BMG Closure Project (Phase 2) Environment Plan

VIC/RL13

Decommissioning | BMG | EP

Document Control

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1.0 Introduction

Cooper Energy Limited (Cooper 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 on the Victorian coast (Figure 1-1). VIC/RL13 includes the Basker Manta Gummy (BMG) subsea facilities.

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

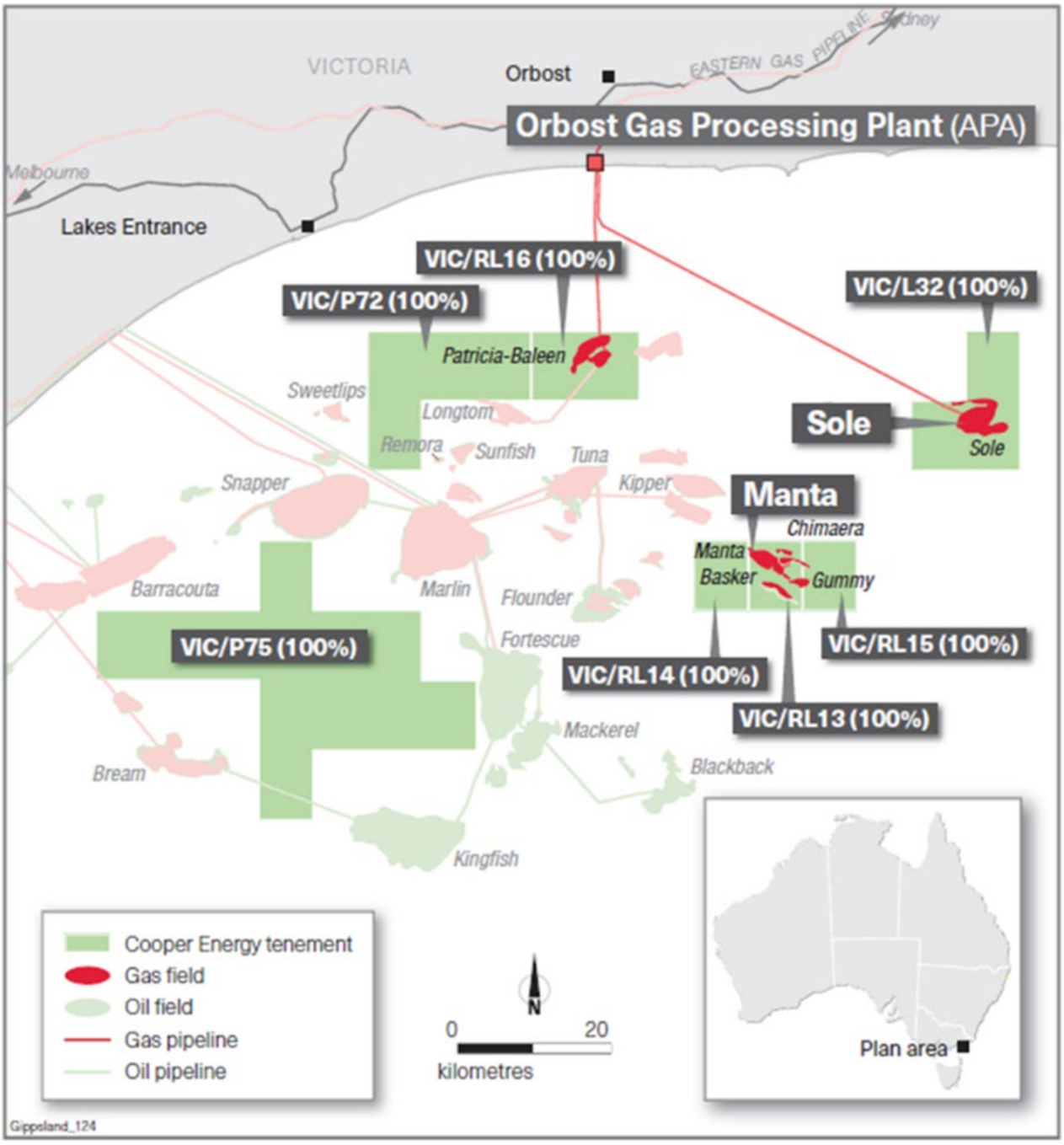


Figure 1-1 - Location of Permit VIC/RL13

1.1 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 11(4) of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (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	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 9.13
A summary of the response arrangements in the oil pollution emergency plan	Section 7.0, and BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004)^
Details of consultation already undertaken and plans for ongoing consultation	Section 10.0
Details of the titleholders nominated liaison person for the activity	Section 1.6

^ Available publicly at: https://docs.nopsema.gov.au/A832863

1.2 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 Basker-Manta-Gummy field infrastructure
- a distance of 360 m around the Basker-6 wellhead
- a distance of 300 m around the exposed flowlines.

The BMG 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 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, Cooper Energy intends to decommission the remaining BMG oil production subsea facilities and infrastructure in phases:

- Phase 1a – facility cleaning, preparations, and well abandonment (covered under the BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001])

- Phase 1b – removal of structures, flowline spools, and flying leads, depending on progress with well abandonment (covered under the BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001])
- Phase 2 – decommissioning of flowlines, umbilicals, and any remaining equipment not removed in Phase 1 (covered under this EP).

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

1.3 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 2022a).

The EP also serves to outline how matters related to General Direction 824, and Sections 571, 572 and 270 of the *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.

1.4 Scope

Cooper 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 Plug and Abandonment (P&A) of the wells (Table 1-2). The existing Gippsland Operations EP, which provides for the NPP, shall be revised and resubmitted in 2024 to remove BMG from the scope of that EP.

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

Table 1-2 - Overview of BMG EP 's

EP Name (document number)	Relevant scope	Initiation point	Termination point
Gippsland Offshore Operations Environment Plan (VIC-EN-EMP-0002)	Inspection and maintenance	Superseded previous BMG NPP EP to provide coverage of NPP activities.	BMG component of the Gippsland Offshore Operations EP is not active upon commencement of Phase 1 activities. BMG will be removed from the Gippsland Offshore Operations EP during 2024 through the 5 year EP revision cycle.
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.
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.

Activities excluded from the scope of this EP are:

- BMG Closure Project (Phase 1) decommissioning activities that are 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 facility is considered to have been completed. Although Cooper Energy do not plan to relinquish VIC/RL13 once activities are complete, Cooper Energy will submit a Regulation 25A end of operation form to close out the EP.

1.5 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 Cooper Energy's project planning process. Cooper 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.

Typically, regulatory approvals, including the EP are submitted / accepted during the 'develop' phase. This EP is being submitted earlier than is typical, prior to detailed engineering, and hence provides for a number of options for project execution. The early timing of the EP is in the context of General Direction 824 and is in line with regulatory expectations for this particular project.

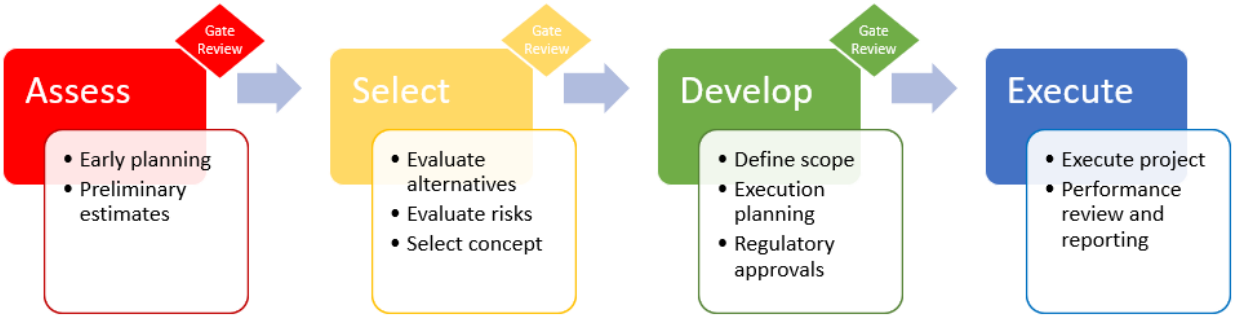


Figure 1-2 Project Workflow

Phase timing: circa 2024 to 2026 (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. Report: Technical considerations for decommissioning of subsea infrastructure at BMG 17-033-RP-001.
Umbilical flying leads	Removal	None

Facilities/infrastructure	Planned end state	Alternatives considered
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 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):

- 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
  - plug and abandonment of all wells to permanently isolate the production zones (by end 2023)
  - removal of structures on the seabed, flowline jumpers, and flying leads (2023/24). 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) 2024 to end-2026 (this EP):
  - decommissioning of flowlines and umbilicals, and any other remaining equipment via full removal; this will be undertaken as a separate campaign following well plug and abandonment. The only elements currently planned to be left in situ are the well components below the seabed, and the section of the Basker-A Manifold pile below the seabed. The activities associated with these elements are provided for within the Phase 1 EP.
  - 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 decommissioning schedule showing indicative timing of project regulatory submissions and supporting environmental studies. The decommissioning timings provided here supplants the indicative timings provided within the Gippsland Operations EP (VIC-EN-EMP-0002) in relation to existing BMG NPP activities.

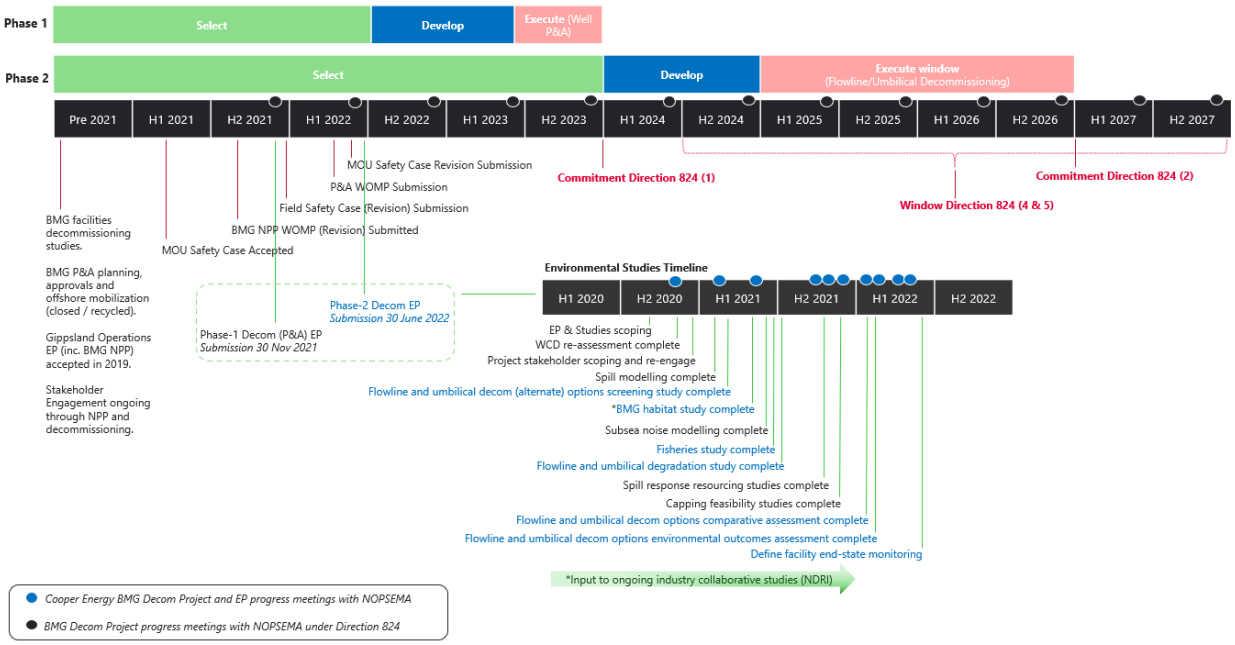


Figure 1-3 BMG decommissioning schedule showing indicative regulatory submission timings

1.6 Titleholder Details

In accordance with Regulation 15 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.

If the titleholder's nominated liaison person or contact details for the nominated liaison person changes, Cooper Energy will notify the Regulator in accordance with Regulation 15(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: Cooper Energy Limited **ABN:** 93 096 170 295 **Lease:** VIC/RL 13	**Address:** Level 8, 70 Franklin Street, Adelaide, 5000 **Telephone Number:** (08) 8100 4900	Nathan Childs Chief Corporate Services Officer Cooper Energy Limited Level 8, 70 Franklin St, Adelaide, SA, 5000 **Phone:** (08) 8100 4900 **Email:** nathan.childs@cooperenergy.com.au

2.0 Requirements

This section provides information on the requirements that apply to the petroleum activity described in this EP, 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 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 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 State and Commonwealth waters, a summary of Commonwealth, Victoria, New South Wales (NSW) and Tasmania requirements, and any codes or guidelines applicable to the activity is provided in Appendix 1.

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

OPGGS(E)R	Description	Document Section
13(1)	A description of proposed activities	Section 3.0
13(2), 13(3)	A description of the existing environment including details of the particular 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 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).	Section 4.0
13(4), 14(10)	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
13(5), 13(6)	An identification and evaluation of environmental risks of described 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 and unplanned activities.	Section 6.0, and Section 7.0
13(7)	The environmental performance outcomes, standards and measurement criteria that apply to both planned and unplanned activities.	Per aspect Section 6.0, and Section 7.0 (and summarised in Section 8.0)
14(1), 14(2)	An appropriate implementation strategy including routine reporting arrangements to the Regulator in relation to environmental performance.	Section 9.0
14(3)	A description of the environmental management system and measures to ensure that impacts and risks are continually identified and reduced, control measures are effective in reducing impacts and risks, and that performance outcomes and standards are being met to ALARP.	Section 9.0
14(4)	Details of role and responsibilities of personnel in relation to implementation, management, and review of this EP, including during emergencies or potential emergencies.	Section 9.4
14(5)	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 9.5
14(6), 26C	Details of monitoring, recording, auditing, management of non-conformance and review of environmental performance and the implementation strategy.	Section 9.13
14(7)	Details of monitoring and maintenance of quantitative records for emissions and discharges.	Section 9.13.1
14(8AA), 14(8), 14(8A), 14(8B), 14(8C), 14(8E)	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 9.6.2 and the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004)
14(8D)	Details of monitoring of impacts to the environment from oil pollution and response activities	Section 7.0, BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004) and Offshore Victoria Operational and Scientific Monitoring Plan (OSMP) [VIC-ER-EMP-0002]
16(c), 26A, 26B	Details of reportable incidents in relation to the activity, procedures for reporting and notifying reportable and recordable incidents.	Section 9.12

OPGGS(E)R	Description	Document Section
11A, 14(9), 16(b)	Details of Relevant Person consultation that has been undertaken prior to, and during preparation of the EP, including all correspondence.	Section 10.0
15(1), 15(2), 15(3)	Details of the titleholder and an appropriate nominated liaison person, including arrangements for notifying the Regulator should this change.	Section 1.6
16(a)	Details of the titleholders' environmental policy.	Section 2.3
25(a)	Details of titleholder notification requirements at end of activity.	Section 10.3

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 issues 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 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 guidance note "Section 572 Maintenance and Removal of Property" (NOPSEMA 2022b) 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 Section 270 Consent to surrender title - NOPSEMA advice, outlines the principles adopted when advising the Joint Authority about giving or refusing consent to surrender a title (NOPSEMA 2022a). Cooper Energy acknowledge this Policy, however, do not plan to relinquish the title on completion of the activities under this EP as detailed in Section 1.4.

2.1.2 General Direction 824

In September 2021 NOPSEMA issued a General Direction 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 .

Table 2-2 General Direction 824: Directions and relevant plans

Schedule 1 - Directions		Relevant Plans
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)
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 [this document]
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 [this document] Gippsland Operations EP (VIC-EN-EMP-0002) BMG Facilities Integrity Management Plan (BMG-IT-IMP-0001). BMG Well Operations Management Plan. (BMG-DC-WMP-0001)

Schedule 1 - Directions		Relevant Plans
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 [this document] Specifically refer to Section 6.3.
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 [this document]. Specifically refer to Section 6.3.
6	Submit to NOPSEMA annual progress reporting until all directions have been met. Publish the report on the registered holder's website within 14 days of obtaining NOPSEMA satisfaction.	BMG Closure Project (Phase 1) EP [BMG-DC-EMP-0001] BMG Closure Project (Phase 2) EP [this document]

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 Section 270 and 572 of the Act are set out in Table 2-3. Although the title is not planned to be relinquished, Cooper has set out the requirements below in a manner to demonstrate the requirements of the Act have been met.

Table 2-3 Relevant requirements of the OPGGS Act 2006

Schedule 1 - Directions		How this requirement has been addressed
Section 270 – Consent to surrender title		
3	The Joint Authority may consent to the surrender sought by the application only if the registered holder of the permit, lease or licence: 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) arrangements that are satisfactory to NOPSEMA in relation to that property; and	As detailed in Section 3.4 Cooper Energy plan to removal all subsea infrastructure except for the sub-seabed section of the Basker-A Manifold pile.
3	e) has provided, to the satisfaction of NOPSEMA, for the conservation and protection of the natural resources in the surrender area; and	
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 development has been detailed.
	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.	As the title is not planned to be surrendered this requirement is not considered applicable.
Section 572 - Maintenance and removal of property etc. by titleholder		
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.	Detailed in Section 3.6 how the infrastructure is planned to be maintained.
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 the title area; and (b) used in connection with the operations authorised by the permit, lease, licence or authority	As detailed in Section 3.3 Cooper Energy plan to removal all subsea infrastructure

2.1.4 Matters to be addressed (permissioning documents)

In September 2021 NOPSEMA issued a list of matters to be addressed in relation to Policy 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.

Table 2-4 Matters to be addressed (permissioning documents)

Item	Matters to be addressed	How/where addressed		
		Gippsland Operations EP (accepted)	BMG Closure Project (Phase 1) EP (BMG-DC-EMP-0001)	BMG Closure Project (Phase 2) EP (this EP)
A	Description of all property brought onto the title, including its current status and condition.	The Gippsland Operations EP provides for the non-production phase of the BMG facilities. The EP provides a description of the facilities and links to the asset integrity management plan (IMP) which provides a detailed inventory of all property.	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 s 572(3) and the General Direction 824 to NOPSEMA's satisfaction.	N/A	The BMG Closure Project (Phase 1) EP provided for plugging of wells and removal of structures. Specifically, to meet the requirements of s 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 s 572(3) and Direction 2 of General Direction 824 as soon as practicable and by no later than 31 December 2026.
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 Gippsland Operations EP describes the indicative decommissioning dates for the BMG facilities. These dates are superseded by General Direction 824 and the dates outlined within the decommissioning activity EPs.	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. This description will supplant details within the Gippsland Operations EP once the BMG Closure Project (Phase 1) EP is accepted.	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.	N/A	BMG Closure Project (Phase 1) EP schedule of activities included all decommissioning activities and permissioning documents.	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.	N/A	The BMG Closure Project (Phase 1) EP provided for plugging 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 • subsea noise adaptive management plan • worst case discharge assessment • oil spill 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 • flowline and umbilical decommissioning options screening study

Item	Matters to be addressed	How/where addressed		
		Gippsland Operations EP (accepted)	BMG Closure Project (Phase 1) EP (BMG-DC-EMP-0001)	BMG Closure Project (Phase 2) EP (this EP)
			• spill response resourcing • subsea dispersant study • expansion of OSMP • capping feasibility study. An activity specific OPEP was drafted for the decommissioning activity (BMG Closure Project (Phase 1) OPEP), 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 comparative assessment of decommissioning options • flowline and umbilical environmental outcomes assessment of decommissioning options. Relevant Person engagement (informing the evaluation to date) has commenced 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 Cooper 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 Gippsland Operations EP provides for integrity management of facilities whilst in NPP. The EP links to the BMG Facilities IMP. 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.	BMG Closure Project (Phase 1) EP outlined how the plug and abandonment activities will be managed such that full removal is not precluded.	BMG Closure Project (Phase 2) EP provides for the decommissioning end states for the infrastructure. The offshore activities, impacts and risks associated with the asset during NPP Phase are currently covered within the Gippsland Operations EP. These activities will be covered by the BMG Closure Project (Phase 2) EP (this EP) following P&A of the wells and once the revised Gippsland Operations EP is accepted.
G	Description of the arrangements for reporting to NOPSEMA on progress with implementing the activities under the EP, until these activities are complete.	N/A	BMG Closure Project (Phase 1) EP included 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.	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 Cwth 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.

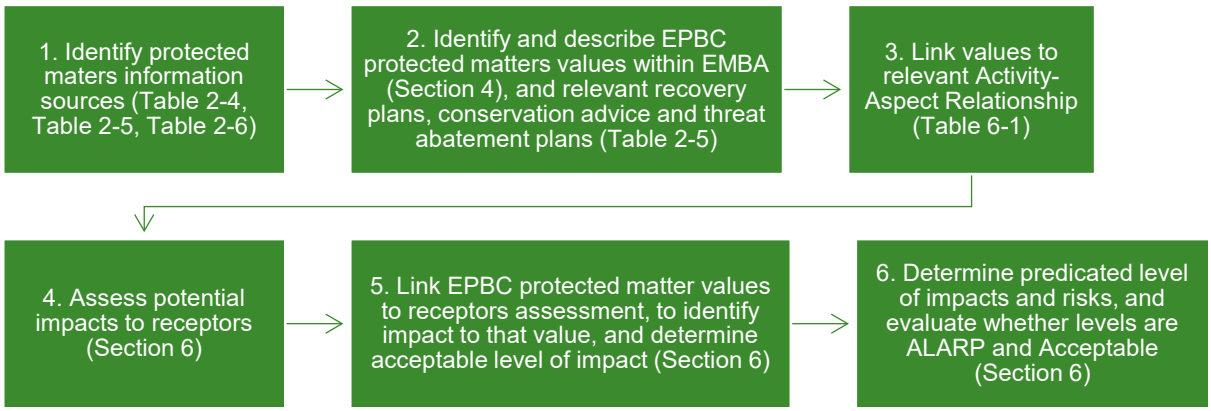


Figure 2-1 Impact assessment process of EPBC MNES

Table 2-5 Act information incorporated into this EP

EPBC Act Relevant Information Considered	How information is used	Document Section
Protected matters search tool (PMST)	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 EMBA is provided in Section 4.0. The EPBC PMST report also includes 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 of oil spill impact assessment. The EPBC PMST reports are included in Appendix 3.	Section 4.0, and 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,	The Australian Government has established numerous Australian Marine Parks (AMPs) around Australia under the EPBC Act. There are five AMPs	Section 4.0, Section 6.0, and Cooper Energy Description of

EPBC Act Relevant Information Considered	How information is used	Document Section
Australian marine parks, or National Heritage places	that intersect with the EMBA. The closest AMP is East Gippsland Marine Park, 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 are 12 Commonwealth Heritage Places/Properties listed in the EPBC PMST for the EMBA, of which many are buildings or sites without a marine/coastal influence. 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 or National Heritage property that intersects with the EMBA were identified in the EPBC PMST.	the Environment: Projects & Operations (COE-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 • National Light Pollution Guidelines for Wildlife Including marine turtles, seabirds, and migratory shorebirds • Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life.	Section 6.0
Ramsar wetland ecological character descriptions	There is one Ramsar wetland that has coastal boundaries intersecting with the EMBA, Gippsland lakes.	Section 4.0, and Appendix 2
Marine bioregional plan	Marine bioregional plans are identified and considered in Section 4.0 and Section 6.0. Key Ecological Features (KEF) are elements of the Commonwealth marine environment considered as regional importance for either a region's biodiversity or its ecosystem function and integrity. Six KEFs intersect with the EMBA, including: • Big Horseshoe Canyon • Canyons on the eastern continental slope • Seamounts South and east of Tasmania • Shelf rocky reefs • Tasman Front and eddy field • Upwelling East of Eden.	Section 4.0, Section 6.0, and Appendix 2
The Conservation Values Atlas	The Conservation Values Atlas has been developed by the Commonwealth Government, and has been used for the identification of features, including biologically important areas (BIAs) and KEFs, within the EMBA. These have been presented specific to receptors in the Section 4.0 and considered in the assessment of impacts and risks in Section 6.0. BIAs are identified by the Commonwealth Government, are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviour, such as breeding, foraging, resting or migration. Multiple BIAs intersect with the EMBA, including: • one dolphin species • 22 bird species • two shark species • three whale species.	Section 4.0, Section 6.0, and Appendix 2
Species profile and threats (SPRAT) database (DCCEEW 2021a)	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 taxonomic. 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 Rockcod)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the species	None identified
Approved Conservation Advice *for Rhincodon typus* (Whale Shark)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the whale shark	• **vessel disturbance**: evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **marine debris**: evaluate risk of marine debris (including risk of entanglement and/o ingestion) and, if required, appropriate mitigation measures will be implemented • **climate change impacts**: no explicit relevant management actions; threat identified as 'climate change ecosystem effects as a result of habitat modification and climate change (including changes in sea temperature, ocean currents and acidification)'.
Recovery Plan for the Grey Nurse Shark (*Carcharias Taurus*)	Recovery plan provides strategy for recovery of grey nurse shark	None identified
National Recovery Plan for Australian Grayling	The recovery plan is coordinated conservation strategy for the Australian grayling	None identified
Recovery Plan for the White Shark (*Carcharodon carcharias*)	The recovery plan is a coordinated conservation strategy for the white shark	None identified
Marine Turtles		
Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle)	Refer to the recovery plan for marine turtles in Australia, 2017-2027	Refer to the 'Recovery Plan for Marine Turtles in Australia, 2017-2027' (Commonwealth of Australia 2017a)
Recovery Plan for Marine Turtles in Australia, 2017-2027	The long-term recovery plan objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles	• **marine pollution**: evaluate risk of oil spill impact to marine turtles and, if required, appropriate mitigation measures will be Implemented • **marine debris**: evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures will be implemented • **noise interference**: evaluate risk of noise impacts to marine turtles and, if required, appropriate mitigation measures will be implemented • **light interference**: evaluate risk of light impacts to marine turtles and, if required, appropriate mitigation measures will be implemented • **vessel disturbance**: evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented.
Migratory shorebirds and seabirds		
Approved Conservation Advice for *Botaurus poiciloptilus* (Australasian bittern)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Australasian bittern	None identified
Approved Conservation Advice for *Calidris canutus* (Red Knot)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the red knot	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the curlew sandpiper	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
Approved Conservation Advice for *Calidris tenuirostriss* (Great Knot)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Great Knot	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Charadrius leschenaultii* (Greater Sand Plover)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Greater Sand Plover	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Charadrius mongolus* (Lesser Sand Plover)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Lesser Sand Plover	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Halobaena caerulea* (Blue Petrel)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the blue petrel	None identified
Approved Conservation Advice for *Limosa lapponica baueri* (Bartailed Godwit (western Alaskan)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the bar-tailed godwit	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Numenius madagascariensis* (Eastern Curlew)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the eastern curlew	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Pachyptila subantarctica* (fairy prion (southern))	Conservation advice provides management actions that can be undertaken to ensure the conservation of the fairy prion (southern)	None identified
Approved Conservation Advice for *Pterodroma heraldica* (Herald Petrel)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Herald Petrel	None identified
Approved Conservation Advice for *Rostratula australis* (Australian painted snipe)	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	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure the species' long-term viability in the wild, and the parties that will undertake those actions	Deterioration of water quality, human disturbance.
Approved Conservation Advice for *Sternula nereis* (Australian Fairy Tern)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented
National Recovery Plan for *Sternula nereis nereis* (Australian Fairy Tern)	Draft recovery plan for actions so species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria	• **habitat degradation and loss of breeding habitat**
Approved Conservation Advice for *Thalassarche Chrysostoma,* Greyheaded Albatross)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the species	Refer to 'Draft National Recovery Plan for Albatrosses and Petrels, 2021' (Commonwealth of Australia 2021)
Approved Conservation Advice for *Thinornis rubricollis (Hooded Plover, Easter)*	Conservation advice provides management actions that can be undertaken to ensure the conservation of the species	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented • **marine debris**: evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures will be implemented
Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan	Conservation advice provides management actions that can be undertaken to ensure the conservation of the Gould's petrel	None identified
Little Tern (*Sterna albifrons*) Recovery Plan	Conservation strategy for the recovery of little tern	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
National Recovery Plan for Eastern Bristlebird (*Dasyornis brachypterus*)	Conservation strategy for the recovery of eastern bristlebrid	None identified
National Recovery Plan for the *Lathamus discolour* (swift parrot)	Conservation advice provides management actions that can be undertaken to ensure the conservation of the swift parrot	None identified
National Recovery Plan for the Orange-bellied Parrot (*Neophema chrysogaster*)	The recovery plan is a coordinated conservation strategy for the orange bellied parrot	None identified
National Recovery Plan for Albatrosses and Petrels, 2022	The recovery plan is co-ordinated conservation strategy for albatrosses and giant petrels listed as threatened	• **marine pollution**: evaluate risk of oil spill impact to nest locations and, if required, appropriate mitigation measures will be implemented • **marine debris**: evaluate risk of marine debris (including risk of entanglement and/or ingestion) and, if required, appropriate mitigation measures will be implemented
Wildlife Conservation Plan for Migratory Shorebirds – 2015	The long-term recovery plan objective for migratory shorebirds is to minimise anthropogenic threats to allow for the conservation status of these bird species	• habitat degradation/modification (oil pollution)
Wildlife Conservation Plan for Seabirds	The 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	• **habitat modification**: Evaluate the risk of oil spill impacts on the ability of a seabird to use an area for breeding, roosting, or foraging
Cetaceans		
Approved Conservation Advice for *Balaenoptera borealis* (Sei Whale)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the sei whale	• **vessel disturbance:** evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **noise interference**: evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures will be implemented
Approved Conservation Advice for *Balaenoptera physalus* (Fin Whale)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the fin whale	• **vessel disturbance:** evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **noise interference**: evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures will be implemented
Conservation Management Plan for the Blue Whale, 2015-2025	The long-term recovery plan objective for blue whales is to minimise anthropogenic threats to allow for their conservation status to improve	• **vessel disturbance:** evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **noise interference**: evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures will be implemented • Key terms of the Conservation Management Plan (CMP) and how they have been considered in this EP are provided in Table 2-7
Conservation Management Plan for the Southern Right Whale, 2011-2021	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the southern right whale	• **vessel disturbance:** evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **noise interference**: evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures will be implemented
Pinnipeds		
Conservation Advice for the *Neophoca cinerea* (Australian sea lion)	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the Australian sea lion	• **vessel disturbance:** evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **noise interference**: evaluate risk of noise impacts to cetaceans and, if required, appropriate mitigation measures will be implemented • **marine debris**: evaluate risk of marine debris (including risk of entanglement and/or ingestion)

Relevant Plan/Advice	Description	Threats or Management Advice Relevant to the Activity
		and, if required, appropriate mitigation measures will be implemented
Recovery Plan for the Australian Sealion (*Neophoca cinerea*)	The plan considers the conservation requirements of the species across its range and identifies the actions to be taken to ensure its long-term viability in nature and the parties that will undertake those actions	• **vessel strike** evaluate risk of vessel strikes and, if required, appropriate mitigation measures will be implemented • **marine debris**: evaluate risk of marine debris and, if required, appropriate mitigation measures will be implemented • **pollution and oil spills**: evaluate risk of oil spills and, if required, appropriate mitigation measures will be implemented
Marine habitat		
Conservation Advice for *Dendronephthya australis* Cauliflower Soft Coral	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the species	None identified
Threatened Ecological Communities		
Giant Kelp Marine Forests of Southeast Australia	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the ecological community	None identified
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	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	Conservation advice provides threat abatement activities that can be undertaken to ensure the conservation of the ecological community	• **pollution**: evaluate risk of oil spills and, if required, appropriate mitigation measures will be implemented
Other relevant		
The Threat Abatement Plan for the impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean	The plans focus on strategic approaches to reduce the impacts of marine debris on vertebrate marine life	• **marine debris**: evaluate risk of marine debris and, if required, appropriate mitigation measures will be implemented

Table 2-7: Key terms of the Blue Whale Conservation Management Plan (September 2022) 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 2015), 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 6.4 (underwater sound emissions).
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 DAWE key terms stated: *'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*	Action A.2.3 and the DAWE key terms (September 2021) have informed the assessment of acceptability of underwater sound emissions, described in Section 6.5. In the assessment of underwater sound emissions, Cooper 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. Cooper 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 (50 days). 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

Relevant Plan/Advice	Description
• *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'*	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 6.4).
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 6.4).

2.2 State Legislation

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

2.3 Cooper Energy Environment Practices and Policy

The activities covered by this EP will be planned and executed in accordance with the Cooper Energy Management System (CEMS). As such, the Cooper Energy Health, Safety, Environment and Community (HSEC) Policy is shown in Figure 9-2. Further information regarding the implementation of this policy and related procedures are outlined in the description of the CEMS in Section 9.1.

3.0 Activity Description

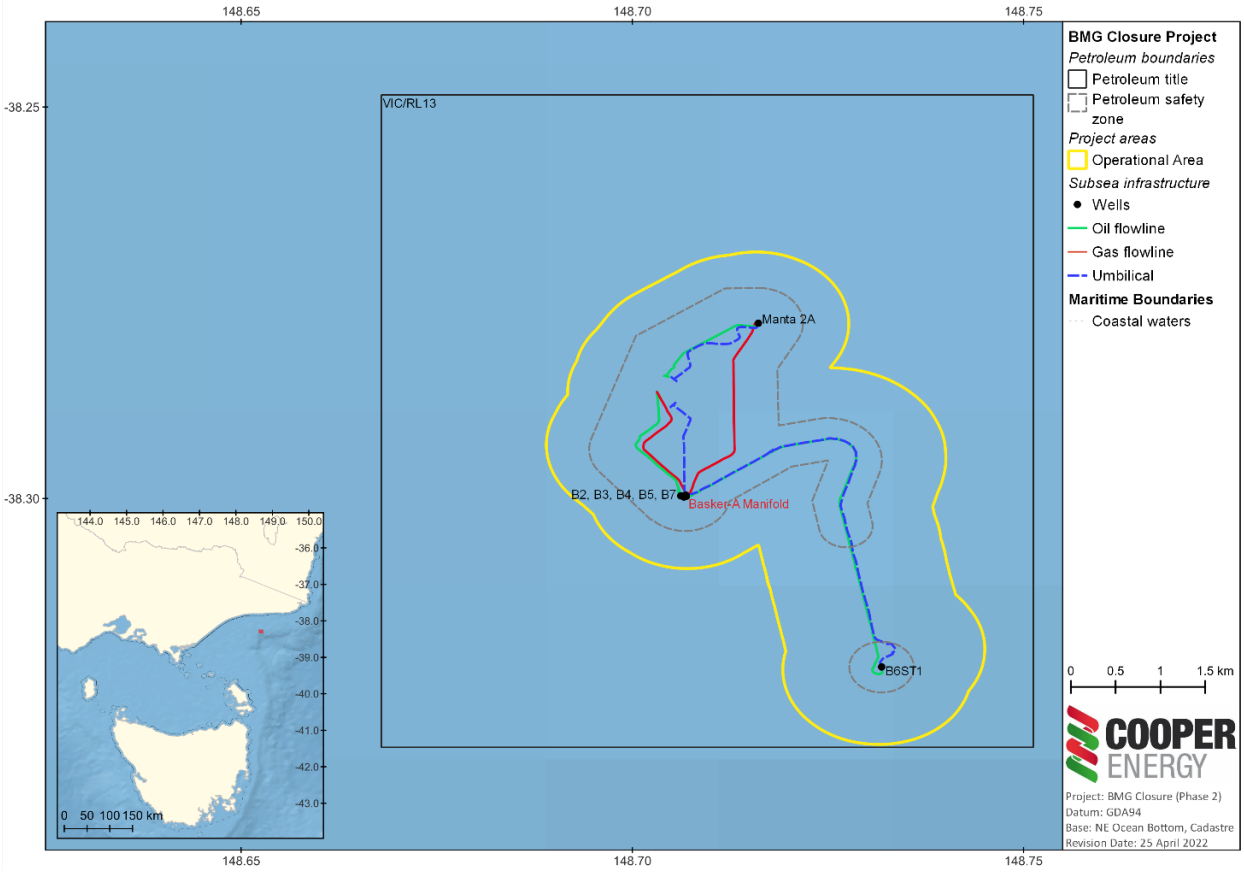
To meet the requirements of the OPGGS(E)R, this section provides a description of:

- location and timing of the activity
- existing infrastructure, including layout and current state
- the petroleum activity
  - contingency removal of subsea infrastructure (from Phase 1b)
  - 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 PSZ are trenched.

Figure 3-1 Operational Area and Petroleum Safety Zones (ref Gazette notice A443819)

3.1.2 Activity Timing

Activities are planned to commence from 2024 with a duration of approximately 50 days. 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 2026 in accordance with Direction 2 of General Direction 824, with all post-decommissioning activities (e.g., monitoring) also expected to be completed by the end of 2027 (in accordance with Directions 4 and 5 of General Direction 824).

Activities will be undertaken as soon as practicable within the planning window (2024 to end 2026), 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.

Further information on planning and progress will be provided within the BMG Closure Project Annual Progress Reports published on the Cooper Energy website: https://www.cooperenergy.com.au/our-operations/reports.

Inspection and maintenance activities will be undertaken on risk-based frequency (Section 3.5). 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.

BMG infrastructure occurs to the east of the Area to be Avoided (ATBA); 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. Table 3-1 also lists the subsea infrastructure currently in field at BMG and identifies the elements that will be removed during Phase 1 or Phase 2. Phase 1 activities are provided for within EP (BMG-DC-EMP-0001). Some Phase 1 activities are also provided for in Phase 2 as a contingency; 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 9.8.2 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, 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. BMG Closure Project (Phase 1) activities will include provision for additional cleaning/flushing of the flowlines prior to disconnection from subsea structures. Flushing activities will cease when hydrocarbon concentrations in the flush water asymptote at 30 ppm or less. Once flushed, the flowline contents will either comprise uninhibited water or water inhibited with corrosion inhibitor (nominal treatment rate 650 ppm).

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.

The Phase 1 EP provides for the disconnection of flowlines and umbilicals from subsea structures and associated discharges. The Phase 2 EP provides for the discharges associated with the recovery of the

equipment, and interim period between disconnection and recovery. 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. Cooper 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 the most recent seabed surveys of the trees and Basker-A Manifold (March 2022); the equipment was reported as in good condition, with secure connections, and no significant scour. Surveys also indicated 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 (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 Cooper 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).

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 planned to be decommissioned during Phase 1 (EP BMG-DC-EMP-0001)								
Subsea Production Wells (x7) B2, B3, B4, B5, B6ST1, B7, Manta 2A								
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
Control Modules x 5	1.6 m	2.1 m	1.5 m	0.07 m^3 ea.	2,000 kg	Steel	-	Removed
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
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 ~1 m below the seabed. Leave in situ ~36 m pile and associated grout below the seabed.
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

	Dimensions					Primary materials	Burial Status	Planned end state
	Height	Width or OD [ID]	Length	Volume Fluid	Dry Weight			
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
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[1] 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

[1] Electro-hydraulic umbilical

	Dimensions					Primary materials	Burial Status	Planned end state
	Height	Width or OD [ID]	Length	Volume Fluid	Dry Weight			
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

3.2 Decommissioning (Phase 2) Project Planning Overview

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

- assess
- select
- develop
- execute.

3.2.1 Assess and Select

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

Feasibility studies

Cooper 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 (Atteris 2018b).

Flowline and umbilical comparative assessment of decommissioning options

Cooper Energy engaged Xodus Group to conduct Comparative Assessment (CA) for the decommissioning of the remaining subsea infrastructure related to the BMG Fields. The purpose of the study was to identify the options available to Cooper 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 5 key options:

- full removal
- major intervention
- minor intervention
- minimal intervention
- leave in-situ

The CA 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 CA recommended that full removal should be implemented for:

- surface laid flexible flowlines and umbilicals, and
- 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 CA 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, Cooper 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.

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, Cooper 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. This information was used in the CA 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 CA outcome.

3.2.2 Develop

This phase of the project is planned 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), Cooper Energy implements the Supply Chain and Procurement Management Standard (MS11).

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 EPO's and EPS's set out in this EP.
- Schedule – the method/proposal should provide for decommissioning inside the timeframes set under General Direction 824.
- 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 Cooper Energy to complete the project planning phases with due process.

Cooper 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, Cooper 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 Cooper Energy will complete a Management of Change assessment in accordance with Section 9.11. This assessment will determine if updates to this EP or resubmission to NOPSEMA is required.

3.3 Contingency Removal of Subsea Infrastructure

The removal of the below subsea infrastructure is planned to be completed during BMG Closure Project Phase 1b activities (BMG-DC-EMP-0001), however, has also been included within the scope of this BMG Closure Project (Phase 2) EP for contingency purposes, if they are not retrieved during Phase 1b.

- 7 subsea trees (B2, B3, B4, B5, B6ST1, B7, Manta 2A)
- 7 wellheads, permanent guide bases and associated equipment such as spools, jumpers and umbilical flying leads
- Basker manifold

- Manifold pile (surface section)
- 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 Basker-A manifold 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 manifold pile is not considered feasible. The wellheads and manifold pile are planned to be cut below the seabed and the cut section recovered to surface.

Cutting wellheads and the manifold pile is anticipated to take approximately 12 hours per location. Target depth of the cut is 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 the steel tubulars to line up for the cut. Cutting 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.

Obtaining access to the inside of the pile may require excavation of materials inside the pile, for example, via 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 3-3). Any materials excavated will be moved adjacent to the pile; 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.

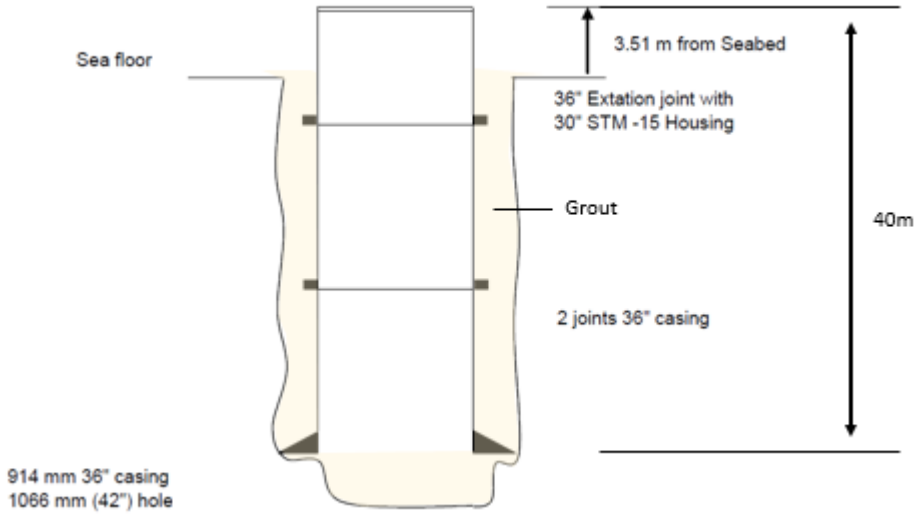


Figure 3-2 Manifold Pile Schematic

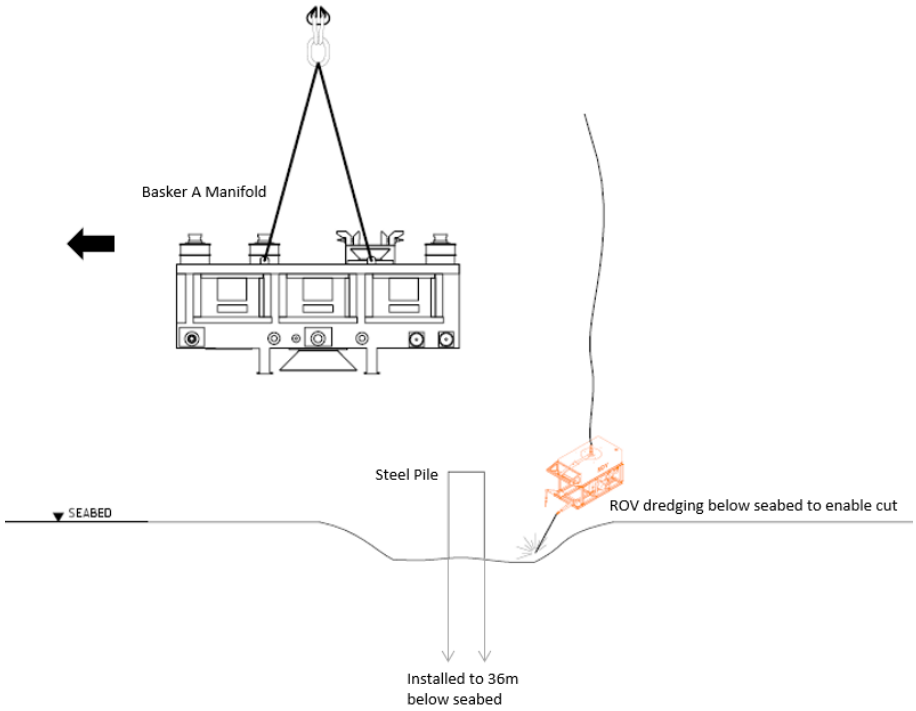


Figure 3-3 Illustration Manifold Pile cut preparation (external cut scenario)

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.

Cooper 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 (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 Cooper 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 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.

3.4.1 Reverse Installation (Reel)

A specialist reel-lay vessel or modified CSV (as further detailed in Section 3.6.1) 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 (planned to be completed during Phase 1 activities [BMG-DC-EMP-0001]), an abandon and recovery winch will be attached to the pulling head on the end of each flowline and each umbilical. Transponders may be utilised to locate the end of the flowline to enable easy recover for either 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 >1,000 m of line.

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.

3.4.2 Contingency De-Burial

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 de-burial 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 ends are currently attached to structures, with elevations above the seabed. The flowline and umbilical ends are planned to be disconnected during Phase 1 in preparation for removal. 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 3-3). 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.

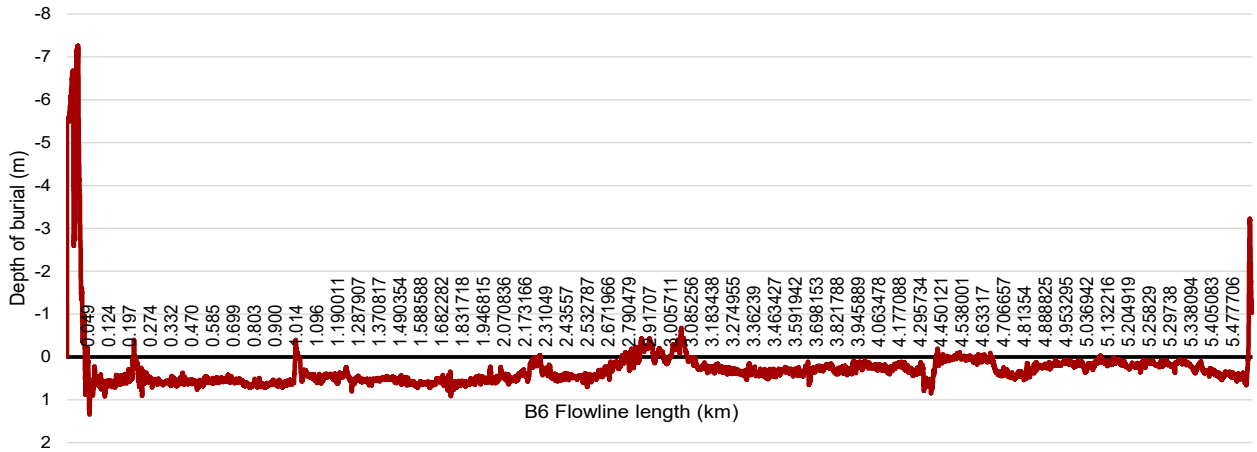


Figure 3-4 B6 Flowline Burial Depth

If de-burial 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. Cooper Energy does not plan to manually backfill disturbed areas. As detailed in Section 3.4.6, once removal activities are completed, Cooper Energy will undertake a seabed survey over the impacted area to identify any remaining debris within the facility footprint. This seabed survey will be used as a baseline for future triggered monitoring activities.

