INJ.*
	Vessel bridge watch crew and helicopter crew will be provided with project inductions which will include whale identification and reporting guidelines. *Risk event addressed: Behavioural changes*
	Vessel bridge watch crew and helicopter crew will report observations daily (when in field). This monitoring will be in place for the duration of the project, for all times of year. Based on prior campaigns, this approach will provide an indicator of any nearby or notable whale activity. This is considered the base level of monitoring and will be supplemented as detailed under adaptive management. *Risk addressed: Behavioural changes*
Impact and Risk Summary	
Residual Impact Consequence	Level 1 – Minor local impacts or disturbances to flora/fauna, nil to negligible remedial/recovery works on land/water systems
Residual Risk Consequence	Level 2 – Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks
Residual Risk Likelihood	Behavioural changes from continuous sound: Unlikely (D) - Could occur during the activity Auditory impairment or auditory injury from continuous sound: Hypothetical (F) - Generally considered hypothetical or non-credible *[note: this risk event applies to masking for fish species only]* Behavioural changes from impulsive sound: Hypothetical (F) - Generally considered hypothetical or non-credible Auditory impairment or auditory injury from impulsive sound: Hypothetical (F) - Generally considered hypothetical or non-credible
Residual Risk Severity	Low
Demonstration of Acceptability	
Principles of ESD	Underwater sound emissions are evaluated as having Level 2 consequence which is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.

Legislative and conventions	Sound emissions will be managed in accordance with legislative requirements. Sound emissions will: • not impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d) • not impact the recovery of the southern right whale as per the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024h) • not impact the recovery of the blue whale as per the Conservation Management Plan for the Blue Whale (Commonwealth of Australia, 2015a) • not impact the recovery of the white shark as per the Recovery Plan for the White Shark (DSEWPaC, 2013d). Actions from the CMP for the Blue Whale (Commonwealth of Australia, 2015a) applicable to the activity in relation to assessing and addressing anthropogenic noise have been addressed as per: • assessing the effect of anthropogenic noise on blue whale behaviour (Section 6.5.4.1 assess the effects of anthropogenic noise from the activity on blue whale behaviour) • anthropogenic noise in BIAs will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area. Section 6.5 demonstrates that the activity can be conducted in a manner that is consistent with the CMP and will not result in injury of blue whales. The applied control measures also serve to reduce the risks of displacement, in line with Australian Government guidelines (DAWE and NOPSEMA, 2021) which advise: '*Mitigation measures must be implemented to reduce the risk of displacement occurring etc...*' • not impact the recovery of the blue whale. Actions from the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024h) applicable to the activity in relation to assessing and addressing anthropogenic sound emissions have been addressed as per: • assessing the effect of anthropogenic noise on southern right whale behaviour (Section 6.5.4 assess the effects of anthropogenic noise from the activity on southern right whale behaviour) • anthropogenic noise in BIAs and HCTS of the southern right whale will be managed such that any southern right whale continues to utilise the area without auditory impairment and is not displaced from these areas. • Section 6.5.5 demonstrates that national policies (e.g. EPBC Regulations (Part 8)) were identified and included • Section 6.5.5 demonstrates that the activity can be conducted in a manner that is not inconsistent with the National Recovery Plan, the risk of behavioural disturbance is minimised to ALARP and ensures that the activity will not result in injury of southern right whale • not impact the recovery of the southern right whale.
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) Activities will be undertaken in accordance with the Implementation Strategy (Section 9.0).
External context	No relevant person objections or claims have been received regarding underwater sound emissions. Amplitude Energy sought advice from the AAD in relation to the management of impacts from underwater sound. The AAD provided some suggestions which have been evaluated within the ALARP assessment process.
Acceptability Outcome	**Acceptable**

Table 6-20 - Underwater sound emissions extended control measures and ALARP assessment for possible blue whale foraging and southern right whale migration

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Eliminate activity	Displacement of blue or southern right whales from vessel / industry noise. Rated as Minor consequence by DAWE (Commonwealth of Australia, 2015a) and rated as Level 2 consequence and low risk in relation to these Phase 2 project activities.	By not undertaking the activity, sound sources would be eliminated.	No	N/A	Decommissioning activities at BMG are required to go ahead; Amplitude Energy has a commitment as titleholder to complete decommissioning activities (Section 2.0).	**Reject.** The legacy risks of not undertaking the activity are considered to be grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Eliminate use of DP vessels during defined periods when blue whales and/or southern right whales are more likely to occur	As above	By avoiding periods when blue whales and/or southern right whales are more likely to occur, impacts to species of conservation significance during biologically important behaviours can be eliminated (for the species of concern).	Not typical in this region or other regions where industry and shipping overlap possible blue whale foraging BIA to avoid certain times of year. This could become typical if Action A.2.3 is applied consistently across offshore industries, with significant societal implications. Relevant person feedback: AAD advised they consider operational mitigations during Antarctic voyages such as avoidance of areas where	There is no window where all seasonal environmental sensitivities for all species can be completely avoided. While operationally the optimum time to undertake Phase 2 activities is summer (Section 3.1.2), the actual timing of activities is unknown at this time and will depend on vessel availability and suitable environmental conditions. As such it is possible that it will overlap with the period where blue whales	Reduced schedule flexibility with knock-on effect on the decommissioning scope. Risk of delay past deadlines set under General Direction 824.	**Reject.** Rationale: Risk elimination is preferred where practicable. Restricting the Phase 2 activities to specific windows could have knock on schedule impacts and encroach on deadlines set under General Direction 824. The residual risks are low and can be managed via lower-level controls. The costs associated with this option are therefore considered to be grossly disproportionate to the risk reduction achieved in relation to temporary

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
			large aggregations of cetaceans are well known or predictable. Though there are no known or predicted large aggregations of blue whales within the Gippsland region, blue whales are considered more likely to be in the region from April to June. There are examples of this type of control being applied in well defined, discrete areas, for example, the exclusion of vessels from Logans Beach, Warrnambool (June-Oct) which is an established nursery for southern right whales in southwest Victoria. However, this type of control is not typical of entire BIAs such as the southern right whale migration area, which encompass the entire southern coastline.	and/or southern right whales may be present. Phase 2 activities are a critical component of the BMG Closure Project and restricting timing of the activity reduces the ability of Amplitude Energy to achieve decommissioning deadlines.		operational subsea underwater sound emissions. This additional control measure was also considered relevant for several other whale species and groups, including humpback whales and beaked whales. However, for the same reasons described above, and the variable nature of whale presence in the region, it is not considered practicable to implement for this activity.
Noise Modelling	As above	Increased definition and confidence in impact	Not typical for offshore industries / individual operators to characterise	Cost associated with noise modelling (circa $40K).	N/A	**Implemented.**

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		assessment (reduced uncertainty).	vessel noise with detailed modelling studies.			Modelling undertaken and described as part of this EP. Noise modelling provides definition of potential impact radius and subsequent design of monitoring and mitigations.
Selected Vessel noise characterisation	As above	Supports scaling of selected mitigations.	Not typical for offshore industries / individual operators to characterise vessel noise with detailed modelling studies.	Cost associated with noise characterisation (circa $10K).	N/A	**Implement.** Noise characterisation provides further definition of potential impact radius and subsequent scaling of selected monitoring and mitigations.
Anchoring of vessels to hold position rather than use DP	As above	By anchoring vessels, sound emissions related to vessel DP would be reduced. The risks remain low.	This is not feasible as the CSV and support vessels are required to move during the decommissioning activities (i.e. not operate from a static position). Additionally, vessels must be able to react to an errant vessel, person overboard or other safety issue.	Not considered feasible.	N/A	**Reject.** Rationale: Option not feasible.
Limit power to thrusters of DP vessels to reduce	As above	Limiting thruster power may reduce the underwater sound	Thruster power is determined by safety limits and operational	Not considered feasible.	N/A	**Reject.**

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
underwater sound contours		contours though would not eliminate them. Risks expected to remain low.	requirements. Thruster levels are optimised to operating modes and conditions. It is not safe to adjust thruster power outside of operationally defined ranges, and therefore the control is not selected.			Rationale: Option not feasible.
DP vessel underwater sound reduction in design (DNV Silent notation)	As above	Vessel design can reduce underwater sound.	Relevant person feedback: AAD advised their new state of the art survey/ice breaker vessel *Nuyina* which will operate in the Antarctic has been designed to reduce underwater sound and vibration. The vessel has been assigned DNV Silent R notation equivalence at 8 kn electric propulsion for science acoustic work. Currently not typical for industry. A review of industry vessels (including PSVs and CSVs) typically operating inside and outside of Australian waters has not identified	Given the current absence of industry vessels with silent notation, this measure is not considered to be feasible for the project.	N/A	**Reject.** Rationale: Option not feasible.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
			any vessels assigned the DNV Silent notation.			
Implement safe shut-down points	As above	Shutting down vessel DP could reduce impacts from subsea underwater sound. Shutting down vessel DP is possible where activities can be first made safe. This action would not be immediate but should reduce the risk of displacement if whales are foraging in the vicinity. Risks would remain low.	Not typically applied to DP vessels. Typically applied to activities that generate impulsive underwater sound such as piling and seismic survey. During consultation, AAD noted use of shutdown zones for explosive use (during wharf construction) in Antarctica.	Cost associated with shutting down DP, requiring suspension of program. Potential cost >$100K.	Retrieval of subsea equipment (e.g. ROV) required prior to DP shutdown. Increased frequency of handling through the splash zone and on deck increases personnel H/S risk exposure. This is considered manageable through existing systems for control of work. Good reliability at project operational level.	**Implement** Rationale: reduces risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea noise. Integrated via **C13** Marine Mammal Adaptive Management Measures. This additional control measure was also considered for several whale species and groups including beaked whales. However, the management of these groups to subsea sound is not established in DCCEEW conservation advices. The sensitivity of different cetaceans to vessel noise also varies, with a greater proportion of vessel source energy within the biologically audible range for low frequency cetaceans,

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						compared to a smaller proportion within the high frequency cetaceans and less again for very high frequency cetaceans. Because of this, together with the variable nature of whale presence in the region, and no BIAs, HCTS of the species, or other known aggregation areas, it is not considered practicable to implement this control for other cetacean groups for this activity.
Deploy bubble curtains around DP vessels	As above	Bubble curtains are sometimes utilised within offshore construction projects which involve piling or detonation of explosives. The bubble curtain (perforated hose) is deployed to the seabed and encompasses the sound source; this obscures sound transmission, resulting in a reduction of received sound levels to receptors outside of the bubble	Bubble curtains were raised as an idea during project ALARP workshops and also by the AAD during relevant person consultation. No known examples of bubble curtains being used as mitigation for DP vessels.	Not considered feasible.	Discussions with technology providers indicates the deployment of bubble curtains at BMG presents several technical challenges that are currently insurmountable. The challenges include: Water depth. The maximum working depth of bubble curtains is typically <100 m. Providing oil-free air to the seabed at BMG would require a large quantity	**Reject** Rationale: Not considered feasible for the project.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		curtain. Approximately 15 dB sound attenuation has been reported for impulsive sound from piling; efficacy is dependent on various factors. Risks would remain low.			of large diesel-run air compressors. At least one additional dedicated DP support vessel would likely be required for these compressors. Currents. Bubble curtains are drastically impacted by currents. Current speeds and directional shifts with wind and tide at the BMG would result in bubble curtains being distorted and ineffective by the time bubbles rise from the seabed to surface. Alternate options such as the deployment of hoses on vessel deck at thruster locations or offset on buoys present SIMOPS and safety risks including congestion of the CSV safety zone and potential interference with/from thrusters. As a result, the use of bubble curtains is not considered effective, feasible or practicable.	

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
DP vessels pre-activity survey (initial arrival)	As above	Increased confidence no foraging blue whales or migrating southern right whales in the vicinity which could be displaced upon DP start. Survey undertaken with means appropriate to assure across the behavioural displacement area. Risks would remain low.	Not typically applied to DP vessels. Typically applied to activities that generate impulsive sound such as piling and seismic survey. During consultation, AAD noted use of survey prior to explosive use (during wharf construction) in Antarctica.	Costs associated with pre-activity survey in the order of $50 K accounting for vessel time, personnel and / or aerial survey costs.	HSE risks associated with aerial survey (can be managed via existing control of work processes). Weather or visibility downtime risk (can be mitigated via different survey options). Good reliability at the project operational level with multiple options for survey.	**Implement** Rationale: reduces risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions. Integrated via **C13** Marine Mammal Adaptive Management Measures. This additional control measure was also considered for several whale species and groups including beaked whales. However, the management of these groups to subsea sound is not established in DCCEEW conservation advices. The sensitivity of different cetaceans to vessel noise also varies, with a greater proportion of vessel source energy within the biologically audible range for low frequency cetaceans, compared to a smaller

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						proportion within the high frequency cetaceans and less again for very high frequency cetaceans. Because of this, together with the variable nature of whale presence in the region, and no BIAs, HCTS of the species, or other known aggregation areas, it is not considered practicable to implement this control for other cetacean groups for this activity.
Opportunistic monitoring from project vessels and helicopters	As above	Increased confidence no foraging blue whales or migrating southern right whales in the vicinity which could be injured or displaced. Risks would remain low.	Yes. Opportunistic monitoring is typically integrated into offshore industry operations including from vessels and helicopters (where used for crew changes).	Costs associated with inducting crew accounted for in planning.	No introduced risks. Good reliability at the project operational level.	**Implement** Rationale: supports reducing risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions. Integrated via C10: EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans, and **C13** Marine Mammal

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						Adaptive Management Measures.
Drone surveillance from vessel	As above	May provide slight increase in visibility beyond nominal MMO viewing platform height for the duration of drone flight. This could provide slight increased confidence no foraging blue whales or migrating southern right whales in the vicinity which could be displaced. Risks would remain low.	Not for this activity type. Some examples of drone use nearshore and offshore particularly for scientific study, though weather sensitive, and not for sustained periods.	Additional cost of drone hire/purchase and pilot for the duration of the campaign estimated circa $60 K.	Dropped object risks. Risks of loss of equipment. Not considered reliable at the operational level for this activity.	**Reject** Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk, whilst adding cost and additional operational HSEC risks. The costs/risks are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Monitor oceanographic precursors (early warning system)	As above	There are oceanographic and biological precursors such as sea surface temperature, eddies and primary production which may provide an indication of increased secondary production (including krill), which may then be conducive to successful foraging (e.g. (Murphy, et al., 2017)). The benefit of this early warning system	Not typically applied in offshore industries. Primary productivity measurements are not an accurate pre-cursor to feeding activity. There can be a significant lag between peaks in Chl-A levels and peaks in krill presence. Other factors determine presence of foraging marine mammals aside from prey levels.	Administrative costs of monitoring and interpreting environmental precursors estimated circa $50 K.	Reliability is likely to be low, which could lead to many false positives with significant cost and schedule impact to the project.	**Reject** Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		is dependent on the reliability of these precursors as indicators of blue whale foraging; currently, reliability is likely to be low, which could lead to many false positives. Risks would remain Low.				temporary operational subsea underwater sound emissions.
Satellite imagery	As above	Satellite imagery can be used to gather oceanographic and biological information to support the understanding of presence of marine mammals in the area. Risks would remain Low.	Not typically applied in offshore industries. Sourcing and interrogating satellite imagery is possible, however at the operational level is not considered reliable.	Administrative costs of monitoring and interpreting satellite images.	Reliability is likely to be low with limited additional benefit relative to accepted controls.	**Reject** Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Infra-red systems	As above	Infra-red (IR) systems could enhance the ability of MMOs to visually detect the presence of foraging whales. Risks would remain Low.	Infra-red systems are not available as a real-time monitoring tool for operations and have the following limitations:	Additional cost of IR tech hire/purchase and operators for the duration of the campaign estimated circa $100 K.	Reliability is likely to be low with limited additional benefit relative to accepted controls.	**Reject** Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
			Poor performance of the system in sea states greater than Beaufort Sea State 4 (due to the inability to adequately stabilise the camera) (Verfuss, et al., 2018; Smith, et al., 2020) Conditions such as fog, drizzle, rain limit detections to be made using IR (Verfuss, et al., 2018). Detection range for large baleen whales is 1 to 3 km.			risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Passive acoustic monitoring (PAM)	As above	PAM can be used to detect marine mammal calls, and support sightings made by MMO. Feedback from AAD indicated PAM was utilised during rock blasting activities in the Antarctic to verify subsea sound levels; if sound levels were higher than anticipated then explosive charges could be reduced.	Not typical for offshore vessel activities. Likely to be some interference from vessel sounds at close range. Not safe to adjust vessel DP thrust on the basis of subsea noise profiles; operational safety considerations take precedence.	Additional cost of PAM tech hire/purchase and operators for the duration of the campaign estimated circa $100 K.	Reliability considered lower than direct observations, with limited additional benefit relative to accepted controls.	**Reject** Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to temporary operational

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						subsea underwater sound emissions.
Additional monitoring vessel	As above	An additional vessel specifically mobilised to monitor the noise contours of the primary work vessel	Not typical for offshore vessel activities.	Additional cost circa $20K/day	Additional sound source Overall increase in noise levels Increase in noise contours Potential to displace blue or southern right whales from noise generated by the monitoring vessel, or cause injury due to collision.	**Reject** Rationale: Adding a specific monitoring vessel may increase the survey area, providing some benefit in terms of overall surveillance coverage. However, on balance, the overall risks are not considered to be reduced as the vessel would introduce additional sound and increase the overall noise footprint.

6.6 Introduction, Establishment and Spread of IMS

6.6.1 Cause of Aspect

Unplanned introduction of invasive marine species (IMS) may occur as a result of the following activity:

- Support operations (vessels).

IMS are marine plants or animals that have been introduced into a region beyond their natural range and can survive, reproduce, and establish founder populations. Species of concern are those that are not native and are likely to survive and establish in the region; and are able to spread by human mediated or natural means. Environmental factors that dictate their survival and invasive capabilities include features such as water temperature, depth, salinity, nutrient levels, and habitat type.

IMS have historically been translocated and introduced around Australia by a variety of natural and anthropogenic means. In relation to the BMG Closure activities, the introduction, establishment, and spread of IMS could occur via several different pathways and risk events (Table 6-21).

Table 6-21 - IMS Risk Events: Pathways for Potential Introduction, Establishment, and Spread of IMS

Risk event	Pathway to introduction	Means of establishment	Mechanisms of spreading	Campaign context
IMS is transferred into the field, becomes established and spreads	IMS within biofouling on CSV or other vessels dislodged to the seabed. IMS within biofouling on equipment that is routinely submerged in water, and which is dislodged to the seabed.	Suitable habitat and conditions available for IMS in field.	Once established may spread by itself if conditions are suitable. In field equipment may provide connectivity allowing spread across infrastructure. Other anthropogenic influence (e.g. trawling) could spread established IMS within and outside of the field.	Section 6.6.2.1
IMS is transferred between vessels, establishes on vessels and is spread to other areas (e.g. ports)	Discharge of ballast water containing IMS.	Suitable habitat and conditions available for IMS on vessels and within ballast and seawater systems.	IMS spreads between ports and other facilities via vessels acting as a vector.	Section 6.6.2.2
IMS is transferred out of the field, becomes established at locations inside or outside the region and spreads.	Already established populations of IMS within the offshore field via natural or anthropogenic influences are recovered with equipment and dislodged whilst being transferred to shore.	Suitable habitat and conditions available for IMS at shoreside facilities.	Once established may spread by itself if conditions are suitable. May become established on structures at ports, and from there spread to vessels which then become a vector for the spread of IMS.	Section 6.6.2.2

6.6.2 Aspect Characterisation

6.6.2.1 IMS Associated with CSV, Vessels and Project Equipment

Since the introduction of mandatory ballast water regulations, where ballast water must be exchanged outside territorial sea (12 nautical miles off the Australian coast, including islands), risk of IMS from international shipping has been greatly reduced. Therefore, the risk of IMS introduction into territorial waters from international shipping should be negligible to low. Domestic ships that discharge or exchange water at any Australian port has variable risk ratings depending on where the ballast water was last acquired.

Analysis of global datasets suggest that biofouling is the most prevalent vector contributing to the introduction of IMS; with ballast water the second most comment vector (DAFF, 2010). The Australian Government provides guidelines as to the management of IMS from biofouling (DAFF, 2023) and ballast water (DAWE, 2020). For the BMG Closure activities, the CSV and equipment may be sourced internationally and/or domestically. The CSV has the potential to host IMS. There could be periods where the CSV and support vessels work in close proximity, where there may be potential for IMS to translocate from one vessel to another, for example, through ballast exchange, or dislodged biofouling, if vessels are not managed appropriately.

6.6.2.2 IMS Already Established in the Region

A variety of IMS has been established within ports around Australia; even within the same region, different ports typically host a different mix of established IMS (Australia Government, 2023; Cooper Energy, 2021b; MPSC, 2009; Parks Victoria, 2019). Ports are often suitable for establishment of IMS because they are regularly exposed to IMS from many different vessels that may lay-up for long periods of time. Ports also typically have shallow areas and hard structures which provide suitable substrate for establishment. IMS can be translocated from a port in either vessel ballast or as biofouling (refer above to Section 6.6.2.1).

Outside of port areas and coastal areas, documented IMS within the Bass Strait include the New Zealand screw shell (*Maoricolpus roseus*). The New Zealand screw shell was thought to have been introduced from New Zealand and spread via fishing activity. Some oil and gas infrastructure in the region overlaps New Zealand screw shell beds (Cooper Energy, 2021b). No screw shell, or any other IMS have ever been identified at BMG. The most recent survey utilising high-definition imagery was analysed extensively; no IMS were identified (Ierodiaconou, et al., 2021). Consequently, the BMG field and infrastructure is not currently considered a potential source of IMS.

Prior to and during operations the Amplitude Energy IMS Risk Management Protocol [CMS-EN-PRO-0002] will be implemented for all vessels and submersible equipment. Further information on the IMS risk management process is provided within Section 10.10.

6.6.3 Predicted Environmental Impact and Risk Events

The potential risk events associated with IMS introduction (assuming their survival, colonisation, and spread) include:

- Displacement or reduction in native marine species diversity and abundance causing changes to conservation values of protected areas
- Socio-economic impacts on commercial fisheries.

6.6.4 Impact and Risk Evaluation

6.6.4.1 Risk Event: Displacement or reduction in native marine species diversity and abundance causing changes to conservation values of protected areas

Inherent Consequence Evaluation

The introduction of an IMS can have a range of impacts on the receiving environment and can potentially alter the ecosystem dynamics of an area. Due to the complexity of ecosystems and level of interactions between and amongst biotic and abiotic receptors; there is no sure way to predict how an individual species may interact with a foreign environment.

Once an IMS is established, its level of invasiveness and ecosystem damage is determined by a range of factors detailed above. IMS have the potential to change ecosystem dynamics by competing for natural resources, reducing the availability of natural resources, predation, change natural cycling processes, segregation of habitat, spread of viruses, change in water quality, producing toxic chemicals, disturb, injure or kill vital ecosystem organisms (ecosystem engineers and keystone species), change surrounding ecosystems, change conservation values of protected areas and create new habitats.

IMS have proven economically damaging to areas where they have been introduced and established, particularly as IMS are difficult to eradicate from areas once established (Hewitt, et al., 2002). If the introduction is captured early, eradication may be effective but is likely to be expensive, disruptive and, depending on the method of eradication, harmful to other local marine life. It has been found that highly disturbed nearshore environments (such as marinas) are more susceptible to colonisation than open-water environments, where the number of dilutions and the degree of dispersal are high (Paulay, et al., 2002).

Predicted impacts from IMS if introduced to the Operational Area include potentially affecting marine fauna and benthic habitats that may utilise or be present within the BMG Operational Area, and protected marine areas present in the wider region. The Operational Area occurs within the Upwelling East of Eden KEF; however, the values and sensitivities of this KEF are oceanographic processes (eddies, upwelling) and associated episodic productivity events, that are unlikely to affected by the presence of IMS. The benthic habitat within the Operational Area is expected to be largely featureless. Habitat studies conducted within the Operational Area described the seafloor as a region where a muddy sand biotope dominates and is quite different to the upper inner shelf (Ierodiaconou, et al., 2021).

If IMS were transferred between the CSV and support vessels, or vice-versa whilst working within the Operational Area an IMS is spread, there is the potential for local impacts to receptors where IMS has become established, including benthic communities, listed marine fish species, coastal and offshore industry. These potential impacts beyond the Operational Area drive a consequence **Level 4**.

Inherent Likelihood

Any IMS introduced to the Operational Area would be expected to remain fragmented and isolated, and only within the vicinity of the infrastructure (i.e. it would not be able to propagate to nearshore environments). The chances of successful colonisation inside the Operational Area are considered small given:

- the nature of the benthic habitats near the Operational Area where seabed contact is made (i.e. predominantly bare silt and sands with patchy occurrences of hard substrate, and outside of coastal waters where the risk of IMS establishment is considered greatest (BRS, 2007))
- the Operational Area is in waters 135 – 270 m deep and therefore very low light levels are expected at the seabed; the depth and associated lack of light rules out establishment of a lot of the more common IMS
- the Operational Area is geographically isolated from other subsea or surface infrastructure which might be suitable for colonisation.

The likelihood of IMS becoming established within the Operational Area as a result of BMG activities is considered **Remote (E)**.

The transfer of IMS between vessels within the operational, and which may then become established elsewhere is also considered here. A number of factors reduce the chance of IMS translocating between vessel:

- support vessels will come alongside the CSV where required; time alongside is relatively short, and managed via DP; there is typically no or minimal contact between support vessels and CSV, risking damage
- the offshore environment within the Gippsland region is highly dispersive, and vessels will be frequently moving; these conditions are not typically conducive to the establishment of marine organisms onto a new surface

The likelihood of the transfer of IMS between vessels within the operational, and which may then become established elsewhere, as a result of the BMG activities is considered **Remote (E)**.

Inherent Risk Severity

The inherent risk severity of IMS causing displacement or reduction in native marine species diversity and abundance is considered **Moderate**.

6.6.4.2 Risk: Socio-economic impacts on commercial fisheries

Inherent Consequence Evaluation

As mentioned previously, IMS have proven economically damaging to areas where they have been introduced and established, particularly as IMS are difficult to eradicate from areas once established (Hewitt, et al., 2002). If the introduction is captured early, eradication may be effective but is likely to be expensive, disruptive and, depending on the method of eradication, harmful to other local marine life. It has been found that highly disturbed nearshore environments (such as marinas) are more susceptible to colonisation than open-water environments, where the number of dilutions and the degree of dispersal are high (Paulay, et al., 2002).

IMS can have a primary and/or secondary impact on socio economic receptors. Primary impacts include direct damage to vessels, equipment and infrastructure which may then cause flow on affects and lead to a reduction in efficiency, productivity and profit. The presence of fouling organisms within a marine environment is likely to have the same or similar impacts to socio-economic receptors.

Ecological impacts associated with IMS introduction may also have an impact to socio-economic receptors through reduction in ecological values. Marine pest species can deplete fishing grounds and aquaculture stock, with between 10% and 40% of Australia's fishing industry being potentially vulnerable to marine pest incursion. For example, the introduction of the Northern Pacific Seastar (*Asterias amurensis*) in Victorian and Tasmanian waters was linked to a decline in scallop fisheries (Dommisse & Hough, 2004).

Predicted impacts from IMS if introduced to the Operational Area include potentially affecting commercial fisheries that may utilise the BMG Operational Area, and protected marine areas present in the wider region. As described in Section 4.4.2, several Commonwealth or State managed commercial fisheries were identified as having management areas that included the Operational Area; however, of these active fishing effort is expected to be predominantly associated with the Commonwealth SESSF..

If IMS were transferred between the CSV and support vessels, or vice-versa whilst working within the Operational Area, IMS could be translocated and introduced to other local areas beyond the Operational Area; ports and other offshore industry could potentially be exposed through both ballast and biofouling. If an IMS is spread, there is the potential for local impacts to receptors where IMS has become established, including fish species, coastal and offshore industry. These potential impacts beyond the Operational Area drive a consequence **Level 4**.

Inherent Likelihood

The likelihood of IMS becoming established within the Operational Area as a result of BMG activities is considered **Remote (E)**.

Inherent Risk Severity

The inherent risk severity of IMS causing impacts to socio-economic receptors is considered **Moderate**.

6.6.5 Control Measures, ALARP and Acceptability Assessment

Table 6-22 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to introduction, establishment and spread of IMS.

Table 6-22 - Introduction, Establishment and Spread of IMS Control Measures, ALARP and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context: B** The introduction, establishment and spread of IMS has been assigned a Level 4 consequence; the likelihood of this consequence occurring is considered Remote. The causes resulting in an introduction of IMS from a planned release of ballast water or vessel, or equipment biofouling are well understood and effectively managed by international, national and State requirements and industry guidance. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or claims were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Moderate risk severity, Amplitude Energy believes ALARP Decision Context B should apply.
Control Measure	**Source of good practice control measures**
C20: IMS Risk Management Protocol [CMS-EN-PRO-0002].	The National biofouling management guidelines for the petroleum production and exploration industry (MPSC, 2009) recommend a biofouling risk assessment is undertaken for vessels and, where necessary, conducting in water inspection, cleaning and antifouling renewal. These guidelines should also be read in conjunction with the draft Australian Anti-fouling and In-water Cleaning Guidelines (DAFF, 2024). Further, the Australian Government provides guidelines for the management of biofouling for commercial vessels (DAFF, 2023) and ballast water management (DAWE, 2020) consistent with requirements under the *Biosecurity Act 2015* (Cwth). In line with these recommendations Amplitude Energy uses an IMS Risk Assessment to evaluate IMS risks. Prior to and during operations the Amplitude Energy IMS Risk Management Protocol will be implemented for all vessels and submersible equipment and will consider all regions visited (international and domestic). The Amplitude Energy IMS Risk Management Protocol has been prepared to align with: • Advice from the Victorian Government Marine Biosecurity Section • National biofouling management guidelines for the petroleum production and exploration industry (MPSC, 2009) • Australia Biofouling Management Requirements (DAFF, 2023) • Australian Ballast Water Management Requirements (DAWE, 2020) • Guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species (IMO Biofouling Guidelines (IMO, 2023)) • NOPSEMA's information paper on reducing marine pest biosecurity risks through good practice management (NOPSEMA, 2024b). Further information on the Amplitude Energy IMS Risk Assessment is provided within Section 10.10.

<table>
<tr><td>ALARP Decision Context and Justification</td><td colspan="6">ALARP Decision Context: B
The introduction, establishment and spread of IMS has been assigned a Level 4 consequence; the likelihood of this consequence occurring is considered Remote.
The causes resulting in an introduction of IMS from a planned release of ballast water or vessel, or equipment biofouling are well understood and effectively managed by international, national and State requirements and industry guidance.
Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations.
No objections or claims were raised during relevant person consultation regarding this aspect or its potential impacts and risks.
Based on a Moderate risk severity, Amplitude Energy believes ALARP Decision Context B should apply.</td></tr>
<tr><td>Control Measures Considered</td><td>Related Risk Event</td><td>Benefit</td><td>Recognised Good Practice?</td><td>Sacrifice</td><td>Introduced Risks</td><td>Conclusion</td></tr>
<tr><td>Utilise local vessels only</td><td>Introduction of IMS</td><td>Through utilising local vessels, the risk of introducing an IMS from an outside source is prevented.</td><td>No.
There is a standard suite of management measures to manage this risk (as detailed in Amplitudes IMS Risk Management Protocol) – the use of local vessels is not one of these.</td><td>Through specifying local vessels only, this drastically restricts the types of vessels that can be used which would result in potentially both schedule and financial costs.</td><td>None.</td><td>Reject.
Rationale: the project cost (operational and schedule constraints) this would implement is too high. Further to this, if no local vessels are identified as being suitable to complete this activity in the future, then further assessment would be required.
Given this management measure removes all operational flexibility, the costs are grossly disproportionate to the level of risk reduction achieved.</td></tr>
<tr><td colspan="7">Impact and Risk Summary</td></tr>
<tr><td>Residual Impact Consequence</td><td colspan="6">N/A</td></tr>
<tr><td>Residual Risk Consequence</td><td colspan="6">Level 4: Extensive medium to long-term impact on highly valued ecosystems, species populations or habitats.</td></tr>
<tr><td>Residual Risk Likelihood</td><td colspan="6">Remote: A freak combination of factors would be required for an occurrence. Not expected to occur during the activity. Occur in exceptional circumstances.</td></tr>
<tr><td>Residual Risk Severity</td><td colspan="6">Moderate</td></tr>
</table>

ALARP Decision Context and Justification	**ALARP Decision Context: B** The introduction, establishment and spread of IMS has been assigned a Level 4 consequence; the likelihood of this consequence occurring is considered Remote. The causes resulting in an introduction of IMS from a planned release of ballast water or vessel, or equipment biofouling are well understood and effectively managed by international, national and State requirements and industry guidance. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or claims were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Moderate risk severity, Amplitude Energy believes ALARP Decision Context B should apply.
Demonstration of Acceptability	
Principles of ESD	Introduction, establishment and spread of IMS is evaluated as having a Level 4 consequence which has the potential to result in serious or irreversible environmental damage. However, Amplitude Energy has completed a large number of seabed surveys in the region and have a clear understanding of the benthic environment. The benthic habitat is homogeneous throughout the region and as the likelihood of this event occurring is remote, the activity is not expected to result in biological diversity or ecological integrity. Although uncertainty exists regarding the vessel(s) required to implement this activity, this is sufficiently managed through the implementation of the controls identified – specifically, Amplitude Energy's IMS Risk Management Protocol.
Legislative and conventions	The control measures proposed to manage this risk meet the following requirements: • *Biosecurity Act 2015* (Cwlth) - Chapter 5, Part 3 (Management of discharge of ballast water) & Chapter 4 (Managing biosecurity risks) • International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (the Ballast Water Management Convention) • *Protection of the Sea (Harmful Anti-fouling Systems) Act 2006* (Cwlth) • AMSA Marine Order 98: Marine Pollution Prevention - Anti-fouling Systems. • *Environment Protection Act 1970* (Vic) • Environment Protection (Ships Ballast Water) Regulations 2006 (VIC) • Australian Ballast Water Management Requirements (DAWE, 2020) • Australia Biofouling Management Requirements (DAFF, 2023) • Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (IMO, 2023) • National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (MPSC, 2009)
Internal context	The environmental controls proposed reflects the Amplitude Energy HSE Policy goals of utilising best practice and standards to eliminate or minimise impacts and risks to the environment and community to a level which is ALARP. Relevant management system processes adopted to implement and manage hazards to ALARP include:

ALARP Decision Context and Justification	**ALARP Decision Context: B** The introduction, establishment and spread of IMS has been assigned a Level 4 consequence; the likelihood of this consequence occurring is considered Remote. The causes resulting in an introduction of IMS from a planned release of ballast water or vessel, or equipment biofouling are well understood and effectively managed by international, national and State requirements and industry guidance. Amplitude Energy is experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or claims were raised during relevant person consultation regarding this aspect or its potential impacts and risks. Based on a Moderate risk severity, Amplitude Energy believes ALARP Decision Context B should apply.
	• MS03 – Risk Management • MS09 – Health, Safety and Environment Management • MS11 – Supply Chain and Procurement Management. Activities will be undertaken in accordance with the Implementation Strategy (Section 9.0).
External context	No relevant person objections or claims have been received regarding IMS.
Acceptability Outcome	**Acceptable**

6.7 Accidental Hydrocarbon Release

Accidental hydrocarbon releases to the environment could include both gas and liquid hydrocarbons.

There are infinite variations in the nature and scale of a spill from these activities. This section addresses the higher order (most severe or worst-case) spill scenarios. Minor LoC scenarios are assessed in Table 6-3.

Loss of well control is not considered within this EP as the wells have been P&A'd during Phase 1 (Section 1.5).

6.7.1 Cause of Aspect

Activities associated with the BMG Closure Project (Phase 2) have the potential to result in an accidental release of hydrocarbons to the marine environment. Guidance on the identification of worst-case credible spills scenarios is given in the AMSA's Technical guidelines for preparing contingency plans for Marine and Coastal Facilities (AMSA, 2015) A range of credible accidental release scenarios up to and including worst case scenario LoC caused by vessel collision event are described in Table 6-23.

Table 6-23 - Accidental Hydrocarbon Release Types, Causes and Estimated Volumes

Accidental Hydrocarbon Release	Cause of Aspect	Fluid Type and Volume	Release location	Source control response
Hydraulic line failure	Vessel and ROV operations (refer to Table 6-3).	~1 m^3 of hydraulic fluid	Spill to containment, deck or ocean.	On-site response.
LoC – melting and release of residual hydrocarbon wax	The flowlines may contain residual hydrocarbon wax. The wax has an appearance temperature of around 35-45°C and therefore is expected to remain solid during flowline recovery. However, if the wax liquifies once on the CSV (due to high ambient temperatures), there is potential for release to the vessel deck. Refer to Table 6-3.	<1 m^3 of hydrocarbon	Spill to containment or deck.	On-site response.
LoC – subsea release of retained diesel within B6 flowline during retrieval	The B6 flowline was previously displaced to inhibited seawater, however a small volume of diesel is expected to remain based on cessation phase reports (Section 3.1.4). The B6 flowline was cut from the B6 production tree during Phase 1 and a flowline plug was inserted. If the flowline plug fails during retrieval there is potential to accidentally release the residual diesel from the B6 flowline. Refer to Table 6-3.	~2 m^3 diesel	Subsea release to ocean.	On-site response.
LoC – Passing or vessel collision with project vessel	Navigational error or loss of DP resulting in a high energy collision between the project vessel and third-party vessel could result in hull damage allowing water ingress. Damage will mainly be in the outer hull, which is typically	500 m^3 of MDO	Surface release within the BMG Operational Area. Modelling location is the Manta-2A well location (closest	Vessel and offsite resources.

Accidental Hydrocarbon Release	Cause of Aspect	Fluid Type and Volume	Release location	Source control response
	ballast or other water tanks. Fuel tanks could be at risk of impact. For the impact assessment the vessels largest fuel tank volume was used as recommended by AMSA's guideline for indicative maximum credible spill volumes for other, non-oil tanker, vessel collision (AMSA, 2015). This was assessed to be 500 m^3 of MDO. The release was modelled to occur over a 5-hour period, which is considered to be a short (and therefore conservative) approach. There are no emergent features within the Operational Area. As such, vessel grounding was not assessed as a credible risk as the water depth in the Operational Area is 135 m – 270 m.		well to shore in the BMG infrastructure).	

6.7.2 Aspect characterisation

6.7.2.1 Quantitative Hydrocarbon Spill Modelling

Spill Modelling from BMG Closure Project Phase 1 (diesel spill scenario) was used to inform this risk assessment as this quantitative modelling covered the worst-case spill scenario (although extremely unlikely) identified in this EP:

- **LoC Vessel Collision Scenario:** 500 m^3 surface release of MDO – This scenario examined a 500 m^3 surface release of MDO over 5 hours, tracked for 30 days, representing a single largest fuel tank rupture after a vessel collision at the Manta-2A (M2A) well location. A total of 200 spill trajectories were simulated across two seasons, summer and winter (100 spills per season) (RPS, 2021a).

The spill modelling was performed using an advanced three-dimensional trajectory and fates model, SIMAP (Spill Impact Mapping Analysis Program). The SIMAP model calculates the transport, spreading, entrainment, and evaporation of spilled hydrocarbons over time, based on the prevailing wind, and current conditions, and physical and chemical properties of the spilled oil (RPS, 2021a).

The SIMAP system, includes algorithms to account for both physical transport and weathering processes (RPS, 2021a). Further, RPS confirms that this work meets and exceeds the American Society for Testing and Materials Standard F2067-13 “Standard Practice for Development and Use of Oil Spill Models”. Reporting thresholds have been specified to account for “exposure” on the sea surface and “contact” to shorelines at meaningful levels.

6.7.2.2 Exposure Values

NOPSEMA's guidance for oil spill modelling (NOPSEMA, 2019; NOPSEMA, 2025d) describes that exposure values should be selected and applied for different purposes, including to:

- identify the EMBA by hydrocarbons (in accordance with regulations 21(2) and 21(3)) and evaluate the consequences of hydrocarbon exposure to relevant values, sensitivities, and features of the environment (in accordance with regulations 21(5) and 21(6))

- inform oil spill response and operational and scientific monitoring arrangements (in accordance with regulations 22(9) and 22(10)).

Table 6-24 provides the exposure values adopted in this EP to identify the EMBA by hydrocarbons (the 'Spill EMBA' in Section 4.0) and to inform the evaluation of the consequences of hydrocarbon on the environment. The exposure values take into consideration NOPSEMA (2019; 2025d) guidance. Table 6-24 also includes the exposer values used to identify the Monitoring Area that is used to inform operational and scientific monitoring.

Table 6-24 - Exposure Values used to Identify the EMBA by hydrocarbons and inform consequence evaluation

Type	Exposure values		Justification
Floating oil (Surface oil)	Low	1 g/m^2	Floating oil at this concentration is expected to be visible; therefore, represents a potential for socioeconomic effects. At this concentration, consequences on ecological receptors are generally not expected. Establishes the planning area for scientific monitoring.
	Moderate	10 g/m^2	Floating oil at this concentration approximates the lower limit for ecological effects (e.g. may be harmful to birds and marine mammals).
	High	50 g/m^2	Floating oil at this concentration represents an increased likelihood of consequences on ecological receptors. Approximates surface oil slick and informs oil spill response planning.
Shoreline oil	Low	10 g/m^2	Shoreline oil at this concentration is expected to be visible; therefore, represents a potential for socioeconomic effects. At this concentration, consequences on ecological receptors are generally not expected.
	Moderate	100 g/m^2	Shoreline oil at this concentration approximates the lower limit for ecological effects. Approximates shoreline area likely to require clean-up effort.
	High	1,000 g/m^2	Shoreline oil at this concentration represents an increased likelihood of consequences on ecological receptors. Approximates shoreline area likely to require intensive clean-up effort.
Dissolved oil	Low	10 ppb	Establishes the planning area for scientific monitoring based on potential for exceedance of water quality triggers.
	Moderate	50 ppb	Dissolved oil at this concentration approximates potential toxic effects to ecological receptors, particularly sublethal effects to sensitive species.
	High	400 ppb	Dissolved oil at this concentration approximates potential toxic effects to ecological receptors, including lethal effects to sensitive species.
Entrained oil	Low	10 ppb	Establishes the planning area for scientific monitoring based on potential for exceedance of water quality triggers.
	Moderate	100 ppb	Entrained oil at this concentration is appropriate to inform risk evaluation. It is a conservative exposure value to account for the uncertainty in consequences on the environment.
	High	1,000 ppb	Entrained oil at this concentration represents an increased likelihood of consequences on ecological receptors.

6.7.2.3 Weathering and Fate

A MDO was used for the LoC from a vessel scenario. The MDO is a light persistent fuel oil used in the maritime industry. It has a density of 829.1 kg/m^3 (API of 37.6) and a low pour point (-14°C) (RPS, 2021a). The low viscosity (4 cP at 25°C) indicates that this oil will spread quickly when released and will form a thin to low thickness film on the sea surface, increasing the rate of evaporation. The oil is categorised as a group II oil (light-persistent) based on categorisation and classification derived from AMSA (2015) guidelines. The classification is based on the specific gravity of hydrocarbons in combination with relevant boiling point ranges.

Figure 6-20 shows weathering graphs for a 500 m^3 release of MDO over 5 hours (tracked for 30 days) during three static wind conditions. The prevailing weather conditions will influence the weathering and fate of the MDO. Under lower windspeeds (5 knots), the MDO will remain on the surface longer, spread quicker, and in turn increase the evaporative process. On the contrary, sustained stronger winds (>15 knots) will generate breaking waves at the surface, causing a higher amount of MDO to be entrained into the water column and reducing the amount available to evaporate.