3.4.3 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 the pulling head on the end of each flowline or umbilical. Each flowline or umbilical will be pulled sufficiently along the deck and secured with further deck winches. 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 a specialist reel-lay vessel, and subsequently allows Cooper 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.

There may be some residual hydrocarbon wax within the flowlines. 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. Hydrocarbons will be recovered and treated via vessel or project water treatment systems, or otherwise returned to shore for treatment.

3.4.4 Contingency De-Burial

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

3.4.5 Contingency Cut and Lift

As a contingency, Cooper Energy may implement a cut and lift methodology for both flowlines and umbilicals. This would result in subsea cutting of infrastructure using an ROV and abrasive cutting tool prior to recovering the infrastructure to the vessel. Similar to reverse reel and lift and cut methodologies, cut and lift would result in subsea discharge from the flowlines and umbilicals, albeit occurring as smaller batch discharges.

3.4.6 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), sidescan sonar and/or sub-bottom profiler.

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 is able to be removed when neither used, nor to be used, in connection with the operations.

Property maintenance is currently provided for within the Gippsland Operations EP (VIC-EN-EMP-0002) until that EP is revised and BMG removed from scope. Property maintenance activities (post P&A) are included within scope of this BMG Closure Project (Phase 2) Decommissioning EP. The property maintenance provisions included within this EP will supplant provisions within the Gippsland Operations EP from 2024 upon acceptance of the revised Gippsland Operations EP.

An inspection and maintenance (I&M) program is undertaken on 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.

Seven 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):

- 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., 75% remaining). All observed anodes were active, with obvious oxide layers
- In general, Cathodic Protection (CP) readings on structural steel ranged from -906mV to -992mV, with average -955mV indicating well protected steel. M2A had slightly lower readings (-921mV 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 3-4). 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.

The detailed inspections to date have provided in-depth information to support decommissioning planning for Phases 1 and 2. Additional inspections may be undertaken, where deemed necessary, to support removal planning; the scope of these inspections may include verification access for tooling and of lifting points. Such inspections would likely be undertaken under the Phase 1 decommissioning scope, whilst vessels are in field, though additional surveys may be undertaken subsequent to Phase 1 (under this EP) if necessary, to support the final decommissioning activities.

3.6 Support Operations

3.6.1 Vessel Operations

A 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, cutting activities (refer to Sections 3.4.1 and Section 3.4.3). 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
- 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 will 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 3.4.6).

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 Decommissioning Tools

Tool	Application	Duration
Mass flow excavator, suction dredge, or jetting	De-burial and burial operations	Intermittent
Grinders, circular and mechanical cutters, hydraulic shears, diamond wire cutter	Subsea equipment removal above mudline	Intermittent
Abrasive cutting tool	Wellhead removal, above mudline via high-energy jet of water-borne abrasive particles	Continuous, 12hrs per well
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.	Physical presence of structures and associated local influence on seabed, sediment movements and demersal communities.	Seabed Disturbance	Footprint will be within the existing PSZ.
Contingency removal of subsea structures (from BMG Closure Project (Phase 1))	Subsea well infrastructure removal will include subsea excavation and wet parking.	Seabed Disturbance	Footprint will be within the existing Operational Area.
	Wellhead and manifold pile remove 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.	Seabed Disturbance	Within the existing footprint.
		Subsea Discharge	Grit discharge: 1.7 Mt per hour (3–7 hours 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 oil in water) and corrosion inhibitor chemical @650ppm. Umbilical volumes are between 1 m^3 and 15 m^3. Discharge of Transaqua HT2™ and freshwater; B6 umbilical also includes solvent.
	Contingent de-burial will result in seabed disturbance and underwater sound emissions.	Seabed Disturbance	Likely only relevant to Basker-6 umbilical and B6 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, sidescan sonar, sub-bottom profilers will generate impulsive sound when in use.
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 <300L pre application.
Support Operations			

Activity	Planned Disturbance, Discharge or Emission	Environmental Aspect (Refer to Section 6.0)	Details (includes indicative quantities where relevant)
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 days). Deck drainage and bilge treated in line with MARPOL requirements (15 ppm oil in water).
	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, description of the environment that may be affected (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 13(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 13(3) of the OPGGS(E)R which states that particular relevant values and sensitivities may include any of the following:

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

With regards to Regulation 13(3)(d) and 13(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 regionally significant species may display biologically important behaviours such as breeding, foraging, resting or migration.

With regards to Regulation 13(3)(f) more detail has been provided for:

- KEFs as they are considered a conservation value under a Commonwealth Marine Area (CMA)
- AMPs as they are enacted under the EPBC Act.

4.2 Environment that May be Affected

The EMBA by the activity has been defined as an area where a change to ambient environmental conditions may potentially occur as a result of planned activities or unplanned events. It is noted that a change does not always imply that an adverse impact will occur; for example, a change may be required over a particular exposure value or over a consistent period of time for a subsequent impact to occur. Table 4-1 and Figure 4-1 detail the Project Areas 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 BMG Closure Project (Phase 2) specific Project Area descriptions

Project Area	Description
Operational Area	For the activity, the Operational Area is a 1,000 m corridor centred over the BMG infrastructure (as described in Section 3.1). Planned operational discharges, physical presence and seabed disturbance that occur during the activity will be within the Operational Area. Appendix 3.1 details the EPBC Protected Matters Report for the Operational Area.
Spill EMBA	The boundary of the EMBA is defined using the hydrocarbon exposure (low) thresholds (Table 6-21) for the accidental release of marine diesel oil (MDO) from a vessel collision (Section 6.7). Based on stochastic modelling results (RPS 2021a), the EMBA overlaps Victoria, NSW, and Tasmania State waters (Figure 4-1), five Integrated

Project Area	Description
	Marine and Coastal Regionalisation of Australia (IMCRA) Provincial Bioregions (Bass Strait Shelf Province, Southeast Shelf Transition, Tasmanian Province, Southeast Transition and Central Eastern Province) and Australia economic Exclusive Zone (EEZ), which are described further in Appendix 2. Appendix 3.2 details the EPBC Protected Matters Report for the EMBA.

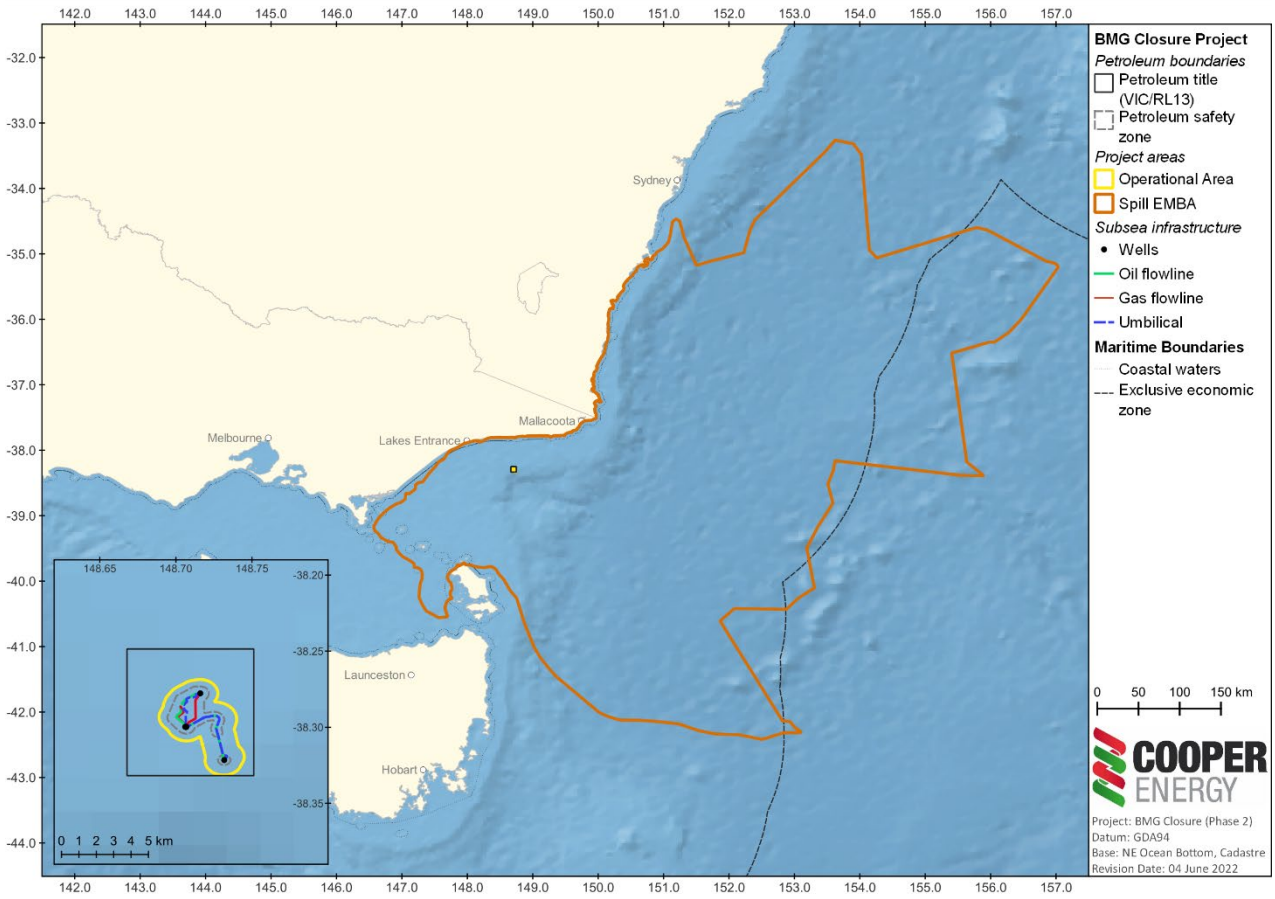


Figure 4-1 BMG Close Project (Phase 2) Operational Area and Spill EMBA

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 Shield 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 and 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 and Wang 2019).

The coast of the Twofold Shelf 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, Pope and S 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 and 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.

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 protected matter searches (Appendix 3.1and Appendix 3.2)

- presence of BIAs and habitats critical to the survival of the species (Appendix 3.1and Appendix 3.2)
- presence of important behaviours (e.g., foraging, roosting, breeding) by fauna, including those identified in the EPBC protected matter searches (Appendix 3.1and Appendix 3.2)
- 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 EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[2]		Spill EMBA[3]
Habitat	Shoreline	Rocky	• foraging habitat • nesting or breeding habitat • haul-out sites	-	**Not present** The Operational Area does not include the coastal environment.	✓	**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. Detailed existing environment descriptions of these shoreline habitats within the spill EMBA is described in Appendix 2, Section 3.1.
		Sandy	• foraging habitat • nesting or breeding habitat • haul-out sites	-		✓	
		Artificial structure	Sessile invertebrates	-		✓	
	Mangroves (Dominant Habitat)	Intertidal/ subtitle habitat, mangrove communities	• nursery habitat • breeding habitat	-	**Not present** The Operational Area does not include the coastal environment.	✓	**Present** Mangrove dominated habitat exists within Gippsland and Central NSW within the spill EMBA. Mangroves have been recorded in all Australian states except Tasmania. One species, *Avicennia marina*, occurs in Victoria: typically, in inlets or estuaries (e.g.,

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

[3] Combination of an EPBC PMST for the spill EMBA area, and characteristics of the Gippsland, Bass Strait and Central NSW environment 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[2]		Spill EMBA[3]
							Corner Inlet). Species diversity increasing as they occur further to the north in NSW. Mangrove habitats nearshore along the Victorian coast are distributed in South Gippsland around the French Island National Park and coast around Port Welshpool. Dominant mangrove habitat based on National Intertidal-Subtidal Benthic Habitat Classification Scheme are present in the spill EMBA within Victoria and NSW. Detailed existing environment descriptions of these mangrove habitats within the spill EMBA is 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.	✓	**Present** Saltmarsh is identified in the spill EMBA. 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 with greater than 10% coverage of saltmarsh occurs along most of the coastline of the spill EMBA in Victoria. In the broader region within the spill EMBA, extensive saltmarsh occurs within the Corner Inlet-Nooramunga 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 within the spill EMBA is 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 3.5). 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.	✓	**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 within the spill EMBA is described in Appendix 2, Section 3.5.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[2]		Spill EMBA[3]
					Detailed existing environment descriptions of soft sediment habitats within the Operational Area is described in Appendix 2 Section 3.5		
	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 occurs around Melbourne and extends along the Gippsland coast along NSW (Appendix 2, Section 3.6). 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. Detailed existing environment descriptions of seagrass habitats within the spill EMBA is described in Appendix 2, Section 3.6.
	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 3.7). 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** Dominant habitat identified within the spill EMBA is located near Mallacoota. Species may include bull kelp and other brown algae species. 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. They are not common as a dominant habitat type in East Gippsland or NSW but do occur in mixed reef environments. Detailed existing environment descriptions of algae habitats within the spill EMBA is described in Appendix 2 Section 3.7.
	Coral	Hard and soft coral communities (Dominant Habitat)	• nursery habitat • breeding habitat	✓	**Present** The Operational Area is in deep water (135 m – 270 m) and beyond the photic zone, therefore 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** One endangered coral species (or species habitat), Cauliflower Soft Coral, may occur within the spill EMBA (Appendix 3.2). This species is known to contain brightly coloured genera, mostly described as bushy, globe-shaped or arborescent in appearance and a worldwide distribution occurring in tropical waters (TSSC 2020a). The species appears to be confined to estuarine environments in NSW where it occurs in depths of 1 m to 18 m. It is generally found in sandy bottom areas in regions of high current flow, and it can expand and contract in relation to tidal flow cycle (Davis, Harasti and Smith 2015).

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
							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). Detailed existing environment descriptions of coral habitats within the spill EMBA is described in Appendix 2, Section 3.8.
	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 3.1).	✓	**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). 17 TECs were identified in the EPBC PMST for the EMBA (Appendix 3.2), of which many are located without a marine/coastal intersection. The following three TECs have coastal presence: • 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 within the spill EMBA is described in Appendix 2, Section 3.
Marine Fauna	Plankton	Phytoplankton and zooplankton	Food source	✓	**Present** Phytoplankton and zooplankton are widespread throughout oceanic environments and is 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 3.9). Detailed existing environment descriptions of plankton within the Operational Area is described in Appendix 2, Section 3.9.	✓	**Present** Phytoplankton and zooplankton are widespread throughout oceanic environments and is expected to occur within the spill EMBA. Increased abundance and productivity can occur in areas of upwelling, such as Upwelling East of Eden KEF, which intersects the spill EMBA (Appendix 2, Section 3.9) Detailed existing environment descriptions of plankton within the spill EMBA is described in Appendix 2, Section 3.9.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
	Marine Invertebrates	Benthic and pelagic invertebrate communities	• food source • commercial species	✓	**Present** A variety of marine invertebrate species may occur within the Operational Area. • Studies of infauna in shallower waters of East Gippsland has indicated a high species diversity and abundance (Beaman, Daniell and Townsend 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 3.11). • 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 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 be present within the Operation Area (Appendix 3.1). Detailed existing environment descriptions of marine invertebrates within the Operational Area is described in Appendix 2, Section 3.11.	✓	**Present** One crustacean species (or species habitat), Furneaux burrowing crayfish, was identified in the EPBC PMST for the spill EMBA (Appendix 3.2). This species is only found on Flinders Island and Cape Barren Island in the Bass Strait, known to occur only from isolated locations in fern-rich gullies on Mount Strzelecki and the Darling Ranges on Flinders Island, and from Mount Munro on Cape Barren Island (Horwitz 1990, Richardson, Doran and Hansen 2006). Studies of infauna along the Victorian coast have shown high species diversity, particularly in East Gippsland (Heislers and Parry 2007). Commercially important species may occur within the spill EMBA. Detailed existing environment descriptions of marine invertebrates within the spill EMBA is described in Appendix 2, Section 3.11.
	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 (2021) describes several commercial fish species as active within the BMG Operational Area, including Southern and Eastern Scalefish and Shark Fishery (SESSF)	✓	**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, and species of wrasse, and flathead.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
					Commonwealth Trawl sector, SESSF shark gillnet and shark hook sectors, and SESSF occurring hook sectors. Detailed existing environment descriptions of commercial fish species within the Operational Area is described in Appendix 2, Section 3.12.		Detailed existing environment descriptions of commercial fish species within the spill EMBA is described in Appendix 2, Section 3.12.
			Listed Threatened species	✓	**Present** Four threatened fish species were identified within the Operational Area PMST search (Appendix 3.1): • Orange roughy (conservation dependant) • Eastern gemfish (conservation dependent) • Blue warehou (conservation dependent) • Southern bluefin tuna (conservation dependent). 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.	✓	**Present** Seven threatened fish species (or species habitat) may occur within the spill EMBA (Appendix 3.2): • Black rockcod (vulnerable) • Eastern dwarf galaxias (vulnerable) • Orange roughy (conservation dependant) • Australian grayling (vulnerable) • Eastern gemfish (conservation dependent) • Blue warehou (conservation dependent) • Southern bluefin tuna (conservation dependent). Detailed existing environment descriptions of threatened fish species within the spill EMBA is described in Appendix 2, Section 3.12.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
		Sharks and Rays	Listed Migratory Species	✓	**Present** Eight shark species (or species habitat) are known and may occur within the Operational Area (Appendix 3.1): • white shark • whale shark • oceanic whitetip shark • shortfin mako • porbeagle • dumb gulper shark • little Gulper shark • school shark No rays were identified within the Operational Area (Appendix 3.1). **Threatened Species** Five listed threatened shark species were identified by the EPBC PMST Report as known to occur within Operational Area: • white shark (vulnerable) • whale shark (vulnerable) • dumb gulper shark (conservation dependent) • little gulper shark (conservation dependent) • school shark (conservation dependent)	✓	**Present** Eleven shark species (or species habitat) may occur within the spill EMBA (Appendix 3.2), of which the grey nurse shark and white shark have known occurrences. The white shark has a known breeding behaviour, while the green sawfish may have a breeding behaviour within the spill EMBA. • grey nurse shark (east coast population) • white shark • dumb gulper shark • little Gulper Shark • school shark • whale shark • scalloped hammerhead • oceanic whitetip shark • shortfin mako • longfin Mako • porbeagle One ray species (or species habitat), giant manta ray, may occur within the spill EMBA (Appendix 3.2) (not linked with biologically important behaviours).
			Listed Threatened species	✓	Ierodiaconou et al (2021) describe potential species of conservation value (*Urolophus spp.,* stingaree); although these were tentative identifications unable to be verified without higher resolution imagery.	✓	**Threatened Species** Seven listed threatened shark species were identified by the EPBC PMST Report as known to occur within the EMBA, of which the grey nurse shark and white shark have known occurrences, with the white shark linked to breeding behaviours.
			BIAs and habitat critical to the survival of the species	✓	**BIA** The Operational Area is within a distribution BIA for the white shark (Appendix 2, Section 3.12.1) (Figure 4-2). No habitats critical to the survival of the species or behaviours have been identified. Detailed existing environment descriptions of sharks and rays within the Operational Area are described in Appendix 2, Section 3.12.1.	✓	• grey nurse shark (east coast population) (critically endangered) • white shark (vulnerable) • whale shark (vulnerable) • dumb gulper shark (conservation dependent) • little gulper shark (conservation dependent) • school shark (conservation dependent) • scalloped hammerhead (conservation dependent) There are no threatened ray species identified within the spill EMBA (Appendix 3.2)

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[2]		Spill EMBA[3]
							BIA The grey nurse shark has a foraging and migration BIA, and the white shark has a distribution, foraging and breeding BIAs within the spill EMBA (Appendix 3.2). No habitats critical to the survival of the species has been identified within the spill EMBA. No BIAs were identified for ray species within the spill EMBA. Detailed existing environment descriptions of sharks and rays within the spill EMBA are described in Appendix 2, Section 3.12.1.
		Syngnathids (Pipefish, seahorse, seadragons)	Listed Marine Species	✓	**Present** 24 listed marine syngnathids may occur within the Operational Area (Appendix 3.1). No important behaviours, BIAs or threatened species were identified. Detailed existing environment descriptions of syngnathids within the Operational Area is described in Appendix 2 Section 3.12.3.	✓	**Present** 38 listed marine syngnathids were identified within the spill EMBA (Appendix 3.2). No important behaviours or BIAs were identified. Detailed existing environment descriptions of syngnathids within the spill EMBA is described in Appendix 2, Section 3.12.3. **Threatened species** One Syngnathid species (or species habitat), white's seahorse, may occur within the spill EMBA (Appendix 3.2) (not linked with biologically important behaviours).
			Listed Threatened Species	-		✓	
	Seabirds and shorebirds	Birds that live or frequent the coast or ocean	Listed Marine Species	✓	**Present** 34 seabird and shorebird species (or species habitat) may occur within the Operational Area (Appendix 3.1). **Threatened species** 26 threatened bird species may occur within the Operational Area. There was one important foraging behaviour identified within the Operational Area for the Australian fairy tern but is not linked a with biologically important area. **BIA** The Operational Area intersects foraging BIAs for the following nine species (Figure 4-3): • antipodean albatross • black-browed albatross • buller's albatross • campbell albatross • common diving petrel	✓	**Present** 82 seabird and shorebird species (or species habitat) may occur within the spill EMBA, with breeding, foraging and migration behaviours identified (Appendix 3.2). **Threatened species** 52 threatened bird species may occur within the spill EMBA, with 19 of the threatened seabird and shorebird species having important behaviours (roosting, breeding, foraging) identified. **BIA** The spill EMBA intersects 33 seabird and shorebird BIAs. The identified BIAs within the spill EMBA include foraging, breeding and migration. Detailed existing environment descriptions of seabirds and shorebirds within the spill EMBA is described in Appendix 2, Section 3.10.
			Listed Threatened Species	✓		✓	
			Listed Migratory Species	✓		✓	
			BIAs	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[2]		Spill EMBA[3]
					• indian yellow-nosed albatross • shy albatross • wandering albatross • white-faced storm petrel. Detailed existing environment descriptions of seabirds and shorebirds within the Operational Area is described in Appendix 2, Section 3.10.		
	Marine Reptiles	Turtles	Listed Marine Species	✓	**Present** Three marine turtle species (or species habitat) are likely to occur within the Operational Area (Appendix 3.1): • loggerhead turtle • green turtle • leatherback turtle **Threatened Species** The three turtle species identified are listed as threatened: • loggerhead turtle (endangered) • green turtle (vulnerable) • leatherback turtle (endangered) **BIA** No BIAs or Habitat Critical areas are within the Operational Area. Detailed existing environment descriptions of marine turtles within the Operational Area is described in Appendix 2, Section 3.13.	✓	**Present** Five marine turtle species were identified within the spill EMBA, of which the occurrence of four is linked to foraging behaviours (Appendix 3.2). • loggerhead turtle • green turtle • leatherback turtle • hawksbill turtle • flatback turtle **Threatened Species** All five turtle species identified are listed as threatened: • loggerhead turtle (endangered) • green turtle (vulnerable) • leatherback turtle (endangered) • hawksbill turtle (vulnerable) • flatback turtle (vulnerable) **BIA** No BIAs or habitats critical to the survival of the species has been identified within the spill EMBA. Detailed existing environment descriptions of marine turtles within the spill EMBA is described in Appendix 2, Section 3.13.
			Listed Threatened Species	✓		✓	
			Listed Migratory Species	✓		✓	
			BIAs and habitat critical to the survival of the species	-		✓	
		Snakes	Listed Threatened Species	-	**Not present** No sea snake species were identified within the Operational Area (Appendix 3.1).	✓	**Present** One sea snake species (or species habitat), Broad-headed Snake, was identified that may occur within the spill EMBA (Appendix 3.2). No important behaviours identified within the spill EMBA. Detailed existing environment descriptions of snakes within the spill EMBA is described in Appendix 2, Section 3.13.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
	Marine Mammals	Seals and Sealions (Pinnipeds)	Listed Marine Species	✓	**May be present** The EPBC PMST does not identify any listed threatened or marine pinniped species as occurring within the Operational Area (Appendix 3.1). However, 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).	✓	**Present** Two pinniped species (or species habitat) may occur within the spill EMBA (Appendix 3.2). • long-nosed fur-seal • Australian fur-seal Australian fur-seal species have important behaviours (breeding) identified. **Threatened Species** No identified Pinnipeds species are threatened species within the spill EMBA (Appendix 3.2). **BIA** No BIAs or habitats critical to the survival of the species has been identified within the spill EMBA. Detailed existing environment descriptions of pinnipeds within the spill EMBA is described in Appendix 2, Section 3.14.1.
			Listed Threatened Species	✓		-	
		Dugong	Listed Marine Species	-	**Not present** No dugong species were identified within the Operational Area EPBC PMST report (Appendix 3.1).	✓	**Present** One dugong species (or species habitat) is known to occur within the spill EMBA (Appendix 3.2). **Threatened Species** No identified dugong species are threatened species within the spill EMBA (Appendix 3.2). **BIA** No BIAs or habitats critical to the survival of the species has been identified within the spill EMBA. Detailed existing environment descriptions of dugongs within the spill EMBA is described in Appendix 2, Section 3.14.
			Listed Migratory Species	-		✓	
		Whales	Listed Marine Species	✓	**Present** 23 whale species (or species habitat) may occur within the Operational Area (Appendix 3.1) (Figure 4-4 and Figure 4-5). Of which eleven are listed as migratory and three have important behaviours (foraging) that are not linked to biologically important behaviours (Appendix 3.1). **Threatened Species** Four whales are identified as threatened species, of which two have known occurrence within the Operational Area: • sei whale (vulnerable)	✓	**Present** 29 whale species (or species habitat) may occur within the spill EMBA (Appendix 3.2). Foraging behaviours were identified for some species (sei, fin, pygmy right and humpback whales), no other important behaviours were identified. **Threatened Species** Four whales are identified as threatened, of which two have known occurrences within the EMBA. • sei whale (vulnerable)
			Listed Threatened Species	✓		✓	
			Listed Migratory Species	✓		✓	
			BIAs and habitat critical to the survival of the species	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
					• blue whale (endangered) • fin whale (vulnerable) • southern right whale (endangered) **BIA** The Operational Area intersects a possible foraging BIA for the pygmy blue whale (Figure 4-4), 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. Consultation advice has indicated that if blue whale is sighted within the Gippsland region it would be reasonable to assume that they are foraging (P. Gill 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. Recent sightings data during a 2020 offshore seismic survey indicated presence within the region in June (P. Gill 2021). The Operational Area also intersects a known core range BIA for the Southern right whale (Figure 4-5). No habitats critical to the survival of the species has been identified within the Operational Area. Detailed existing environment descriptions of whales within the Operational Area is described in Appendix 2, Section 3.14.2.		• blue whale (endangered) • fin whale (vulnerable) • southern right whale (endangered) **BIA** The spill EMBA intersects a foraging and distribution BIA for the pygmy blue whale, a migration, resting on migration, connecting habitat and known core range BIA for the Southern right whale and a foraging BIA for the humpback whale. No habitats critical to the survival of the species has been identified within the spill EMBA. Detailed existing environment descriptions of whales within the spill EMBA is described in Appendix 2, Section 3.14.2.
		Dolphins	Listed Marine Species	✓	**Present** Five dolphin species (or species habitat) may occur within the Operational Area. Of which two are listed as migratory: • common dolphin • risso's dolphin • dusky dolphin • southern right whale dolphin • bottlenose dolphin No dolphin species are known to occur within the Operational Area. **Threatened Species** No identified dolphin species are threatened species within the Operational Area.	✓	**Present** Ten dolphin species (or species habitat) may occur within the spill EMBA (Appendix 3.2). Of which one are listed as migratory and one has an important behaviour (breeding), which is linked to a BIA: • common dolphin • risso's dolphin • dusky dolphin • southern right whale dolphin • spotted dolphin • striped dolphin • long-snouted spinner dolphin • rough-toothed dolphin • indian ocean bottlenose dolphin • bottlenose dolphin
			Listed Migratory Species	✓		✓	
			BIAs and habitat critical to the survival of the species	-		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[2]		Spill EMBA[3]	
					BIA No identified dolphin species have BIAs or habitat critical areas within the Operational Area. Detailed existing environment descriptions of marine dolphins within the Operational Area is described in Appendix 2, Section 3.14.3.		**Threatened Species** No identified dolphin species are threatened species within the spill EMBA (Appendix 3.2). **BIA** The spill EMBA intersects a breeding BIA for the Indo-pacific/spotted bottlenose dolphin (Appendix 3.2). No habitats critical to the survival of the species has been identified within the spill EMBA. Detailed existing environment descriptions of marine dolphins within the spill EMBA is described in Appendix 2, Section 3.14.3.
	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*) was common in the Sole and Patricia Baleen pipeline corridors, generally in water depths greater than 40 m (Appendix 2, Section 3.15)

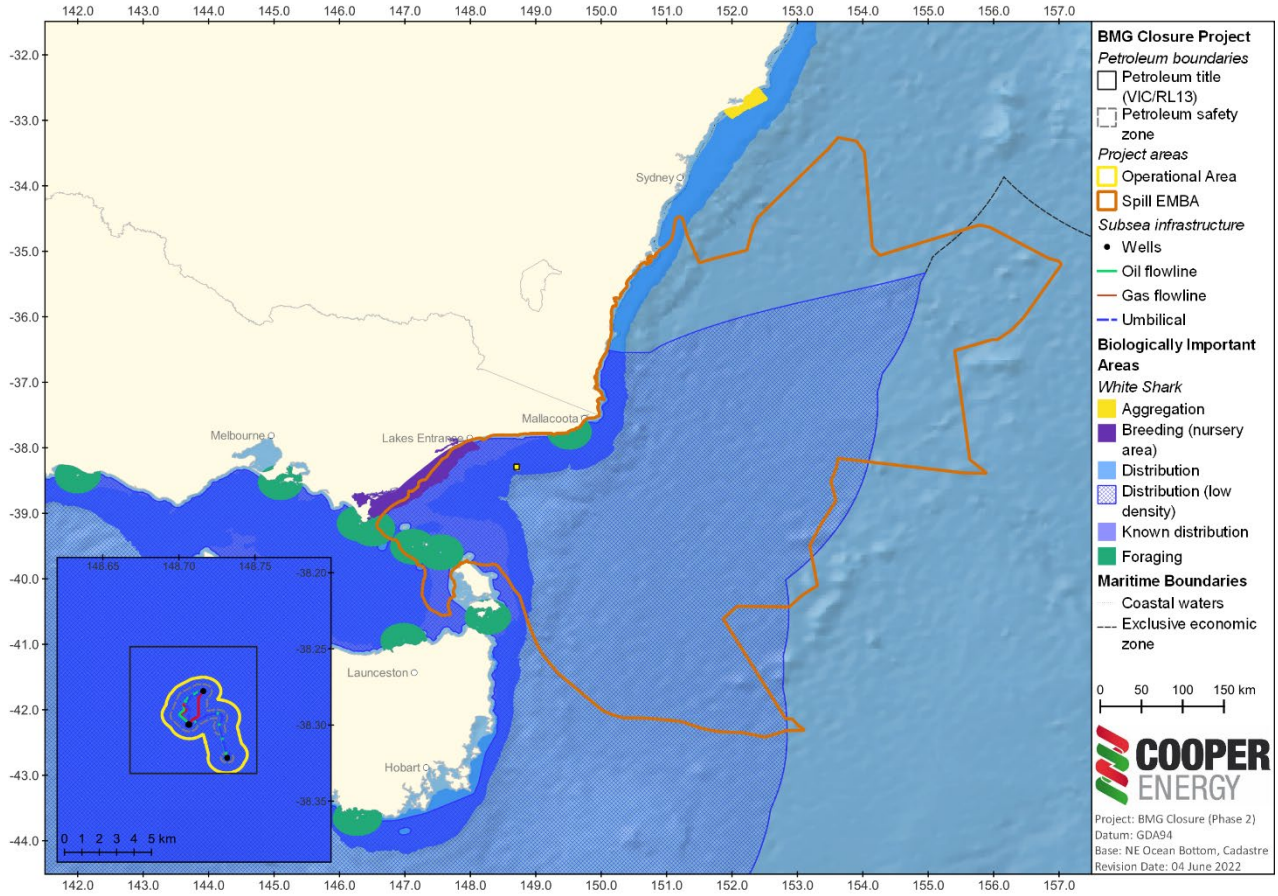


Figure 4-2 White shark BIAs within the Operational Area and Spill EMBA

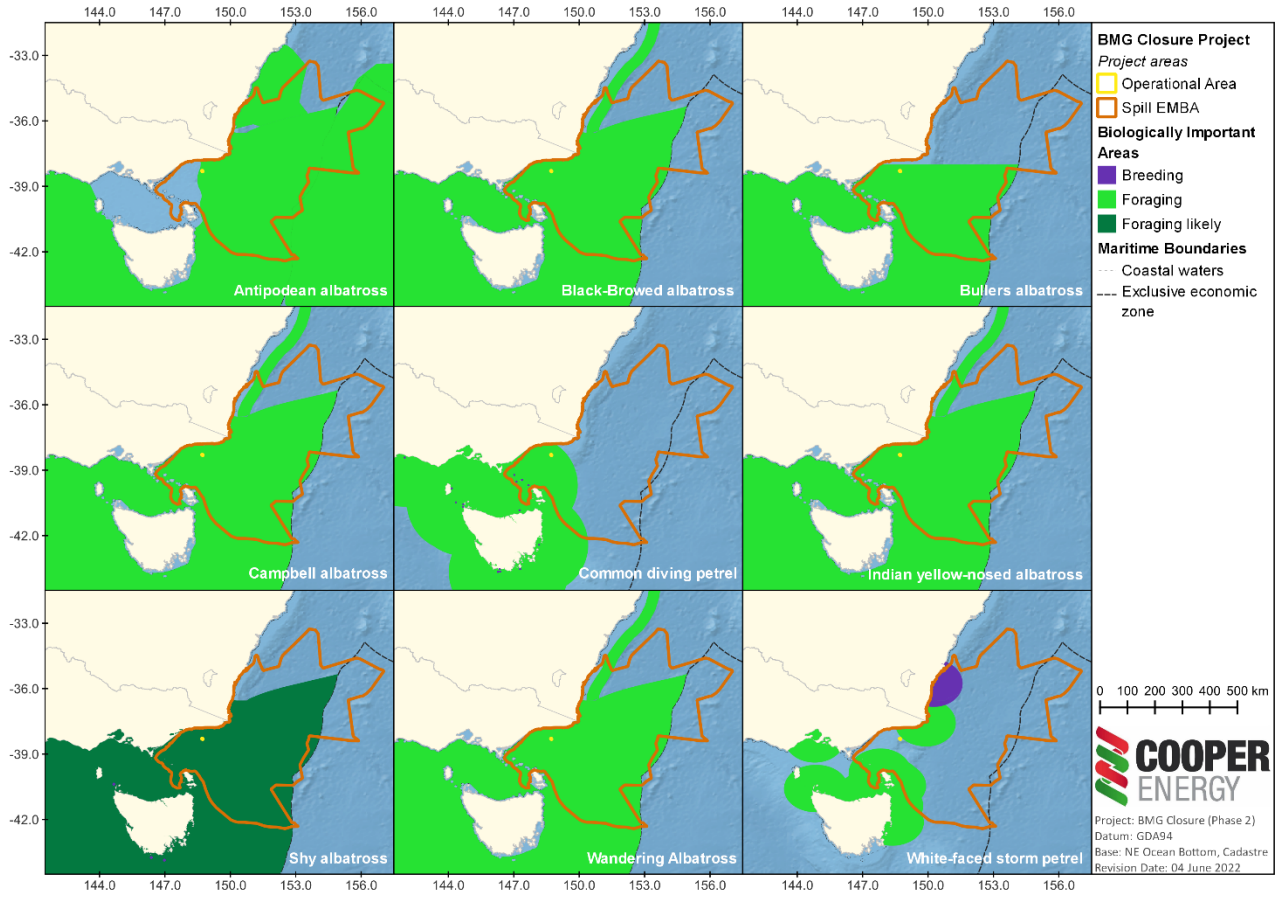


Figure 4-3 Bird BIAs within the Operational Area and Spill EMBA

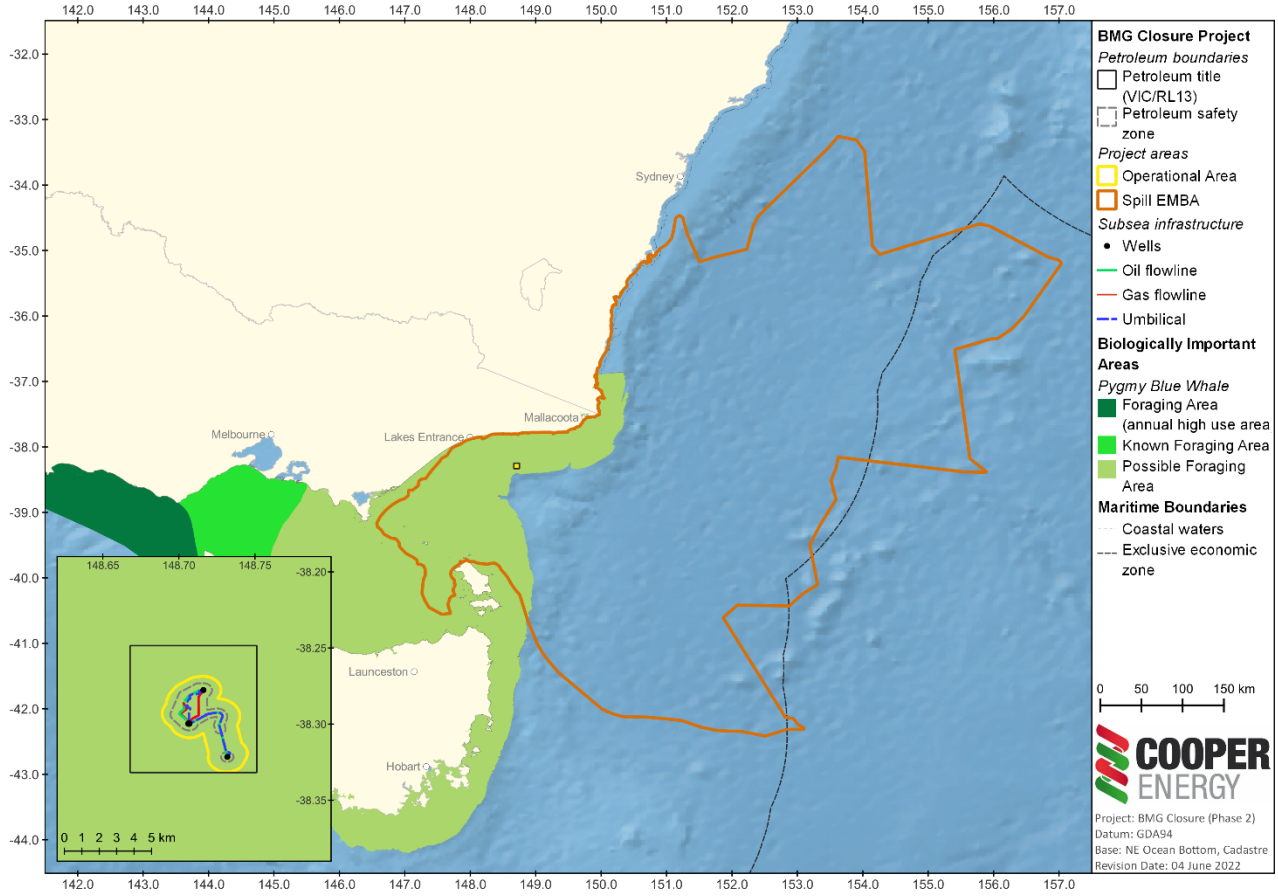


Figure 4-4 Pygmy Blue Whale BIAs within the Operational Area and Spill EMBA

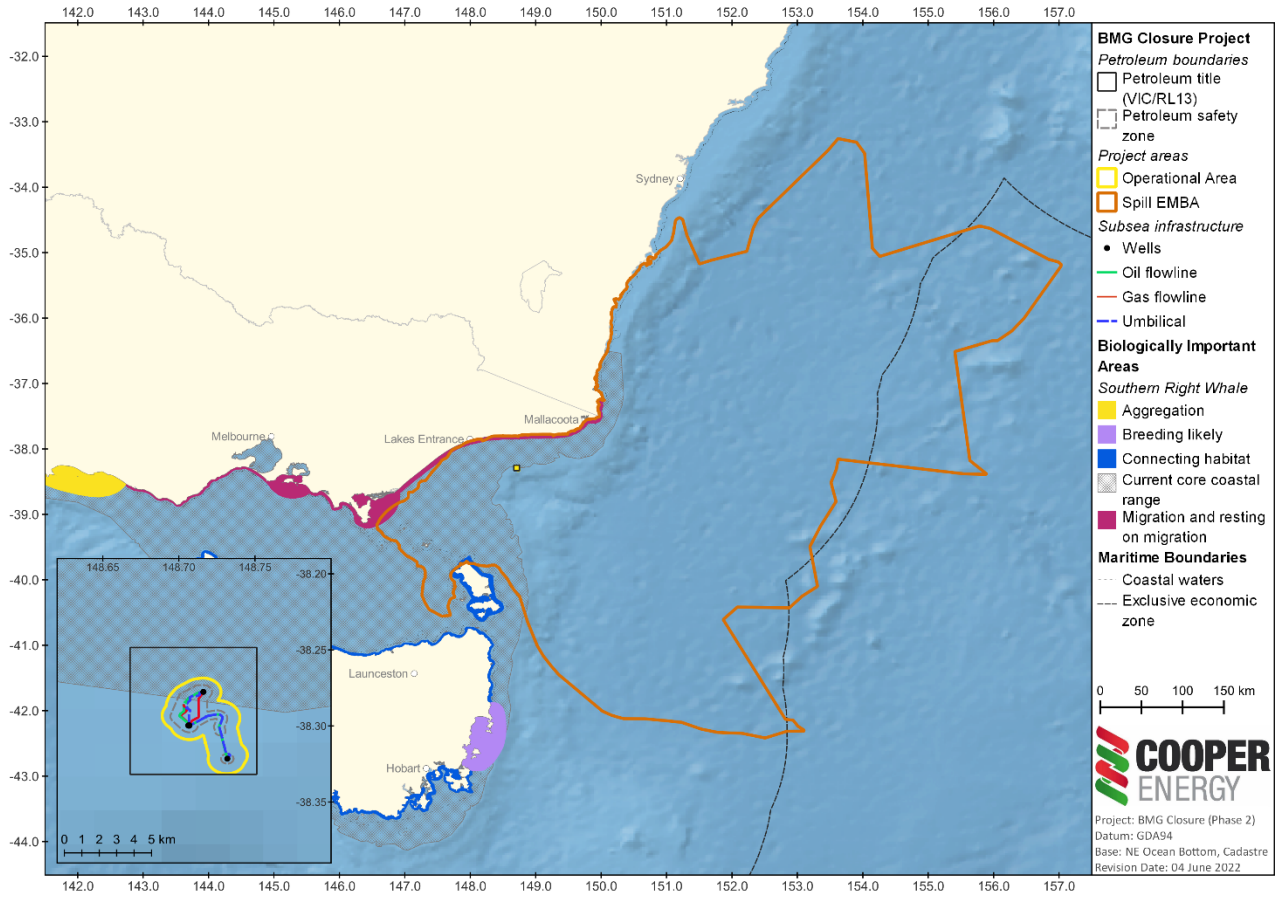


Figure 4-5 Southern Right Whale BIAs within the Operational Area and Spill EMBA

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[4]		Spill EMBA[5]	
Socio-ecological System	Commonwealth Marine Area	KEF	High productivity (includes episodic productivity)	✓	**Present** The Operational intersects the Upwelling East of Eden KEF (Appendix 3.1) (Figure 4-6). 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 within the Operational Area is described in Appendix 2, Section 4.6.	✓	**Present** The spill EMBA intersects six KEFs (Appendix 3.2): • Big Horseshoe Canyon • Canyons on the eastern continental slope • Seamounts South and east of Tasmania • Shelf rocky reefs • Tasman Front and eddy field • Upwelling East of Eden Detailed existing environment descriptions of KEFs within the spill EMBA is described in Appendix 2, Section 4.6
			Aggregations of marine life	-		✓	
			High biodiversity	✓		✓	
			High level of endemism	-		✓	
			Unique Habitat	-		✓	
		Australian Marine Parks	• aggregations of marine life • high productivity and biodiversity • unique habitat	-	**Not Present** No Australian Marine Parks were identified within the Operational Area (Appendix 3.1)	✓	**Present** Five Australian Marine Parks were identified within the spill EMBA (Appendix 3.2): • Jervis • Flinders • Freycinet • Beagle • East Gippsland Detailed existing environment descriptions of these Australian Marine Parks within the spill EMBA is described in Appendix 2, Section 4.3

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

[5] Combination of an EPBC PMST for the spill EMBA area, and characteristics of the Gippsland, Bass Strait and Central NSW environment sectors 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[4]		Spill EMBA[5]
	State Parks and Reserves	Marine Protected Areas	• aggregations of marine life • high productivity • biodiversity	-	**Not Present** The Operational Area does not overlap Marine Protected Areas (Appendix 3.1)	✓	**Present** The spill EMBA intersects eight Marine Protected Areas (MPA): • Three Victorian MPAs • one Tasmanian MPAs • Two NSW MPAs Detailed existing environment descriptions of these Marine Protected Areas within the spill EMBA is described in Appendix 2, Section 4.5.1.
		Terrestrial Protected Areas	• aggregations of terrestrial life • high productivity • biodiversity	-	**Not present** The Operational Area does not include the onshore environment (Appendix 3.1).	✓	**Present** The spill EMBA intersects several terrestrial protected areas throughout Victoria, NSW and Tasmania. Detailed existing environment descriptions of Terrestrial Protected Areas within the spill EMBA is described in Appendix 2, Section 4.5.2.
	Wetlands of International Importance	Ramsar wetlands (Internationally Importance)	Aggregation, foraging and nursery habitat for marine life	-	**Not present** The Operational Area does not include coastal or onshore environments (Appendix 3.1).	✓	**Present** The spill EMBA intersects with one Ramsar wetland, Gippsland Lakes (Appendix 3.2). Detailed existing environment descriptions of the Ramsar wetland within the spill EMBA is described in Appendix 2, Section 4.4.1.
		Nationally Importance Wetlands	Aggregation, foraging and nursery habitat for marine life	-	**Not present** The Operational Area does not include coastal or onshore environments (Appendix 3.1).	✓	**Present** The spill EMBA intersects 27 Nationally Important Wetlands (Appendix 3.2) • 15 NSW Nationally Important Wetlands • 11 Victoria Nationally Important Wetlands • One Tasmania Nationally Important Wetlands Detailed existing environment descriptions of these National Important Wetlands is described in Appendix 2, Section 4.4.2.
	Heritage	Underwater Heritage (wrecks and aircraft)	Historic significance	-	**Not present** One historic shipwreck, the Result (shipwreck ID 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.	✓	**Present** Several shipwrecks were identified within the EMBA. Detailed existing environment descriptions of the present underwater shipwrecks within the spill EMBA is described in Appendix 2, Section 5.6.1

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[4]		Spill EMBA[5]
		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.	✓	**Present** The EMBA does not overlap any World Heritage or National Heritage Places. 12 Commonwealth Heritage Places may exist within the spill EMBA, of which many are buildings or sites without a marine/coastal influence. The following two Commonwealth Heritage Places have coastal interface: • Jervis Bay Territory • Beecroft Peninsula Detailed existing environment descriptions of the culture heritage places within the spill EMBA with a marine or coastal interface are described in Appendix 2, Section 5.6.2
		Indigenous	Indigenous use or connection	-	**Not present** Research by Holdgate, et. Al (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 15-150m in the past (current water depth range is 135-270). Therefore it is unlikely any cultural heritage sites would exist within the BMG infrastructure footprint. During consultation 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 cultural heritage sites was not raised. No Indigenous protected areas (IPAs) or Native Titles were identified within the Operational Area. Detailed existing environment descriptions of the Indigenous heritage is described in Appendix 2, Section 5.6.3.	✓	**Present** The coastal area of southeast Australia was amongst the most densely populated regions of pre-colonial Australia. Through cultural traditions, Indigenous groups 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 indigenous 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 5.6.3

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[4]		Spill EMBA[5]	
Socio-ecological System	Commercial Fisheries	Commonwealth managed	Economic benefit	✓	**Present** Fishing effort over a five-year period (2016–2020) (ABARES 2021) was recorded within the 60 nm graticular block that overlaps the Operational Area. Six Commonwealth managed fisheries were identified, of which the following three have recorded fishing effort: • Bass Strait Central Zone Scallop Fishery • Southern Squid Jig Fishery • Southern and Eastern Scalefish and Shark Fishery. According to research undertaken by Boag and Koopman (2021), though multiple different fisheries have rights to fish around BMG, it is only the SESSF managed fisheries that actively fish around BMG infrastructure; these are: • SESSF Commonwealth Trawl sector (Otter trawl and Danish seine) • SESSF Shark Gillnet and Shark Hook sectors • SESSF Scalefish Hook sector Detailed existing environment descriptions of the Commonwealth fisheries within the Operational Area is described Appendix 2, Section 5.1.1	✓	**Present** The spill EMBA overlaps with seven Commonwealth managed fisheries, of which the following six are known to actively fish within the EMBA (Figure 4-7, Figure 4-8): • Bass Strait Central Zone Scallop Fishery • Eastern Tuna and Billfish Fishery • Southern Bluefin Tuna Fishery • Small Pelagic Fishery • Southern Squid Jig Fishery • Southern and Eastern Scalefish and Shark Fishery. 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** Seven Victorian state managed fisheries area overlap the Operational Area, of which none are confirmed to actively fish within the Operational Area (see Stakeholder Engagement Register, Section 10.0). Note 11 fisheries active fishing areas are unknown due to limited data available and/or fisher confidentiality. Note, the existing PSZ around operational infrastructure would preclude fishing activity within the direct area. Detailed existing environment descriptions of the State fisheries within the Operational Area is described Appendix 2, Section 5.1.2.	✓	**Present** 23 state managed fisheries area overlap the EMBA. Note eight fisheries active fishing areas are unknown due to limited data available and/or fisher confidentiality. • seven Victoria commercial fisheries (sea urchin, scallop, rock lobster, octopus, eel, abalone and corner Inlet) • six NSW commercial fisheries (abalone, lobster, sea urchin and Turban shell, ocean trawl, Ocean Hauling, ocean trap) • ten Tasmania commercial fisheries (abalone, dive, giant crab, Detailed existing environment descriptions of the State fisheries within the spill EMBA is described Appendix 2, Section 5.1.2.
		State Managed – NSW		-		✓	
		State Managed – Tasmania		-		✓	
	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.	✓	**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

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area[4]		Spill EMBA[5]	
					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		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 are 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. Detailed existing environment descriptions of the recreation and tourism within the Operational Area is described Appendix 2, Section 5.4	✓	**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 is renowned for its nature-based tourism, recreational fishing and water sports. Detailed existing environment descriptions of recreation and tourism 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 include 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) and Flinders Island (Tasmania) are important towns which support a number of communities. The closest heavily populated urban areas to the EMBA, are Melbourne and Sydney.
	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 5.5.1.	✓	**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 EMBA. There are several local ports within the 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 5.5.1
		Energy Development Areas	Economic benefit	-	**Not Present** The petroleum activity is within Cooper 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

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area[4]		Spill EMBA[5]
							offshore to onshore petroleum processing facilities at Longford and Orbost. The Area to Be Avoided is located within the EMBA. Offshore wind development is identified as priority in the Bass Strait region, off Northern Tasmania and Pacific Ocean region off the Illawarra in NSW. A renewable energy exploration licence has been granted to Star of the South within Australian Commonwealth waters about 8 to 13 kilometres off the Gippsland coast in Victoria. Oil and gas production, development and decommissioning projects are also ongoing and/or in planning within the Gippsland region. Detailed existing environment descriptions of energy development areas within the spill EMBA is described Appendix 2, Section 5.5.2
		Submarine Cables and Pipelines	• economic benefit • national utilities	-	**Not present** No cables or pipelines occur within the Operational Area	✓	**Present** Submarine cables located in Bass Strait are limited to the subsea floor between Tasmania and the Australian mainland. Three communication cables also extend offshore from Sydney. Detailed existing environment descriptions of the submarine cables and pipelines within the spill EMBA is described Appendix 2, Section 5.5.3
		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 within the EMBA. 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. Detailed existing environment descriptions of defence areas within the spill EMBA is described Appendix 2, Section 5.5.4

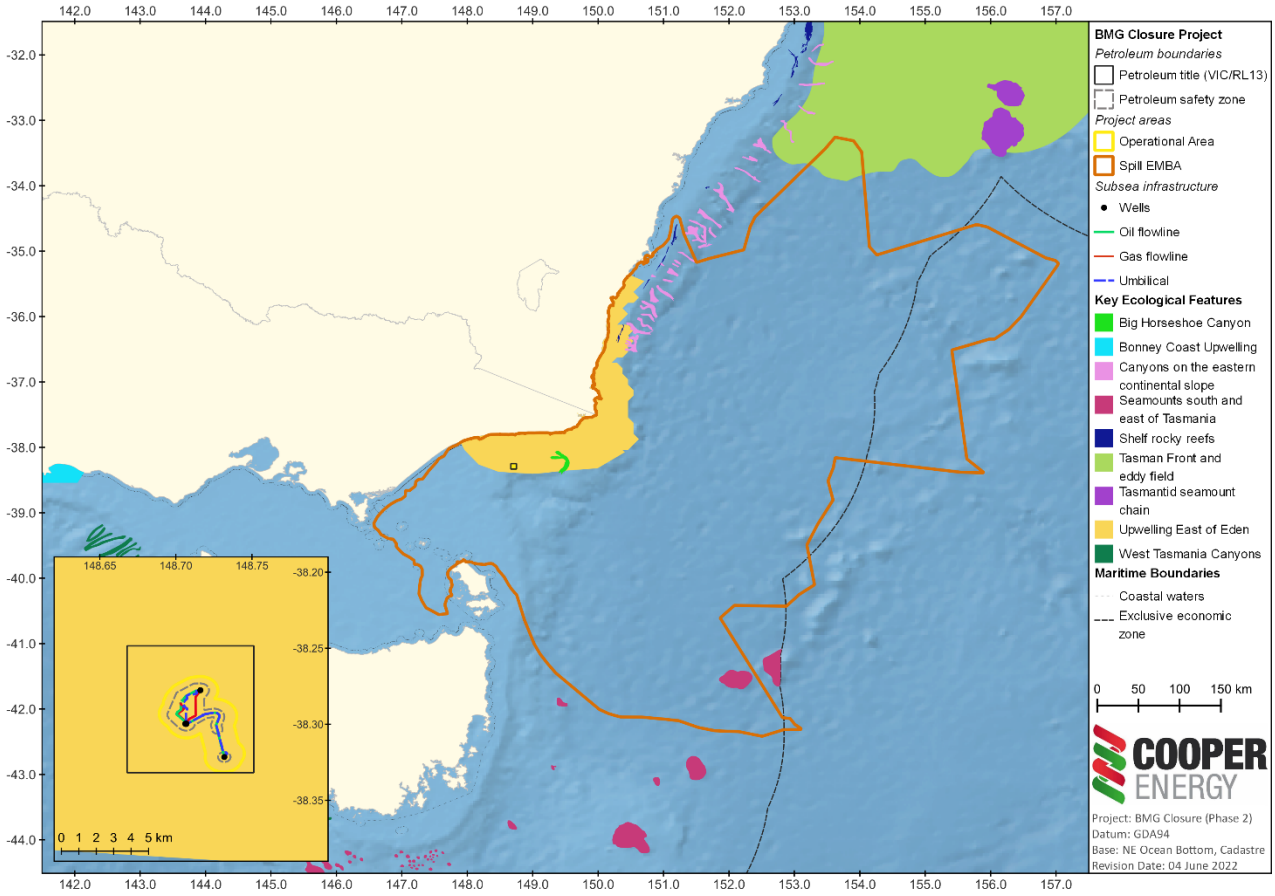


Figure 4-6 KEFs within the Operational Area and Spill EMBA

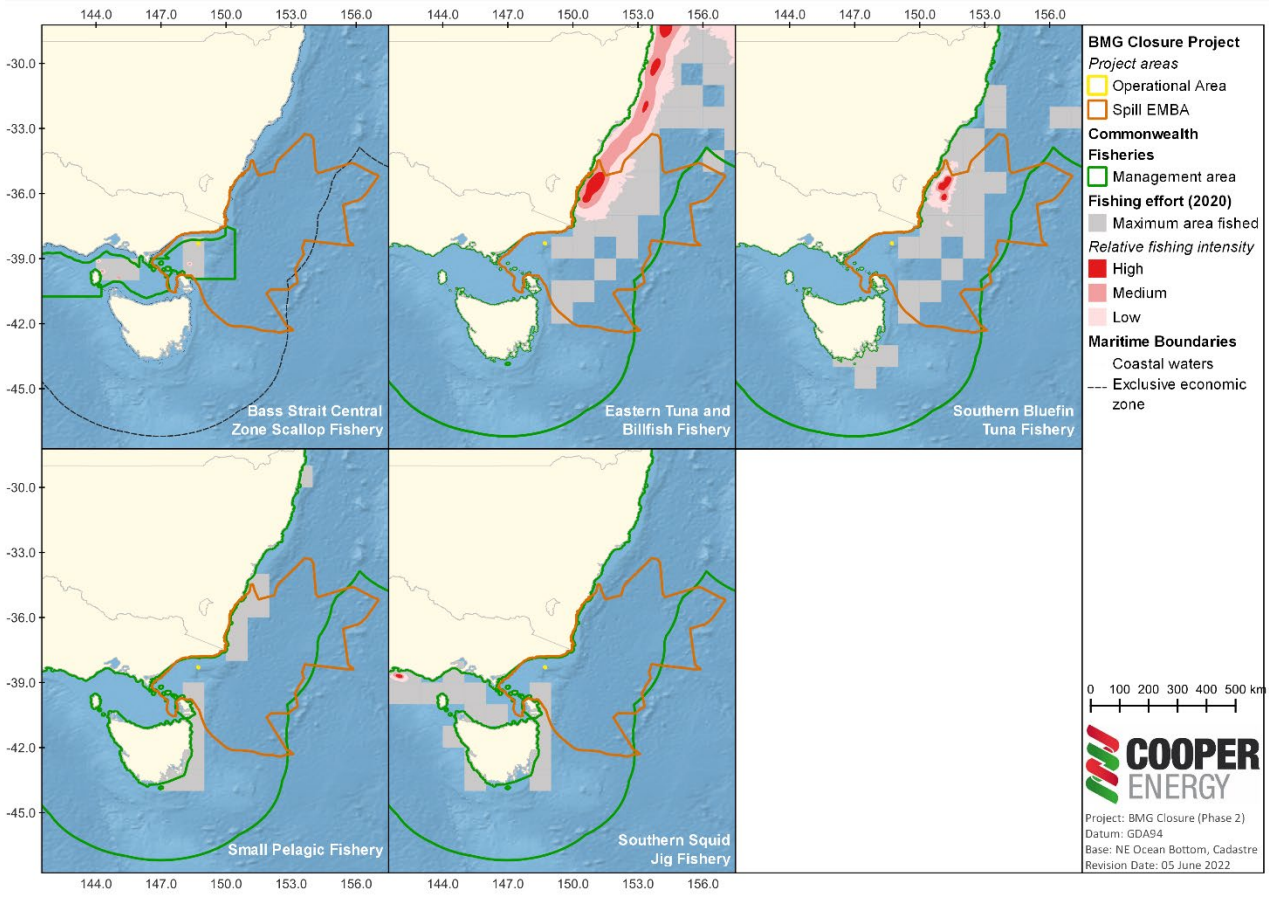


Figure 4-7 Commonwealth commercial fisheries within the Operational Area and Spill EMBA

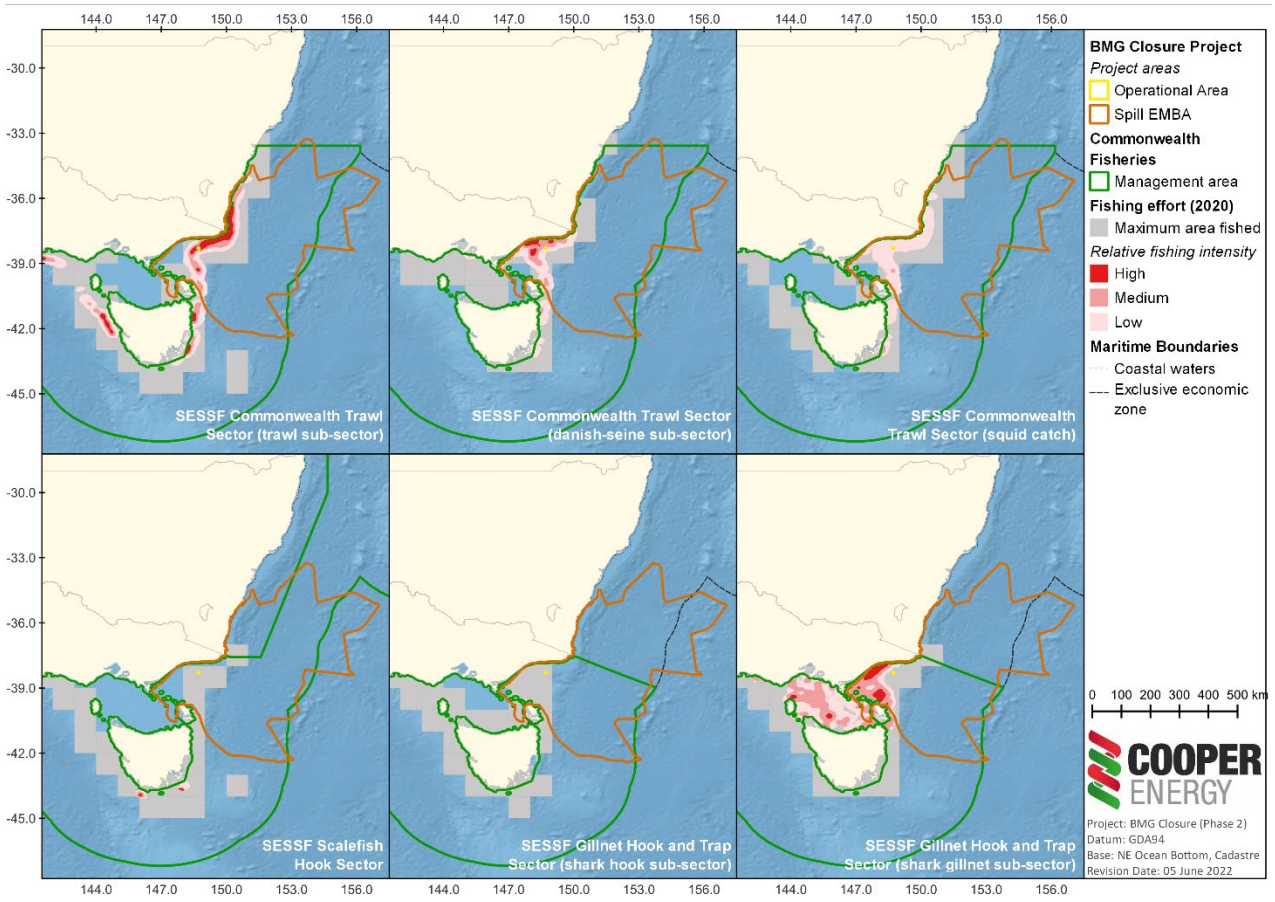


Figure 4-8 Commonwealth commercial fisheries (Southern and Eastern Scalefish and Shark Fishery [SESSF]) within the Operational Area and Spill EMBA

Table 4-4 BMG Seasonality of key sensitivities within the Operational Area

Key Sensitivity	Significance Status	Presence	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Marine megafauna														
White shark	LT (V), BIA(d)	Seasonal			Distribution (low density)									
Whale shark	LT (V)	Occasional	Species or species habitat may occur											
Loggerhead turtle	LT I	Occasional	Species or species habitat likely to occur											
Green turtle	LT (V)	Occasional	Species or species habitat likely to occur											
Leatherback turtle	LT I	Occasional	Species or species habitat likely to occur											
Sei whale	LT (V)	Seasonal	Foraging likely to occur (Nov–May)											
Blue whale	LT I, BIA (pf)	Seasonal				Distribution (Apr–June)								
Fin whale	LT (V)	Seasonal	Foraging likely to occur (Dec–May)											
Southern right whale	LT I, BIA (kcr)	Seasonal				Migration					Migration			
Seabirds and shorebirds														
Antipodean albatross	LT (V), BIA(f)	Transitory	Species or species habitat likely to occur											
Australian fairy tern	LT (V)	Transitory	Foraging, feeding or related behaviour likely to occur											
Black-browed albatross	LT (V), BIA(f)	Seasonal				Foraging BIA (known to occur)								
Blue petrel	LT (V)	Seasonal							Species may occur					

Key Sensitivity	Significance Status	Presence	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Buller's albatross	LT (V), BIA(f)	Seasonal	Foraging BIA and species may occur											
Campbell albatross	LT (V), BIA(f)	Seasonal	Foraging BIA and species likely to occur											
Chatham albatross	LT I	Transitory	Species or species habitat likely to occur											
Common diving petrel	BIA(f)	Transitory	Not present in PMST, however foraging BIA with birds present year-round											
Curlew sandpiper	LT (CE)	Seasonal									May occur Sept – Mar			
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 I	Seasonal	Species or species habitat may occur											
Grey-headed albatross	LT I	Seasonal	Species may occur									Species may occur		
Indian yellow-nosed albatross	BIA(f)	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 I	Transitory	Species or species habitat likely to occur											
Red knot	LT I	Seasonal	Species or species habitat may occur							Arrive late Aug and leave by late Apr				
Salvin's albatross	LT (V)	Seasonal				Species likely to occur (Apr–Aug)								
Shy albatross	LT I, BIA(f)	Transitory	Species or species habitat likely to occur, Foraging BIA											
Sooty albatross	LT (V)	Transitory	Species or species habitat may occur											
Southern giant petrel	LT I	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)	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)	Seasonal	Foraging BIA								Foraging BIA			
Conservation														
Upwelling East of Eden		Sporadic												
Social Receptors														
Southern and Eastern Scalefish and Shark Fishery	Active commercial fishers	Boats present throughout the year												

Legend	Threatened status:	Type of BIA:
Significance Status: LT – Listed Threatened BIA – Biologically Important Area	(V) – Vulnerable I – Endangered (CE) – Critically endangered	(f) – foraging (pf) – possible foraging (kcr) – known core range (d) – distribution

Data Sources	Definitions
EPBC PMST Reports (Appendix 3.1 and Appendix 3.2) Description of the environment (COE-EN-EMP-0001) DCCEEW (2021a)	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

5.0 Environmental Impact and Risk Assessment Methodology

In accordance with Regulation 13(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 Cooper Energy Risk Management Protocol (CMS-RM-PRO-0001). This Protocol is consistent with the approach outlined in ISO 14001 (Environmental Management Systems), ISO 31000:2009 (Risk Management) and HB 203:2012 (Environmental Risk Management – Principles and Process).

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 Cooper Energy risk assessment methodology.

Figure 5-1 CEMS 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 CEMS 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, Cooper Energy has provided a list of terminology and definitions that will be meet the requirements of Regulation 13(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.

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 Cooper 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
- 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 Cooper Energy Risk Matrix is provided in Table 5-1 with definitions of the level of consequence.

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	Localized 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	Localized 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; the activity does not proceed until the Managing Director approves the treatment plans to bring the residual risk to an acceptable level. The Board must also be informed of the risk and its treatment.
- **high (orange):** inherent risk at this level requires involvement of the respective General Manager who will approve the treatment plans before the activity proceeds; the Board must also be informed of the risk and its treatment.
- **moderate (yellow):** inherent risk at this level is tolerable if it is also ALARP. General Managers must approve treatment plans and risks should be reported to the Executive Leadership Team during regular reporting.
- **low (green):** this level of risk is largely acceptable. Review of control procedures should occur, and the risk should be regularly monitored for deterioration.

Table 5-2 Cooper Energy qualitative risk matrix

LIKELIHOOD						CONSEQUENCE				
Qualitative										
Rating	Level	Probability	Time Period	Description	Quantitative	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.	$\leq 10^{-2}$	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.	$\leq 10^{-3}$	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.	$\leq 10^{-4}$	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.	$\leq 10^{-5}$	Low	Low	Moderate	Moderate	High
F	Hypothetical	< 1%	Not in 100 years	Generally considered hypothetical or non-credible.	$\leq 10^{-6}$	Low	Low	Low	Low	Moderate

5.2.4 Risk Evaluation

5.2.5 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.

5.2.6 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, August 2022), Cooper 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, Cooper 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.

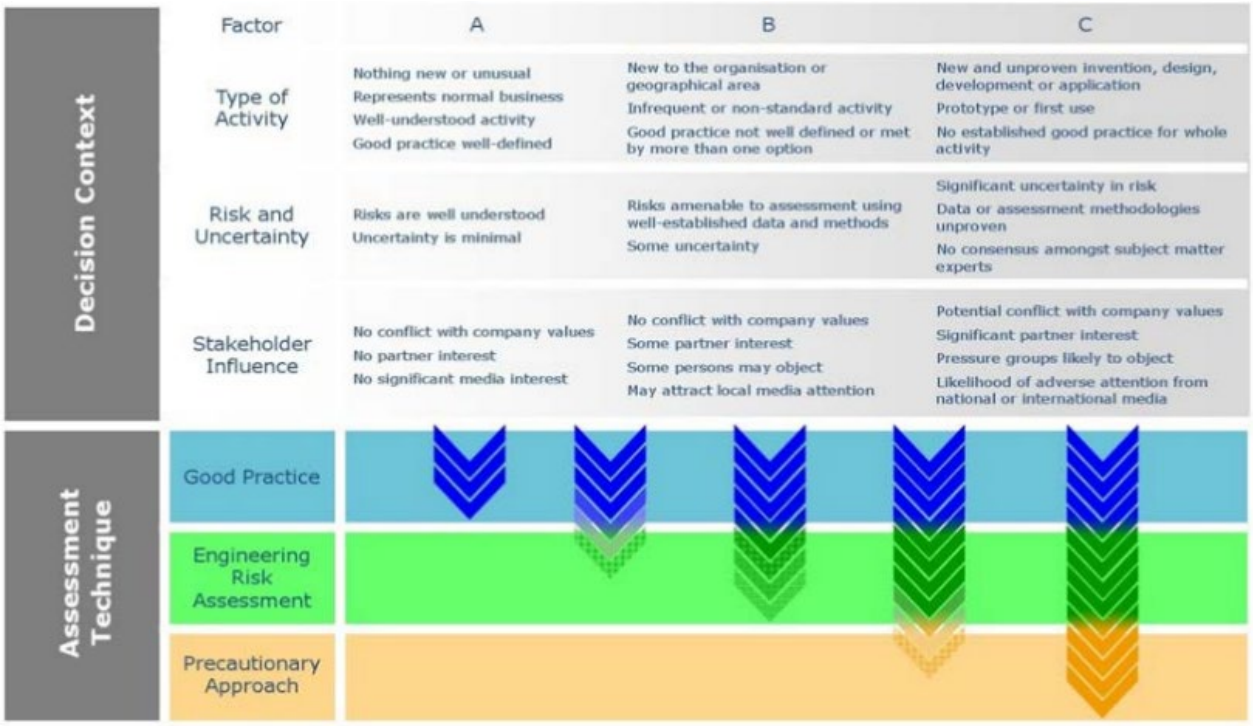


Figure 5-2 ALARP risk related Decision Support Framework (Source (OGUK 2014))

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
- changing regulator expectations and/or 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), Cooper 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.

5.2.7 Evaluate the Acceptability of the Potential Impact and Risk

Cooper 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 Notes for EP Content Requirement (N04750-GN1344, December 2022) and guidance issued in Guideline – Environment plan decision making (N-04750-GL1721, December 2022).

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

Table 5-3 Cooper Energy Acceptability Evaluation

Factor	Criteria/Test
Cooper Energy Risk Management Protocol	Is the risk severity Extreme (i.e., inherent risk not within Company's risk appetite. Requires involvement from the Managing Director to approve the treatment plan), or High (i.e., requires involvement from the respective General Manager to approve the treatment plan)?
Principles of Ecologically Sustainable Development (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 CEMS? 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?

5.2.8 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 Ecologically Sustainable Development (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.	Cooper 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 so, an assessment is completed to determine if there is significant uncertainty in the evaluation.

ESD	Principle	Relevance to Acceptability
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.

5.2.9 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 the OPGGS(E)R 13(5) and 13(6)– Evaluation of environmental impacts and risks, and 13(7) – Environmental performance outcomes and standards, 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 (EPO), Environmental Performance Standards (EPS), 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. EPOs, EPSs and measurement criteria are summarised in Section 8.0.

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 in the impact or risk assessment which requires further analysis, for example where modelling is required to understand the nature and scale of an impact
- ALARP decision context B and above (refer to Section 5.2.6)
- residual risk severity moderate and above (refer to Sections 5.2.3)
- stakeholder concerns.

Higher order impacts require a higher order of evaluation, as described in the NOPSEMA Environment Plan decision making guideline (N-04750-GL1721 A524696 December 2022).

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

ACTIVITY	ASPECT												
	Physical Presence		Planned Emissions			Planned Discharges		Unplanned Interactions				Accidental Release	
Lower Order Impacts and Risks - yellow Higher Order Impacts and Risks - green	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 & as-left survey				X									
Inspection & Maintenance													
Inspections & 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	Impact/Risk Evaluation	Consequence	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 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 manifold pile below seabed level is not feasible. However, Cooper Energy plan cut the wellheads and manifold pile ~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 three active Commonwealth and no active State fisheries that overlap the Operational Area (refer to Section 4.4.2). There may be some 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 manifold pile and wellheads will be cut below the seabed such that interaction with the commercial fisheries is not expected to occur. During Relevant Person consultation, concerns were raised by commercial fisheries around in-situ decommissioning concepts. This feedback was factored into Cooper Energy's decommissioning approach; as Cooper Energy is	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 Damage Protocol C2: Wet parking restricted to within the PSZs C29: All well heads and the manifold pile will be cut below seabed	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* • Cooper Energy MS Standards and Processes have been identified • Relevant Person concerns were raised around in-situ decommissioning concepts; as Cooper Energy is planning to remove all infrastructure above the seabed, these

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		planning to remove all infrastructure above the seabed, these concerns have been addressed. Given the safety exclusion zone 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**.						concerns have been addressed.
		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 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 Cooper Energy have not experienced interactions with shipping whilst implementing petroleum activities in this area. Cooper Energy has also maintained ongoing consultation with Relevant Persons and no objections have been raised by the shipping industry for this or previous Cooper Energy campaigns in the region. 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 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						

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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.** **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 2021). 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.						
Planned emissions								
Light Emissions • vessel operations	• change in ambient light. • change in fauna behaviour (attraction, disorientation.)	**Ambient light, marine turtles, seabirds and migratory shorebirds** Sources of light from the activity include navigation and safety lighting from the CSV and any other vessels (continuous source for the 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. Light emissions may result in a localised change to marine fauna's behaviour. Marine species with the greatest sensitivity to light are marine turtles, seabirds, and migratory shorebirds. The National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2020) has been reviewed and light sensitive species have been identified. The purpose of the guideline is to minimise the adverse impacts on marine fauna from artificial lighting. Given the absence of biological important areas and habitat critical to the survival of marine turtles, this assessment has focused on seabirds and migratory shorebirds. The guidelines indicate that observed effects of sky glow on fledgling seabirds	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 (Commonwealth of Australia 2020)

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		grounded in response to artificial light can occur up to 15 km away (Commonwealth of Australia 2020). For the purposes of this risk assessment, Cooper Energy have assessed an area 15 km around the Operational Area. The PMST report (Appendix 3.3) for a 15 km area around the potential light source identified 31 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 (short-tailed shearwaters, wandering albatross, antipodean albatross, white faced storm petrel, common diving petrel, Buller's albatross, shy albatross, Indian yellow-nosed albatross, black-browed albatross, Campbell albatross). No key nesting, roosting, or resting areas were identified to be associated with these species. No shoreline habitat occurs within this 15 km buffer around the Operational Area (coast is approximately 35 km away), and as such the risk of affecting nesting or fledgling is considered negligible. Consequently, the impact of changes to ambient light levels to marine turtles, seabirds and migratory shorebirds was evaluated as **Level 1.**						- EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species • Activity will not impact the recovery of: - Albatrosses and Giant Petrels as per National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011-2016 • Cooper Energy MS Standards and Processes have been identified. • no concerns were raised by relevant persons regarding light emissions.
		Plankton and fish The National Light Pollution Guidelines for Wildlife (Commonwealth of Australia 2020) 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			N/A		
Atmospheric Emissions • vessel operations	• change in air quality	**Ambient air quality** Atmospheric emissions will be generated by power generation by the CSV and any other vessels required (continuous throughout 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	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

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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 CSV, vessel engines, helicopters, generators, and equipment. Emissions will occur for the duration of the activity (50 days). 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.**						• 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) 2013 • Cooper Energy MS 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.**						
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	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

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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. • 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 m^3 and 0.45 m^3 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 L of food waste per person, per day is expected. • 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) oil in water 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 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						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 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 • Cooper Energy MS Standards and Processes have been identified

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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 m^3 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 m^3. 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.**						• no objections or claims have been raised by relevant persons.
	• Injury/mortality	**Plankton** Mortality rates for plankton are naturally high with distribution often patchy and linked to localised and seasonal productivity that produces sporadic						

Aspect	Predicted Impacts	Impact/Risk Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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**. 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	Risks	Consequence Evaluation	Consequence	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	Level 2	A	C10: EPBC Regulations 2000 – 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

Aspect	Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		moving, although they generally do not approach, and sometimes avoid, faster moving ships (Richardson, et al. 1995). Cooper 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. Listed threatened marine fauna that may occur in the Operational Area, and which may be at risk of surface interactions includes: • one threatened shark species: whale shark (Vulnerable). • three listed threatened marine turtle species: loggerhead turtle (Endangered), green turtle (Vulnerable) and the leatherback turtle (Endangered). No BIAs, internesting or nesting critical habitats have been identified within the Operational Area for marine turtles. • four threatened whale species have a known presence within the Operational Area: sei whale (Vulnerable), blue whale (Endangered), fin whale (Vulnerable), and southern right whale (Endangered). Of these species only two have BIAs within the Operational Area: known foraging and						• good practice controls defined and implemented • legislative and other requirements have been identified and met: - EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans - National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia 2017b) - section 229 of the EPBC Act • activity will not impact the recovery of: - marine turtles as per the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a) - White shark as per the Recovery Plan for the White Shark (Carcharodon carcharias)

Aspect	Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		distribution BIA for the pygmy blue whale and known core range BIA for the southern right whale. The Operational Area has no threatened species presence or BIAs for pinnipeds, dugongs or dolphins, although Australian fur seal has previously been observed in the area during routine inspections (Ierodiaconou, et al. 2021). The following management plans and conservation advices identify vessel strike as a threat: • Conservation Management Plan for the Blue Whale (Commonwealth of Australia 2015); • Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012); • Conservation Advice for the Sei Whale (TSSC 2015a); • Conservation Advice for the Fin Whale (TSSC 2015b); • Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a). The occurrence of physical interactions with marine fauna is very low with no incidents occurring during Cooper 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.						(DSEWPaC 2013a) - Australian sealion as per the Recovery Plan for the Australian Sealion (DSEWPaC 2013b) - Blue Whale per the Conservation Management Plan for the Blue Whale, 2015-2025 - Southern Right Whale as per Conservation Management Plan for the Southern Right Whale, 2011-2021 (DSEWPaC 2012) - Conservation Advice for the Sei Whale (TSSC 2015a) - Conservation Advice for the Fin Whale (TSSC 2015b) • Cooper Energy MS Standards and Processes have been identified • no objections or claims have been raised by relevant persons.

Aspect	Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
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 management plans and conservation advices identify marine debris as a threat: • Draft national Recovery Plan for Albatrosses and Petrels 2021 (Commonwealth of Australia 2021) • Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a) • Draft Wildlife Conservation Plan for Seabirds (Commonwealth of Australia 2019) • Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (Commonwealth of Australia 2018) 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	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: - Albatross and Giant Petrel populations breeding and foraging as per the Draft National

Aspect	Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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.**						Recovery Plan for Albatrosses and Petrels 2021 (Commonwealth of Australia 2021). - Marine turtles as per the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a). • Cooper Energy MS Standards and Processes have been identified. • no objections or claims have been raised by relevant persons.
Dropped Object • contingency removal of subsea structures • reverse installation (Reel) • reverse installation (Lift and Cut) • vessel 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	Level 2	A	C17: As-left seabed survey C8: NOPSEMA accepted safety cases C11: Equipment deployment 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

Aspect	Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
		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 management plans and conservation advices identify marine debris as a threat: • Draft National Recovery Plan for Albatrosses and Petrels 2021 (Commonwealth of Australia 2021) • Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia 2017a) • Draft Wildlife Conservation Plan for Seabirds (Commonwealth of Australia 2019) • Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (Commonwealth of Australia 2018) 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**.						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 2009 • activity will not impact the recovery of EPBC listed species • Cooper Energy MS Standards and Processes have been identified • no objections or claims have been raised by relevant persons.
Accidental Release								
Loss of Containment Accidental release: • LOC – minor Cause of Aspect:	• change in water quality	**Ambient water quality** LOC scenarios include: • hydraulic line failure (~1 m^3) • consumables onboard the vessel (paints, chemicals etc).	Level 1	A	C1: Planned Maintenance System C23: Vessel compliant with MARPOL	Impact is conceivable and could occur, however it would require a	Low	Acceptable, based on: • impacts well understood • residual risk (severity) is Low

Aspect	Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk (Severity)	Acceptability Outcome
• vessel operations		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. 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.			Annex I, as appropriate to class (i.e., SMPEP or equivalent)	rare combination of factors and is therefore considered Unlikely (D).		• 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) - Guidelines for Offshore Marine Operations GOMO 0611-1401 (2013) • activity will not impact the recovery of EPBC listed species • Cooper Energy MS 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
- contingency removal of subsea structures
- reverse installation (reel)
- reverse installation (lift and cut)
- legacy environmental impacts from historic BMG project impacts
- leave property in situ.

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) receptor assessment has been completed in Table 6-4.

Section 3.7 summarises planned and unplanned discharges 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 & 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** • 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 Future well abandonment fluids also include the brines and treatment chemicals outlined in the Phase 1 EP.	No	The Environment Plan for constructon 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 EP's being the Basker-6 drilling program (2008) and Basker Manta Ocean Patriot Drilling Campaign (2009). Both these Environment plans ranked the potential impact from these discharges as minimal (1). These plans also described that the discharges were highly unlikely to cause any significant alteration of sediment characteristics either physically or chemically. Since well construction, Cooper 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 environment plans 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	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

<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>• 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 Boag and Koopman (2021). There have been no reports of hook-ups at this trenched section.
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>naturally over time with fisheries being active along trenched sections without incident for over 10-years.
The Environment Plan for Full Field Development (09/HSEQ/ENV/PL02) described the discharges from flowline commissioning. The lines were hydro-tested 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 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.</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 Environment Plan for Full Field Development (09/HSEQ/ENV/PL02) described the produced water 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>
</table></td></tr>
</table>

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
					Carbonate (CO_3) mg/L <1 Bicarbonate (HCO_3) mg/L 1400 Sulphate (SO_4) mg/L 480 Chloride (Cl) mg/L 18000 Nitrate (NO_3) mg/L <0.1 Derived & Other Data: Total Dissolved Solids (Calculated) mg/L 36000 Total Hardness as $CaCO_3$ mg/L 1000 Total Alkalinity as $CaCO_3$ mg/L 1200 pH at Measured temp 7.0 Measured temp °C 21.2 Electrical Conductivity µS/cm 57000 Calculated TDS indicates that the PW TDS was likely to have been similar to surrounding ambient 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 Australia Resources Pty Ltd 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 located in 170 m water depth, much deeper than those modelled at the Tuna Platform (60 m) • benthic sediments at both locations are comparable with (Esso Australia Resources Pty Ltd 2021) indicating the sediments are unconsolidated

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
					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 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 Australia Resources Pty Ltd 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 bio-accumulate 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, oil-in -water (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

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
					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 59m and 1574 m of the discharge source. The monitoring undertaken by Esso Australia Resources Pty Ltd in 2018 (Esso Australia Resources Pty Ltd, 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 Environment Plan 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 (in Esso Australia Resources Pty Ltd [2019]) 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 2019 indicating that regulator expectations regarding the potential for seabed contamination from produced water 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 oil in water and apply to all vessels, including those operating in field, 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

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
					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 Gippsland Offshore Operations EP, the system utilized 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 Development Pty Ltd [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	No	The BMG Closure Project (Phase 1) Environment Plan 1 NOPSEMA was accepted by NOPSEMA in March

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
			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.		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 localized 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 • restoring cap rock - control fluids from testing and operation of the pressure control equipment • cementing and flocculant	No	The BMG Closure Project (Phase 1) Environment Plan 1 NOPSEMA was accepted by NOPSEMA in March 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.
		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	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. ..

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
			- 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		
	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 Cooper 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 Australian Institute of Marine Science and Deakin university (Ierodiaconou, et al. 2021), reviewed the benthic habitat and marine communities present within the Operational Area. The study identified that forty one percent 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. Infrastructure (i.e. wellheads) not removed during the BMG Closure Project (Phase 1) activities may also be removed in the scope of this EP. Wet parking will occur within the Operational	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
			Area, and the footprint of wet parked infrastructure will be no larger than the infrastructure itself (Table 3-1)		
	Leave property in situ	Yes	The wellheads and the Basker-A manifold 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 ~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 3-1.	No	The well infrastructure below the seabed must remain in place as it is part of the permanent reservoir barrier. Although degradation of the manifold 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, Garbatov and Zayed 2011). Iron corrosion may lead to iron enrichment on the small benthic biota at the seafloor (Soltwedel, Rapp and Hasemann 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, 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. Cooper 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)	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..

Development Phase	Activity	Interaction with the Seabed?	Description	Potential for Long-term Seabed Contamination?	Rationale
			• **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) oil in water 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.		
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 discernable 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

6.3.5 Impact: Change to benthic habitat

6.3.5.1 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 PSZ's 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).

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)

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. 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.

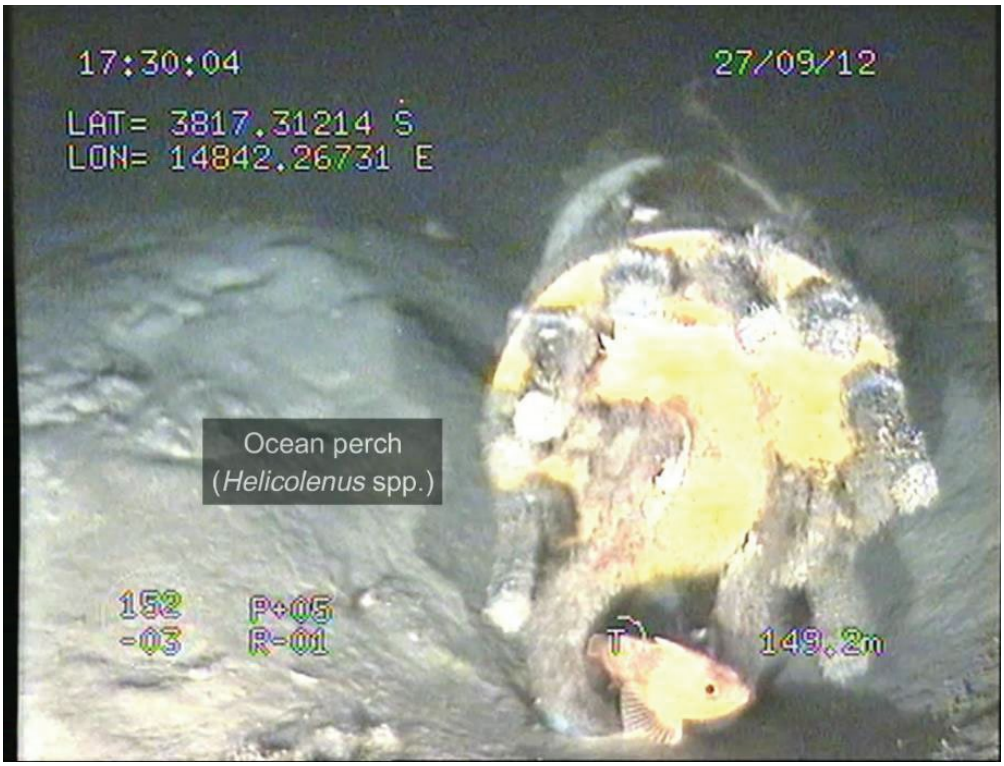


Figure 6-4 Image showing some localised scour around flowline midline end point, showing ocean perch within (Ierodiaconou, et al. 2021)

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 de-burial 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 de-burial 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 1500 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 1km 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 (Boag and Koopman, 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.

6.3.6 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 4-2, 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 Cooper Energy offshore infrastructure, undertaken by Deakin University and the Australian Institute of Marine Science (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 and 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 6-1). 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) 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.

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 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).

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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 are able to 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, Davis and Cummins 2006, Pineda, Duckworth and Webster 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) is 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**.

6.3.7 Risk Event: Indirect impacts to marine habitats

Inherent Consequence Evaluation

As the Basker-A Manifold pile will remain in situ, over time, it will corrode.

As identified in Table 4-2, 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, Rapp and Hasemann 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, Rapp and Hasemann 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).

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), it is likely that any impacts to marine habitats or benthic communities would be limited to the immediate vicinity of the manifold pile, 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**.

6.3.8 Risk Event: Commercial fisheries

According to research undertaken by Boag and Koopman (2021), although multiple different fisheries have rights to fish around BMG, it is only the SESSF managed fisheries that actively fish around BMG; these are:

- SESSF Commonwealth Trawl sector (Otter trawl and Danish seine)
- SESSF Shark Gillnet and Shark Hook sectors
- SESSF Scalefish Hook sector.

Direct impacts to fish and commercial fisheries arising from the removal of infrastructure and benthic disturbance are expected to be limited. As the 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 was completed by SETFIA and Fishwell Consulting in 2012 and in 2021. These studies indicated that the SESSF (commonwealth Trawl) fishery had the highest risk of interaction due to the trawling methods used (SETFIA and Fishwell Consultants 2012, SETFIA 2021). 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, Cooper Energy engaged with relevant 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 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, and umbilicals.

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), 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, Cooper 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, Cooper Energy does not believe that the conditions exist where the petroleum activities at BMG have or will impact 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**.

6.3.9 Risk Event: Cultural heritage values

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 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 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 120m below current levels during previous glacial maxima (Holdgate et al., 2003). Preserved fluvial features identified by Holdgate extend to approximately 95m below current sea level. The BMG operational area is in water depths 135-270m and, based on published information, this area has likely remained submerged through previous glacial maxima. Sedimentation rates during the Holocene are reported by Mitchel et al as approximately 77mm/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 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 9.11.;

Given no 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**.

6.3.10 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

Seabed Disturbance	
ALARP Decision Context and Justification	**ALARP Decision Context: Type B** Seabed disturbance in the BMG field has been a common an occurrence and has occurred due to 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, Cooper Energy believes **ALARP Decision Context A** should apply. However, given Direction items 4 and 5, 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 Cooper Energy make good the seabed prior to completing activities covered in this EP.
Control Measure	**Source of good practice control measures**

Seabed Disturbance						
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 Title.					
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 survey's and MBES. These surveys indicate that sediments 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.	Standard practice (onshore) is to assess land for acceptability for future proposed land use through a combination of contamination screening and sampling. Initial assessments of historical activities and discharges at the offshore BMG site indicate a low risk of contamination. Sampling would provide confirmation.	There will be a 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 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.	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 long-term contamination of the seabed, sampling information which confirms no seabed contamination, does not currently exist. Through collecting and analysis of sediment samples, Cooper 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 9.13.2

Seabed Disturbance						
		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.				
Conduct annual seabed surveys to monitor recovery of seabed disturbance arising from deburial activities.	Seabed Disturbance	Cooper Energy understand that removal activities will disturb the seabed. These modifications have the potential to influence how 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 3.4.6). 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.	No. It is standard practice to conduct an "as left" or final seabed survey upon completion of the activity (as detailed in Section 3.4.6). In addition to this, Cooper Energy plan to implement an event driven survey effort (refer to control measure below).	There will be a cost to complete annual (or regular) seabed surveys. Based upon the previous seabed survey, each survey comprising an ROV and MBES component is estimated to cost approximately $1,000,000.	Additional vessel movements and HSE risks will be introduced through the implementation of this control.	Rejected Rationale: The physical environment and mobile nature of sediments in this 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 Cooper Energy remains Titleholder, Cooper 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	Cooper 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 snag risks, should they be made. The benefit of this control is that it provides a	No. It is standard practice to conduct an "as built" or final seabed survey upon completion of the activity (as detailed in Section 3.4.3).	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 $500K, depending on the vessel and equipment spread necessary to address the validated claim.	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.

Seabed Disturbance						
		mechanism linked to permit duration for objections and claims to be addressed.				
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 weeks					
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 Manifold Pile in situ (below seabed) are expected to be highly localised and limited. Cooper Energy will survey and sample sediments to demonstrate no long-term impacts associated with activities from BMG project will occur (Section 9.13.2). An adaptive management approach (as identified in Section 4.4.2). 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. Consequently, no further evaluation against the principles of ESD is required.					
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	No Relevant Person objections or claims have been raised related to these impacts. Consultation with DCCEEW Sea Dumping Section indicates a Sea Dumping Permit may be required to leave the un-retrievable portion of the manifold pile below the seabed. This has been captured within Section 8.0 as performance standard C27 Sea Dumping Permits.					
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:
  - contingency removal of subsea structures
  - reverse installation (lift and cut, or contingency cut and lift) methodology.
- flowline contents will be discharged during the removal of subsea infrastructure - flowline and umbilical removal, during the following activities:
  - contingency removal of subsea structures
  - 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 will 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). 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[6]). 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.

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 predicted no effect (PNEC) levels would not be exceeded beyond 1 m of the cutting activity (Figure 6-5).

[6] 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 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).

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

Planned discharge	Discharge volumes	Known or proxy chemical details					
		Chemical	Function	OCNS or HQ	Treatment rate	LC50 (product or WC component)	% Of product
Contingency removal of subsea structures: Cutting tools required to remove wellheads and manifold 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 (3–7 hours to complete per operation) Flocculant: 150 L per operation Metal swarf and cement cuttings: 0.5 Mt per operation	Proxy 1	Flocculant	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						

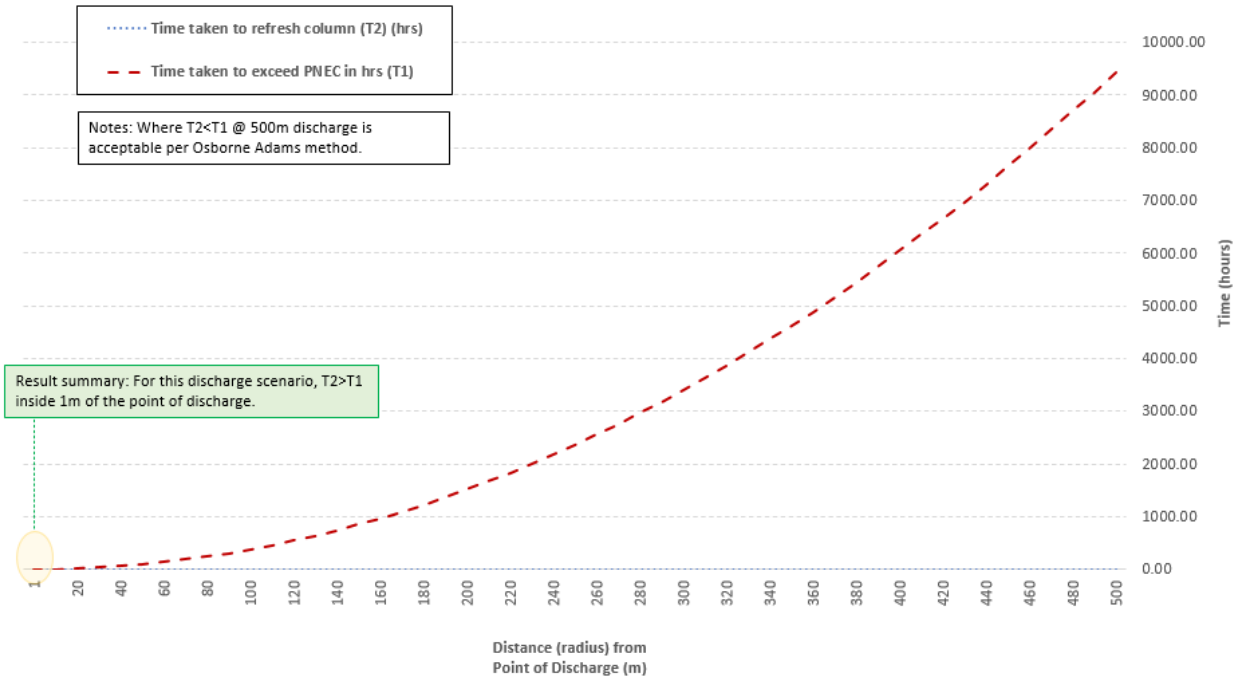


Figure 6-5 Discharge analysis – flocculant (assume limited mixing, low current)

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.