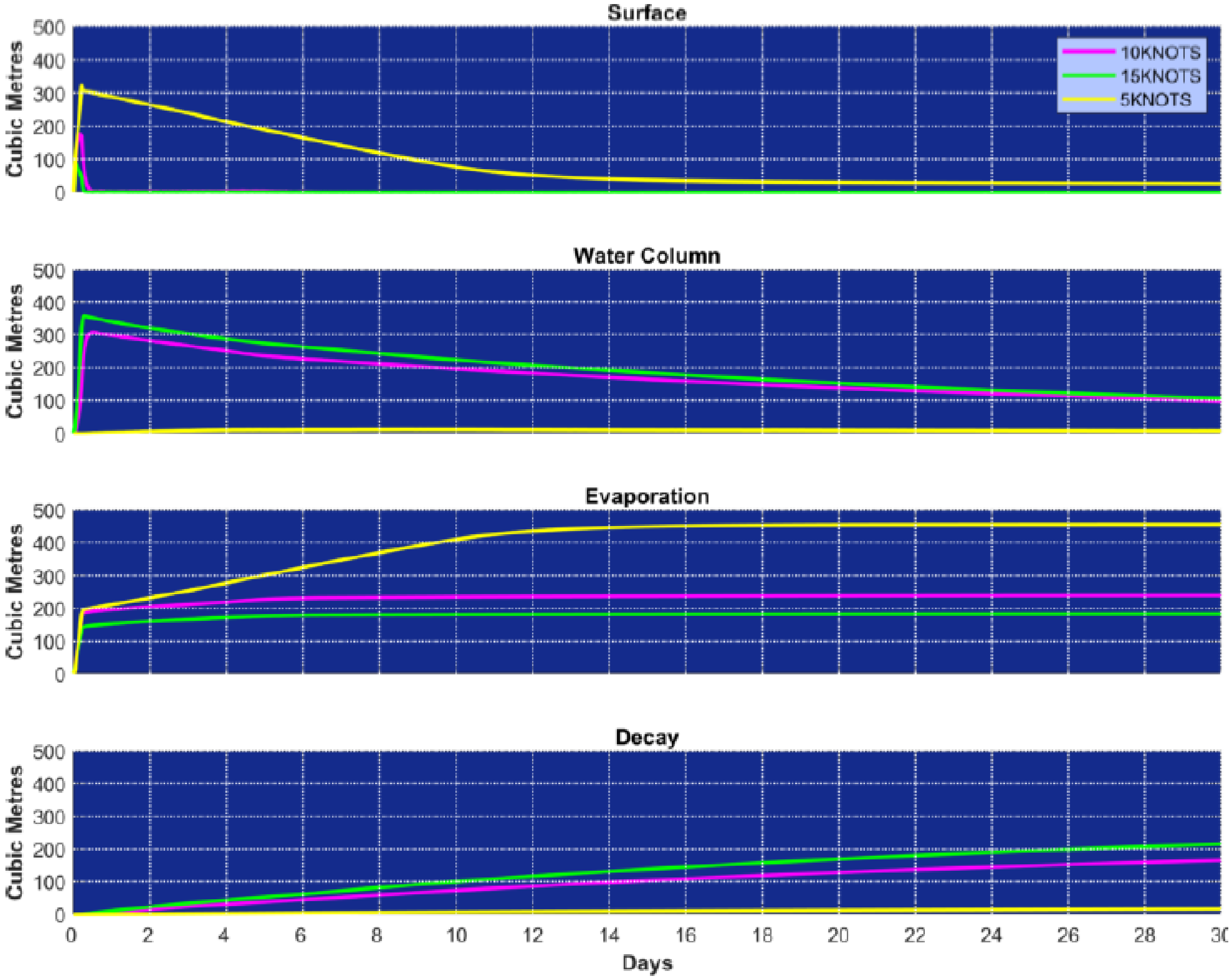


Figure 6-20 - Weathering of MDO under three static wind conditions (5, 10 and 15 knots) (RPS, 2021a)

6.7.2.4 Modelling Outputs

Below is a summary of the results from the stochastic modelling undertaken for a LoC caused by vessel collision and outline the area potentially exposed to hydrocarbons. The modelling report is provided in Appendix 6 of the BMG Closure Project (Phase 1) Environment Plan[23]. Figure 6-21 and Figure 6-22 shows the areas with the potential to be exposed to surface, shoreline, and in water (dissolved, entrained) oil, according to the modelling results (RPS, 2021a). The ecological and social receptors with the potential to be exposed to surface, shoreline

[23] Available publicly at: **https://docs.nopsema.gov.au/A832875**

accumulation, and in-water hydrocarbons from a LoC caused by vessel collision event are evaluated in Table 6-25, Table 6-26, and Table 6-27 respectively.

Surface Exposure (Figure 6-21**)**

- For summer conditions, the predicted maximum distance of surface exposure from the release location at the low exposure value (≥1 g/m^2) was 194 km east, at the moderate exposure value (≥10 g/m^2) was 32 km west-southwest, and at the high exposure value (≥50 g/m^2) was 11 km north-northwest
- For winter conditions, the predicted maximum distance of surface exposure from the release location at the low exposure value (≥1 g/m^2) was 177 km northeast, at the moderate exposure value (≥10 g/m^2) was 132 km east-northeast, and at the high exposure value (≥50 g/m^2) was 7 km northeast.

Shoreline Exposure (Figure 6-21**)**

- Probability of any shoreline contact ranged from 4% (summer) to 8% (winter)
- The minimum time before shoreline contact was approximately 1.9 days (~46 hours) and the maximum volume of oil ashore was 64.8 m^3, both predicted during winter conditions
- Only two shoreline receptor sites[24], East Gippsland and Cape Howe / Mallacoota recorded exposure values at the high exposure value (≥1,000 g/m^2) and only during the winter season
- No sites were exposed at the high exposure value during the summer season
- Gabo Island recorded the highest probability of shoreline accumulation at the low exposure value during summer conditions with 3%, while East Gippsland and Cape Howe / Mallacoota LGAs/sub-LGAs recorded the highest probability at the low exposure value during winter conditions with 7%
- The minimum time recorded before low shoreline accumulation was 1.92 days at Cape Howe Mallacoota and East Gippsland under winter conditions while the maximum volume to reach the shoreline was 64.6 m^3, recorded at East Gippsland and Cape Howe / Mallacoota.

In water – Dissolved (Figure 6-22**)**

- In the surface (0-10 m) depth layer, a total of 12 BIAs (i.e. the BIAs which intersect the Operational Area) were predicted to be exposed to dissolved hydrocarbons at the low (≥10 ppb) and moderate (≥50 ppb)exposure values during summer and winter conditions, and the greatest probabilities of 72% and 36% and 69% and 50% respectively
- Aside from the 12 BIAs that the release location resides within, all the other BIAs recorded probabilities of less than 10% except the white-faced storm-petrel foraging BIA which recorded a 17% probability of exposure
- No locations were exposed at the high exposure value (≥400 ppb) for either season
- Two AMPs (East Gippsland and Flinders) were predicted to be exposed to dissolved hydrocarbons at the low exposure value during summer conditions, and one AMP (East Gippsland) during winter conditions, with all recording a 1% probability of exposure
- No AMPs were predicted to be exposed to dissolved oil at the moderate or high exposure values
- Dissolved oil at the low and moderate exposure values were predicted to cross into both NSW and Victorian state waters; however the probability of this exposure was low (≤5%).

[24] Based on local government areas (LGAs) and sub-LGAs boundaries (RPS, 2021a).

In water – Entrained (Figure 6-22**)**

- In the surface (0-10 m) depth layer, a total of 12 BIAs (i.e. the BIAs which intersect the Operational Area) were predicted to be exposed to entrained oil at the low and moderate exposure values during summer and winter conditions, and the highest probabilities were 94% and 89% and 98% and 89% respectively
- Aside from the 12 BIAs that the release location resides within, 13 and 12 additional BIAs recorded probabilities of exposure to entrained hydrocarbons at the moderate exposure value during summer and winters conditions, respectively. The greatest probabilities of moderate exposure during summer and winter conditions were predicted at the white-faced storm-petrel foraging BIA with 36% and 37%, respectively
- One AMP (East Gippsland) was predicted to be exposed to entrained hydrocarbons at the moderate exposure value (≥100 ppb) during summer and winter conditions, with the highest probability predicted as 2% during summer conditions and 1% during winter conditions
- Entrained hydrocarbons at the moderate exposure value were predicted to cross into NSW and Victoria state waters during summer conditions with probabilities of 2% and 11% respectively. During winter conditions, entrained hydrocarbons at the moderate exposure value were predicted to cross into NSW and Victoria state waters with probabilities of 4% and 5% respectively.

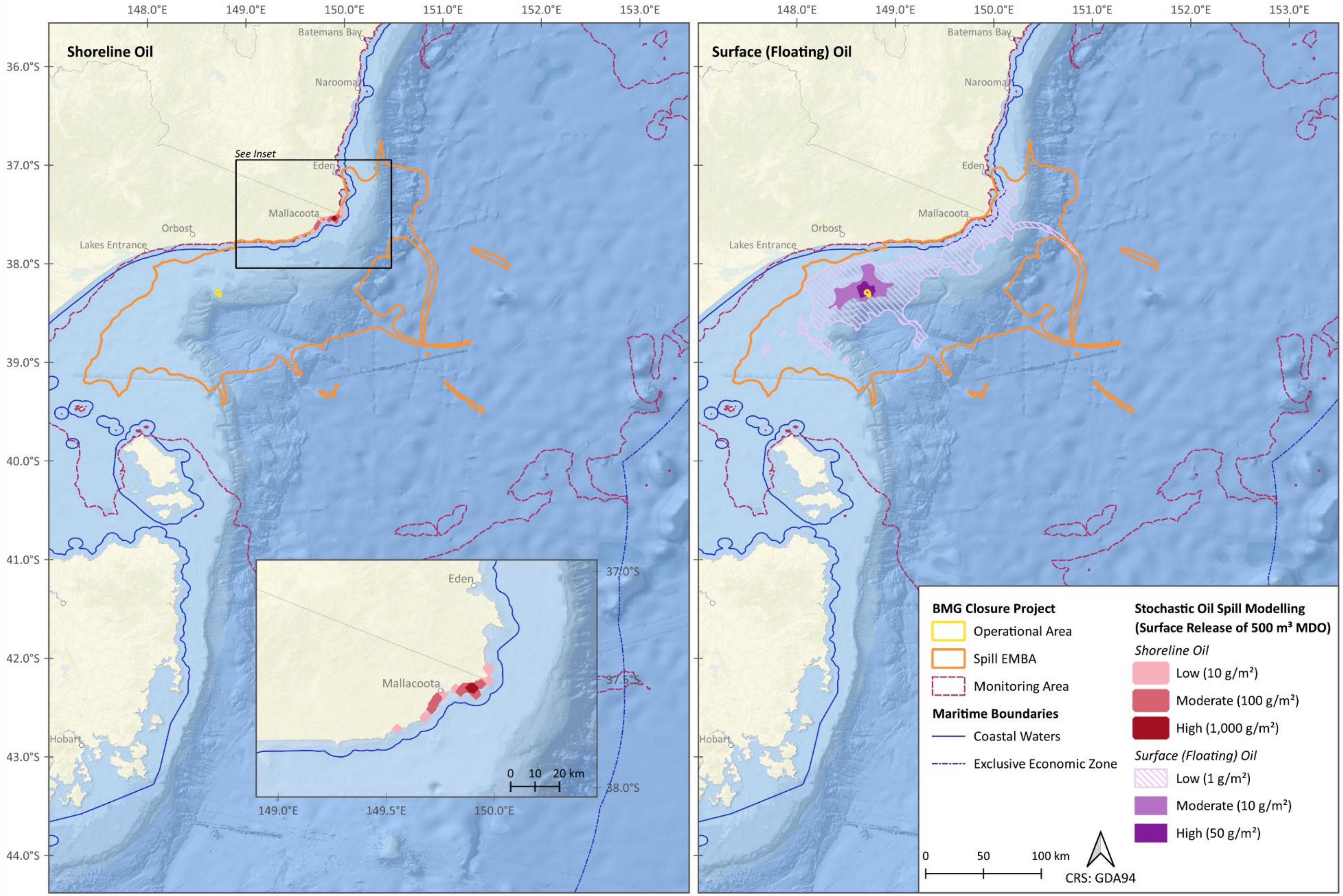


Figure 6-21 - EMBA by Shoreline Oil (left) and Surface Oil (right) from a 500 m^3 surface release of MDO at the M2A well (results shown are summer and winter combined)

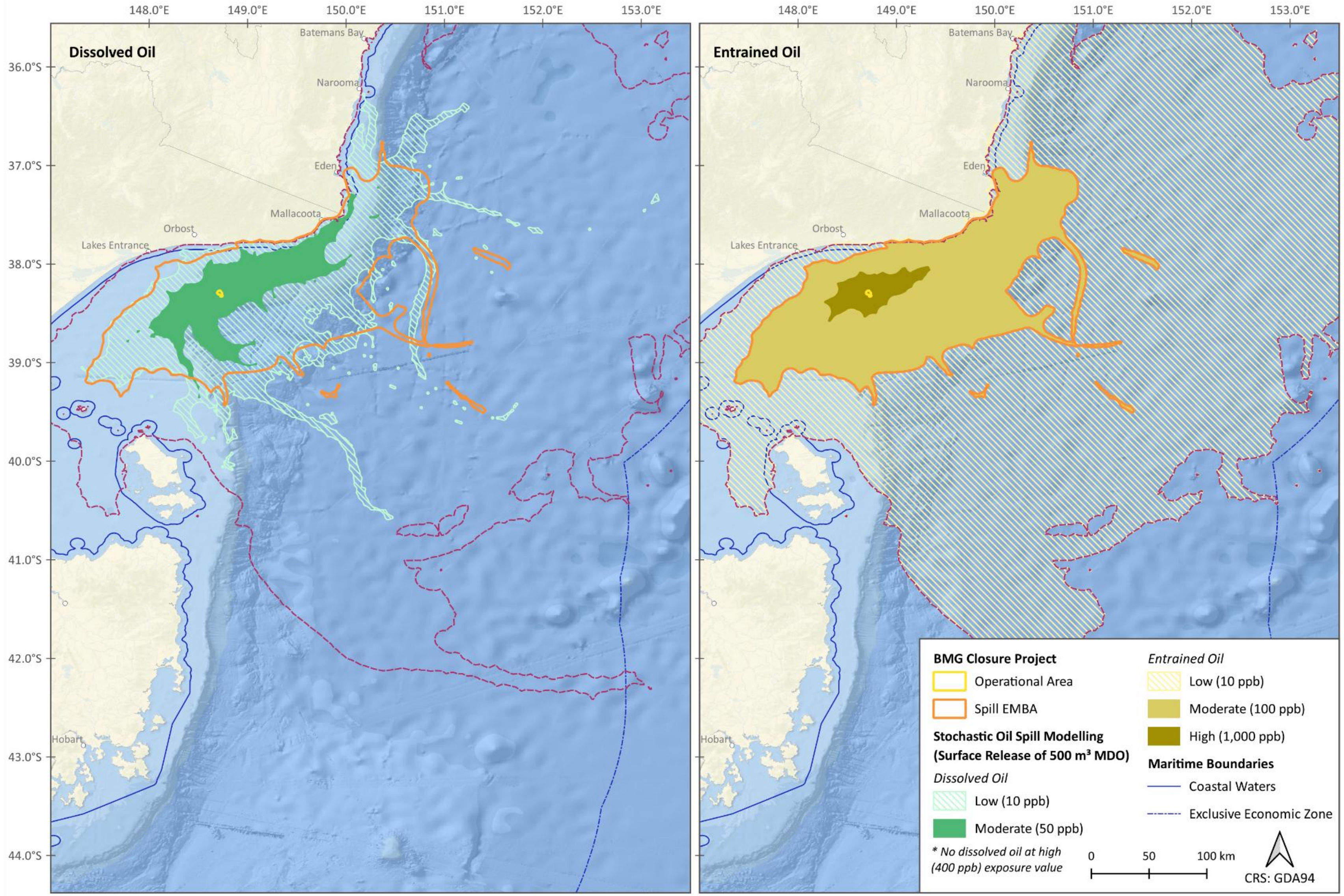


Figure 6-22 - EMBA by Dissolved Oil (left) and Entrained Oil (right) from a 500 m³ surface release of MDO at the M2A well (results shown are summer and winter combined)

6.7.3 Predicted Environmental Impacts and Risk Events

Spills to the marine environment have the potential to expose ecological and social receptors to different hydrocarbon exposures and concentrations. Hydrocarbon exposures include:

- Surface
- Shoreline
- In water (dissolved, entrained).

Hydrocarbon spill events have the potential to result in:

- Toxicity effects/physical oiling
- Reduction in intrinsic values/visual aesthetics.
- Impacts to commercial businesses.

Note: The Spill EMBA is based on stochastic modelling; i.e. it does not represent the predicted coverage of any single oil spill event, nor does it depict a single plume at any given point in time. Rather, the Spill EMBA is a composite of a large number of spill scenarios modelled under differing metocean conditions. In addition, the potential risks to ecological and social receptors within the extent of the Spill EMBA are not homogenous; they vary in consequence. The concentrations of oil are not uniform to the outer extent of each exposure value threshold, they will decrease with further distance from the source. Therefore, generally the potential consequences would also diminish with distance from the spill source, and the probability of a consequence, which is highly unlikely in the first instance, becomes less likely still, with distance from the spill source out to the edge of the Spill EMBA.

6.7.4 Impact and Risk Evaluation

6.7.4.1 Risk Event: LoC – Vessel Collision

Table 6-25 - Consequence evaluation for MDO hydrocarbon exposure – Surface

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
Ecological Receptors			
Marine Fauna	Seabirds	Several EPBC Act threatened, migratory and/or listed marine species have the potential to be present within the area predicted to be contacted by ≥10 g/m² surface hydrocarbons. Some of these species may undertake biologically important behaviours (foraging, roosting) within the area (refer to the PMST report for Spill EMBA – Surface in Appendix 3). There are several foraging BIAs that are present within the area potentially exposed to ≥10 g/m² surface hydrocarbons for albatross, petrel, and shearwater species. Foraging BIAs are typically large broad areas (Section 3.12 -Appendix 2). Birds can feed via surface skimming or diving – both exposing the bird to any oil on the water surface. HCTS for bird species are not spatially mapped; however from descriptions in the recovery plan (Commonwealth of Australia, 2020a) the Spill EMBA – Surface may intersect with HCTS for the Australian fairy tern. Pollution was identified as a threat within the recovery plan for the Australian fairy tern (Table 2-6). No nesting/breeding activity occurs in offshore oceanic waters.	When first released, MDO has higher toxicity due to the presence of volatile components. Individual birds making contact close to the spill source at the time of the spill may be impacted, however, it is unlikely that a large number of birds will be affected as the majority (up to ~95%) of the MDO volume likely to have evaporated or become entrained within several days of release depending on wind and wave conditions. Seabirds rafting, resting, diving or feeding at sea have the potential to come into contact with areas where hydrocarbons concentrations are greater than 10 µm and due to physical oiling may experience lethal surface thresholds. As such, acute or chronic toxicity impacts (death or long-term poor health) to birds is possible but unlikely for an MDO spill as the number of birds would be limited due to the small area and brief period of exposure above 10 µm (up to ~95% evaporation expected within several days). Therefore, potential impact, if occurs, would be limited to individuals, with population impacts not anticipated. Marine pollution is listed as a threat for several migratory shorebirds and seabird conservation advice / recovery plans (refer to Table 2-6), however management actions (where they exist) mostly relate to nesting locations. The potential consequence to seabirds from a vessel collision (MDO) event is assessed as **Level 2** based on the potential for localised and short-term impacts to species of recognised conservation value but not affecting local ecosystem functioning.
	Marine Turtles	There may be EPBC Act threatened, migratory, and marine listed marine turtles in the area predicted to be exposed to ≥10 g/m² surface oil. These	Marine turtles are vulnerable to the effects of oil at all life stages. Marine turtles can be exposed to surface oil externally (i.e. swimming through oil

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		species may undertake biologically important behaviours (foraging, breeding) within the area (refer to the PMST report for Spill EMBA – Surface in Appendix 3). However, there are no BIAs or HCTS of the species within this area. No breeding activity occurs in offshore oceanic waters.	slicks) or internally (i.e. swallowing the oil). Ingested oil can harm internal organs and digestive function. Oil on their bodies can cause skin irritation and affect breathing. The number of marine turtles that may be exposed to MDO is expected to be low as there are no BIAs or HCTS of the species within the area, hence, potential turtle presence may be of a transient nature only within the Spill EMBA. The surface oiling area is expected to reduce quickly, with the majority (up to ~95%) of the MDO volume predicted to have evaporated or become entrained within several days of release. Therefore, potential impact would be limited to individuals, with population impacts not anticipated. Marine pollution is listed as a threat to marine turtle in the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017d), particularly in relation to shoreline oiling of nesting beaches. There are no nesting beaches within the Spill EMBA, and the activity will be conducted in a manner which is not inconsistent with the relevant management actions. The potential consequence to turtles from a vessel collision (MDO) event is assessed as **Level 2** based on the potential for localised and short-term impacts to species of recognised conservation value but not affecting local ecosystem functioning.
	Marine Mammals (Pinnipeds)	There may be EPBC Act listed marine pinnipeds in the area predicted to be affected by hydrocarbons ≥10 g/m^2; no biologically important behaviours were associated with this potential presence (refer to the PMST report for Spill EMBA – Surface in Appendix 3). There are also no BIAs or HCTS of the species within this area.	Exposure to surface oil can result in skin and eye irritations and disruptions to thermal regulation. Oiling of pinnipeds can lead to hypothermia if the fur is affected, or poisoning if oil is ingested, resulting in reduced foraging and reproductive fitness or death (DSEWPaC, 2013c). Fur seals are particularly vulnerable to hypothermia from oiling of their fur, as well as irritation to lungs if breathing in fumes (e.g. if feeding occurs in the area). Fur seals are known to forage throughout the Gippsland and have been sighted foraging at BMG. The number of pinnipeds that may be exposed to MDO is expected to be low as there are no BIAs or HCTS of the species present, hence, pinnipeds may be transient within the Spill EMBA. Surface oiling area is expected to reduce quickly, with the majority (up to ~95%) of the MDO volume predicted to have evaporated or become entrained within several days of release. Therefore,

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
			potential impact would be limited to individuals, with population impacts not anticipated. Given that fur seals are vulnerable to hypothermia from oiling and poisoning from ingestion, the potential consequence to pinnipeds from a vessel collision (MDO) event is assessed as **Level 3** based on the potential for medium term impacts to species of recognised conservation value but not affecting local ecosystem functioning.
	Marine Mammals (Whales)	Several EPBC Act threatened, migratory and/or listed cetacean species may be present in the area predicted to be affected by hydrocarbons ≥10 g/m^2. Some of these may be undertake biologically important behaviours (foraging) within the area (refer to the PMST report for Spill EMBA – Surface in Appendix 3). The following BIAs are within the area predicted to be above the surface thresholds of ≥10 g/m^2: • pygmy blue whale possible foraging BIA • humpback whale migration BIA • southern right whale migration and reproduction BIAs. The National Recovery Plan for the Southern Right Whale (DCCEEW, 2024h) identifies HCTS for southern right whales as all reproductive BIAs across the species range.	Cetaceans can be exposed to oil through direct contact with the skin, eyes, mouth, and blowhole(s), and they can also inhale volatile petroleum fractions at the water's surface, ingest oil directly, and consume oil components in food (Amstrup, et al., 1989; O'Hara & T.J., 2001). Physical contact by individual whales with MDO is unlikely to lead to any long-term impacts, due to the insulative properties of their thick layers of blubber and skin (Geraci & St Aubin, 1990). Given the mobility of whales, only a small proportion of the migrating population might surface in the affected areas, resulting in short-term and localised consequences, with no long-term population viability effects. If whales are foraging at the time of the MDO spill, a greater number of individuals may be present in the area where sea surface oil is ≥10 g/m^2 (10 µm). Surface oiling area is expected to reduce quickly, with the majority (up to ~95%) of the MDO volume predicted to have evaporated or become entrained within several days of release. Although oil spill (pollution, chemical discharges) has been identified as a potential threat for cetaceans (refer to Table 2-6), activities within this EP will be conducted in a manner not inconsistent with the relevant management actions outline in the Plans. The potential consequence to cetaceans from a vessel collision (MDO) event is assessed as **Level 2** based on the potential for localised and short-term impacts to species of recognised conservation value but not affecting local ecosystem functioning.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
	Fish and Sharks	Several threatened, migratory and/or listed fish and sharks may occur within the area. Fish and sharks have the potential to be foraging, migrating and breeding within the area predicted to be contacted by ≥10 g/m^2 surface hydrocarbons (refer to the PMST report for Spill EMBA – Surface in Appendix 3). No BIAs or HCTS of the species has been identified within the area predicted to be above the surface thresholds of ≥10 g/m^2.	Fish and sharks may be vulnerable to hydrocarbon exposure from an oil spill. Fish that have been exposed to dissolved aromatic hydrocarbons are capable of eliminating the toxicants once placed in clean water; hence, individuals exposed to a spill are likely to recover (King, et al., 1996). In addition, since fish do not generally break the sea surface, the risk from surface oil spills is low. Whale sharks were identified as species that may be present within the area. Whale sharks have the tendency to feed close to surface waters (Compagno, 1984), increasing the likelihood of exposure to surface slicks. Surface spills may also affect whale shark migration if attempting to travel through an area impacted by a spill. However, whale sharks do not spend all their time in surface waters—they routinely move between surface, can dive to great depths (~700 m) and they can remain away from the surface for long periods (DAWE, 2021). In the unlikely event, whale sharks are within the exposure area at the time of the spill, where sea surface oil is ≥10 g/m^2 (10 µm), surface oiling area is expected to reduce quickly with the majority (up to ~95%) of the MDO volume predicted to have evaporated or become entrained within several days of release. Therefore, the potential consequence to fish and sharks from a vessel collision (MDO) event is assessed as **Level 2** based on the potential for localised and short-term impacts to species of recognised conservation value but not affecting local ecosystem functioning.
	Syngnathids and dolphins	EPBC Act marine listed syngnathids and migratory and/or cetacean listed dolphins have the potential to be present within the area exposed to ≥10 g/m^2 surface oil. However, there are no EPBC Act threatened species, BIAs, or HCTS of the species within the area that could be potentially affected (refer to the PMST report for Spill EMBA – Surface in Appendix 3). Therefore, surface exposure to syngnathids and dolphins is not expected and not evaluated further.	N/A
Social Receptors			
Natural Systems	Key Ecological Features	The Upwelling East of Eden KEF is within the area predicted to be above the surface thresholds of ≥10 g/m^2 (refer to the PMST report for Spill EMBA – Surface in Appendix 3).	Based on the worse case potential consequence to key receptors within the Upwelling East of Eden KEF (e.g. seabirds, pinnipeds and cetaceans), the

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		Values associated with these areas are high productivity and aggregations of marine life (e.g. whales, seals, sharks and seabirds).	potential consequence to this KEF is assessed to be **Level 3** as per the assessment for pinnipeds. Refer also to: • Seabirds • Marine mammals (pinnipeds, cetaceans).
	Marine Protected Areas	No State or Commonwealth Marine Parks are within the area predicted to be exposed to the surface thresholds of ≥10 g/m^2 (refer to the PMST report for Spill EMBA – Surface in Appendix 3). Therefore, surface exposure to marine protected areas is not expected and not evaluated further.	N/A
Human Systems	Recreation and Tourism (including recreational fisheries)	Marine pollution can result in impacts to marine-based tourism from reduced visual aesthetic. MDO is known to rapidly spread and thin out on release. Consequently, a large area may be exposed to surface hydrocarbon concentrations ≥1 g/m^2 (Figure 6-21). Low exposure thresholds (≥1 g/m^2) are predicted up to 194 km east (summer) or 177 km northeast (winter) of the release location. LGAs and sub-LGAs adjacent to where low threshold surface oil is predicted include East Gippsland, and Cape Howe a Mallacoota.	Visible surface hydrocarbons on the water have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. Given the nature of the MDO, it is expected to rapidly weather offshore; waters close to the mainland coast (e.g. the LGAs and sub-LGAs) have a low probability (≤5%) of exposure. . Regardless any exposure is expected to be limited in duration and consequently, the potential consequence to recreation and tourism from a vessel collision (MDO) event is considered to be **Level 2** as it could be expected to result in localised short-term impacts.
	Shipping	Shipping occurs within the area predicted to be above the surface thresholds of ≥10 g/m^2 and ≥1 g/m^2 (visible oil).	Vessels may be present in the area where sea surface oil is ≥10 g/m^2 (10 µm) and ≥1 g/m^2 (1 µm), however, due to the short duration of surface exposure (up to ~95% expected to be evaporated or entrained within several days) impacts would be localised and short term. Consequently, the potential consequence is considered to be **Level 1**.
	Oil and gas	Oil and gas platforms are located within the area predicted to be above the surface thresholds of ≥10 g/m^2 and ≥1 g/m^2 (visible oil).	Oil and gas infrastructure present in the area where sea surface oil is ≥10 g/m^2 (10 µm) could be potentially oiled, or within a visible sheen in the areas where surface oil is ≥1 g/m^2 (1 µm). However, due to the short duration of surface exposure (up to ~95% evaporated or entrained within several days) impacts would be localised and short term, consequently, the potential consequence is considered to be **Level 1**.

Table 6-26 - Consequence evaluation for MDO hydrocarbon exposure – Shoreline

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
Ecological Receptors			
Habitat	Rocky Shoreline	Rocky shores are within the area potentially exposed to hydrocarbon ashore; however, within the stretch of coast where shoreline contact could be expected, there is no sheltered rocky coasts (i.e. those rocky coasts more sensitive to shoreline oiling). As MDO is not sticky or viscous, if it contacts rocky shorelines, it is not expected to stick, with tidal washing expected to influence the longevity of exposure.	The sensitivity of a rocky shoreline to oiling is dependent on a number of factors including its topography and composition, position, exposure to oceanic waves and currents etc. Exposed rocky shorelines are less sensitive than sheltered rocky shorelines. One of the main identified values of rocky shores or scarps is as habitat for invertebrates (e.g. sea anemones, sponges, sea-squirts, molluscs). Rocky areas are also utilised by some pinniped and bird species; noting that foraging and breeding/nesting typically occurs above high tide line. The impact of oil on any organism depends on the toxicity, viscosity and amount of oil, on the sensitivity of the organism and the length of time it is in contact with the oil. Even where the immediate damage to rocky shores from oil spills has been considerable, it is unusual for this to result in long-term damage and the communities have often recovered within 2 or 3 years (IPIECA, 1995). The potential consequence to rocky sites from a vessel collision (MDO) event is assessed as **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function. Refer also to: • Marine invertebrates • Seabirds and shorebirds • Pinnipeds.
	Sandy Shoreline	Sandy beaches are within the area potentially exposed to hydrocarbons ashore. Sandy beaches are the predominant habitat type within the stretch of coast where shoreline contact could be expected from a vessel collision (MDO) event. MDO would be expected to penetrate porous sediments of sandy shorelines quickly but may also be washed off shorelines just as quick via waves and tidal	Sandy beaches are considered to have a low sensitivity to hydrocarbon exposure. Sandy beaches provide habitat for a diverse assemblage (although not always abundant) of infauna (including nematodes, copepods and polychaetes); and macroinvertebrates (e.g. crustaceans).

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		flushing. NOAA (2014) note that as MDO is readily and completely degraded by naturally occurring microbes, it could be expected to disappear from shorelines within one to two months. MDO has the potential to be buried due to the continual washing in the intertidal zone.	Due to proximity to shore, a release of MDO may reach the shoreline prior to it completely weathering and consequently impacts due to toxicity and/or smothering of infauna may occur. The potential consequence to sandy shorelines from a vessel collision (MDO) event is assessed as **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function. Refer also to: • Marine invertebrates • Seabirds and shorebirds • Pinnipeds • Recreation.
	Mangroves	Mangroves are known to be located in close proximity to the area potentially exposed to hydrocarbons ashore, however, mangroves are not expected to be exposed within the stretch of coast from vessel collision (MDO) event, there is no coastal habitat mapped specifically as this vegetation type. Oil can enter mangrove forests when the tide is high and be deposited on the aerial roots and sediment surface as the tide recedes (IPIECA, 1993). This process commonly leads to a patchy distribution of the oil and its effects because different places within the forests are at different tidal heights (IPIECA, 1993; NOAA, 2014). The physical smothering of aerial roots by standard hydrocarbons can block the trees' breathing pores used for oxygen intake and result in the asphyxiation of sub-surface roots (IPIECA, 1993).	Mangroves are considered to have a high sensitivity to hydrocarbon exposure. Mangroves can take up hydrocarbons from contact with leaves, roots or sediments, and it is suspected that this uptake causes defoliation through leaf damage and tree death (Wardrop, et al., 1987). Acute impacts to mangroves can be observed within weeks of exposure, whereas chronic impacts may take months to years to detect (NOAA, 2014). Snedaker et al. (1997) suggest that at least some mangroves species can tolerate or accommodate exposure to moderate amounts of oil on breathing roots. Given the non-viscous nature of MDO impacts are expected to be limited to the volatile component of the hydrocarbon, however given their sensitivity to hydrocarbons (as a conservative assessment), the potential consequence to mangroves is assessed to be **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function.
	Saltmarsh	Communities of saltmarsh are known to be located in close proximity to the area potentially exposed to hydrocarbons ashore and is present within some	Saltmarsh is considered to have a high sensitivity to hydrocarbon exposure. Saltmarsh vegetation offers a large surface area for oil absorption and tends to

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		estuaries and inlet / riverine systems. Some of the saltmarsh habitat along this coast may be representative of the Subtropical and Temperate Saltmarsh TEC. Oil can enter saltmarsh systems during the tidal cycles if the estuary / inlet is open to the ocean. Similar to mangroves, this can lead to a patchy distribution of the oil and its effects, because different places within the inlets are at different tidal heights. Oil (in liquid form) will readily adhere to the marshes, coating the stems from tidal height to sediment surface. Heavy oil coating will be restricted to the outer fringe of thick vegetation, although lighter oils can penetrate deeper, to the limit of tidal influence (IPIECA, 1994).	trap oil. In comparison with mangroves, saltmarsh is generally less vulnerable to oil spills (US EPA, 2004). Evidence from case histories and experiments shows that the damage resulting from oiling, and recovery times of oiled marsh vegetation, are very variable (IPIECA, 1994). In areas of light to moderate oiling where oil is mainly on perennial vegetation with little penetration of sediment, the shoots of the plants may be killed but recovery can take place from the underground systems. NOAA & API (2013b) indicate that marshes that are oiled at the start of or during dormancy have a much greater potential for recovery. Good recovery commonly occurs within one to two years (IPIECA, 1994). Given the sensitivity to hydrocarbons (as a conservative assessment), the potential consequence to saltmarsh is assessed to be **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function.
Marine Fauna	Invertebrates	Invertebrates that live in intertidal zones include crustaceans, molluscs and infauna, and can be present in wide range of habitats including sandy beaches and rocky shores (refer also to the exposure evaluation for these habitats). Exposure to hydrocarbons for invertebrates is typically via direct contact and smothering but can also occur via ingestion.	The impact of oil on any marine organism depends on the toxicity, viscosity and amount of oil, on the sensitivity of the organism and the length of time it is in contact with the oil. Acute or chronic exposure, through surface contact, and/or ingestion can result in toxicological impacts, reproductive impacts, smothering and potentially cause death. However, the presence of an exoskeleton (e.g. crustaceans) will reduce the impact of hydrocarbon absorption through the surface membrane. Other invertebrates with no exoskeleton and larval forms may be more sensitive to impacts from hydrocarbons. If invertebrates are contaminated by hydrocarbons, tissue taint can remain for several months but can eventually be lost. As MDO is expected to rapidly spread out, a portion of the coast that comprises suitable habitats for intertidal invertebrates could be potentially exposed. Thus, the potential consequences are assessed as **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
	Seabirds and Shorebirds	EPBC Act listed marine, threatened and/or migratory bird species have the potential to be present within the area potentially exposed to hydrocarbons ashore. Some of these species may undertake biologically important behaviours (foraging, roosting, breeding) within the area (refer to the PMST report for Spill EMBA – Shoreline in Appendix 3). This fauna can be present in wide range of habitats including sandy beaches and rocky shores (refer also to the exposure evaluation for these habitats). There are several foraging or breeding BIAs within the area potentially exposed to hydrocarbon ashore. However these species are oceanic foragers, not shoreline foragers. HCTS for bird species are not spatially mapped; however, from descriptions in the recovery plan (Commonwealth of Australia, 2020a) the Spill EMBA – Shoreline may intersect with HCTS for the Australian fairy tern. Pollution was identified as a threat within the recovery plan for the Australian fairy tern (Table 2-6). Shorebirds may also utilise intertidal and onshore zones for feeding even though no BIAs or HCTS of the species have been identified. Given hydrocarbons may wash ashore prior to weathering, there is the potential for both physical oiling and toxicity (e.g. surface contact or ingestion), particularly for shorebirds utilizing the intertidal area. Noting that these events will be temporary, so length of exposure is limited.	Direct contact with hydrocarbons can foul feathers, which may result in hypothermia due to a reduction in the ability of the bird to thermo-regulate and impair waterproofing. Oiling of birds can also suffer from damage to external tissues, including skin and eyes, as well as internal tissue irritation in their lungs and stomachs (ITOPF, 2011). Toxic effects may result where the oil is ingested as the bird attempts to preen its feathers, or via consumption of oil-affected prey (Peakall, et al., 1987). It is unlikely that a large number of birds will be affected by hydrocarbons ashore as the probability of shoreline contact above the moderate exposure value (≥100 g/m^2) is ≤6%. Therefore, should potential impacts occur, these would be limited to individuals; impacts to populations are not anticipated. Marine pollution is listed as a threat for several migratory shorebirds and seabird conservation advice / recovery plans (refer to Table 2-6), however management actions (where they exist) mostly relate to nesting locations. The potential consequence to seabirds and shorebirds from a vessel collision (MDO) event is assessed as **Level 2** based on the potential for localised short-term impacts to species or habitats of recognised conservation value not affecting ecosystem function.
	Marine Reptiles	Turtles nesting on exposed shores would be exposed by direct contact with skin or body. However, there are no BIAs or HCTS of the species within the shorelines that could be potentially exposure to shoreline oil (refer to the PMST report for Spill EMBA – Shoreline in Appendix 3. Therefore, shoreline exposure to marine turtles is not expected and not evaluated further.	NA
	Marine Mammals (Pinnipeds)	EPBC Act listed marine pinniped species have the potential to present within the area predicted to be exposed to hydrocarbons ashore. No biologically important behaviours were associated with this potential presence (refer to the PMST report for Spill EMBA – Shoreline in Appendix 3). There is also no BIAs or HCTS of the species within the area that maybe exposed to hydrocarbons ashore.	Pinnipeds have high site fidelity and can be less likely to exhibit avoidance behaviours, thus staying near established colonies and haul-out areas. Fur seals are particularly vulnerable to hypothermia from oiling of their fur (Helm, et al., 2015) and consequently, once onshore hydrocarbons pose a significant hazard to pinnipeds with biological impacts caused from ingestion possibly resulting in reduced reproduction levels.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		Pinnipeds hauling out on exposed shores could be exposed by direct contact of oil with skin or body. Direct oiling is possible but expected to have a limited window for occurring due to rapid weathering and flushing of MDO.	The number of pinnipeds that may be exposed to MDO is expected to be low as there are no BIAs or HCTS of the species present within the shoreline exposure area. Therefore, potential impacts would be limited to individuals, impacts to populations are not anticipated. Given that fur seals are vulnerable to hypothermia from oiling, the potential consequence to pinnipeds from exposure are assessed as **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function.
Social Receptors			
Natural System	Wetlands	Wetlands are predicted to be within the area potentially exposed to hydrocarbons ashore. One nationally important wetland is present in the area potentially exposed to hydrocarbon ashore, Mallacoota Inlet Wetlands. No wetlands of international importance (Ramsar) are present within the area.	The impacts of hydrocarbons on wetlands are generally similar to those described for mangroves and saltmarshes. The degree of impact of oil on wetland vegetation are variable and complex, and can be both acute and chronic, ranging from short-term disruption of plant functioning to mortality. Spills reaching wetlands during the growing season will have a more severe impact than if oil reaches wetlands during the times when many plant species are dormant. Wetland habitat can be of particular importance for some species of birds and invertebrates. As such, in addition to direct impacts on plants, oil that reaches wetlands also may affect these fauna utilising wetlands during their life cycle, especially benthic organisms that reside in the sediments and are a foundation of the food chain. Thus, the potential consequence to wetlands from exposure are assessed as **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function. Refer also to: • Marine invertebrates • Seabirds and shorebirds.
Human System	Coastal Settlements	Coastal settlements are within the area potentially exposed to hydrocarbons ashore; however, the stretch of coast expected to be exposed is not densely populated. Noting that a spill event will be temporary, so duration of exposure is also limited. Most of the hydrocarbons will be concentrated along the high tide	Visible hydrocarbons (i.e. those above the low exposure value ≥10 g/m^2) have the potential to reduce the visual amenity of the area for coastal settlements. Given its rapid weathering and potential for tidal flushing and rapid degradation, the potential consequence to coastal settlements is assessed as **Level 2** based on the potential for localised short-term impacts.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		mark while the lower/upper parts are often untouched (IPIECA, 1995) and expected to be visible.	Refer also to: • Rocky shores • Sandy beaches.
	Recreation and Tourism	Recreational and tourism activities may occur within the area potentially exposed hydrocarbons ashore; however, the stretch of coast expected to be exposed is not densely populated, as such the volume of recreation or tourism is not as high as other places. Noting that a spill event will be temporary, so duration of exposure is also limited. Most of the oil will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA, 1995) and expected to be visible.	Visible hydrocarbons (i.e. those above the low exposure value ≥10 g/m^2) have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. The potential consequence to recreation and tourism is assessed as **Level 2** based on the potential for localised short-term impacts. Refer also to: • Rocky shores • Sandy beaches • Coastal settlements.
	Heritage	No World Heritage Properties or National Heritage Places were identified within the area predicted to be contacted by shoreline oil (refer to the PMST report for Spill EMBA – Shoreline in Appendix 3). The PMST report for the Spill EMBA - Shoreline did identify one Commonwealth Heritage Place, the Gabo Island Lighthouse. However, while Gabo Island is within the Spill EMBA, the lighthouse itself does not have a marine/coastal interface, and as such is not considered to be at risk of being exposed to shoreline oil. Specific locations of First Nation Peoples spiritual and ceremonial places of significance, or cultural artefacts, are often unknown, but are expected to be present along the mainland coast. Therefore, there is the potential that some of these sites may be within the area potentially exposed to hydrocarbons ashore. Noting that a spill event will be temporary, so duration of exposure is also limited. Most of the oil will be concentrated along the high tide mark while the lower / upper parts are often untouched (IPIECA, 1995) and expected to be visible.	Visible hydrocarbons ashore above the low exposure value (≥10 g/m^2) have the potential to reduce the visual amenity and/or affect heritage sites or artefacts. However, it is expected that these sites/artefacts would generally be above the high tide mark. Thus, the potential consequence to heritage is assessed as **Level 2** as they could be expected to result in localised short-term impacts. Refer to: • Rocky shoreline • Sandy beaches • Coastal settlements.

Table 6-27 - Consequence evaluation for MDO hydrocarbon exposure – In water

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
Ecological Receptors			
Habitat	Coral	Soft corals may be present within reef and hard substrate areas within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Stochastic modelling indicates that most entrained oil ≥100 ppb occurs within upper water column (<20 m) only; however dissolved oil at the moderate (≥50 ppb) threshold may extend further into the water column (RPS, 2021a). Therefore, potential exposure to subtidal or intertidal benthic habitats is only expected to occur within shallower nearshore areas. Note that the greater wave action and water column mixing within the nearshore environment will also result in rapid weathering of the MDO residue.	Exposure of entrained hydrocarbons to shallow subtidal corals has the potential to result in lethal or sublethal toxic effects, resulting in acute impacts or death at moderate to high exposure thresholds (Shigenaka, 2001). Contact with corals may lead to reduced growth rates, tissue decomposition, and poor resistance and mortality of sections of reef (NOAA, 2010). However, given the lack of hard coral reef formations, and the sporadic cover of soft corals in mixed reef communities, such impacts are considered to be limited to isolated corals. Thus, the potential consequence to corals is assessed as **Level 2** based on the potential for localised short-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.
	Macroalgae	Macroalgae may be present within reef and hard substrate areas within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). However, it is not a dominant habitat feature within this area. Stochastic modelling indicates that most entrained oil ≥100 ppb occurs within upper water column (<20 m) only; however dissolved oil at the moderate (≥50 ppb) threshold may extend further into the water column (RPS, 2021a). Therefore, potential exposure to subtidal or intertidal benthic habitats is only expected to occur within shallower nearshore areas. Note that the greater wave action and water column mixing within the nearshore environment will also result in rapid weathering of the MDO residue.	Reported toxic responses to oils have included a variety of physiological changes to enzyme systems, photosynthesis, respiration, and nucleic acid synthesis (Lewis & Pryor, 2013). A review of field studies conducted after spill events by Connell et. Al. (1981) indicated a high degree of variability in the level of impact, but in all instances, the algae appeared to be able to recover rapidly from even very heavy oiling. In the event that a TEC: Giant kelp marine forests of SE Australia is present within the area potentially affected following a credible but unlikely spill scenario, there is the potential to expose this important habitat to in-water hydrocarbons. However, as described above, given hydrocarbons are expected to have limited impacts to macroalgae and as MDO is not sticky and expected to rapidly degrade upon release, the potential consequence to macroalgae is assessed as Level 2 based on the potential for localised short-term impacts to species / habitats of recognised conservation value, but not affecting local ecosystem functioning.
	Seagrass	Seagrasses may be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Stochastic modelling indicates that most entrained oil	There is the potential that exposure could result in sub-lethal impacts, rather than lethal impacts, possibly because much of seagrasses' biomass is underground in their rhizomes (Zieman, et al., 1984).