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

<table>
<tr><th>Planned discharge</th><th>Discharge volumes</th><th>Known or proxy chemical details</th></tr>
<tr><td rowspan="5">During Phase 1, a ROV will cut or disconnect 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="3">Flowline volumes are between 5.67 m^3 and 101.7 m^3.
Assume 10% volume discharge when cut (considered conservative as flowlines not at pressure).</td><td>Discharge of water with ≤30 ppm oil in water, water treated with inhibitor chemical @650 ppm and gas.
Incumbent flowline contents will be displaced downhole or to MOU for treatment via flowline flushing in BMG Closure Project (Phase 1). Depending on corrosion studies a corrosion inhibitor may be added to the seawater introduced to the flowlines in Phase 1 to provide for flowline integrity until full removal. The incumbent corrosion inhibitor @650 ppm is used as a proxy for discharge assessment purposes. The Cooper Energy Offshore Chemical Assessment Procedure will be 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>
<table>
<tr><th>Chemical</th><th>Function</th><th>OCNS or HQ</th><th>Treatment rate</th><th>LC50 (product or WC component)</th><th>% Of product</th></tr>
<tr><td>Proxy 1
Pour point depressant / Solvent</td><td>Asphaltene Inhibitor / Wax dissolution</td><td>Silver (No SUB) / N/A</td><td>≤30ppm after treatment (flushing) undertaken in Phase 1</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>
</td></tr>
<tr><td rowspan="2">Umbilical volumes are between 1.6 m^3 and 11.8 m^3 (total combined volume of cores) Assume 10% volume discharge 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).</td></tr>
<tr><td>
<table>
<tr><th>Chemical</th><th>Function</th><th>OCNS or HQ</th><th>Treatment rate</th><th>LC50 (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 is a cut subsea then lift method is used or
• longer release of the</td><td>Refer to the chemicals and toxicities above.</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>entire contents at the flowline and umbilical end as the flowline is lifted onto the vessel</td><td></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 ~ <0.3L (on average) per 20 m section recovered. Occasional releases in the order of 10L 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 (2021) report the following toxicity values for BMG crude, for use within impact assessment, and which are considered relevant to minor releases subsea:
<table>
<tr><td colspan="2">Exposure levels (potential for impact)</td></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>
<tr><td>Low</td><td>10 ppb</td></tr>
<tr><td>High</td><td>100 ppb</td></tr>
</table>
</td></tr>
</table>

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 PPD during disconnection
- full release of flowline during reverse reel recovery.

Release of corrosion inhibitor and PPD during disconnection

Conservatively, it is assumed 10% loss from the lines at the time of initial disconnection over 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 scenarios are shown in Figure 6-6 and Figure 6-7.

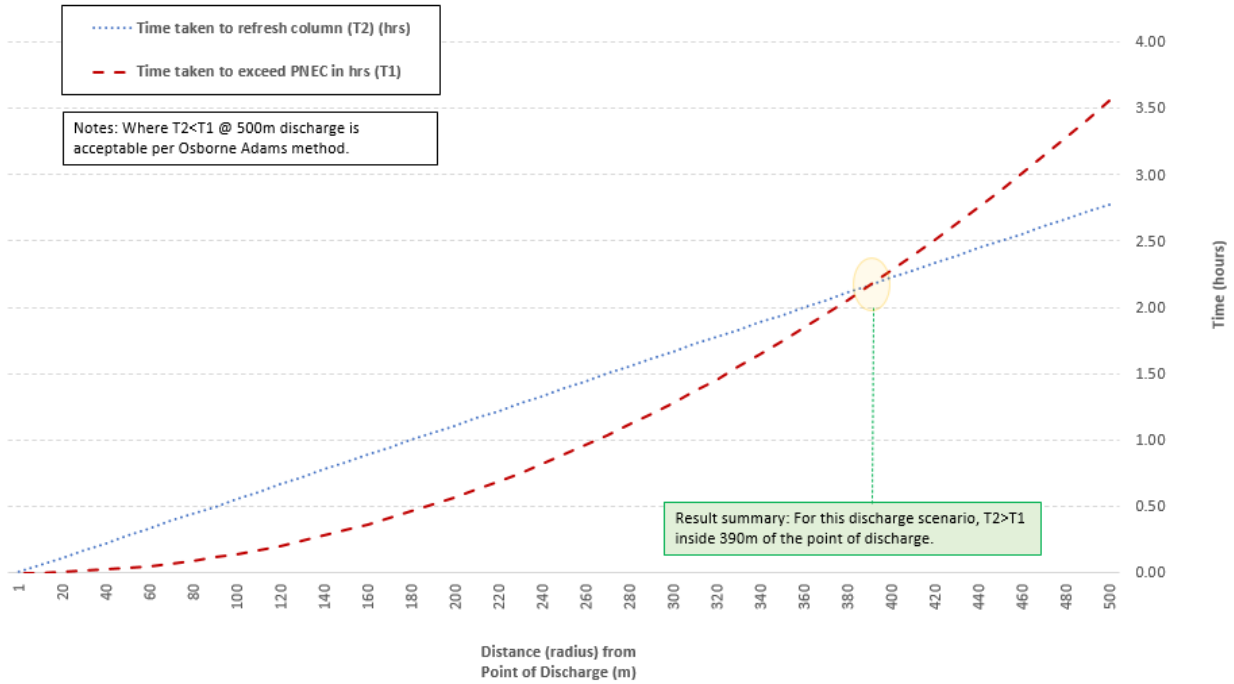


Figure 6-6: Discharge analysis – corrosion inhibitor; flowline disconnected (assume limited mixing, low current)

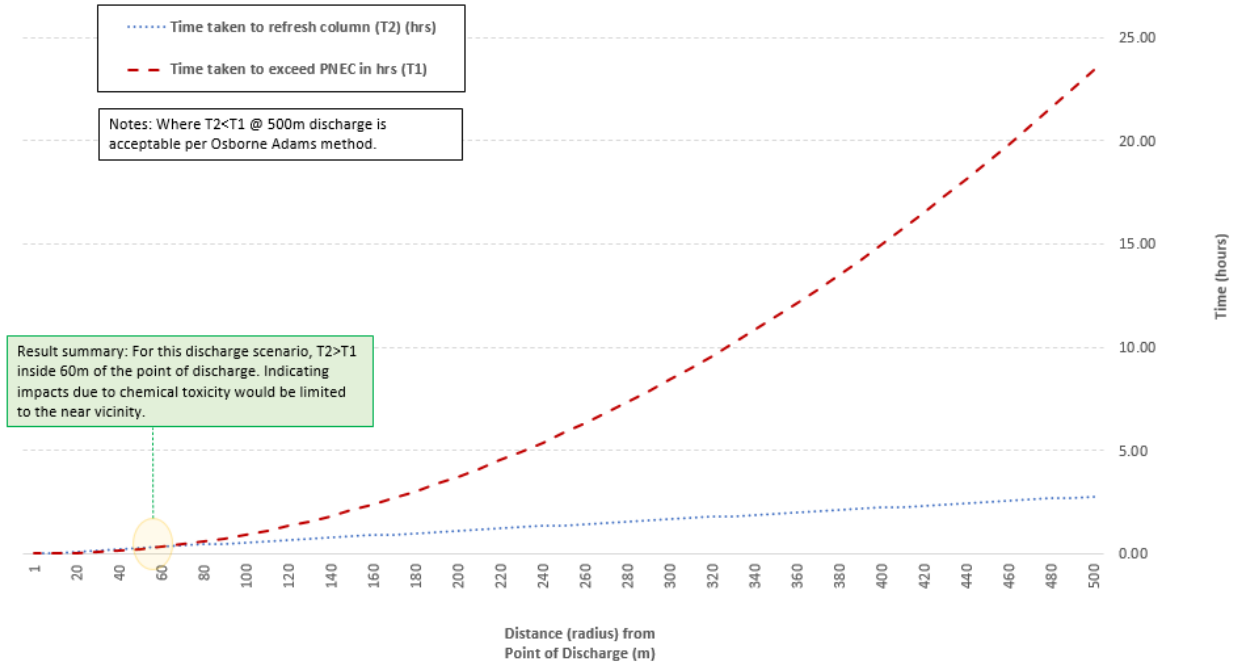


Figure 6-7: Discharge analysis – PPD umbilical disconnected (assume limited mixing, low current)

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 contingency removal methods such as a cut and lift methodology would result in smaller discharges which would be similar in nature to the planned Phase 1 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 within umbilicals (*Figure 6-8* and *Figure 6-9*) 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 6-10 and Figure 6-11, 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.

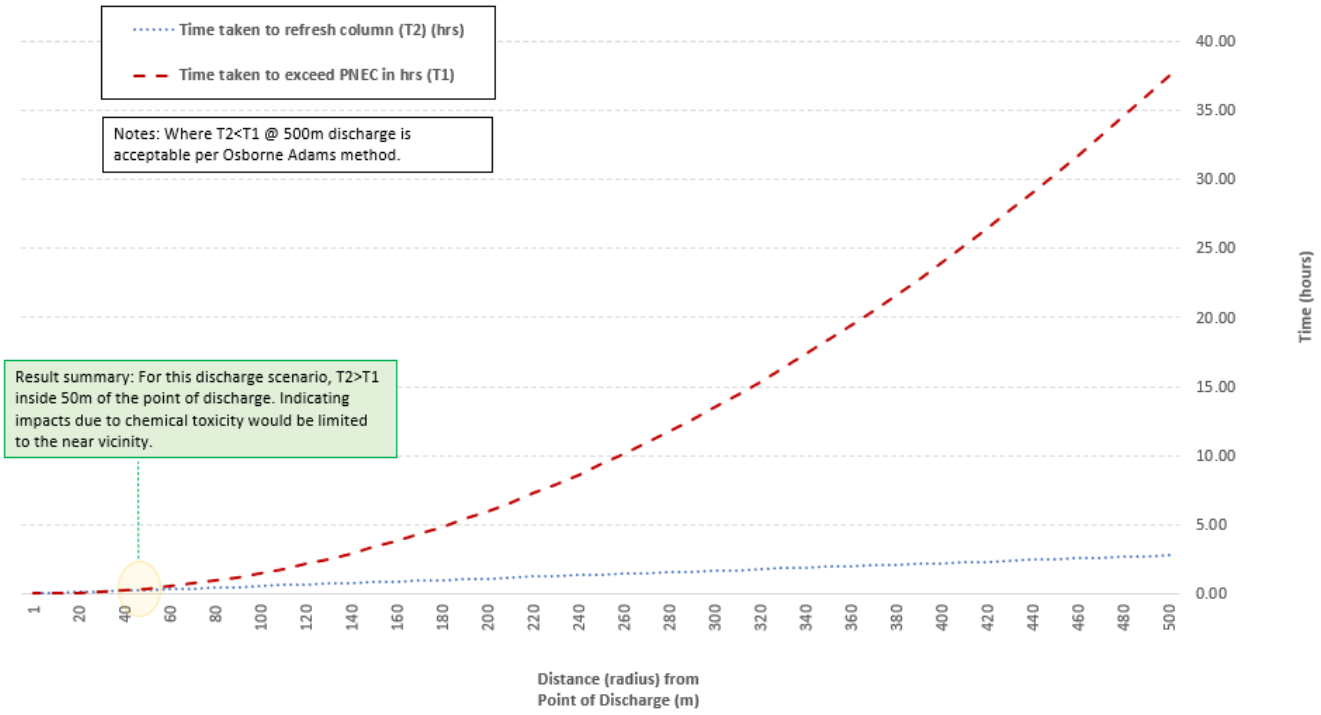


Figure 6-8 Discharge analysis – PPD release B6 during umbilical reverse-reel (assume limited mixing, low current)

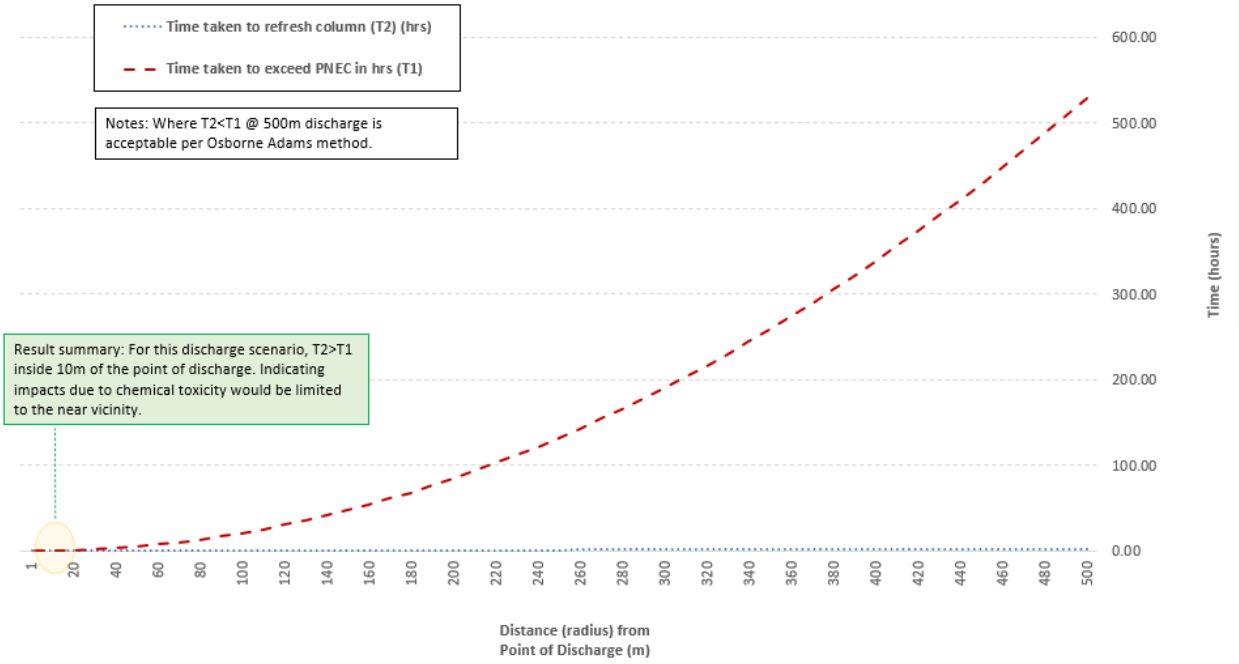


Figure 6-9 Discharge analysis – Transaqua B6 during umbilical reverse-reel (assume limited mixing, low current)

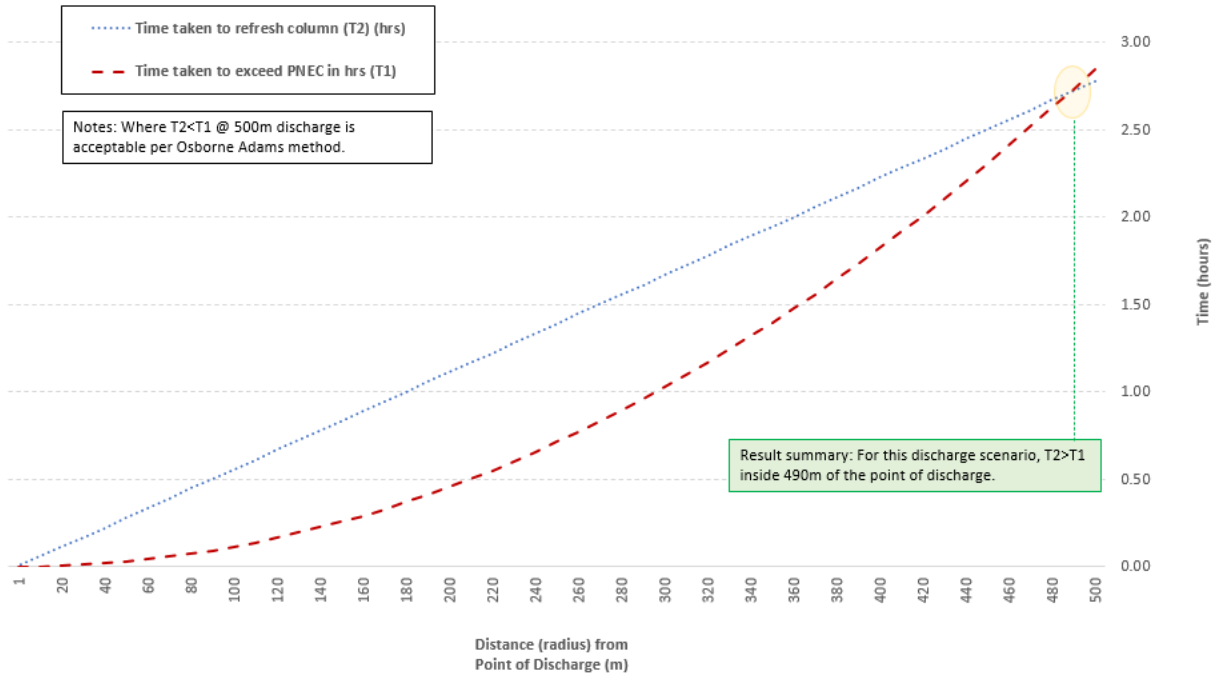


Figure 6-10 Discharge analysis - corrosion inhibitor flowline reverse-reel (assume limited mixing, low current)

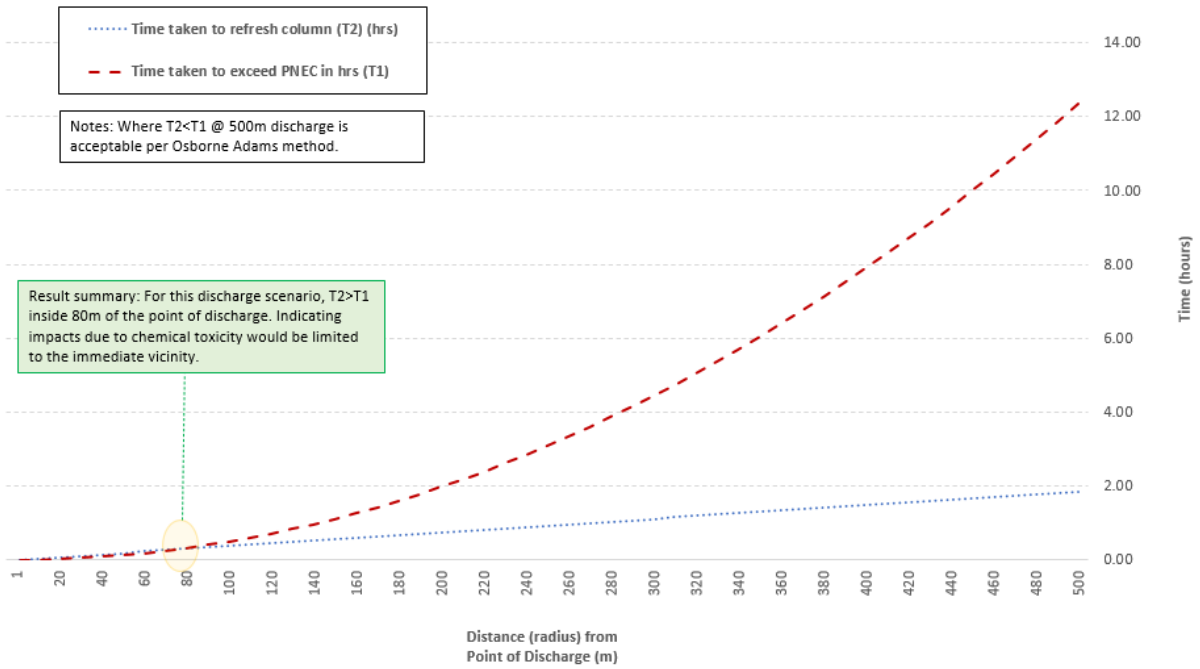


Figure 6-11 Discharge analysis - corrosion inhibitor flowline reverse-reel (assume full mixing, average current)

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 6-12) indicates releases would be expected to disperse to levels below the Low impact threshold for dissolved and entrained hydrocarbons (10 ppb) within the near vicinity of the release point, within a water column of 130m (shallowest depth in field). For assessment purposes, a conservative volume of 10 litres has been assumed for the release volume.

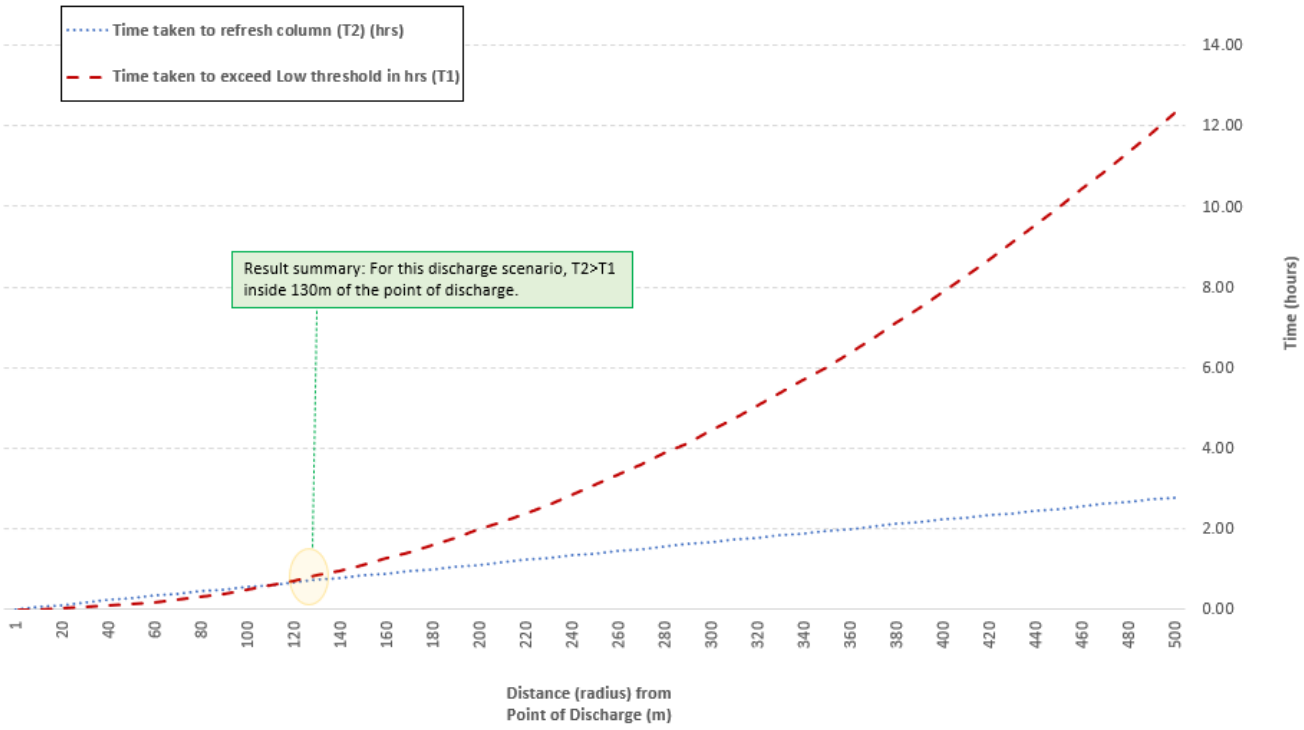


Figure 6-12 Discharge analysis – hydrocarbons subsea cut scenario (assume full mixing, low current)

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

6.4.4.1.1 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 predicted no effect (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 mudline. 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

6.4.4.2.1 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 60 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**.

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

Inherent Consequence Evaluation

Contingency removal of subsea structures – Flowline discharge:

Quantitative discharge assessments for corrosion inhibitor @650 ppm and pour point depressant (solvent) @1000 ppm[7] 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 sensitivity analysis indicates the PNEC of the corrosion inhibitor could be exceeded within 390 m during the discharge; acute toxicity would be limited to within the immediate vicinity of the discharge point.

Contingency removal of subsea structures – Umbilical discharge:

Quantitative discharge assessments for control fluid and pour point depressant 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 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 sensitivity analysis (Figure 6-10) 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 immediate 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 analysis shows the PNEC of the corrosion inhibitor is not exceeded beyond 80 m during the discharge (Figure 6-11).

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 Low impact thresholds could be exceeded within approximately 130m of the release point, assuming low current speed (0.1 m/s) and rising / dispersing through a water column of 130m. This relates to a higher volume release scenario shown in Figure 6-12. Smaller releases would disperse to below low impact thresholds closer to the release point.

The PMST report (Appendix 3.1) 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

[7] 1000 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. If a hydrocarbon based PPD or solvent is used during BMG Closure Project (Phase 1), then residuals would be reduced to ≤30 ppm after successful flushing. It follows that the displacement of ≤30 ppm PPD is well inside the PNEC radius determined for 1000 ppm.

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

Project Planned Discharges						
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. Cooper 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 activity or its potential impacts and risks. Based on a Level 1 consequence, Cooper 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 & Discharge (Contingency removal of 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 and recovery procedures.
Apply Cooper 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: Cooper Energy Offshore Chemical 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: Cooper Energy Offshore Chemical Assessment Procedure (CMS-EN-PCD-0004).

Project Planned Discharges						
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 (LC50 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 place and subsequent use.	Offline work scope	Flowlines & Umbilicals – possible increased corrosion which may limit options (would not rule out all) for full removal. Associated regulatory/legal risk.	Implement pending advice from integrity/corrosion SME to address whether leaving flowlines filled with seawater only could preclude full removal. 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 lines into sections subsea, then pressure retaining caps are obsolete.	Reject Rationale: during BMG Closure Project (Phase 1) flowline contents will be treated and tested to confirm contents are acceptable for discharge. 2) Umbilicals are filled with Transaqua HT2™ and PPD (B6 only) with discharge analysis indicating PNEC are achieved inside 50 m of the release location. 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.

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.
Legislative and conventions	The proposed activities align with the requirements of the: • OPGGS Act 2006 (Cwlth) [S13(5) Risk assessment to ALARP]

Project Planned Discharges	
Internal context	The environmental controls proposed reflects the Cooper Energy HSEC 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
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 subsea infrastructure
- reverse installation (reel) and reverse installation (lift and cut)
- seabed and as-left survey
- inspections and maintenance
- support operations (vessels, helicopters).

Most of these activities will generate continuous sound, except for the survey equipment (i.e., MBES, sidescan sonar, sub-bottom profiler) which emit impulsive sound. Some sound sources, such as the vessels, will be continual throughout the duration of the activity (i.e., approximately 50 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

6.5.2.1.1 Acoustic modelling

Cooper Energy commissioned JASCO Applied Sciences to conduct acoustic modelling to inform the risk assessment associated with underwater sound exposure from vessels (platform support vessel [PSV], and an ROV vessel), ROV, and ROV cutting tool operations (Connell, Koessler and McPherson 2021). The modelling was undertaken to assist in understanding the potential acoustic impact on receptors including marine mammals (cetaceans and otariid seals), turtles, 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 (Connell, Koessler and McPherson 2021).

Different combinations of activities were modelled at different well centre locations (Table 6-9).

Table 6-9 Acoustic modelling scenarios

Scenario ID	Location	Modelled water depth	Source depth	Description
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
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

** Survey data from Cooper 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*

The source characteristics for the PSV, ROV vessel, and ROV cutting tools described by Connell, Koessler, and McPherson (2021) 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, Koessler, and McPherson (2021), whose modelling accounted for a range of PSV and ROV 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 and McPherson 2021). 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.

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, 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 sources frequencies and sound levels

Emission source	Source sound level	
PSV ROV vessel	Broadband SPL: 185.2 dB re 1 µPa	(Connell, Koessler and McPherson 2021)
ROV cutter	Broadband SPL: 161.4 dB re 1 µPa	(Connell, Koessler and McPherson 2021)
Jetting equipment	SPL: 123 dB re 1 µPa @ 160 m	(Nedwell, Langworthy and Howell 2003)
MFE equipment	SPL: 162 dB re 1 µPa @ 1 m	(Xodus 2017)
Helicopter	SPL: 162 dB re 1 µPa	(Richardson, et al. 1995)

Broadband SPL calculated over 10 Hz to 25 kHz range.

6.5.2.1.2 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 6-11), based on current best available science, have been used in the impact and risk assessment:

- frequency-weighted accumulated sound exposure levels (SEL_{24h}) from the NOAA Technical Guidance (NMFS 2018) for the onset of PTS[8] and TTS[9] in marine mammals
- un-weighted SPL for behavioural threshold for marine mammals based on 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).

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 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, Koessler and McPherson 2021).

The NOAA (2019) 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.

[8] PTS is a physical injury to an animal’s hearing organs.

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

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 (2019) behavioural threshold for marine mammals of a SPL at 120 dB re 1 µPa is likely to represent a conservative threshold.

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^2s	N/A	SEL_{24h}: 199 dB re 1 μPa^2s	N/A
Mid-frequency cetaceans	SPL: 120 dB re 1 µPa	N/A	SEL_{24h}: 178 dB re 1 μPa^2s	N/A	SEL_{24h}: 198 dB re 1 μPa^2s	N/A
High-frequency cetaceans	SPL: 120 dB re 1 µPa	N/A	SEL_{24h}: 153 dB re 1 μPa^2s	N/A	SEL_{24h}: 173 dB re 1 μPa^2s	N/A
Otariid seals	SPL: 120 dB re 1 µPa	N/A	SEL_{24h}: 199 dB re 1 μPa^2s	N/A	SEL_{24h}: 219 dB re 1 μPa^2s	N/A
Turtles	(N) High (I) Moderate (F) Low	N/A	SEL_{24h}: 200 dB re 1 μPa^2s	N/A	SEL_{24h}: 220 dB re 1 μPa^2s	N/A
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).

6.5.2.1.3 Modelling outputs

The maximum-over-depth sound fields for all modelled scenarios (Table 6-9) are presented in Table 6-12 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 and McPherson 2021). 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 influence the extent of ensonification or predicted radii for the relevant SPL metrics; and for the SEL metrics, the only radii influenced were those

for the high-frequency cetaceans. 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.

Table 6-12: Modelled maximum horizontal distances (R_{max}) from any modelling scenario to reach noise effect criteria

Receptor	Behavioural	Temporary threshold shift	Recoverable injury	Permanent threshold shift
Low-frequency cetaceans	SPL: 8.62 km	SEL_{24h}: 1.09 km	N/A	SEL_{24h}: 0.05 km
Mid-frequency cetaceans	SPL: 8.62 km	SEL_{24h}: 0.05 km	N/A	SEL_{24h}: —
High-frequency cetaceans	SPL: 8.62 km	SEL_{24h}: 1.57 km	N/A	SEL_{24h}: 0.06 km
Otariid seals	SPL: 8.62 km	SEL_{24h}: —	N/A	SEL_{24h}: —
Turtles	N/A	SEL_{24h}: 0.06 km	N/A	SEL_{24h}: —
Fish (swim bladder involved in hearing)	N/A	SPL (for 12 hours): 0.03 km	SPL (for 48 hours): —	N/A

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

6.5.2.2 Impulsive sound

6.5.2.2.1 Acoustic modelling

Cooper Energy commissioned JASCO Applied Sciences to provide empirical estimations of the effect ranges from survey equipment (e.g., MBES, sidescan sonar, and sub-bottom profilers) and positioning equipment (ultra-short baseline; USBL). The source characteristics determined from the literature review (McPherson and Koessler 2021) and used the subsequent impact and risk assessment are shown in Table 6-13.

Table 6-13 Positioning and survey equipment source frequencies and sound levels

Emission source	Example equipment	Source frequency range	Source sound level
USBL	Sonardyne Ranger	18–36 kHz	SPL: 204 dB re 1 µPa @ 1 m SEL_{SS}: 173 dB re 1 μPa^2s @ 1 m PK: 170 dB re 1 µPa @ 30 m
MBES	R2Sonic 2024 Reson SeaBat 8101	200–400 kHz	SPL: 221 dB re 1 µPa @ 1 m SEL_{SS}: 130 dB re 1 μPa^2s @ 40 m PK: 170 dB re 1 µPa @ 40 m
Sidescan sonar	EdgeTech 4200	70–400 kHz	SPL: 205 dB re 1 µPa @ 1 m SEL_{SS}: 176 dB re 1 μPa^2s @ 1 m PK: 210 dB re 1 µPa @ 1 m
Sub-bottom profiler (with boomer)	Applied Acoustics AP3000	100–1,000 Hz	SPL: 203.3 dB re 1 µPa @ 1 m SEL_{SS}: 172.6 dB re 1 μPa^2s @ 1 m
Sub-bottom profiler (with CHIRP)	Edgetech X-star system CHIRP Applied Acoustics AA301	2–16 kHz	SPL: 191.7 dB re 1 µPa PK: 215 dB re 1 μPa^2m^2

SEL_{SS} is per-pulse SEL (i.e., not an accumulated value).

6.5.2.2.2 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 6-14), based on current best available science, have been used in the impact and risk assessment:

- peak pressure levels (PK) and frequency-weighted accumulated sound exposure levels (SEL_{24h}) from the US National Oceanic and Atmospheric Administration (NOAA) Technical Guidance (NMFS 2018) for the onset of PTS and TTS in marine mammals
- marine mammal behavioural threshold based on the current NOAA (NOAA 2019) criterion for marine mammals of 160 dB re 1 µPa (SPL) for impulsive sound sources
- peak pressure levels (PK) and frequency-weighted accumulated sound exposure levels (SEL_{24h}) from Finneran et al. (Finneran, et al. 2017) for the onset of PTS and TTS in marine turtles

- marine turtle behavioural response threshold of 166 dB re 1 µPa (SPL) (Commonwealth of Australia 2017a) 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 6-14 Noise effect criteria for impulsive sound

Receptor	Behavioural	Impairment			Injury	
		Masking	Temporary threshold shift	Recoverable injury	Permanent threshold shift	Mortality or potential mortal injury
Low-frequency cetaceans	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 168 dB re 1 µPa^{2}s PK: 213 dB re 1 µPa	N/A	SEL_{24h}: 183 dB re 1 µPa^{2}s PK: 219 dB re 1 µPa	N/A
Mid-frequency cetaceans	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 170 dB re 1 µPa^{2}s PK: 224 dB re 1 µPa	N/A	SEL_{24h}: 185 dB re 1 µPa^{2}s PK: 230 dB re 1 µPa	N/A
High-frequency cetaceans	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 140 dB re 1 µPa^{2}s PK: 196 dB re 1 µPa	N/A	SEL_{24h}: 155 dB re 1 µPa^{2}s PK: 202 dB re 1 µPa	N/A
Otariid seals	SPL: 160 dB re 1 µPa	N/A	SEL_{24h}: 188 dB re 1 µPa^{2}s PK: 226 dB re 1 µPa	N/A	SEL_{24h}: 203 dB re 1 µPa^{2}s PK: 232 dB re 1 µPa	N/A
Turtles	SPL: 166 dB re 1 µPa SPL: 175 dB re 1 µPa	N/A	SEL_{24h}: 189 dB re 1 µPa^{2}s PK: 226 dB re 1 µPa	N/A	SEL_{24h}: 204 dB re 1 µPa^{2}s PK: 232 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^{2}s	SEL_{24h}: >216 dB re 1 µPa^{2}s PK: >213 dB re 1 µPa	N/A	SEL_{24h}: >219 dB re 1 µPa^{2}s 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^{2}s	SEL_{24h}: 203 dB re 1 µPa^{2}s PK: >207 dB re 1 µPa	N/A	SEL_{24h}: 210 dB re 1 µPa^{2}s 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^{2}s	SEL_{24h}: 203 dB re 1 µPa^{2}s PK: >207 dB re 1 µPa	N/A	SEL_{24h}: 207 dB re 1 µPa^{2}s 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^{2}s 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).

6.5.2.2.3 Modelling outputs

Empirical estimates of the distances to thresholds were either taken from equivalent and comparable sources in literature or estimated using a simple spreading loss calculation and associated literature inputs (McPherson and Koessler 2021). The estimated maximum from any of the individual positioning or survey equipment to reach the respective noise effect criteria is summarised in Table 6-15.

Where criteria (defined in Section 6.5.2.2.2) contain weighted thresholds, unweighted estimated levels and unweighted literature values were compared to the weighted threshold as part of a conservative distance calculation. If weighted estimates were compared to thresholds, they would be reached at closer distances than the unweighted estimates presented in Table 6-15) (McPherson and Koessler 2021).

Table 6-15: Estimated maximum horizontal distance from any equipment to reach noise effect criteria

Receptor	Behavioural	Impairment			Injury	
		Masking	Temporary threshold shift	Recoverable injury	Permanent threshold shift	Mortality or potential mortal injury
Low-frequency cetaceans	SPL: <130 m	N/A	SEL_{24h}: — PK: —	N/A	SEL_{24h}: — PK: —	N/A
Mid-frequency cetaceans	SPL: <130 m	N/A	SEL_{24h}: — PK: —	N/A	SEL_{24h}: — PK: —	N/A
High-frequency cetaceans	SPL: <130 m	N/A	SEL_{24h}: — PK: —	N/A	SEL_{24h}: — PK: —	N/A
Otariid seals	SPL: <130 m	N/A	SEL_{24h}: — PK: —	N/A	SEL_{24h}: — PK: —	N/A
Turtles	SPL: <130 m	N/A	SEL_{24h}: — PK: within metres	N/A	SEL_{24h}: — PK: within metres	N/A
Fish (no swim bladder)	N/A	N/A	SEL_{24h}: within metres	SEL_{24h}: within metres PK: within metres	N/A	SEL_{24h}: within metres PK: within metres
Fish (swim bladder not involved in hearing)	N/A	N/A	SEL_{24h}: within metres	SEL_{24h}: within metres PK: within metres	N/A	SEL_{24h}: within metres PK: within metres
Fish (swim bladder involved in hearing)	N/A	N/A	SEL_{24h}: within metres	SEL_{24h}: within metres PK: within metres	N/A	SEL_{24h}: within metres PK: within metres
Fish eggs and fish larvae (also relevant to plankton)	N/A	N/A	N/A	N/A	N/A	SEL_{24h}: within metres PK: within metres

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

6.5.4.1.1 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, Reichmuth and Cunningham 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 and McPherson 2021) indicated that sound at an SPL of 110 dB re 1 µPa would extend 34.6–43.9 km from the source for each of the modelling scenarios in Table 6-9.

Given the short duration (i.e., approximately 50 days for decommissioning, or 7 days for inspection and maintenance) of Phase 2 activities, and localised extent of change (e.g., up to 44 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.

6.5.4.1.2 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 8.62 km (Table 6-12).

The PMST report (Appendix 3.4) for a 10 km buffer around 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:

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

In addition, a 'possible foraging area' BIA for the pygmy blue whale, and the 'core coastal range' BIA for the southern right whale also overlaps with the predicted ensonified area for behavioural disturbance. Of all the cetacean species that may occur within the ensonified area (Appendix 3.4), the following species were identified within the PMST report as undertaking a biologically important behaviour[10]:

- sei whale, fin whale, pygmy right whale (foraging, feeding or related behaviour likely to occur within 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. Mid-frequency cetaceans are represented by most odontocetes (toothed whales) and dolphins, specialised in hearing mid frequencies, and include the dusky dolphin, killer whale, and sperm whale. High-frequency cetaceans are represented by a subset of odontocetes (toothed whales) and dolphins, specialised in hearing high frequencies. Limited high-frequency cetaceans' species are expected to occur with the Gippsland region; the PMST report (Appendix 3.4) indicates that two species (pygmy sperm whale, dwarf

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

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 2021a)

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 3.4). No BIA, critical habitat, or biologically important behaviours were identified with the potential presence of these seal species. As described in Section 4.4.1, 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.

Australia has two known seasonal feeding aggregation locations, that are supported by upwelling systems, for pygmy blue whales (Commonwealth of Australia 2015). The Bonney Upwelling is the closest known seasonal feeding area for blue whales (Commonwealth of Australia 2015, 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 2015).

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 2015). 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 2015). The possible foraging area, as delineated within the CMP (Commonwealth of Australia 2015), is extensive (~181,406 km^2), encompassing all of central and eastern Bass Strait (Figure 4-4). 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, Torres and Hodge 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 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 pers comms) (Appendix 2). The 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 2015), the low sightings may in part be a function of lower levels of monitoring compared to other regions such as the Otway. Based on their migration patterns, blue whales are more likely to be moving through the Gippsland region in May, with April and June considered shoulder times; presence outside of this time period is unlikely. This aligns with highest detections of both Antarctic blues and pygmy blues in the central Bass Strait between April and June (McCauley, et al. 2018).

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 and 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 6-13), limited food sources for opportunistic foraging are expected to be present within the vicinity of the Phase 2 activity.

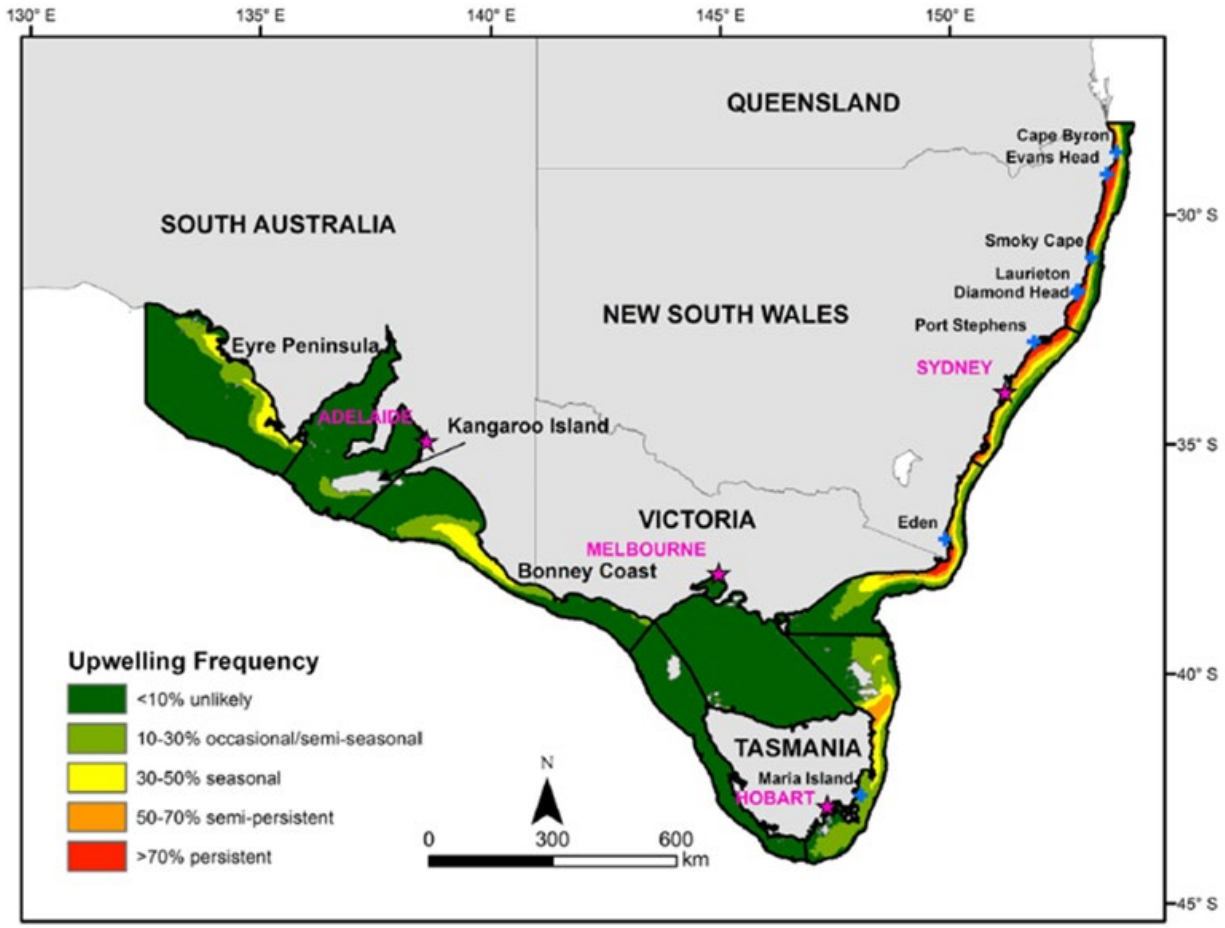


Figure 6-13 Upwelling Frequency in the Bass Straight (Huang and Wang 2019)

The CMP for the blue whale (Commonwealth of Australia 2015) 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*". The CMP assesses the threat from shipping and industrial noise, 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, Kniest and Dunlop 2019, TSSC 2022).

In Australian coastal waters, southern right whales occur along the southern coast (including Tasmania), generally as far north as Sydney on the east coast, and Perth on the west coast (DSEWPaC 2012). In coastal areas, southern right whales generally occur within 2 km of the coast and tend to be distinctly clumped in aggregation areas (DSEWPaC 2012). There are no established or emerging aggregation areas on the Gippsland coast (DSEWPaC 2012). Nursery grounds are typically occupied from May to October; and calving typically occurs in shallow coastal waters of <10 m depth (DSEWPaC 2012). The southern

right whale 'core coastal range' includes the areas where whale presence may occur (DSEWPaC 2012). There is the potential for southern right whales to be transiting through the area offshore Victoria during May to June, and September to November as they move to and from coastal aggregation areas.

The CMP for the southern right whale (DSEWPaC 2012) assesses the threat from shipping and industrial noise, 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 southern right whales are largely unknown, a precautionary approach has been taken regarding assignation of possible consequences*". No specific management action for managing underwater sound emissions is defined in the CMP.

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 2021a). Pygmy right whales have primarily been recorded in areas associated with upwellings and with high zooplankton abundance (DCCEEW 2021a). Few or no records are available for NSW, eastern Victoria, and the northern part of the Great Australian Bight (DCCEEW 2021a).

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 6-13). 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 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 ~8.62 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**.

6.5.4.1.3 Risk Event: TTS and PTS (Marine Mammals)

Inherent Consequence Evaluation

Acoustic modelling indicated that the TTS and PTS SEL_{24h} noise effect criteria were not predicted to be exceeded for otariid seals (Table 6-12), and as such, the risk of auditory impairment or injury to otariid seals is not considered credible and has not been evaluated further.

Acoustic modelling indicated that the R_{max} from the source (e.g., vessels on DP) to PTS SEL_{24h} noise effect criteria was 0.05 km, and 0.06 km for low-frequency, and high-frequency cetaceans respectively; and was not predicted to be exceeded for mid-frequency cetaceans (Table 6-12). 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 low-frequency or high-frequency cetaceans, this requires them to remain within ~50 m or ~60 m of the vessel for at least a 24-hour period before PTS auditory injury may occur. Given that cetaceans (if present) are expected to be transitory through the area, the risk of auditory injury (PTS) to cetaceans is not considered credible and has not been evaluated further.

Acoustic modelling indicated that the R_{max} from the source (e.g., vessels on DP) to the TTS SEL_{24h} noise effect criteria was 1.09 km, 0.05 km, and 1.57 km for low-frequency, mid-frequency, and high-frequency cetaceans respectively (Table 6-12).

Specifically for mid-frequency cetaceans, this requires them to remain within ~50 m of the vessel for at least a 24-hour period before TTS auditory impairments may occur. Given that mid-frequency cetaceans (if present) are expected to be transitory through the area, the risk of auditory impairment is not considered credible, and has not been evaluated further.

Similarly for low-frequency and high-frequency cetaceans, this requires them to remain within ~1.09 km or ~1.57 km of the vessel for at least a 24-hour period before TTS auditory injury 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 high-frequency cetaceans with BIAs and/or biologically important behaviours were identified. As described in Section , 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, Jenner and Jenner 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, Kniest and Dunlop 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 1000 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.

The evidence suggests that the presence of any cetacean species for extended (≥24 hour) periods, and consistently within close proximity (<1.6 km) to the vessel, 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.

6.5.4.1.4 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 3.1) 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 critical habitat occur within the predicted ensonified area for behavioural changes for marine turtles.

Given the short duration (i.e., approximately 50 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**.

6.5.4.1.5 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 SEL_{24h} noise effect criteria was 0.06 km for turtles (Table 6-12). The PTS SEL_{24h} noise effect criteria for turtles was not predicted to be exceeded (Table 6-12).

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 ~60 m of the CSV or support vessels for at least a 24-hour period before TTS auditory impairments may occur. Given that marine turtles (if present) are expected to be transitory through the area, the risk of auditory impairment is not considered credible, and has not been evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.5.4.1.6 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 3.1) for the Operational Area, identifies that fish species listed as threatened and/or migratory under the EPBC Act have the potential to present, including:

- white shark, whale shark (vulnerable, migratory)
- oceanic whitetip shark, shortfin mako shark, porbeagle (migratory)
- harrison's dogfish, southern dogfish, school shark, orange roughy, eastern gemfish, blue warehou, southern bluefin tuna (conservation dependant)

In addition, a 'distribution' BIA for the white shark also overlaps with the predicted medium or high-risk area (i.e. hundreds of metres) for behavioural changes for fish. 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 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 several Commonwealth and State managed fisheries, two of which (Southern and Eastern Scalefish and Shark Fishery, Southern Squid Jig Fishery) are known to actively fish within 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**.

6.5.4.1.7 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 not predicted to be exceeded (Table 6-12). As such, recoverable injuries, or mortality and potential mortal injuries, are not 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 0.03 km for fish with a swim bladder involved in hearing (Table 6-12). These results indicates that fish are required to remain within tens of metres of the CSV or support vessels for at least a 24-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 in Section 6.5.4.1.2, some threatened and/or migratory species, have been identified within the predicted ensonified area for masking.

Given the short duration (i.e., approximately 50 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

6.5.4.2.1 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, Reichmuth and Cunningham 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 (McPherson and Koessler 2021) indicated that sounds may extend up to ~130 m from the source (Table 6-15).

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.

6.5.4.2.2 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 <130 m (Table 6-15); well within the potential effect distances associated with continuous vessel noise. This distance was associated with the use of sidescan sonar with a highly directional source output beam pattern (McPherson and Koessler 2021). Other equipment was predicted to have smaller exposure areas (e.g., 36 m from positioning equipment, <10 m from MBES, and <12 m for sub-bottom profilers) (McPherson and Koessler 2021).

The PMST report (Appendix 3.1) 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:

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

In addition, a 'possible foraging area' BIA for the pygmy blue whale, and the 'core coastal range' BIA for the southern right whale also overlaps with the predicted ensonified area for behavioural disturbance. Of all the cetacean species that may occur within the ensonified area (Appendix 3.1), the following species were identified within the PMST report as undertaking a biologically important behaviour:

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

6.5.4.2.3 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 PTS for all marine mammal groups (i.e., low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, or otariid seals) was not predicted to be exceeded (Table 6-15). As such, auditory impairments or auditory injuries to marine mammals from impulsive sound from positioning or survey equipment is not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.5.4.2.4 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 all marine turtles was <130 m (Table 6-15). As per the discussion above for marine mammals, this distance varied with equipment source (Section 6.5.4.2.3). 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 and Koessler 2021).

The PMST report (Appendix 3.1) 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 critical habitat occur within the 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 ~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 turtles is considered **Low**.

6.5.4.2.5 Risk Event: TTS and PTS (Turtles)

Inherent Consequence Evaluation

Empirical estimates indicated that the SEL_{24h} noise effect criteria for TTS or PTS for marine turtles was not predicted to be exceeded (Table 6-15), and as such, the risk of auditory impairment or injury to marine turtles from cumulative ≥24-hour exposure is not considered credible and has not been evaluated further.

Empirical estimates indicated that the maximum distance from an equipment sound source to the PK noise effect criteria for TTS or PTS for marine turtles was only within metres of the sound source (Table 6-15).

As described in Section 6.5.4.2.4, four species listed as threatened and/or migratory under the EPBC Act have the potential to present within the predicted ensonified area. However, no BIAs or critical habitat occur for marine turtles within the predicted 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., within metres) of exposure to impulsive sounds above auditory impairment or injury 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 turtles is considered **Low**.

6.5.4.2.6 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 6-14). 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 6-14). 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 6-14).

However, the only survey equipment with energy below 1 kHz is the sub-bottom profiler using a boomer acoustic source, all other equipment which operates at higher frequencies is unable to be heard by most fish, which further reduces the risk of any behavioural change (McPherson and Koessler 2021).

The PMST report (Appendix 3.1) for the Operational Area, identifies that fish species listed as threatened and/or migratory under the EPBC Act have the potential to present, including:

- white shark, whale shark (vulnerable, migratory)
- oceanic whitetip shark, shortfin mako shark, porbeagle (migratory)
- harrison's dogfish, southern dogfish, school shark, orange roughy, eastern gemfish, blue warehou, southern bluefin tuna (conservation dependant)

In addition, a 'distribution' BIA for the white shark also overlaps with the predicted medium or high-risk area (i.e. hundreds of metres) for behavioural changes for fish. 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**.

6.5.4.2.7 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 (McPherson and Koessler 2021). However, this is only relevant for a sub-bottom profiler using a boomer acoustic source, as all other sources have signals outside the hearing range of most fish in the region (McPherson and Koessler 2021).

Impulsive sounds from survey equipment could result in physiological impacts to fish from the sidescan sonar, but not for the MBES or positioning equipment (McPherson and Koessler 2021).

Empirical estimates indicated that the SEL_{24h} noise effect criteria for TTS, recoverable injury, and mortality or potential mortal injury for fish was only within metres of the sound source (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 fish, this requires them to remain within metres of the sidescan sonar for at least a 24-hour period before auditory impairments or injuries may occur. Given that fish (if present) are expected to be transitory through the area, the risk of auditory impairments or injuries from an accumulated 24-hour exposure is not considered credible and has not been evaluated further.

Empirical estimates indicated that the PK noise effect criteria for recoverable injury, and mortality or potential mortal injury for fish was only within metres of the sound source (Table 6-15).

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 or injury 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**.

6.5.5 Control Measures, ALARP and Acceptability Assessment

Table 6-16 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 Cooper Energy's Relevant Person engagement for the project, Cooper 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 6-16 and Table 6-17.

Table 6-16 Underwater sound emissions ALARP, Control Measures and Acceptability Assessment

Underwater sound emissions	
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**, Cooper 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 because there is a residual (low) risk in relation to behavioural disturbance to this species within a BIA. The particular action which triggers this decision context is Action A.2.3 from the blue whale CMP 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 2000 – Part 8 Division 8.1 interacting with cetaceans	EPBC Regulations 2000 – 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 2000 – 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 2000 – 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, Cooper 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, Cooper Energy will review the vessel attributes against those used in the aspect characterisation in this EP.
Additional controls adopted	
C13: Marine Mammal Adaptive Management Measures	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. 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. These adopted measures (as detailed in Section 9.10) are applicable during the defined blue whale period: • For vessels operating with DP: - 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*
	Vessel bridge watch crew and helicopter crew will be provided with project inductions which will include whale ID 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 2017a) • not impact southern right whale established or emerging aggregation BIAs or the migration and resting on migration BIA (DSEWPaC 2012) • not impact the recovery of the southern right whale as per the Conservation Management Plan for the Southern Right Whale (DSEWPaC 2012) • not impact the recovery of the white shark as per the Recovery Plan for the White Shark (DSEWPaC 2013a). Actions from the CMP for the Blue Whale (Commonwealth of Australia 2015) 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 (Sections 6.5.4.1.3 and 6.5.4.2.2 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. Sections 6.5.4.1.3 and 6.5.4.2.2 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 DAWE guidelines (2021) which advise: '*Mitigation measures must be implemented to reduce the risk of displacement occurring etc...'* • not impact the recovery of the blue 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. Cooper 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 6-17 Underwater sound emissions extended control measures and ALARP assessment for possible blue whale foraging period

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Eliminate activity	Displacement of blue whales from vessel / industry noise. Rated as Minor consequence by DAWE (Commonwealth of Australia 2015) 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; Cooper 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 are more likely to occur	As above	By avoiding periods when blue 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 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 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 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 Cooper Energy to achieve decommissioning deadlines.	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 operational subsea underwater sound emissions.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Noise Modelling	As above	Increased definition and confidence in impact assessment (reduced uncertainty).	Not typical for offshore industries / individual operators to characterise vessel noise with detailed modelling studies.	Cost associated with noise modelling (circa $40K).	N/A	Implemented. 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 underwater sound contours	As above	Limiting thruster power may reduce the underwater sound contours though would not eliminate them. Risks expected to remain low.	Thruster power is determined by safety limits and operational 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.	Not considered feasible.	N/A	Reject. Rationale: Option not feasible.
DP vessel underwater sound reduction in	As above	Vessel design can reduce underwater sound.	Relevant Person feedback:	Given the current absence of industry vessels with silent notation, this measure is not	N/A	Reject. Rationale: Option not feasible.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
design (DNV Silent notation)			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) operating inside and outside of Australian waters has not identified any vessels assigned the DNV Silent notation.	considered to be feasible for the project.		
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.
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	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	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:	Reject Rationale: Not considered feasible for the project.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		source; this obscures sound transmission, resulting in a reduction of received sound levels to receptors outside of the bubble curtain. Approximately 15 dB sound attenuation has been reported for impulsive sound from piling; efficacy is dependent on various factors. Risks would remain low.	curtains being used as mitigation for DP vessels.		• 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 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.	
DP vessels pre-activity survey (initial arrival)	As above	Increased confidence no foraging blue whales in the vicinity which could be displaced upon DP start. Survey undertaken with	Not typically applied to DP vessels. Typically applied to activities that generate impulsive sound such as piling and seismic survey.	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).	Implement Rationale: reduces risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		means appropriate to assure across the behavioural displacement area. Risks would remain low.	During consultation, AAD noted use of survey prior to explosive use (during wharf construction) in Antarctica.		Weather or visibility downtime risk (can be mitigated via different survey options). Good reliability at the project operational level with multiple options for survey.	relation to temporary operational subsea underwater sound emissions. Integrated via C13 Marine Mammal Adaptive Management Measures.
Opportunistic monitoring from project vessels and helicopters	As above	Increased confidence no foraging blue 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 2000 – Part 8 Division 8.1 interacting with cetaceans, and C13 Marine Mammal 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 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),	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	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

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		which may then be conducive to successful foraging (e.g., (Murphy, et al. 2017)). The benefit of this early warning system 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.	levels and peaks in krill presence. Other factors determine presence of foraging marine mammals aside from prey levels.			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.
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: 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	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 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.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
			using IR (Verfuss, et al. 2018). Detection range for large baleen whales is 1 to 3 km.			
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 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 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. Factors that dictate their survival and invasive capabilities depends on environmental factors 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 as/within a number of different pathways and risk events (Table 6-18).

Table 6-18 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
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.

DAWE (2020) suggest that biofouling has been responsible for more foreign marine introductions than ballast water and provides guidelines as to the management of IMS from biofouling (Marine Pest Sectoral Committee 2018). For the BMG closure activities, the CSV and equipment may be sourced internationally and 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 2020, Cooper Energy 2021b, Marine Pest Sectoral Committee 2018, 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).

Outside of port areas and coastal areas, documented IMS within the Bass Strait include the New Zealand screw shell (*Maoricolpus roseus*). The NZ screw shell was thought to have been introduced from NZ and spread via fishing activity. Some oil and gas infrastructure in the region overlaps NZ 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 Cooper Energy IMS Risk Management Protocol will be implemented for all vessels and submersible equipment. Further information on the risk management process is provided within Section 9.8.

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 could affect marine fauna and benthic habitats that may utilise the BMG Operational Area and protected marine areas present in the wider region. The Upwelling East of Eden (KEF) was the only sensitivity identified in or near the Operational Area. Though this KEF was identified, 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 and Hough 2004).

Predicted impacts from IMS if introduced to the Operational Area could affect 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, eleven managed fisheries were identified, of which three have recorded fishing efforts.

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 6-19 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to introduction, establishment and spread of IMS.

Table 6-19 Introduction, establishment and spread of IMS Control Measures, ALARP and Acceptability Assessment

Introduction, establishment and spread of IMS	
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. Cooper 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 activity or its potential impacts and risks. Based on a **Moderate risk severity**, Cooper Energy believes **ALARP Decision Context B** should apply.
Control Measure	**Source of good practice control measures**
C20: COE IMS Risk Management Protocol (CMS-EN-PRO-0002)	The National biofouling management guidelines for the petroleum production and exploration industry (Marine Pest Sectoral Committee 2018) 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 Anti-fouling and In-water Cleaning Guidelines (Department of the Environment and New Zealand Ministry for Primary Industries 2015). In line with these recommendations Cooper Energy uses an IMS Risk Assessment to evaluate IMS risks. Prior to and during operations the Cooper Energy IMS Risk Management Protocol will be implemented for all vessels and submersible equipment and will consider all regions visited (international and domestic). The Cooper 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 (Marine Pest Sectoral Committee 2018) • guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species (IMO Biofouling Guidelines (IMO 2011)) • reducing marine pest biosecurity risks through good practice management Information paper (NOPSEMA 2022c). Further information on the Cooper Energy IMS Risk Assessment is provided within Section 9.8.

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Utilise local vessels only	Introduction of IMS	Through utilising local vessels, the risk of introducing an IMS from an outside source is prevented.	No. There is a standard suite of management measures to manage this risk (as detailed in Coopers IMS Risk Management Protocol) – the use of local vessels is not one of these.	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.	None.	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.

Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	**Level 4:** Extensive medium to long-term impact on highly valued ecosystems, species populations or habitats.
Residual Risk Likelihood	**Remote:** A freak combination of factors would be required for an occurrence. Not expected to occur during the activity. Occur in exceptional circumstances.
Residual Risk Severity	Moderate
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, Cooper 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, Cooper 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* • AMSA Marine Order 98: Marine Pollution Prevention - Anti-fouling Systems. • *Environment Protection Act 1970* (Vic) • Environment Protection (Ships Ballast Water) Regulations 2006 • Australian Ballast Water Management Requirements (DAWE 2020) • Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (IMO 2011) • National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (Marine Pest Sectoral Committee 2018)
Internal context	The environmental controls proposed reflects the Cooper Energy HSEC 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

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 loss of containment scenario is assessed in Table 6-3.

Loss of well control is not considered within this EP as the wells will be plugged and abandoned in Phase 1, prior to the activities in this EP commencing (Section 1.4).

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) and Technical Report on Calculation of Worst-Case Discharge (SPE 2016). A range of credible accidental release scenarios up to and including worst case scenario loss of containment caused by vessel collision, are described in Table 6-20.

Table 6-20 Accidental Hydrocarbon Release Types, Causes and Estimated Volumes

Accidental Hydrocarbon Release	Cause of Aspect	Fluid Type and Volume	Release location	Source control response
Vessel release				
Hydraulic line failure	Vessel operations (refer to Table 6-3)	~1 m^3 of hydraulic fluid	Spill to containment, deck or 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 ballast or other water tanks. Fuel tanks could be at risk of impact. For the impact assessment the vessel 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.	500 m^3 of MDO	Surface release within the BMG Operational Area. Modelling location is the Manta-2A well location (closest well to shore in the BMG infrastructure).	Vessel and offsite resources.

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 instantaneous surface release of Marine Diesel Oil – This scenario examined a 500 m^3 surface release of MDO over 5 hours, tracked for 30 days, representing a 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 Thresholds

Table 6-21 describes the concentration thresholds for use in the impact assessment that have been defined for the different exposure types (surface, in-water, shoreline). These impact thresholds and exposure pathways are then applied at a receptor level for use in the consequence evaluations. These thresholds align with the NOPSEMA environmental bulletin ‘Oil Spill modelling’ (NOPSEMA 2019).

Table 6-21 Justification for Hydrocarbon Impact Thresholds

Exposure Level	Impact Threshold	Justification
Surface Oil		
Low	1 g/m^2	The low threshold to assess the potential for surface oil exposure was 1 g/m^2, equivalent to an average thickness of 1 µm, referred to as visible oil. Oil of this thickness is described as rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (AMSA 2014). This threshold is below the level which could cause environmental harm, however at this concentration, oil on water is expected to be noticeable, and thus has the potential to impact nature-based activities (such as tourism) given the potential reduction in aesthetics.
Moderate	10 g/m^2	Ecological impact has been estimated to occur at 10 g/m^2 (a film thickness of approximately 10 µm or 0.01 mm) according to French et al. (1996) and French-McCay (2009) as this level of fresh oiling has been observed to mortally impact some birds through adhesion of oil to their feathers, exposing them to secondary effects such as hypothermia. The appearance of oil at this average thickness has been described as a metallic sheen (AMSA 2014). Scholten et al. (1996) and Koops et al. (2004) indicated that oil concentrations on the sea surface of 25 g/m^2 (or greater), would be harmful for all birds that have landed in an oil film due to potential contamination of their feathers, with secondary effects such as loss of temperature regulation and ingestion of oil through preening. The appearance of oil at this thickness is also described as metallic sheen (AMSA 2014). A sea surface oil exposure of 10 g/m^2 represents the practical limit for surface response options; below this thickness, oil containment, recovery and chemical treatment (dispersant) become ineffective (AMSA 2015).
High	50 g/m^2	Concentrations above 50 g/m^2 are considered the lower actionable threshold, where oil may be thick enough for containment and recovery, therefore the high exposure threshold is considered for response planning. The appearance of oil at this average thickness has been described as a discontinuous true oil colour (AMSA 2014).
Shoreline		
Low	10 g/m^2	The low threshold (10 g/m^2) was applied as the reporting limit for oil on shore. This threshold may trigger socio-economic impact, such as temporary closures of beaches to recreation or fishing, or closure of commercial fisheries and might trigger attempts for shore clean-up on beaches or man-made features / amenities (breakwaters, jetties, marinas, etc.). French-McCay et al. (2005a) (2005b) also use a threshold of 10 g/m^2, equivalent to two teaspoons of oil per square meter of shoreline, as a low impact threshold when assessing the potential for shoreline accumulation.
Moderate	100 g/m^2	French et al. (1996) and French-McCay (2009) define a shoreline oil accumulation threshold of 100 g/m^2, or above, would potentially harm shorebirds and wildlife (furbearing aquatic mammals and marine reptiles on or along the shore) based on studies for sub-lethal and lethal impacts. This threshold has been used in previous environmental risk assessment studies (see (D. French-McCay 2003, French-McCay, Reich and Rowe, et al. 2011, French-McCay, Reich and Michel, et al. 2012, NOAA 2013)). Additionally, a shoreline concentration of 100 g/m^2, or above, is the minimum limit

Exposure Level	Impact Threshold	Justification
		that the oil can be effectively cleaned according to the AMSA (2015) guideline. This threshold is equivalent to half cup of oil per square meter of shoreline accumulation.
High	1,000 g/m^2	The higher threshold of 1,000 g/m^2, and above, was adopted to inform locations that might receive oil accumulation levels that could have a higher potential for ecological effect. Observations by Lin & Mendelssohn (1996) demonstrated that loadings of more than 1,000 g/m^2 of oil during the growing season would be required to impact marsh plants significantly. Similar thresholds have been found in studies assessing oil impacts on mangroves (Grant, Clarke and Allaway 1993, Suprayogi and Murray 1999). This threshold is equivalent to 1 L (or 4 ¼ cups) of oil per square meter of shoreline accumulation.
In-water - Dissolved		
Low	10 ppb	Laboratory studies have shown that dissolved hydrocarbons exert most of the toxic effects of oil on aquatic biota ((Carls, et al. 2008); (Nordtug, et al. 2011); (Redman 2015)). The mode of action is a narcotic effect, which is positively related to the concentration of soluble hydrocarbons in the body tissues of organisms (D. French-McCay 2002). Dissolved hydrocarbons are taken up by organisms directly from the water column by absorption through external surfaces and gills, as well as through the digestive tract. Thus, soluble hydrocarbons are termed “bioavailable”. Hydrocarbon compounds vary in water-solubility and the toxicity exerted by individual compounds is inversely related to solubility; however, bioavailability will be modified by the volatility of individual compounds (Nirmalakhandan and Speece 1998, Blum and Speece 1990, L. McCarty, The relationship between aquatic toxicity QSARs and bioconcentration for some organic chemicals 1986, McCarty, Dixon, et al. 1992a, McCarty, et al. 1992b, Mackay, Puig and McCarty 1992); (McCarty and Mackay 1993, McCarty, Dixon, et al. 1992a); (Verhaar, Van Leeuwen and Hermens 1992); (Verhaar, de Jongh and Hermens 1999) (Swartz, et al. 1995, D. French-McCay 2002); (D. French-McCay 2002); (McGrath and Di Toro 2009)). Of the soluble compounds, the greatest contributor to toxicity for water-column and benthic organisms are the lower-molecular-weight aromatic compounds, which are both volatile and soluble in water. Although they are not the most water-soluble hydrocarbons within most oil types, the polynuclear aromatic hydrocarbons (PAHs) containing 2-3 aromatic ring structures typically exert the largest narcotic effects because they are semi-soluble and not highly volatile, so they persist in the environment long enough for significant accumulation to occur ((Anderson, Neff, et al. 1974, Anderson, Riley, et al. 1987, Neff and Anderson 1981, Malins and Hodgins 1981, McAuliffe 1987, NRC 2003). The monoaromatic hydrocarbons (MAHs), including the BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), and the soluble alkanes (straight chain hydrocarbons) also contribute to toxicity, but these compounds are highly volatile, so that their contribution will be low when oil is exposed to evaporation and higher when oil is discharged at depth where volatilisation does not occur (D. French-McCay 2002). French-McCay (2002) reviewed available toxicity data, where marine biota was exposed to dissolved hydrocarbons prepared from oil mixtures, finding that 95% of species and life stages exhibited 50% population mortality (LC50) between 6 and 400 ppb total PAH concentration after 96 hours exposure, with an average of 50 ppb. Hence, concentrations lower than 6 ppb total PAH value should be protective of 97.5% of species and life stages even with exposure periods of days (at least 96 hours). Early life-history stages of fish appear to be more sensitive than older fish stages and invertebrates. Thresholds of 10, 50 or 400 ppb over a 1-hour timestep to indicate increasing potential for sub-lethal to lethal toxic effects (low to high).
Moderate	50 ppb	
High	400 ppb	
In-water - Entrained		
Low	10 ppb	Entrained hydrocarbons consist of oil droplets that are suspended in the water column and insoluble. As such, insoluble compounds in oil cannot be absorbed from the water column by aquatic organisms, hence are not bioavailable through absorption of compounds from the water. Exposure to these compounds would require routes of uptake other than absorption of soluble compounds. The route of exposure of organisms to whole oil alone include direct contact with tissues of organisms and uptake of oil by direct consumption, with potential for biomagnification through the food chain (NRC 2003). The 10-ppb threshold represents the very lowest concentration and corresponds generally with the lowest trigger levels for chronic exposure for entrained hydrocarbons in the ANZECC (2000) water quality guidelines. Due to the requirement for relatively long exposure times (> 24 hours) for these concentrations to be significant, they are likely to be more meaningful for juvenile fish, larvae and planktonic organisms that might be entrained (or otherwise moving) within the entrained plumes, or when entrained hydrocarbons adhere to organisms or trapped against a shoreline for periods of several days or more. The entrained hydrocarbon 10 ppb exposure value has been used to inform the EMBA.
High	100 ppb	The 100-ppb exposure value is considered to be representative of sub-lethal impacts to most species and lethal impacts to sensitive species based on toxicity testing. This is considered conservative as toxicity to marine organisms from oil is likely to be driven by the more bioavailable dissolved aromatic fraction, which is typically not differentiated from entrained hydrocarbon in toxicity tests using water accommodated fractions. Given entrained hydrocarbon is expected to have lower toxicity than dissolved aromatics, especially over time periods where these soluble fractions have dissoluted from entrained hydrocarbon, the high exposure value is considered appropriate for risk evaluation.

6.7.2.3 *Weathering and Fate*

A MDO was used for the containment loss 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^{o}C) (RPS 2021a). The low viscosity (4 cP at 25^{o}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. Approximately, 5% (by mass) of 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 6-14 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.

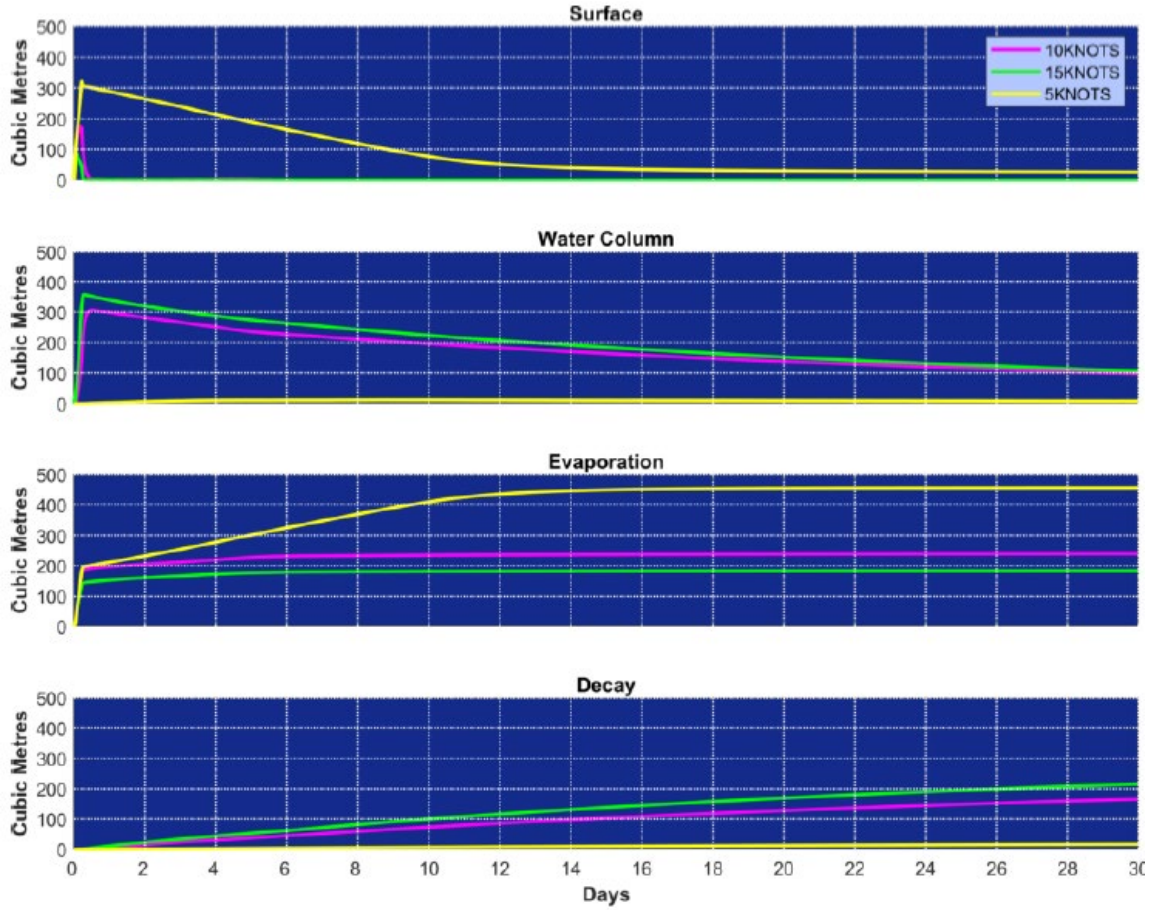


Figure 6-14 Weathering of MDO under three static wind conditions (5, 10 and 15 knots)

6.7.2.4 *Modelling Outputs*

Below is a summary of the results from the stochastic modelling undertaken for a loss of containment 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[11]. Figure 6-15 shows the surface, shoreline and in water areas with the potential to be exposed, according to the modelling results (RPS 2021a). The ecological and social receptors with the potential to be exposed to surface, shoreline accumulation and in-water hydrocarbons from a loss of containment caused by vessel collision event are evaluated in Table 6-22, and Table 6-24 respectively.

[11] ^ Available publicly at: https://docs.nopsema.gov.au/A832863

Surface Exposure (Figure 6-15)

- for summer conditions, the predicted maximum distance of surface exposure from the release location at moderate exposure threshold (≥ 10 g/m^2) was 32 km WSW and at high exposure threshold (≥ 50 g/m2) was 11 km NNW
- for winter conditions, the predicted maximum distance of surface exposure from the release location at moderate exposure threshold (≥ 10 g/m^2) was 132 km ENE and at high exposure threshold (≥ 50 g/m^2) was 7 km NE.

Shoreline Exposure (Figure 6-16)

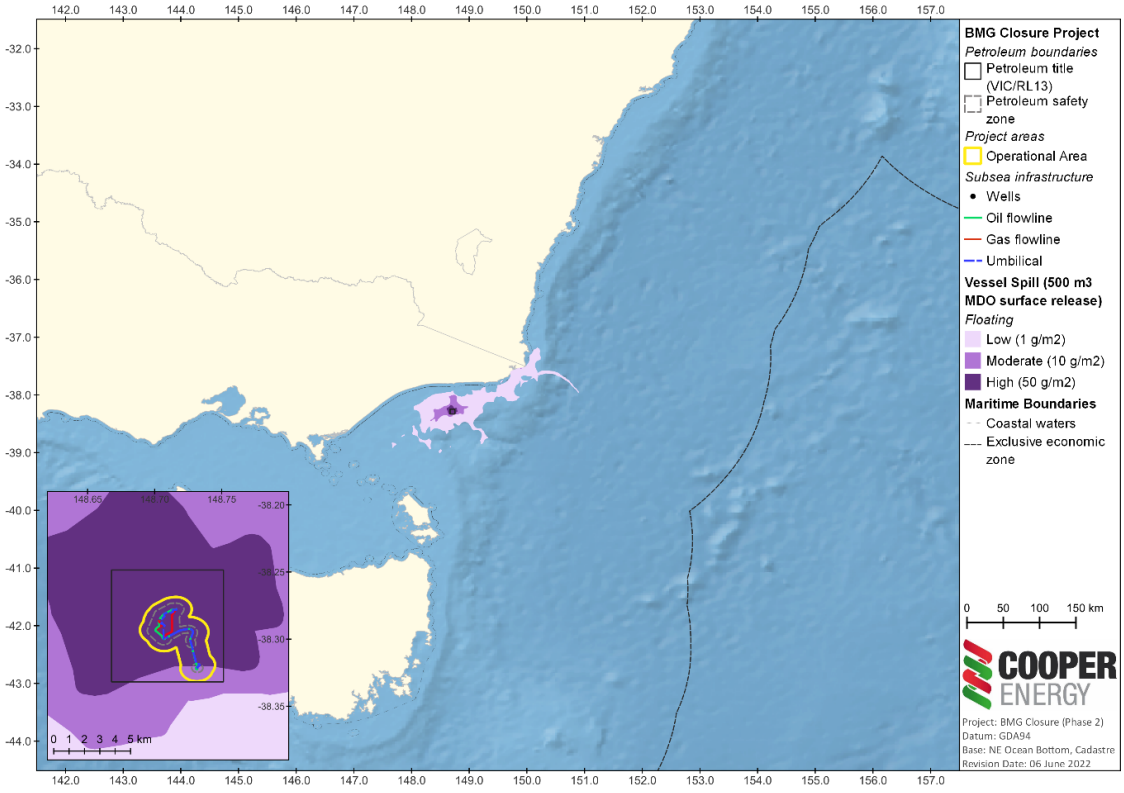
- probability of shoreline contact ranged from 4% (summer) to 8% (winter)
- the minimum time before shoreline contact was approximately 1.9 days (~46 hours) and the maximum volume of oil ashore was 64.8 m^3, both predicted during winter conditions
- only two sites, East Gippsland and Cape Howe / Mallacoota recorded exposure values at or above the high threshold and only during the winter season
- no sites were exposed at the high threshold during the summer season.
- Gabo Island recorded the highest probability of shoreline accumulation at the low threshold during summer conditions with 3%, while East Gippsland and Cape Howe / Mallacoota recorded the highest probability at the low accumulation threshold 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 6-17)

- 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 or above the low and moderate thresholds 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%
- no locations were exposed at or above the high exposure threshold for either season.
- two AMPs (East Gippsland and Flinders) were predicted to be exposed to dissolved hydrocarbons at the low threshold during summer conditions and one AMP (East Gippsland) during winter conditions, with all recording a 1% probability of exposure
- dissolved hydrocarbons at, or above the low threshold were predicted to cross into both New South Wales and Victoria state waters.

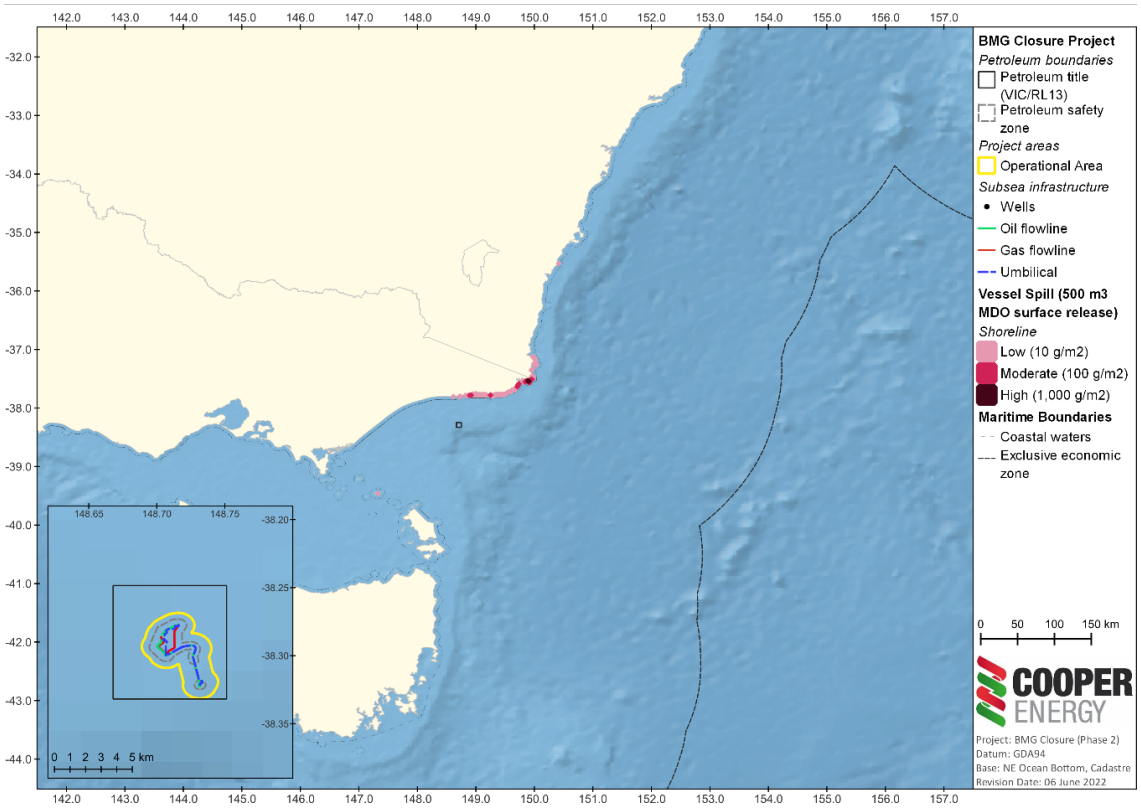
In water – Entrained (Figure 6-17)

- 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 or above the low and high thresholds 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 high threshold during summer and winters conditions, respectively. The greatest probabilities of high exposure during summer and winter conditions were predicted at the White-faced Storm-petrel – Foraging BIA with 36% and 37%, respectively
- a total of four and three AMPs were predicted to be exposed to entrained hydrocarbons at, or above the low threshold during summer and winter conditions, respectively, with the highest probability predicted at East Gippsland (15%) during summer conditions
- entrained hydrocarbons at, or above the low threshold were predicted to cross into NSW, Tasmania and Victoria state waters during summer conditions with probabilities of 26%, 5% and 37%, respectively. During winter conditions, entrained hydrocarbons at or above the low threshold were predicted to cross into NSW and Victoria state waters with probabilities of 28% and 33%, respectively.



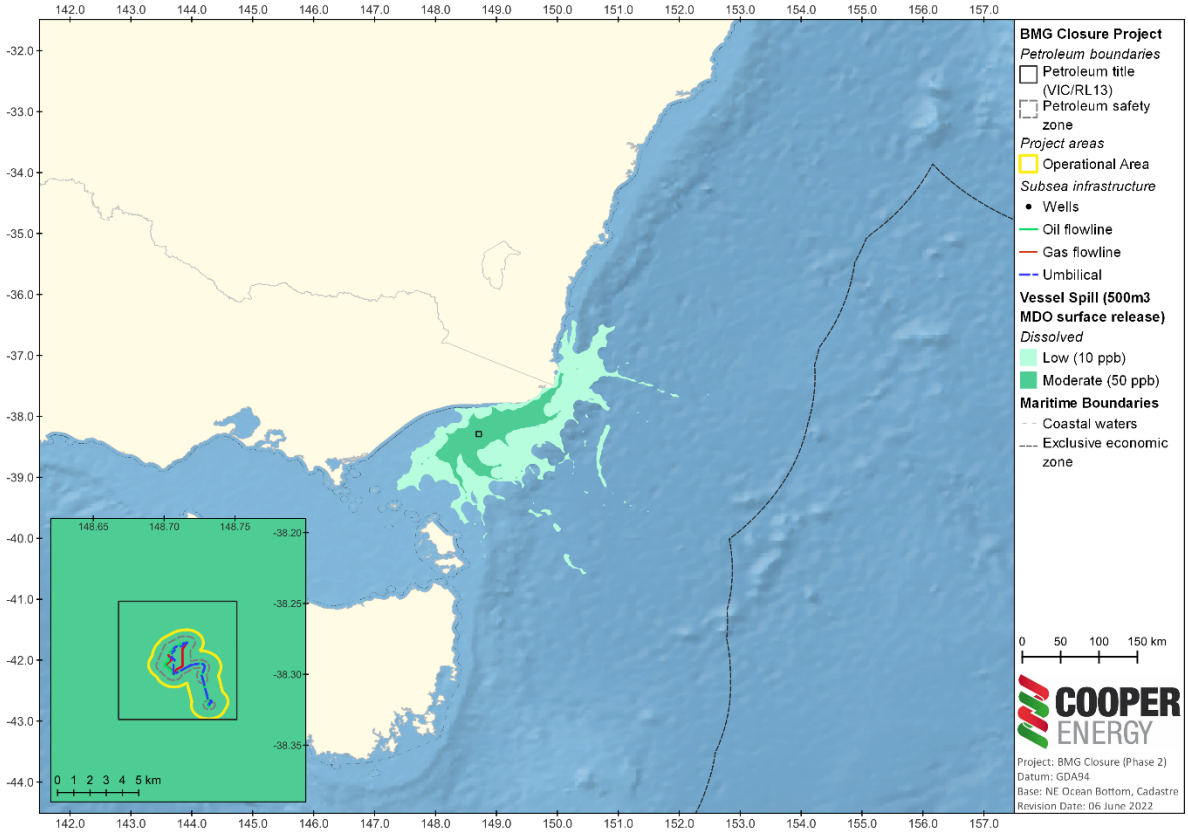
Note: Spill modelling shapefiles provided by RPS (2021a)

Figure 6-15 Zones of potential floating oil exposure, in the event of a 500 m^3 surface release of MDO at the M2A well (results shown are summer and winter combined)



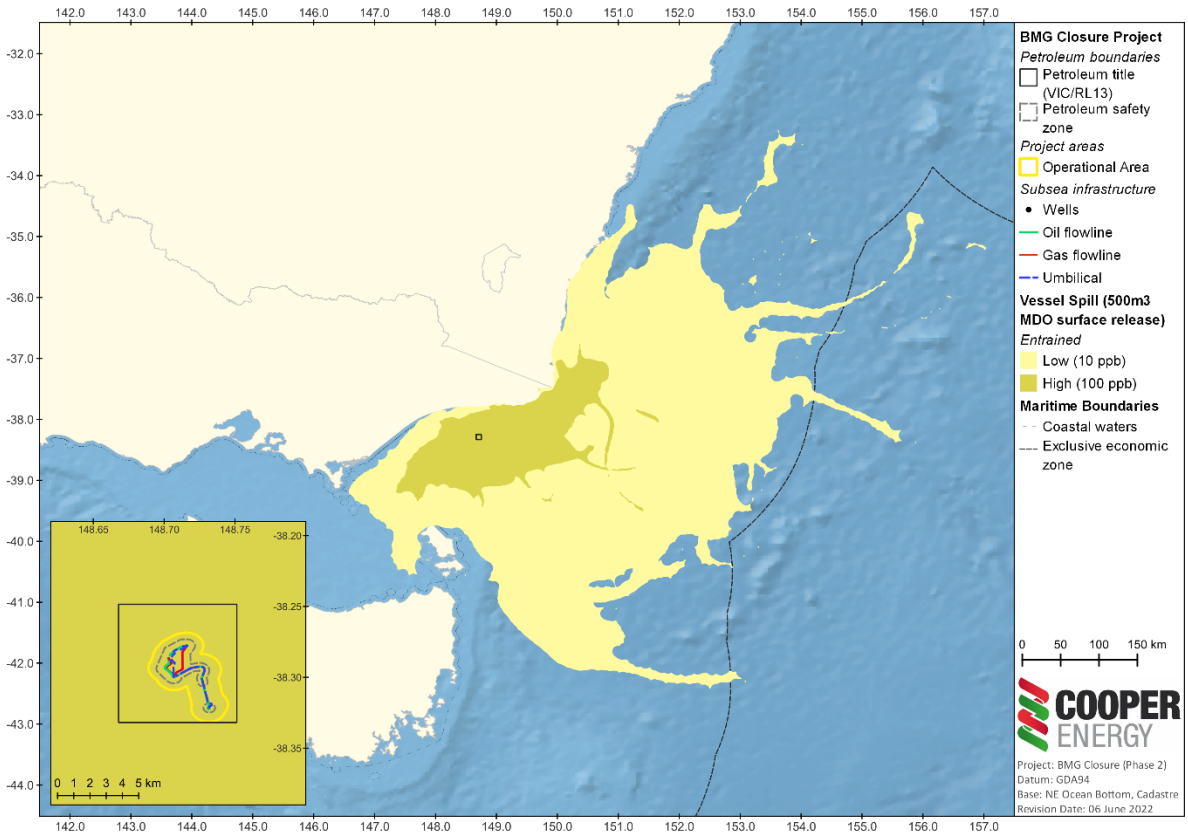
Note: Spill modelling shapefiles provided by RPS (2021a)

Figure 6-16 Zones of potential shoreline oil exposure, in the event of a 500 m^3 surface release of MDO at the M2A well (results shown are summer and winter combined).



Note: Spill modelling shapefiles provided by RPS (2021a)

Figure 6-17 Zones of potential instantaneous dissolved hydrocarbon exposure at 0-10 m below the sea surface in the event of a 500 m^3 surface release of MDO at the M2A well location (results shown are summer and winter combined)



Note: Spill modelling shapefiles provided by RPS (2021a)

Figure 6-18 Zones of potential instantaneous entrained hydrocarbon exposure at 0-10 m below the sea surface in the event of a 500 m^3 surface release of MDO at the M2A well location (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.

Hydrocarbon spill events have the potential to result in:

- toxicity effects/physical oiling
- reduction in intrinsic values/visual aesthetics.
- impacts to commercial businesses.

6.7.4 Impact and Risk Evaluation

6.7.4.1 Risk Event: LOC – Vessel Collision

Table 6-22 Consequence evaluation for MDO hydrocarbon exposure – Surface

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
Ecological Receptors			
Marine Fauna	Seabirds	Several threatened, migratory and / or listed marine species have the potential to be rafting, resting, diving and feeding within the area predicted to be contacted by >10 g/m^2 surface hydrocarbons (Appendix 3.5). There are several foraging BIAs that are present within the area potentially exposed to >10 g/m^2 surface hydrocarbons for albatross, petrel, and shearwater species. Foraging BIAs are typically large broad areas (e.g., antipodean albatross) (Section 3.10 -Appendix 2). The birds can feed via surface skimming or diving – both exposing the bird to any oil on the water surface. No breeding activity occurs in 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 (95%) of the MDO volume will have evaporated within a few days of release. 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 (95% evaporation expected within a few 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 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 marine turtles in the area predicted to be exposed to >10 g/m^2 surface oil. However, there are no BIAs or habitat critical to the survival of the species within this area (Appendix 3.5).	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 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 habitat critical to the survival of the species present, hence, turtles may be transient within the EMBA. Surface oiling area is expected to reduce quickly, with the majority (95%) of the MDO volume predicted to have evaporated within a few 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, 2017- 2027, particularly in relation to shoreline oiling of nesting beaches. There are no nesting beaches within the 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 pinnipeds in the area predicted to be affected by hydrocarbons >10 g/m^2. However, there are no BIAs or habitat critical to the survival of the species within this area (Appendix 3.5).	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 2013b). 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.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
			The number of pinnipeds that may be exposed to MDO is expected to be low as there are no BIAs or habitat critical to the survival of the species present, hence, pinnipeds may be transient within the EMBA. Surface oiling area is expected to reduce quickly, with the majority (95%) of the MDO volume predicted to have evaporated within a few days of release. Therefore, potential impact would be limited to individuals, with population impacts not anticipated. Conservation Advice for the *Neophoca cinerea* (Australian sea lion) (TSSC 2020b) identifies oil spills as a potential threat to habitat. Activities within this EP will be consistent with the conservation and management priorities outlined in this advice. 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 threatened, migratory and/or listed marine cetacean species have the potential to be migrating, resting or foraging within an area predicted to be above the surface thresholds of >10 g/m^2 (Appendix 3.5). The following BIAs are within the area predicted to be above the surface thresholds of >10 g/m^2: • pygmy blue whale known foraging BIA • southern right whale known core area BIA	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 and 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 and D.J. 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 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 (95%) of the MDO volume predicted to have evaporated within a few days of release. Although oil spill has not been identified as a potential threat for cetaceans or its habitat (refer to Table 2-6), activities within this EP will be conducted in a consistent manner 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.
	Fish and Sharks	Several threatened, migratory and/or listed fish and sharks may occur within the area. Sharks have the potential to be foraging, migrating and breeding within the area predicted to be contacted by >10 g/m^2 surface hydrocarbons (Appendix 3.5). A distribution BIA for white sharks 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 2021c).

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
			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 (95%) of the MDO volume predicted to have evaporated within a few 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	Syngnathids and dolphins have the potential to be exposed to >10 g/m^2 surface oil. However, there are no threatened species, BIAs or habitat critical to the survival of the species within the surface that could be potentially affected (Appendix 3.5). Therefore, surface exposure to syngnathids and dolphins is not expected and not evaluated further.	N/A
Social Receptors			
Natural Systems	Key Ecological Features	Upwelling East of Eden is within the area predicted to be above the surface thresholds of >10 g/m^2 (Appendix 3.5). Values associated with these areas are high productivity and aggregations of whales, seals, sharks and seabirds.	Based on the worse case potential consequence to key receptors within the Upwelling East of Eden KEF (e.g., seabirds, pinnipeds and cetaceans), the 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).
	State Marine Protected Areas	No Marine National Parks are within the area predicted to be exposed to the surface thresholds of >10 g/m^2 (Appendix 3.5). Therefore, surface exposure to MPA 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 hydrocarbon concentrations greater than 1 g/m^2. Low exposure thresholds (1 g/m^2) are predicted up to 194 km E (summer) or 177 km NE (winter) of the release location. Local government areas and sub-areas where low threshold surface oil is predicted include East Gippsland, Cape Howe & Mallacoota.	Visible surface hydrocarbons have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. Given the nature of the oil, it is expected to rapidly weather offshore and once onshore is expected to continue weathering until it is flushed via natural processes from the coastline, or until it is physically cleaned-up. 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. Refer also to marine mammals (pinnipeds, cetaceans).
	Shipping	Shipping occurs within the area predicted to be above the surface thresholds of >10 g/m^2.	Vessels may be present in the area where sea surface oil is >10 g/m^2 (10 µm), however, due to the short duration of surface exposure (95% evaporated within a few 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.	Oil and gas infrastructure present in the area where sea surface oil is >10 g/m^2 (10 µm) could be potentially oiled. However, due to the short duration of surface exposure (95% evaporated within a few days) impacts would be localised and short term, consequently, the potential consequence is considered to be **Level 1**.