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		≥100 ppb occurs within upper water column (<20 m) only; however dissolved oil at the moderate (≥50 ppb) threshold may extend further into the water column (RPS, 2021a). Therefore, potential exposure to subtidal or intertidal benthic habitats is only expected to occur within shallower nearshore areas. Seagrass in this region isn't considered a significant food source for marine fauna.	Thus, the potential consequence to seagrass is assessed as Level 2 based on the potential for localised short-term impacts to species / habitats of recognised conservation value, but not affecting local ecosystem functioning.
Marine Fauna	Plankton	Plankton are likely to be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Exposure above these thresholds is predicted in the 0-10 m water depth, which is also where plankton are generally more abundant. Entrained and dissolved phase MDO may intersect the Upwelling East of Eden KEF. While a spill event would not affect the upwelling itself, if the spill occurs at the time of an upwelling event, it may result in krill being exposed to entrained and dissolved phase MDO. Pygmy blue whales feeding on this krill may suffer from reduced prey, however, these impacts are expected to be extremely localised and temporary.	Relatively low concentrations of hydrocarbon are toxic to both plankton [including zooplankton and ichthyoplankton (fish eggs and larvae)]. Plankton risk exposure through ingestion, inhalation and dermal contact. Plankton are numerous and widespread but do act as the basis for the marine food web, meaning that an oil spill in any one location is unlikely to have long-lasting impacts on plankton populations at a regional level. Once background water quality conditions have re-established, the plankton community may take weeks to months to recover (ITOPF, 2011), allowing for seasonal influences on the assemblage characteristics. Thus, the potential consequence to plankton is assessed as **Level 2** based on the potential for short-term and localised impacts, but not affecting local ecosystem functioning.
	Invertebrates	Marine invertebrates may be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Stochastic modelling indicates that most entrained oil ≥100 ppb occurs within upper water column (<20 m) only; however dissolved oil at the moderate (≥50 ppb) threshold may extend further into the water column (RPS, 2021a). Therefore, potential exposure to epifaunal or infaunal invertebrates is only expected to occur within shallower nearshore areas, whereas pelagic invertebrates may be exposed across a greater area. Impact by direct contact of benthic species with hydrocarbon in the deeper areas of the release area is not expected given the surface nature of the spill and the water depths throughout the area predicted to be exposed. Species	Acute or chronic exposure through contact and/or ingestion can result in toxicological risks. However, the presence of an exoskeleton (e.g. crustaceans) reduces the impact of hydrocarbon absorption through the surface membrane. Invertebrates with no exoskeleton and larval forms may be more prone to impacts. Localised impacts to larval stages may occur which could impact on population recruitment that year. Thus, the potential consequence to invertebrates including commercially fished invertebrates is assessed as **Level 2** based on the potential for localised short-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		closer to shore may be affected although these effects will be localised, low level and temporary. Filter-feeding benthic invertebrates such as sponges, bryozoans, abalone and hydroids may be exposed to sub-lethal impacts, however, population level impacts are considered unlikely. Tissue taint may occur and remain for several months in some species (e.g. lobster, abalone) however, this will be localised and low level with recovery expected. Invertebrates of value have been identified to include squid, crustaceans (rock lobster, crabs) and molluscs (scallops, abalone). Several commercial fisheries for marine invertebrates have management areas that are within the area predicted to potentially be exposed above the in-water threshold: • Commonwealth Southern Squid Jig Fishery • Victorian Abalone Fishery. • Victorian Rock Lobster Fishery. • Victorian Giant Crab Fishery.	
	Fish and Sharks	Fish and sharks may be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Stochastic modelling indicates that most entrained oil ≥100 ppb occurs within upper water column (<20 m) only; however dissolved oil at the moderate (≥50 ppb) threshold may extend further into the water column (RPS, 2021a). Therefore, potential exposure to demersal fish is only expected to occur within shallower nearshore areas, whereas pelagic fish and sharks may be exposed across a greater area. Entrained hydrocarbon droplets can physically affect fish exposed for an extended duration (weeks to months). Effects will be greatest in the upper 10 m of the water column and areas close to the spill source where hydrocarbon concentrations are likely to be highest. Several fish communities in these areas are demersal and therefore more prevalent towards the seabed. Therefore, any impacts are expected to be highly localised.	Pelagic free-swimming fish and sharks are unlikely to suffer long-term damage from oil spill exposure because dissolved or entrained hydrocarbons in water are not expected to be sufficient to cause harm (ITOPF, 2011). The potential for environmental risks associated with in-water exposure would be limited to a relatively short period following the release. Although subsurface hydrocarbons could potentially result in acute exposure to marine biota such as juvenile fish, larvae, and planktonic organisms, impacts are not expected cause population-level impacts. Impacts on fish eggs and larvae entrained in the upper water column are not expected to be significant given the temporary period of water quality impairment, and the limited areal extent of the spill. As egg/larvae dispersal is widely distributed in the upper layers of the water column it is expected that current induced drift will rapidly replace any oil affected populations. Thus, the potential consequence to fish and sharks including commercially fished species is assessed as **Level 2** based on the potential for localised short-

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		The Spill EMBA intersects a foraging and migration BIA for the grey nurse shark, and a foraging BIA for the white shark (Figure 4-2). HCTS for shark species are not spatially mapped. From descriptions in the recovery plans the Spill EMBA may intersect with HCTS for the white shark, and occurs adjacent to HCTS for the grey nurse shark (see Section 4.4.1, and the PMST report for Spill EMBA[25] in Appendix 3). However, it is not expected that these shark species spend large amounts of time close to the surface where greater concentrations of dissolved and entrained oil are predicted to occur.	term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.
	Mammals (Pinnipeds)	Pinnipeds may be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Stochastic modelling indicates that most entrained oil ≥100 ppb occurs within upper water column (<20 m) only; however dissolved oil at the moderate (≥50 ppb) thresholds may extend further into the water column (RPS, 2021a). Localised parts of the foraging range for New Zealand fur-seals and Australian fur-seals may be temporarily exposed to in-water hydrocarbons following a spill event. However, no BIAs or HCTS of the species was identified within the Spill EMBA (see Section 4.4.1).	Exposure to hydrocarbons in the water column or consumption of prey affected by the oil may cause sub-lethal impacts to pinnipeds, however given the temporary and localised nature of the spill, their widespread nature, the low-level exposure zones and rapid loss of the volatile components of MDO in choppy and windy seas (such as that of the Spill EMBA), the potential consequence is assessed as **Level 2** based on the potential for localised short-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.
	Mammals (Whales)	Several EPBC Act threatened, migratory and/or listed cetacean species have the potential to be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Some of these may be undertake biologically important behaviours (foraging) within the area (refer to the PMST report for Spill EMBA in Appendix 3). The following BIAs are present within the Spill EMBA (Figure 4-10, Figure 4-11): • pygmy blue whale possible foraging BIA	The potential for impacts to cetaceans would be limited to a relatively short period following the MDO release and would need to coincide with migration and seasonal periods to result in exposure to a large number of individuals. However, if exposure did occur it is not anticipated to result in long-term population viability effects. A proportion of the migrating population of whales could be affected for a single migration event, thus potential consequence is assessed as **Level 2** based on the potential for localised short-term impacts to species / habitats of recognised conservation value, but not affecting local ecosystem functioning.

[25] The Spill EMBA and the area that may be exposed to dissolved and entrained hydrocarbons is the same area (Figure 6-22).

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		• humpback whale migration BIA • southern right whale migration and reproduction BIAs. The National Recovery Plan for the Southern Right Whale (DCCEEW, 2024h) identifies HCTS for southern right whales as all reproductive BIAs across the species range. Cetacean exposure to entrained hydrocarbons can result in physical coating as well as ingestion (Geraci & St Aubin, 1990). Such impacts are associated with 'fresh' hydrocarbon; however, the risk of impact declines rapidly as the MDO weathers.	
	Mammals (Dolphins)	Several EPBC Act migratory and/or listed cetacean species have the potential to be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). No biologically important behaviours were associated with the presence (refer to the PMST report for Spill EMBA in Appendix 3). The Spill EMBA does intersect with a breeding BIA for the Indo-pacific bottlenose dolphin (Figure 4-10). No HCTS of the species were identified. Cetacean exposure to entrained hydrocarbons can result in physical coating as well as ingestion (Geraci & St Aubin, 1990). Such impacts are associated with 'fresh' hydrocarbon; however, the risk of impact declines rapidly as the MDO weathers.	Inshore dolphins may be vulnerable to oil spills because of their highly localised populations along the east coast (DSEWPaC, 2012c). The Indo-Pacific bottlenose dolphin occurs in riverine and coastal waters, shallow waters on the continental shelf and around oceanic islands. However, dolphins have been known to detect oil and avoid it (DSEWPaC, 2012c). The potential for environmental risks associated with in-water exposure would be limited to a relatively short period and not expected to result in population-level impacts. Thus, the potential consequence to dolphins is assessed as **Level 2** based on the potential for short-term and localised impacts, but not affecting local ecosystem functioning.
	Seabirds	Several EPBC Act threatened, migratory and/or listed marine species have the potential to be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). Some of these may be undertake biologically important behaviours (foraging, roosting) within the area (refer to the PMST report for Spill EMBA in Appendix 3). No nesting/breeding activity occurs in offshore oceanic waters. There are several foraging BIAs that are present within the area potentially exposed. Foraging BIAs are typically large broad areas (Section 3.12 - Appendix 2). The birds may feed via surface skimming or diving – both exposing the bird to any oil on the water surface. HCTS for bird species are not spatially mapped; however from descriptions in the recovery plan	Seabirds at sea have the potential to interact with oil spills. Foraging birds will be at potential risk of both direct impacts through contamination of individual birds (e.g. fouling of feathers) and indirect impacts (e.g. fouling and/or a reduction in prey items) (Clarke, 2010). Acute and chronic toxic effects may result where the product is ingested as the bird attempts to preen its feathers (Peakall, et al., 1987). However, the risk of impact declines rapidly as MDO weathers. Marine pollution is listed as a threat for several migratory shorebirds and seabird conservation advice / recovery plans (refer to Table 2-6), however management actions (where they exist) mostly relate to nesting locations.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		(Commonwealth of Australia, 2020a) the Spill EMBA may intersect with HCTS for the Australian fairy tern.	Thus, the potential consequence to seabirds is assessed as **Level 2** based on the potential for short-term and localised impacts, but not affecting local ecosystem functioning.
	Reptiles	Turtles have the potential to be present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained). However, there are no BIAs or HCTS of the species within the area that could be potentially affected (refer to the PMST report for Spill EMBA – Shoreline in Appendix 3). Therefore, in water exposure to turtles is not expected and not evaluated further.	NA
Social Receptors			
Human System	Commercial Fisheries and Recreational Fishing	In-water exposure to MDO may result in a reduction in commercially targeted marine species, resulting in impacts to commercial fishing and aquaculture. Actual or potential contamination of seafood can affect commercial and recreational fishing and can impact seafood markets long after any actual risk to seafood from a spill has subsided (Yender , et al., 2002) which can have economic impacts to the industry. Several commercial fisheries are known to have management areas that intersect with the Spill EMBA (see Section 4.4.2) and therefore overlap with the spatial extent of the in-water hydrocarbon predictions.	Any acute impacts are expected to be limited to small numbers of juvenile fish, larvae, and planktonic organisms, which are not expected to affect population viability or recruitment. Impacts from entrained exposure are unlikely to manifest at a fish population viability level. Any exclusion zone established would likely be limited to the immediate vicinity of the release point, and due to the rapid weathering of MDO, would only be in place 1-3 days after release, therefore physical displacement to vessels is unlikely to be a significant impact. Thus, the potential consequence to commercial and recreational fisheries is assessed as **Level 2** based on the potential for localised short-term impacts to species / habitats of recognised conservation value, but not affecting local ecosystem functioning. Refer also to: • Fish and sharks • Invertebrates.
Natural System	Marine Protected Areas	Marine protected areas present within the area predicted to be exposed above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained) include the Commonwealth Flinders and East Gippsland Marine Parks, and the State Cape Howe Marine National Park, Point Hicks Marine National Park, Beware Reef Marine Sanctuary, and Batemans Marine Park (see Section 4.4.2).	Based on the worse case potential consequence to key receptors the consequence to protected marine areas is assessed Level 2. Refer to: • Invertebrates • Macroalgae

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		Conservation values for these areas include high marine fauna and flora diversity, including fish and invertebrate assemblages and benthic coverage (sponges, soft corals, macroalgae).	• Pinnipeds.
	Key Ecological Features	Big Horseshoe Canyon and Upwelling East of Eden KEFs are present within the area predicted to be exposed to above the relevant in-water thresholds for the Spill EMBA (i.e. ≥50 ppb dissolved or ≥100 ppb entrained) Values associated with these areas are: • Big Horseshoe Canyon – high productivity and aggregations of marine life • Upwelling East of Eden – high productivity and aggregations of marine life (DotE, 2015b).	Based on the worse case potential consequence to key receptors within these KEFs, the potential consequence is assessed to be **Level 2**. Refer also to: • Coral • Macroalgae • Seagrass • Plankton • Invertebrates • Seabirds • Fish and sharks • Marine mammals.
	Heritage	Underwater cultural heritage associated with seabed environments such as shipwrecks or archaeological significance artefacts would be unlikely to be exposed to high levels of in-water hydrocarbons given the water depths within the Title Area. Seabed interaction may be more likely to occur in nearshore environments and consequently, exposure to cultural heritage receptors may occur in these areas, where they are present (refer to heritage section in Table 6-26).	In-water hydrocarbons have the potential to impact the seabed and associated heritage in shallower water depths. However, as any hydrocarbon presence would be expected to continually disperse and degrade over time, the potential consequence to heritage is assessed as **Level 2** as they could be expected to result in localised short-term impacts. Refer also to: • Coral • Macroalgae • Seagrass.

6.7.5 Control Measures, ALARP and Acceptability Assessment

Table 6-28 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to accidental hydrocarbon releases.

Table 6-28 - Accidental Hydrocarbon Release ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context: B** Amplitude Energy operates offshore both in the Otway and the Gippsland. The activities proposed within this EP are not novel and vessel-based activities are undertaken by Amplitude Energy and other operators in the region regularly. The activities of other marine users are also well understood, and there are well established protocols in place to manage potential interactions that could lead to a hydrocarbon release from vessel collision. The risks associated with vessel collision are well understood, however a worst-case release of MDO has the potential to result in Level 3 consequences. Consequently, Amplitude Energy believes that ALARP Decision Context B should be applied.
Control Measure	**Source of good practice control measures**
C14: Marine exclusion and caution zones	Vessel exclusion zone established via notice to Mariners.
C18: Ongoing consultation	Under the *Navigation Act 2014* (Cth), the Australian Hydrographic Service (AHS) is responsible for maintaining and disseminating hydrographic and other nautical information and nautical publications including • Notices to mariners • AUSCOAST warnings. Relevant details will be provided to the Joint Rescue Coordination Centre (JRCC) to enable AUSCOAST warnings to be disseminated.
C1: Planned Maintenance System	PMSs ensure that safety-critical equipment is maintained in accordance with manufacturer specifications to enable optimal performance.
C16: Marine Order 27: Safety of navigation and radio equipment	AMSA MO 27: Safety of navigation and radio equipment gives effect to SOLAS regulations regarding radiocommunication and safety of navigation and provides for navigation safety measures and equipment and radio equipment requirements.
C21: Marine Order 31: SOLAS and non-SOLAS certification	All vessels contracted to Amplitude will have in date certification in accordance with AMSA MO 31: SOLAS and non-SOLAS certification.

C23: Vessel compliant with MARPOL Annex I, as appropriate to class (i.e. SMPEP or equivalent)	In accordance with MARPOL Annex I and AMSA MO 91 [Marine Pollution Prevention – oil], a Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class) is required to be developed based upon the Guidelines for the Development of Shipboard Oil Pollution Emergency Plans, adopted by IMO as Resolution MEPC.54(32) and approved by AMSA. To prepare for a spill event, the SMPEP/SOPEP details:
	• response equipment available to control a spill event
	• review cycle to ensure that the SMPEP/SOPEP is kept up to date
	• testing requirements, including the frequency and nature of these tests
	• in the event of a spill, the SMPEP/SOPEP details
	  – reporting requirements and a list of authorities to be contacted
	  – activities to be undertaken to control the discharge of hydrocarbon
	  – procedures for coordinating with local officials.
	Specifically, the SMPEP/SOPEP contains procedures to stop or reduce the flow of hydrocarbons to be considered in the event of tank rupture.

ALARP Decision Context and Justification	**ALARP Decision Context: B** Amplitude Energy operates offshore both in the Otway and the Gippsland. The activities proposed within this EP are not novel and vessel-based activities are undertaken by Amplitude Energy and other operators in the region regularly. The activities of other marine users are also well understood, and there are well established protocols in place to manage potential interactions that could lead to a hydrocarbon release from vessel collision. The risks associated with vessel collision are well understood, however a worst-case release of MDO has the potential to result in Level 3 consequences. Consequently, Amplitude Energy believes that ALARP Decision Context B should be applied.
C22: Marine Order 21: Safety and emergency arrangements	AMSA MO 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety.
C5: Marine Order 30: Prevention of collisions	AMSA MO 30: Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards.
C8: NOPSEMA accepted safety cases	Under Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2024 the following safety cases will be required for the campaign: • CSV safety case and/ or • BMG Field Safety Case [BMG-HS-SMP-0001] A safety case identifies all hazards having the potential to result in major accident events (MAEs). Safety cases therefore address major source control events associated with vessel collision. As part of MAE prevention and control, formal safety assessments are details and systematic assessment of the risk associated with each of those hazards, including the likelihood and consequences of each potential major accident event; and identifies the technical and other control measures that are necessary to reduce that risk to ALARP. The accepted safety cases (and their implementation) are therefore considered key components of the environmental risk management for the campaign.
C25: OSMP	Amplitude Energy's OSMP details the arrangements and capability in place for: • Operational monitoring of a hydrocarbon spill to inform response activities • Scientific monitoring of environmental impacts of the spill and response activities. Operational monitoring will allow adequate information to be provided to aid decision making to ensure response activities are timely, safe, and appropriate. Scientific monitoring will identify if potential longer-term remediation activities may be required and potential breaches of protected places management objectives, specifically those of Australian Marine Parks.
C24: OPEP	Under the OPGGS(E)R, NOPSEMA require that the petroleum activity have an accepted Oil Pollution Emergency Plan (OPEP) in place before the activity commences. In the event of a LoC – vessel collision, the OPEP will be implemented. The Offshore Victoria Oil Pollution Emergency Plan (OPEP) has been developed and includes activities described under this EP. By committing to implement this EP, Amplitude Energy acknowledges that any response will be implemented in accordance with the requirements described within the OPEP.
Impact and Risk Summary	
Residual Impact consequence	N/A
Residual Risk Consequence	Level 3 - Localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function; remedial, recovery work to land/water systems over months/year.

ALARP Decision Context and Justification	**ALARP Decision Context: B** Amplitude Energy operates offshore both in the Otway and the Gippsland. The activities proposed within this EP are not novel and vessel-based activities are undertaken by Amplitude Energy and other operators in the region regularly. The activities of other marine users are also well understood, and there are well established protocols in place to manage potential interactions that could lead to a hydrocarbon release from vessel collision. The risks associated with vessel collision are well understood, however a worst-case release of MDO has the potential to result in Level 3 consequences. Consequently, Amplitude Energy believes that ALARP Decision Context B should be applied.
Residual Risk Likelihood	In most vessel collisions where a loss of containment occurs, the release is from a forward tank. The tanks are generally double-lined and smaller than other tanks, the loss of the 500 m^3 diesel as used in this evaluation not expected. Considering the inherent low likelihood of a collision occurring, the safeguards in place, enactment of the OPEP, the LoC-vessel collision scenario resulting in a level-3 consequence is considered to be Remote (E). LoC is not expected to occur during the activity.
Residual Risk Severity	Moderate
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised medium-term impact to species or habitats of recognized conservation value or to local ecosystem function; remedial, recovery work to land / water systems over months / year. The activities were evaluated as having the potential to result in a Level 3 consequence. Consequently, no further evaluation against the principles of ESD is required.
Legislative and conventions	Legislation and other requirements considered relevant control measures include: • NOPSEMA accepted Safety case • OPGGS (Resource Management and Administration) Regulations 2024 • OPGGS(E)R 2023 – Offshore Victoria Oil Pollution Emergency Plan (OPEP) and Offshore Victoria Operations OSMP
Internal context	The environmental controls proposed reflects the Amplitude Energy HSE Policy goals of utilising best practice and standards to eliminate or minimise impacts and risks to the environment and community to a level which is ALARP. Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05). Activities will be undertaken in accordance with the Implementation Strategy (Section 9.0).
External context	No objections or claims have been raised during relevant person consultation. Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed.
Acceptability Outcome	**Acceptable**

7.0 Oil Spill Response

This section presents the risk assessment for oil spill response options as required by the OPGGS(E)R.

Amplitude Energy has developed a regional Offshore Victoria OPEP [VIC-ER-EMP-0001] which contains further detail of the response strategies that would be implemented in the event of a hydrocarbon spill and the relevant control measures.

7.1 Oil Spill Response Strategies

7.1.1 Hydrocarbon Spill Risks associated with the Activity

Table 7-1 summarises the potential spill scenarios identified in Section 6.7 during the activities associated with this EP, and the relevant level. Spill levels are described in Table 2-2 of the Offshore Victoria OPEP [VIC-ER-EMP-0001].

Table 7-1 - Hydrocarbon Spill Risks associated with the Activity of this EP

Spill Risk	Spill Level	Fluid Type
Minor LoC	Level 1	MDO, hydraulic oil
Vessel Collision LoC	Level 1 or 2	MDO (Group II)
Subsea LoC	Level 1	Condensate, MDO

7.1.2 Response Option Selection

Different oil types, spill locations, and volumes require different response options and tactics, or a combination of response options and tactics, to form an effective response strategy. Due to that, not all response options and tactics are appropriate for every oil spill.

Net Environmental Benefit Analysis (NEBA) is the process of considering advantages and disadvantages of different spill response options (including no response) to arrive at a spill response decision resulting in the lowest overall environmental and social impacts. NEBA is undertaken at a strategic level to identify predetermined recommended response strategies, and an operational NEBA is undertaken throughout the emergency response, accounting for the situation on the day. The process requires the identification of sensitive environmental receptors and the prioritisation of those receptors for protection so that the strategic objectives of the response can be established.

Table 7-2 provides an assessment of the available oil spill response options, their suitability to the potential Level 2spill scenarios and their recommended adoption for the identified events.

Table 7-2 - Oil Spill Response Options

Response Option	Description	LoC – Vessel Collision (MDO)	Viable Response?	Strategic Net Benefit?
Source control	Limit flow of hydrocarbons to environment.	Achieved by vessel SMPEP/SOPEP.	✓	✓
Monitor and evaluate	Direct observation-aerial or marine, vector calculations, oil spill trajectory modelling, satellite tracking buoys. To maintain situational awareness, all monitor and evaluate options suitable.	MDO spreads rapidly to thin layers. Aerial surveillance is considered more effective than vessel to inform spill response and identify if oil has contacted shoreline or wildlife. Vessel surveillance is limited in effectiveness in determining spread of oil.	✓	✓

Response Option	Description	LoC – Vessel Collision (MDO)	Viable Response?	Strategic Net Benefit?
		Manual calculation based upon weather conditions will be used at the time to provide guidance to aerial observations. Oil Spill Trajectory Modelling may also be used to forecast impact areas. Deployment of oil spill monitoring buoys at the time of vessel incident will assist in understanding the local current regime during the spill event.		
Dispersant application	Breakdown surface spill and draw droplets into upper layers of water column. Increases biodegradation and weathering and provides benefit to sea-surface air breathing animals.	MDO, while having a small persistent fraction, spreads rapidly to thin layers. Insufficient time to respond while suitable surface thicknesses are present. Dispersant application can result in punch-through where dispersant passes into the water column without breaking oil layer down if surface layers are too thin. Application can contribute to water quality degradation through chemical application without removing surface oil. Considered not to add sufficient benefits.	X	X
Contain and recover	Booms and skimmers to contain surface oil where there is a potential threat to environmental sensitivities.	MDO spreads rapidly to less than 10 µm and suitable thicknesses for recovery are only present for the first 36 hours for a large offshore spill, and there is insufficient mobilisation time to capture residues. In general, this method only recovers approximately 10-15% of total spilled oil (ITOPF, 2022) , creates significant levels of waste, requires significant manpower and suitable weather conditions (calm) to be deployed.	X	X
Protect and deflect	Booms and skimmers deployed to protect environmental sensitivities.	Corralling of surface hydrocarbons close to shore may not be effective for MDO depending on sea surface conditions. However, if operational monitoring indicates sensitive receptors are exposed, and are accessible to response personnel and equipment, protection and deflection may be an effective technique for reducing oil within inland water ways, in low energy environments.	✓	✓
Shoreline clean-up	Shoreline clean-up is a last response strategy due to the potential environmental impact	As shoreline exposure is possible, and as there are various shoreline techniques that are appropriate for this type of hydrocarbon, a shoreline clean-up may be an effective technique for reducing shoreline loadings where access to shorelines is possible.	✓	✓
Oiled wildlife response (OWR)	Consists of capture, cleaning and rehabilitation of oiled wildlife. May include hazing or pre-spill captive management.	Given limited size and rapid spreading of the MDO spill, large scale wildlife response is not expected. However, individual birds could become oiled in the vicinity of the spill. OWR is	✓	✓

Response Option	Description	LoC – Vessel Collision (MDO)	Viable Response?	Strategic Net Benefit?
	In Victoria, this is managed by Department of Energy, Environment, and Climate Action (DEECA).	both a viable and prudent response option for this spill type.		

7.2 Response Priority Areas

To support the identification of priority response areas, shoreline sensitivity analysis and mapping was undertaken guided by IPIECA principles and informed by the regional description of the environment and understanding of receptor presence in the region (Appendix 2). The Response Priority Areas (RPAs) process is detailed in the Section 4.4 of the Offshore Victoria OPEP [VIC-ER-EMP-0001] and was followed for the events detailed in this EP.

7.2.1 Priority Protection Areas

The priority RPAs identified for the BMG Closure Project (Phase 2) are shown in Table 7-3.

Table 7-3 - Priority Response Planning Areas

Priority Response Planning Area	Summary
Gabo Island	High coastal habitat sensitivity High biological sensitivity
Tullaburga Island	High biological sensitivity

As detailed in the Offshore Victoria OPEP [VIC-ER-EMP-0001], tactical response plans have been developed for these priority RPAs. As such the Offshore Victoria OPEP [VIC-ER-EMP-0001] covers the priority RPAs associated with the spill events detailed in this EP.

7.3 Pre-spill Net Environmental Benefits Assessment (NEBA)

Location specific information was used for each of the priority RPAs to further refine receptor presence, with these receptors ranked based upon the sensitivity criteria detailed in the OPEP (Section 4.4 Priority Protection Areas). An assessment of the effective spill response strategies and the net benefit they offer, specific to the sensitivities located within each of the priority RPAs is provided in the OPEP Section 4.4. Priority Protection Areas.

The pre-spill NEBA detailed in the Offshore Victoria OPEP [VIC-ER-EMP-0001] was compared to the response option selection assessment completed in Section 7.1.2 of this EP. All primary response options detailed in the pre-spill NEBA are consistent with this EP and thus the pre-spill NEBA is considered suitable for this activity.

7.4 Spill Response: Source Control

7.4.1 Overview

Source control arrangements for significant vessel spills resulting from fuel tank perforation includes:

- Closing watertight doors
- Checking bulkheads
- Determining whether vessel separation will increase spillage

- Isolating penetrated tanks
- Tank lightering.

Source control relies heavily upon the activation of the vessels SOPEP / SMPEP (or equivalent).

7.4.2 Resources Required and Availability

The feasibility and effectiveness of a source control response is provided in Table 7-4.

Table 7-4 - Feasibility and Effectiveness of Source Control Response

Parameter	Source Control
Suitability/Functionality How does the response strategy perform to achieve its required risk reduction?	Successful source control response will reduce the oil to the marine environment. While preserving the structural integrity and stability of the vessel, actions include reducing the affected tank inventory by pumping contents into an empty tank, possibly pumping water into the leaking tank to create a water cushion to prevent cargo loss or other measures as listed in the vessel's SOPEP / SMPEP.
Dependencies Does the response strategy rely on other systems to perform its intended function?	The successful execution of source control relies on the SOPEP activation and continuous actions to reduce the leakage.
Availability and limitations Time the response strategy is available to perform its function?	Time to be operational – Immediately. Source control will take place during daylight hours only and in appropriate conditions. Vessel crew will meet the crew competency and navigation equipment.

7.4.3 Source Control ALARP Evaluation

Source Control ALARP considerations are included in Table 7-5.

Table 7-5 - Source Control ALARP Evaluation

Additional control measures	Benefit	Cost	Outcome
Training and competencies	Personnel controlling an oil spill are trained or are guided by trained personnel. Amplitude Energy is able to provide support to the Vessel Master, if required.	There are no significant costs associated with this control measure.	Selected

7.4.4 Source Control Impact and Risk Evaluation

As all vessel-based source control activities relate to activities onboard the vessel, no additional environmental impacts or risks have been identified. As such, no additional evaluation is required.

7.5 Spill Response: Monitor and Evaluate

7.5.1 Overview

Ongoing monitoring and evaluation of the oil spill is a key strategy and critical for maintaining situational awareness and to complement and support the success of other response activities. In some situations, monitoring and evaluation may be the primary response strategy where the spill volume or risk reduction through natural dispersion and weathering processes is considered the most appropriate response. Monitor and evaluate will apply to all marine spills. Higher levels of surveillance such as vessel or aerial surveillance, oil spill trajectory modelling, and deployment of satellite tracking drifter buoys will be undertaken for Level 2/3 spills given the nature and scale of the spill risk.

It is the responsibility of the Control Agency to undertake operational monitoring during the spill event to inform the operational response. Operational monitoring may include the following:

- Aerial observation
- Vessel observation
- Tools:
  - Oil spill trajectory modelling
  - Vector analysis (manual calculation)
  - Automated Data Inquiry for Oil Spills (ADIOS) (a spill weathering model).
- Utilisation of satellite tracking drifter buoys.

The responsibility for operational monitoring lies with the respective control agency (refer to Section 10.7.2).

7.5.2 Resources Required and Availability

To understand the response equipment and personnel associated with a monitor and evaluate response technique, Amplitude identified the quantity and type of equipment and personnel required for the proposed optimum response.

One or more satellite tracking buoys would be deployed to provide an understanding in real time of environmental conditions. The outcomes from this will feed into both oil spill trajectory modelling and manual trajectory calculations to provide situational awareness and an understanding of the spill trajectory and sensitivities that have the potential to be exposed. Minimum requirements are:

- 1 x Satellite tracking buoy.

Whilst this can be done rapidly, additional vessel and aerial surveillance may take more time to initiate dependant on the time of the spill and conditions offshore. Vessel surveillance can be conducted from any offshore vessel under Amplitude Energy’s control which may be engaged immediately in the event of a spill depending on the time of day. Vessel observations will assist in determining if additional response actions are required, however, vessel observation is generally considered to be less effective than aerial observation due to the limited distance in which observations can be conducted. Nonetheless, vessel surveillance activities also incorporate operational monitoring studies as outlined in the Offshore Victoria OSMP [VIC-ER-EMP-0002]; which will involve various monitoring and sampling methodologies of water to determine the extent of surface, entrained and dissolved hydrocarbons in the water column and near sensitive receptors. Minimum requirements, in addition to vessel crew, are:

- 1 x Vessel surveillance team comprising:
  - 1 x Visual observer
  - 1 x Vessel.

Aerial surveillance may be undertaken from specially mobilised aircraft, available crew transfer helicopters, or similar. Trained observers must be present on the surveillance aircraft who can be sourced from the Australian Marine Oil Spill Centre (AMOSC) and/or AMSA. If aerial surveillance is required, an over-flight schedule is developed. The frequency of flights will be sufficient to ensure that the information collected during each flight (i.e. observer log and spill mapping) meets the information needs to validate dispersion of the spill.

Aerial surveillance would be used at the start of spill to gain situational awareness assess including trajectory of spill, size of slick and thickness to enable a baseline quantity to be established. Initial reconnaissance may be basic to enable a level of understanding of the spill within 24 hours without waiting for trained observers to arrive, whilst later observations may require more skill/calculations to estimate behaviour, therefore trained observers are critical.

Given the relatively small distance offshore, the proximity to airfields, and the surveillance time requirement, minimum requirements are:

- 1 x Aerial surveillance team:
  - 1 x Visual observer
  - 1 x Aircraft (helicopter or fixed wing).

The feasibility and effectiveness of a monitor and evaluate response is provided in Table 7-6.

Table 7-6 - Feasibility and Effectiveness of Monitor and Evaluate Response

Parameter	Monitor and Evaluate
Suitability/Functionality How does the response strategy perform to achieve its required risk reduction?	Implementation of monitoring is fundamental in informing all of the remaining response strategies. The response activity validates trajectory and weathering models providing forecasts of spill trajectory, determines the behaviour of the oil in the marine environment, determines the location and state of the slick, determines the effectiveness of the response options and confirms the impact on receptors. Monitoring and evaluation activities will continue throughout the response until the termination criteria have been met.
Dependencies Does the response strategy rely on other systems to perform its intended function?	The successful execution of monitoring relies on of the pre-planning of monitoring assets being completed to enable the shortest mobilisation time of personnel, and equipment required for gaining situational awareness. To ensure the IMT can maintain the most accurate operating picture the monitoring data collected in the field will be delivered to the IMT as soon as possible.
Availability and limitations Time the response strategy is available to perform its function?	Time to be operational - Monitoring from aerial platforms will only operate in daylight hours; all other options are capable of 24-hour operations. Access to ADIOS is available within 1 hour of the establishment of the IMT with initial results available within 1 hour of accessing the system. Initial external modelling results are available 2 hours after initial request. Personnel downtime will be planned and managed to ensure appropriate levels of response personnel are maintained and rotated as required or until the response is terminated.

Table 7-2 of the Offshore Victoria OPEP [VIC-ER-EMP-0001] details the resource capability to undertake monitor and evaluate activities in accordance with the identified required resources above, their availability and hence Amplitude Energy's capability to support a 'monitor and evaluate' response.

Amplitude Energy maintains operational monitoring capability and implements operational monitoring for Level 2 or 3 facility-based incidents and this response capability would be available to assist the Control Agencies in the event of a MDO vessel spill if requested. Amplitude Energy would initiate Type II (scientific) monitoring in the event of any Level 2 or 3 spill. Through this resourcing Amplitude Energy is capable of:

- Acquiring knowledge of the spill conditions from any vessel based MDO spill via deployed tracking buoys and undertaking manual trajectory calculations within 1 hour of Emergency Management Team mobilisation
- Activating and obtaining modelling forecast within 4 hours of spill
- Deploying aircraft within 24 hours to verify modelling / vector calculation forecast and provide real-time feedback of impacts / predicted impacts.

Amplitude Energy considers that during a 'worst-case' spill event, there are sufficient monitoring resources to respond in sufficient time to allow Amplitude Energy to understand if any sensitivities have the potential to be threatened by a spill (i.e. via satellite tracking buoy deployment; manual and computerised trajectory calculation and finally via aerial observation). The operational constraints and termination criteria for a 'Monitor and Evaluate' response is provided in Section 5.5 of the Offshore Victoria OPEP [VIC-ER-EMP-0001].

7.5.3 Monitor and Evaluate ALARP Evaluation

Monitor and evaluate ALARP considerations are included in Table 7-7.

Table 7-7 - Monitor and evaluate ALARP Evaluation

Additional control measures	Benefit	Cost	Outcome
Utilise additional vessels and aircraft for spill observations during initial response stages	Although additional surveillance activities will provide additional information, continuous monitoring of the spill has limited benefit given significant changes in trajectory are influenced by oceanic currents and wind direction that is being continuously monitored via both tracking buoys and Meteye services. Consequently, a single aerial and vessel Monitoring, Evaluation and Surveillance (MES) Team is expected to be sufficient for the initial stages of the response planning and using additional platforms is not considered to provide a considerable environmental benefit.	Amplitude Energy have arrangements in place to enable additional platforms to be deployed for MES activities if required and thus the cost of deploying additional platforms is not expected to be significant. However, during the initial stages of the response, deploying additional platforms increases simultaneous operations risk whilst the emergency management structure and communication protocols are being initiated. Consequently, as there is no considerable benefit of scaling up MES during the initial stages of the response implementation of this control measures have not been considered further. As the response progresses, scaling up or down of the response effort will be considered in accordance with the OPEP which reviews the effectiveness of each strategy. Amplitude Energy has demonstrated in Table 7-6 that existing arrangements are in place (such as with both vessel and aircraft providers) to access additional resources (not just that required for the initial stages of the response) if required by this process.	Not Selected
Use unmanned aerial vehicles (UAV) to provide a more rapid monitoring response with reduced safety risks	This control measure is not expected to provide significant environmental benefit as BMG infrastructure is located around 50 km offshore, whereas civilian drone ranges are limited, more sensitive to weather, and may not provide any additional information when compared to vessels and aerial survey via fixed wing aircraft or helicopter.	The cost associated with purchasing this a drone and maintaining a contract with drone operator may not be significant. However, is not expected to provide any additional benefit when compared to aerial survey via fixed wing or helicopter.	Not Selected
Night-time monitoring - infrared	Infrared may be used to provide aerial monitoring at night-time; however, the benefit is minimal given trajectory monitoring (and infield monitoring during daylight hours) will give good	The cost associated with utilising infra-red monitoring is not considered to be significant. As infra-red monitoring needs to be deployed from an aerial platform, this	Not Selected

Additional control measures	Benefit	Cost	Outcome
	operational awareness. In addition to this, satellite imagery may be used (is already provided for) at night to provide additional operational awareness.	activity creates significant health and safety risks.	

7.5.4 Monitor and Evaluate Impact and Risk Evaluation

Monitoring and evaluate response activities have the potential to result in:

- Marine fauna interactions.

7.5.4.1 Cause of the aspect

The following activities associated with operational monitoring have the potential to interfere with fauna:

- Aircraft use for aerial surveillance (fixed wing or helicopter)
- Vessels use for surveillance.

7.5.4.2 Aspect characterisation

The cause of these aspects is not considered to be any different to those planned under this EP (i.e. aircraft and vessel use). Consequently, no further aspect characterisation has occurred.

7.5.4.3 Predicted Environmental Impacts and Risk

The potential risks associated with a monitor and evaluate response are:

- Localised and temporary fauna behavioural disturbance
- Injury or mortality due to an unplanned interaction
- Change in water quality.

7.5.5 Impact and Risk Evaluation

The potential impacts associated with vessel and aircraft activities have been evaluated throughout the risk assessment of this EP (Section 6.0). Based upon the nature and scale of the activities, the evaluation is considered appropriate for any aerial or marine surveillance undertaken and thus has not been considered further.

7.5.6 Control Measures, ALARP and Acceptability Assessment

Table 7-8 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to monitoring and evaluation activities.

Table 7-8 - Monitor and Evaluate ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context A** The use of vessels and aircraft in offshore areas is well practiced with the potential impacts and risks from these activities well understood. There is a good understanding of control measures used to manage these risks from aircraft. There is little uncertainty associated with the potential environmental impacts and risks, which have been evaluated as **Level 2**.

	No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. As such, Amplitude Energy believes ALARP Decision Context A should apply.
Control Measure	**Source of good practice control measures**
Ongoing consultation	Consultation in the event of a spill will ensure that relevant government agencies support the monitor and evaluate strategy thus minimising potential impacts and risks to sensitivities.
Maintain monitoring and evaluation capability	Amplitude Energy will maintain the required level of response capability to implement a monitoring and evaluation strategy commensurate with the spill events detailed in this EP.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	N/A (Refer to relevant aspects in Section 6.0)
Residual Risk Likelihood	N/A (Refer to relevant aspects in Section 6.0)
Residual Risk Severity	N/A (Refer to relevant aspects in Section 6.0)
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect are limited to standard aerial and vessel activities, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities do not have the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act 2006 (Commonwealth).
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health, Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs and Stakeholder Management (MS05)
External context	No relevant person objections or claims have been raised to date regarding impacts and risks from monitor and evaluate response strategies. As such, Amplitude Energy considers that there is broad acceptance of the impacts and risks associated with the activity.
Environmental Performance	
The EPOs, EPSs, and measurement criteria for response preparedness and implementation of monitoring and evaluation activities are shown in Table 7-3 of the Offshore Victoria OPEP [VIC-ER-EMP-0001].	

7.6 Spill Response: Protect and Deflect

7.6.1 Overview

Booms and skimmers can be deployed to protect or deflect oil from environmental sensitivities. Noting that the effectiveness of boom operation is dependent on current, wave and wind conditions.

7.6.2 Resources Required and Availability

Response resources will be activated via AMOSC in the first instance, with equipment and resources selected on the basis of the Tactical Response Plan (TRP) activation and subsequent Incident Action Plan (IAP), as defined in the Offshore Victoria OPEP [VIC-ER-EMP-0001].

The feasibility and effectiveness of a protect and deflect response is provided in Table 7-9.

Table 7-9 - Feasibility and Effectiveness of Protect and Deflect Response

Parameter	**Protect and deflect**
Suitability/Functionality How does the response strategy perform to achieve its required risk reduction?	Successful implementation of the protection and deflection response strategy will reduce the oil reaching the shoreline. Protection strategies can be used for targeted protection of sensitive receptors. The use of zoom and beach guardian boom is the most technically suitable and feasible application of the response strategy. Alternative offshore boom types cannot be deployed successfully in shallow water due to depth of draft. Chevron, cascade and exclusion booming formations will be deployed based on the location.
Dependencies Does the response strategy rely on other systems to perform its intended function?	Operational effectiveness of this response is dependent on monitoring and surveillance (including deterministic modelling predictions and visual surveillance) of the floating oil before stranding which enables the prioritization and targeted protection of environmental sensitivities. This will ensure boom is deployed at the sensitivities reducing the oil reaching the shorelines.
Availability and limitations Time the response strategy is available to perform its function?	Time to be operational - Based on the availability of personnel, equipment and vessels, the deployment of the response strategy will take place within 48 hours of response activation. Protection and deflection operations will take place during daylight hours only and in appropriate weather and tide conditions. Deployed boom formations will require regular monitoring to ensure continued effectiveness. Personnel downtime will be planned and managed to ensure appropriate levels of response personnel are maintained and rotated as required or until the response is terminated.

7.6.3 Protect and Deflect ALARP Evaluation

Protect and deflect ALARP considerations are included in Table 7-10.

Table 7-10 - Protect and Deflect ALARP Evaluation

Additional control measures	**Benefit**	**Cost**	**Outcome**
Implement optimum protect and deflect sooner by storing equipment at strategic locations.	The environmental benefits associated with this option are negligible; existing logistics pathways have demonstrated that this equipment can be mobilised to potentially impacted shorelines before shoreline contact occurs.	Any equipment mobilised to site would need to be purchased by Amplitude. Most equipment proposed to be used (available via the various agreements) can only be mobilised in an emergency as it needs to be stored and available in strategic locations nationwide for the whole industry. Purchasing such equipment would result in significant costs that are considered grossly disproportionate to the level of risk reduction achieved.	Not Selected

7.6.4 Protect and Deflect Impact and Risk Evaluation

Protect and deflect activities have the potential to result in:

- Interactions with shoreline and nearshore habitats.

7.6.4.1 Cause of the aspect

The following activities associated with protection and deflection have been identified as having the potential to interact near-shore / shoreline habitats:

- Boom deployment and management (especially anchored boom).

7.6.4.2 Aspect characterisation

Stochastic modelling (RPS, 2021a) indicates that the largest volume of hydrocarbons ashore was 64.8 m^3 with the maximum length of shoreline exposed to hydrocarbons above the moderate shoreline exposure value[26] (≥100 g/m^2)was 6.0 km. Any protection and deflection response would be expected to be focused to these areas, and as such disturbance associated with protect and deflect tactics would be limited.

7.6.4.3 Predicted Environmental Impacts and Risks

The potential impacts of protection and deflection activities are:

- Loss of seabed vegetation / disturbance to estuarine habitats from boom anchors
- Restricting access to the area for recreational activities.

7.6.5 Impact and Risk Evaluation

7.6.5.1 Risk Event: Loss of seabed vegetation / disturbance to estuarine habitats from boom anchors

Inherent Consequence Evaluation

Potential impacts of protect and deflect response vary, depending on the method used and the nearshore/shoreline habitat. Particular values and sensitivities in the area that may be affected by the spill include nearshore and estuarine habitats (such as seagrass) and shoreline habitats (sandy beach habitats).

Loss of vegetation may occur where equipment cannot be mobilised using existing tracks or where protection booms may be placed. Based upon the nature of the spill events associated with this EP, and the limited area of shoreline that would likely be exposed to hydrocarbons above actionable response thresholds, any impacts are likely to be highly localised the response infrastructure. These impacts would likely result in localised medium-term impacts to species or habitats with recover over months to a year.

As such the consequence has been ranked as a Level 3.

Inherent Likelihood

Given the low likelihood of the vessel collision event occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a Hypothetical likelihood of occurring.

[26] This exposure value represents the concentration of shoreline oil that is likely to require clean-up effort on man-made structures, sandy or rocky beaches/shorelines, as well as more sensitive marine habitats (NOPSEMA, 2025d).

Inherent Risk Severity

The inherent risk severity for this event is ranked as Low.

7.6.5.2 Risk Event: Restricting access to the area for recreational activities.

Inherent Consequence Evaluation

Potential impacts of protect and deflect response vary, depending on the method used and the nearshore/shoreline habitat. Particular values and sensitivities in the area that may be affected by the spill include local recreational activities along the coastline.

Based upon the nature of the spill events associated with this EP, and the limited area of shoreline that would likely be exposed to hydrocarbons above actionable response thresholds, any impacts are likely to be highly localised the response infrastructure. Areas maybe temporary restricted to the public while protection and deflection activities occur. As the diesel will weather rapidly this would only occur for days. As such, these impacts would likely result in localised short term impacts social receptors.

As such the consequence has been ranked as a Level 2.

Inherent Likelihood

Given the low likelihood of the vessel collision event occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a Hypothetical likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as Low.

7.6.6 Control Measures, ALARP and Acceptability Assessment

Table 7-11 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to protect and deflect activities.

Table 7-11 - Protect and Deflect ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context A** Implementing protect and deflect response techniques is standard practice for marine oil spills. There is a good understanding of potential impacts and risks from these techniques, and the control measures required to manage these. There is little uncertainty associated with the potential environmental impacts and risks, evaluated as Level 2 due to the small disturbance footprint expected with these techniques. No objections or concerns were raised during relevant person consultation regarding this aspect or its potential impacts and risks. As such, Amplitude Energy considers ALARP Decision Context A should apply.
Control Measure	**Source of good practice control measures**
Maintain protect and deflect capability	Amplitude Energy will maintain the required level of response capability to implement a protection and deflection strategy commensurate with the spill events detailed in this EP.
Develop TRPs for priority protection sites	Identify priority protection sites and apply tactical response planning measures.
Ongoing consultation	Consultation in the event of a spill will ensure that relevant government agencies support the protect and deflect strategy thus minimising potential impacts and risks to sensitivities.
OSMP (monitor response effectiveness)	Monitoring the response effectiveness will ensure response is terminated where the response is no longer effective or where a net environmental benefit is no longer present.

Use of existing tracks and pathways	Utilising existing tracks and paths where possible will ensure the disturbance footprint associated with the implementation of this response technique is reduced to ALARP.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 2 - Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks
Residual Risk Likelihood	The likelihood of vessel collision event was determined to be Hypothetical (F) (Section 6.7.5). As such, the likelihood of impacts from protection and deflection response activities in the event of vessel collision have been determined to be Hypothetical (F).
Residual Risk Severity	Low
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities were evaluated as having the potential to result in a Level 2 consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act 2006 (Commonwealth). •
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05).
External context	No relevant person concerns have been raised to date regarding impacts and risks from protect and deflect strategies. As such, Amplitude Energy considers that there is broad acceptance of the impacts associated with the activity.
Environmental Performance	
The EPOs, EPSs, and measurement criteria for response preparedness and implementation of Protect and Deflect activities are shown in Table 8-2 of the Offshore Victoria OPEP [VIC-ER-EMP-0001].	

7.7 Spill Response: Shoreline Assessment and Clean-up

7.7.1 Overview

Any shoreline operations will be undertaken in consultation with, and under the control of the Control Agency, and the appropriate land managers of the shoreline affected.

Shoreline clean-up consists of different manual and mechanical recovery techniques to remove oil and contaminated debris from the shoreline to reduce ongoing environmental contamination and impact. It may include the following techniques:

- Manual collection of oil and debris – people collect oil from the shoreline

- Mechanical collection – use of machinery to collect and remove stranded oil and contaminated material
- Mechanical alterations to shoreline – use of machinery to temporarily move sand to close estuaries/waterways
- Sorbents – use of sorbent padding to absorb oil
- Vacuum recovery, flushing and washing – the use of high volumes of low-pressure water, pumping and/or vacuuming to remove floating oil accumulated at the shoreline
- Sediment reworking – move sediment to the surf to allow oil to be removed from the sediment and move sand by heavy machinery
- Vegetation cutting – removing oiled vegetation
- Cleaning agents – application of chemicals such as dispersants to remove oil.

Shorelines within the Spill EMBA are predominantly sandy beaches; numerous estuaries are also present along the Victorian coast.

By the time MDO reaches shore it has weathered significantly, with only the persistent residual remaining. Under low energy conditions, the residual components may form a thin liquid sheer on the coast and may persist in the environment; this may allow them to be physically removed until physically removed. The following clean-up methods may have environmental benefit:

- Manual clean-up
- Mechanical collection.

7.7.2 Resources Required and Availability

The number and tasks of personnel will vary according to the quantity of spill debris, its rate of delivery to the site and the disposal method chosen.

Response resources will be activated via AMOSC in the first instance, with equipment and resources selected based on the TRP activation and subsequent IAPs as defined in the Offshore Victoria OPEP [VIC-ER-EMP-0001].

The feasibility and effectiveness of a shoreline assessment and clean-up response is provided in Table 7-12.

Table 7-12 - Feasibility and Effectiveness of Shoreline Assessment and Clean-up Response

Parameter	Shoreline Assessment and Clean-up
Suitability/Functionality How does the response strategy perform to achieve its required risk reduction?	Successful implementation of the shoreline assessment and clean up response strategy will result in a reduction of oil on the shoreline, assist in preventing the remobilization of oil and act to reduce the lasting impact of the oil spill on shoreline receptors. The method of clean up chosen will be selected based on shoreline type, local knowledge of the conditions and the availability of equipment and personnel. Oil clean up quantities are estimated to recover 1 m^3 per person/ day or 10 m^3 per team/day (manual recovery) and 2.4 m^3 per team/hour (mechanical collection).
Dependencies Does the response strategy rely on other systems to perform its intended function?	Operational effectiveness of this response is dependent on the continuous use of monitoring and surveillance to help direct clean-up efforts towards the areas most affected by stranded oil which enables the prioritization and targeted clean-up of environmental sensitivities.
Availability and limitations Time the response strategy is available to perform its function?	Time to be operational - Shoreline Clean-up and Assessment Technique personnel will be available on site within 12 hours to commence terrestrial assessment. Based on the availability of personnel and equipment the clean-up activities will commence within 12 hours of response Activation.

Parameter	Shoreline Assessment and Clean-up
	Personnel downtime will be planned and managed to ensure appropriate levels of response, personnel are maintained and rotated as required or until the response is terminated.

7.7.3 Shoreline Assessment and Clean-up ALARP Evaluation

Shoreline Assessment and Clean-up ALARP considerations are included in Table 7-13.

Table 7-13 - Shoreline Assessment and Clean-up ALARP Evaluation

Additional control measures	Benefit	Cost	Outcome
Implement shoreline assessment and clean-up sooner	Modelling indicates that shortest time to shore at levels where a shoreline response can be implemented (≥100 g/m^2)[26] is within ~2 days (RPS, 2021a). Existing pathways allow for mobilising relevant shoreline assessment and clean-up resources within minimum shoreline contact times; therefore, implementing clean-up operations earlier is not expected to result in any additional environmental benefit.	Amplitude Energy has demonstrated that optimum shoreline response can be implemented before shoreline contact, and there is no environmental benefit with implementing this control measure; therefore, this control measure is not considered further.	Not Selected
Implement larger initial shoreline assessment and clean-up response	Modelling indicates that shortest time to shore at levels where a shoreline response can be implemented (≥100 g/m^2)[26] is within ~2 days (RPS, 2021a). Amplitude Energy has demonstrated capability to rapidly implement the planned shoreline assessment and clean-up response within the required timeframes. Deploying more resources than are required to clean-up a shoreline can incur additional risks and reduced environmental benefits; therefore, an optimum level of response has been identified, based on modelling outcomes. If shorelines are cleaned-up too soon and hydrocarbons continue to wash ashore, there is the potential that continued cleaning will sensitise habitats. Therefore, in accordance with International Petroleum Industry Environmental Conservation Association guidance, it is recommended that shoreline clean-up activities are slowly increased to ensure that techniques are effective, and impacts are minimised. Consequently, there is no environmental benefit associated with implementing this control measure.	As Amplitude Energy has access to the required resources, the cost of implementing a larger response will not result in a significant cost. However, because there is no environmental benefit identified with this control measure, it is not considered further.	Not Selected

7.7.4 Shoreline Assessment and Clean-up Impact and Risk Evaluation

Shoreline assessment and clean-up activities have the potential to result in:

- Interactions with shoreline habitats.

7.7.4.1 Cause of the aspect

The following activities associated with shoreline clean-up tactics may interact with shoreline habitats:

- Personnel and equipment access to beaches
- Shoreline clean-up
- Waste collection and disposal.

7.7.4.2 Aspect characterisation

Stochastic modelling (RPS, 2021a) indicates that the largest volume of hydrocarbons ashore was 64.8 m^3 with the maximum length of shoreline exposed to hydrocarbons above the moderate shoreline exposure value[26] (≥100 g/m^2)was 6.0 km. Any shoreline clean-up response would be expected to be focused to these areas, and as such disturbance associated with shoreline clean-up tactics would be limited.

7.7.4.3 Predicted Environmental Impacts and Risks

The potential impacts of these activities are:

- Damage to or loss of shoreline habitats
- Disturbance to fauna habitat and fauna behaviours
- Temporary exclusion of the public from amenity beaches.

7.7.5 Impact and Risk Evaluation

7.7.5.1 Risk Event: Damage to or loss of shoreline habitats

Inherent Consequence Evaluation

Sandy beaches have been used for the consequence evaluation as they are considered to provide a comprehensive indication of possible worst-case consequences as a result of implementing shoreline response activities (due to presence of potential sensitivities and the invasive nature of techniques such as mechanical collection). This is not to say that sandy beaches themselves are considered more sensitive than other habitats.

Based upon the low viscosity, it is possible that MDO will infiltrate porous shorelines (such as sandy beaches) where it washes onshore rapidly and has not significantly weathered. Consequently, mechanical recovery could be required (resulting in excavation of shorelines). If not done correctly, any excavation of hydrocarbon contaminated materials along the coast could exacerbate beach erosion to a point where its recovery longer term recovery.

Based upon the potential for localised medium-term impacts to shoreline habitats, the consequence has been ranked as Level 3.

Inherent Likelihood

Given the low likelihood of the vessel collision event occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a Hypothetical likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as Low.

7.7.5.2 Risk Event: Disturbance to fauna habitat and fauna behaviours

Inherent Consequence Evaluation

The noise and general disturbance created by shoreline clean-up activities could potentially disturb the feeding, breeding, nesting or resting activities of resident and migratory fauna species that may be present (such as shorebirds and seabirds). Any erosion caused by responder access to sandy beaches, or the removal of sand, may also bury nests.

On the basis that these disturbances could cause medium term impacts to local populations of shorebirds and seabirds, the consequence has been ranked as Level 3.

Inherent Likelihood

Given the low likelihood of the vessel collision event occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a Hypothetical likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as Low.

7.7.5.3 Risk Event: Temporary exclusion of the public from amenity beaches.

Inherent Consequence Evaluation

The presence of stranded oil and clean-up operations will necessitate temporary beach closures (likely to be weeks but depends on the degree of oiling and nature of the shoreline). This means recreational activities (such as swimming, walking, fishing, boating) in affected areas will be excluded until access is again granted by local authorities. Based upon stochastic modelling that indicates a maximum shoreline impact for concentrations above 100 g/m^2 is 6.0 km, and as diesel will weather rapidly, clean-up operations are expected to take days-weeks. As such, these impacts would likely result in localised short term impacts social receptors. As such the consequence has been ranked as a Level 2.

Inherent Likelihood

Given the low likelihood of the vessel collision event occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a Hypothetical likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as Low.

7.7.6 Control Measures, ALARP and Acceptability Assessment

Table 7-14 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to shoreline assessment and clean-up.

Table 7-14 - Shoreline Assessment and Clean-up ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context A** The implementation of shoreline assessment and clean-up response techniques are standard practice for marine oil spills where there is the potential for shoreline exposures. There is a

	good understanding of potential impacts and risks from these techniques, and the control measures required to manage these. There is slight uncertainty associated with the potential environmental impacts and risks, which have been evaluated as Level 3 due to the localised area of disturbance and (conservatively assessed) medium-term impacts associated with these response techniques. No objections or claims were raised during relevant person consultation regarding this aspect or its potential impacts and risks. As such, Amplitude Energy believes ALARP Decision Context A should apply.
Control Measure	**Source of good practice control measures**
Maintain shoreline assessment and clean-up capability	Amplitude Energy will maintain the required level of response capability to implement a shoreline assessment and clean-up strategy commensurate with the spill events detailed in this EP.
Consultation	Consultation in the event of a spill will ensure that relevant government agencies support the shoreline assessment and clean-up strategy thus minimising potential impacts and risks to sensitivities.
Use of existing tracks and pathways	Utilising existing tracks and paths where possible will ensure the disturbance footprint associated with the implementation of this response technique is reduced to ALARP.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 3 - Localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function; remedial, recovery over months/year.
Residual Risk Likelihood	The likelihood of vessel collision event was determined to be Hypothetical (F) (Section 6.7.5). In addition, the small volumes hydrocarbons ashore and associated limited residual fractions indicate implementing this type of technique is low. Thus, the likelihood associated with causing a Level 3 consequence from this technique is considered to Hypothetical (F).
Residual Risk Severity	Low
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised medium-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities were evaluated as having the potential to result in a Level 3 consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act 2006 (Commonwealth). •
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05).
External context	No relevant person concerns have been raised to date regarding impacts and risks from shoreline assessment and clean-up strategies. As such, Amplitude Energy considers that there is broad acceptance of the impacts associated with the activity.

Environmental Performance
The EPOs, EPSs, and measurement criteria for response preparedness and implementation of shoreline clean-up activities are shown in Table 9-3 of the Offshore Victoria OPEP [VIC-ER-EMP-0001].

7.8 Spill Response: Oiled Wildlife Response

7.8.1 Overview

In the event of a Level 2 hydrocarbon spill, the impacts on wildlife are determined by the types of fauna present, the type of oil spilled and the extent of exposure. A review of the species likely to be present within the Spill EMBA identifies seabirds, shorebirds, marine mammals and reptiles could be affected, and which may necessitate an OWR.

OWR consists of a three-tiered approach involving:

- Primary – situational understanding of the species / populations potentially affected (ground-truth species presence and distribution by foot, boat or aerial observations)
- Secondary –deterrence or displacement strategies (e.g. hazing by auditory bird scarers, visual flags or balloons, barricade fences; or pre-emptive capture)
- Tertiary – recovery, field stabilisation, transport, veterinary examination, triage, stabilisation, cleaning, rehabilitation, release.

7.8.2 Resources Required and Availability

Response resources would be activated via AMOSC in the first instance, with equipment and resources selected on the basis of the TRP activation and subsequent IAPs as defined in the Offshore Victoria OPEP [VIC-ER-EMP-0001].

Amplitude Energy will not deploy any resources without first receiving a formal deployment request from relevant Control Agency.

Amplitude Energy identified the estimated waste types associated with an oiled wildlife response technique to understand the response equipment and personnel required to support waste management activities. Table 7-15 provides a conservative indication of the level of waste that may be required to be managed by this activity.

The feasibility and effectiveness of an OWR is provided in Table 7-16.

Table 7-15 - Estimated Oiled Waste Types and Volumes

Response Technique	Waste Type	Waste Volume (m^3)
OWR	Wastewater	1 m^3 per unit (1 bird = 1 unit)
	Personal Protective Equipment	5 kg per unit per day

Table 7-16 – Feasibility and Effectiveness of Oiled Wildlife Response

Parameter	Oiled Wildlife Response
Suitability/Functionality How does the response strategy perform to achieve its required risk reduction?	The OWR may lead to the survival of vulnerable wildlife populations. The level of OWR required can be scaled based on the predicted number of animals oiled. It is not expected a large-scale wildlife response, given the limited size and nature of the MDO spill.

Parameter	Oiled Wildlife Response
Dependencies Does the response strategy rely on other systems to perform its intended function?	Operational effectiveness of the OWR relies on supporting monitoring information from aerial, vessel and ground surveys. This supporting information can be gathered during daylight hours only.
Availability and limitations Time the response strategy is available to perform its function?	Time to be operational - Once the oiled wildlife facility has been established 24-hour continuous operations are feasible where it is confirmed safe to do so. Under the direction of DEECA personnel, downtime will be planned and managed to ensure appropriate levels of response personnel are maintained and rotated as required or until the response is terminated.

7.8.3 Oiled Wildlife Response ALARP Evaluation

OWR ALARP considerations are included in Table 7-17.

Table 7-17 - OWR ALARP Evaluation

Additional control measures	Benefit	Cost	Outcome
Training and competencies	Personnel handling oiled wildlife are trained as fauna handlers or are guided by OWR-trained personnel. During an oil spill there is the potential for fauna to come into contact with floating or stranded oil. If this occurs, State response agencies would lead OWR, with Amplitude energy providing labour and resources as requested by the controlling agency.	State agencies lead the OWR, providing trained personnel, technical expertise and instruction to Amplitude energy for support as required, Training additional personnel before an event occurs is not expected to provide any benefit; responders will be given direction from the appropriate agency during an OWR. This option has therefore not been implemented.	Not Selected

7.8.4 Oiled Wildlife Impact and Risk Evaluation

7.8.4.1 Cause of aspect

The activities associated with OWR that have the potential to impact on fauna are:

- Hazing of target fauna that may deter non-target species from their normal activities (resting, feeding, breeding, etc.)
- Inappropriate handling and treatment that may cause distress, injury or death of target fauna.

7.8.4.2 Aspect Characterisation

Stochastic modelling (RPS, 2021a) indicates that the largest volume of hydrocarbons ashore was 64.8 m^3 with the maximum length of shoreline exposed to hydrocarbons above the moderate shoreline exposure value[26] (≥100 g/m^2)was 6.0 km. Any OWR would be expected to be focused to these areas.

7.8.4.3 Predicted Environmental Impacts and Risks

The potential impacts of this activity are disturbance, injury or death of fauna.

7.8.5 Impact and Risk Evaluation

7.8.5.1 Risk Event: Disturbance, injury or death of fauna.

Inherent Consequence Evaluation

Untrained resources capturing and handling native fauna may cause distress, injury and death of the fauna. To prevent these impacts, only appropriately trained oiled wildlife responders will approach and handle fauna. This will eliminate any handling impacts to fauna from untrained personnel and reduce the potential for distress, injury or death of a species.

It is preferable to have oil-affected animals that have no prospect of surviving or being successfully rehabilitated and released to the environment humanely euthanized than to allow prolonged suffering. The removal of these individuals from the environment has additional benefits in so far as they are not consumed by predators / scavengers, avoiding secondary contamination of the food-web.

Hazing and exclusion of wildlife from known congregation, resting, feeding, breeding or nesting areas may have a short or long-term impact on the survival of that group if cannot access preferred resources. These effects may be experienced by target and non-target species. For example, shoreline booming, or ditches dug to contain oil may prevent penguins from reaching their burrows after they've excited the water and low helicopter passes flown regularly over a beach to deter coastal birds from feeding in an oil-affected area may also deter penguins from leaving their burrows to feed at sea, which may impact on their health.

Due to the potential for localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning, the potential impacts form this activity have been identified as Level 2.

Inherent Likelihood

Given the low likelihood of the vessel collision event occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a Hypothetical likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as Low.

7.8.6 Control Measures, ALARP and Acceptability Assessment

Table 7-18 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to OWR activities.

Table 7-18 - Oiled Wildlife Response ALARP, Control Measures and Acceptability Assessment

ALARP Decision Context and Justification	**ALARP Decision Context A** The implementation of OWR activities is standard practice for marine oil spills where there is the potential for hydrocarbon exposure to wildlife. There is a good understanding of potential impacts and risks from these techniques, and the control measures required to manage these. There is little uncertainty associated with the potential environmental impacts and risks, which have been evaluated as Level 2 due to the incidental expected impacts from this response. No objections or claims were raised during relevant person consultation regarding this aspect or its potential impacts and risks. As such, Amplitude Energy believes ALARP Decision Context A should apply.

Control Measure	Source of good practice control measures
Maintain OWR capability	Offshore Victoria OPEP [VIC-ER-EMP-0001]. Amplitude Energy will maintain the required level of response capability to implement an OWR strategy commensurate with the spill events detailed in this EP.
Consultation	Consultation in the event of a spill will ensure that relevant government agencies support the OWR thus minimising potential impacts and risks to sensitivities.
Use of existing tracks and pathways	Utilising existing tracks and paths where possible will ensure the disturbance footprint associated with the implementation of this response technique is reduced to ALARP.
Trained fauna handlers will handle wildlife (unless different direction is received from State agency)	Wildlife is only approached or handled by State agency trained oiled wildlife responders unless formal direction is received from the Government IMT. Amplitude Energy response personnel are advised of wildlife interaction restrictions through site safety inductions.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 2 - Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks.
Residual Risk Likelihood	The likelihood of vessel collision event was determined to be Hypothetical (F) (Section 6.7.5). In addition, the small volumes hydrocarbons ashore indicate implementing this type of technique is low. Thus, the likelihood associated with causing a Minor Impact from this technique is considered to be Hypothetical (F).
Residual Risk Severity	Low
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities were evaluated as having the potential to result in a Level 2 consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act 2006 (Commonwealth) • EPBC Act 1999 and EPBC Regulations 2025 • Emergency Management Act 2013 (Victoria) • *Wildlife Act 1975 (Victoria)* Oil Spill Response Technical Guidelines: The adopted controls have been guided by the following technical guides: • Wildlife Response Preparedness (IPIECA-IOGP, 2014). • State Maritime Emergencies (Non-search and Rescue) Sub-Plan Edition 3 (Victorian Department of Transport and Planning, 2024).
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05).

External context	No relevant person objections or claims have been raised to date regarding impacts and risks from OWR strategies. As such, Amplitude Energy considers that there is broad acceptance of the impacts associated with the activity.
Environmental Performance	
The EPOs, EPSs, and measurement criteria for response preparedness and implementation of OWR activities are shown in Table 10-3 of the Offshore Victoria OPEP [VIC-ER-EMP-0001].	

8.0 Environmental Performance Outcomes, Standards and Measurement Criteria

This section summarises the EPOs, EPSs, and measurement criteria that have been developed as part of a systematic approach to the management of environmental impacts and risks as identified in Section 6.0.

The EPOs, EPSs, and measurement criteria related to the BMG Closure Project (Phase 2) activities are shown in Table 8-1. Also shown are key responsible and accountable personnel who will ensure the EP is implemented and records of implementation retained.

The following OPGGS(E)R definitions are used in this EP:

- EPO – a measurable level of performance required for the management of environmental aspects of the activity to ensure that environmental impacts and risks of the activity will be of an acceptable level
- EPS – a statement of the performance required of a control measure
- Measurement criteria – used to determine whether each EPO and EPS is being met.

Table 8-1 - Environmental Performance Outcomes, Standards, and Measurement Criteria for BMG Closure Project (Phase 2) Activities

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
EPO1: No serious or irreversible harm to a threatened or migratory listed species. **EPO2**: Biologically important behaviours can continue while the activity is being undertaken. **EPO3**: No substantial reduction of air quality within local airshed caused by atmospheric emissions produced during the activity. **EPO4**: No substantial and unrecoverable change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health. **EPO5**: No substantial and unrecoverable changes to seabed which may adversely impact on biodiversity, ecological integrity, social amenity or human health. **EPO14**: Undertake the activity in a manner that the natural resources within the title area have been conserved. **EPO15**: Any substantial change or damage to seabed or subsoil will be made good.	**C1**: Planned Maintenance System.	Critical equipment on vessels will be maintained in accordance with preventative maintenance system, including: • Equipment used to treat planned vessel discharges • Combustion equipment.	PMS records	Vessel Master
	C2: Wet parking restricted to within the existing PSZs.	All infrastructure requiring wet parking is limited to identified planned areas inside existing PSZs.	Data verifies infrastructure locations are as planned within Amplitude Energy infrastructure tracking system.	Project Manager
			Planned wet parking locations are within existing PSZs.	Project Manager
	C3: Positioning Technology.	Infrastructure will be positioned in the planned location where impacts have been assessed.	Data verifies infrastructure locations are as planned within Amplitude Energy infrastructure tracking system.	Project Manager
	C4: Sediment sampling and management actions.	Amplitude Energy will collect sediment samples within the BMG Field, as described in Section 10.15.2, and have them analysed prior to Title relinquishment. Management actions will be applied according to the Sampling Program Decision Process (Section 10.15.2)	Field reports Laboratory analysis reports Environment and Health assessments (where initiated) Relevant person consultation (where initiated)	Project Manager
	C5: Marine Order 30: Prevention of collision.	Vessels shall meet the navigation equipment, watchkeeping, radar and lighting requirements of AMSA MO 30.	Vessel inspection	Vessel Master
	C6: AMSA Discharge Standards.	Low-sulphur (<0.5% m/m) marine-grade diesel used.	Bunker receipts SEEMP records	Vessel Master

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
		Vessels with diesel engines>130 kW must be certified to emission standards (e.g. International Air Pollution Prevention, International Air Pollution Prevention). Vessels implement their Ship Energy Efficiency Management Plan (SEEMP) to monitor and reduce air emissions (as appropriate to vessel class).	Certification documentation	
		Bilge water treated via a MARPOL (or equivalent) approved oily water separator and only discharge if oil content less than 15 ppm.	Oil record book	Vessel Master
		Sewage discharged at sea is treated via a MARPOL (or equivalent) approved sewage treatment system. Food waste only discharged when: • Vessel is *en-route* and >12 nm from land, or • Food waste is communited or ground to <25 mm and vessel is en route and >3 nm from land • Food waste is communited or ground to <25 mm and platform is >12 nm from land.	Certification documentation	Vessel Master
		Waste handled according to vessel waste management plan. Waste with potential to be windblown stored in covered containers.	Garbage record book Incident report	Vessel Master

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
		Waste lost overboard is recorded and recovered if possible.		
	C7: Garbage Management Plan	Vessels will have a garbage management plan in place.	Garbage record book	Vessel Master / Offshore Decommissioning Manager
	C8: NOPSEMA accepted safety case	Activities will be managed in accordance with the accepted safety case	Accepted Safety Cases in place Inspection records	Project Manager
	C9: Offshore Chemical Assessment Procedure (CMS-EN-PCD-0004).	Project chemicals will meet the requirements of the Amplitude Energy Offshore Chemical Assessment Procedure.	Completed and approved chemical assessment	Project Manager
	C10: EPBC Regulations 2025 – Part 8 Division 8.1 interacting with cetaceans	Vessels adhere to the distances and vessel management practices of EPBC Regulations 2025 (Part 8) with increased caution zone of 500 m between whales and project vessels.	Daily operations report details when whales, dolphins or seals sighted, and the interaction management actions were implemented, if required.	Vessel Master
	C11: Equipment deployment, transfers, and recovery procedures	Unconventional lifts managed under contractors lifting plans Equipment transfers between vessels managed under contractors procedures Dropped objects will be searched for with the aim of recovery	Project Procedures Project execution reports	Project Manager
	C28: Contamination Management Plan	Contamination testing (for Mercury and NORMS) and safe handling provisions will be designed into the equipment recovery campaign and operational procedures.	Project Procedures Project execution reports	Project Manager

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
	C29: All wellheads and the BAM pile will be cut at or below seabed.	The wellheads and BAM pile will be cut at or below seabed (target depth ~1m below seabed).	Project Procedures define required target cut depth at or below seabed. Project execution reports confirm cut depth.	Project Manager
	C34: Adaptive management for wellhead and BAM pile end states.	If planned cutting at or below the seabed is not practicable, the cuts will be made as close as practicable to the seabed (with maximum remnant up to 0.5 m above the surrounding seabed). See **C17**.	Project procedures adjusted to define the adaptive cut depth and method. Project execution reports confirm cut depth. See C17	Project Manager
		Engagement with commercial trawl fisheries on alternate end state (of up to 0.5 m of wellhead/s and/or BAM pile remaining in situ). See **C18** and **C19**.	Consultation Records with fisheries representatives	Project Manager
		Risk Treatment Plan developed and implemented to address residual risk to trawl fisheries (in situ remnants of wellhead/s and BAM pile as relevant).	Risk Treatment Plan characterising residual risks and mitigations for trawl fishers. Risk Treatment Implementation Records Consultation Records	Project Manager
		Engagement with DCCEEW to confirm compliance (and/or revision if required) with sea dumping permits, if deemed required, as granted under the Environment Protection (Sea Dumping) Act 1981.See **C27**.	Consultation records. Sea dumping permits.	Project Manager
	C14: Marine exclusion and caution zones	Subsea infrastructure is marked on navigational charts at the discretion of AHO.	Engagement records with AHO	Project Manager
	C17: As-left seabed survey	An as-left seabed survey will be undertaken prior to completion of the activity.	Survey records	Project Manager

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
	C18: Ongoing consultation	Notifications for any on-water activities and ongoing consultations undertaken per Section 10.12.	Notification records	Project Manager
	C19: Fisheries Damages Protocol	Fisheries Damages Protocol in place to provide a compensation mechanism to fishers should they damage fishing equipment on BMG Property outside of established PSZs.	Fisheries Damages Protocol	Chief Operating Officer
EPO1: No serious or irreversible harm to a threatened or migratory listed species. **EPO2**: Biologically important behaviours can continue while the activity is being undertaken. **EPO6**: Minimise anthropogenic threats to allow for blue whale and southern right whale conservation status to improve so that they can be removed from the EPBC Act threatened species list, consistent with the objectives and specific actions of the species' recovery plans.	**C10**: EPBC Regulations 2025 - Part 8 Division 8.1 interacting with cetaceans	Vessels adhere to the distances and vessel management practices of EPBC Regulations 2025 (Part 8) with increased caution zone of 500 m between whales and project vessels.	Daily operations report details when whales, dolphins or seals sighted, and the interaction management actions were implemented, if required.	Vessel Master
	C12: Underwater Noise characterisation	Noise associated with DP vessels will be sufficiently characterised via: • Noise modelling using analogous sound sources, for impact assessment and mitigation design • Review of selected vessel source level; if source levels are larger than those used in existing project modelling; additional noise contour characterisation will be undertaken. Monitoring regimes will be scaled to encompass the behavioural noise contour, in accordance with the plan outlined in Section 10.11.	Noise modelling report Vessel noise characterisation review	Project Manager

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
		Timing: where DP vessel activity coincides with blue whale season		
	C13: Blue whale CMP Action A.2.3 and Marine Mammal Adaptive Management	Blue whale CMP Action A.2.3: Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area. DAWE guidance on key terms: mitigation measures are implemented to reduce the risk of displacement occurring during operations where modelling indicates that behavioural disturbance within a foraging area may occur. These measures will be implemented where the action is needed to achieve the objective of the blue whale CMP (EPO6). This will involve: • Adaptive management measures will be implemented for vessels operating within the defined peak periods (including shoulder periods) when blue whales are more likely to be foraging in the area • Application of mitigation measures to reduce the risk of (blue whale) displacement occurring during operations. Timing: where DP vessel activity coincides with blue whale season	Daily report MMO reports Risk Review Records (where required)	Project Manager

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
EPO7: Undertake the activity in a manner that will not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted.	**C14**: Marine exclusion and caution zones	A permanent PSZ shall be maintained for the BMG subsea infrastructure until PSZ adjustment/revocation .	PSZ gazetted notice	Operations Manager
		Subsea infrastructure is marked on navigational charts.	Navigational charts	Operations Manager
		500 m safety exclusion zone to be established via Notice to Mariners around vessels undertaking petroleum activities.	Completed Notice to Marines request	Project Manager
	C15: Pre-start notifications	The AHS will be notified no less than three weeks before operations commence, or as otherwise agreed to with AHS, to enable Notices to Mariners to be published.	Email records	Project Manager
		AMSA's JRCC will be notified within 2 days of expected commencement of activities, or as otherwise agreed with AMSA JRCC.	Email records	Vessel Master
	C16: Marine Order 27: Safety of navigation and radio equipment	Vessels shall meet the safety of navigation and radio equipment requirements of AMSA MO 27.	Vessel inspection	Vessel Master
	C17: As-left seabed survey	An as-left seabed survey will be undertaken prior to completion of the activity.	Survey records	Project Manager
	C18: Ongoing consultation	Notifications for any on-water activities and ongoing consultations undertaken per Section 10.12.	Notification records	Project Manager
	C19: Fisheries Damages Protocol	Fisheries Damages Protocol in place until VIC/RL13 is relinquished, to provide a compensation mechanism to fishers should they damage fishing equipment	Fisheries Damages Protocol	Chief Operating Officer

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
		on BMG Property outside of established PSZs		
	C2: Wet parking restricted to within the existing PSZs.	All infrastructure requiring wet parking is limited to identified planned areas inside existing PSZs.	Data verifies infrastructure locations are as planned within Amplitude Energy infrastructure tracking system.	Project Manager
			Planned wet parking locations are within existing PSZs	Project Manager
	C19: Fisheries Damages Protocol, and provision for seabed surveys where supported by a valid claim	After completion of Phase 2 decommissioning and until VIC/RL13 is relinquished: • Where complaints of hook-up are received by Amplitude Energy; the Fisheries Damages Protocol shall be applied. • Amplitude Energy may complete a seabed survey where the claim identifies an un-mitigated snag risk likely to be attributable to BMG infrastructure.	Survey records Relevant person log/records	Project Manager
EPO8: No unplanned discharge of waste to the marine environment.	**C6**: AMSA Vessel Discharge Standards	Waste with potential to be windblown shall be stored in covered containers.	HSE inspection records Garbage record book Incident report	Vessel Master / Offshore Decommissioning Manager
	C7: Garbage Management Plan	Vessels will have a garbage management plan in place.	Garbage record book	Vessel Master / Offshore Decommissioning Manager
	C11: Equipment deployment, transfers, and recovery procedures.	Equipment will be deployed and recovered in line with the Operations Program and Vessel Safe Work Systems Management System.	Daily activity report	Activity Superintendent

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
EPO9: No introduction, establishment or spread of a known or potential invasive marine species	**C20**: IMS Risk Management Protocol	Completed risk assessment and management actions in accordance with the IMS Risk Management Protocol.	Compliance and Readiness Review report verifies that IMS Risk Assessment undertaken.	Project Manager
EPO10: No spills of chemicals or hydrocarbons to the marine environment.	**C14**: Marine exclusion and caution zones	500 m safety exclusion zone to be implemented around vessels during petroleum activities	Completed Notice to Mariners request	Project Manager
	C18: Ongoing consultation	The AHS will be notified no less than three working weeks before operations commence to enable Notices to Mariners to be published, or as otherwise agreed with AHS.	Email records confirm a Notice to Mariners request was provided to the AHS via email and that such notice was provided at least three weeks before operations commenced, or as otherwise agreed during consultation.	Project Manager
		AMSA's JRCC will be notified within 2 days of expected commencement of activities to enable AMSA to distribute an AUSCOAST warning.	Email records confirm that information to distribute an AUSCOAST warning was provided to the JRCC.	Offshore Decommissioning Manager / Vessel Master
		Relevant persons will be notified of activities prior to operations commencing as and where agreed during consultation.	Stakeholder log/records confirm that pre-start notifications were sent to relevant persons where applicable.	Project Manager
	C16: Marine Order 27: Safety of navigation and radio equipment	Vessels shall meet the safety of navigation and radio equipment requirements of AMSA MO 27.	Vessel inspection	Vessel Master
	C21: Marine Order 31: SOLAS and non-SOLAS certification	Vessels will meet survey, maintenance and certification of regulated Australian vessels as per AMSA MO 31.	Vessel certification	Vessel Master
	C22: Marine Order 21: Safety and emergency arrangements	Vessels shall meet the safety measures and emergency procedures of the AMSA MO 21.	Vessel inspection	Vessel Master

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
	C5: Marine Order 30: Prevention of collisions	Vessels shall meet the navigation equipment, watchkeeping, radar and lighting requirements of AMSA MO 30.	Vessel inspection	Vessel Master
	C23: Vessel compliant with MARPOL Annex I, as appropriate to class (i.e. SMPEP or equivalent)	Vessel has a SMPEP (or equivalent appropriate to class) which is: • Implemented in the event of a spill to deck or ocean • Exercised as per the vessels exercise schedule. Spill response kits are located in high spill risk areas and routinely checked to ensure adequate.	Vessel SMPEP Vessel exercise schedule Vessel inspection	Vessel Master
	C31: Containment/bunding used on vessels during flowline retrieval.	Vessel shall have containment/bunding on deck to contain any accidental release of residual hydrocarbon from flowlines.	Vessel inspection	Vessel Master
	C32: Flowline plugs to be installed prior to removal of B6 flowline.	Appropriately designed flowline plugs to be installed prior to removal of B6 flowline.	Daily activity report	Offshore Decommissioning Manager / Vessel Master
	C33: Infield visual monitoring of B6 during flowline removal.	Visual surveillance (via ROV) of B6 flowline retrieval to monitor visible signs of hydrocarbon release. Visual surveillance of water surface during flowline retrieval to monitor visible signs of hydrocarbon release.	Daily activity report	Offshore Decommissioning Manager / Vessel Master
EPO11: Impacts to values and sensitivities are minimised in the event of a loss of hydrocarbons.	**C24**: OPEP	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.	Records confirm that emergency response activities have been implemented in accordance with the OPEP	Incident Management Team (IMT) Incident Controller (IC)

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
	C25: OSMP	Operational and scientific monitoring will be implemented in accordance with the OSMP.	Records confirm that operational and scientific monitoring have been implemented in accordance with the OSMP	IMT IC
	C18: Ongoing consultation	In the event of a major spill event, potentially relevant persons will be identified and notified.	Records confirm that relevant persons identified using oil spill trajectory modelling, and that consultation efforts commenced	IMT IC
EPO12: General Direction 824(3) Until such time as direction 1 and 2 are complete, maintain all property on the title to NOPSEMA's satisfaction, to ensure removal of property is not precluded.	**C26**: Phase 1 Flowline Integrity Provisions	Flowlines are managed during Phase 1 activities such that full removal is not precluded during Phase 2. Integrity provisions for implementation in Phase 1 include: • Flowline flushing procedures are developed and implemented • Environmental caps are installed on flowlines if needed to limit corrosion of flowline internal materials between Phase 1 and Phase 2. Depending on corrosion studies, the flowlines may capped and/or displaced to inhibited water after flushing, if required, to maintain integrity sufficient to allow removal within the period 2024-2026 (Phase 2 campaign).	Project procedures Project execution reports	Project Manager
EPO13: Sea dumping is undertaken in accordance with the *Sea Dumping Act.*	**C27**: Sea Dumping Permits	Sea Dumping permits are obtained prior to sea dumping, and permit requirements are fulfilled. A sea dumping permit is required for the infrastructure to remain in situ on the seabed prior to relinquishment of Title.	Approved Sea Dumping Permits Project Execution Reports	Project Manager

EPO	Control Measure	EPS	Measurement Criteria	Responsible Person
EPO16: Onshore waste management is undertaken in accordance with relevant state legislation.	**C30**: Onshore waste management	Onshore waste will be disposed of at an appropriately licenced waste facility that complies with relevant state legislation Waste will be managed according to the Waste Hierarchy, with opportunities sought to re-use and recycle equipment recovered from the seabed.	Records confirm that onshore waste have been disposed of in an appropriate licenced waste facility. Records confirm opportunities for re-use and recycling of recovered equipment are investigated.	Project Manager

9.0 Consultation

9.1 Summary

Amplitude Energy is committed to engaging with relevant persons (as that term is defined in regulation 25 of the OPGGS(E)R) in a transparent, genuine and meaningful way, through our consultation process. We recognise that our consultation process must be robust and systematic, so that it is consistently and demonstrably compliant with the applicable regulatory requirements. Amplitude Energy consulted with relevant persons in the course of preparing this EP in accordance with our consultation process, and applicable regulations and guidelines. Amplitude Energy's consultation process sought to acknowledge that any consultation process must also have a degree of adaptability, as it is a "real world" activity in a dynamic environment, that will vary depending on the nature of the authority, persons or organisations to be consulted. This is because the purpose of consultation is to inform Amplitude Energy's understanding of the environment, including the social, cultural and heritage values of features that may be impacted by our EP activities.

This section sets out how Amplitude Energy has carried out consultation for the BMG Closure Project (Phase 2) EP [BMG-DC-EMP-0002], in accordance with the OPGGS(E)R, and having regard to the published guidance materials from NOPSEMA. Amplitude Energy commenced consultation from early-August 2025, with select stakeholders, including the closest First Nations organisation and those fisheries most likely to be impacted. The broader consultation process, with the majority of stakeholders, commenced late-September/early-October 2025 and ran until prior to the submission date of this EP. The design of our consultation process ensured that relevant persons were identified and provided sufficient information and a reasonable time period to make an informed assessment of the potential impacts of our EP activities. Given the broad range and geographical spread of relevant persons, a variety of engagement methods were used to ensure they were provided with sufficient information, and opportunities to obtain further information. These engagement methods included phone calls, emails, text messages, newspaper advertisements, a dedicated consultation website, tailored meetings and tailored information sheets.

Overall, there were limited enquiries, claims, or objections raised in the consultation process by relevant persons. For the limited concerns raised, Amplitude Energy's process was to carefully assess the merits of the claims or objections on a case-by-case basis, and (where appropriate) adopt new or changed control measures to reduce the relevant risks or impacts to an acceptable level and ALARP, and consistent with the principles of ESD. This is described further in Section 5.2.4. In practice, only one objection was received, where the relevant person expressed a preference to leaving offshore infrastructure in situ.

Where Amplitude Energy has received input from relevant persons in consultation undertaken in the course of preparing other EPs, it has considered and applied that input in the course of preparing this EP and included where appropriate.

Consultation in the course of preparing this EP has been completed in accordance with the regulatory and legal requirements for such consultation. This EP demonstrates that Amplitude Energy's consultation process has met or exceeded the requirements of the OPGGS(E)R. Should Amplitude Energy receive any further concerns or feedback regarding this EP after the EP has been accepted by NOPSEMA, these will be managed as described in Section 10.12.

9.2 Regulatory Compliance – Summary of Requirement

Regulatory compliance has been achieved, and this EP demonstrates that:

- Per **regulation 25(1) of the OPGGS(E)R**, identification of, and consultation with, relevant persons has occurred (see Section 9.3)

- Per **regulation 25(2) of the OPGGS(E)R**, sufficient information has been provided to relevant persons to enable them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities (see Section 9.3.2)
- Per **regulation 25(3) of the OPGGS(E)R**, a reasonable period for consultation has been provided to each relevant person to consider the information, make their assessment and provide feedback if they wish to do so (see Section 9.3.3)
- Per **regulation 25(4) of the OPGGS(E)R**, relevant persons have been advised that they may request that particular information provided during consultation not be published, and ensuring that such information is not published (see Section 9.3.49.3.4)
- Based on the information and feedback acquired through the consultation process, appropriate measures have been adopted to reduce the impacts and risks associated with the activity (see Appendix 5).

This EP sets out the following information pursuant to regulation 24(b) OPGGS(E)R (see Appendix 5 and the Sensitive Information file):

- A summary of each response made by a relevant person
- Our assessment of the merits of any objection or claim about the adverse impacts of any activity to which the EP relates
- Our response, or proposed response, to each objection or claim
- Any measures adopted as a result of consultation
- Copies of the full text of any responses given by a relevant person.

Amplitude Energy continuously reviews and improves its policies and procedures, to reflect changes in law, regulator guidelines, judicial decisions and industry standards. Additionally, following the appeal decision of *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193, Amplitude Energy conducted an extensive review of its methodology for identifying and consulting with relevant persons, for the purposes of preparing its EPs.

The following NOPSEMA guidelines were also considered in planning and delivering our consultation process:

- GL2086 – Consultation in the course of preparing an environment plan – May 2024 (NOPSEMA, 2024c)
- GN1344 – Environment plan content requirements – July 2025 (NOPSEMA, 2025a)
- GN1488 – Oil pollution risk management – March 2026 (NOPSEMA, 2026c)
- GN1785 – Petroleum activities and Australian Marine Parks – August 2025 (NOPSEMA, 2025e)
- GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – November 2024 (NOPSEMA, 2024d).