Table 6-23 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 / 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 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.	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). 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	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

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		vessel collision (MDO) event, there is no coastal habitat mapped specifically as this vegetation type either. 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 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 estuaries and inlet / riverine systems. Some of the saltmarsh habitat along this coast will 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).	Saltmarsh is considered to have a high sensitivity to hydrocarbon exposure. Saltmarsh vegetation offers a large surface area for oil absorption and tends to 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.
	Seabirds and Shorebirds	Listed marine, threatened and/or migratory bird species have the potential to be resting, feeding or nesting within the area potentially exposed to hydrocarbons ashore. 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).	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, Wells and Mackay 1987).

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		There are several foraging BIAs throughout the area potentially exposed to hydrocarbon ashore, however these species are oceanic foragers, not shoreline foragers. Shorebirds will still utilise intertidal and onshore zones for feeding though no BIAs or habitat critical to the survival 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.	It is unlikely that a large number of birds will be affected by hydrocarbons ashore as the probability of shoreline contact is less than 8%. 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 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 / body. However, there are no BIAs or habitat critical to the survival of the species within the shorelines that could be potentially affected (Appendix 3.6). Therefore, shoreline exposure to marine turtles is not expected and not evaluated further.	NA
	Marine Mammals (Pinnipeds)	Pinniped species have the potential to present within the area predicted to be exposed to hydrocarbons ashore. There are no BIAs or habitat critical to the survival of the species within the area that maybe exposed to hydrocarbons ashore (Appendix 3.6). Pinnipeds hauling out on exposed shores could be exposed by direct contact of oil with skin / body. Direct oiling is possible but expected to have a limited window for occurring due to rapid weathering and flushing of MDO.	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. Conservation Advice for the *Neophoca cinerea* (Australian sea lion) (TSSC 2020b) identifies oil spills as a potential threat to habitat. Activities within this EP will be consistent with the conservation and management priorities outlined in this advice. The number of pinnipeds that may be exposed to MDO is expected to be low as there are no BIAs or habitat critical to the survival of the species present, 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:

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
			• 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 these events will be temporary, so duration of exposure is also limited. Most of the hydrocarbons 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 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. Refer also to: • rocky shores • sandy beaches.
	Recreation and Tourism	Recreational and tourism activities occur within the area potentially exposed hydrocarbons ashore; however, the stretch of coast expected to be exposed, as such the volume of recreation / tourism is not as high as other places. Noting that these events 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 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, Commonwealth Heritage Places or National Heritage Places were identified within the area predicted to be contacted (Appendix 3.6). Specific locations of 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 these events 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 have the potential to reduce the visual amenity of heritage sites. However, it is expected that these sites would 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 6-24 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 thresholds (>100 ppb). Note that the greater wave action and water column	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

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		mixing within the nearshore environment will also result in rapid weathering of the MDO residue.	(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 thresholds (>100 ppb). However, it is not a dominant habitat feature within this area. 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 and 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 thresholds (>100 ppb). Seagrass in this region isn't considered a significant food source for marine fauna.	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, Iverson and Ogden 1984). 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 exposed to entrained above threshold (>100 ppb). Exposure above thresholds is predicted in the 0-10 m water depth, which is also where plankton are generally more abundant. Entrained phase MDO may intersect the Upwelling East of Eden KEF. While a spill 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 low (effects) level entrained phase MDO (99% species protection). 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	The modelling indicates that temporary patches of entrained MDO (>100 ppb) may be present at 0-10 m water depth. 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 closer to shore may be affected although these effects will be localised, low level and temporary,	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
		noting that in-water thresholds selected for interpretation are effects levels for 95-99% species protection. 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. In-water invertebrates of value have been identified to include squid, crustaceans (rock lobster, crabs) and molluscs (scallops, abalone). Several commercial fisheries for marine invertebrates are within the area predicted to be exposed above the impact threshold: • Commonwealth Southern Squid Jig Fishery • Victorian Abalone Fishery. • Victorian Rock Lobster Fishery. • Victorian Giant Crab Fishery.	
	Fish and Sharks	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, which modelling does not predict is exposed >10 m water depth. Therefore, any impacts are expected to be highly localised. There is a known distribution, foraging and breeding BIA for the great white shark and a migration and foraging BIA for the Grey Nurse Shark in the area predicted to be over the impact threshold (Appendix 3.7), however, it is not expected that this species spends a large amount of time close to the surface where thresholds are predicted to be exceeded.	Pelagic free-swimming fish and sharks are unlikely to suffer long-term damage from oil spill exposure because dissolved / 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-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.
	Mammals (Pinnipeds)	Localised parts of the foraging range for New Zealand fur-seals and Australian fur-seals may be temporarily exposed to low concentrations of entrained MDO in the water column -no dissolved phase- (Appendix 3.7).	Exposure to low / moderate effects level 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 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 threatened, migratory and/or listed marine species have the potential to be migrating, resting or foraging within an area predicted to be above the surface threshold (> 100 ppb) (Appendix 3.7). The following known BIAs are present:	The potential for impacts to cetaceans would be limited to a relatively short period following the release and would need to coincide with migration to result in exposure to a large number of individuals. However, such exposure is not anticipated to result in long-term population viability effects.

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
		• foraging (pygmy blue whale and humpback whale) • migration and resting on migration (southern right whale). Cetacean exposure to entrained hydrocarbons can result in physical coating as well as ingestion (Geraci and D.J. 1990). Such impacts are associated with 'fresh' hydrocarbon; however, the risk of impact declines rapidly as the MDO weathers.	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.
	Mammals (Dolphins)	Dolphin species have the potential to occur within the area predicted to be above the surface threshold (> 100 ppb) (Appendix 3.7). One breeding BIA for the Indo-pacific bottlenose was identified. Cetacean exposure to entrained hydrocarbons can result in physical coating as well as ingestion (Geraci and D.J. 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 2012). 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 2012). 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 threatened, migratory and/or listed marine species have the potential to be foraging and breeding within the area predicted to be above the surface threshold (> 100 ppb) (Appendix 3.7). There are several foraging BIAs that are present within the area potentially exposed. Foraging BIAs are typically large broad areas (e.g., Antipodean Albatross) (Section 3.10 - Appendix 2). The birds can feed via surface skimming or diving – both exposing the bird to any oil on the water surface. No breeding activity occurs in oceanic waters.	Seabirds at sea and onshore 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, Wells and Mackay 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 mostly relate to nesting locations. 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 within the area predicted to be exposed to >100 ppb. However, there are no BIAs or habitat critical to the survival of the species within the area that could be potentially affected (Appendix 3.7). 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 entrained 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 (NOAA 2002) which can have economic impacts to the industry. Several commercial fisheries are known to operate in the EMBA and overlap the spatial extent of the water column 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. Exclusion zone established would 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

Receptor Group	Receptor Type	Exposure Evaluation	Consequence Evaluation
			• invertebrates.
Natural System	State Marine Protected Areas	Marine protected areas predicted to be exposed to entrained hydrocarbons above thresholds are Cape Howe Marine National Park and the Point Hicks Marine National Park. Conservation values for these areas include high marine fauna and flora diversity, including fish and invertebrate assemblages and benthic coverage (sponges, soft corals, macroalgae).	Based on the worse case potential consequence to key receptors the consequence to protected marine areas is assessed **Level 2**. Refer to: • invertebrates • macroalgae • pinnipeds.
	Key Ecological Features	Big Horseshoe Canyon and Upwelling East of Eden are predicted to be exposed to entrained hydrocarbons above thresholds (>100 ppb). Values associated with these areas are: • Big Horseshoe Canyon – hard substrate for benthic flora and fauna. • Upwelling East of Eden – high productivity and aggregations of whales, seals, sharks and seabirds.	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 • seabirds.
	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 6-23).	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 6-25 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to seabed disturbance.

Table 6-25 Accidental Hydrocarbon Release ALARP, Control Measures and Acceptability Assessment

Accidental Hydrocarbon Release	
ALARP Decision Context and Justification	**ALARP Decision Context: B** Cooper Energy operates offshore both in the Otway and the Gippsland. The activities proposed within this EP are not novel and similar vessel-based activities are undertaken by Cooper 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. The risks associated with vessel collision are well understood, however a worst-case release of marine diesel has the potential to result in **Level 3** consequences. Consequently, Cooper 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* (Commonwealth), 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 Cooper 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.
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 2009 the following safety cases will be required for the campaign: • CSV safety case and/ or • BMG Field Safety Case 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.

Accidental Hydrocarbon Release	
	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	Cooper 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, Cooper 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.
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 2011 • OPGGS(E)R 2009 – Offshore Victoria Oil Pollution Emergency Plan (OPEP) and Offshore Victoria Operations OSMP
Internal context	The environmental controls proposed reflects the Cooper Energy HSEC 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)
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 Overview

This section presents the risk assessment for oil spill response options as required by the OPGGS(E)R and is used to inform the BMG Closure Project (Phase 1) Oil Pollution Emergency Plan (BMG-ER-EMP-0004).

7.1 Oil Spill Response Strategies

7.1.1 Hydrocarbon Spill Risks associated with the Activity

Table 7-1 summarises the 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 and Table 2-3 of the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).

Table 7-1 Hydrocarbon spill risks associated with the activity of this EP

Spill Risk	Spill Level	Fluid Type
Minor spill LOC	Level 1	MDO, hydraulic oil, chemical
Vessel Collision LOC	Level 1 or 2	MDO (Group II)

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 spill 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 Shipboard Marine Pollution Emergency Plan (SMPEP) / Shipboard Oil Pollution Emergency Plan (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. 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 & draw droplets into upper layers of water column. Increases biodegradation and	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	X	X

Response Option	Description	LOC – Vessel Collision (MDO)	Viable Response?	Strategic Net Benefit?
	weathering and provides benefit to sea-surface air breathing animals.	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.		
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. In Victoria, this is managed by Department of Energy, Environment, and Climate Action (DEECA).	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 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 process is detailed in the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004) Section 4.4 Priority Protection Areas and was followed for the events detailed in this EP.

7.2.1 Priority Protection Areas

The priority response planning areas identified for the BMG Closure Project (Phase 2) are shown in table (Table 7-3).

Table 7-3 Priority Response Planning Areas

Response Planning Areas	Sector Name	Summary
Gabo Island Tullaburga Island	Mallacoota	High biological sensitivity

As detailed in the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004), tactical response plans have been developed for these priority response planning areas. As such the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004) covers the priority response planning areas 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 response planning areas 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 response planning areas is provided in the OPEP Section 4.4. Priority Protection Areas.

The pre-spill NEBA detailed in the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004) 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 / effectiveness of a source control response is provided in Table 7-4.

Table 7-4 Feasibility / Effectiveness of Protect and Deflect 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. Cooper 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 / 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 / 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 9.6.2).

7.5.2 Resources Required and Availability

To understand the response equipment and personnel associated with a monitor and evaluate response technique, Cooper 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 Cooper 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 OSMP; 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 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 aerial surveillance team:
  - 1 x visual observer
  - 1 x aircraft (helicopter or fixed wing).

The feasibility/effectiveness of a monitor and evaluate response is provided in Table 7-6.

Table 7-6 Feasibility / Effectiveness of Monitor and Evaluate Response

Parameter	Protect and deflect
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 mobilization 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 BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004) details the resource capability to undertake monitor and evaluate activities in accordance with the identified required resources above, their availability and hence Cooper Energy's capability to support a 'monitor and evaluate' response.

Cooper 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. Cooper Energy would initiate Type II (scientific) monitoring in the event of any Level 2 or 3 spill. Through this resourcing Cooper 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.

Cooper Energy considers that during a 'worst-case' spill event, there are sufficient monitoring resources to respond in sufficient time to allow Cooper 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 BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).

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.	Cooper 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. Cooper 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 operational awareness. In addition to this, satellite imagery may be used (is already provided for) at night to provide additional operational awareness.	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 activity creates significant health and safety risks.	Not Selected

7.5.4 Monitor and Evaluate Impact and Risk Evaluation

Monitoring and evaluation 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 EIA / ERA for monitoring and evaluation activities.

Table 7-8 Monitor and Evaluate EIA/ERA

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 activity or its potential impacts and risks. As such, Cooper 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	Cooper 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) • OPGGS Act 2010 (Victoria)
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, Cooper Energy considers that there is broad acceptance of the impacts and risks associated with the activity.
Environmental Performance	
The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of monitoring and evaluation activities are shown in Table 7-4 of the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).	

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 BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).

The feasibility / effectiveness of a protect and deflect response is provided in Table 7-9.

Table 7-9 Feasibility / 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.

Parameter	Protect and deflect
	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 Cooper. 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 indicates that the largest volume of hydrocarbons ashore was 64.8 m^3 with the maximum length of shoreline exposed to hydrocarbons above impact thresholds 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 mobilise 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 impact / 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.

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 impact / 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 EIA / ERA for protect and deflect activities.

Table 7-11 Protect and Deflect EIA/ERA

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 activity or its potential impacts and risks. As such, Cooper Energy considers ALARP Decision Context A should apply.
Control Measure	**Source of good practice control measures**
Maintain protect and deflect capability	. Cooper 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) • OPGGS Act 2010 (Victoria)
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, Cooper Energy considers that there is broad acceptance of the impacts associated with the activity.
Environmental Performance	
The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of Protect and Deflect activities are shown in Table 8-2 of the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).	

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 EMBA are predominantly sandy beaches with numerous estuaries present along the Victorian Coastline.

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 BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).

The feasibility / effectiveness of a shoreline assessment and clean-up response is provided in Table 7-12.

Table 7-12 Feasibility / 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/per day (manual recovery) and 24 m^3 per team/per day (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. 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) is within 2 days. 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.	Cooper 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) is within 2 days. Cooper Energy has demonstrated capability to rapidly implement the planned shoreline	As Cooper 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	Not Selected

Additional control measures	Benefit	Cost	Outcome
	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.	with this control measure, it is not considered further.	

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 indicates that the largest volume of hydrocarbons ashore was 64.8 m^3 with the maximum length of shoreline exposed to hydrocarbons above impact thresholds 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 100g/m2 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 the EIA / ERA for shoreline assessment and clean-up.

Table 7-14 Shoreline Assessment and Clean-up EIA/ERA

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 concerns were raised during Relevant Person consultation regarding this activity or its potential impacts and risks. As such, Cooper Energy believes **ALARP Decision Context A** should apply.
Control Measure	**Source of good practice control measures**
Maintain shoreline assessment and clean-up capability	Cooper 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) • OPGGS Act 2010 (Victoria)
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, Cooper Energy considers that there is broad acceptance of the impacts associated with the activity.
Environmental Performance	
The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of shoreline clean-up activities are shown in Table 10-4 of the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).	

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 EMBA identifies seabirds, shorebirds, marine mammals and reptiles could be affected, and which may necessitate an oiled wildlife response.

Oiled wildlife response 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 BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).

Cooper Energy will not deploy any resources without first receiving a formal deployment request from relevant Control Agency.

Cooper Energy identified the estimated waste types associated with an Oily 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.

Table 7-15 Estimated Waste Types and Volumes from a BMG Vessel Collision Event

Response Technique	Waste Type	Waste Volume (m3)
Shoreline Clean-up – decontamination stations	Wastewater	1 m^3 per unit (1 bird = 1 unit)
	Personal Protective Equipment	5 kg per unit

The feasibility / effectiveness of an oiled wildlife response is provided in Table 7-16.

Table 7-16 Feasibility/Effectiveness of Shoreline Assessment and Clean-up Response

Parameter	Oiled Wildlife Response
Suitability/Functionality How does the response strategy perform to achieve its required risk reduction?	The oiled wildlife response may lead to the survival of vulnerable wildlife populations. The level of oiled wildlife response 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.
Dependencies Does the response strategy rely on other systems to perform its intended function?	Operational effectiveness of the oiled wildlife response 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 oiled wildlife response, with Cooper energy providing labour and resources as requested by the controlling agency.	State agencies lead the oiled wildlife response, providing trained personnel, technical expertise and instruction to Cooper 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 indicates that the largest volume of hydrocarbons ashore was 64.8 m^3 with the maximum length of shoreline exposed to hydrocarbons above impact thresholds 6.0 km. Any oiled wildlife response 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 the EIA / ERA for OWR activities.

Table 7-18 Shoreline Assessment and Clean-up EIA/ERA

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 concerns were raised during Relevant Person consultation regarding this activity or its potential impacts and risks. As such, Cooper Energy believes ALARP Decision Context A should apply.
Control Measure	**Source of good practice control measures**
Maintain Oiled Wildlife Response capability	BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004). Cooper 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. Cooper 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) • OPGGS Act 2010 (Victoria) • EPBC Act 1999 and EPBC Regulations 2000 • 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 2014). • State Maritime Emergencies (non-search and rescue) Subplan (State of Victoria (Department of Transport) 2021).
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 OWR strategies. As such, Cooper Energy considers that there is broad acceptance of the impacts associated with the activity.
Environmental Performance	
The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of OWR activities are shown in Table 11-3 of the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).	

8.0 Environmental Performance Outcomes, Standards and Measurement Criteria

This section summarises the EPOs, standards, and measurement criteria that have been developed as part of a systematic approach to the management of environmental risks as identified in Section 6.0. The EPOs, standards and 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.

Table 8-1 Environmental Performance Outcomes, Standards and Measurement Criteria (BMG Closure Project (Phase 2) activities)

EPO	Control	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 Cooper 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 Cooper Energy infrastructure tracking system.	Project Manager
	C4: Sediment sampling and management actions	Cooper Energy will collect sediment samples within the BMG Field, as described in Section 9.13.2, and have them analysed prior to Title relinquishment. Management actions will be applied according to the Sampling Program Decision Process (Section 9.13.2)	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. 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).	Bunker receipts SEEMP records Certification documentation	Vessel Master
		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	Certification documentation	Vessel Master

EPO	Control	EPS	Measurement Criteria	Responsible Person
		• 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.		
		Waste handled according to vessel waste management plan. Waste with potential to be windblown stored in covered containers. Waste lost overboard is recorded and recovered if possible.	Garbage record book Incident report	Vessel Master
	C7: Garbage Management Plan	Vessels will have a garbage management plan in place.	Garbage record book	Vessel Master OIM
	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: COE Offshore Chemical Assessment Procedure (CMS-EN-PCD-0004).	Project chemicals will meet the requirements of the Cooper Energy Offshore Chemical Assessment Procedure.	Completed and approved chemical assessment	Project Manager
	C10: EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans	Vessels adhere to the distances and vessel management practices of EPBC Regulations (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 and recovery procedures	Unconventional lifts managed under contractors lifting plans 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
	C29: All wellheads and the manifold pile will be cut below sea-level	The wellheads and manifold pile will be cut at least ~1 m below the seabed	Project Procedures Project execution reports	Project Manager

EPO	Control	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. **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 2000 - Part 8 Division 8.1 interacting with cetaceans	Vessels adhere to the distances and vessel management practices of EPBC Regulations (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 9.10. Timing: where DP vessel activity coincides with blue whale season	Noise modelling report Vessel noise characterisation review	Project Manager
	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
EPO7: Undertake the activity in a manner that will not interfere with other	C14: Marine exclusion and caution zones	A permanent PSZ shall be maintained for the BMG subsea infrastructure until PSZ adjustment/revocation is agreed with Relevant Persons and administrators.	PSZ gazetted notice	Operations Manager

EPO	Control	EPS	Measurement Criteria	Responsible Person
marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted.		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 four working weeks before operations commence to enable Notices to Mariners to be published.	Email records	Project Manager
		AMSA's JRCC will be notified 24–48 hours before operations commence to enable AMSA to distribute an AUSCOAST warning. AMSA JRCC will also be notified if the vessel moves out of the area that the broadcast is issued for.	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 as per Section 10.0 Consultation.	Notification records	Project Manager
	C19: Fisheries Damage Protocol	Fisheries Damage Protocol in place until VIC/RL13 is relinquished, to provide a compensation mechanism to fishers should they damage fishing equipment on BMG Property outside of established PSZs	Fisheries Damages Protocol	General Manager Projects and Operations
	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 Cooper 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 Cooper Energy; the fisheries damages protocol shall be applied. • Cooper 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 / OIM

EPO	Control	EPS	Measurement Criteria	Responsible Person
	C7: Garbage Management Plan	Vessels will have a garbage management plan in place.	Garbage record book	Vessel Master OIM
	C11: Equipment deployment and recovery procedures.	Equipment will be deployed and recovered in line with the Operations Program and Cooper Energy Management System (including well engineering management).	Daily activity report	Activity Superintendent
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 four working weeks before operations commence to enable Notices to Mariners to be published.	Email records confirm a Notice to Mariners was provided to the AHS via email hydro.ntm@defence.gov.au and that such notice was provided at least four weeks before operations commenced	Project Manager
		AMSA's JRCC will be notified 24–48 hours before operations commence to enable AMSA to distribute an AUSCOAST warning. AMSA JRCC will also be notified if the vessel moves out of the area that the broadcast is issued for.	Email records confirm that information to distribute an AUSCOAST warning was provided to the JRCC via email rccaus@amsa.gov.au	OIM / Vessel Master
		Relevant Persons will be notified of activities prior to operations commencing as agreed during consultation.	Stakeholder log/records confirm that pre-start notices were sent to all Relevant Persons	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
	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	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.	Vessel SMPEP Vessel exercise schedule Vessel inspection	Vessel Master

EPO	Control	EPS	Measurement Criteria	Responsible Person
	(i.e., SMPEP or equivalent)	Spill response kits are located in high spill risk areas and routinely checked to ensure adequate.		
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)
	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
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 Implementation Strategy

Cooper Energy retains full and ultimate responsibility as the Titleholder of the activity and is responsible for ensuring that the activity is undertaken in accordance with this EP.

Regulation 14 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 Cooper Energy Management System (CEMS).

9.1 Cooper Energy Management System

The CEMS consolidates all of Cooper Energy's business processes into one system of management. The system covers every aspect of Cooper Energy's business including Risk, Health, Safety, Environment and Community, Operations, Well Construction, Engineering, Finance, etc.) in accordance with a set of core concepts detailed in Table 9-1.

The CEMS document hierarchy is shown in Figure 9-1, the Cooper Energy's HSEC Policy is shown in Figure 9-2, and the CEMS standards list in Table 9-2.

Table 9-1 CEMS 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 9-1 CEMS Document Hierarchy

Table 9-2 CEMS Standards

CEMS 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

Cooper Energy | HSEC | Policy

This policy describes our approach to managing Health, Safety and Environmental risks at Cooper Energy

Our Commitment

Cooper 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: 13 July 2023 Review Date: 13 July 2026

Figure 9-2 Cooper Energy Health, Safety, Environment and Community Policy

9.2 Asset Integrity Management

The existing Gippsland Operations EP provides for the NPP of the BMG fields, including integrity maintenance. The BMG Facilities IMP (BMG-IT-IMP-0001) describes how Cooper 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 CP 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.

As described in Section 3.5, the property maintenance provisions included within this EP will supplant provisions within the Gippsland Operations EP from 2024 upon acceptance of the revised Gippsland Operations EP.

9.3 Contractor Management System

The Supply Chain and Procurement Management Standard (MS11) details Cooper 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 Cooper Energy's expectations.

The Standard applies to sub-contractors, Third Party Contractors (TPCs) and suppliers conducting work at Cooper Energy sites or providing services to Cooper Energy.

The Standard addresses operational HSEC performance of all contractors while working under a Cooper Energy contract or in an area of Cooper 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 Cooper Energy approved HSE Management System that meets regulatory requirements and ensures compliance with this EP.

Cooper Energy will undertake an on-hire audit of the relevant vessel against EP requirements. Cooper Energy shall also provide Contractors with this EP and EP commitments register, inclusive of the EPOs and EPSs established in this plan. This is one of a number of means to ensure Contractors are aware of, and comply with, EP requirements.

9.4 Roles and Responsibilities

As required by Regulation 14(4) of the OPGGS(E)R, this section outlines the chain of command and roles and responsibilities of personnel in relation to the implementation, management and review of this EP.

The emergency response structure for the Activity is detailed in the BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004). The chain of command for the Activity is shown in Figure 9-3 with the roles and responsibilities of personnel in relation to the implementation, management and review of this EP detailed in Table 9-3.

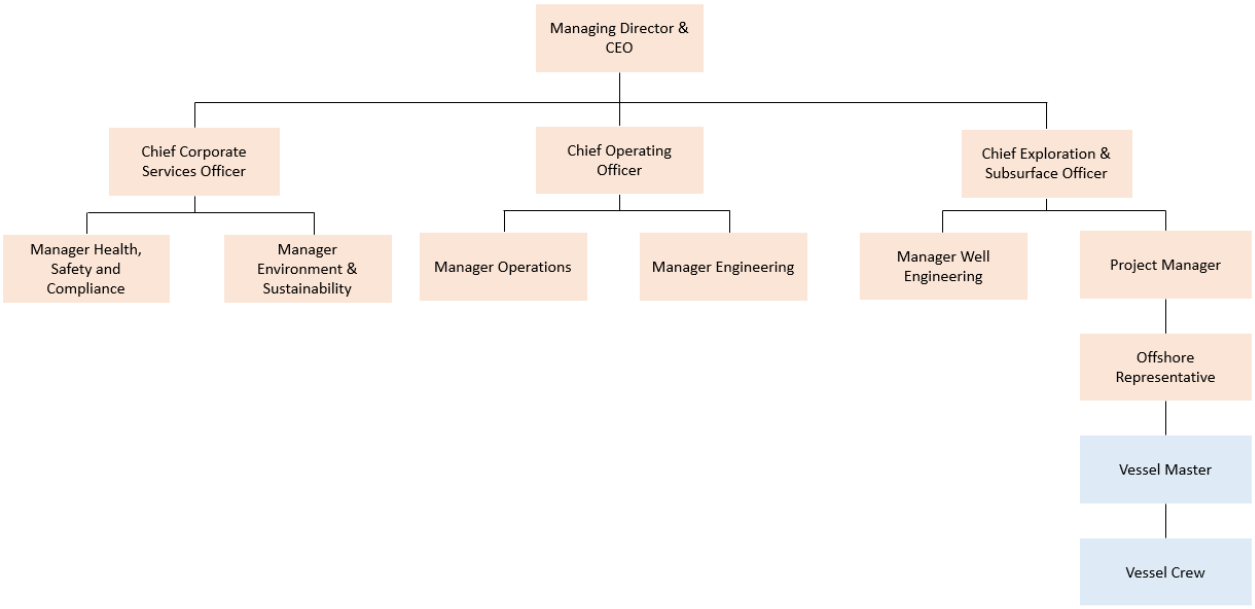


Table 9-3 Cooper Energy Environment Plan Roles and Responsibilities

Role	Environment Plan Responsibility
Cooper Energy	
Managing Director	The Managing Director is accountable for ensuring a framework has been established through which the Management System requirements will be met
Chief Operating Officer	Ensures: • Compliance with the Cooper Energy HSEC Policy and Management System. • 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.
Manager Operations	Ensures: • compliance with the Cooper Energy HSEC Policy • compliance with this EP and controls implemented • contractor prequalification and qualification processes are undertaken (Section 9.3) • personnel are inducted into this EP requirements and are aware of their environmental responsibilities (Section 9.5.1) • response arrangements in the OPEP are in place and tested (Section 9.6.2) • environmentally relevant changes are assessed and approved by Cooper Energy (Section 9.11.2) • environmental incidents are reported internally and externally, and investigations are undertaken (Section 9.12) • inspections and audits are undertaken (Section 9.13.6)

Role	Environment Plan Responsibility
	• actions from environmental audits and incidents are tracked to completion (Section 9.13.6.1) • Relevant Person engagement is undertaken (Section 10.0).
Chief Exploration, Subsurface Officer	Ensures: • Compliance with the Cooper Energy HSEC Policy and Management System. • 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.
Project Manager	Ensures: • compliance with the Cooper Energy HSEC 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 9.3) • personnel are inducted into this EP requirements and are aware of their environmental responsibilities (Section 9.5.1) • response arrangements in the OPEP are in place and tested prior to the survey commencing (Section 9.6.2) • environmentally relevant changes are assessed and approved by Cooper Energy (Section 9.11.2) • environmental incidents are reported internally and externally, and investigations undertaken (Section 9.12) • inspections and audits undertaken (Section 9.13.6) • actions from environmental audits and incidents are tracked to completion (Section 9.13.6.1) • Relevant Person activity pre-start and cessation notifications undertaken (Section 10.0) • annual progress reporting in accordance with General Direction 824.
Offshore Representative	Ensures: • compliance with relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP • inductions completed, and record of attendance maintained (Section 9.5) • chemicals that have the potential to be discharged to the marine environment are assessed and approved using the Cooper Energy's Offshore Chemical Assessment Procedure (CMS-IM-PCD-0002) (Section 9.7) • environmentally relevant changes are assessed and approved by Cooper Energy (Section 8.8) • incidents reported to the Cooper Energy Project Manager (Section 9.12) • monitoring and other records (Section 9.13) are collated and provided to the Cooper Energy Project Manager on completion of the program • ensure HSEC inspections undertaken throughout the offshore activity to ensure ongoing compliance with the EP requirements (Section 9.13.4) • corrective actions identified from incidents or inspections are implemented (Section 9.13.7).
Environment & Sustainability Manager	Ensures: • Identify and communicate relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP and OPEP to the Operations Manager, Project Manager and Offshore Representative • develop the environmental component of inductions (Section 9.5.3) • maintain and test oil spill response arrangements (Section 9.6.2) • assess any environmentally relevant changes (Section 9.11.2) • review any non-conformances relevant to environment performance to ensure corrective actions are appropriate to prevent recurrence (Section 9.13.7) • prepare and submit environmental incident reports and performance reports to regulators (Section9.12 and 9.13).
Manager Health, Safety and Compliance	Ensures: • Response arrangements in the OPEP are in place and tested. Coordinates: • Cooper Energy's approach to Emergency Response and Preparedness including oil spills. • Emergency Response Training and Competency.

Role	Environment Plan Responsibility
Contractors	
Vessel Master	Ensure compliance with relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP.
Vessel Crew	Ensure compliance with relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP.

9.5 Training and Competency

Regulation 14(5) 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.

9.5.1 Cooper Energy Personnel

Cooper 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.

9.5.2 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.

9.5.3 Environmental Induction

Cooper 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 9-4. Records of personnel that complete the induction will be maintained internally in accordance with MS06 Information and Systems Management.

Table 9-4 Environmental components to be included in Environmental Inductions

Component	Onshore personnel	Offshore personnel
Description of the environmental sensitivities and conservation values of the operations area and surrounding waters.	✓	✓
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.	✓	✓

9.6 Emergency Response

9.6.1 General Response

Cooper Energy manages emergencies from offshore Victoria activities in accordance with the Cooper Incident Management Plan (COE-ER-ERP-0001). The purpose of the Incident Management Plan is to provide the Cooper 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.

9.6.2 Oil Pollution Emergency Plan

In accordance Regulation 14(8) of the OPGGS(E)R the implementation strategy must include an Oil Pollution Emergency Plan (OPEP) / Emergency Response Plan (ERP), and arrangements for testing the response arrangements within these plans.

The BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004) and Offshore Victoria OSMP (VIC-ER-EMP-0002) provide for oil spill response and monitoring arrangements for this activity. These documents were submitted and approved with the BMG Closure Project (Phase 1) EP[12].

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.

As part of the planning process for the BMG decommissioning program, Cooper Energy and AMOSC completed a capability needs analysis (Figure 9-4), with a focus on the Incident Management Team (IMT), Forward Operating Base and Field Team capacity and capability required to respond to a worse-case scenario during the BMG Closure Project (Phase 1). The capability requirements for the events detailed in this EP are smaller than those associated with BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004). Once Phase 1 activities are complete, the required capability and response arrangements will need to be amended to be commensurate to the nature and scale of risks detailed in this EP. As such Cooper Energy will complete a new capability assessment following the process detailed in Figure 9-4. On completion, the capability and response arrangements will be reviewed, and paired back to be consistent with the outcomes of the new assessment.

[12] Available publicly at: https://info.nopsema.gov.au/activities/469/show_public

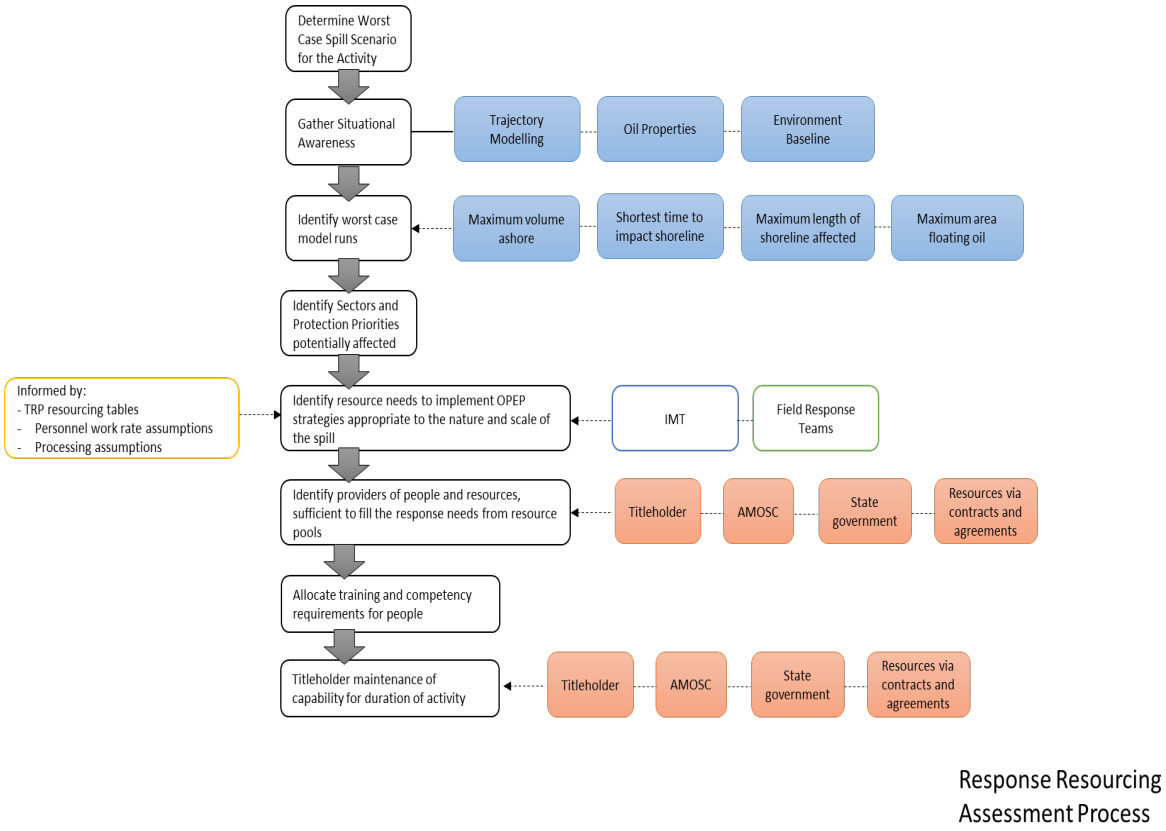


Figure 9-3: Response resource assessment Process

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 and Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009, along with NOPSEMA's guidance note (N-09000-GN1661) help titleholders to understand when a vessel is classed as a facility (or an associated place) or a vessel.

Based upon this information, Cooper 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 Cooper 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 BMG Closure Project (Phase 1) OPEP (BMG-ER-EMP-0004).

9.7 Chemical Assessment and Selection

Cooper Energy's Offshore Chemical Assessment Procedure (CMS-EN-PCD-0004) requires that project chemicals 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 the lowest toxicity, most biodegradable and least accumulative chemicals are selected which meet the technical requirements.

A summary of the evaluation process is detailed in Table 9-5.

Table 9-5 Cooper Energy Environment Plan Roles and Responsibilities

Step	Evaluation	Input	Outcome
1	Characterise proposed chemical.	Confirm the following: • chemical name & supplier • chemical function/ purpose • formulation, where available • CAS number, where available • eco toxicity, where available • estimated use, dosage and discharge.	Proceed to **Step 2.**
2	Determine whether the chemical proposed is to be discharged to the marine environment.	Refer to EP to determine proximity to priority sensitivities.	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	Determine whether the chemical proposed is on the 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	Use the OCNS Definitive Ranked Lists of Registered Substances to determine the risk banding.	Search the OCNS Definitive Ranked Lists of Registered Substances for the product name or equivalent branding. Always use the latest version.	Is the HQ Band “Gold” or “Silver,” or OCNS Group “E” or “D”? If yes go to **Step 5**. Where the chemical is not listed go to **Step 6.**
5	Determine whether the chemical has a substitution or product warning.	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.**
6	Assess the Ecotoxicity.	LC50 or EC50 concentrations for representative species; Octanol-water partition coefficient (Log Pow); and Biodegradation information (% biodegradation in 28 days).	Requires a Hazard Assessment and ALARP justification where: • toxicity = LC50 <100 mg/L or EC50 <100 mg/L • bioaccumulate = Log Pow >3 • biodegradability <20%
7	Consider an alternative or complete ALARP justification.	Technical justification required to proceed with selected chemical.	Where there is no technical justification for the chemical, it is not accepted for use. Where there is a technical justification, the A Technical note on the Chemical Selection. ALARP Justification must be prepared by the Environment Advisor and approved by the Project Manager.

9.8 Waste Management and Disposal

Cooper 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 9-5).

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 9.3). 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. Activity assurance is described in Section 9.13.6.

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 Cooper Energy against the plan, including of contractors, as described in Section 9.13.6.3..

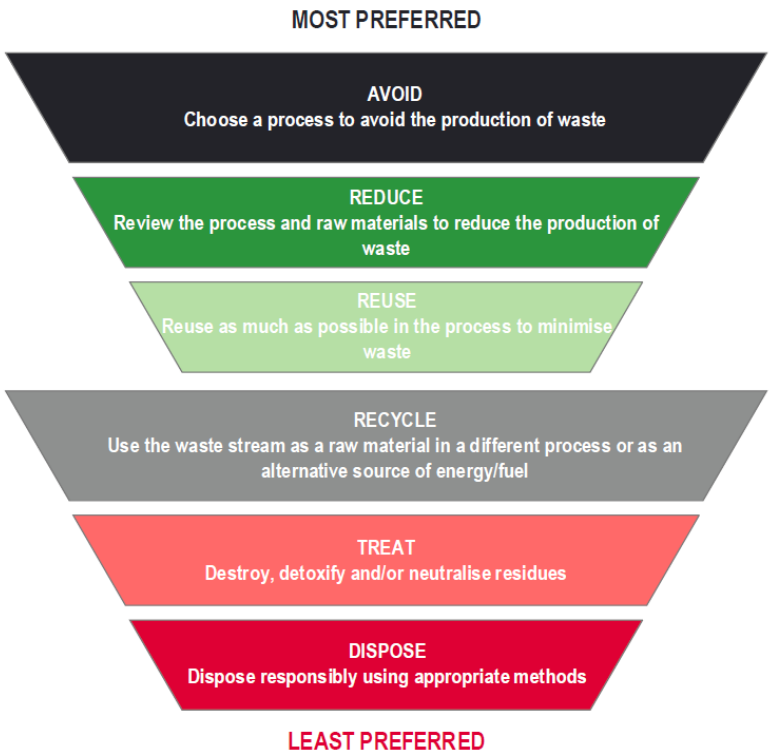


Figure 9-4 Waste Management Hierarchy

9.8.1 Preliminary inventory of recovered materials

Based on the equipment being recovered, Table 9-6 outlines the types and estimated quantities of materials expected to be processed onshore. In 2021 Cooper 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, Cooper 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, Cooper 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 9-6 Preliminary Inventory of recovered materials, treatment and destination targets

Material	Approximate quantities	Assumptions	Estimated Treatment	Anticipated material destinations
Steel (various grades)	470 tonnes	-	100% repurposed or recycled	Repurpose within industry or construction (AU or international) Recycle markets (AU)
Mixed Steel and Polymer (various grades)	1,400 tonnes	-	>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)

**some or all structures, jumpers and flying leads may be recovered in Phase 1 but are also included within the Phase 2 EP as a contingency.*

**All quantities are approximate estimates based on Cooper 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.*

9.8.2 Contingency contamination provisions

To date, there has been no evidence to suggest any of the waste generated from decommissioning activities would comprise Naturally Occurring Radioactive Substances (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, see Appendix A) 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 oil can vary widely between fields and regions, generally between 0.1 ppb and 1,000 ppb, and has the potential to accumulate over time inside production equipment; deposits of mercury can begin to vaporise at low temperatures (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 (<0.05mg/m^3) (Petrolab, Basker-2 Final Well Report - Petrolab Reservoir Fluid study A-25013 2006a).Testing of BMG condensate indicated levels between 10 ppb and 30 ppb across the field (Petrolab 2006b).

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

9.9 Invasive Marine Species Risk Assessment

Cooper Energy's Invasive Marine Species Risk Management Protocol (CMS-EN-PRO-0002) was developed to integrate Australian IMS prevention efforts into Cooper Energy's offshore operations. 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 Cooper Energy Operational Area (as defined under the EP for the activity). The procedure incorporates key considerations from IMO (IMO 2011) and Australian Government (2018) biofouling guidelines; the inputs, decision points and general flow of the of IMS risk management actions are shown in Figure 9-6.

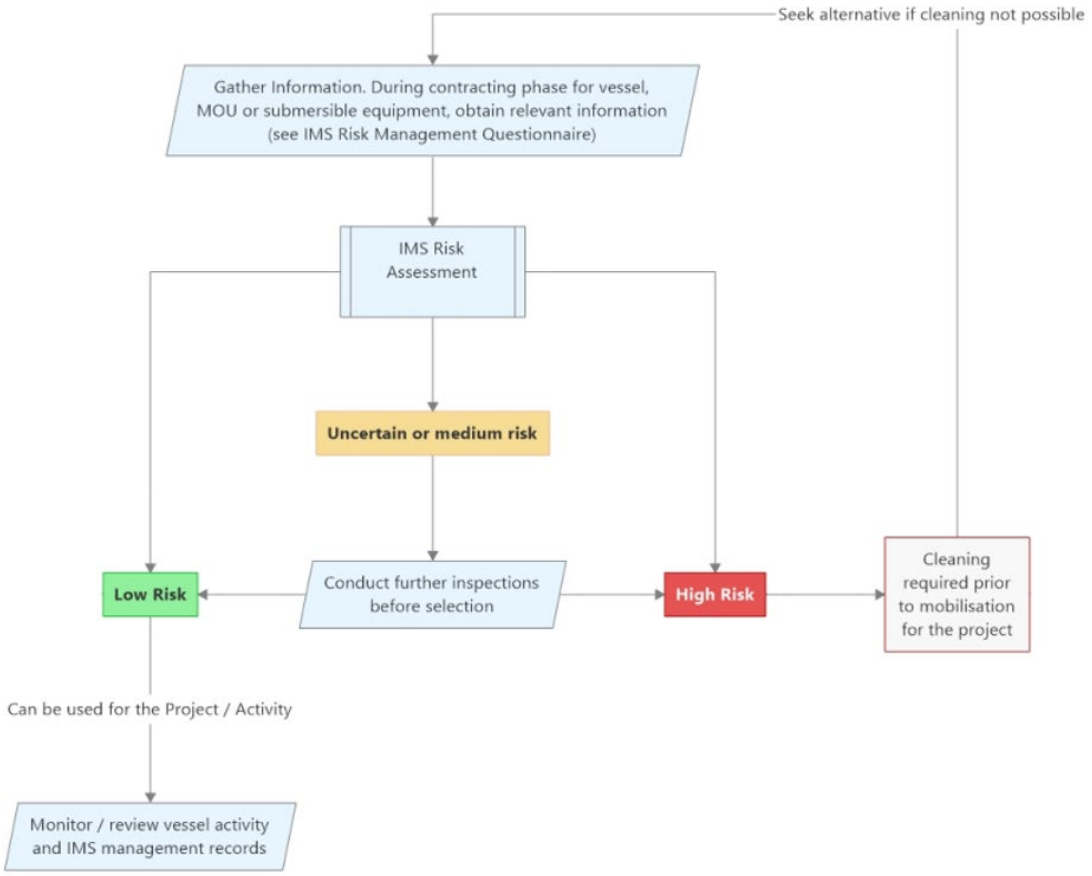


Figure 9-5 Cooper Energy IMS Risk Management Flow

9.10 Marine Mammal Adaptive Management Measures

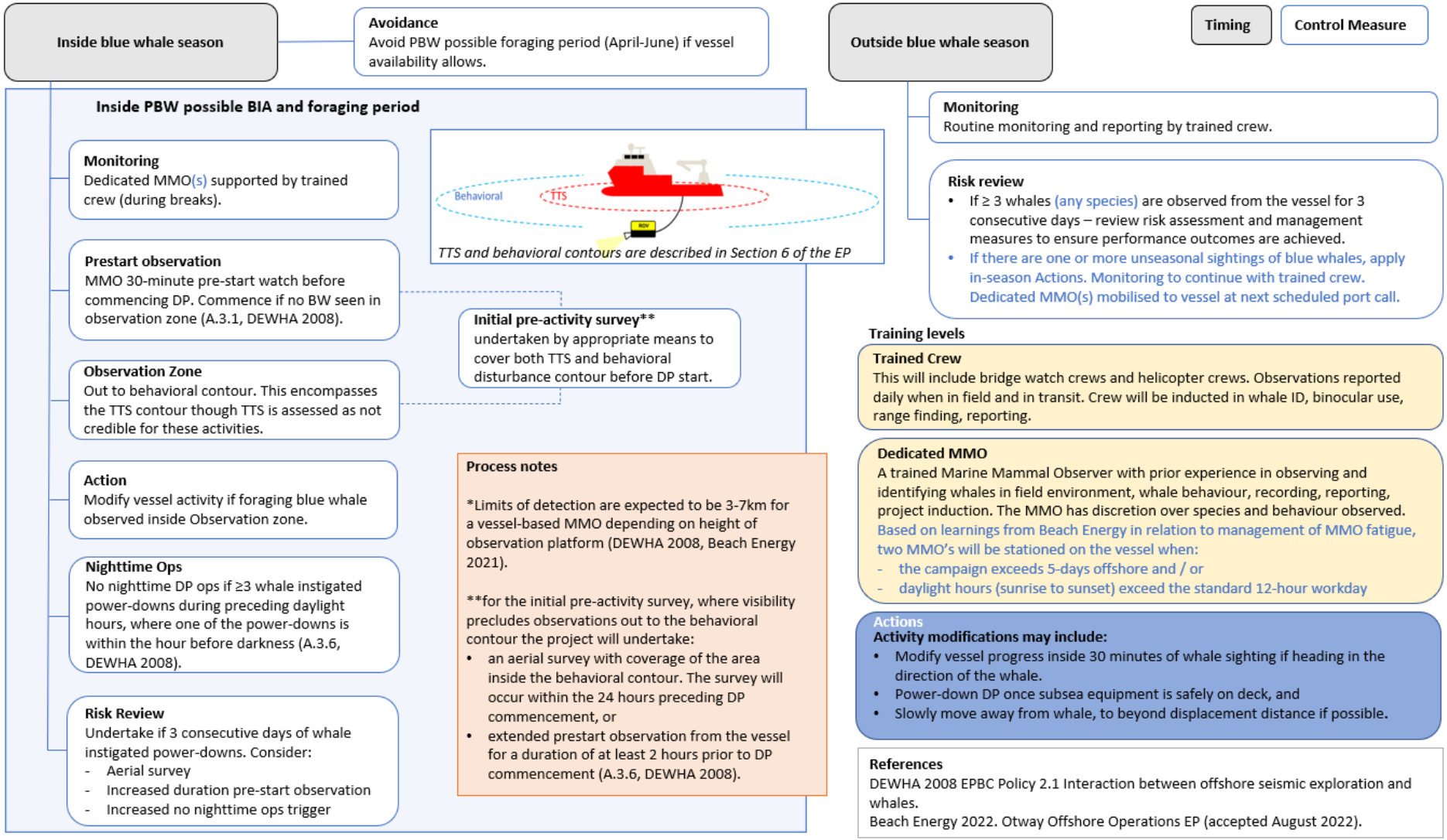


Figure 9-6 Marine Mammal Adaptive Management Measures

9.11 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. 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, and any changes to protective matter requirements
- changes to the requirements of an existing external approval (e.g., changes to conditions of environmental licences)
- new information or changes in information from research, Relevant Persons, legal and other requirements, and any other sources used to inform the EP
- changes or updates identified from incident investigations, emergency response activities or emergency response exercises.