Table 9-1 - OPGGS(E) Regulation Consultation Requirements

OPGGS(E)R Regulation	NOPSEMA Guideline	How requirements were met
34 Criteria for acceptance of environment plan *Regulation 34 provides that the criteria for acceptance of an environment plan are that the plan demonstrates that:* • *(g)(i) the titleholder has carried out the consultations required by section 25; and* • *(g)(ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate.*	Regulation 25 establishes a duty on titleholders to carry out consultation in the course of preparing an EP. In order to accept an EP under regulation 33, NOPSEMA must be reasonably satisfied (as per regulation 34) that the environment plan demonstrates the duty (to carry out consultation with relevant persons required by regulation 25) has been discharged and that the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate. Consultation should be a genuine and meaningful two-way dialogue in which relevant persons are given sufficient information and time to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities. The consultation process used for different activities may vary depending on a range of factors, certain key principles should be evident in the environment plan.	This EP demonstrates that these requirements were met: • The below summary rows setting out how the consultations required by regulation 25 were carried out; and • Adopting measures as a result of consultation as per the Report on Consultation in Appendix 5.
25(1) Consultation with relevant authorities, persons and organisations etc. *In the course of preparing an environment plan (including a revised environment plan referred to in Division 5) a titleholder must consult each of the following (a relevant person):* • *(a) each Commonwealth, State or Northern Territory agency or authority to which the activities to be carried out under the environment plan may be relevant* • *(b) if the plan relates to activities in the offshore area of a State—the Department of the responsible State Minister* • *(c) if the plan relates to activities in the Principal Northern Territory offshore area—the Department of the responsible Northern Territory Minister* • *(d) a person or organisation whose functions, interests or activities may be affected by the*	Titleholders are required to identify and consult with each authority, person or organisation who falls within the categories of relevant persons set out in regulation 25. Titleholders must clearly identify in their EP who is a relevant person and the rationale the titleholder has used to determine who they consider falls within that definition. EPs should set out the processes that have been applied to identifying and determining who are relevant persons, as well as the process undertaken for consultation. Authorities, persons and organisations are to be identified on a case-by-case basis. Factors such as the nature of the activity, the environment in which the activity is being undertaken, and the possible impacts and risks of the activity should be taken into account when determining whether the activity may be relevant to authorities, or determining who has functions, interests or activities that may be affected. Regulation 25, like most statutory consultation provisions, imposes an obligation that must be capable of practicable and reasonable discharge by the titleholder. It also involves 'some decisional choice' that the titleholder must make in identifying relevant persons and in how the consultation is undertaken. Processes for the identification of relevant persons must provide for sufficiently broad capture of ascertainable persons and organisations who may have their functions, interests or activities affected or that may be affected by the activity.	This EP sets out how Amplitude Energy satisfied the requirements of this regulation in Section 9.3.1 This section, in conjunction with Appendix 5, identifies each relevant person identified for the purpose of this EP and the methodology adopted to identify such relevant persons.

OPGGS(E)R Regulation	NOPSEMA Guideline	How requirements were met
activities to be carried out under the environment plan • *(f) any other person or organisation that the titleholder considers relevant.*	Publication in appropriate media forms may be a reasonable tool to assist in the identification of relevant persons and inform the delivery of more targeted notices to potentially relevant persons. It is recognised that in any community consultation there will inevitably be persons within a group who could not participate for various reasons, however the absence of their participation would not invalidate the process provided reasonable efforts were made to identify the relevant persons and to consult with them. The process should include reference to multiple sources of information, such as publicly available materials, review of databases and registers, published guidance, previous history, as well as advice from authorities and other relevant persons. In some cases, relevant persons have developed guidance detailing their functions, interests or activities and how and when they wish to be consulted on activities. Titleholders should take this guidance into account in developing consultation processes with relevant persons. Titleholders may also consider how they can create awareness of their activities to encourage potentially relevant persons to make themselves known to the titleholder.	
***25(2) Consultation with relevant authorities, persons and organisations etc**.* *For the purpose of the consultation, the titleholder must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person.*	Information provided must be sufficient to allow an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person. Again, the titleholder has a 'decisional choice' to make in how information will be given to allow the 'relevant person' to make the assessment contemplated by regulation 25(2). Titleholders should consider the functions, interests or activities of relevant persons and the impacts and risks that affect them when determining information requirements. The EP must demonstrate that the duty (to carry out consultation with relevant persons) has been discharged and that the consultation provided sufficient information about the environment and impacts on the environment. The level of information necessary is likely to vary for different relevant persons and may depend on the degree to which a relevant person is affected. Different consultation processes may be required for relevant persons and organisations depending on information requirements. What constitutes sufficient information as part of a consultation processes may differ depending on the relevant person(s) and the environment plan should demonstrate that the process was suited to the type of relevant person. Generic, targeted electronic mailouts or links to a webpage may not be sufficient. Information should be in a form that is readily accessible and appropriate for the relevant person being consulted. Materials provided may include written forms, pictorial or other	Section 9.3.2 sets out the methodology adopted to preparing and presenting sufficient information to relevant persons, along with the different types of information prepared for relevant persons.

OPGGS(E)R Regulation	NOPSEMA Guideline	How requirements were met
	graphics, verbal briefings or presentations, and the use of other technologies. Information may well need to be provided in an iterative manner, as finer detail and precision is developed through the consultation process. Titleholders are encouraged to discuss expectations around the type and level of detail of information required with relevant persons early when commencing consultation.	
25(3) Consultation with relevant authorities, persons and organisations etc. *The titleholder must allow a relevant person a reasonable period for the consultation.*	Titleholders must provide a 'reasonable period' for the relevant person to make an informed assessment of the possible consequences of the proposed activity on their functions, interests or activities and so they are able to respond with any concerns. The nature, scale and complexity of an activity, as well as the extent and severity of potential impacts and risks on a relevant person's functions, interests or activities may inform what makes a reasonable period for consultation. Relevant persons may have also provided the titleholder with their views of what constitutes reasonable timeframes, their availability and or accessibility issues that should be taken into account. Therefore, what is a reasonable period for consultation should be considered on a case-by-case basis.	Section 9.3.3 sets out Amplitude Energy's approach to ensuring that relevant persons were provided with reasonable periods for consultation.
25(4) Consultation with relevant authorities, persons and organisations etc. *The titleholder must tell each relevant person the titleholder consults that:* • *(a) the relevant person may request that particular information the relevant person provides in the consultation not be published; and* • *(b) information subject to such a request is not to be published under this Part.*	—	See Section 9.3.4, Appendix 5 and the Sensitive Information file.
24 Other information in environment plan. *The environment plan must contain the following:* • *(a) a statement of the titleholder's corporate environmental policy.* • *(b) a report on all consultations under section 25 of any relevant person by the titleholder, that contains:* – *(i) a summary of each response made by a relevant person; and*	The consultation process should be documented within the EP through the titleholder report on consultation and the sensitive information report. Under regulation 24(b) of the OPGGS(E)R, the EP must contain a report on the consultation which provides: • a summary of each response made by a relevant person • an assessment of the merits of any objection or claim about adverse impact of each activity to which the environment plan relates	See Appendix 5 for the Report on Consultation.

OPGGS(E)R Regulation	NOPSEMA Guideline	How requirements were met
– *(ii) an assessment of the merits of any objection or claim about the adverse impact of each activity to which the environment plan relates; and* – *(iii) a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and* – *(iv) a copy of the full text of any response by a relevant person.* • *(c) details of all reportable incidents in relation to the proposed activity.*	• a statement of the titleholder's response, or proposed response, if any, to each objection or claim • a copy of the full text of any response by a relevant person. NOPSEMA expects the EP to also provide descriptions of the consultation processes, and the rationale used to determine who and how to consult with relevant persons, including the approach to provision of sufficient information and how a reasonable period for the consultation was determined. This will assist to provide a basis for NOPSEMA to form a reasonable satisfaction view that the titleholder has carried out the consultations required by regulation 25. The consultation process should also assist the titleholder to meet its obligation under section 280 or section 460 of the OPGGS Act which requires that it must carry out the petroleum or greenhouse gas activity respectively in a manner that does not interfere with navigation, fishing, conservation of resources of the sea and seabed, other offshore electricity infrastructure and petroleum activities, and the enjoyment of native title rights and interests (within the meaning of the *Native Title Act 1993*) to a greater extent than is necessary for the reasonable exercise of the titleholder's rights and obligations. Titleholders should ensure that a summary containing the main matters raised in each response made by a relevant person is included in the consultation report. The report on consultation should not include the full text or extracts of the full text of any response by a relevant person. Under regulation 26(8), this information must be contained in the sensitive information part of the EP and not anywhere else in the plan. The report on consultation should also include clear and precise identification of claims and objections presented, an assessment of the merit of each objection or claim with sufficient rationale provided to support that assessment, and a demonstration of the suitability of any measures adopted as a result of the consultation. Full text (source) records must be provided to verify the accuracy of the summary of the consultation. NOPSEMA interprets the term "full text" to mean an unedited version of the correspondence received without redacted or modified text. Titleholders will need to document in written form all communications undertaken between themselves and relevant persons. This may require documenting the minutes of meetings, undertaking written communications wherever practicable and requesting that responses from relevant persons be provided in writing where practical.	

OPGGS(E)R Regulation	NOPSEMA Guideline	How requirements were met
22(15) and (16) Implementation strategy for environment plan *(15) The implementation strategy must provide for appropriate consultation with:* • *(a) relevant authorities of the Commonwealth, a State or a Territory; and* • *(b) other relevant interested persons or organisations.* *(16) The implementation strategy must comply with the Act, this instrument, any other regulations made under the Act, and any other environmental legislation applying to the activity.*	Demonstrating in an EP that ongoing consultation is a part of a titleholder's implementation strategy as required by regulation 22(15), is separate to demonstrating that requirements for relevant persons consultation as required under regulation 25 and outlined in NOPSEMA's guideline have been met.	Section 10.12 of the Implementation Strategy.

9.3 Consultation with Relevant Authorities, Personal and Organisations – Regulation 25 of the OPGGS(E)R

9.3.1 Identifying Relevant Persons – 25(1)

In properly discharging our consultation obligations for identifying relevant persons under regulation 25(1)(a), (b), (c), (d) and (e) of the OPGGS(E)R, we have adopted a methodology that is reasonable, pragmatic and factors in the practical aspects of the consultation process, while remaining compliant with applicable law. This methodology is consistent with NOPSEMA's guidelines and demonstrates Amplitude Energy's cognisance of:

- the planned activities
- the geographical extent to which the environment may be affected by unplanned events, risks and impacts.

The below graphic (Figure 9-1) sets out an overview of the process undertaken by Amplitude Energy to identify relevant persons.

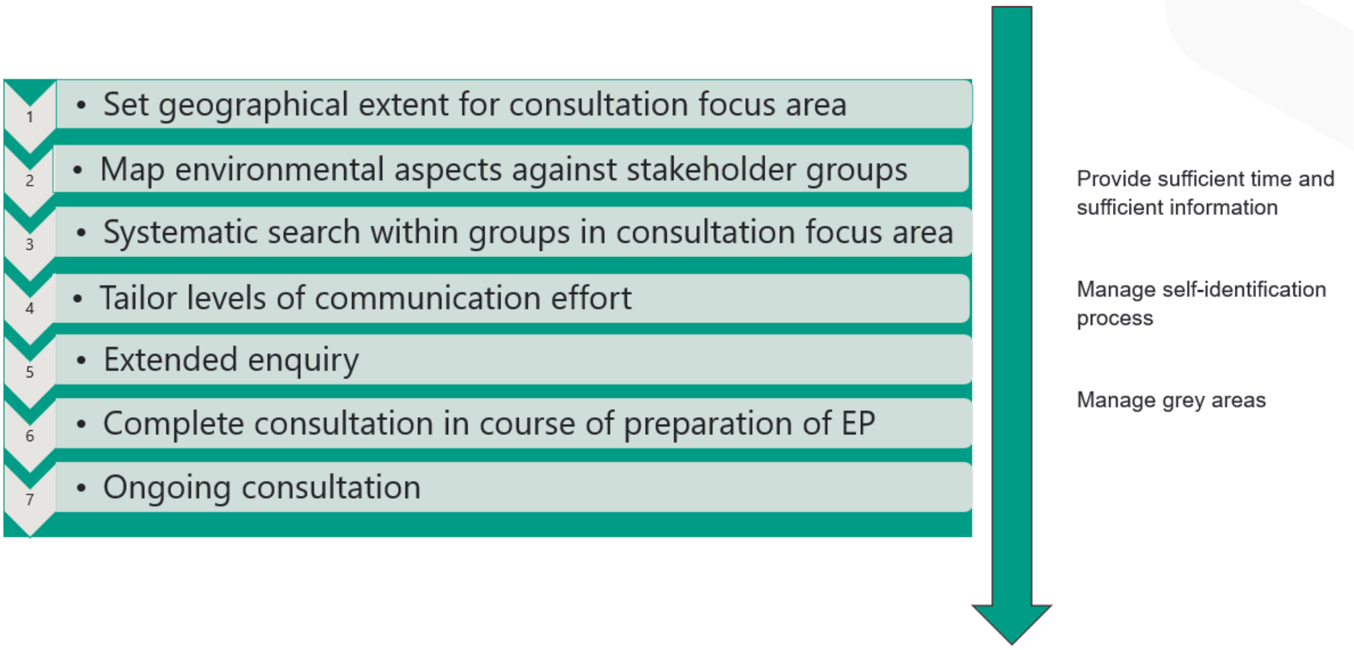


Figure 9-1 - Process Steps

9.3.1.1 Geographical Extent for Consultation Focus Area

The purpose of consultation is to gain input from individuals, groups and authorities who are potentially affected by the activities under the EP, so that these risks and impacts can be assessed and reduced to an acceptable level and ALARP.

The first phase of our methodology for identifying relevant persons was to overlay the extent of potential impacts from our planned activities and unplanned events with persons or organisations whose interests, activities or functions could be impacted.

Our methodology and rationale for this approach is set out further below.

Planned Activities

We considered the largest spatial area where a person's interests, activities or functions could be impacted by the planned activities and determined this to be the EMBA by artificial light and underwater sound emissions. We refer to this as the Activities EMBA.

The persons that may be affected by planned activities do not necessarily reside proximate to the activities, but have functions, interests or activities that potentially overlap with the Activities EMBA.

For example, a person with fishing quota overlapping the Activities EMBA, or a conservation organisation with an interest in protecting marine mammals transiting the area, may be based outside of the Activities EMBA but nonetheless be a relevant person for the purpose of Amplitude Energy's consultation.

Unplanned Events

Of the potential unplanned events, the one that carries the highest level of public interest and potential consequences is a hydrocarbon spill.

We used quantitative stochastic spill modelling for a loss of containment during activities, to determine the total geographic area that could potentially be impacted by a hydrocarbon spill. We use the Spill EMBA (identified in Section 4.2) to guide where to focus consultation efforts and to delineate a Consultation Focus Area (CFA) (Figure 9-2). We do this because whilst the Spill EMBA (and therefore CFA) is large, and impacts are unlikely, it provides conservatism in how broadly we seek relevant persons.

The stochastic modelling in Section 6.7 shows that in the unlikely event of a spill, the lower concentrations for visible surface and shoreline oil (i.e. where there is some potential for social affects) is within the Spill EMBA and therefore the CFA. Further, as described in Section 6.7, the potential risks to ecological and social receptors within the extent of the Spill EMBA are not homogenous; they would vary in consequence as the concentrations of oil are not uniform to the outer extent of each exposure value, they would decrease distance from the spill source, and therefore the potential consequences are generally of lower severity and scale, and the risk of occurrence is more remote. Having regard to this, we consider that the boundary depicted by the Spill EMBA represents a natural and reasonable point at which to transition from direct identification of relevant persons, to the extended enquiry process described in Section 9.3.1.5

Through our extended enquiry process, sufficiently broad capture and reasonable opportunity was provided for self-identification by relevant persons outside the CFA. We undertook broad coverage advertising of consultation on this EP in national, state-wide, and regional press, and we also made enquiries with the ~230 relevant persons that we consulted with, as to whether there were any other potentially interested persons they thought we should contact.

Overall, by using in combination of:

- A CFA that identified and concentrated efforts on persons who might have functions, interests or activities within the Spill EMBA
- An extensive extended enquiry process with a sufficiently broad capture to seek out and allow for self-identification of persons outside the CFA

Amplitude Energy has been able to discharge its consultation requirements in a practical and reasonable manner, that supports the objects of the OPGGS(E)R.

For this EP, in addition to completing direct enquiry within the CFA, we undertook additional direct enquiry along the full coastal areas adjacent to wherever the CFA crossed the State waters boundary, even if the CFA did not intersect the coastline itself.

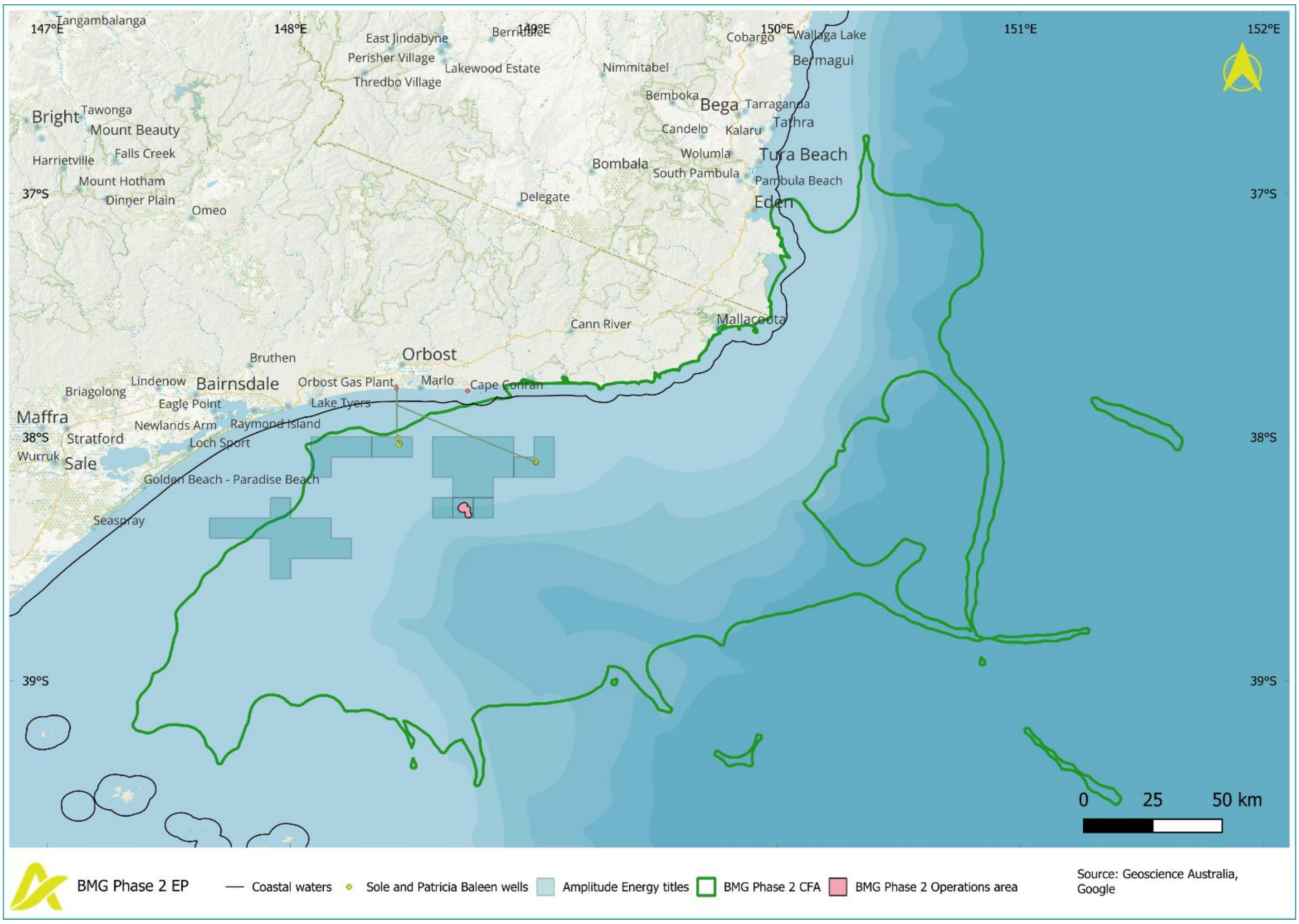


Figure 9-2 - Consultation Focus Area (CFA)

9.3.1.2 Defining Relevant Person Categories

The second phase of our methodology for identifying relevant persons was to assess the categories of relevant persons who might have their functions, interests or activities affected by our activities under the EP. By mapping these categories of relevant persons, we were then able to perform more detailed searches and research for identification purposes.

Consistent with the objects of the OPGGS(E)R, a broad approach was taken to the ‘relevant persons’ concept and this included government departments and agencies, private sector organisations and individuals. The “interests” of relevant persons were not confined to legal interests in land or property but also included environmental values and sensitives in connection with the sea and marine resources that may be affected.

To support identification of groups of relevant persons that may be affected, they were mapped against environmental aspects to determine how their functions, interests or activities may be affected by our activities. This mapping is shown in Table 9-2

Commonwealth and State government departments and agencies are not included in this mapping table. Rather, in their case we considered whether the activities may be relevant to their roles and responsibilities, and reviewed:

- GL1887 - Consultation with Commonwealth agencies with responsibilities in the marine area (NOPSEMA, 2024d)
- GN1785 - Petroleum activities and Australian Marine Parks (NOPSEMA, 2025e)

- Amplitude Energy's prior consultation in the area
- Desktop analysis to identify any agency or department changes.

Appendix 5 of the EP provides lists of the relevant persons that were identified, and our rationale for their inclusion in the list.

Table 9-2: Aspects and Groups of Relevant Persons

Group of Relevant Person	Indicative level of effort	Physical Presence		Planned Emissions			Planned Discharges		Unplanned Interaction			Accidental release	
		Displacement of other marine users	Seabed disturbance	Light Emissions	Underwater sound	Atmospheric	Subsea discharges	Routine Vessel Discharges	Marine Fauna Interaction	Introduction, Establishment and Spread of IMS	Dropped object	LoC – Minor	LoC – Vessel Collision
Business, industry and research													
Marine based businesses	2	X								X			X
Energy operators	2	X			X				X	X			X
Other infrastructure	2	X	X								X		X
Research	2	X	X	X	X	X	X	X	X	X	X	X	X
Tourism	2	X							X				X
First Nations													
NSW South Coast Local Aboriginal Land Councils	1								X				X
Gunaikurnai	1		x	x	x		x		X				X
Other First Nations peoples (if identified)	1		X	X	X		X		X				X
Fisheries licence holders or representatives													
Fishers – major peak bodies – SIV and SETFIA	1	X	X		X		X		X	X			X
Fishers- other	2												
Recreational fishers	2	X	X		X		X		X	X			X
Aquaculture operators	2		X		X		X		X	X			X
Interest groups													

Group of Relevant Person	Indicative level of effort	Physical Presence		Planned Emissions			Planned Discharges		Unplanned Interaction			Accidental release	
		Displacement of other marine users	Seabed disturbance	Light Emissions	Underwater sound	Atmospheric	Subsea discharges	Routine Vessel Discharges	Marine Fauna Interaction	Introduction, Establishment and Spread of IMS	Dropped object	LoC – Minor	LoC – Vessel Collision
Conservation & environment	2		X	X	X	X	X	X	X	X	X	X	X
Marine recreation	2	X							X				X
Coastal community interest groups	2			X		X			X				X
Government													
Local government authorities	2			X		X							X

9.3.1.3 Search within Relevant Persons Categories

A systematic search was undertaken across each group for relevant persons within the CFA, using the following tools:

- Amplitude Energy's established and ongoing operational presence in the area for a decade, and previous consultation undertaken for this and other activities in the region
- Web searches
- Review of other operators' EPs in same general area for comparable projects
- Asking known relevant persons
- Asking other stakeholders who may not be relevant persons themselves
- Reviewing NOPSEMA's consultation with Commonwealth agencies with responsibilities in the marine area guideline (NOPSEMA, 2024d).

This search effort placed maximum weight on known functions, interests or activities that fall within the Activities EMBA (i.e. state/national conservation groups, fishing licence holders, peak bodies), as these may be affected by impacts and risks known to be present. The secondary, but still substantial, search effort targeted identified groups in the CFA.

Amplitude Energy have operated in this area for many years, so most of the relevant persons with functions, interests or activities within the Activities EMBA were already known, as were many with functions, interests or activities more generally within the CFA.

As new groups of relevant persons were identified they were added to Table 9-2 and were subject to the systematic search for members of that group.

9.3.1.4 Tailoring Communications to Relevant Person Categories

Genuine and reasonable efforts were made to elicit a response from relevant persons identified in Section 9.3.1.3. This level of effort varied from multiple emails to multiple attempts via multiple channels (if other channels for contacting a relevant person were ascertainable). This was based on a qualitative, case-by-case assessment, that sought to achieve a balance between overwhelming relevant persons and providing reasonable prompts and opportunities to those wishing to be consulted. We considered factors such as:

- The relevant person's administrative maturity (with shire councils, NGOs, and businesses assumed to have mature communication practices)
- Whether they were represented by other organisations (such as peak bodies or Registered Aboriginal Parties (RAPs)/Prescribed Body Corporates (PBCs)/Local Aboriginal Land Councils (LACLs))
- Whether they could be resource poor and potentially not monitoring communications
- The likelihood, extent or severity of potential risks and impacts to the relevant person's functions, activities and interests
- Our previous consultation with relevant persons for the BMG Closure Project (Phase 2) EP (accepted 13 February 2024), noting that the primary difference in the activity under this EP is timing, and is unlikely to be of consequence to those other than the fishing (primarily trawling) community.

Our general approach was to implement at least the minimum level effort described in Table 9-3 for each type of stakeholder.

Table 9-3 - Levels of Effort Examples

Relevant person	Minimum Level of effort (1 being highest)	Rationale
RAP, PBC or LALC	1	Can be under-resourced.

Relevant person	Minimum Level of effort (1 being highest)	Rationale
		Important conduit to community.
Fishing peak body – SIV, TA, and SETFIA – cover the majority of potentially impacted fishers	1	Important conduit to members.
Individual fisher – not represented	2	Experience tells us they do not like to be over-engaged and will respond if wish to engage.
Individual fisher – represented	None	If clearly represented, they generally would not wish to be contacted.
Fishers – smaller representative bodies such as local co-ops and sub-regional groups	2	Reasonable maturity, monitor correspondence as a primary function, and represented by peak body.
Local conservation group	2	Typically responsive when a project is of interest.
Business	2	Monitoring correspondence is a critical business function.
Local government authority	2	High level of administrative capability.

Table 9-4 - Levels of Effort

Level of effort	Description of minimum follow up to initial contact[27]
1	Phone call and/or text message if no response received to original email. Email to notify the relevant person that we were approaching the time of submission of the EP to NOPSEMA. (Not required if already in dialogue, or engagement complete).
2	Email to notify the relevant person that we were approaching the time of submission of the EP to NOPSEMA. (Not required if already in dialogue, or engagement complete).

9.3.1.5 Extended Engagement

The majority of relevant persons were expected to be ascertainable through the systematic search described in Section 9.3.1.3. However, we considered that some relevant persons might be missed due to factors including geographic location or inadequate communication from their representative bodies. Through extended enquiry over an area informed by the full Monitoring Area (identified in Section 4.2), reasonable additional efforts were made to contact these persons.

Extended enquiry comprised media advertisements during November 2025 inviting consultation through:

- Coastal regional press over the CFA and extended east to Illawarra (south of Sydney), west to Wonthaggi (south-east of Melbourne), and south to north-east Tasmania (see Figure 9-5).
- Melbourne and Sydney metropolitan (state-wide) press – *The Herald Sun and the Daily Telegraph*
- National Indigenous media – *Koori Mail*
- National press through – *The Australian.*

A link to the **consultation web page** was also provided on our Amplitude Energy website. Examples of posted advertisements are shown in Figure 9-3 and Figure 9-4.

[27] Where a relevant person effectively restricts contact to that via a webform with no other means provided, no follow up is made to initial contact (if no response) as it is reasonably assumed that contact is via their preferred method and is well received.

RELEVANT PERSONS CONSULTATION ON ENVIRONMENT PLAN

BMG CLOSURE PHASE 2 - OFFSHORE MARLO, EAST GIPPSLAND

Amplitude Energy* is updating its accepted environment plan for the 2nd and final phase of decommissioning of the legacy Basker Manta Gummy (BMG) oil field in Commonwealth waters ~50kms offshore Marlo, Victoria.

In May 2024, Amplitude Energy completed phase 1 of the project and safely decommissioned all 7 legacy wells. Phase 2 activities will involve recovering equipment from the seabed for onshore recycling and disposal. The environment plan covering these phase 2 activities is being revised to reflect updated timing, which will be driven by vessel availability between 2026-2030.

Relevant persons consultation

If your functions, interests or activities may be affected by the proposed activities under this environment plan, then we invite you to consult with us. We consult with relevant persons to understand if you may have information that we might not otherwise be aware of which we can use to improve our environment plan.

For more information about our proposed project, please see our consultation page via the QR code, or at https://amplitudeenergy.com.au/consultation.

The consultation process

For information about our offshore environment plans and the consultation process, including our obligations, please visit: https://amplitudeenergy.com.au/consultation/why-we-consult

Please contact us by 8 December 2025 at stakeholder@amplitudeenergy.com.au or call 61 8 8100 4900 if you would like further information or to be consulted on this EP.

*Amplitude Energy is the name of the parent company of Cooper Energy Limited

Figure 9-3 - Wonthaggi Times (18 November 2025)

COOPER ENERGY Amplitude energy *

RELEVANT PERSONS CONSULTATION ON ENVIRONMENT PLAN
BMG CLOSURE PHASE 2 - OFFSHORE MARLO, EAST GIPPSLAND

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Please contact us by 8 December 2025 at stakeholder@amplitudeenergy.com.au or call 61 8 8100 4900 if you would like further information or to be consulted on this EP.

*Amplitude Energy is the name of the parent company of Cooper Energy Limited

www.koorimail.com

Figure 9-4 - Koori Mail (19 November 2025)

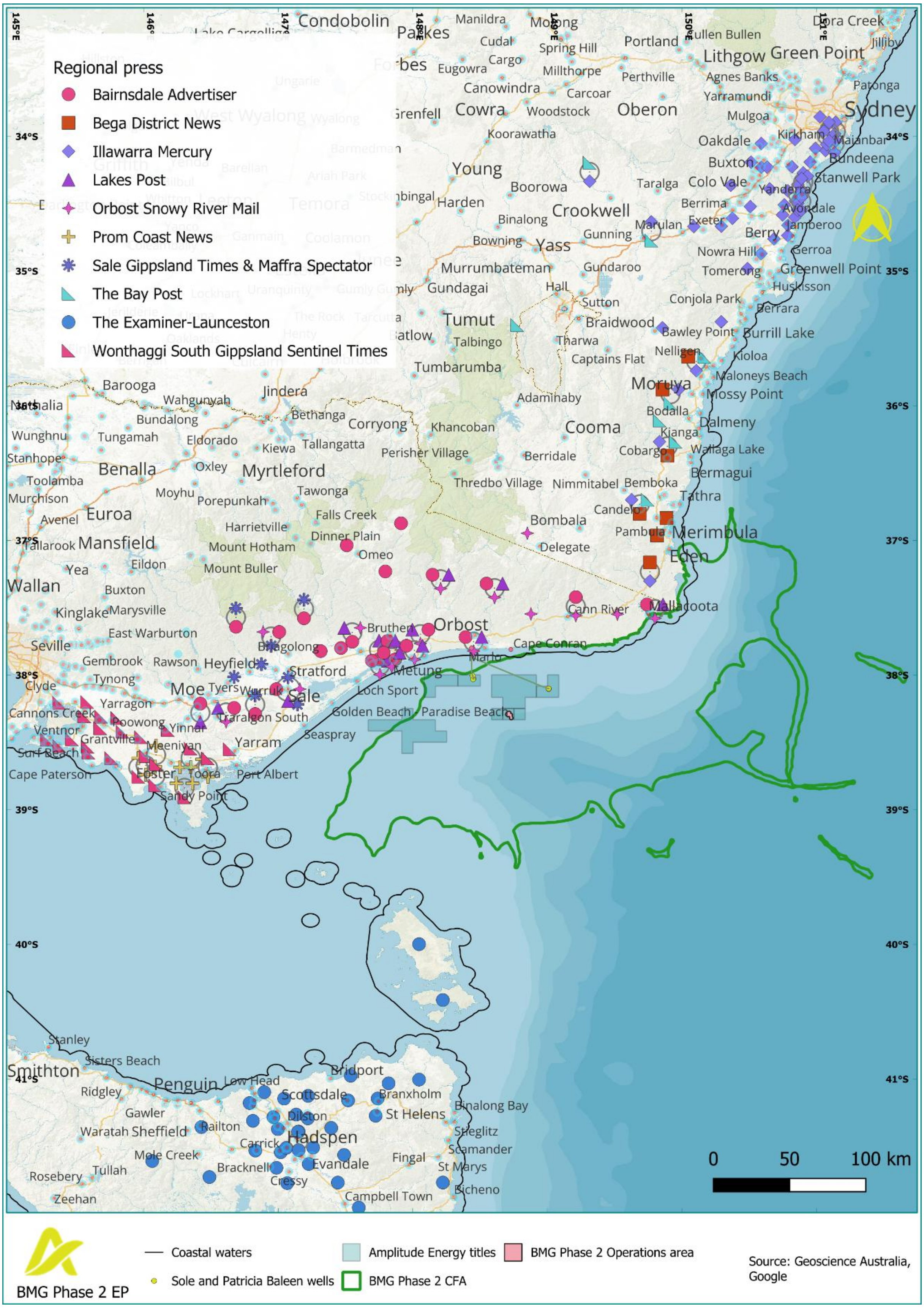

Figure 9-5 - Distribution of Advertisements in Regional Press

9.3.1.6 Summary of Media Used

Table 9-5 - Summary of Advertisements Run

Media	Invitation to consult
Koori Mail	19 November 2025
The Australian	13 November 2025
The Herald Sun	13 November 2025
The Daily Telegraph	13 November 2025
The Launceston Examiner	17 November 2025
Illawarra Mercury	17 November 2025
Batemans Bay Post	15 November 2025
Bega District News	15 November 2025
Bairnsdale Advertiser	19 November 2025
Lakes Post	19 November 2025
Orbost Snowy River Mail	19 November 2025
Prom Coast News	19 November 2025
Sale Gippsland Times	19 November 2025
Wonthaggi South Gippsland Sentinel Times	18 November 2025

9.3.1.7 Self-Identification

In addition to relevant persons that were identified by us, other relevant persons were able to self-identify at any time.

Our approach was not to impose any unnecessary barriers to being considered a relevant person. However, the person would need to demonstrate more than a general interest, and instead advise how their functions, interests or activities may be affected by our activities and provide full contact details to be thereafter included in consultation as a relevant person (if they wished to be included).

Once confirmed as relevant persons, any self-identified relevant persons were consulted in accordance with the process already described in Section 9.3. Levels of effort to communicate described in Section 9.3.1.4 were designated as Level 2, as once such a relevant person had indicated a willingness to engage and provided contact details, it was reasonable to assume any follow up correspondence was received and no further effort was needed to pursue a response.

Nobody self-identified as relevant persons during consultation under this EP. This may be due to the broad effort and the opportunity already provided during prior consultation in preparation of Revision 3 of this EP (accepted 13/2/24).

9.3.2 Providing Relevant Persons Sufficient Information – 25(2)

To satisfy regulatory requirements, Amplitude Energy must give each relevant person sufficient information to allow them to make an informed assessment of the possible consequences of the proposed activity on their functions, interests or activities. Amplitude Energy has prepared and provided information to relevant persons with these requirements and applicable guidelines in mind.

Our approach was to build information flow from the simple to the complex, so relevant persons could gain the depth of information needed relative to their category, and likelihood and degree to which they could be impacted. Noting many relevant persons either have limited time to read through correspondence and/or are experiencing consultation fatigue, our approach to providing sufficient information to relevant persons, was typically to:

- First, capture the relevant person's attention that their functions, interests or activities may be affected by our activities under the EP

- Second, bring key risks and impacts to their further attention
- Third, draw them to our website where more detailed information was available, and ensure pathways for additional information were clear.

Table 9-6 - Information Provided

Information type	Purpose	Key content
Project webpage	The project webpage on the consultation website provides information specific to this EP.	• Description of proposed activities • Location description including map, water depths and distance from shore • Easy links to specific high-level impacts and risks, such as: – Interaction with other marine users – Seabed disturbance – Underwater sound – Greenhouse gas emissions – Other atmospheric emissions – Light emissions – Planned discharges – Invasive marine species – Unplanned interactions with marine fauna – Accidental or uncontrolled hydrocarbon release – Loss of materials or waste overboard • Easy links to tailored information for the following groups: – Research – Marine recreation – Conservation and environment – Recreational fishing – Commercial fishing – Coastal community – Coastal business – First Nations • Link to information sheet • Contact form • Link to current in-force EP - Revision 3 of this EP (accepted 13/2/24) • Link to video showing BMG seabed.
Consultation pages	The consultation pages and the corporate website provide an overview of different activities, and other useful information for relevant persons and other stakeholders.	• Amplitude Energy's general activities and maps of offshore titles • Link to NOPSEMA's community consultation brochure • Amplitude Energy's consultation obligations • Purpose of consulting with relevant persons • Description of an environment plan • Overview of the different activities that might occur in the exploration and production lifecycle • Decommissioning • Oil spill preparedness.
General mailout #1	Invited relevant persons to consult on the proposed activities	• Described change in timing from accepted in-force EP - Revision 3 of this EP (accepted 13/2/24) • Noted location of proposed activities

Information type	Purpose	Key content
		• Purpose of consultation • Why we consult with relevant persons • Described the activities proposed • Provided overview of timing and duration of proposed activities • Downloadable information sheet with maps and diagrams • Provided link to consultation webpage where they could find tailored information • Queried as to whether they knew other relevant persons • Link to NOPSEMA brochure “Consultation on offshore petroleum environment plans – information for the community” • If a First Nations organisation, requested that they share information with members or other relevant persons • Provided an indicative consultation timeline with flexibility noted • Provided “quick response table” to make responding easier • Provided clear contact details. • Noted that they should advise if any information they provided was not to be published • Offered to meet in a manner that met the relevant person’s needs.
Bulk email #3	Advised that this phase of consultation was closing	• Noted this phase of consultation was closing • EP is being prepared for submission to NOPSEMA • Requested that if they had not already done so, they contact by the end of the following week • Noted that ongoing consultation would continue for the life of the project.
Information sheet	Provided as an attachment in emails and downloadable from project consultation webpage	• Map • Expected timing and duration of activities • Diagrams and images • Activity detail • Simple layout of high-level impacts and risks • Activity detail • Why the EP is being updated • Contact details for comment or further information •

Our website was structured so a person could access broad information, but with highlighted pathways to areas of particular interest. This allowed the website user to navigate easily to specific areas, while ensuring all other topics were visible, in case they had wider interests than would be immediately obvious to us. The website provided broader, contextual information about the activities (e.g. that the EP provides for full removal of all equipment from the seabed that can be removed), to provide transparency to relevant persons, and explain why we are undertaking these activities, and how they fit into our future plans.

A clear point of contact was provided on the website, and in all correspondence, for relevant persons to direct their communications, seek additional information or clarifications, or request meetings (as applicable).

A link to the NOPSEMA brochure “Consultation on offshore petroleum environment plans – Information for the community” was also included on the website, to ensure relevant persons understood what to expect with the consultation process and how to participate effectively.

We did not provide our draft EP or draft chapters to relevant persons prior to submission to NOPSEMA, and no requests for such were made by relevant persons. We considered that sharing any early drafts of the EP would be unproductive, as it would not capture the full learnings or benefits of the consultation process.

In addition to the reasonable general information that was provided to all relevant persons, Amplitude Energy also provided information responsively to relevant persons. When responding to relevant persons, specific inquiries were made to confirm whether there was any further information required for those relevant persons to consider the potential impact of the activities on their functions or interests.

9.3.3 Providing Relevant Persons Reasonable Period – 25(3)

To satisfy regulatory requirements, Amplitude Energy must provide relevant persons a reasonable period to identify the possible consequences of the proposed activity on their functions, interests or activities and to respond. The time required for this to occur depends on factors such as the hours available to the relevant person, complexity of issues that may be raised and, in the case of organisations, whether members and/or management are to be consulted. Noting that complex issues may arise in consultation, and it is an iterative process, reasonable time must be given to both the relevant person and Amplitude Energy to review and respond to each other's feedback and/or requests. These reasonable timeframes should be determined on a case-by-case basis and appropriately communicated.

With this in mind, Amplitude Energy commenced consultation with Traditional Owner groups in August and September 2025 resulting in a meeting in September 2025 with GLaWAC, the closest RAP to the activities. This early engagement ensured Tradional Owner groups would have sufficient time to call a properly notified and conducted meeting should that be required.

As the group potentially most impacted by the change in timing, early engagement with SETFIA also resulted in a meeting in September 2025.

For the majority of relevant persons, consultation commenced later in early-October 2025, with a mailout containing sufficient information for a relevant person to determine whether their functions, interests or activities might be affected. Weblinks included in the email took them to specific locations on the website, and the website was designed so they could find the information that might be most relevant to their specific interests. Consultation information and opportunities were provided up until prior to submission of the EP. Throughout this period, we invited relevant persons to contact us if they required further information or wished to discuss any potential impacts or risks that might affect their functions, interests or activities.

We also provided significant flexibility in when, where, and how we could discuss feedback, which included phone calls, online meetings, and exchange of correspondence up until prior to submission of the EP. We had regard to any material provided to us by relevant persons setting out how they wished to be consulted when engaging with those relevant persons. We also informed relevant persons of our planned consultation schedule (Figure 9-6), whilst allowing for variations to that schedule based on their reasonable input.

As a general rule, we considered 30 days to be a reasonable period for relevant persons to either raise initial issues or signal their intention to consult and potentially request additional time or information to do so. Notwithstanding this general view, we took an adaptive approach to the period of time and number of contact attempts made for relevant persons and sought to ensure they were given reasonable opportunities to raise any concerns or queries they had about the proposed activities.

The indicative base timeline for consultation is illustrated in Figure 9-6.

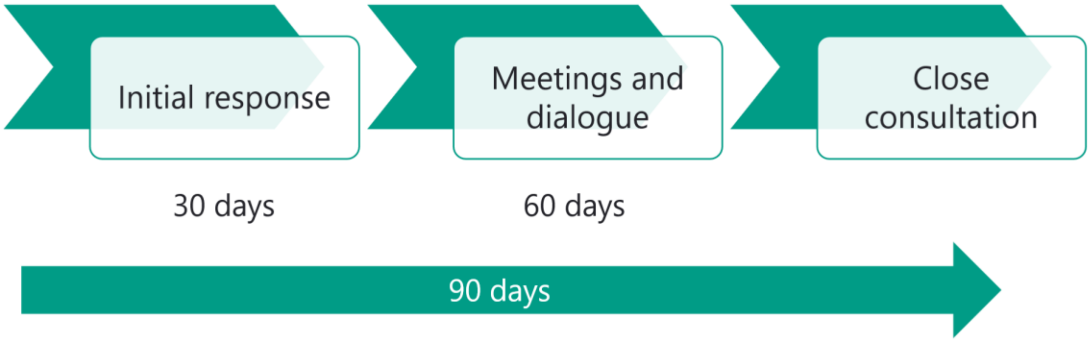

Figure 9-6 - Indicative Timeline

The timeline could be extended based on individual relevant person's reasonable requests.

Other factors considered in deciding whether a relevant person had been provided with a reasonable period for consultation were whether during dialogue with the relevant person, a point was reached where either no new issues were being raised for consideration, or they became unresponsive.

No relevant person indicated to Amplitude Energy that they considered that insufficient time for consultation was provided.

Amplitude Energy considers that a reasonable period of time was afforded to all relevant persons who wished to be consulted in the course of the preparation of this EP.

9.3.4 Sensitive Information – 25(4)

In accordance with regulation 25(4) of the OPGGS(E)R, when engaging in consultation, Amplitude Energy advised relevant persons that they may request that particular information provided during consultation not be published, and that information subject to that request will not be published in the EPs. See Table 9-6 wherein the initial email noted that respondents could request that sensitive information not be published.

9.4 Consultation Approach with Traditional Owners

Amplitude Energy is committed to carrying out respectful and effective consultation with relevant Traditional Owners and building positive and ongoing relationships. In planning, developing and implementing its consultation process with Traditional Owners, we have been cognisant of:

- NOPSEMA's consultation guideline (GL2086 – Consultation in the course of preparing an environment plan – May 2024; (NOPSEMA, 2024c)).
- Recent judicial decisions, namely *Santos NA Barossa Pty Ltd v Tipakalippa [2022] FCAFC 193*, *Cooper v NOPSEMA (No 2) [2023] FCA 1158* and *Munkara v Santos NA Barossa Pty Ltd (No 3) [2024] FCA 9*.
- Applicable legislation including the *Aboriginal Heritage Act 2006* (Vic) that recognises Registered Aboriginal Parties (RAPs) and the *Native Title Act 1993* (Cth) that recognises native titleholders.