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.

9.11.1 Changes to Titleholders and Nominated Liaison Person

Section 1.6 details the titleholders, survey nominated liaison person and contact details for both. Any change in these details is required to be notified to NOPSEMA as soon as possible.

9.11.2 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.

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 17(5) 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.

9.12 Incident Reporting and Recording

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), Cooper 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 Cooper Energy senior management and the Cooper Energy Board
- methodology for determining root cause
- responsible persons to undertake investigation
- classification and analysis of incidents.

Notification and reporting requirements for environmental incidents to external agencies are listed Table 9-7. Notification and reporting requirements for oil spills (Level 2/3) are detailed in the OPEP.

Table 9-7 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 DEECA -reports@ecodev.vic.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. •	**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.	**Commonwealth Waters** Within 3 days of notification of the incident	**Verbal:** NOPSEMA – Phone 1300 674 472 **Written Notification:** NOPSEMA - submissions@nopsema.gov.au NOPTA – reporting @nopta.gov.au
		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 • the action that has been taken or is proposed to be taken to prevent a similar incident occurring in the future.	**Commonwealth Waters** Within 3 days of notification of the incident	NOPSEMA - submissions@nopsema.gov.au
		Written reports to be submitted to National Offshore Petroleum Titles Administrator (NOPTA).	Within 7 days of written report submission to NOPSEMA	NOPTA – reporting @nopta.gov.au
Reportable incident - in the event an AMP		Notification must be provided to the Director of National Parks and include: • titleholder details	As soon as possible	Marine Park Compliance Duty Officer – 0419 293 465

Incident Type	Description	Requirement	Timing	Contact
may be exposed to hydrocarbons		• 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.		
Reportable Incident – Invasive Marine Species		Suspected or confirmed Invasive Marine Species Introduction.	Within 24 hours of suspected or confirmed marine pest detections.	DEECA on 136 186 or marine.pests@ecodev.vic.gov.au or marine.pests@agriculture.vic.gov.au DAFF: ccimpe@aff.gov.au
Reportable Incident - Injury or Death to Fauna		Incidents of injury or death to native fauna including whales and dolphins. https://www.wildlife.vic.gov.au/wildlife-emergencies/whale-and-dolphin-emergencies https://www.zoo.org.au/fighting-extinction/marine-response-unit/	As soon as possible	DEECA Whale & Dolphin Emergency Hotline - 1300 136 017. Seals, Penguins or Marine Turtles Zoo Victoria Marine Response Unit – 1300 245 678.
		Impacts to MNES, specifically injury to or death of EPBC Act-listed species. https://www.environment.gov.au/biodiversity/threatened/listed-species-and-ecological-communities-notification	Within 7 days	DCCEEW Phone: +61 2 6274 1111 Email: EPBC.Permits@environment.gov.au
		Vessel strike with cetacean.	Within 72 hours of incident.	DCCEEW – National Ship Strike Database https://data.marinemammals.gov.au/report/shipstrike
Reportable Event		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	UnderwaterHeritage@awe.gov.au

9.13 Environmental Performance Monitoring and Reporting

This section details the specific measures Cooper 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
- control measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and an acceptable level
- environmental performance outcomes and standards set out in the EP are being met.

9.13.1 Emissions and Discharges

Emissions and discharge monitoring and records required for operations and vessel-based activities are detailed in Table 9-8. Copies of emission and discharge records will be retained in accordance with the MS06 Information and Systems Management.

Table 9-8 Discharge and Emission Monitoring

Aspect	Monitoring	Frequency	Reporting
Offshore Activity			
Treated bilge	• volume • location • vessel speed	As required	Oil Record Book
Food scraps	• volume • location	As required	Garbage Record Book
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
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

9.13.2 Infield Sediment Sampling

Cooper 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. As an example, sites may include:

- at the historical location for the FPSO
- at Drill Center A
- at a reference site away from the facility footprint.

Sampling at the FPSO and Drill Centre A 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 Drill Centre A), 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 9-9 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 9-8 describes the sampling program decision process.

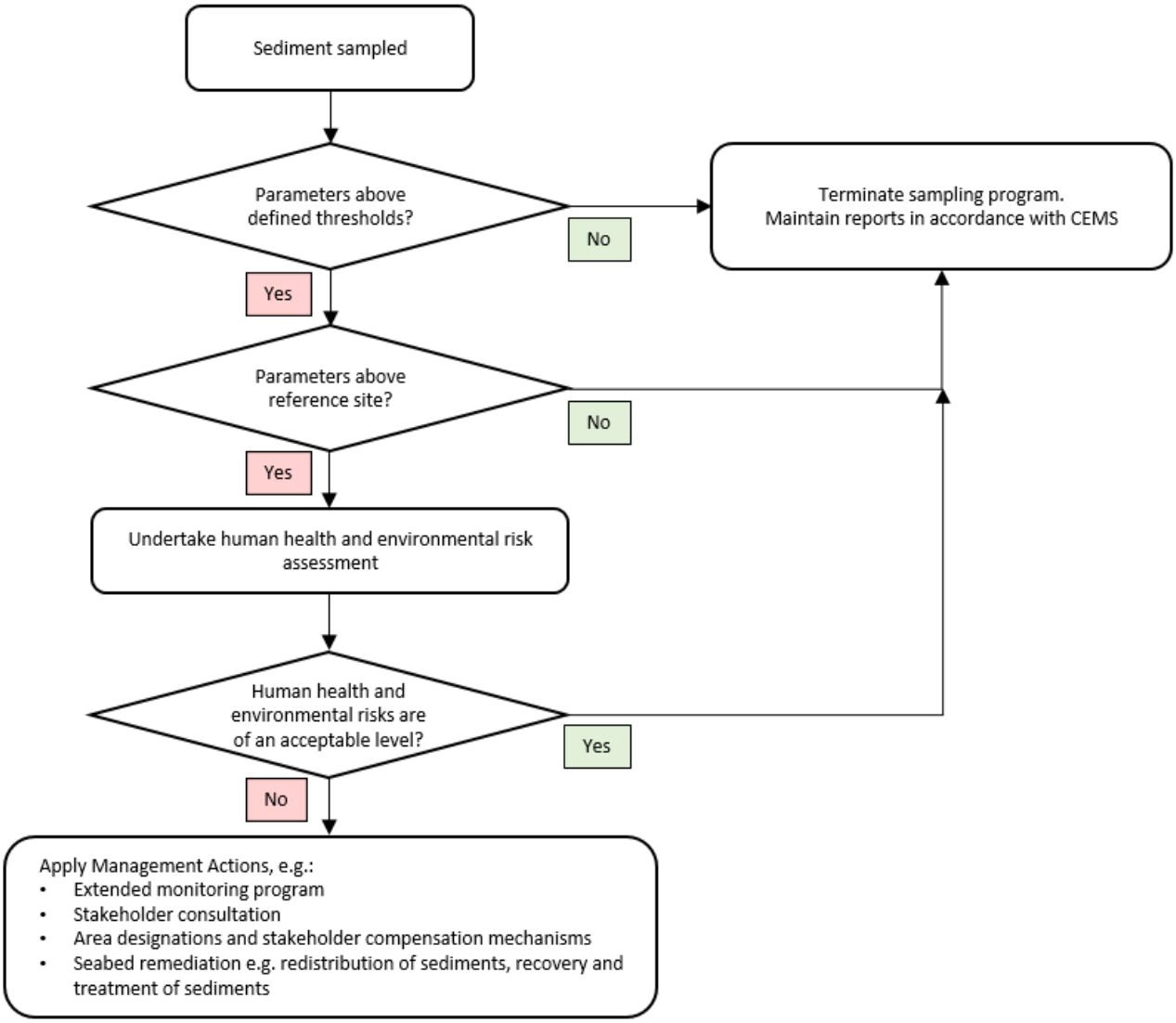


Figure 9-7: Sampling Program decision process

Table 9-9 Sediment Analytes and thresholds

Analyte	Threshold	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.	Australian and New Zealand guideline values for sediment quality

Analyte	Threshold	Brief Description	Reference
		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 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 during equipment deconstruction and 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)
NORMS*	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 2017)
Mercury*	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		

* 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.

NOTE: New threshold values may be adopted where published in Government Guidelines or Scientific (peer-reviewed) Journal

9.13.3 Activity Commencement and Cessation Notifications

Activity notification requirements are detailed in Section 10.5.

9.13.4 Reporting Environmental Performance

Annual Reporting will comprise annual progress report on decommissioning program progress, and annual environment performance report of compliance with EP performance outcomes and standards. Should multiple EPs cover the same phase of the BMG facilities (e.g., NPP and decommissioning) in the reported period, a single annual report will be submitted addressing all commitments undertaken.

9.13.4.1 Annual Progress Report (Direction 824)

In accordance with Direction 6 of General Direction 824, Cooper Energy will:

a. 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
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).

9.13.4.2 Activity Environmental Performance Report

As required by Regulation 26C of the OPGGS(E)R (Commonwealth), Cooper 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 the Regulator to determine whether the environmental performance outcomes and standards in the EP have been met in relation to the decommissioning.

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.

9.13.5 Cetacean Reporting

Cetacean observation data will be submitted to DCCEEW Marine Mammal Centre, 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.

9.13.6 Audit and Inspections

Environmental performance of offshore operations and activities will be audited and reviewed in several ways to ensure that:

- environmental performance standards 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 environmental performance standards outlined in this EP will be managed as per Section 8.0.

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.

9.13.6.1 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 performance outcomes and performance standards 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.

9.13.6.2 Offshore Activities

The following arrangements review the environmental performance of offshore vessel activities:

- a premobilisation inspection will be undertaken for offshore CSV / vessels to ensure they will meet the requirements of the EP
- HSEC inspections will be undertaken throughout the offshore activity on a weekly basis to ensure ongoing compliance with relevant EP requirements. The scope of the inspections will include (but is not limited to):
  - spill readiness (i.e., provision spill kits and drills in accordance with vessel SOPEP/SMPEP)
  - waste management in accordance with EP, EPO and EPSs

- chemical inventory checks to ensure campaign chemicals are accepted via the COE 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 managed per Section 9.13.7.

9.13.6.3 Onshore waste management activities

Cooper 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 9.13.7.

9.13.7 Management of Non-conformance

In response to any EP and environmental audits and inspections 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 Cooper 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.

Cooper 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.

9.14 Records Management

In accordance with the Regulation 27 of the OPGGS(E)R, Cooper Energy will store and maintain documents or records relevant to the EP in accordance with the Document and Records Management Procedure (CMS-IM-PCD-0002).

10.0 Consultation

The OPGGS(E)R require that titleholders:

> *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.*

where a 'relevant person' is:

> *A person or organisation whose functions, interests or activities may be affected by the petroleum activity.*

To meet these requirements, Cooper Energy has and will continue to undertake consultation with persons and organisations that have an interest in the BMG offshore decommissioning activities. This is done as part of the consultation cycle (Figure 10-1).

Figure 10-1 Consultation Cycle

Key learnings and consultation from previous Cooper Energy campaigns and ongoing activities offshore Victoria have been considered for the current campaign, where relevant.

The principal objectives of the Cooper Energy consultation strategy are:

- Confirm existing Relevant Persons;
- Identify whether there are additional Relevant Persons to those identified with regard to previously accepted Otway activities and previous consultation undertaken;
- Initiate and maintain open communications between stakeholders and Cooper Energy relevant to their interests;
- Proactively work with stakeholders on recommended strategies to minimise negative impacts and maximise positive impacts of all activities; and
- Provide for ongoing consultation that reflects the requirements of stakeholders and the activity schedule.

Cooper Energy has maintained records of consultation and tracks commitments made through to closure.

10.1 Scoping – Identification of Relevant Persons

Cooper Energy has undertaken consultation activities in relation to the Gippsland activities and specifically in relation to the Gippsland offshore facilities since the initial stages of development, or since they were acquired from the previous operators. Cooper Energy has continued to consult in relation to its ongoing activities and in doing so has developed a good understanding of issues and areas of interest of Relevant Persons.

Consultation from previous Cooper Energy campaigns and ongoing activities offshore Victoria informed Cooper Energy's initial list of Relevant Persons. The approach to identifying relevant persons was recently broadened in response to recent applicable Case Law and NOPSEMA guidelines A900179.

In seeking relevant persons, Cooper Energy avoided applying screening mechanisms. In doing so, Cooper Energy undertook both targeted and passive campaigns to identify and consult with relevant persons. The targeted approach involved searching for relevant persons with search efforts focussed on the Gippsland Environment Sector (see Appendix 2 for definition of Environment Sectors). This sector encompasses the activities and therefore would include the persons more likely to be directly affected by those activities. This environment sector also captures those areas that might be more significantly and more likely affected by a worst-case spill scenario, considering potential timing of shoreline impact and levels of hydrocarbons that could impact shorelines, and probability of impact in the unlikely event of a major spill.

The Gippsland Environment Sector was not used as a limiter to consultation, noting direct and indirect impacts are not limited to spill risks, nor only physical values and sensitivities, but also potential spiritual and intangible values. For those engaged outside the Gippsland Environment sector, sufficient information and time were still provided, but a lesser effort was made in seeking engagement in line with nature and scale of potential impacts and risks outside the sector.

The steps taken by Cooper Energy include:

- reviewing the receptors identified in the existing environment section, persons or groups linked to those receptors, and their functions interests and activities;
- reviewing existing Relevant Persons identified and contained within the Cooper Energy stakeholder register (offshore Gippsland);
- reviewing previous BMG and Gippsland asset campaign consultation records, including BMG development, cessation and non-production phases;
- discussing with existing Relevant Persons to identify potential new Relevant Persons or changes to Relevant Person contacts or consultation preferences;
- providing information, opportunities and time for persons to self-identify as relevant;
- reviewing Commonwealth and State fisheries jurisdictions and fishing effort in the region;
- reviewing and acting upon NOPSEMA guideline A705589 (20/01/2023) 'Consultation with Commonwealth agencies with responsibilities in the Commonwealth marine area guideline'.

Relevant Persons identified and contacted for this activity are listed in Table 10-2. A subset of these Relevant Persons may be relevant in the event of an oil spill, and these Relevant Persons are listed in Cooper Energy's Emergency Contacts register to prioritise consultation as appropriate and as coordinated with the relevant State Controller should they be activated.

10.1.1 Focussed and extended enquiry

Significant effort was made to contact Relevant Persons through multiple channels, with broad contact initiated early in 2023 via registered post to a large base case list of potentially Relevant Persons. This was followed up by emails, phone calls webforms and the media campaign. Multiple attempts were made to contact the key First Nations groups proximate to operations where the potential for impacts to interests was considered greater.

Based on nature and scale, and administrative maturity of Relevant Persons, not all Relevant Persons were followed up multiple times or with phone calls. For example, it was considered that large environmental Non-Government Organisations (eNGOs) and shire councils had mature processes where it was reasonable to assume email accounts were monitored. Effort to identify and contact persons or organisations who were distant from the activity, and therefore less likely to be impacted by the activity or an emergency was also generally less than those with the potential to be directly impacted by the activity. A non-response from those groups was reasonably construed to be an assessment of limited impact on their interests, and likely reflected the nature and scale of the activities under the EP.

Additional discussion is provided below on First Nations and Local Government administrative areas. These are broken out and mapped so as to show how their communities are represented within the Gippsland Environment sector (Figure 10-3 and Figure 10-4).

Additional opportunity to consult via self-identification as a relevant person was provided through extended enquiry via media. This extended enquiry covered the Gippsland Environment Sector and adjacent environment sectors, along with Melbourne and Sydney metropolitan papers. Some smaller Aboriginal organisations in the Gippsland environment sector were also contacted though they themselves were unlikely to be affected, but they may have been able to provide contacts for community members who might identify as Relevant Persons.

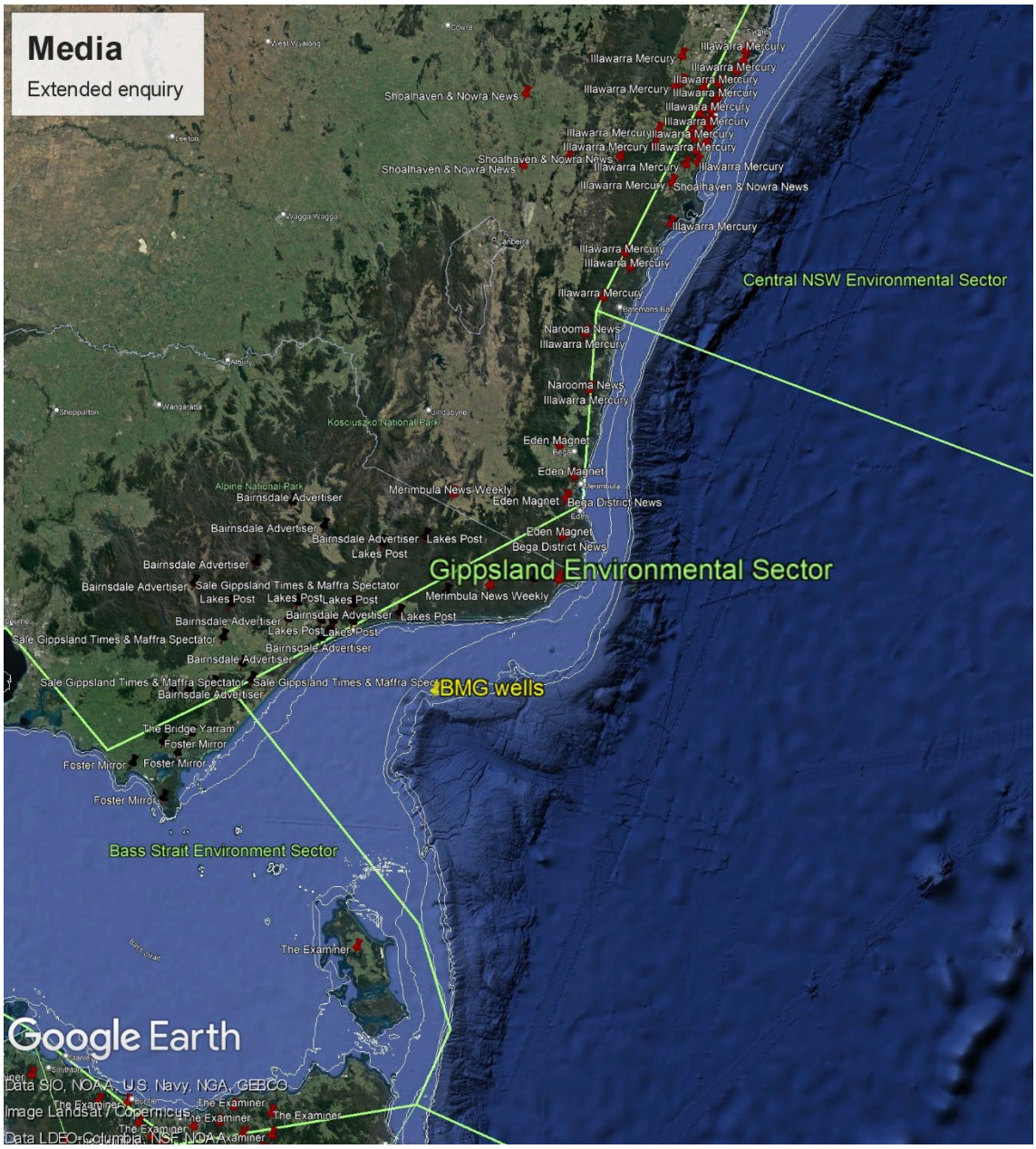


Figure 10-2 Map Showing Media Extended Enquiry Area within Gippsland Environment Sector

First Nations

In NSW 13 Local Aboriginal Land Councils (LALC) form the South Coast zone (Victoria border to Wollongong), and this zone almost entirely encompasses the South Coast People's Native Title land and sea claim area. These 13 LALCs provide a very good representation over the Native Title claim area.

The Constitution, Objects and Functions of the New South Wales Aboriginal Land Council (NSWALC) are set out in Part 7 of the Aboriginal Land Rights Act (1983). These essentially give NSWALC the mandate to provide for the development of land rights for Aboriginal people in NSW, in conjunction with a network of LALCs through (NSWALC n.d.):

- Land acquisition either by land claim or purchase
- Establishment of commercial enterprises and community benefit schemes to create a sustainable economic base for Aboriginal communities
- Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials within NSW).

During consultation with the South Coast Zone director, it was advised that within the legislated boundaries, each Local Aboriginal Land Council (LALC) was independent, with its own CEO and board. As such, the zone administration was not able to consult on the proposed activities within this EP, as each LALC would have its own independent views.

Cooper Energy endeavoured to meet each South Coast Zone LALC individually. To allow for efficiency, the zone administration facilitated a presentation during a South Coast Zone regional forum. Materials were thereafter distributed to individual LALCs and the opportunity to consult individually was provided.

In Victoria, the GunaiKurnai Land and Waters Aboriginal Corporation (GLaWAC) represents an area comprising the greater Gippsland region. During a meeting with GLaWAC senior management, it was confirmed that GLaWAC management could act on behalf of its members for the purposes of consultation on the proposed activities offshore Gippsland.

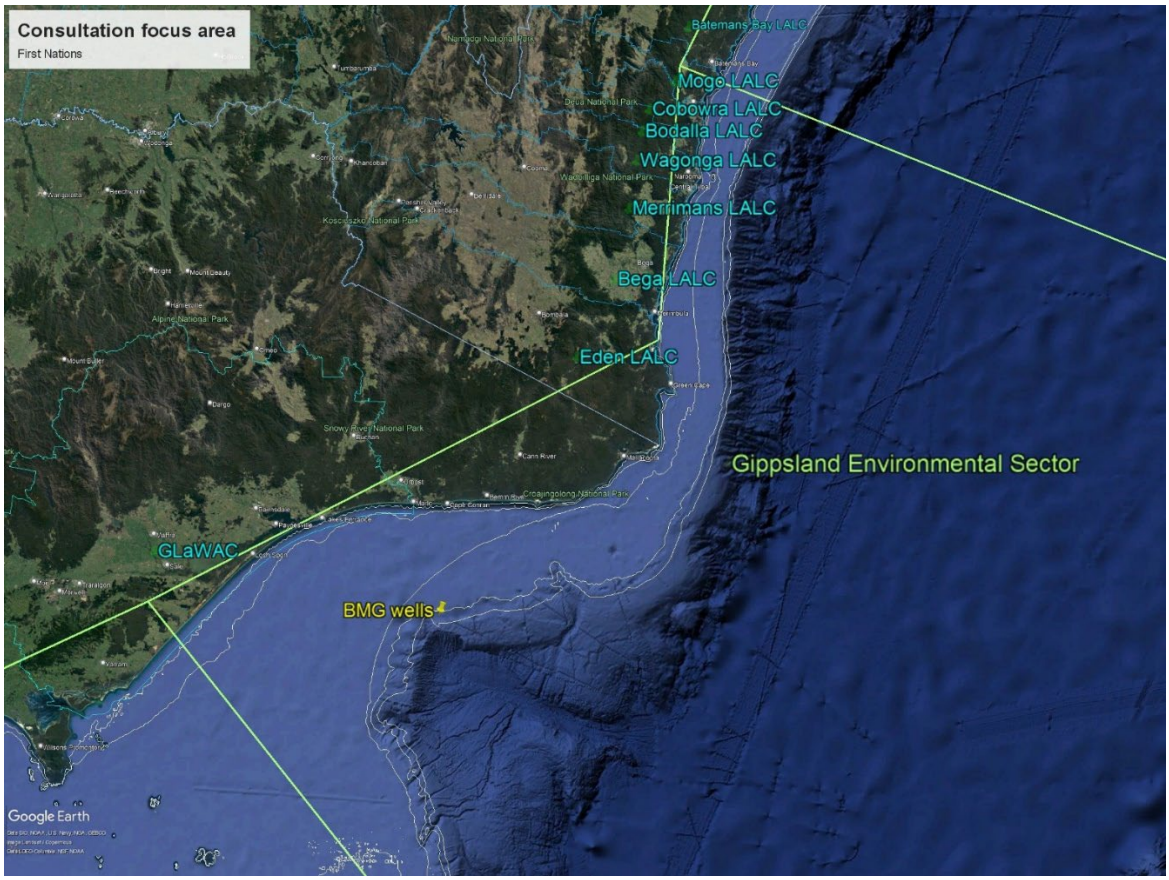


Figure 10-3 Map Showing LALC Area within Gippsland Environment Sector

Local Government

Four local government areas sit within the Gippsland Environment Sector which was the focus area of consultation, although Eurobodalla showed no interest in being consulted. There is a general familiarity with the oil and gas industry after over 50 years of activities in the Gippsland Environment Sector, so this type of response is considered reasonable and was not unexpected.

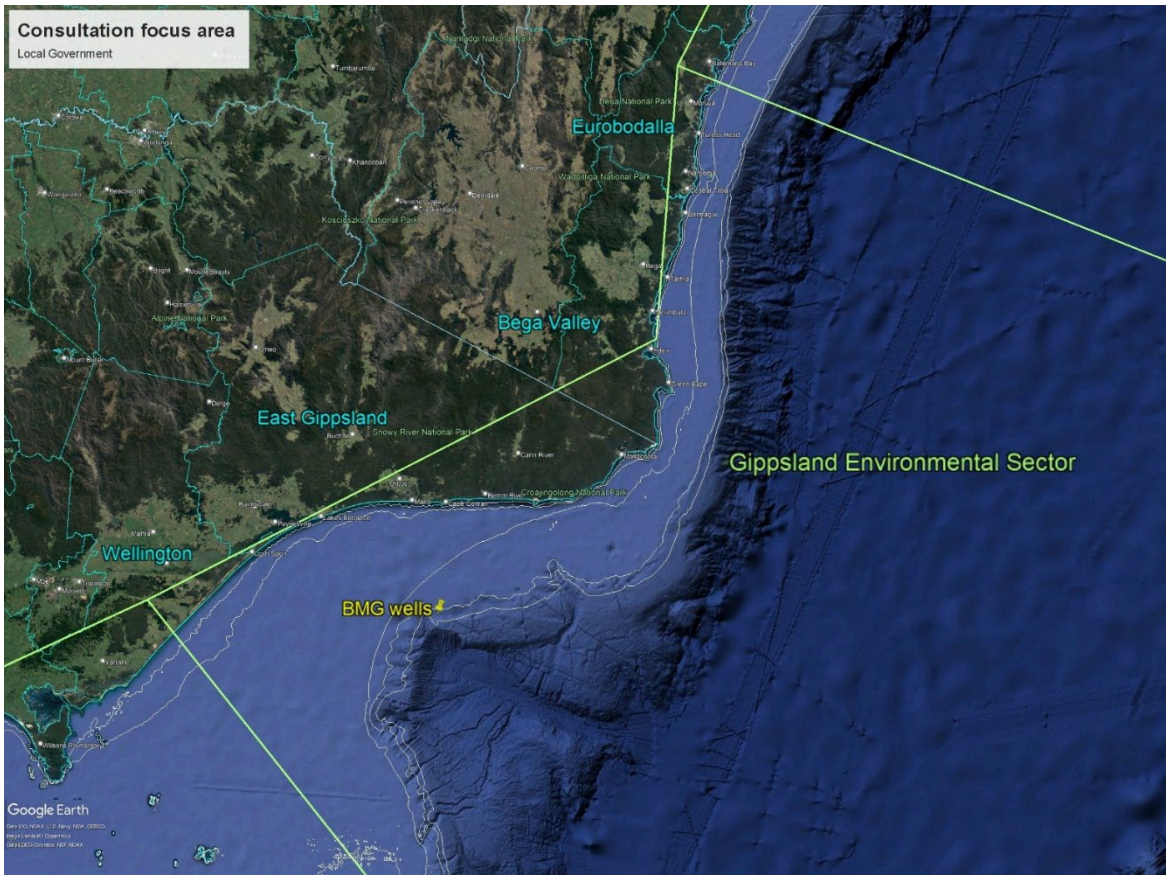


Figure 10-4 Map Showing LGA within Gippsland Environment Sector

10.2 Provision of sufficient information

The OPGGS(E)R 11A(2) require titleholders to make sufficient information available to Relevant Persons to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person.

Cooper Energy integrates consultation into its planning process, ensuring Relevant Persons are:

- provided with details and milestones of the Project
- advised, where they are or may be directly impacted (e.g., fisheries), of any potential hazards/risks and the mitigation measures to address them and provided the opportunity to raise additional concerns
- involved in the closure planning process where their functions, interests or activities may be directly impacted by the project.

Consultation methods and media vary with the project phase and level of engagement required (as informed by the Relevant Person). Typical means of engagement are provided in Table 10-1. Within information materials, readers are also informed of:

- NOPSEMA's brochure "Consultation on offshore petroleum environment plans" which highlights their rights and Cooper Energy's obligations and highlights how consultation can be most effective.
- How their information will be used, and that they may request that their information not be published.

For consultation to be mutually beneficial and effective it needs to be genuine and meaningful, and not superficial. Cooper Energy makes its personnel available to meet for consultation over a wide geographical area with flexibility in timing and location, and discussions are routinely followed up to ensure mutual understanding of issues covered. It was important for Cooper Energy to understand current issues facing relevant persons to provide context of where the activities sat within their broader interests, so discussions were often wide ranging and beyond the scope of the EP itself. Relevant Persons are provided various ways to contact Cooper Energy through web forms and email and are provided a direct name and mobile number to contact.

Table 10-1 BMG Closure Project consultation approach

Communication method	Description
Media Campaign	Cooper Energy ran advertisements seeking relevant persons for consultation across a range of EPs under preparation including this EP. Regional press coverage was broad, covering the north and east coast of Tasmania, and the Victorian and NSW coastlines from South Australia to Queensland. Distribution also extended a small distance west into South Australia (Grant/Mt Gambier). Advertisements were also carried in the Herald-Sun (Melbourne), the Daily Telegraph (NSW), the Courier Mail (Qld) and the Mercury (Tas). An advertisement was also run in the national Koori Mail which has both digital and paper distribution across the nation. The advertisements provided a written link and QR code that would take interested persons to the activities' website. Sufficient information is contained on the website to enable a person to determine if their functions, interests, or activities might be affected by activities under this EP, their rights and Cooper Energy's obligations to them, and how they could seek to consult or request further information.
Meetings	Cooper Energy is committed to meeting with Relevant Persons for the Project in order to enable transparent and direct feedback on the proposed Project. This includes: • Regulator / state agency briefings on a semi-regular basis • Meetings with individual Relevant Persons and/or community information sessions where warranted Face-to-face meetings (where possible given COVID-19 otherwise video conference or phone calls) have been and will continue to be conducted where requested and appropriate with Relevant Persons. The purpose of meetings is to provide project updates, reinforce key messages, clarify any areas of uncertainty, listen and learn about Relevant Person concerns and issues, appropriately address any issues raised and build stronger Relevant Person relationships.
Letters and emails	Letters and emails were used as an initial consultation tool to introduce the Project to Relevant Persons and establish appropriate forms of communication that will be used during the Project. Written communications may include formal correspondence, Project updates regarding developments or upcoming activities, and specific responses to issues, concerns or requests. Emails may also form a means of full interactive consultation if this suits the relevant persons.
Information sheets	Information sheets on the Project were developed to inform Relevant Persons. Information sheets were provided during personal meetings, housed on the Cooper Energy webpage and provided in hard copy upon request by any Relevant Person. Note that any significant change to relevant activity information (such as project timing) will be re-communicated to Relevant Persons. Further information, such as detailed maps will be tailored to meet the needs of each Relevant Persons' circumstances and will be provided as part of the consultation process as required.
Public display of regulatory documentation	Assessment documents (the EP) will be placed on public exhibition within the NOPSEMA website following acceptance. To protect the rights of parties involved in the consultation process, records of all engagements between Cooper Energy and third parties during the Project development will be maintained by Cooper Energy, subject to Information Privacy requirements.
Cooper Energy activities website	The Cooper Energy activities website will be used to provide information regarding the Project. The website: • contains details on Cooper Energy and the Project • contains any fact sheets or newsletters as they are developed • contain details of any public displays and information sessions • allows documents produced for public display to be downloaded • provides methods for contacting, providing feedback to, or registering complaints with Cooper Energy. • videos of seabed conditions and petroleum safety zones to provide added context and understanding https://cooperenergy.wixsite.com/coeoffshore
Address, phone and email	Relevant Persons may wish to contact the Project team via the details below: Address: Level 8, 70 Franklin Street, Adelaide SA 5000 Phone: (08) 8100 4900 Email: stakeholder@cooperenergy.com.au

10.2.1 Period for consultation

Consultation in relation to the offshore activities at BMG spans decades. For the BMG Closure Project, consultation has been expanded over the past few years with a focus on the particular decommissioning activities and planned end states. Subsequent to new case law 2022 FCAFC 193, consultation has again expanded with the most recent consultation campaign spanning approximately 6-months. During this time the list of relevant persons has grown, and individual persons and organisations afforded reasonable time to consult prior to submission of the EP. Relevant Persons are also informed that objections, claims and feedback on the activity will be continue to be received and considered by Cooper Energy.

Cooper Energy considers 30-60 days to be a reasonable period for consultation, with flexibility depending on the nature and scale of the activity. By exception rather than in relation to nature and scale, the period for consultation afforded during the preparation of this EP has well exceeded this reasonable period.

A significant time has been provided to respond to this latest round of consultation. In particular, it was recognised that First Nations organisations sometimes had limited capacity relative to the large consultation burdens being placed on them by proponents of multiple projects in multiple industries. It was important that Cooper Energy allowed them time to respond without feeling pressured.

Cooper Energy emailed Relevant Persons listed in Table 4 of Appendix 5 in August 2023 to provide additional opportunity to consult, and to re-iterate a request to help in identifying additional interested persons to support broad ongoing consultation. This additional email also contained wording noting that Relevant Persons could request that any sensitive information be withheld from publication.

10.2.2 Level of interest

The level of interest was in line with the nature and scale of the activities and quite low with a general view that Cooper Energy were carrying on business as usual, and most having no negative comments about the decommissioning work, notwithstanding the potential for an uncontrolled hydrocarbon release during plug and abandonment operations.

Through a review of the web analytics, general interest in the project activities website was low, with very few repeat visits.

Table 10-2 Relevant Persons for the BMG Closure Project

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Department or agency of the Commonwealth to which the activities to be carried out under the EP may be relevant - Reg 11A(1)(a)			
Australian Antarctic Division (AAD)	Marine Mammal research, protection and conservation	Administrators of Australian marine mammal sightings database. Experience and specialism in marine mammal monitoring and risk mitigations.	Targeted consultation in relation to marine mammal sightings, risk management and reporting.
Australian Border Force	National maritime security	Responsible for coordinating and advising on maritime security. Communicates with industry to advise of maritime actions that may impact on their businesses and advising of appropriate preventive security measures. Australian Border Force have a role in the enforcement of Petroleum Safety Zones. A PSZ is currently established at BMG whilst there are risks to infrastructure from other sea users.	Decommissioning options not relevant to functions or interests, however, changes to PSZ following decommissioning and relevance to maintaining maritime security.
Australian Communications and Media Authority (ACMA)	Subsea communication infrastructure	Subsea communication cables occur within Bass Strait area, and support activities may overlap. However, no impact from planned activities to Relevant Persons' functions, interests or activities.	No overlap with BMG Operational Area. Basslink Cable is >100km from COE offshore assets. General interest in activities within shared marine space.
Australian Fisheries Management Authority (AFMA)	Commonwealth fisheries	Activity is within a Commonwealth fishery area or will impact or potentially impact a Commonwealth fishery area or resource. Via prior consultation, AFMA has recommended engagement with Commonwealth Fisheries Association (CFA) as the peak fishing industry body for Commonwealth waters and that 'Australian Bureau of Agricultural and Resource Economics and Sciences' reports should be reviewed for fishery status. CFA is included in this table as a Relevant Person; the latest 'Australian Bureau of Agricultural and Resource Economics and Sciences' report and study by SETFIA (2021) was used to determine which Commonwealth fisheries have fishing effort within the activity area.	There has been no fishing by licence holders in Commonwealth managed fisheries in the Operational Areas since operation commenced. However future changes in PSZ, decommissioning end states and support vessel movements may be of interest.
Australian Hydrological Service (AHS)	Maritime safety	Interest in identifying and charting potential seabed features and hazard warnings to mariners. Via prior consultation, AHS have requested to provide information at least three weeks prior to commencement of any oil and gas activity to allow for publication of notices to mariners.	Changes in rezoning PSZ associated with decommissioning. Interested in safe navigation of commercial shipping in Australian waters during activity and in relation to decommissioning end states.
Australian Maritime Safety Authority (AMSA)	Marine Vessel Safety	Activity focused consultation regarding shipping, emergency response preparedness and offshore activity levels.	Changes in rezoning PSZ associated with decommissioning. Interested in safe navigation of commercial shipping in Australian waters during activity and in relation to decommissioning end states.
Department of Agriculture, Fisheries and Forestry (DAFF) – Aircraft, vessels and military & Biosecurity	Biosecurity	DAFF has primary policy and regulatory responsibility for managing marine pest biosecurity through administering the Biosecurity Act. Responsible for implementation of marine pest and biosecurity within Australian Waters (12nm), including conveyances into Australian Waters. The BMG closure project will involve activities beyond 12nm, provisioned by conveyances within 12 nm. The department is a relevant person under Environment Regulation 11A(1)(a) of the OPGGS(E)R when a petroleum activity has the potential to introduce or spread	Potential for biosecurity risk associated with conveyances applicable to the Activity, such as equipment and vessels.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
		marine pests and diseases into Australian waters. The department should be consulted by titleholders to ensure titleholders are planning to meet biofouling requirements and manage ballast water appropriately.	
DAFF- Fisheries	Fisheries	Activity is within a Commonwealth fishery area or will impact or potentially impact a Commonwealth fishery area or resource.	Consultation in relation to potential impacts to other marine users, including commonwealth fisheries.
DAFF - Sea Cargo Policy, Industry Partnerships and Strategic Engagement	Sea Cargo	Government department focussing on Sea cargo policy and elements of biosecurity	Referral from DAFF Biosecurity
DCCEEW – Sea Dumping Section	Administration of the Sea Dumping Act	NOPSEMA guidance N-04750-GL1887 identifies DCCEEW as a relevant Department or Agency with respect to Sea Dumping. Further to guidelines released in Q4 2019 (Revised specific guidelines for assessment of platforms or other man-made structures at sea), DCCEEW will now review facility/infrastructure decommissioning scenarios on a case-by-case basis (pers comm. DCCEEW Sea dumping section).	May be relevant if any equipment is planned to remain on or in the seabed, to be addressed within the BMG Closure Project (Phase 1 and 2) EPs and supporting sea dumping permits (if required).
DCCEEW – Underwater Cultural Heritage	Administration of the Underwater Cultural Heritage Act	DCCEEW administers the *Underwater Cultural Heritage Act 2018* (UCH Act). DCCEEW regulates activities in relation to protected UCH within Australian waters including the Commonwealth marine area. DCCEEW is a relevant agency for consultation where: • an activity has the potential to directly or indirectly adversely impact protected UCH (see section 30(2) of the UCH Act), whether located or unlocated; and/or • an activity or part of the activity is proposed within an underwater heritage protected zone.	Actions resulting in seabed disturbance have the potential to impact underwater heritage. None of the activities are proposed within an underwater heritage protected zone. Underwater heritage protected zones were identified within the spill EMBA
DCCEEW – Wetlands Section	Administrative authority within Australia for the Ramsar Convention.	Authority overseeing conservation of Ramsar wetlands.	One Ramsar wetland, Gippsland Lakes, was identified within the spill EMBA.
Department of Foreign Affairs and Trade (DFAT)	Australia's shared maritime boundaries	DFAT has no direct role in the management of the Commonwealth marine area but has an interest in ensuring that consultation with foreign entities, both private and government, is effective and is aligned with Australia's interests.	The BMG worst case spill scenario extends beyond the Australian EEZ and therefore prudent to check DFAT interest.
Department of Industry, Science, and Resources (DISR)	Commonwealth resource management and innovation	The Department's primary function is to support economic growth and job creation for all Australians. Provides public consultation hub for Australian policy and legislative frameworks.	Involved in recent review of Australia's decom policy and legislative frameworks to ensure they remain fit for purpose now and into the future. i.e., Offshore petroleum decommissioning guideline 2018 and Discussion Paper.
Department of Defence (DoD)	National security	Relevant where the proposed activity may impact DoD operational requirements, where the proposed activity encroaches on known training areas and/or restricted airspace and where there is a risk of unexploded ordnance in the area where the activity is taking place.	Not directly relevant to activities within VIC/RL13. Consult in relation airspace restrictions pending definition of offshore crew transfer plans.
National Native Title Tribunal (NNTT)	Cultural heritage / spiritual connection	Body that manages applications for and administration of native title in Australia. There are numerous areas of determination along the coastline representing many	Petroleum activity occurs in Commonwealth waters. Gippsland Environment Sector intersects the coastline

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
		first nations peoples' communities. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected.	and nearby sea country with determination and claims in place.
Director of National Parks (DNP)	Managing Commonwealth reserves and conservation zones	The DNP is a relevant person for consultation for this project in relation to potential incidents in Commonwealth waters which could impact on the values of a Commonwealth marine park.	Operational Area does not overlap marine parks however, potential EMBA for unplanned spill scenario (vessel collision) overlap and impact the values within a Commonwealth marine park. Consult in relation to spill response planning as relevant.
Each Department or agency of a State to which the activities to be carried out under the EP may be relevant - Reg 11A(1)(b)			
Department of Jobs, Skills, Industry and Regions (DJSIR) – Victorian Fishery Authority **See VFA in table below (DJSIR)**	Changes in fishery access and/or habitat	Activity is within a Victorian fishery area or will impact or potentially impact a Victorian fishery area or resource.	Activity Operational Area overlaps with Victorian fishery areas.
Department of Energy, Environment and Climate Action (DEECA) - Biodiversity Division	Victorian biodiversity	Department protects and preserves Victoria's native landscape through a range of biodiversity programs and also manages biodiversity reference tools/maps and native vegetation information system.	BMG spill EMBA intersects Victorian waters and coastline.
DEECA – Biosecurity and agricultural services	Victorian biosecurity	DEECA Biosecurity and Agricultural Services manage advice on biosecurity within Victoria including vessels in state waters/calling into ports. The DEECA BAS has provided advice during the development of Cooper Energy IMS risk management processes and BMG closure project IMS risks.	Potential for biosecurity risk associated with conveyances applicable to the Activity, such as equipment and vessels.
Parks Victoria	Wildlife and habitat protection/conservation in Victoria	Manages Victoria's land and marine national parks and reserves.	There is no overlap with Victorian parks by the Operational Area; however, the EMBA overlaps marine and terrestrial Victorian parks.
DEECA – Marine National Parks and Marine Parks	Wildlife and habitat protection/conservation	Management of marine national parks within Victorian State Waters is via Parks Victoria.	There is no overlap with Victorian parks by the Operational Area; however, the EMBA overlaps three Victorian MPA.
DEECA - Victorian wildlife emergencies	Wildlife and habitat protection/conservation	Responsible for management of wildlife impacted by marine pollution / oil spill (control agency). Responsibilities defined in the Victorian Emergency Animal Welfare Plan (VEAWP) and the Victorian State Maritime Emergencies (non-search and rescue) Plan (SMEP).	Wildlife response control agency in the event of an oil spill. Input into OPEP wildlife response plan where there is shoreline contact in Victoria or impact on Victorian coastal waters.
Department of Jobs Skills Industry and Regions (DJSIR)- Regional Development Victoria (RDV)	Economic development	Partnership between the Australian, state and territory governments to support the growth and development of Australia's regions.	EMBA intersects the area managed by the Gippsland RDA committee.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Department of Transport and Planning (DTP)	Marine pollution response in Victoria	Responsible for marine pollution response arrangements in Victorian jurisdiction. DTP coordinates advice with other state agencies involved in marine pollution response including DEECA and Port Authorities.	EMBA and Support vessel routes overlaps with Victoria waters as such OPEP sets out arrangements with DTP.
Department of Planning and Environment - Environment and Heritage Group NSW	Wildlife and habitat protection/conservation	Environment and Heritage works with communities, businesses, and governments to protect, preserve, and strengthen the quality of their natural environment and heritage.	Petroleum activity is not occurring in NSW waters. Spill EMBA enters NSW waters and overlaps 15 Nationally Important Wetlands and two Commonwealth heritage listed places.
Department of Primary Industry NSW	Wildlife and habitat protection/conservation	The Department of Primary Industries undertakes the day-to-day management of marine parks and aquatic reserves in NSW.	Petroleum activity is not occurring in NSW waters. Spill EMBA enters NSW waters and intersects with two NSW marine protected areas.
Department of Primary Industries – Fisheries NSW	Changes in fishery access and/or habitat	Agency of the NSW Government, responsible for the administration and development for fisheries and aquaculture in NSW.	Petroleum activity is not occurring in NSW waters. Spill EMBA enters NSW waters and overlaps six NSW fisheries.
Transport Safety Victoria (Maritime Safety)	Marine Safety	Manages safety of waterways in Victoria and prepares State Waters Notice to Mariners. Acts as AMSA delegate in Victoria in event of marine incidents.	Notice to Mariners required in State waters for the Activity when IMR vessel operates in State waters.
Tasmanian EPA	Marine pollution response in Tasmania	Responsible for preparedness and responding to oil and chemical spills in Tasmanian waters. Spill Response 'Control Agency' for any spill that enters (or threatens to enter Tasmanian coastal waters). Where relevant the OPEP sets out arrangements for working with the DPIPWE in the event of a spill. Required to be notified of reportable incidents.	Petroleum activity is not occurring in Tasmanian waters. Spill EMBA overlaps with Tasmanian waters.
Transport NSW	Marine pollution response in NSW	Responsible for marine pollution response arrangements in NSW jurisdiction. Transport NSW coordinate advice with other state agencies involved in marine pollution response including NSW EPA and Port Authorities.	EMBA overlaps with NSW waters/shoreline involved in response and management of pollution incidents involving hazardous materials (in collaboration with other government agencies).
NSW Department of Planning, Industry and Environment (See Transport NSW)	Regulator – NSW	In the event of a marine pollution incident, activities associated with spill response may be required to enter NSW waters.	Oil spill EMBA overlap with NSW waters
Victorian Fisheries Authority (VFA) - Department of Jobs Precincts and, Skills, Industry and Regions (DJSIR)	Changes in fishery access and/or habitat	Independent statutory authority established to effectively manage Victoria's fisheries resources. It is also a function to respond to any emergency or undertake compliance and enforcement activities. The VFA is the control agency for shark hazards in Victorian waters and is a support agency for emergencies in the aquatic environment.	Operational Area and EMBA overlap with Victorian Fisheries.
The Department of the responsible State Minister- Reg 11A(1)(c)			