It is clear from the Full Federal Court's decision in the *Tipakalippa* appeal (and further reflected in NOPSEMA's consultation guidelines for regulation 25) that some reasonable limits must be applied to titleholder's duty to consult with relevant persons, to ensure that the process is workable. To this end, a titleholder's obligation to consult under regulation 25 of the OPGGS(E)R may be discharged without:

- Accommodating every extension of time or other request made by a particular consultee
- Obtaining consent from the consultee to the activity

- Obtaining confirmation from the consultee, that the process has been carried out to their subjective preferences or individual satisfaction
- What the titleholder must do is provide:
  - Sufficient information to enable the relevant person to make an informed assessment of the possible consequences of the activity on their functions, interests or activities
  - A reasonable period of time for the relevant person to provide feedback, and for the titleholder to assess their objections or claims, and action the assessment and response.

While Amplitude Energy identified both RAPs and LALCs, and individual Traditional Owners as relevant persons, Amplitude Energy considered that those organisations were the nominated representative entities to engage in consultation. Amplitude Energy specifically inquired with the relevant RAP and LALCs as to whether they were aware of other groups or individuals with whom Amplitude Energy should consult, to ensure that it was inclusive and wide-reaching in its consultation with Traditional Owners.

Individual Traditional Owners and Traditional Owners who may not be affiliated with a RAP or LALC were able to self-identify as relevant persons throughout the consultation process, and extended enquiry afforded additional opportunities for any such relevant persons to engage with Amplitude Energy in consultation (using the methodology set out above).

9.4.1 Consultation Approach with Traditional Owners Representative Groups

Having regard to the above, our consultation with the RAPs and LALCs has included the following key actions:

1. Undertaking desktop research to identify RAPs and LALCs overlapping the CFA
2. Providing each of the identified RAPs and LALCs with reasonable information in plain English about the activities covered by this EP
3. Explaining to each of the identified RAP and LALCs the purpose of consultation, and how cultural values and heritage are important to the preparation of the EP
4. Reviewing published literature/sources (e.g. consultation guidelines, protocols or Sea Country plans) for each identified RAP and LALC, to improve our understanding of the cultural features and heritage values overlapping with the Operational Area or Spill EMBA
5. Reviewing published rules, constitutions and other material to identify specific requirements of organisations for consultation (e.g. notice requirements, preferences for how material is prepared, decision making processes)
6. Enquiring how each of these identified RAP/LALCs wish to be consulted
7. Enquiring directly with each identified RAP/LALC as to whether they have any information they wish to provide on their cultural values and heritage
8. Enquiring directly with each identified RAP/LALC as to whether they are authorised to consult on behalf of their members
9. Requesting that each identified RAP/LALC shares consultation information with their members and any other person they consider relevant
10. Informing identified RAP/LALCs of our targeted end date for carrying out consultation, but that we can also accommodate reasonable requests for extensions of time.

If there was no response from the RAP/LALC to our initial communication, we followed up at least two times, and (where possible) via multiple communication channels. This demonstrates a reasonable level of effort, respecting that participation in consultation is voluntary (for the relevant person), that the activity may not be a concern or priority for some RAP/LALCs, and that 'spamming' such organisations may lead to 'consultation fatigue'. This is particularly so in circumstances where the relevant RAP/LALCs had previously been consulted on these activities (with the primary change only being timing).

Where a RAP/LALC responded seeking further engagement, we used best endeavours to conduct consultation in accordance with their expressed preferences and requirements.

In determining whether we had provided a reasonable period of time for consultation with RAP/LALCs, we benchmarked this against other relevant legislative processes, for example:

- Regulation 30 of the OPGGS(E)R, which sets out a public comment period of 30 days for seismic or exploratory drilling EPs
- The then Western Australian Department of Industry and Resources (2004) "Guidelines for Consultation with Indigenous People by Mineral Explorers" which directs a period of 21–30 days of consultation with Traditional Owners
- While repealed, guidance taken from the Aboriginal Cultural Heritage Act 2021—Consultation Guidelines (Government of Western Australia, 2023) suggests that up to 12 weeks may be a reasonable period of time to allow identification, contact, and response, from Traditional Owners (subject to any alternative timeframe being agreed through co-design of consultation).
- Recent DCCEEW consultation on offshore wind zone (Southern Ocean) in the same general offshore region as this project allowed for two months.

Amplitude Energy notes that in *Tipakalippa*, at paragraph 136, Lee J commented that "…it must be taken to be the regulatory intention that the consultation requirement cannot be one that is incapable of being complied with in a reasonable time." In line with this reasoning and having regard to the benchmarks referred to above, Amplitude Energy considers that the total period of time provided to RAP/LALCs for consultation is reasonable, even on a highly conservative view.

9.4.2 Reasonable Opportunity

Our primary efforts to proactively consult with Traditional Owners were made through engagement with the RAP/LALCs as described in the section above. In adopting this approach to consultation with Traditional Owner groups, we were cognisant of:

- The United Nations Declaration of the Rights of Indigenous People which encourages consultation to be undertaken with Indigenous peoples' through their chosen representative entity
- The *Aboriginal Heritage Act 2006* (Vic) which recognises RAPs as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage and the primary source of advice relating to Aboriginal places and objects in the appointed region.
- The *Aboriginal Land Rights Act* 1983 (NSW) which recognises LALCs functions in relation to promoting awareness of and protecting Aboriginal culture and heritage in the LALC's area
- The published rules and constitutions of such RAP/PBCs, and whether their objectives and powers indicated that they were the appropriate authority to engage with in respect of such matters, on behalf of their members.

We also recognised that by approaching individual members of a RAP/LALC directly, we may be perceived to be undermining their nominated representative body and circumventing its proper processes. This could be perceived as disrespectful, cause division within those communities, and may not actually be effective in establishing what cultural features, values or beliefs are held by the relevant peoples, as a people. This was particularly the case where a RAP had previously conveyed that they considered their organisation to be the correct body to be consulting with for the purpose of the regulations (see consultation record 20250916 031656-1405).

Notwithstanding the above, broader efforts were also made to consult with any interested individual Traditional Owners through the following key actions:

1. Placing public notice advertisements in selected local, state and national newspapers to facilitate the opportunity for First Nations persons to self-identify and consult with us; this included the *Koori Mail*
2. Requesting that identified RAP/LALCs distribute consultation information to their members and any other individuals they consider to be relevant, to enable them to self-identify and consult with us

3. Requesting that identified RAP/LALCs identify any individuals that should be consulted, so that we could contact them directly.

In considering how to ensure that we reached Traditional Owners, through our extended enquiry methods, we had specific regard to:

- The public notification process provided under section 66 of the *Native Title Act* (Cth), where the Registrar notifies the general public through the *Koori Mail* and a local newspaper in the area
- The content of our advertisements – which were specifically designed to be easily understood and to make it easy to seek further information (i.e. through our consultation website) or engagement with us.

Amplitude Energy has held regular internal meetings with environment and community engagement team members, to discuss this EP and in particular, our consultation process. As part of these meetings, we regularly reviewed and challenged the soundness of our consultation methodology and considered other opportunities to consult with individual Traditional Owners and/or RAP/LALCs. Some of the opportunities considered (but ultimately dismissed for the reasons outlined below) included:

- Requesting evidence from the RAP/LALCs that they had shared consultation information with their members and other persons they considered relevant, as per our repeated requests and since we did not have a line of sight to this. This option was ultimately discounted, as there has been nothing to suggest that any of the RAP/LALCs would not, or had not, fulfilled their role and responsibilities to members (e.g. by sharing information and complying with any member consultation requests). Therefore, it would have been inappropriate for us to question this, or to ask to review their communications, and this would be inconsistent with how we treat other organisations that represent communal interests.
- Attempting to contact members of RAP/LALCs directly, notwithstanding they had not self-identified and expressed interest in consultation directly with Amplitude Energy. This was ultimately considered to be inappropriate, given the strong rationale described above for treating RAP/LALCs as the primary point of contact, and appropriate authority to speak to the cultural values and sensitivities held by the group (rather than the beliefs of an individual). Additionally, Amplitude Energy was cognisant of the risk that seeking to identify and then contact individual RAP/LALCs members, may be intrusive and unlawful from a privacy perspective, given that the members' contact details were not readily available from a public source or offered by the RAP/LALC itself.
- Attempting to speak with RAP/LALCs directly, by visiting their offices without having scheduled a formal meeting in advance. We determined that this would be inappropriate, as it would be inconsistent with our aim of engaging with Traditional Owners in a voluntary, respectful and productive way.

9.5 Consultation Approach with Individual Traditional Owners

In *Tipakalippa*, the Federal Court when considering the requirements for consultation under regulation 25 (then regulation 11A), had regard to case law concerning the requirements under the *Native Title Act 1993* (Cth) to provide a 'reasonable opportunity' to participate in decision-making. The Court indicated that under the *Native Title Act*, reasonable notice should be provided to relevant native title group members, but exhaustive communications with each and every person are not required. This approach has been endorsed by NOPSEMA in the context of regulation 25 consultation and can be found in the NOPSEMA guidelines.

Amplitude Energy considers that it provided all relevant persons a reasonable opportunity to participate in consultation through the process described in this EP.

9.6 Assessment of Merits of Claims or Objections

Amplitude Energy assessed the merit of any claims or objections raised by relevant persons during consultation (including ongoing consultation) in line with the following process.

For a claim to have merit, it must first and foremost be relevant to the EP and the activities captured by the EP. After passing this relevancy test, the objection or claim should have a reasonable and credible basis for related effects or impacts to occur. This test does not need to be exhaustive, as a proper construction of the OPGGS(E)R requires that all reasonable matters should be assessed.

Once a claim or objection is considered both relevant and reasonable, Amplitude Energy responds as follows:

1. If the claim or objection raised by the relevant person is already addressed in the EP, Amplitude Energy will respond to the relevant person by outlining how the claim or objection has been considered and captured in the EP.
2. If, following Amplitude Energy's evaluation of the claim or objection, it results in new risks/impacts being identified and/or additional controls being developed, the outcomes are shared with the relevant person.

The above steps may comprise an iterative process, and there may be a point at which consultation on an issue is concluded (and the relevant obligations discharged) without the relevant person being satisfied with the outcome.

Amplitude Energy must have fully considered matters raised and demonstrate that impacts and risks of the activity are reduced to ALARP and an acceptable level.

In the case of Traditional Owners interests including intangible cultural heritage, Amplitude Energy will work with the relevant person to gain an appropriate understanding of the relevant claims or objections and aims to work collaboratively to manage and mitigate impacts and risks, where reasonably practicable.

As noted above, Amplitude Energy has satisfied its obligations under regulation 25 of the OPGGS(E)R. Amplitude Energy acknowledges that relevant persons may have different views as to whether the consultation obligations have been discharged.

9.7 Compliance with Consultation Requirements

Section 9.2 sets out in comprehensive detail the steps that have been undertaken to ensure there has been full compliance with the consultation requirements for this EP.

This compliance can be summarised as follows:

- The steps outlined in Section 9.3.1 had been followed, resulting in reasonably ascertainable relevant persons being identified in Appendix 5
- Sufficient information had been provided as described in Section 9.3.2
- Sufficient time had been provided as per Section 9.3.3
- The merits of objections or claims raised by relevant persons (if any) had been considered, and resultant measures (if any) proposed to address those impacts and risks had been communicated to the respective relevant persons and captured in the EP, as described in Appendix 5.
- The date that the current and potentially final phase of consultation was closing had been communicated to any relevant persons with whom an active dialogue had been established, unless that engagement had clearly concluded.

Amplitude Energy consider that we have met the required statutory criteria for consultation for the EP, and in some cases engaged with relevant persons in a manner that has exceeded those criteria.

9.8 Report on Consultation – Regulation 24(b) of the OPGGS(E)R

The report on all consultations under regulation 25 of the OPGGS(E)R of any relevant person, which is provided in Appendix 5 includes:

- A summary of information provided to relevant persons.
- A summary of each response made by a relevant person, as required under regulation 24(b)(i) of the OPGGS(E)R

- Our assessment of the merits of any objection or claim about the adverse impact of each activity, as required under regulation 24(b)(ii) of the OPGGS(E)R
- Our response, or proposed response, to each objection or claim, as required under regulation 24(b)(iii) of the OPGGS(E)R.

10.0 Implementation Strategy

Amplitude Energy retains full and ultimate responsibility as the Titleholder of the petroleum activity and is responsible for ensuring that the petroleum activity is undertaken in accordance with this EP.

Regulation 22 of the OPGGS(E)R details that the EP must contain an implementation strategy. The implementation strategy described in this section provides a summary of the AEMS.

10.1 Amplitude Energy Management System

The AEMS is Amplitude Energy's integrated system which consolidates all of Amplitude Energy's business processes into one system of management, to manage every aspect of Amplitude Energy's business (such as Risk, Health, Safety, Environment and Community [HSEC], Operations, Well Construction, Engineering, and Finance) in accordance with a set of core concepts (Table 10-1).

The AEMS document hierarchy is shown in Figure 10-1, with the AEMS standards listed in Table 10-2, and Amplitude Energy's Health, Safety and Environment Policy (HSE Policy) shown in Figure 10-2.

Table 10-1 - AEMS Core Concepts

Core Concepts	
People	How we organise (line and function) Which roles we need Which skills we need How we build and sustain capability
Culture	Why we exist What we value How we work together How we communicate
Process	What we do How we do it How we learn How we continuously improve
Technology	Which tools we use How we use them How we support people to perform their role
Governance	How we manage risk How we make decisions How we ensure safety, quality and technical integrity

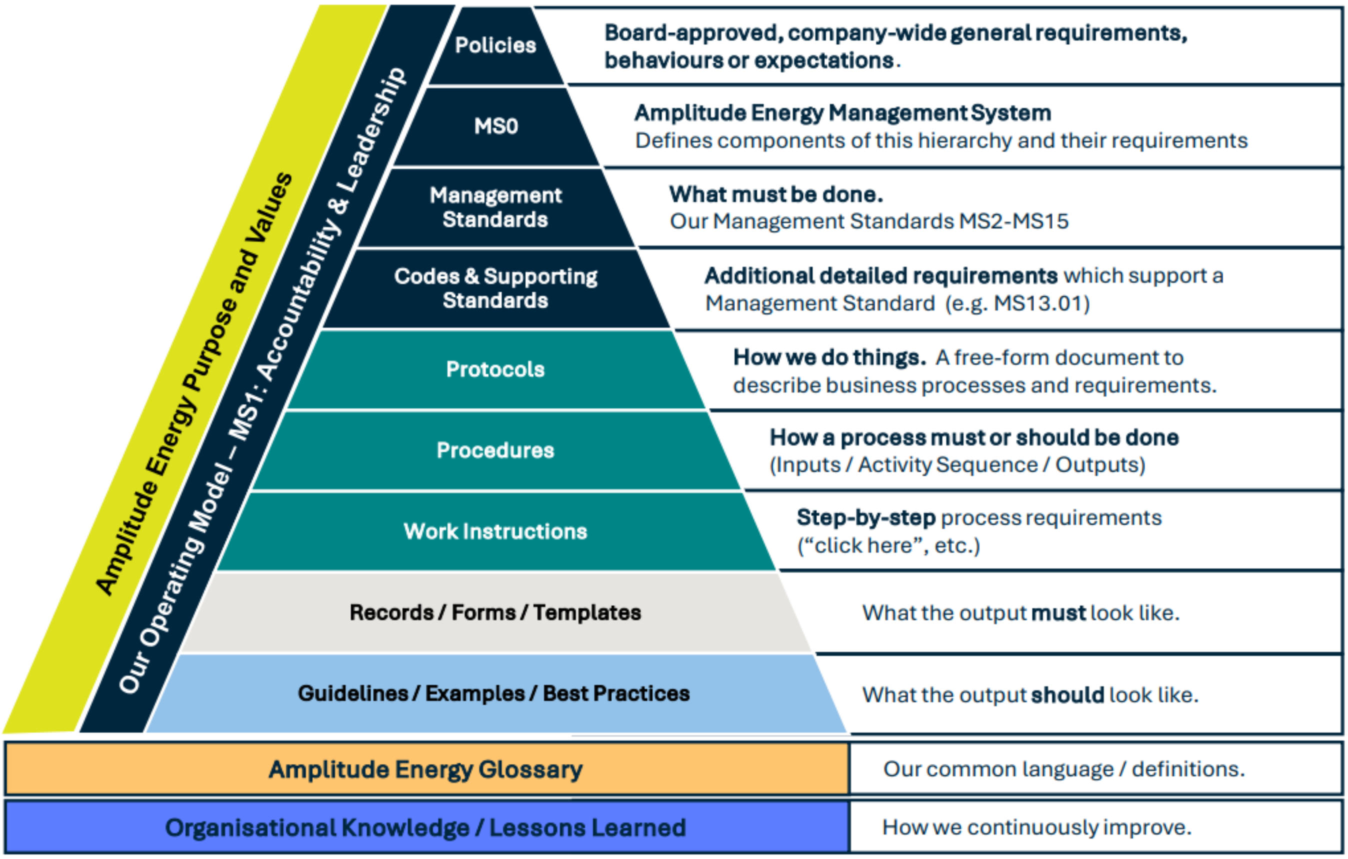

Figure 10-1 - AEMS Document Hierarchy

Table 10-2 - AEMS Standards

AEMS Standard	Focus Area
MS00	Statement of Intent and Expectations
MS01	Accountability and Leadership
MS02	People Management
MS03	Risk Management
MS04	Strategy and Planning Management
MS05	External Affairs, Investor Relations, Community and Stakeholder Management
MS06	Information Systems
MS07	Operations Management
MS08	Technical Management
MS09	Health, Safety and Environment Management
MS10	Incident and Crisis Management
MS11	Supply Chain and Procurement Management
MS12	Technical Assurance and Compliance Management
MS13	Financial Management
MS14	Commercial Marketing and Economics Management
MS15	Asset Lifecycle Management

Health, Safety and Environment Policy

AEMS | Health & Safety | Policy

This policy describes our approach to managing Health, Safety and Environmental risks at Amplitude Energy

Our Commitment

Amplitude Energy is committed to taking all reasonably practicable steps to protect the health and safety of our workers, contractors, partners, and the communities in the areas where we operate.

In addition, we will ensure our business is conducted in an environmentally responsible manner.

Our Actions

We will:

- **Integrate** health, safety and environmental requirements into our daily work, our business planning and our decision making
- **Comply** with all relevant health, safety and environmental laws and regulations
- **Provide** resources and systems to enable delivery of our health, safety and environmental objectives
- **Identify, control and monitor** risks that have the potential to harm people and the environment to as low as reasonably practical
- **Empower** our people, regardless of position, to "Stop the Job" if they consider it necessary to prevent harm to themselves, others or the environment
- **Consult, communicate and promote participation** of our workforce to build and maintain a strong health, safety and environment culture
- **Ensure** all employees and contractors are trained, competent and suitably supervised so that works are undertaken in a safe and environmentally responsible manner
- **Collaborate** proactively with our stakeholders and the communities where we operate
- **Investigate and learn** from our incidents and from those in our industry
- **Set, measure and monitor** health, safety and environmental targets to drive continuous improvement in our performance
- **Report** publicly and transparently on our health, safety and environmental performance

Governance

The HSE Improvement Forum has oversight of this policy. The Managing Director is accountable for communicating this Policy and for ensuring compliance with its undertakings. All Executive Leadership Team members and Managers shall ensure the effective implementation, management and monitoring of our HSE Management System and its subsequent outcomes.

All Staff are responsible for compliance with our policy, standards, and procedures.

This policy will be reviewed at appropriate intervals and revised as necessary to keep it current.

Policy authorised by

Jane Norman
Managing Director & CEO
Date: 11 February 2025 Review Date: 13 July 2026

Figure 10-2 - Amplitude Energy's Health, Safety and Environment Policy

10.2 Asset Integrity Management

The integrity of all Amplitude Energy Assets is managed in line with MS08: Technical Management. The BMG Facilities IMP [BMG-IT-IMP-0001] describes how Amplitude Energy manages integrity of the BMG assets whilst in NPP, utilising the Plan-Do-Act-Check cycle. The overall strategy is to maintain the assets as close to their design condition as possible. Accordingly, the integrity of the BMG assets is maintained and monitored in a number of ways, including:

- Design, pressure containment and primary protection functions:
  - Design basis and documentation
  - Pipeline cover (where required)
  - Protection and support structures
  - External corrosion protection system
  - Internal corrosion control system
  - Restriction and safety zone systems
  - Intervention procedures
  - Pipeline integrity reviews
- Monitoring and inspection:
  - Marine activity monitoring
  - Weather (exceedance) monitoring
  - ROV visual and cathodic protection inspection
  - Relevant person engagement (facility awareness).

This approach is preferred to 'controlled deterioration' as it attempts to maintain enough control effectiveness to prevent 'surprise' deterioration threatening integrity, acknowledges that individual control effectiveness will not always be perfect and provides operational flexibility for decommissioning options.

10.3 Activity Planning

The development and ongoing management of offshore facilities is planned and executed in accordance with MS15: Asset Lifecycle Management. Amplitude Energy uses a gated process; the process workflow is divided into phases (Figure 10-3). Each phase is subject to assurance processes and a gate review, the outcomes of which include continue, stop, hold, or recycle.

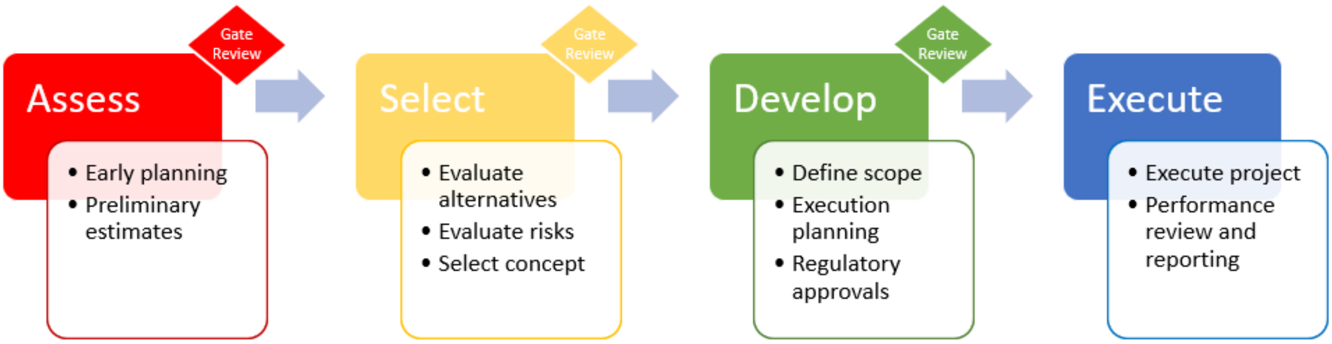

Figure 10-3 - Activity Workflow

10.3.1 Decommissioning Planning

Decommissioning of an asset involves well plugging, deconstruction and removal (base case) in a safe and environmentally responsible manner, processing of materials, reagents, waste and infrastructure associated with the operations, and rehabilitation of the area.

Decommissioning planning and planned activities for the BMG Closure Project are described in Sections 1.0 and 3.0.

10.4 Contractor Management

The MS11: Supply Chain and Procurement Management Standard details Amplitude Energy's contractor management system, which provides a systematic approach for the selection and management of contractors to ensure any third party has the appropriate safety and environment management system and structures in place to achieve HSEC performance in accordance with Amplitude Energy's expectations.

The Standard applies to sub-contractors, Third Party Contractors (TPCs) and suppliers conducting work at Amplitude Energy sites or providing services to Amplitude Energy.

The Standard addresses operational HSEC performance of all contractors while working under a Amplitude Energy contract or in an area of Amplitude Energy responsibility or which may be covered under the HSEC Management System. The key HSEC steps in MS11 include:

- Planning—HSEC assessment of potential contractors, suppliers and/or TPCs
- Selection—Submission and review of contractors and/or TPCs HSEC management data
- Implementation—Onsite contractors and/or TPCs HSEC requirements including induction and training requirements
- Monitoring, review and closeout—Ongoing review of contractors and/or TPCs HSEC performance including evaluation at work handover.

Prior to Contractor commencement of operations, contractors must have in place a Amplitude Energy approved HSE Management System that meets regulatory requirements and ensures compliance with this EP.

Amplitude Energy will undertake an on-hire inspection of the relevant vessel against EP requirements. Amplitude Energy shall also provide Contractors with this EP and EP commitments register, inclusive of the EPOs and EPSs established in this EP. This is one of a number of means to ensure Contractors are aware of, and comply with, EP requirements. See also Section 10.6 regarding training and competency requirements.

10.5 Organisational Structure, Roles and Responsibilities

As required by regulation 22(3) of the OPGGS(E)R, this section outlines the chain of command (Figure 10-4) and roles and responsibilities

Table 10-3) of employees and contractors in relation to the implementation, management, and review of this EP.

The emergency response structure for the petroleum activity is detailed in the Offshore Victoria OPEP [VIC-ER-EMP-0001].

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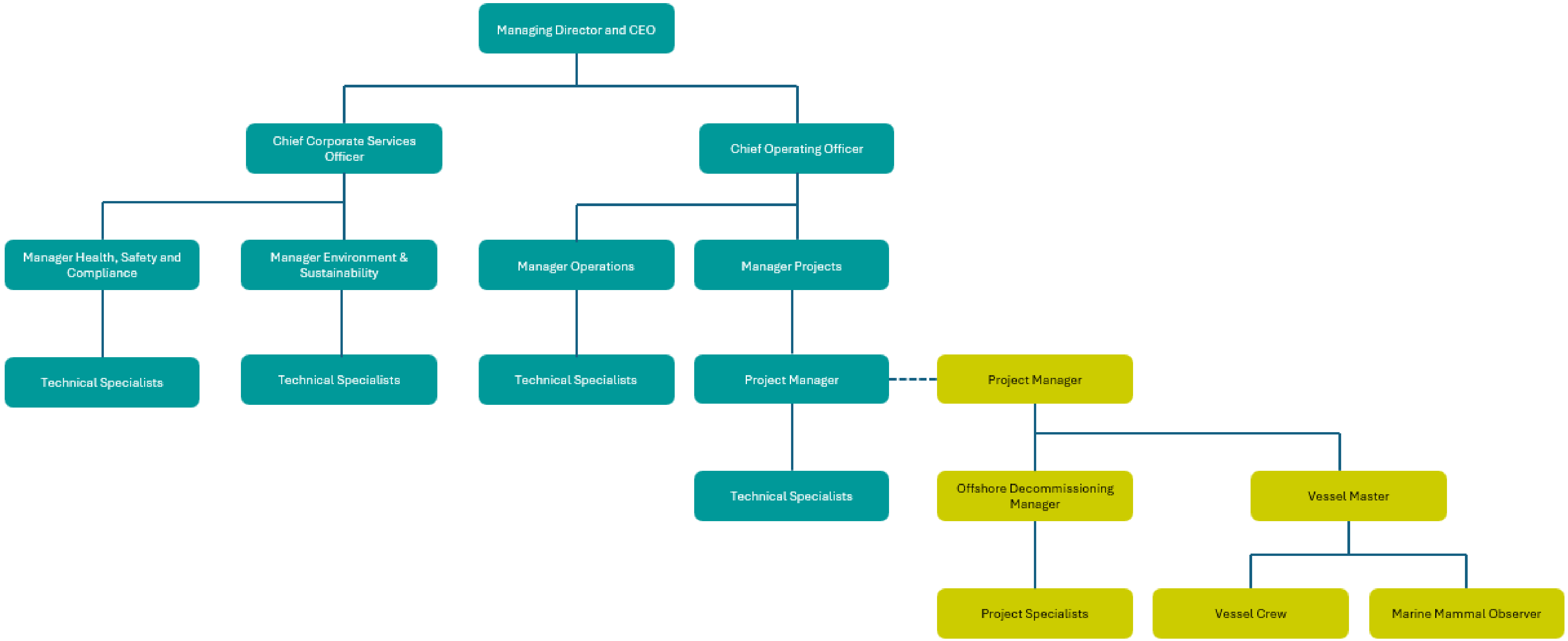


Figure 10-4 - Amplitude Energy Offshore Operational Organisational Structure

Table 10-3 - Amplitude Energy Environment Plan Roles and Responsibilities

Role	Environment Plan Responsibility
Amplitude Energy	
Managing Director and CEO	The Managing Director and CEO is accountable for ensuring a framework has been established through which the AEMS requirements will be met.
Chief Operating Officer	Ensures: • Compliance with the Amplitude Energy HSE Policy and AEMS • Audits and inspections to verify HSEC and integrity performance are scheduled and undertaken • Adequate resources are in place to meet the requirements within the EP and OPEP • Adequate emergency response capability is in place • Incidents and non-conformances are recorded, reported, and investigated.
Chief Corporate Services Officer	Ensures: • Amplitude Energy's emergency response preparedness is appropriate for the risks posed by the petroleum activity • Emergency response training, competency, and testing is commensurate to the risks associated with the offshore petroleum activity.
Manager Environment & Sustainability	Ensures: • Environmental regulatory requirements are embedded within the AEMS • Compliance with relevant statutory and AEMS requirements • Specialist environment input and support is provided to implement the EP during the petroleum activity • Identify and communicate relevant environmental legislative requirements, EPOs, control measures, EPSs, measurement criteria, and requirements in the implementation strategy in this EP and OPEP • Develop the environmental component of inductions (see Section 10.6.3) • Environmental incidents are investigated in accordance with Amplitude Energy requirements and learnings are disseminated appropriately • An in-depth and up to date knowledge of the legal and statutory environmental obligations is maintained within the organisation. • Environmental performance is monitored, evaluated, and reported as appropriate at all levels in the organisation • Review of environmental monitoring records to ensure compliance with the requirements (EPOs, EPSs, and processes) described in Section 8.0 of this EP Assess any environmentally relevant changes as per the MoC process (Section 10.13.3) • Review any non-conformances relevant to environment performance to ensure corrective actions are appropriate to prevent recurrence (Section 10.15.7) • Prepare and submit environmental incident reports and performance reports to regulators (Section 10.14 and 10.15).
Manager Health, Safety and Compliance	Coordinates: • Amplitude Energy's approach to emergency response and preparedness • Emergency response training • Competency and testing commensurate to the risks associated with the offshore petroleum activity • Maintain and test oil spill response arrangements.
Manager Projects	Ensures:

Role	Environment Plan Responsibility
	• Compliance with Amplitude Energy's HSE Policy and the AEMS components applicable to the offshore petroleum activity • Compliance with this EP and controls implemented • Contractor prequalification and qualification processes are undertaken (Section 10.4) • Personnel are inducted into this EP requirements and are aware of their environmental responsibilities (Section 10.6) • Response arrangements in the OPEP are in place and tested commensurate to the risks associated with the offshore petroleum activity (Section 10.7.2) • Environmentally relevant changes are assessed and approved by Amplitude Energy (Section 10.13.3) • Environmental incidents are reported internally and externally, and investigations are undertaken (Section 10.14) • Inspections and audits are undertaken (Section 10.15.6) • Actions from environmental audits and incidents are tracked to completion (Section 10.15.6) • Review any non-conformances relevant to environment performance to ensure corrective actions are appropriate to prevent recurrence. • Relevant person engagement is undertaken (Section 9.0).
Project Manager	Ensures: • Compliance with the Amplitude Energy HSE Policy • Compliance with this EP and controls implemented • Environmental approvals are in place for the activity to be undertaken (Section 2.0) • Contractor prequalification and qualification processes are undertaken (Section 10.4) • Personnel are inducted into this EP requirements and are aware of their environmental responsibilities (Section 10.6) • Response arrangements in the OPEP are in place and tested prior to the survey commencing (Section 10.7.2) • Environmentally relevant changes are assessed and approved by Cooper Energy (Section 10.13) • Environmental incidents are reported internally and externally, and investigations undertaken (Section 10.14) • Inspections and audits undertaken (Section 10.15.6) • Actions from environmental audits and incidents are tracked to completion (Section 10.15.6) • Relevant person activity pre-start and cessation notifications undertaken (Section 10.12) • Annual progress reporting in accordance with General Direction 824.
Service Partners	
Project Manager	Ensures in relation to respective area of responsibility: • Compliance with the Amplitude Energy HSE Policy • Compliance with this EP and controls are implemented • Support implementation of whale disturbance risk management measures described in this EP • Personnel are inducted with EP requirements and are aware of their environmental responsibilities • Response arrangements in the OPEP are in place and tested • Environmentally relevant changes are assessed and approved by Amplitude Energy

Role	Environment Plan Responsibility
	• Environmental incidents are reported internally and externally, and investigations undertaken • Inspections and audits undertaken • Actions from environmental audits and incidents are tracked to completion.
Offshore Decommissioning Manager	Ensures: • Compliance with relevant environmental legislative requirements, EPOs, control measures, EPSs, measurement criteria, and requirements in the implementation strategy in this EP • Inductions are completed, and record of attendance maintained (Section 10.6) • Chemicals that have the potential to be discharged to the marine environment are assessed and approved using the Amplitude Energy's Offshore Chemical Assessment Procedure [CMS-IM-PCD-0002] (Section 10.8) • Environmentally relevant changes are assessed and approved by Amplitude Energy (Section 10.12) • Incidents reported to the Amplitude Energy Offshore Projects Manager (Section 10.14) • Monitoring and other records (Section 10.15) are collated and provided to the Amplitude Energy Offshore Projects Manager on completion of the petroleum activity • HSEC inspections undertaken throughout the offshore petroleum activity to ensure ongoing compliance with the EP requirements (Section 10.15.6) • Corrective actions identified from incidents or inspections are implemented (Section 10.15.7).
Vessel Master, Vessel Crews	Ensure compliance with relevant environmental legislative requirements, EPOs, control measures, EPSs, measurement criteria, and requirements in the implementation strategy in this EP.
Marine Mammal Observer	• Support implementation of whale disturbance risk management measures described in this EP • Observe for marine mammals in accordance with EP requirements • Record and report all marine mammal sighting events.

10.6 Training and Competency

Regulation 22(4) of the OPGGS(E)R requires that the implementation strategy detail measures to ensure each employee or contractor working on, or in connection with, the activity is aware of their responsibilities in relation to this EP, including during emergencies or potential emergencies.

10.6.1 Amplitude Energy Personnel

Amplitude Energy personnel competency and training requirements are outlined in position descriptions and reviewed during the recruitment process. Competencies and training are initiated as defined in the Training and Development Procedure [CMS-HR-PCD-0004].

Personnel training records are maintained internally in accordance with MS06: Information and Systems Management.

10.6.2 Contractor Personnel

Contractors engaged to work on the activity are assessed and engaged in accordance with the requirements of the MS11: Supply Chain and Procurement Management.

Competency of contractors is assessed as part of the pre-qualification and qualification process and requires contractors to define the competency and training requirements necessary to ensure that contractor personnel have the relevant knowledge and skills relevant to their role.

10.6.3 Environmental Induction

Amplitude Energy and contractor personnel who work on the activity will complete an induction.

The environmental component of the induction will include information as detailed in Table 10-4. Records of personnel that complete the induction will be maintained internally in accordance with MS06: Information and Systems Management.

Table 10-4 - Environmental Components to be included in Environmental Inductions

Component	Onshore personnel	Offshore personnel
Description of the environmental sensitivities and conservation values of the Operational Area and surrounding waters. Information on the cultural links with elements of the environment that may be observed in the Operational Area, including whales.	✓	✓
Controls to be implemented to ensure impacts and risks are ALARP and of an acceptable level.	✓	✓
Requirement to follow procedures and use risk assessments/job hazard assessments to identify environmental impacts and risks and appropriate controls.	✓	✓
Procedures for responding to and reporting environmental hazards or incidents.	✓	✓
Megafauna sighting and vessel interaction procedures	x	✓
Overview of emergency response and spill management procedures.	✓	✓

10.7 Emergency Response

10.7.1 General Response

Amplitude Energy manages emergencies from offshore Victoria activities in accordance with the their Incident and Crisis Management Protocol [CMS-ER-PRO-0002]. The purpose of the Incident Management Plan is to provide the Amplitude Energy Incident Management Team (IMT) with the necessary information to respond to an emergency affecting operations or business interruptions. The Incident Management Plan:

- Describes the Emergency Management process
- Details the response process
- Lists the roles and responsibilities for the IMT members
- Includes a communications management instructions outlining the types of communications which should occur and by whom within Amplitude Energy. Amplitude Energy maintains an Emergency Contacts Directory which lists Stakeholders relevant to different types of incidents.

10.7.2 Oil Pollution Emergency Plan

In accordance regulation 22(8) and 22(9) of the OPGGS(E)R the implementation strategy must include an Oil Pollution Emergency Plan (OPEP), and arrangements for testing the response arrangements within these plans. Regulation 22(10) requires that the implementation strategy also provides for the monitoring of impacts from oil pollution and response activities.

The Offshore Victoria OPEP [VIC-ER-EMP-0001] and Offshore Victoria OSMP [VIC-ER-EMP-0002] provide for oil spill response and monitoring arrangements for this activity. These documents are submitted with this EP.

Roles and responsibilities for maintaining oil spill response capability and preparedness, testing and review arrangements, and oil spill response competency and training requirements are detailed in the OPEP. The OPEP also includes Section 2.4 outlining Notification and Ongoing Consultation requirements in the event of a spill requiring OPEP activation.

Vessels will operate under the vessel's SMPEP (or equivalent appropriate to class) or spill clean-up procedures to ensure timely response and effective management of any vessel-sourced oil spills to the marine environment. The SMPEP (or equivalent) is routinely tested. The SMPEP (or equivalent) is designed to ensure a rapid and appropriate response to any vessel oil spill and provides guidance on practical information that is required to undertake a rapid and effective response, and reporting procedures in the event of a spill.

Schedule 3 of the Commonwealth OPGGS Act, the Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2024, and with NOPSEMA's guidance note [N-09000-GN1661; (NOPSEMA, 2020)] help titleholders to understand when a vessel is classed as a facility (or an associated place) or a vessel.

Based upon this information, Amplitude Energy understands that:

- any vessel performing activities such as flowline recovery is classified as a facility for all activities it is responsible for (including 'non-facility' activities such as umbilical recovery) – consequently Amplitude Energy would be the control agency for a spill event associated with this situation
- however, if a vessel in the field is solely responsible for the recovery of umbilicals and/or manifolds it will not be classified as a facility – consequently AMSA would be the control agency for a spill event associated with this situation.

Information regarding control agencies and response arrangements relevant to each situation are provided for in the Offshore Victoria OPEP [VIC-ER-EMP-0001].

10.8 Chemical Assessment and Selection

Amplitude Energy's Offshore Chemical Assessment Procedure [CMS-EN-PCD-0004] requires that all relevant project chemicals planned for use offshore that will be or have the potential to be discharged to the environment are assessed and approved prior to use. This process is used to ensure:

- All relevant chemicals are assessed in accordance with the process
- All assessments are logged and made available on the Offshore Environment Chemical Environment Assessment (OECEA) database
- The OECEA is reviewed on an annual basis to ensure compliance with active Environment Plans (EPs) and ongoing activities
- The acceptance or rejection of chemicals that require ALARP justification is elevated to the relevant Amplitude Energy Project Manager and/or senior technical representative
- If there is no Offshore Chemical Notification Scheme (OCNS) or ecotoxicity data available, and environmental assessment of the chemical is not possible, the discharge of the product offshore will not be approved..

The evaluation process uses a series of steps to assess chemicals by first screening chemicals against public databases. Where necessitated by the screening, such as where public data shows a chemical to have toxicity, bioaccumulation or biodegradation outside of defined thresholds, an ALARP justification is completed. This ALARP justification includes consideration of alternatives, and a detailed technical justification is required to approve the chemical. The ALARP Justification must be approved by the Project Manager. Where technical justification for the chemical cannot be provided, the chemical is not accepted for use.

A summary of the evaluation process is detailed in Table 10-5. Note: Where a chemical is not included on the OCNS Definitive Ranked List, an ecotoxicity assessment is undertaken. If the use is short term use (<6 months) and no ecotoxicity data for the exact chemical (product) is available, ecotoxicity data from a chemically similar product may be accepted for assessment.

Table 10-5 - Amplitude Energy Offshore Chemical Assessment Procedure Steps to Propose a New Chemical

Step	Evaluation	Input	Outcome
1	Characterise proposed chemical.	Confirm the following: • Chemical name and supplier • Chemical function/purpose • Formulation, where available • CAS number, where available • Ecotoxicity, where available • Estimated use, dosage and discharge.	Proceed to Step 2.
2	Identify sensitive factors.	Chemical assessment is only required for chemicals which are to be discharged to the marine environment. If a chemical is used within a closed system or stored onboard the vessel, the chemical can be accepted as 'Zero Discharge'. Refer to EP to determine proximity to priority sensitivities. Sensitive factors may include: • Species endemicity/uniqueness • Species diversity • Biological productivity including benthic primary productivity • The social/cultural value of an area.	Where chemical is to be used in an entirely closed loop system no further action is required. Where chemical is to be discharged- proceed to Step 3.
3	Decision: Check OSPAR PLONOR List.	Refer to OSPAR PLONOR List.	Where the chemical is listed, the chemical is approved at Step 3. Where the chemical Is not listed go to Step 4.
4	Decision: Check OCNS Definitive Ranked Lists of Registered Substances.	Search the OCNS Definitive Ranked Lists of Registered Substances for the product name or equivalent branding. Always use the latest version.	Is the chemical listed on the OCNS Definitive Ranked List? If yes go to Step 5. Where the chemical is not listed go to Step 6.
5	Determine the OCNS Hazard Quotient.	Use the OCNS Definitive Ranked Lists of Registered Substances to determine the Risk Banding. Where applicable use the Chemical Hazard Assessment and Risk Management calculator (CHARM) to rank the chemical.	No further action is needed for chemicals with a HQ band Gold, Silver, or OCNS grouped E or D, with no product or substitution warnings. Where chemicals have a HQ colour banded white, blue, orange or purple, or OCNS grouped C, B or A go to Step 6.

Step	Evaluation	Input	Outcome
6	Determine whether the chemical has an OCNS substitution or product warning.	Use the OCNS Definitive Ranked Lists of Registered Substances or obtain from the current Cefas template. Always use the latest version.	Where the chemical does not have a product or substitution warning no further action is required and chemical is approved.
			Where the chemical has a product or substitution warning go to Step 7.
7	Consider an alternative or complete ALARP justification.	Chemical assessor and chemical requestor work together to seek alternative.	Where there is no technical justification for the chemical, it is not accepted for use.
		If no alternatives are available (based on technical requirements, HSE risk and chemical availability) technical justification is required to proceed with selected chemical.	Where there is a technical justification, an ALARP justification must be approved by the Project Manager.

10.9 Waste Management and Disposal

Amplitude Energy's Environmental Protocol [CMS-EN-PCD-0001] was developed to outline the measures implemented to ensure operations have minimal impact on the environment and maintain compliance with regulatory requirements.

In accordance with the Protocol, operations and activities that involve the generation, storage, handling, transportation, recycling, treatment, and/or disposal of waste must have a documented Waste Management Plan, which considers the Waste Management Hierarchy (Figure 10-5).

The Waste Management Plan must include, as a minimum:

- Relevant legislation
- A classified waste inventory
- Segregation and storage requirements
- Re-use and recycling options
- Treatment and disposal options
- Transportation requirements within and across geographic boundaries
- Risks associated with handling, treatment, and disposal of waste
- Monitoring, reporting, and record keeping requirements for tracking waste
- Procedures relevant to waste management for that operation or activity.

Waste management is a planned activity involving specialist contractors. Contractors shall be selected according to MS11: Supply Chain and Procurement Management (Section 10.4). This Standard will ensure that contractors will be selected based review of HSEC data that will ensure that appropriate qualifications and licences are provided as required by the Waste Management Plan..

Indirect impacts arising from waste management onshore have the potential to occur.

Potential impacts from waste include:

- Injury of fauna species, if waste is lost to the environment or not properly managed, can cause localised impacts to terrestrial fauna. Fauna at risk from waste include mammals and birds through ingestion or entanglement which has the potential to limit feeding/foraging behaviours as well as toxicity effects and thus can result in fauna deaths.

- Environmental pollution causing contamination of soil/groundwater. Once suitable contractors are engaged, and waste management strategy is developed it will be documented within the Waste Management Plan. The Plan will address the transport, staging and end points for materials recovered from the seabed, and will include measures to prevent impacts described above.

Waste will be managed in accordance with relevant legislative requirements, and where further uses cannot be found, for recovered materials, they will be disposed of at an appropriately licenced waste facility that complies with relevant state legislation. This has been captured within Section 8.0 as performance standard C30: Onshore waste management.

Assurance checks will be undertaken by Amplitude Energy against the plan, including of contractors, as described in Section 10.15.6.3.

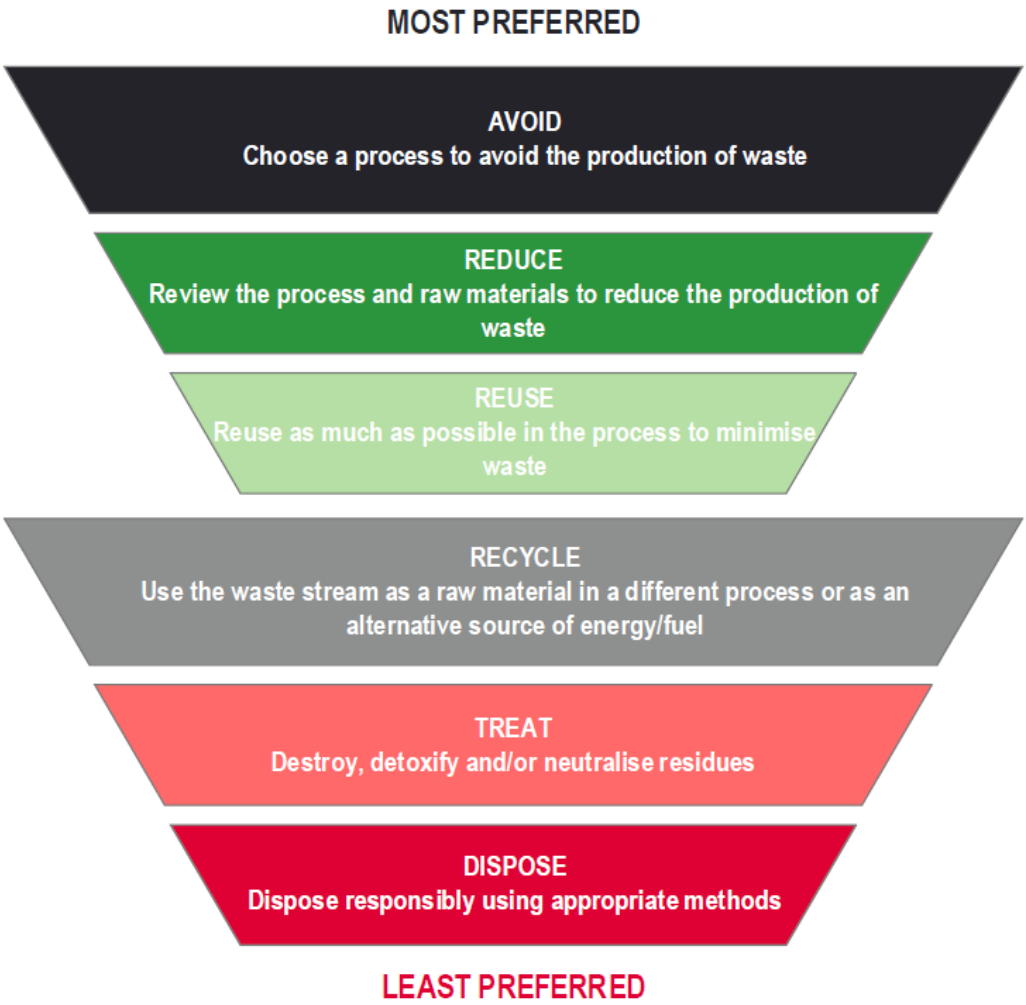


Figure 10-5 - Waste Management Hierarchy

10.9.1 Preliminary inventory of recovered materials

Based on the equipment being recovered, Table 10-6 outlines the types and estimated quantities of materials expected to be processed onshore. In 2021 Amplitude Energy and service partners undertook a pilot project to better understand the processing capability (for typical recovered subsea equipment) in Australia, as well as re-use/recycling opportunities. Based on the results of this project and prior development campaigns, Amplitude Energy expects that all of the steel structures, and between 15% and 50% of the flowlines, jumpers, umbilicals and flying leads could be repurposed or recycled. However, Amplitude Energy targets zero waste from the recovered materials; the project will seek opportunities for the reuse of materials where possible, working through the waste hierarchy, with disposal as a last resort.

Table 10-6 - Preliminary Inventory of Recovered Materials[28], Treatment and Destination Targets

Material	Approximate quantities[29]	Assumptions	Estimated Treatment	Anticipated material destinations
Steel (various grades)	470 tonnes	N/A	100% repurposed or recycled	Repurpose within industry or construction (AU or international) Recycle markets (AU)
Mixed Steel and Polymer (various grades)	1,400 tonnes	N/A	>50% repurposed or recycled	Recycle markets (AU) Licenced landfill sites (AU)
Polymer	0.1 tonnes	Polymer coating and rope associated with mattress and grout bags	>50% recycle or treat	Recycle markets (AU) Licenced landfill site (AU)
Concrete	47.3 tonnes	Assumed same weight of concrete is recovered with surface sections of wellhead and manifold pile.	>50% recycled	Construction markets (AU)
Residual controlled (including oily) liquids	2.1 m^3	Assuming 10 L residual water / 1 m^3 line volume	100% treated	Onshore water treatment / oil recovery
Encrusting material (biotic / abiotic)	1.9 tonnes	Assumed 0.001% of structure or line weight	50% Left in situ at site	BMG field Licenced landfill sites (AU)

10.9.2 Contingency contamination provisions

To date, there has been no evidence to suggest any of the waste generated from decommissioning activities would comprise NORMs or mercury over prescribed limits [17-033-RP-001]. Testing for NORMs was undertaken on the Crystal Ocean FPSO during the production phase and later during the cessation of production and cessation of production phase in 2011. Sample testing of this removed waste found that levels of combined Ra-226 and Ra-228 nuclides were below prescribed material levels (10,000 Bq/kg) by a factor of 5 [BMG-HS-RAS-0004].

Mercury is a trace element and occurs at low levels in the environment. Mercury is estimated to occur in concentrations around 50 ppb in the earth's crust. Mercury concentration within crude oils and condensates can vary widely (≤2 ppb to >100 ppb) between fields and regions; however, a study by IPIECA showed that ~96% of crude oils and condensates reviewed had mercury concentrations of ≤50 ppb (IPIECA, 2014). Mercury has the potential to accumulate over time inside production equipment (IPIECA, 2014). Deposits of elemental mercury can begin to vaporise at low temperatures; however, this is not the most common form of mercury (IPIECA, 2014). Testing during the clean-up flow of Basker-2 production zones indicated mercury in gas was below the limit of detection at the time (<0.05 mg/m^3) (Petrolab, 2006a). Testing of BMG condensate indicated levels between 10 ppb and 30 ppb across the field (Petrolab, 2006b).

[28] Some or all structures, jumpers and flying leads may be recovered in Phase 1b but are also included within the Phase 2 EP.

[29] All quantities are approximate estimates based on Amplitude Energy pilot project and engagements with waste management and decommissioning service providers; estimates will be refined with material processing / waste contractors as planning progresses and detailed in a waste management plan. Actual quantities will be recorded through the recovery and processing of materials, along with treatment according to the waste hierarchy.

Noting the potential for NORM and mercury to accumulate at varying rates within different production equipment over time, testing will be undertaken offshore to identify if materials are contaminated when production equipment is recovered to surface during decommissioning. Safe handling provisions will be designed into the campaign and operational procedures, as required. A contamination management plan will be developed in preparation for the recovery of production equipment (refer to **C28**, Table 8-1) and will include:

- Occupational health and safety exposure thresholds
- Testing processes
- Contingency occupational health and safety measures
- Safe handling, storage and transfer provisions
- Decontamination process and end points
- Personnel qualifications / competencies.

10.10 Invasive Marine Species Risk Assessment

Amplitude Energy's Invasive Marine Species Risk Management Protocol [CMS-EN-PRO-0002] was developed to:

- Integrate Australian IMS prevention efforts into Amplitude Energy's offshore operations
- Prevent the introduction, establishment or spread of a known or potential invasive marine species (attributable to Amplitude Energy activities) within Australian waters
- Ensure appropriate reporting in the event of identification of a marine pest, to enable a response in accordance with the Australian Marine Pest Emergency Plan.

The procedure details the actions to be undertaken during the contracting phase for a vessel and submersible equipment (e.g. ROVs) for a project within a Amplitude Energy Operational Area (as defined under the EP for the activity). The procedure incorporates key considerations from IMO biofouling guidelines (IMO, 2023), and the Australian Government biofouling guidelines for the petroleum industry (MPSC, 2009) and biofouling management requirements for commercial vessels (DAFF, 2023); the inputs, decision points, and general flow of the IMS risk management actions are shown in Figure 10-6.

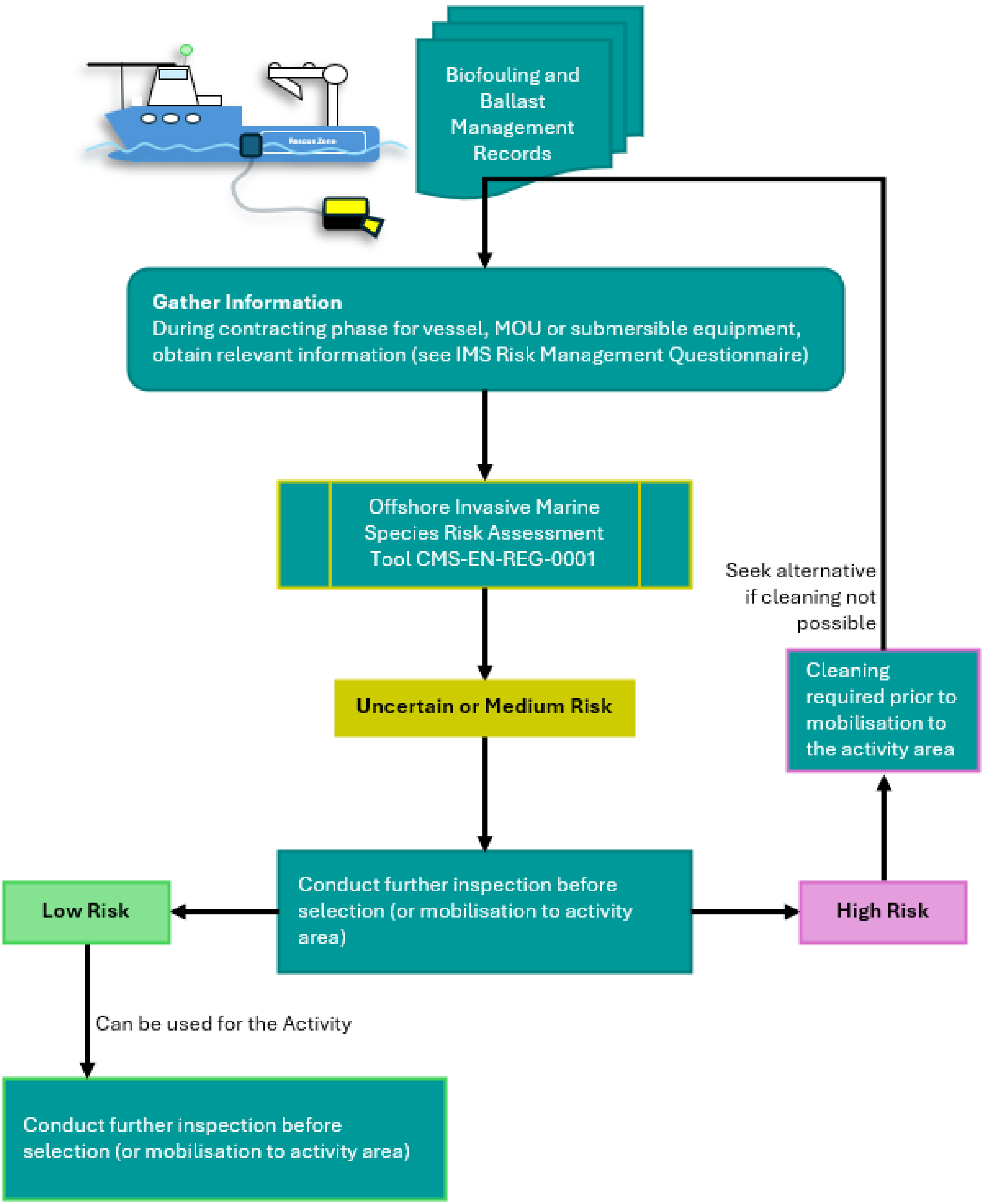


Figure 10-6 - Amplitude Energy IMS Risk Management Flow

10.11 Marine Mammal Adaptive Management Measures

Amplitude Energy implements risk reviews prior to undertaking offshore activities.

The Offshore Victoria Whale Disturbance Risk Management Procedure [CMS-EN-PCD-0006] is designed to reduce impacts and risks to ALARP and acceptable levels. The procedure specifically deals with risks of physical interaction (vessel strike), and behavioural disturbances (from underwater sound) to whales, and other marine mammals. Focus is given to the two EPBC Act listed endangered whale species which undertake important behaviours within both the Otway and the Gippsland regions.

The procedure communicates how whale interaction and disturbance risks are to be managed by offshore project teams, and crews on offshore vessels involved in offshore projects, in both the Otway and Gippsland regions. The procedure is informed by the respective offshore activity EPs, relevant government guidelines and species recovery plans or conservation management plans. The risk review framework addressing campaign timing in relation to seasonal sensitivities (pygmy blue whale and southern right whale important behaviours) is shown in Figure 10-7.

Figure 10-8 shows the process that will be followed by the MMOs and vessels operating on this petroleum activity, as described in Section 6.5 and **C13**.

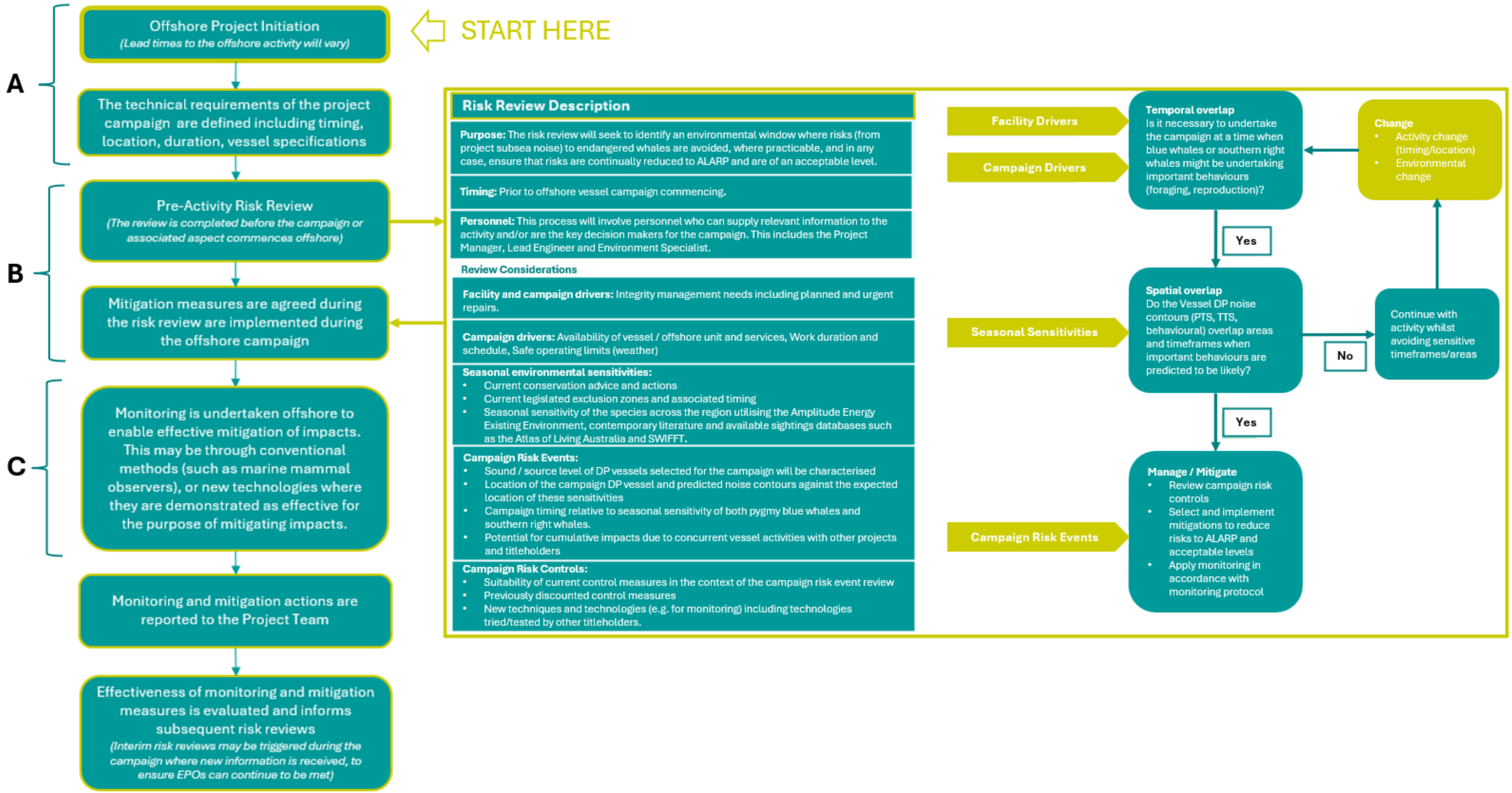
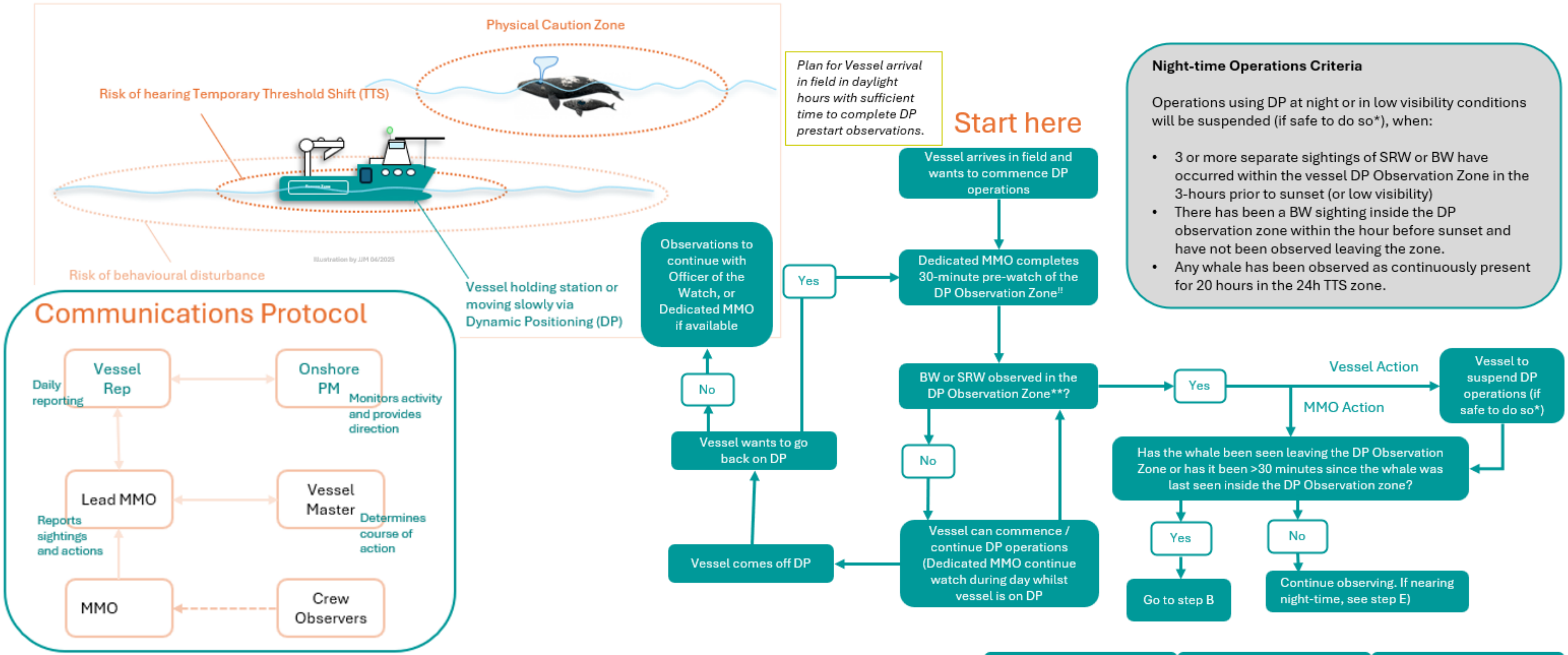


Figure 10-7 – Campaign Risk Review Framework



Notes:
*Safety of the crew, vessel and equipment is the responsibility of the Vessel Master or their delegate in command.
**If there is a verified sighting of a BW or SRW within the DP Observation Zone communicated from another vessel or observation platform, then this is treated as 'Yes'.
A Dedicated MMO must undertake the 30-minute pre-watch. The dedicated MMO can thereafter be supported by Trained Officers of the watch during normal work breaks.

Vessel Name (or Scenario)	DP Observation Zone (r)	DP TTS Zone (r)

Insert vessel name and zone distances prior to campaign using modelling relevant to the vessel and location

Figure 10-8 - Marine Mammal Adaptive Monitoring and Action Flow Chart

10.12 Ongoing Consultation - Regulation 22(15)

Ongoing consultation (as required under regulation 22(15) of the OPGGS(E)R) is that which occurs following the final submission of the EP to NOPSEMA prior to acceptance and during the implementation phase. Ongoing consultation supports the following:

- Implementation of commitments made during consultation such as:
  - Notifications as agreed during consultation and as required under the OPGGS(E)R
  - Follow ups that may be agreed (e.g. commitments to data sharing)
  - Consultation in preparation of emergency events that ensures emergency preparedness is maintained
- Consultation with newly identified relevant persons to:
  - Capture new comments or concerns
  - Assess if significant new impacts or risks arise, or any opportunity for continuous improvement
  - Provide feedback on assessment of issues or concerns raised, and any resultant improvements made to the EP
- Consultation with existing relevant persons to:
  - Consider any changes to impacts or risks where that change might affect those relevant persons' functions, interest or activities
  - Assess the merits of any objection or claim raised about those changes
  - Respond to each objection or claim
  - Incorporate any new measures to be adopted as a result of this consultation via MoC process outlined in this EP.

To support ongoing consultation, Amplitude Energy will monitor for new relevant persons and maintain the BMG Closure Project EP stakeholder notifications register noting triggers for any agreed or required notifications, or agreed follow ups.

This consultation process has been developed considering the OPGGS(E)R, guidance and case law, and Amplitude Energy company values. However, consultation is a "real world" activity in a dynamic environment and grey areas may appear. Where this occurs, Amplitude Energy will manage the change in accordance with the MoC process considering the above. Where unresolved, the objects of the OPGGS(E)R will further guide the MoC process.

10.13 Management of Change

MS08: Technical Management and Management of Change (MoC) General Protocol [CMS-TS-PRO-0002] describes the requirements for dealing with change management. The objective of the MoC process is to ensure that changes do not increase the risk of harm to people, assets or the environment; and to ensure that impacts and risks remain at an acceptable level. This includes:

- Deviation from established corporate processes
- Changes to offshore operations and/or status of infrastructure
- Deviation from specified safe working practice or work instructions/procedures
- Implementation of new systems
- Significant change of HSEC-critical personnel.

Environmentally relevant changes include:

- New activities, assets, equipment, processes or procedures proposed to be undertaken or implemented that have the potential to impact on the environment and have not been:

  - Assessed for environmental impact previously, in accordance with the relevant standard
  - Authorised in the existing management plans, procedures, work instructions or maintenance plans.
- Proposed changes to activities, assets, equipment (including change of well or infrastructure status that may be undertaken under another EP), processes or procedures that have the potential to impact on the environment or interface with the environmental receptor
- Changes to the existing environment including (but not limited to) fisheries, tourism, and other commercial and recreational uses, any changes to protective matter requirements, and information which may be shared by Traditional Owners (e.g. through consultation)
- Changes to the requirements of an existing external approval (e.g. changes to conditions of environmental licences)
- Changes, updates, or environmental performance improvement identified from incident investigations, emergency response activities or emergency response exercises, or audits.

For any MoC with identified environmental impacts or risks, an impact/risk assessment will be undertaken to ensure that impacts and risks from the change can be managed to meet the nominated EPOs set out in the accepted EP as well as be ALARP and of an acceptable level.

Depending on the nature of the change, an MoC may be completed for a single change or for a series of changes. In either case, where an MoC is raised, the change(s) are evaluated against regulatory criteria (Section 10.13.3) and the EP revised and/or resubmitted where required.

10.13.1 Identifying Change

Environmentally relevant changes will be identified via pre-activity and ad-hoc reviews. Reviews will seek to identify both internal and external changes which might result in deviations from the impact and risk profiles provided for within the accepted EP. The reviews may include:

- Regular review of new and upcoming regulatory and policy change via access to weekly alerts coving changes across legislation and guidelines
- Involvement with industry associations such as Australian Energy Producers
- Ongoing engagement with relevant persons (refer to Section 10.12)
- Pre-activity review - During the planning phase for offshore vessel activities, the campaign components are reviewed in the context of the accepted EP to ensure the activities and associated impacts and risks and are provided for
- Monthly review and reporting of recordable incidents; this includes investigation of incidents and may initiate the change assessment process depending on the nature of the incident
- EP audits (refer to Section 10.15) with findings and actions tracked to closure via Synergi.

Environmentally relevant changes identified through these processes are recorded and tracked through to integration within relevant documents (e.g. plans, protocols etc.) and implementation within the business.

The regulatory requirement to revise and resubmit an EP is described in Section 10.13.3.

10.13.2 Changes to Titleholders and Nominated Liaison Person

Section 1.6 details the titleholders and nominated liaison person and contact details. Any change in these details is required to be notified to NOPSEMA as soon as possible.

10.13.3 Revisions to the EP

In the event that the proposed change introduces a significant new environmental impact or risk, results in a significant increase to an existing risk, or through a cumulative effect of a series of changes there is a significant increase in environmental impact or risk, this EP will be revised for re-submission to NOPSEMA in line with the MoC process described in this implementation strategy.

Where a change results in the EP being updated, the change/s are to be logged in the EP Change Register (Appendix 4).

In addition, the titleholder is obligated to ensure that all specific activities, tasks or actions required to complete the activity are provided for in the EP. Regulation 39(1) of the OPGGS(E)R require that where there is a significant modification or new stage of the activity (that is, change to the spatial or temporal extent of the activity) a proposed revision of the EP will be submitted to NOPSEMA.

10.14 Incident Reporting and Recording

As per MS10: Incident and Crisis Management, the Incident and Crisis Management Protocol [CMS-ER-PRO-0002], and the Incident Investigation and Reporting Protocol [CMS-ER-PRO-0001], Amplitude Energy has a systematic method of incident reporting and investigation and a process for monitoring close out of preventative actions.

The incident reporting and investigation procedure defines the:

- Method to record, report, investigate and analyse accidents and incidents
- Legal reporting requirements to the regulators within mandatory reporting timeframes
- Process for escalating reports to Amplitude Energy senior management and the Amplitude Energy Board
- Methodology for determining root cause
- Responsible persons to undertake investigation
- Classification and analysis of incidents.

Any complaints received from third parties relevant to the activities are managed in accordance with the Incident Investigation and Reporting Protocol [CMS-ER-PRO-0001]. If complaints are received, they are recorded in Amplitude Energy's incident management system (Synergi) with appropriate corrective actions assigned. Where appropriate, feedback on corrective actions is also provided to the complainant. Where complaints may relate to fisheries, such as an equipment damage claim, this is managed in accordance with both Amplitude Energy Incident Investigation and Reporting Protocol [CMS-ER-PRO-0001] and the Fisheries Damages Protocol.

Notification and reporting requirements for environmental incidents to external agencies are listed Table 10-7. Notification and reporting requirements for oil spills (Level 2/3) are detailed in the OPEP.

Table 10-7 - External Incident Reporting Requirements

Incident Type	Description	Requirement	Timing	Contact
Recordable Incident	OPGGS(E)R: An incident arising from the activity that breaches an EPO or EPS in the EP that applies to the activity that is not a reportable incident.	As a minimum, the written monthly recordable report must include a description of: • All recordable incidents occurred during the calendar month • All material facts and circumstances concerning the incidents that the operator knows or is able to reasonably find out • Corrective actions taken to avoid or mitigate any adverse environmental impacts of the incident • Corrective actions that have been taken, or maybe taken, to prevent a repeat of similar incidents occurring.	Before the 15th day of the following calendar month.	**Written Notification**: NOPSEMA - **submissions@nopsema.gov.au**
Reportable Incident	OPGGS(E)R: An incident arising from the activity that has caused, or has the potential to cause, moderate to significant environmental damage. For Amplitude Energy, reportable incidents include, but are not limited to, those that have been identified through the risk assessment process as having an inherent impact consequence Level 3, 4, or 5, or at a minimum, the following incidents: • A level 2/3 spill incident • IMS Introduction.	**Verbal Notification**: The notification must contain: • All material fact and circumstances concerning the incident • Any action taken to avoid or mitigate the adverse environmental impact of the incident • The corrective action that has been taken or is proposed to be taken to stop control or remedy the portable incident. • This must be followed by a written record of notification as soon as possible after notification.	Within 3 days of notification of the incident.	**Verbal Notification**: NOPSEMA – Phone 1300 674 472
		Written Notification: Verbal notification of a reportable incident to the regulator must be followed by a written report. As a minimum, the written incident report will include: • The incident and all material facts and circumstances concerning the incident • Actions taken to avoid or mitigate any adverse environmental impacts • The corrective actions that have been taken, or may be taken, to prevent a recurrence of the incident	Within 3 days of notification of the incident.	**Written Notification**: NOPSEMA - **submissions@nopsema.gov.au**

Incident Type	Description	Requirement	Timing	Contact
		• The action that has been taken or is proposed to be taken to prevent a similar incident occurring in the future.		
		Written Notification: Written reports to be submitted to National Offshore Petroleum Titles Administrator (NOPTA).	Within 7 days of written report submission to NOPSEMA.	**Written Notification**: NOPTA – **reporting@nopta.gov.au**
Reportable incident - in the event an AMP may be exposed to hydrocarbons		Notification must be provided to the Director of National Parks and include: • Titleholder details • Time and location of the incident (including name of marine park likely to be affected) • Proposed response arrangement • Confirmation of providing access to relevant monitoring and evaluation reports when available • Contact details for the response coordinator.	As soon as possible.	**Written Notification**: Marine Park Compliance Duty Officer – 0419 293 465
Reportable Incident – Invasive Marine Species		Suspected or confirmed IMS Introduction.	As soon as possible.	**Verbal Notification**: DAFF - Phone 1800 900 090
Reportable Incident - Injury or Death to Fauna		Impact to cetacean/s in or beyond the Australian Whale Sanctuary resulting in death, injury or harassment. **https://www.dcceew.gov.au/environment/marine/marine-species/cetaceans/notification-interactions**	Within 7 days.	DCCEEW – Phone: 1800 423 135 Email: **EPBC.Permits@environment.gov.au**
		Impacts to MNES, specifically injury to or death of EPBC Act-listed species. **https://www.dcceew.gov.au/environment/biodiversity/threatened/listed-species-and-ecological-communities-notification**	Within 7 days.	DCCEEW – Phone: 1800 423 135 Email: **EPBC.Permits@environment.gov.au**
		Vessel strike with cetacean.	Within 72 hours of incident.	DCCEEW – National Ship Strike Database

Incident Type	Description	Requirement	Timing	Contact
				https://data.marinemammals.gov.au/report/shipstrike
Reportable Event	Under the UCH Act, the discovery of suspected UCH in Australian waters must be reported.	Provide a notification of the discovery of any suspected underwater heritage identified during the course of the activity within 21 days of the discovery. **http://www.dcceew.gov.au/parks-heritage/heritage/underwater-heritage/auchd**	Within 21 days of the discovery.	DCCEEW – Underwater Cultural Heritage Database online form: **https://environment.gov.au/shipwreck/public/forms/notification.do?mode=add&reset=true**

10.15 Environmental Performance Monitoring and Reporting

This section details the specific measures Amplitude Energy will implement to ensure that, for the duration of the activity:

- The environmental impacts and risks of the activity continue to be identified and reduced to a level that is ALARP and acceptable
- Control measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and an acceptable level
- Emissions and discharges are monitored
- EPOs and EPSs set out in the EP are being met.

These measures are integrated throughout this EP and key assurance processes are summarised in Table 12-8.

Table 10-8 - Summary of Assurance Processes

Process	Frequency and Responsibility
Change management reviews	See Section 10.13
Tracking of emissions and discharges	See Section 10.15.1
Audits and inspections	See Section 10.15.6
Management of non-conformance	See Section 10.15.7

10.15.1 Emissions and Discharges

Quantitative monitoring, record-keeping and reporting of emissions and discharges is undertaken for all activities within the scope of this EP. Emissions and discharge monitoring and records required for operations and vessel-based activities are detailed in Table 10-9. These are used to validate inputs and assumptions to the impact assessments within the EP, ensuring impact profiles remain within defined acceptable levels. Copies of emission and discharge records will be retained in accordance with the MS06 Information and Systems Management (see Section 10.16).

Table 10-9 – Emissions and Discharge Monitoring

Aspect	Monitoring	Frequency	Reporting
Treated bilge	• Volume • Location • Vessel speed	As required	Oil Record Book
Food scraps	• Volume • Location	As required	Garbage Record Book
Sewage and greywater	• Volume • Location	As required	Maintenance Records
Fuel use	• Volume	Daily	Daily Report
Ballast water discharge	• Volume • Location	As required	Ballast Water Record System
Chemical discharges to marine environment	• Chemical name • Chemical type • Discharge volume	Weekly	Daily Report
Waste	• Quantities sent ashore	As required	Garbage Record Book Waste Transfer Records

Aspect	Monitoring	Frequency	Reporting
Spill	• Volume • Chemical / oil type	As required	Daily Report Incident Report
Accidental release or losses overboard	• Nature of the discharge material • Volume / amount	As required	Daily Report Incident Report

10.15.2 Infield Sediment Sampling

Amplitude Energy plan to apply the "change over space" monitoring study design for the proposed infield sediment sampling program. As described by the Australian & New Zealand Guidelines for Fresh & Marine Water Quality, this study design is often used when no comparable data was collected before the disturbance as well as is used to identify the severity of impact or monitor whether changes from discharges have occurred (Australian Government, 2018). Sites within the BMG field will be selected to undertake the sediment sampling along with suitable reference sites, providing a basis for inferring potential historical disturbance. Sites will be selected during survey design, accounting for point sources of potential contamination described in Section 6.3. As an example, sites may include:

- At the historical location for the FPSO
- At Basker-A drill centre
- At a reference site away from the facility footprint.

Sampling at the FPSO and Basker-A drill centre locations captures the areas where the majority of development, operational and decommissioning related discharges within the field have occurred, and therefore where contamination of the seabed (though not expected) would be considered more likely to occur.

Sampling will be undertaken via methods such as ROV mounted push corer, or surface deployed grab. A methodology and procedures will be developed ensuring suitable collection and preservation. Nominally, a sampling program will involve the recovery of samples from each location (historical FPSO and Basker-A drill centre), with samples spaced approximately to understand contamination gradients with distance from the central location. One or more control site(s) will also be integrated into the program.

Table 10-10 describes the parameters that are expected to be sampled accounting for discharges identified in this EP, and parameters typical of historical sampling programs in other fields. The list of analytes may be expanded during detailed program design. Samples will be analysed by a National Association of Testing Authorities (NATA) accredited laboratory and held/transported to the laboratory. Figure 10-9 describes the sampling program decision process.

An initial infield sampling program was undertaken during the Phase 1 campaign; results are described in Section 4.3.1.

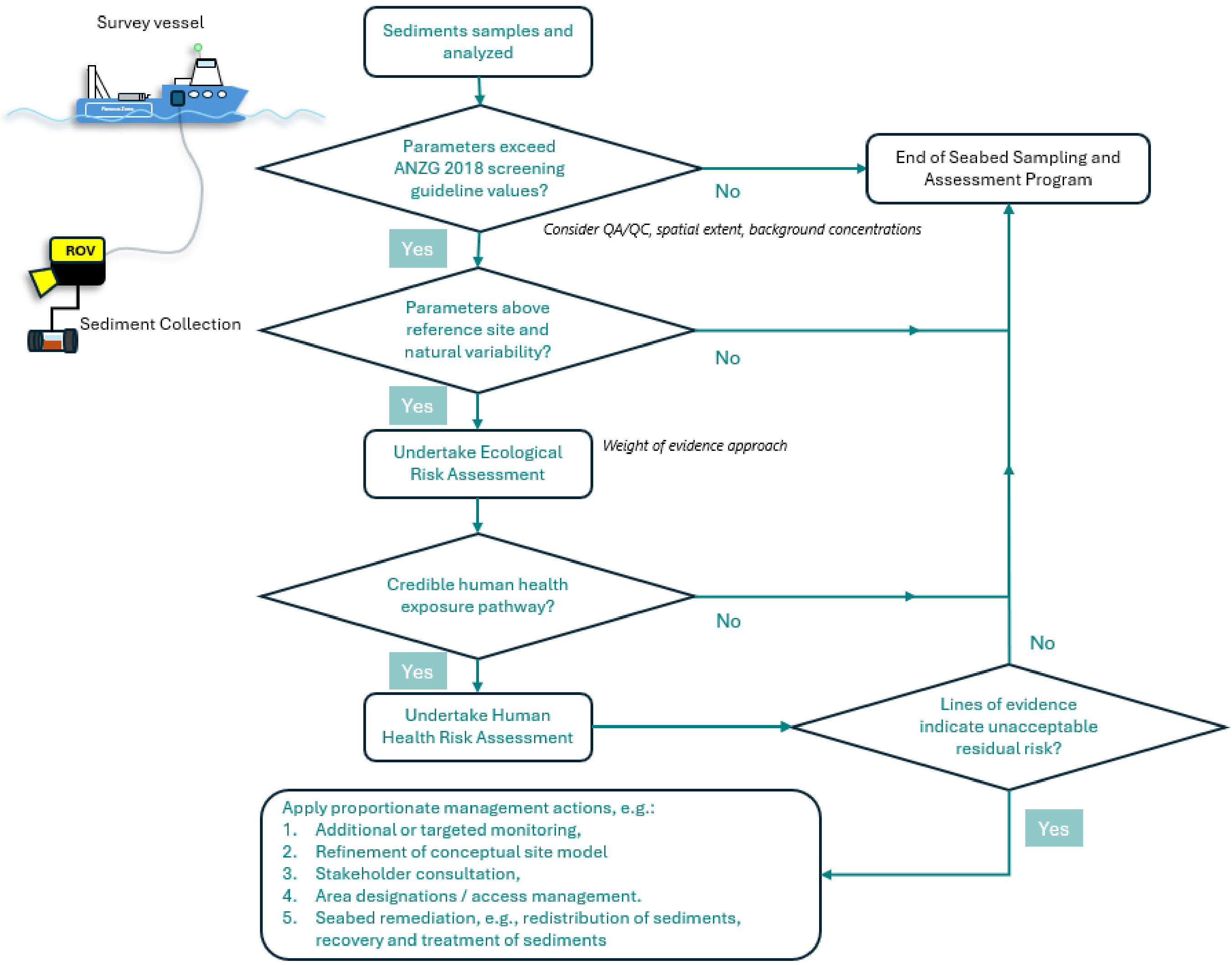


Figure 10-9 - Sampling and Assessment Program Decision Process

Table 10-10 - Sediment Analytes and Thresholds

Analyte	Threshold[30]	Brief Description	Reference
Total PAH	10,000 µg/kg	PAH are considered a proxy to understand if any interaction with the seabed occurred during historic PW discharges. Residual hydrocarbons may be present within the flowlines. Residual hydrocarbons are displaced to sea during equipment recovery operations. Discharge assessment indicated negligible impact. Sampling will be used to verify impact predictions.	Australian and New Zealand guideline values for sediment quality (Australian Government, 2019)
TPHs	280 µg/kg	TPH are considered a proxy to understand if any interaction with the seabed occurred during historic PW discharges. Residual hydrocarbons may be present within the flowlines. Residual hydrocarbons are displaced to sea	Australian and New Zealand guideline values for sediment quality (Australian Government, 2019)

[30] Note: New threshold values may be adopted where published in Government Guidelines or peer-reviewed scientific journals.

Analyte	Threshold[30]	Brief Description	Reference
		during equipment deconstruction and recovery operations. Discharge assessment indicated negligible impact. Sampling will be used to verify impact predictions.	
NORMS[31]	1 mSv/year (adopted from drinking water levels)	NORMS has not been identified over prescribed limits within the BMG facilities. If NORM were present, it would be as deposits within production equipment. Flakes of NORM scale and water within subsea equipment (e.g. flowlines, jumpers) could be shed during subsea dismantling and recovery operations. No NORMS are anticipated, to be confirmed via sampling.	Guide for Radiation Protection in Existing Exposure Situations (Commonwealth of Australia, 2017b)
Mercury[31]	0.15 mg/kg	Mercury is not expected based on historical sampling (e.g. during well tests). Refer to Section 9.8.2 for contingency contamination provisions.	Australian and New Zealand guideline values for sediment quality (Australian Government, 2019)
Cadmium	1.5 mg/kg	Cadmium and Chromium are trace elements in drilling fluids and cements. Sampling / testing will verify concentrations of these parameters relative to guideline values.	Australian and New Zealand guideline values for sediment quality (Australian Government, 2019)
Chromium	80 mg/kg		

10.15.3 Activity Commencement and Cessation Notifications

Activity notification requirements are detailed in Section 10.12 and maintained in the EP stakeholder notifications register. The register includes the regulation 54 start and end of activities notifications. Regulation 46 of the OPGGS(E)R provides for the notification to NOPSEMA that:

- The activity or activities to which the EP relates have ended
- All of the obligations under the EP have been completed.

Once NOPSEMA accepts the notification, the EP is ended [N-04750-GL1691; (NOPSEMA, 2025c)].

10.15.4 Reporting Environmental Performance

Annual reporting will comprise annual progress report on decommissioning program progress (Section 10.15.4.1), and annual environment performance report of compliance with EP performance outcomes and standards (Section 10.15.4.2).

10.15.4.1 Annual Progress Report (Direction 824)

In accordance with Direction 6 of General Direction 824, Amplitude Energy will:

- Submit to NOPSMEA 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, 4, and 5
- The report submitted under Direction 6(a) must be to the satisfaction of NOPSEMA and submitted to NOPSEMA no later than 31 December each year
- Publish the report on the registered holder's website within 14 days of obtaining NOPSEMA satisfaction under Direction 6(b).

[31] NORMS and mercury are not expected to be present above prescribed limits in any equipment or sediments. Should testing of recovered production equipment show NORMs or mercury above threshold levels then these parameters shall be included within the seabed sampling program.

10.15.4.2 *Activity Environmental Performance Report*

As required by regulation 51 of the OPGGS(E)R, Amplitude Energy will submit an EP performance report to NOPSEMA for the activities provided for under this EP. This report will provide sufficient detail to enable NOPSEMA to determine whether the EPOs and EPSs in the EP have been met.

The report will be submitted to NOPSEMA no later than 31 December each year, from the committed period.

The report will include activities undertaken during the reporting period 01 January – 31 December.

10.15.5 Cetacean Reporting

Cetacean observation data will be submitted to DCCEEW, either directly or via the National Marine Mammal Data Portal (**https://data.marinemammals.gov.au/report/sighting**).

Data will be reported within 3 months of the completion of an offshore activity.

Observation data in relation to culturally significant species will be made available to First Nations Groups where requested.

10.15.6 Audit and Inspections

Environmental performance of offshore operations and activities will be audited and reviewed in several ways to ensure that:

- EPSs to achieve the EPOs are being implemented and reviewed
- Potential non-compliances and opportunities for continuous improvement are identified
- Environmental monitoring requirements are being met.

Non-compliance with the EPSs outlined in this EP will be managed as per Section 10.15.7.

Opportunities for improvement or non-compliances noted will be communicated to relevant personnel at the time of the inspection or audit to ensure adequate time to implement corrective actions. The findings and recommendations of inspections or audits will be documented and distributed to relevant personnel for comment, and any actions tracked until completion.

10.15.6.1 *EP Compliance*

The following assurance arrangements will be undertaken:

- Pre-start readiness review to ensure the implementation of EP controls is provided for
- Audit of the EPOs and EPSs contained in the EP and the requirements detailed in the implementation strategy; this audit will be used to inform the EP performance report submitted to NOPSEMA
- Pre-activity reviews the OPEP to ensure the arrangements are up to date and can be met
- Testing of spill response and source control arrangements in accordance with the OPEP.

Any environmentally relevant changes and opportunities to improve environmental performance will be assessed as described in Section 10.13 and incorporated into EP revisions as required.

10.15.6.2 *Offshore Activities*

The following arrangements review the environmental performance of offshore vessel activities:

- A pre-mobilisation marine assurance inspection will be undertaken for offshore CSV / vessels to ensure they will meet the requirements of the EP and OPEP

- An activity-wide pre-start readiness review to ensure controls measures are in place, resourced and communicated to enable compliance.
- HSEC inspections will be undertaken throughout the offshore activity at least fortnightly to ensure ongoing compliance with relevant EP requirements. The scope of the inspections will include (but is not limited to) a range of marine and activity assurance checks:
  - Spill readiness (i.e. provision spill kits and drills in accordance with vessel SOPEP/SMPEP)
  - Waste management in accordance with EP, EPOs and EPSs
  - Control measure performance for project activities occurring on the vessels
  - Chemical inventory checks to ensure campaign chemicals are accepted via the Offshore Chemical Assessment Procedure
  - Maintenance checks for equipment identified within an EP EPS (e.g. oily water separator).

Non-compliance and improvement opportunities will be communicated to Amplitude Energy HSEC onshore for advice, tracking, and reporting in accordance with Section 10.15.7.

10.15.6.3 Onshore waste management activities

Amplitude Energy will undertake a number of assurance checks for the management of materials and wastes:

- Review of waste receiver licences (ensuring appropriate licence to receive waste type)
- Review and reconciliation of offshore manifests
- Review and reconciliation of transfer records
- Review and reconciliation of waste processing records
- Audit of primary waste management service provider

Non-compliance and improvement opportunities will be managed per Section 10.15.7.

10.15.7 Management of Non-conformance

In response to any EP environmental audit and inspection non-compliances, corrective actions will be implemented and tracked to completion as per MS10 Incident and Crisis Management, Incident and Crisis Management Protocol [CMS-ER-PRO-0002] and Incident Investigation and Reporting Protocol [CMS-ER-PRO-0001].

Corrective actions will specify the remedial action required to fix the breach and prevent its reoccurrence and is delegated to the person deemed most appropriate to fulfil the action. The action is closed out only when verified by the appropriate Manager and signed off. This process is maintained through the Amplitude Energy corrective action tracking system.

Where more immediacy is required, non-compliances will be communicated to relevant personnel and responded to as soon as possible. Where relevant the results of these actions will be communicated to the offshore crew during daily toolbox meetings or at daily or weekly HSEC meetings.

Amplitude Energy will carry forward any non-compliance items for consideration in future operations to assist with continuous improvement in environmental management controls and performance outcomes.

10.16 Records Management

In accordance with the regulation 52 of the OPGGS(E)R, Amplitude Energy will store and maintain documents or records relevant to the EP in accordance with the Technical Information Management Procedure [CMS-IM-PCD-0002].

11.0 References

11.1 Amplitude Energy Documents

Document Number	Document Name
09/HSEQ/ENV/PL07	BMG Non-Production Phase Environment Plan [EP finalised and closed]
17-033-RP-001	BMG Technical Considerations for Decommissioning of Subsea Infrastructure (Atteris, 2018a)
17-033-RP-002	BMG Technical Considerations for Decommissioning of the B6 Flowline and Umbilical (Atteris, 2018b)
AEL-EN-EMP-0001	Description of the Environment [included as Appendix 2 to this document]
BMG-DC-EMP-0001	BMG Closure Project (Phase 1) Environment Plan [EP finalised and closed]
BMG-DC-EMP-0002	BMG Closure Project (Phase 2) Environment Plan [this document]
BMG-DC-REP-0001	BMG Subsea Closeout Report (Phase 1)
BMG-DC-WMP-0001	BMG Well Operations Management Plan
BMG-EN-EMP-0002	BMG Well Abandonment (Phase 1) Environment Plan [EP finalised and closed]
BMG-EN-REP-0018	BMG Decommissioning Methodologies Report (Xodus, 2021a)
BMG-EN-REP-0019	BMG Field Decommissioning Comparative Assessment (Xodus, 2021c)
BMG-EN-REP-0021	BMG Flowline and Umbilical Polymer Degradation Study (Xodus, 2021b)
BMG-HS-RAS-0004	BMG NORM Strategy for Field Operations (AGR, 2011)
BMG-HS-SMP-0001	BMG Field Safety Case
BMG-IT-IMP-0001	BMG Facilities Integrity Management Plan
BMG-SS-REP-4400-0001	BMG Phase 2 Flowline Corrosion Study (Extrin 2025)
BMG-SS-TFN-0060	Technical Note – BMG Manifold Padeye Capacity Check (AME Offshore Solution 2025)
CMS-EN-PCD-0001	Environmental Protocol
CMS-EN-PCD-0004	Offshore Chemical Assessment Procedure
CMS-EN-PCD-0006	Offshore Victoria Whale Disturbance Risk Management Procedure
CMS-EN-PRO-0002	Invasive Marine Species Risk Management Protocol
CMS-ER-PRO-0001	Incident Investigation and Reporting Protocol
CMS-ER-PRO-0002	Incident and Crisis Management Protocol
CMS-HR-PCD-0004	Training and Development Procedure
CMS-HS-POL-0001	Health, Safety and Environment Policy
CMS-IM-PCD-0002	Technical Information Management Procedure
CMS-RM-PRO-0001	Amplitude Energy Risk Management Protocol
CMS-TS-PRO-0002	Management of Change (MoC) General Protocol
VIC-EN-EMP-0002	Gippsland Offshore Operations Environment Plan
VIC-ER-EMP-0001	Offshore Victoria Oil Pollution Emergency Plan
VIC-ER-EMP-0002	Offshore Victoria Operational and Scientific Monitoring Plan
VIC-SS-REP-4900-0001	Basker Manta Gummy Results Final Report- Volume 2 (Multifield IRM) (Fugro, 2020)

11.2 Guidance

Document Number	Document Name
NOPSEMA Guidance	
N-00500-PL1903	Policy – Section 572 Maintenance and removal of property, March 2026 (NOPSEMA, 2026a)

Document Number	Document Name
N-00500-PL1959	Policy – Section 270 Consent to surrender title - NOPSEMA advice, March 2026 (NOPSEMA, 2026b)
N-04750-GL1721	Guideline – Environment Plan decision making, January 2024 (NOPSEMA, 2024a)
N-04750-GL2086	Guideline – Consultation in the course of preparing an environment plan, May 2024 (NOPSEMA, 2024c)
N-04750-GL1887	Guideline – Consultation with Commonwealth agencies with responsibilities in the marine area, November 2024 (NOPSEMA, 2024d)
N-04750-GL1691	Guideline – End of operation of an environment plan – Regulation 46, July 2025 (NOPSEMA, 2025c)
N-04300-GN0166	Guidance Note – ALARP, October 2025 (NOPSEMA, 2025b)
N-04750-GN1344	Guidance Note– Environment plan content requirements, July 2025 (NOPSEMA, 2025a)
N-04750-GN1488	Guidance Note – Oil Pollution Risk Management, March 2026 (NOPSEMA, 2026c)
N-09000-GN1661	Guidance Note – Vessels subject to the Australian Offshore Petroleum Safety Legislation, October, 2020 (NOPSEMA, 2020)
N-04750-GN1785	Guidance Note – Petroleum activities and Australian Marine Parks: A guidance note to support environmental protection and effective consultation, August 2025 (NOPSEMA, 2025e)
N-04750-IP1899	Information Paper – Reducing marine pest biosecurity risks through good practice management, January 2024 (NOPSEMA, 2024b)
N-04750-IP2376	Information Paper – Application of oil spill modelling in Environment Plans, December 2025 (NOPSEMA, 2025d)
N-00500-IP2002	Information Paper – Planning for proactive decommissioning, March 2026
A1301427	Environment Bulletin – Underwater sound impact evaluation – Auditory effects criteria for marine mammals and turtles, February 2026
A652993	Environment Bulletin – Oil spill modelling, April 2019 (NOPSEMA, 2019)
Other Guidance	
DCCEEW	National Light Pollution Guidelines for Wildlife, 2023 (DCCEEW, 2023h)
DCCEEW	EPBC Regulations 2025 – Part 8, Division 8.1 – Interacting with cetaceans
Department of the Environment and Energy (DotEE)	EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia, 2017a)
DotEE	Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans, 2018 (Commonwealth of Australia, 2018)
DotEE	National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna, 2017 (Commonwealth of Australia, 2017c)
Department of Agriculture, Water and the Environment (DAWE)	National biofouling management guidelines for the petroleum production and exploration industry, 2009 (MPSC, 2009)
DAWE	Australian Ballast Water Management Requirements, Version 8, 2020 (DAWE, 2020)
Department of Fisheries and Forestry (DAFF)	Australian anti-fouling and in-water cleaning guidelines: Exposure draft, 2024 (DAFF, 2024)
DAFF	Australian biofouling management requirements for commercial vessels, Version 3, 2023 (DAFF, 2023)
Victorian Joint Industry	Victorian Joint Industry and State Oil Pollution Responses, Guidance Note, 2025 Version 3
HB 203:2012	Managing Environmental-related Risk
IMO Resolution MEPC.378(80)	2023 Guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species (IMO, 2023)

Document Number	Document Name
IOGP Report 516	Wildlife response preparedness: Good practice guidelines for incident management and emergency response personnel (IPIECA-IOGP, 2014)
ISO 14001	Environmental Management Systems
ISO 31000	Risk management - Guidelines

11.3 Literature

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12.0 Glossary

Term	Definition
AAD	Australian Antarctic Division
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ADIOS	Automated Data Inquiry for Oil Spills
AEMS	Amplitude Energy Management System
AFMA	Australian Fisheries Management Authority
AHO/AHS	Australian Hydrographic Office / Australian Hydrographic Service
AIMS	Australian Institute of Marine Science
ALA	Atlas of Living Australia
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Parks
AMSA	Australian Maritime Safety Agency
AMSIS	Australian Marine Spatial Information System
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Governments
API	American Petroleum Institute
ATBA	Area to be Avoided
AUSCOAST	Coastal Navigational Warnings
b	breeding
BAM	Basker-A Manifold
BIA	Biologically Important Area
BMG	Basker Manta Gummy
BTEX	Benzene, toluene, ethylbenzene, and xylene
Ca	Calcium
CAS	Chemical Abstracts Service
CE	Critically endangered
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CFA	Consultation Focus Area
CH_4	Methane
CHIRP	Compressed High-Intensity Radar Pulse
Cl	Chloride
CMP	Conservation Management Plan
CMST	Centre for Marine Science and Technology (Curtin University)
CO_2	Carbon Dioxide
CO_3	Carbonate
COLREGs	International Regulations for Preventing Collisions at Sea 1972

Term	Definition
Cooper Energy	Cooper Energy Limited
CSV	Construction Support Vessel
DAFF	(Commonwealth) Department of Agriculture, Fisheries and Forestry
DAWE	(Commonwealth) Department of Agriculture, Water and the Environment (now DAFF and DCCEEW)
DCCEEW	(Commonwealth) Department of Climate Change, Energy, the Environment and Water
DEECA	(Victorian) Department of Energy, Environment, and Climate Action
DEWHA	(Commonwealth) Department of the Environment, Water, Heritage and the Arts (now DCCEEW)
DGV	ANZG default guideline value
DNV	Det Norske Veritas (this Company set standards for ships and offshore structures)
DP	Dynamic positioning
DSEWPaC	(Commonwealth) Department of Sustainability, Environment, Water, Population and Communities (now DCCEEW)
E	Endangered
EFL	Electrical flying lead
EHU	Electro-Hydraulic Umbilical
EMBA	Environment that May Be Affected
EMSA	European Maritime Safety Agency
ENVID	Environmental Workshop
EP	Environment Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPA	(Victorian) Environmental Protection Authority
EPO	Environmental Performance Outcomes
EPS	Environmental Performance Standards
ESD	Ecologically Sustainable Development
f	Foraging
Fl	Foraging likely
FLs	Flying leads
(F)	Far
FPSO	Floating Production Storage and Offloading
GDA94	Geocentric Datum of Australia 1994
GHG	Greenhouse gases
GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation
HCO_3	Bicarbonate
HCTS	Habitat critical to the survival
HDPE	High-Density Polyethylene
HFL	Hydraulic flying lead
HSE	Health, Safety, and Environment
HSEC	Health, Safety, Environment and Community

Term	Definition
(I)	Intermediate
IC	Incident Controller
ISO	International Organization for Standardization
IAP	Incident Action Plan
ID	Internal diameter
IMCRA	Integrated Marine and Coastal Regionalisation of Australia
IMO	International Maritime Organization
IMOS	Integrated Marine Observing System
IMP	Integrity Management Plan
IMS	Invasive Marine Species
IMT	Incident Management Team
IPIECA	International Petroleum Industry Environmental Conservation Association
IR	Infra-red
ITOPF	International Tanker Owners Pollution Federation Limited
IUCN	International Union for Conservation of Nature
JASCO	JASCO Applied Sciences
JRCC	Joint Rescue Coordination Centre
JVP	Joint Venture Partner
K	Potassium
KCl	Potassium Chloride
KEF	Key Ecological Features
ky	1000 years
LALC	Local Aboriginal Land Council
LoC	Loss of containment
LoR	Limit of reporting
LT	Listed Threatened
m	Migration
MAE	Major Accident Event
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multibeam Echo Sounder
MDO	Marine Diesel Oil
MEPC	Marine Environment Protection Committee
MES	Monitoring, Evaluation and Surveillance
MFE	Mass flow excavation
Mg	Magnesium
MMO	Marine Mammal Observer
MNES	Matters of National Environmental Significance
MoC	Management of Change

Term	Definition
MODU	Mobile Offshore Drilling Unit
MS	Management System
(N)	Near
Na	Sodium
NEBA	Net Environmental Benefit Analysis
NISB	National Intertidal-Subtidal Benthic
NMFS	National Marine Fisheries Service (US)
N_2O	Nitrous oxide
NOAA	National Oceanic and Atmospheric Administration
NO_3	Nitrate
NO_X	Nitrous oxides
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
NORM	Naturally Occurring Radioactive Substances
NPP	Non-Production Phase
NRC	National Research Council (US)
NSW	New South Wales
NZ	New Zealand
OCNS	Offshore Chemical Notification Scheme
OD	Outer diameter
OIW	Oil in water
OGUK	Oil and Gas UK (now Offshore Energies UK)
OH	Hydroxide
OIW	Oil in water
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth)
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (Cth)
OSMP	Operational and Scientific Monitoring Plan
OSPAR	Oil Spill Prevention, Administration and Response
OWR	Oiled wildlife response
P&A	Plug and abandonment
PAH	Polycyclic aromatic hydrocarbon
PAM	Passive acoustic monitoring
pf	Possible foraging
PHPA	Partially hydrolyzed polyacrylamide
PK	Peak pressure level
PLEM	Pipeline end manifold
PLONOR	Pose Little or No Risk to the Environment

Term	Definition
PMS	Planned Maintenance System
PMST	Protected matters search tool
PNEC	Predicted No effect
PPD	Pour point depressant
ppm	Parts per million
PTS	Permanent Threshold Shift
PSV	Platform Support Vessel
PSZ	Petroleum Safety Zone
PW	Produced Water
r	Reproduction
R_{max}	Maximum horizontal distance
ROV	Remotely Operated Vehicles
RPS	RPS Group
SBP	Sub-bottom profiler
SEEMP	Ship Energy Efficiency Management Plan
SEL	Sound Exposure Level
SESSF	Southern and Eastern Scalefish and Shark Fishery
SETFIA	South East Fishing Trawl Industry Association
SIMAP	Spill Impact Mapping Analysis Program
SIV	Seafood Industry Victoria
SMPEP	Shipboard Marine Pollution Emergency Plan
SO_4	Sulphate
SO_X	Sulphur oxides
SOLAS	Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
SPE	Society of Petroleum Engineers
SPL	Sound Pressure Level
SSS	Side scan sonar
TDS	Total dissolved Solids
TEC	Threatened Ecological Communities
TRH	Total recoverable hydrocarbons
TRP	Tactical Response Plan
TSSC	Threatened Species Scientific Committee
TTS	Temporary Threshold Shift
UAV	Unmanned Aerial Vehicles
UCH	Underwater cultural heritage
UK	United Kingdom
UTA	Umbilical Termination Assembly

Term	Definition
US	The United States of America
USBL	Ultra-Short Baseline
V	Vulnerable
VFA	Victorian Fishery Authority
VIC	Victoria
VIC/RL	Victoria Retention Lease
WBM	Water Based Mud
WOMP	Well Operations Management Plan

Appendix 1 - Legislative Requirements Relevant to the Activity

Table A-1 - Commonwealth Legislation and/or Requirements

Legalisation/Requirement	**Scope**	**Applicability to the Activity (under the OPGGS(E)R)**	**Related International Conventions**	**Authority**
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The Act is Commonwealth legislation that can be used by Aboriginal and Torres Strait Islander people to make applications to protect places and objects from injury or desecration. The places or objects in question must be of particular significance in accordance with Aboriginal tradition. Areas or objects protected under this Act are included in the National Heritage List and Commonwealth Heritage List.	No known areas or objects protected under this Act are present within the Operational Area or Spill EMBA.	None applicable.	DCCEEW
Australian Ballast Water Management Requirements (DAWE, 2020)	The Australian Ballast Water Management Requirements set out the obligations on vessel operators with regards to the management of ballast water and ballast tank sediment when operating within Australian seas.	Provides requirements on how vessel operators should manage ballast water when operating within Australian seas. Section 6.0 details these requirements.	International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management Convention).	DAFF
Australian Biofouling Management Requirements (DAFF, 2023)	Sets out vessel operator obligations for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas.	Provides requirements on biofouling management for vessels and having biofouling management plans. Impacts and risks associated with biofouling management as part of the proposed activities are discussed in Section 6.0 of this EP.	IMO 2011 Guidelines for the Control and Management of Ships' biofouling to Minimize the Transfer of Invasive Aquatic Species	DAFF
Australian Maritime Safety Authority (AMSA) Act 1990	The aims of the Act are to: • Promote maritime safety • Protect the marine environment from pollution from ships and other environmental damage caused by shipping • Provide for a national search and rescue service. AMSA is the authority responsible for the application of the Act.	The Act is applicable to offshore petroleum activities where these have the potential to affect maritime safety and/or result in pollution and other environmental damage associated with the operation of ships. This is in particular relevant to the potential risk of oil spill associated with offshore petroleum activities. Impacts and risks associated with vessel movements as part of the proposed activities are discussed in Section 6.0 of this EP.	• International Convention on Oil Pollution Preparedness, Response and Cooperation 1990 (OPRC) • Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000	AMSA

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
			• International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties 1969 • Articles 198 and 221 of the United Nations Convention on the Law of the Sea 1982.	
Biosecurity Act 2015 Biosecurity Regulations 2016	The *Biosecurity Act 2015* replaced the *Quarantine Act 1908* in June 2016. The Biosecurity Act and regulations apply to 'Australian territory' which is the airspace over and the coastal seas out to 12 nm from the coastline. The aims of this Act are to: • Provide for managing the following: – Biosecurity risks – The risk of contagion of a listed human disease – The risk of listed human diseases entering Australian territory or a part of Australian territory, or emerging, establishing themselves or spreading in Australian territory or a part of Australian territory – Risks related to ballast water. – Biosecurity emergencies and human biosecurity emergencies. • Give effect to Australia's international rights and obligations, including under the International Health Regulations, the SPS Agreement and the Biodiversity Convention.	For the petroleum industry, the Act regulates the condition of vessels and drill rigs entering Australian waters regarding ballast water and hull fouling. The regulations stipulate that all information regarding the voyage of the vessel and the ballast water and hull fouling is declared correctly to the quarantine officers. Noting that the Operational Area is outside of 12 nm from the coastline, the activity does not fall under the Biosecurity Act 2015. However, vessels and the MOU travelling to and from the Operational Area will cross into the 12 nm territory limit, and therefore must adhere to relevant requirements. Management measures related to risk associated with the program are presented in Section 6.0.	International Convention on the Control and Management of Ship's Ballast Water and Sediment (Ballast Water Management Convention) (adopted in principle in 2004 and in force on 8 September 2017).	DAFF

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
	Provides a definition of 'quarantine' and establishes the DAWE (now DAFF).			
Environment Protection (Sea Dumping) Act 1981 and associated permit requirements	Aims to prevent the inappropriate disposal of wastes (loading, dumping, and incineration) at sea from vessels, aircraft, and platforms. As such this Act regulates the loading and dumping of wastes at sea, as well as the creation of artificial reefs.	A sea dumping permit is needed it for any disposal of waste required to be made at sea from vessels, aircraft and platforms involved in the conduct of petroleum exploration and production activities in Australian waters, excluding operational discharges from ships (e.g. sewage and galley wastes). Thus, if a titleholder proposes to leave infrastructure partially or wholly in situ, or dispose of infrastructure at a different site, a permit under the *Sea Dumping Act* may be required. Disposal of wastes required during the proposed activities is discussed in Section 6.0 of this EP.	Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter 1972 and 1996 Protocol Thereto (London Convention).	DCCEEW
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The aims of this Act are to: • Protect MNES • Provide for Commonwealth environmental assessment and approval processes • Provides an integrated system for biodiversity conservation and management of protected areas. MNES include: • World heritage properties • Ramsar wetlands • Listed threatened species and communities. • Migratory species under international agreements • Nuclear actions • Commonwealth marine environment • Great Barrier Reef Marine Park	EPBC Protected Matters are described in Section 4.0. Where offshore petroleum activities have the potential to impact on MNES, an assessment of these impacts is required to be presented in the EP. Potential impacts to MNES due to the proposed activities are assessed in Section 6.0 of this EP. The OPGGS Regulations preclude undertaking a petroleum activity within a world heritage area. The BMG P&A activity is not located within a world heritage area.	• Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment 1974 (JAMBA) • Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment 1986 (CAMBA) • Convention on Biological Diversity and Agenda 21 1992 • Convention on the Conservation of Migratory	DCCEEW

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
	• Water trigger for coal seam gas and coal mining developments. The assessment process is overseen by NOPSEMA as the delegated authority under the EPBC Act.		Species of Wild Animals (Bonn Convention) 1979 • Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973 (CITES) • Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (RAMSAR) • International Convention for the Regulation of Whaling 1946.	
Environment Protection and Biodiversity Conservation Regulations 2000	Part 8 of the regulations provide distances and actions to be taken when interacting with cetaceans.	The interaction requirements are applicable to the activity in the event that a cetacean is sighted. Potential impacts to cetaceans due to the proposed activities are assessed in Section 6.0 of this EP.	None applicable.	DCCEEW
Hazardous Waste (Regulation of Exports and Imports) Act 1989	The Act controls the import and export of hazardous waste in Australia	This Act applies to offshore petroleum activities when an Operator is required to move hazardous waste generated during the Activity in or out of Australia. The Act requires that a permit is required to transport controlled wastes. Hazardous wastes to be produced during the program are described in Section 3.0. Management measures applicable to hazardous wastes are presented in Section 6.0 of this EP.	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1992.	DCCEEW
Industrial Chemicals Environmental Management (Register) Act 2021	The Act establishes the Industrial Chemicals Environmental Management Standard (IChEMS) to manage environmental risks from industrial	Management measures identified under IChEMS may have implications for the import and use of particular chemicals and products for the petroleum activity (e.g. fire extinguishing media).	None applicable.	DCCEEW

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
	chemicals, including the IChEMS Register which lists chemicals and assigns risk management measures.			
National Biofouling Management Guidance for the Petroleum Production and Exploration Industry 2009 (MPSC, 2009)	The guidance document provides recommendations for the management of biofouling hazards by the petroleum industry	Applying the recommendations within this document and implementing effective biofouling controls can reduce the risk of the introduction of an introduced marine species. The requirements applicable to the activities are presented in Section 6.0.	• Convention on Biological Diversity • United Nations Convention on the Law of the Sea • International Convention on the Control of Harmful Anti-Fouling Systems on Ships • IMO Resolution MEPC.207(62) • 2011 Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species.	DAFF
National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia, 2017c)	The overarching goal of the strategy is to provide guidance on understanding and reducing the risk of vessel collisions and the impacts they may have on marine megafauna.	Applying the recommendations within this document and implementing effective controls can reduce the risk of the vessel collisions with megafauna. The requirements applicable to the activities are presented in Section 6.0.	Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979.	DCCEEW
Navigation Act 2012 *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*	The Act regulates international ship and seafarer safety as well as the protection of the marine environment from shipping and the actions of seafarers in Australian waters. The Act regulates: • Vessel survey and certification • Vessel construction standards • Vessel crew • Personnel qualifications and welfare	All ships involved in petroleum activities in Australian waters are required to abide to the requirements under this Act. Several Marine Orders (MO) are enacted under this Act which relate to offshore petroleum activities, including: • MO 21: Safety of navigation and emergency procedures • MO 30: Prevention of collisions	• International Convention for the Prevention of Pollution from Ships 1973/78 (MARPOL 73/78) • International Regulations for Preventing Collisions at Sea 1972 (COLREGs).	AMSA

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
	• Occupational health and safety • Handling of cargoes passengers • Marine pollution prevention • Monitoring and enforcement activities. The Act also has subordinate legislation contained in Regulations and Marine Orders.	• MO 31: SOLAS and non-SOLAS certification. • MO 47: Offshore industry units • MO 57: Helicopter operations • MO 59: Offshore industry vessel operations • MO 91: Marine pollution prevention—oil • MO 95: Marine pollution prevention—garbage • MO 96 Marine pollution prevention—sewage • MO 97 Marine pollution prevention—air pollution • MO 98: Marine pollution prevention—anti-fouling systems. Management measures related to shipping safety during the program are presented in Section 6.0 of this EP.		
Minamata Convention on Mercury	The Minamata Convention on Mercury is an international treaty that seeks to protect human health and the environment from anthropogenic (caused by humans) emissions and releases of mercury and mercury compounds.	Applying the recommendations within this document and implementing controls non mercury management can reduce the risk of the introduction of potential impacts from mercury. The requirements applicable to the activities are presented in Section 6.0.	Minamata Convention was ratified on 7 December 2021.	DCCEEW
Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act) and OPGGS(E)R	The Act addresses all licensing, health, safety, environmental and royalty issues for offshore petroleum exploration and development operations extending beyond the 3 nm limit. Part 2 of the OPGGS(E)R specifies that an EP must be prepared for any petroleum activity and that activities are undertaken in an ecologically sustainable manner and in accordance with an accepted EP.	The OPGGS Act provides the regulatory framework for all offshore petroleum exploration and production activities in Commonwealth waters, to ensure that these activities are carried out: • Consistent with the principles of ESD as set out in section 3A of the EPBC Act • So that environmental impacts and risks of the Activity are reduced to ALARP.	None applicable.	NOPSEMA

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
		• So that environmental impacts and risks of the Activity are of an acceptable level. Demonstration that the proposed activities will be undertaken in line with the principles of ESD, and that impacts and risks resulting from these activities are ALARP and acceptable is provided in Section 6.0 of this EP.		
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989	The Ozone Acts control the manufacture, import, export, use and disposal of ozone depleting substances and synthetic greenhouse gases and products containing these gases. The aims of this Act are to: • Control the manufacture, import, export, use and disposal of substances that deplete ozone in the stratosphere and contribute to climate change. • Achieve a faster and greater reduction in the levels of production and use of ozone depleting substances than are required under the Montreal Protocol • Promote responsible management and handling of ozone depleting substances and synthetic greenhouse gases to minimise their impact on the atmosphere.	This Act applies to offshore petroleum activities when an Operator is required to use listed substances under the Act (HCFC, PFC and/or sulphur hexafluoride), e.g. for the operation of machinery such as refrigeration and air condition systems. Relevant management measures are presented in Section 6.0 of this EP.	• Montreal Protocol on Substances that Deplete the Ozone Layer 1987 • United Nations Framework Convention on Climate Change 1992.	DCCEEW
Protection of the Sea (Harmful Antifouling Systems) Act 2006	The Act aims to protect the marine environment from the effects of harmful anti-fouling systems. Under this Act, it is an offence for a person to engage in negligent conduct that results in a harmful anti-fouling compound being applied to a ship.	All ships involved in offshore petroleum activities in Australian waters are required to abide to the requirements under this Act. The Marine Order MO 98: Marine Pollution Prevention – Anti-fouling Systems is enacted under this Act.	International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001.	AMSA

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
	This Act also requires that Australian ships must hold 'anti-fouling certificates', provided they meet certain criteria.	The management of risk is discussed in Section 6.0.		
Protection of the Sea (Prevention of Pollution from Ships) Act 1983	The Act aims to protect the marine environment from pollution by oil and other harmful substances discharged from ships in Australian waters. It also invokes certain requirements of the MARPOL Convention such as those relating to discharge of noxious liquid substances, sewage, garbage and air pollution. This Act requires ships greater than 400 gross tonnes to have pollution emergency plans in place, and also provides for emergency discharges from ships.	All ships involved in petroleum activities in Australian waters are required to abide to the requirements under this Act. Several MOs are enacted under this Act relating to offshore petroleum activities, including: • MO Part 91: Marine Pollution Prevention – Oil • MO Part 93: Marine Pollution Prevention – Noxious Liquid Substances • MO Part 94: Marine Pollution Prevention – Harmful Substances in Packaged Forms • MO Part 95: Marine Pollution Prevention – Garbage • MO Part 96: Marine Pollution Prevention – Sewage • MO Part 97: Marine Pollution Prevention – Air Pollution • MO Part 98: Marine Pollution Prevention – Antifouling Systems. Management measures related to pollution from oil or other hazardous substances are presented in Section 6.0 of this EP.	MARPOL	AMSA
Underwater Cultural Heritage Act 2018	The Act protects the heritage values of shipwrecks sunken aircraft and other underwater cultural heritage (older than 75 years) below the low water mark. The Act designates protection zones around identified heritage values, where circumstances	The Act is applicable to any activities that has the potential to result in damage, interference, removal or destruction of an historic value, including offshore petroleum activities that have the potential to interact with known wreck sites and relics.	• Agreement between the Netherlands and Australia concerning old Dutch Shipwrecks 1972	DCCEEW

Legalisation/Requirement	Scope	Applicability to the Activity (under the OPGGS(E)R)	Related International Conventions	Authority
	place a particular site at risk of interference. The Act prohibits any activities within this zone unless a permit has been obtained.	Shipwreck database identifies a historical shipwreck site within the Operational Area, however consultation with DAWE (now DCCEEW) has confirmed the listing is for the suspected Barque shipwreck, the location of which is unknown. Heritage values of the area of the proposed activities are described in Section 4.0 of this EP. Anyone who finds the remains of a ship, sunken aircraft or other underwater cultural heritage article needs to notify the relevant authorities, as soon as possible but ideally no later than after one week, and to give them information about what has been found and its location. 500 m protected zones to be observed around historic ship/aircraft wrecks under section 20(1). No relevant management measures have been identified given absence of heritage sites within Operational Area.	• UNSECO Convention on Protection of the Underwater Cultural Heritage 2001.	

Table A-2 - Victorian Legislation/Requirements

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
Aboriginal Heritage Act 2006 and Regulations 2018	The primarily purpose of the Act is to provide for the protection of Aboriginal cultural heritage in Victoria.	There is the potential for First Nations cultural heritage, and RAPs, PCBs, or LACLs, to associated with the Operational Area or Spill EMBA. Sections 4.09.0 and 9.0 describe cultural receptors and identify relevant First Nations groups.	Minister for Aboriginal Affairs, Victorian Department of Premier and Cabinet
Emergency Management Act 2013 and Regulations 2003	The regulations provide for the establishment of governance arrangements for emergency management in Victoria, including	Emergency response structure for managing emergency incidents within Victorian waters. Emergency	Department of Justice and Regulation (Inspector General for Emergency Management)

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
	the Office of the Emergency Management Commissioner and an Inspector-General for Emergency Management. Provides for integrated and comprehensive prevention, response and recovery planning, involving preparedness, operational coordination and community participation, in relation to all hazards. These arrangements are outlined in the Emergency Management Manual Victoria.	management structure will be triggered in the event of a spill threatening State waters. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	
Environment Protection Act 2017 and Regulations 2021	Controls discharges and emissions (air, water, noise) to the environment within Victoria. Provides for the maintenance and, where necessary, restoration of appropriate environmental quality and is relevant to oil pollution in Victorian state waters.	The Operational Area is outside of state waters, so this legislation is only applicable in the event of an oil spill threatening state waters. Management measures in the event of an oil spill are described in Sections 6.0 and 7.0.	EPA
Flora and Fauna Guarantee Act 1988 (FFG Act) and Regulations 2020	The purpose of this Act is to protect rare and threatened species and enable and promote the conservation of Victoria's native flora and fauna and to provide for a choice of procedures that can be used for the conservation, management or control of flora and fauna and the management of potentially threatening processes. Where a species has been listed as threatened an Action Statement is prepared setting out the actions that have or need to be taken to conserve and manage the species and community.	The EP must assess any actual or potential impacts or risks to FFG Act-listed species (e.g. from an accidental hydrocarbon release affecting state waters) and apply controls in line with any Action Statements. Operational Area does not overlap with State waters, as such only applicable in the event of oil spill which threatens state waters. Any rare or threatened species within the EMBA have been identified in Section 4.0. The management of risk applicable Action Statement controls is discussed in Section 6.0.	Department of Energy, Environment, and Climate Action (DEECA)
Heritage Act 1995 and Heritage (Underwater Cultural Heritage) Regulations 2017	The purpose of the Act is to provide for the protection and conservation of historic places, objects, shipwrecks and archaeological sites in State areas and waters (complementary legislation to Commonwealth legislation). Part 5 of the Act is focused on historic shipwrecks, which are defined as the remains of all ships that have been situated in Victorian waters for 75 years or more. The Act addresses, among other things, the registration of wrecks, establishment of protected	Identification of historic places, objects, shipwrecks and archaeological sites in State waters that may be impacted by the Activity and reporting of any identified historic places, objects, shipwrecks and archaeological sites or impacts to them. Operational Area does not overlap with State waters, as such only applicable in the event of oil spill which threatens state waters. Applicable heritage values of	Heritage Victoria (DEECA)

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
	zones, and the prohibition of certain activities in relation to historic shipwrecks.	the area of the proposed activities are described in Section 4.0 of this EP. Where relevant, management measures are presented in Section 6.0 of this EP.	
Marine Safety Act 2010 and Regulations 2023	This Act provides for safe marine operations in Victoria of including imposing safety duties on owners, managers and designers of vessels, marine infrastructure and marine safety equipment; marine safety workers, masters and passengers on vessels; regulation and management of vessel use and navigation in State waters; and enforcement provisions of Police Officers and the Victorian Director of Transport Safety. This Act reflects the requirements of international conventions - Convention on the International Regulations for Preventing Collisions at Sea & International Convention for the Safety of Life at Sea. The Act also defines marine incidents and the reporting of such incidents to the Victorian Director of Transport Safety.	Applicable to vessel masters, owners, crew operating vessels in Victorian State waters. Operational Area does not overlap with State waters, as such only applicable in the event of oil spill which threatens state waters. No relevant management measures have been identified given Operational Area is outside of state waters.	Maritime Safety Victoria
National Parks Act 1975	This Act established a number of different types of reserve areas onshore and offshore, including Marine National Parks and Marine Sanctuaries. A lease, licence or permit under the OPGGS Act 2010 (Vic) that is either wholly or partly over land in a marine national park or marine sanctuary is subject to this Act. Activities within these areas require Ministerial consent before activities are carried out.	Applies where there are activities within reserve areas. Operational Area does not overlap with State waters, and no planned activities will occur within a reserve area. As such, this legislation is only applicable in the event of an oil spill which threatens reserve area. Victorian National Park and other protected terrestrial areas within the EMBA have been identified in Section 4.0. Relevant person consultation undertaken is detailed in Section 9.0.	DEECA
Port Management Act 1995	This Act sets out particular provisions for the operation and management of the Port of Melbourne and provides Victorian Ports Corporation (Melbourne) (VPCM) with certain powers and functions in the areas of towage, hazardous activities and pollution.	Applicable in the event of an oil spill entering Victorian Ports. Awareness and engagement with ports around SEMPS will facilitate integration of the different safety and environmental regimes that already apply and address	Jointly administered by Environment Protection Authority of Victoria; the Director, Transport Safety; and the Health and Safety Organisation

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
	Under this Act all managers of local and commercial ports must prepare a Port Safety Management Plan and Environmental Management Plan (together known as SEMPs)	any potential overlaps or gaps in emergency response planning. Relevant person consultation undertaken is detailed in Section 9.0. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	
Wildlife Act 1975 and Regulations 2024	The purpose of this Act is to promote the protection and conservation of wildlife, prevent wildlife from becoming extinct and prohibit and regulate persons authorised to engage in activities relating to wildlife (including incidents). The Wildlife (Marine Mammal) Regulations 2019 prescribe minimum distances to whales and seals/seal colonies, restrictions on feeding/touching and restriction of noise within a caution zone of a marine mammal (dolphins (150 m), whales (300 m) and seals (50 m)).	Applicable in the event of an oil spill entering state waters. Prescribed minimum proximity distances to whales, dolphins and seals by vessels are included in this EP. Reporting requirements are triggered if an incident results in the injury or death of whales, dolphins or seals. Applicable requirements of the proposed activities are described in Section 6.0 of this EP. Reporting requirements provided in Section 10.0 of this EP.	DEECA

Table A-3 - New South Wales Legislation/Requirements

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
Biosecurity Act 2015 and Biosecurity Regulation 2017	This Act provides a framework to support risk-based management and efficient response to biosecurity risks.	Applicable where project activities may pose biosecurity risk to NSW. Operational Area does not overlap with State waters, as such only applicable in emergency events. Applicable NSW values are described in Section 4.0 of this EP. Relevant management measures are presented in Section 8.0 of this EP.	Department of Primary Industries
Heritage Act 1977	This Act provides for the identification, registration and interim protection of items of State heritage significance (including shipwrecks within state waters) in NSW.	Identification of historic places, objects, shipwrecks and archaeological sites in State waters that may be impacted by the Activity and reporting of any identified historic places, objects, shipwrecks and archaeological sites or impacts to them. Operational Area does not overlap with State waters, as such only applicable in the event of oil spill. Applicable heritage values of the area of the proposed activities are described in Section 4.0 of this EP.	Heritage Council of NSW

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
Marine Estate Management Act 2014	This Act provides for the protection and management of marine areas.	Operational Area does not overlap with State waters, as such only applicable in the event of oil spill. Applicable where oil spill poses a risk to NSW marine parks. NSW marine parks that maybe impacted by the Activity have been identified in Section 4.0 of this EP. Relevant person consultation undertaken is detailed in Section 9.0.	NSW Marine Parks Authority
Marine Pollution Act 2012	This Act is the NSW state legislation giving effect to the requirements of MARPOL 73/78 within state waters.	Operational Area does not overlap with State waters, as such only applicable in the event of oil spill. Triggered in the event of a diesel spill originating from or entering NSW state waters. Applicable requirements of the proposed activities are described in Section 6.0 of this EP.	NSW Transport
National Parks and Wildlife Act 1974	This Act provides for the care, control and management of all national parks, historic sites, nature reserves, conservation reserves, Aboriginal areas and game reserves, and the protection and care of native flora and fauna, and Aboriginal places and objects.	Applicable where oil spill poses a risk to NSW National parks, historic sites, nature reserves, conservation reserves, Aboriginal areas and game reserves, and the protection and care of native flora and fauna protected under the Act. Relevant NSW environmental and social receptors that maybe impacted by the Activity have been identified in Section 4.0 of this EP. Relevant person consultation undertaken is detailed in Section 9.0.	NSW National Parks and Wildlife Service
Ports and Maritime Administration Act 1995	This Act provides for the provision of marine safety services and emergency environment protection services for dealing with pollution incidents in NSW waters.	Applicable in the event of an oil spill entering NSW Ports. Awareness and engagement with ports will facilitate integration of the different safety and environmental regimes that already apply and address any potential overlaps or gaps in emergency response planning. Relevant person consultation undertaken is detailed in Section 9.0. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	Port Authority of NSW
Protection of the Environment Operations Act 1997	This is the main piece of NSW environmental legislation covering water, land, air and noise pollution and waste management.	Applies where oil spill poses a risk to NSW state waters and coastline. Relevant person consultation undertaken is detailed in Section 9.0. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	NSW Environment Protection Authority
Wilderness Act 1987	This Act affords declared wilderness the most secure level of protection, requiring it to be managed in a way that will maintain its wilderness values and pristine condition by limiting activities likely to damage flora, fauna and cultural heritage.	Applies where oil spill poses a risk to NSW state waters and coastline. Relevant NSW environmental and social receptors that maybe impacted by the Activity have been identified in Section 4.0. Reporting requirements provided in Section 10.0 of this EP.	NSW National Parks and Wildlife Service

Table A-4 - Tasmanian Legislation / Requirements

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
Biosecurity Act 2019	The Act consolidates Tasmania's biosecurity laws into a single modern statute. It establishes a Biosecurity Advisory Committee, which provides advice to the Tasmanian Government and Minister for Primary Industries and Water on biosecurity in Tasmania.	Applicable where project activities may pose biosecurity risk to Tasmanian waters and coastlines. Operational Area does not overlap with State waters, as such only applicable in emergency events. Applicable Tasmanian values are described in Section 4.0 of this EP. Management measures are presented in Section 6.0 of this EP.	Department of Primary Industries, Parks, Water and Environment
Emergency Management Act 2006	This Act establishes the Tasmanian emergency management framework which operates at state, regional and municipal levels, and provides for the protection of life, property and the environment in the event of an emergency in Tasmania.	Emergency response structure for managing emergency incidents within Tasmanian waters. Emergency management structure will be triggered in the event of a spill originating from or entering State water. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	Department of Police and Emergency Management
Environmental Management and Pollution Control Act 1994	This is the primary environment protection and pollution control legislation in Tasmania, with focus on prevention, reduction and remediation of environmental harm.	Applicable in the event of oil spill entering State water. Operational Area does not overlap with State waters, as such only applicable in emergency events. Applicable Tasmanian values are described in Section 4.0 of this EP. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	Environment Protection Authority Tasmania
Historic Cultural Heritage Act 1995	This Act provides for the identification, assessment, protection and conservation of places having historic cultural heritage significance (including shipwrecks within state waters) in Tasmania.	Identification of historic places, objects, shipwrecks and archaeological sites in State waters that may be impacted by the Activity and reporting of any identified historic places, objects, shipwrecks and archaeological sites or impacts to them. Operational Area does not overlap with State waters, as such only applicable heritage values of the area of the proposed activities are described in Section 4.0 of this EP. Relevant management measures are presented in Section 6.0 of this EP.	Jointly administered by Tasmanian Heritage Council and Historic Heritage Section of Parks and Wildlife Service Tasmania (shipwrecks)
Marine and Safety Authority Act 1997	This Act establishes Marine and Safety Tasmania as the authority responsible for the	Applicable to vessel masters, owners, crew operating vessels in Tasmanian State waters.	Marine and Safety Tasmania

Legalisation/Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
	safe operation of vessels in Tasmanian waters and managing its marine facilities.	Operational Area does not overlap with State waters, as such only applicable in emergency events. Applicable Tasmanian values are described in Section 4.0 of this EP. Relevant management measures are presented in Section 6.0 of this EP.	
National Parks and Reserves Management Act 2002	This Act provides for the management of national parks and other reserved land.	Applicable where oil spill poses a risk to Tasmanian National and other Parks protected under the Act. Tasmanian National Park and other protected terrestrial areas that maybe impacted by the Activity have been identified in Section 4.0 of this EP. Relevant person consultation undertaken is detailed in Section 9.0.	Parks and Wildlife Service Tasmania
Marine-related Incidents (MARPOL Implementation) Act 2020	This Act is the Tasmanian state legislation giving effect to the requirements of MARPOL 73/78 within state waters.	As the Operational Area is located outside of state waters, these requirements will be triggered in the event of a diesel spill originating from or entering Tasmanian state waters. Applicable MARPOL requirements of the proposed activities are described in Section 6.0 of this EP.	Environment Protection Authority Tasmania

Appendix 2 - Description of the Environment: Projects & Operations [AEL-EN-EMP-0001]

Appendix 2 supports the descriptions provided within Sections 4 and 6 of this Environment Plan. Where there may be differences in the information between this EP and the Description of the Environment document, this EP can be considered more current and accurate for the purposes of the assessment and management of impacts and risks for the activities provided for undier this EP.

Appendix 3 - EPBC Act Protected Matters Reports

Operational Area

Spill EMBA

Monitoring Area

Activities EMBA (Operational Area with 16 km Buffer)

Spill EMBA – Surface

Spill EMBA – Shoreline

Appendix 4 - EP Changes Register

Date	Revision	Change	MoC #	Trigger Resubmission
21 September 2022	01	Updates in response to NOPSEMA RFFWI	N/A	N/A (under assessment)
31 August 2023	02	Updates in response to NOPSEMA RFFWI	N/A	N/A (under assessment)
14 December 2023	03	Updates in response to NOPSEMA RFFWI	N/A	N/A (EP accepted 13 February 2024)
28 April 2026	04	Resubmission of EP to NOPSEMA to update activity timeframes, increased activity detail and associated assessment of impacts, risks and their management.	SC #3188	Yes. Activity timeframe outside the timeframes provided for within the accepted EP.

Appendix 5 - Relevant Persons Consultation

Appendix 6 - BMG Field Architecture Deconstruction Report

Appendix 7 - Subsea Noise Modelling Studies