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
DEECA – Earth Resources Regulation (ERR)	Regulator of exploration, mining, quarrying, petroleum, recreational prospecting and other earth resource activities in Victoria.	In the event of a marine pollution incident, activities associated with spill response will be required to enter Victorian waters.	EMBA overlaps with Victoria waters.
A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP - Reg 11A(1)(d) (No Relevant Persons were classified under 11A(1)(e))			
Commonwealth Fisheries			
Australian Southern Bluefin Tuna Industry Association	Changes in fishery access and/or habitat	Represents the Australian Southern Bluefin Tuna Industry.	Fishery management area intercepts with Operational Area and Gippsland Environment Sector. No fishing effort within the BMG Operational Area.
Bass Strait Scallop Industry Association	Changes in fishery access and/or habitat	Industry association for the Bass Strait Central Scallop Fishery operators.	Operational Area and Gippsland Environment Sector intersect the management area for Bass Strait Central Zone Scallop fishery.
Commonwealth Fisheries Association (CFA)	Changes in fishery access and/or habitat	Peak industry body representing the interests of fishers operating in Commonwealth managed fisheries. AFMA recommended engagement with CFA as the peak fishing industry body for Commonwealth fisheries.	Petroleum Activity and support route overlaps with Commonwealth fisheries areas and may restrict access. Future changes in PSZ of interests to fishers.
Seafood Industry Australia	Changes in fishery access and/or habitat	The national peak-body representing members from the wildcatch, aquaculture and post-harvest sectors of the Australian seafood industry.	Gippsland Environment Sector overlaps with fisheries who may be members of the peak body.
South East Fishing Trawl Industry Association (SEFTIA)**	Changes in fishery access and/or habitat	Peak industry body representing the interests of fishers operating in the Commonwealth Trawl Sector. BMG closure project activities overlap with fisheries whose licence holders SEFTIA represent (Southern Shark Industry Alliance, Eastern Rock Lobster and Small Pelagic Fishery Industry Association).	Records indicate LEFCOL (represented by SIV) and SEFTIA have historically represented the majority of fishing vessels that may be impacted by the BMG development since its commencement. Cooper Energy has ongoing engagement with SETFIA across all operations offshore Victoria.
Southern Rock Lobster Ltd (SRL)	Changes in fishery access and/or habitat	National peak body working to further the interests of the Australian Southern Rock Lobster Industry. Note Southern Rock Lobsters have extensive larval dispersal and can be found to depths of 150 metres, with most of the catch coming from inshore waters less than 100 metres deep (VFA 2017). Small quantities of Eastern Rock Lobster are taken off eastern Victoria, particularly near the border of New South Wales and Victoria (VFA 2017). The fishing grounds for southern rock lobster extend through State and Commonwealth waters, however based on known rock lobster habitat and depths it is unlikely that rock lobster fishing occurs at BMG.	Activity is within the eastern zone of the Rock Lobster Fishery.
Southern Shark Industry Alliance (SSIA)**	Changes in fishery access and/or habitat	Industry body representing interests of its Commonwealth-licenced shark gillnet and shark hook members in the Gillnet Hook and Trap Fishery. Activity is within the Southern and Eastern Scalefish and Shark Fishery management area where there is no fishing effort.	Within fishery area and given fisheries interest in area access. However, no overlap between this aspect of the project and Relevant Person functions, interests, and

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
			activities expected given no recent fishing effort. *Noting engagement is via SETFIA.
Southern Squid Jig Fishery	Changes in fishery access and/or habitat	Individual skippers managed by AFMA South East Management Advisory Committee. Activity is within the Southern Squid jig fishery management area, though the fishery is transient and operate at water depths between 60 m and 120 m. It is therefore unlikely the fishery operates in in the BMG area.	Within fishery area and given fisheries interest in area access. However, no overlap between this aspect of the project and Relevant Person functions, interests, and activities expected given depth.
Sustainable Shark Fishing Inc. (SSF)**	Changes in fishery access and/or habitat	Activity is within the Southern and Eastern Scalefish and Shark Fishery management area where there is no fishing effort.	Within fishery area and given fisheries interest in area access. However, no overlap between this aspect of the project and Relevant Person functions, interests, and activities expected.
Tuna Australia	Changes in fishery access and/or habitat	Peak body representing statutory fishing right owners, holders, fish processors and sellers, and associate members of the Eastern and Western tuna and billfish fisheries of Australia.	Operational Area overlaps Eastern Tuna and Billfish Fishery and Southern Bluefin Tuna Fishery area. No active fishing identified in vicinity of BMG.
State Fisheries			
Abalone Council Australia	Changes in fishery access and/or habitat	Peak industry body representing the wild-harvest abalone Industry from Tasmania, Victoria, South Australia, Western Australia and New South Wales.	Operational Area and Gippsland Environment Sector overlap with the Victorian Eastern Abalone Zone. Based on water depths for fishing (<30 m) and habitat it is unlikely overlap between planned activities of the project and Relevant Person functions, interests, and activities. However, should a spill occur, Relevant Person functions, interests, and activities may be affected.
Abalone Council Victoria	Changes in fishery access and/or habitat	The peak body representing interests of abalone divers, quota holders and processors in the Victorian wild harvest abalone fishery.	Operational Area and Gippsland Environment Sector overlap Victorian Central Abalone Zone. Abalone diving activity occurs close to shoreline (generally to depths of 30 m on rocky reefs). Based on water depths for fishing it is unlikely overlap between planned activities of the project and Relevant Person functions, interests, and activities. However, should a spill occur, Relevant Person functions, interests, and activities may be affected.
Abalone Victoria Central Zone Ltd (AVCZ)	Changes in fishery access and/or habitat	Represents the views and interests of its members and to ensure appropriate governance of member resources. However, fishing occurs in water depths <30 m.	Activity is within the Victorian Central Abalone Zone which also overlaps the Gippsland Environment sector. No overlap between planned activities of the project and Relevant Person functions, interests, and activities. However, should a spill occur, Relevant Person functions, interests, and activities may be affected.
Australian Wildcatch Fishing (Corporate Alliance Enterprises)	Changes in fishery access and/or habitat	Operate in SESS Fishery	Operational Area and Gippsland Environment Sector are within the SESS Fishery management area.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Commercial Fishermen's Co-Operative	Changes in fishery access and/or habitat	Supports local commercial fishers in NSW (assist members to maximise their returns from the sale of their seafood catches)	Gippsland Environment Sector intersects with NSW waters used for commercial fishing
East Gippsland Estuarine Fishermen's Association	Changes in fishery access and/or habitat	Industry body representing views and interests of its members which operate within the Gippsland Lakes. Represented by SIV. (Fishery currently closed)	Gippsland Environment Sector intersects with East Gippsland waters.
Eastern Victoria Sea Urchin Divers Association	Changes in fishery access and/or habitat	Industry body representing views and interests of its members. Activity is within the eastern zone of the Sea Urchin Fishery. Based on water depths and habitat, it is unlikely that sea urchin fishing occurs at BMG.	Activity and Gippsland Environment Sector overlap fishery. However, given depth no active fishing overlap between this aspect of the project and Relevant Person functions, interests, and activities expected. Note indirectly engaged via representative body (SIV)
Eastern Victorian Rock Lobster Industry Association	Changes in fishery access and/or habitat	Industry body representing views and interests of its members. Note Southern Rock Lobsters have extensive larval dispersal and can be found to depths of 150 m, with most of the catch coming from inshore waters less than 100 m deep. Small quantities of Eastern Rock Lobster are taken off eastern Victoria, particularly near the border of New South Wales and Victoria (VFA 2017). The fishing grounds for southern rock lobster extend through State and Commonwealth waters, however based on known rock lobster habitat and depths it is unlikely that rock lobster fishing occurs at BMG.	Activity and Gippsland Environment Sector overlap fishery. However, given depth no active fishing overlap between this aspect of the project and Relevant Person functions, interests, and activities expected. Note engagement is via SETFIA.
Eastern Zone Abalone Industry Association	Changes in fishery access and/or habitat	Industry body representing views and interests of its members. Activity is within the Victorian Eastern Abalone Zone. Based on water depths for the fishery (typically <30 m) and habitat it is unlikely that abalone fishing occurs in the Operational Area. Relevant Person has been sent information regarding Sole and BMG activities during 2017 and 2018 with no response.	Activity and Gippsland Environment Sector overlap fishery. However, given depth no active fishing overlap between this aspect of the project and Relevant Person functions, interests, and activities expected. Note indirectly engaged via representative body (SIV)
Lakes Entrance Fishermen's Society Cooperative Limited (LEFCOL)	Changes in fishery access and/or habitat	Industry body and fishing services provider. Represents views and interests of its members. Activity overlaps with State fisheries who may be members of the cooperative.	Activity and Gippsland Environment Sector overlap fishery. *Note indirectly engaged via representative body (SIV). 2017/18 consultation concerns around noise and fishing area access, as such likely to be interested in PSZ changes. Records indicate LEFCOL and SETFIA represent the majority of fishing vessels impacted by the BMG development. They had concerns in relation to leaving the property in situ. However, decommissioning activities will remove all property brought, according to General Direction 824. Previously influenced trenching and PSZ reductions at BMG.
NSW Professional Fishermen's Association	Changes in fishery access and/or habitat	Not-for-profit representative group providing a voice for members of the Professional Fishing Industry in NSW	Gippsland Environment Sector intersects with NSW waters used for commercial and recreational fishing
Port Franklin Fishermen's Association	Changes in fishery access and/or habitat	Industry body representing views and interests of its members. Activity overlaps with State fisheries who may be members of the association. Port Franklin is in South Gippsland.	Activity and Gippsland Environment Sector overlaps with State fisheries who may be members of the association. Note indirectly engaged via representative body (SIV).

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Scallop Fishermen's Association Inc.	Changes in fishery access and/or habitat	Represents the interests of scallop fishermen operating within Australia's south east waters. Members hold entitlement to operate within the Bass Strait Central Zone Scallop Fishery (Commonwealth), and may also have licences in the Victorian Scallop Fishery and the Tasmanian Scallop Fishery. Represented by SETFIA,	Operational Area and Gippsland Environment Sector overlap scallop fishery
Seafood Industry Victoria (SIV)	Changes in fishery access and/or habitat	Peak industry body representing the interests of fishers operating in State (Vic) managed fisheries. SIV primary contact for State fishers. Multiple constructive engagements over the years with SIV to discuss Cooper Energy's activities and ongoing engagement. SIV has expressed interest in overlapping activities with its members and reducing the size of PSZs. SIV engagement covers following fisheries; VRLA, AVCZ, Eastern Victoria Sea Urchin Divers Association, Eastern Zone Abalone Industry Association, LEFCOL, Port Franklin Fishermen's Association, San Remo Fishing Cooperative	Activity and Gippsland Environment Sector overlaps with a number of State fisheries. Changes in PSZ and fishing access of interest. Records indicate LEFCOL (represented by SIV) and SETFIA represent the majority of fishing vessels impacted by the BMG development.
Victorian Rock Lobster Association (VRLA)	Changes in fishery access and/or habitat	Activity is within the eastern zone of the Rock Lobster Fishery. Support activities (vessel transits) may overlap.	Activity and Gippsland Environment Sector overlap fishery, however Based on habitat it is unlikely that rock lobster fishing occurs in the Operational Area. Note requested that consultation be undertaken via SIV as such indirectly engaged via SIV
Victorian Scallop Fisherman's Association	Changes in fishery access and/or habitat	Representative body of Victorian Scallop Fisherman. Most of our members are based in Lakes Entrance, in East Gippsland, Victoria. Activity is within the Bass Strait Scallop Fishery. BMG area does not intersect active scallop fishing grounds; commercial scallops are mainly found at depths of 2-20 m, occurring at depths of up to 120 m (Victorian Scallop Fisherman's Association, 2020). Support activities (vessel transits) may overlap.	Activity and Gippsland Environment Sector overlap with the Bass Strait Scallop Fishery. Via previous consultation are mainly concerned regarding seismic surveys and do not fish in water depths relevant to the BMG project.
AMP Licence Holders			
AARNet Pty Ltd	Changes in seabed quality Changes to water quality	Provides telecommunications, cyber security, data and collaboration services and network with focus on research and education sector. Involved in the install of new structures in Central Eastern AMP from 2019 – 2044.	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Commonwealth Scientific and Industrial Research Organisation	Changes to water quality. Wildlife and habitat protection/conservation Non-commercial research	Australian government agency responsible for scientific research.	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Major Projects Foundation Ltd	Wildlife and habitat protection/conservation	Supports conservation, research and education. Relevant Person is an AMP licence holder for research and monitoring in Beagle	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Stakeholder ID: OI-SCMY (New ID 314)	Changes in fishery access and/or habitat Tourism	Undertakes commercial tourism and charter fishing in the Central Eastern AMPs.	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Stakeholder ID: OI-SP (New ID 321)	Visual amenity	Wildlife, aerial, underwater film and photography specialist who is an AMP licence holder for commercial media and drone use in Beagle, Jervis, Flinders, Freycinet.	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Stakeholder ID:OI-JGP (New ID 203)	Visual amenity	Wildlife, aerial, underwater film and photography specialist	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Subpartners Pty Ltd	Changes in seabed quality Changes to water quality	Construction company delivering telecommunication infrastructure projects with submarine cable speciality. Relevant Person is an AMP licence holder for commercial structures and works in Beagle AMP from 2018 - 2043.	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
The Trustee for The Minderoo Foundation Trust	Changes to water quality Wildlife and habitat protection / conservation Non-commercial research	Philanthropic organisation that is an AMP licence holder for research and monitoring and non-commercial research.	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Southern Cross Cables Ltd (SCCL)	Changes in seabed quality Changes to water quality	Provides telecommunications networks	Petroleum activity is not occurring in AMPs. Gippsland Environment Sector intersects East Gippsland AMP.
Businesses			
Orbost Chamber of Commerce	Local business and community	Promotes and supports the growth of local business and communities in the Orbost region proximate to the Cooper Energy Orbost Gas Plant,	Organisation focus overlaps with Gippsland Environment Sector.
RPS Group	Local business Offshore industry	Provides professional services to operators and titleholders in offshore Gippsland waters.	Working with nearby titleholder and currently considering cumulative impacts.
Yarram and District Traders Association	Local business and community	Members based business association promoting local organisations, activities and services across Gippsland.	Petroleum activity is not occurring within organisation focus areas which includes local businesses. Gippsland Environment Sector intersects within this area. Recommended for inclusion by Wellington Shire Council.
ENGOs			
Australian Conservation Foundation	Climate change and habitat protection/conservation	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Organisation's focus is climate action and conservation.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Australian Marine Conservation Society	Climate change and wildlife and habitat protection/conservation in Australia	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Society employs conservation experts and collaborate with research centres to safeguard the future of Australia's oceans and also take action against climate change.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Friends of the Earth - Melbourne	Climate change and habitat protection/conservation	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Organisation focus includes climate justice, ecosystem conservation, First Nations' allegiance and keeping fossil fuels in the ground.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Greenpeace	Climate change and habitat protection/conservation	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Organisation campaigns include ending the oil age, whale protection and climate change.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
International Fund for Animal Welfare	Wildlife and habitat protection/conservation	Global non-profit helping animals and people thrive together. Run various programmes including marine mammal rescue and research, and marine conservation	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Sea Shepherd Australia	Wildlife and habitat protection/conservation	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Organisation focus is marine conservation to protect global oceans.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Wilderness Society Melbourne	Wildlife and habitat protection/conservation	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Organisation holds opposition to drilling for oil along Australia's southern coast and support communities to stand up to Big Oil.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
World Wildlife Fund	Climate change and habitat protection/conservation	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters. Organisation's focus is conservation of nature, climate change and ocean plastic.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Environment Groups			
Australian Coastal Society – Victorian Chapter	Wildlife and habitat protection/conservation	Contributes to a number of coastal and marine policy reforms happening in Victoria via working groups and submissions.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Environment Victoria	Wildlife and habitat protection/conservation	Victoria based charity campaigning to solve the climate crisis and build a thriving, sustainable society that protects and values nature. Key focus is climate change and Victorian wildlife.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Living Ocean	Research and monitoring	Centre for marine studies to contribute to international research, community education, and the conservation of marine environments and animals. Focus areas include climate change. BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Marine Mammal Foundation	Water quality Marine wildlife Habitat protection/conservation	Protects the marine environment for mammals (including Southern Right Whales) through research, community engagement, and education.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Ocean Watch	Changes in fishery access and/or habitat Habitat protection/conservation	Not-for-profit environmental company that works to advance sustainability in the Australian seafood industry and operates community-based coastal habitat restoration programs. BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Rising Tide Australia	Climate change Community interest	Grassroots activist collective based in Newcastle, Australia, with focus on climate change and demanding Australia honours commitment to the goals of the Paris Climate Agreement. BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Surfers for Climate	Climate change Community interest Water quality Marine wildlife Habitat protection/conservation	A sea-roots movement dedicated to positive climate action with focus being no new oil.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Surfrider Foundation Australia	Climate change Community interest Water quality Marine wildlife Habitat protection/conservation	Not-for-profit dedicated to the protection of Australia's waves and beaches through conservation, activism, research and education.	Petroleum activity is not occurring in nearshore waters. Spill EMBA overlaps with shorelines such as sandy beaches; therefore, Relevant Person functions, interests, and activities may be affected
The Nature Conservation Council of NSW	Wildlife and habitat protection/conservation	Advocate and campaign to protect nature and for a safe climate. Focus areas include climate change and wetlands. BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Whale and Dolphin Conservation Australia	Habitat protection/conservation Marine fauna	BMG facilities and their decommissioning involve a petroleum activity being undertaken in offshore Australian waters where there is whale and dolphin presence.	Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
First Nations Communities			
Batemans Bay LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. This LALC does not intersect the Gippsland Environment Sector but was consulted as a member of the South Coast ALC zone as the Gippsland Environment Sector overlaps the South Coast zone.
Bega LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.
Bidwell First Nations Clans Aboriginal Corporation	Cultural heritage / spiritual connection	Corporation represents Bidwell First Nations Clans located in Gippsland eastern Victoria. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected.	Petroleum activity occurs in Commonwealth waters. Spill EMBA intersects coastline of eastern Gippsland and sea country.
Bodalla LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Cobowra LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.
Eden LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.
Federation of Victorian Traditional Owner Corporations	Cultural heritage / spiritual connection	An incorporated peak body comprising of seven of the Victorian Traditional Owner Groups. State-wide body convenes and advocates for the rights and interests of Traditional Owners while progressing wider social, economic, environmental and cultural objectives.	Petroleum activity occurs in Commonwealth waters. Gippsland Environment Sector intersects the coastline of Victoria and nearby sea country.
First Nations Legal & Research Services	Cultural heritage / spiritual connection	Provides native title services for traditional owners in Victoria. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected.	Petroleum activity occurs in Commonwealth waters. Gippsland Environment Sector intersects the coastline of eastern Victoria and nearby sea country.
Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC)	Cultural heritage / spiritual connection	Gunaikurnai people are the Traditional Owners of lands from Warragul in the west to the Snowy River in the east. GLaWAC is the Registered Aboriginal Party (RAP) for the Gunaikurnai. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected.	Petroleum activity occurs in Commonwealth waters. Gippsland Environment Sector intersects coastline of Gunaikurnai lands and nearby sea country.
Illawarra LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. This LALC does not intersect the Gippsland Environment Sector but was consulted as a member of the South Coast ALC zone as the Gippsland Environment Sector overlaps the South Coast zone.
Jerrinja LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. This LALC does not intersect the Gippsland Environment Sector but was consulted as a member of the South Coast ALC zone as the Gippsland Environment Sector overlaps the South Coast zone..
Krowathunkoolong Keeping Place	Cultural heritage / spiritual connection	Museum in Bairnsdale displaying the heritage of the Gunaikurnai people who have lived in East Gippsland. Organisation is active in local Aboriginal working groups. Some of their stakeholders or members may be Relevant Persons that they can connect to COE. Sits within GLaWAC RAP.	Petroleum activity occurs in Commonwealth waters. Gippsland Environment Sector intersects coastline of east Gippsland and nearby sea country.
Lake Tyers Aboriginal Trust	Cultural heritage / spiritual connection	Based in Lakes Entrance in Victoria, the trust is made up of self-governing community based on Lake Tyers permanent reserve. In the unlikely event a spill occurs and reaches shorelines, cultural heritage and spiritual connections could be affected. Some of their stakeholders or members may be Relevant Persons who can be connected to Cooper Energy. Sits within GLaWAC RAP.	Petroleum activity occurs in Commonwealth waters. Gippsland Environment Sector intersects coastline of east Gippsland and nearby sea country.
Merrimans LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Mogo LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.
Ngambri LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. This LALC does not intersect the Gippsland Environment Sector but was consulted as a member of the South Coast ALC zone as the Gippsland Environment Sector overlaps the South Coast zone.
Nowra LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. This LALC does not intersect the Gippsland Environment Sector but was consulted as a member of the South Coast ALC zone as the Gippsland Environment Sector overlaps the South Coast zone.
NSW Aboriginal Land Council (NSW ALC)	Cultural heritage / spiritual connection	NSW statutory corporation set up as peak representative body in Aboriginal Affairs to protect interests of its members and the Aboriginal community. The largest member based Aboriginal organisation in NSW. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected. LALC's are significant land holders across the state and have functions under the Act in respect to the management and development of land assets as well as the protection and promotion of Aboriginal culture and heritage.	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector intersects the NSW coastline and nearby sea country and overlaps with the ALC's South Coast Zone.
NTSCORP Limited	Cultural heritage / spiritual connection	Native Title Service Provider for Aboriginal Traditional Owners in NSW and the Australian Capital Territory. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected. NTSCORP itself is unlikely to be directly affected by activities but may be in a position to provide useful advice.	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector intersects the coastline and nearby sea country with determination and claims in place
South Coast regional LALC – captured under NSW ALC	Cultural heritage / spiritual connection	This regional LALC represents the southernmost coastal section of the network of NSW LALC including environment and heritage group , Ulladulla, Nowra, Ngambri, Mogo, Merrimans, Jerrinja, Illawarra, Eden and Cobowra communities. In the unlikely event a spill occurs that extends into sea country, cultural heritage and spiritual connections could be affected, and there may be cultural connections to the activities area.	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector intersects the southern coastline of NSW and nearby sea country.
Ulladulla LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. This LALC does not intersect the Gippsland Environment Sector but was consulted as a member of the South Coast ALC zone as the Gippsland Environment Sector overlaps the South Coast zone.
Wagonga LALC	Cultural heritage / spiritual connection	Functions include Maintenance and enhancement of Aboriginal culture, identity and heritage (including the management of traditional sites and cultural materials).	Petroleum activity is not occurring in NSW waters. The Gippsland Environment Sector overlaps LALC coastline and sea country.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Local Government			
Bega Valley Shire Council	Community interest	Local government area located adjacent to the south-eastern coastline of NSW.	Information being provided to local government authorities that sit within the Gippsland Environment Sector as constituents would comprise those most likely affected by planned or unplanned activities.
East Gippsland Shire Council	Community interest	Local government area in Gippsland, Victoria located in the eastern part of the state.	Information being provided to local government authorities that sit within the Gippsland Environment Sector as constituents would comprise those most likely affected by planned or unplanned activities.
Eurobodalla Shire Council	Community interest	Local government area located in the south coast region of NSW in a largely mountainous coastal region and situated adjacent to the Tasman Sea, the Princes Highway and the Kings Highway.	Information being provided to local government authorities that sit within the Gippsland Environment Sector as constituents would comprise those most likely affected by planned or unplanned activities.
Wellington Shire Council	Community interest	Represents a local government area in Victoria, located in the eastern part of the state.	Information being provided to local government authorities that sit within the Gippsland Environment Sector as constituents would comprise those most likely affected by planned or unplanned activities.
Member of Parliament			
Member for Gippsland South – Lower House-Victoria	Community interest Jobs Projects Emergency Response	Government / Community Representative - focal point for the wider onshore community	Information being provided to Member of Parliament representing areas where an oil spill may result in shoreline contact
Member for Gippsland East-Lower House-Victoria	Community interest Jobs Projects Emergency Response	Government / Community Representative and focal point for the wider onshore community	Information being provided to Member of Parliament representing areas where an oil spill may result in shoreline contact
Member for Gippsland-Lower House - Commonwealth	Community interest Jobs Projects Emergency Response	Government / Community Representative and focal point for the wider onshore community	Information being provided to Member of Parliament representing areas where an oil spill may result in shoreline contact
Member for Eastern Victoria – Upper House - Victoria	Community interest Jobs Projects Emergency Response	Government / Community Representative and focal point for the wider onshore community	Information being provided to Member of Parliament representing areas where an oil spill may result in shoreline contact
Oil and Gas Industry			

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
3D Oil Limited	Oil and Gas exploration and production Maritime safety Cumulative impacts	3D Oil have Permit in Vic/P74 in Gippsland Basin. Permit work program details potential seismic survey (2023), geological and geophysical surveys (2024) and drilling of one well (2025).	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Asset Energy Pty Ltd	Oil and Gas exploration and production Maritime safety Cumulative impacts	Asset Energy holds an 85% interest in Petroleum Exploration Permit 11 (PEP-11).	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Carnarvon Hibiscus Pty Ltd	Oil and Gas exploration and production Maritime safety Cumulative impacts	CHIB holds VIC/P57. Work program includes one exploration well in 2023 and geophysical and geotechnical studies in 2024. Vic/RL17 (formerly VIC/L31) work program includes geotechnical studies in 2023 within the Gippsland Basin.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Emperor Energy	Oil and Gas exploration and production Maritime safety Cumulative impacts	Proponent holding offshore exploration permit Vic/P47 in the Gippsland Basin which currently contains two gas discovery wells. Seeking to drill an exploration well in 2024.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Esso (a subsidiary of Exxon Mobil)	Oil and Gas exploration and production Maritime safety Cumulative impacts	Oil and Gas proponent with offshore and onshore operations in the Gippsland Basin.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Liberty Petroleum Corporation	Oil and Gas exploration and production Maritime safety Cumulative impacts	Oil and Gas Proponent in the Gippsland Basin holding Vic/P77 and Vic/P78 exploration permits to the east of Cooper Energy. Permit work program outlines a 2024 seismic survey and 2025 exploration well.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
SGH Energy	Oil and Gas exploration and production Maritime safety Cumulative impacts	SGH has 100% interest in the Longtom gas and condensate field in Bass Strait, Victoria but are not the operator.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
The Crown in right of Victoria	Oil and Gas exploration and production Maritime safety Cumulative impacts	Holds a greenhouse gas assessment permit for G-5-AP in Gippsland. Work program in 2023 shows no offshore work..	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Offshore Wind			

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Bluefloat Energy (Greater Gippsland Offshore Wind)	Offshore wind energy exploration and generation	The Greater Gippsland Offshore Wind Project is a 2.085 GW project located off the coast of the Gippsland region of Victoria.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Corio Generation (Great Eastern Offshore Wind Farm)	Offshore wind energy exploration and generation	Great Eastern Offshore Wind is proposed to be located approximately 22 kilometres off the central Gippsland coast. Great Southern Offshore Wind is a proposed renewable energy project off the Bass Coast.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Flotation Energy (Seadragon)	Offshore wind energy exploration and generation	Large scale offshore wind project proposed in Gippsland. Currently in planning and approvals stage.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Port Anthony Renewables	Offshore wind energy exploration and generation	Organisation committed to establishing themselves as the largest green hydrogen hub in southeastern Australia.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Star of the South	Offshore wind energy exploration and generation	Proposed to be located off the south coast of Gippsland with the potential to supply up to 20% of Victoria's electricity needs.	Information being provided to offshore wind proponents near to operational area or within the spill EMBA. Simultaneous activities are a consideration for operational synergies and cumulative impact assessments.
Other			
Catherine Hill Bay Progress Association	Environment and Heritage	Preserving the heritage values and representing Catherine Hill Bay.	Catherine Hill Bay coastline intersects the BMG spill EMBA.
Australian Oceanographic Services Pty Ltd	Oil and Gas exploration and production Fisheries	Oil and Gas and Fishery Liaison with interested in work being undertaken in the area.	Relevant Person has requested information on Cooper Energy's activities and has offered services to support Cooper Energy's offshore activities.
Golden Beach VMMR Recreation Reserve Club	Community interest	Recreation reserve and community hub home to bowls, bush walking and food and drink.	Recommended for inclusion by Wellington Shire Council as local area coastline intersects the spill EMBA.
Golden Paradise Beach Ratepayers and Residents Association	Community interest	Members based not for profit Volunteer Organisation providing a range of services and advocacy for the communities of Golden and Paradise Beach, in Gippsland, Victoria.	Recommended for inclusion by Wellington Shire Council as local area coastline intersects the spill EMBA.
Port Albert Progress Association	Community Interest	Represents local community through involvement in events, fundraising, improvement of facilities and works with local government on development and community planning issues.	Recommended for inclusion by Wellington Shire Council as local area coastline intersects the spill EMBA.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Seaspray Ratepayers Association	Community Interest	Local community group involved in Seaspray developments and planning with a focus on growing Seaspray into a premier tourism destination.	Recommended for inclusion by Wellington Shire Council as local area coastline intersects the spill EMBA.
Yarram / Port Albert / Tarraville Anglican Church and Markets	Community Interest	Anglican church and parish community markets in Yarram and Tarraville Victoria	Recommended for inclusion by Wellington Shire Council as local area coastline intersects the spill EMBA.
Ports / Ports Operators			
Port Authority NSW	Marine Safety Water Quality	Port Authority of NSW that manages the navigation, security and operational safety needs of commercial shipping in NSW. Encompasses Port Kembla, Port of Eden, Port Botany and Newcastle.	Information being provided to port / operators within the spill EMBA.
Gippsland Ports	Marine Safety Water Quality Emergency Response	Gippsland's local ports stretch over 720 kms from Anderson Inlet to Mallacoota on the south-eastern coastline of Victoria, Snowy River (Marlo), Gippsland Lakes, Corner Inlet and Port Albert, Anderson Inlet (Inverloch) and four waterways.	Information being provided to port / operators within the spill EMBA. Gippsland ports would be involved in the emergency response in the event of a spill.
Recreational Fishing			
Recreational Fishing (NSW)	Fishing Access to fishing areas Ecosystem/fish health Sustainability of fisheries	Aiming to be recognised as the peak body of NSW and represent the interests of the recreational anglers of NSW	Recreational fishing vessels may intersect with the spill EMBA.
Victoria Game Fishing Club	Fishing Access to fishing areas Ecosystem/fish health Sustainability of fisheries	The premier game fishing club in the southern states of Australia	Recreational fishing vessels may intersect with the spill EMBA.
Victorian Bays and Inlets Fisheries Association	Fishing Access to fishing areas Ecosystem/fish health Sustainability of fisheries	Members organisation that act as custodians of marine resources and the environment. Members promote and demonstrate ecologically sustainable and thriving bay and inlet Fisheries and ensure the continued supply of high quality, locally caught fresh seafood, which is valued by the Victorian community.	Recreational fishing vessels may intersect with the spill EMBA.
Victorian Recreational Fishers Association (VRFish)	Fishing Access to fishing areas Ecosystem/fish health Sustainability of fisheries	Peak body representing recreational fishing interests in Victorian waters.	Recreational fishing vessels may intersect with the spill EMBA.
Recreational Groups			
Academy of Scuba	Changes in water quality Tourism Fish and invertebrates	Ocean diving training centre	Information being provided to recreational groups with shoreline location and water-based focus within EMBA.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
	Fish and invertebrates spawning Ecosystem / fish health Marine fauna		
Boating Industry Association of Victoria	Ecosystem health Water quality	Peak body for the marine sector with members comprising registered boat owners, marine license holders, and boating participants in Victoria.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Dive Industry Association of Australia	Changes in water quality Tourism Fish and invertebrates Fish and invertebrates spawning Ecosystem / fish health Marine fauna	Encourages the exchange of ideas and information on diving-related issues; to seek solutions to matters of common concern, and to offer practical advice and support to its constituent membership.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Diving Industry of Victoria	Fish and invertebrates Fish and invertebrates spawning Ecosystem / fish health Marine fauna Changes in water quality Tourism	Promoting and supporting the diving industry. Activities include liaison with government bodies and authorities on marine conservation, environmental issues and other matters that affect the diving industry and the sport of diving in Victoria.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Ocean Racing Club of Victoria	Ecosystem health Water quality	Club which conducts regular offshore racing in Victoria. Home of blue water classic Melbourne to Hobart and Rudder Cup yacht races (noting route goes along west coast of Tasmania).	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Paddle NSW	Water quality Ecosystem health	Peak body for recreational and competitive paddling in NSW.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Paddle Victoria	Water quality Ecosystem health	Members organisation to support the paddling community	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
SCUBA Divers Federation of Victoria	Fish and invertebrates Fish and invertebrates spawning Ecosystem / fish health Marine fauna Changes in water quality Tourism	Amateur organisation representing diving clubs throughout Victoria.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Surfing Victoria	Ecosystem health Water quality	Governing and organising body for surfing in Victoria.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Windsurfing NSW Association	Water quality Ecosystem health	A network of affiliated windsurfing clubs across NSW.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Windsurfing Victoria	Ecosystem health Water quality	Represents the community of windsurfers in Victoria, and promotes all aspects of the sport locally. Windsurfing Victoria is the public voice promoting windsurfing and lobbying to protect access to preferred spots around the State.	Information being provided to recreational groups with shoreline location and water-based focus within the spill EMBA.
Research Groups			
Blue Whale Study	Pygmy blue whale conservation	International research collaboration interested in pygmy blue whale migration in south-east Australia.	Pygmy blue whales have the potential to be impacted by the activity. Potential overlap between the activity or EMBA and the blue whale study area. Sharing of sightings data collected during offshore campaigns.
Deakin University - School of Life and Environmental Sciences	Marine flora and fauna Research Ecosystem health Water quality	Academic Institution with interests and expertise in the marine environment, including built environments and interactions with marine fauna.	Cooper Energy has previously worked with Deakin University to undertake a habitat study focusing on BMG infrastructure. Petroleum activity with potential impacts and risks to the environment (Section 6.0); therefore, Relevant Person functions, interests, and activities may be affected.
Fisheries Research and Development Corporation	Ecosystem health Water quality Aquaculture Fisheries	A co-funded partnership between the Australian Government and the fishing and aquaculture sectors, to plan and invest in fisheries research, development and extension activities in Australia.	Petroleum Activity and spill EMBA intersect numerous fisheries.
Fishwell Consulting	Ecosystem health Water quality Aquaculture Fisheries	Research advice and consulting services to encourage and promote sustainable fishing practices to the commercial fishing industry within Australia.	Petroleum Activity and spill EMBA intersect numerous fisheries.
Institute for Marine and Antarctic Studies (IMAS) – University of Tasmania	Climate change Water quality Ecosystem health	Research body in marine and Antarctic science between the University of Tasmania, CSIRO Marine and Atmospheric Research, the Australian Antarctic Division and other agencies. Research interests in various environment values and sensitivities and support for further research programs with common interests.	Other EPs in the Gippsland area have included this group in consultation upon their request. Broad area of research interest extends beyond Tasmania.
Surf Life Saving Clubs			
Lakes Entrance Surf Life Saving Club	Water Quality	Community club undertaking beach patrols, surf sport, events and community social functions.	Relevant coastal area lies within spill EMBA.

Relevant Person	Functions, Interests, Activities	Activity relevance	Reason for inclusion
Life Saving Victoria	Water Quality	Organisation works with communities, educational institutions, governments, businesses and the broader aquatic industry to achieve new lifesaving and water safety initiatives.	Relevant coastal area lies within spill EMBA.
Seaspray Surf Lifesaving Club	Water Quality	Community club undertaking beach patrols, surf sport, events and community social functions.	Relevant coastal area lies within spill EMBA. Recommended by Wellington Shire Council for inclusion.
Tourism			
NSW Tourism Industry Council	Socio-economic Coastline ecosystem health Water quality Marine fauna	NSW Tourism Industry Council helps businesses operating in the visitor economy.	Tourism operators are present in the spill EMBA
Victorian Tourism Industry Council	Ecosystem health Water quality Marine fauna	Peak tourism industry body advocating for Victoria's tourism and events industry. Represents over 1,000 businesses, providing opportunities for members to connect and keep informed on the latest research, policy development and impacts that shape the Victorian visitor economy.	Tourism operators are present in the spill EMBA

***Actively fish within the vicinity of BMG. Although multiple fisheries can legally fish in the area, only a few actually do due to the unsuitability of the area (depth/habitat) and/or the relative lack of target species.*

10.3 Summary of Relevant Persons Consultation

Appendix 5 provides a summary of the Relevant Person consultation undertaken as part of revising the EP and where applicable an assessment of any claims or objections.

All Relevant Person consultation activities along with any actions required and commitments made, are recorded and tracked via a stakeholder engagement register.

10.4 Assessment of Claims and Feedback

Cooper Energy assesses the merit of any claims or objections in line with the following process that also applies to new objections or claims received during ongoing consultation.

For a claim to have merit, it must first and foremost be relevant to 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 all reasonable matters should be assessed when considering the objects of the Regulations.

Once a claim or objection is considered both relevant and reasonable, Cooper Energy will respond as follows:

1. If the matter raised is already considered in the EP, respond through the sharing of this information for the consideration of the Relevant Person.
2. If the matter raised results in the development of additional controls through further impact and risk evaluations, the Cooper Energy Management of Change Process shall be applied, and the outcomes will be 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 without the Relevant Person being satisfied with the outcome. Cooper 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 First Nations spiritual aspects, Cooper Energy will work with the Relevant Person to gain an appropriated understanding of the issue(s) and aim to work collaboratively to manage impacts and risks.

10.5 Ongoing Consultation

Consultation for the BMG development and decommissioning scopes has spanned a number of decades. The activities and management described within this EP are informed by historical and present consultation and will continue to be shaped by feedback from Relevant Persons.

Since the commencement of consultation on the BMG decommissioning activities the timing of the offshore scope has shifted. Cooper Energy will continue to provide annual updates to Relevant Persons with up-to-date timeframes. More detailed and more frequent updates will be provided to Relevant Persons as the campaign approaches in accordance with agreed communications with particular Relevant Persons.

Further consultation for the planning and execution phases is described in Table 10-3. Note, whilst NOPSEMA are not considered a ‘Relevant Person’, they are included here for completeness. The assessment of merit of any new claims or objections will be in accordance with the method outlined above.

During a mid-2023 emergency response exercise, it was noted there was a gap in contacts from the boundary of the GunaiKurnai RAP area and Eden (NSW) LALC. Victoria DTP advised they will coordinate necessary contacts in the case of an emergency event as the numerous very small groups are not part of a formal organisation. As noted below, Cooper Energy will also endeavour to contact these groups as part of its ongoing consultation.

Table 10-3 BMG Closure Project ongoing engagements

Ongoing Engagements	Timing	Person or Organisation
Annual progress reports to the regulator (Direction 824).	Annual by 31 December.	NOPSEMA
Regular project updates with Regulator	6-monthly, as advised by regulator	NOPSEMA

Ongoing Engagements	Timing	Person or Organisation
Provision of operational activity plans and Cooper Energy contact person flyer with updates on timing and activity details.	Annual (typically Q1) until this EP is closed or replaced.	Relevant stakeholders
Risk Reviews (fishery activity).	6-monthly	Fisheries
Meetings, calls, enquiries and follow up	Ongoing. Stakeholder engagement inbox is monitored throughout the planning and execution phases.	Relevant Persons
Regulatory notification of start of an activity.	10 days prior to activity commencing	NOPSEMA
Courtesy notifications of vessel activities	Prior to activity commencing	South Gippsland Shire Council
Provision of cetacean sightings	Within 2 months of activity completion	AAD Blue Whale Study
Other notifications as agreed during consultation	As agreed, and captured in the notifications register	Relevant persons
Notification to Eden LALC (ELALC) and GunaiKurnai Land and Waters Aboriginal Corporation (GLaWAC) in the event of an emergency spill scenario.	After activation of the OPEP, in line with OPEP notification requirements	ELALC and GLaWAC
Notification of start of activity for publication of AUSCOAST warning and notice to mariners.	3 weeks prior to activity commencing	AHS
	24-48 hours prior to activity commencing	AMSA-JRCC
Notification to trawl fisheries of on-water activity. Notification to include: • type of activity • location of activity: coordinates and/or map • timing of activity: start and finish date and duration	4 weeks prior to activity commencing Then, 1 day prior to activity commencing	SETFIA, who will provide SMS to eastern fleet.
Notification to trawl fisheries of cessation of on-water activity	Within 10 days of activity completion	
Regulatory notification of cessation of an activity	Within 10 days of activity completion	NOPSEMA
Notification of cessation of activity to cease warnings for an activity	On vessel demobilisation from field	AHS AMSA-JRCC
Notifications and Consultation in the event of an Oil Pollution Emergency.	Refer to Section 2.4 of the Offshore Victoria OPEP	Control Agencies Regulators Relevant Persons

Cooper Energy shall determine through internal risk assessment, whether a risk or impact is considered 'significant' (i.e., has resulted in an increased residual risk ranking) based on information available at that time (e.g., reviewed scientific information, Relevant Person claims or concerns). If the outcome of the assessment suggests that impacts and risks are new or significantly increased, then this will trigger a revision to the EP as described in Section 9.10. Under sub regulation 8(1) it is an offence for a titleholder to continue if a new impact or risk, or significant increase in an impact or risk not provided for in the EP in force is identified.

Notification to Relevant Persons of significant new or increased risks will be issued prior to submission of the revised EP as part of an ongoing and/or a new consultation process for the revised EP.

11.0 References

11.1 Cooper Energy Documents

Document Number	Document Name
Cooper Energy Documents	
17-033-RP-001	BMG Technical Considerations for Decommissioning of Subsea Infrastructure
17-033-RP-002	BMG Technical Considerations for Decommissioning of the B6 Flowline and Umbilical
BMG-DC-EMP-0001	BMG Closure Project (Phase 1) EP
BMG-EN-EMP-0002	2018 BMG Well Abandonment EP (concluded)
BMG-IT-IMP-0001	BMG Facilities Integrity Management Plan
CMS-RM-PRO-0001.02	Cooper Energy Risk Management Protocol
COE-EN-EMP-0001	Cooper Energy Description of the Environment
CMS-EN-PCD-0001	Cooper Energy Environmental Protocol
CMS-EN-PCD-0004	Cooper Energy Offshore Chemical Assessment Procedure
CMS-EN-PCD-0006	Cooper Energy Invasive Marine Species Protocol
CMS-EN-PRO-0002	Invasive Marine Species Risk Management Protocol
CMS-ER-PRO-0001	Incident Investigation and Reporting Protocol
CMS-ER-PRO-0002	Crisis Management Protocol
CMS-HS-POL-0001	Health, Safety and Environment Policy
CMS-HR-PCD-0004	Training and Development Procedure
CMS-TS-PRO-0002	Management of Change (MoC) General Protocol
COE-ER-ERP-0001	Cooper Incident Management Plan
BMG-DC-WMP-0001	BMG Well Operations Management Plan
BMG-HS-SMP-0001	BMG Field Safety Case
VIC-EN-EMP-0002	Gippsland Offshore Operations EP
VIC-ER-EMP-0001	Offshore Victoria Oil Pollution Emergency Plan
VIC-ER-EMP-0002	Victoria Operational and Scientific Monitoring Plan
VIC-SS-REP-4900-0001	Basker Manta Gummy Results Final Report- Volume 2 (Multifield IRM)

11.2 Guidance

Document Number	Document Name
NOPSEMA Guidance	
N-04300-GN0166	ALARP Guidance Note, August 2022
N04750-GN1344	Guidance Notes for EP Content Requirement December 2022
N-04750-GL1721	Guideline - Environment plan decision making December 2022
N-04750-IP1899	Reducing marine pest biosecurity risks through good practice management Information paper, November 2022
N-00500-PL1903	Section 572 Maintenance and removal of property Policy, December 2022
N-00500-PL1959	Section 270 Consent to surrender title - NOPSEMA advice, June 2022
N-04750-GN1488	Oil Pollution Risk Management, Guidance Note, February 2021
A652993	Environment Bulletin – Oil Spill, April 2019
N-09000-GN1661	Vessels Subject to the Australian Offshore Petroleum Safety Legislation, Guidance Note, October, 2020
A705589	Consultation with Commonwealth agencies with responsibilities in the marine area, January 2023
N-04750-GL2086 A900179	Consultation in the course of preparing an environment plan, December 2022

Document Number	Document Name
Other Guidance	
DCCEEW	National Light Pollution Guidelines for Wildlife Including marine turtles, seabirds and migratory shorebirds
Department of the Environment and Energy	EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species
DCCEEW	EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans
Department of Agriculture, Water and the Environment	National biofouling management guidelines for the petroleum production and exploration industry
Department of Agriculture, Water and the Environment	Anti-fouling and In-water Cleaning Guidelines
Department of the Environment and Energy	Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life
Department of the Environment and Energy	National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna
Victorian Joint Industry	Victorian Joint Industry and State Oil Pollution Responses, Guidance Note, December 2022
GOMO 0611-1401	Guidelines for Offshore Marine Operations GOMO 0611-1401 (2013)
HB 203:2012	Environmental Risk Management – Principles and Process
IMO MEPC/Res.207(62)	Guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species
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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
AFMA	Australian Fisheries Management Authority
AHS	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
ANZECC	Australian and New Zealand Environment and Conservation Council
API	American Petroleum Institute
APPEA	Australian Petroleum Production and Exploration Association
ATBA	Area to be Avoided
AUSCOAST	Coastal Navigational Warnings
AVCZ	Abalone Victoria Central Zone
BAM	Basker Manifold
BAS	Biosecurity & Agriculture Services
BIA	Biologically Important Area
BMG	Basker Manta Gummy
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
Ca	Calcium
CA	Comparative Assessment
CAS	Chemical Abstracts Service
CE	Critically endangered
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEMS	Cooper Energy Management System
CFA	Commonwealth Fisheries Association
CH_4	Methane
CHIRP	Compressed High-Intensity Radar Pulse
Cl	Chloride
CMA	Commonwealth Marine Area
CMP	Conservation Management Plan
CO_2	Carbon Dioxide
CO_3	Carbonate
COE	Cooper Energy
COLREGs	International Regulations for Preventing Collisions at Sea 1972

Term	Definition
Cooper Energy	Cooper Energy Limited
COVID	Coronavirus Disease
CP	Cathodic Protection
CSV	Construction Support Vessel
d	distribution
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture, Water and the Environment (now DAFF and DCCEEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEECA	Department of Energy, Environment, and Climate Action
DEWHA	Department of the Environment, Water, Heritage and the Arts
DFAT	Department of Foreign Affairs and Trade
DISER	Department of Industry, Science, Energy and Resources
DJSIR	Department of Jobs, Skills, Industry and Regions
DNV	Det Norske Veritas (this Company set standards for ships and offshore structures)
DoNP	Director of National Parks
DP	Dynamic Positioning
DPIPWE	Department of Primary Industries, Parks, Water and Environment
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DCCEEW)
DTP	Department of Transport and Planning
EEZ	Economic Exclusive Zones
EHU	Electro-Hydraulic Umbilical
EIA	Environmental Impact Assessment
EIO	Eastern Indian Ocean
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*
EPA	Environmental Protection Authority
EPO	Environmental Performance Outcomes
EPS	Environmental Performance Standards
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
ESD	Ecologically Sustainable Development
f	foraging
(F)	Far
FPSO	Floating Production Storage and Offloading
GDA94	Geocentric Datum of Australia 1994
GHG	Greenhouse gases

Term	Definition
GOMO	Guidelines for Offshore Marine Operations
HCO_3	Bicarbonate
HDPE	High-Density Polyethylene
HSEC	Health, Safety, Environment and Community
I	Endangered
(I)	Intermediate
IC	Incident Controller
ISO	International Organization for Standardization
IAP	Incident Action Plan
ID	Identification
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
kcr	known core range
KEF	Key Ecological Features
ky	1000 years
LALC	Local Aboriginal Land Council
LEFCOL	Lakes Entrance Fishermen's Society Cooperative Limited
LOC	Loss of Control
LT	Listed Threatened
MAE	Major Accident Events
MAH	Monoaromatic Hydrocarbons
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

Term	Definition
MFE	Mass Flow Excavation
Mg	Magnesium
MMO	Marine Mammal Observer
MNES	Matters of National Environmental Significance
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit
MPA	Marine Protected Area
MS	Management System
(N)	Near
Na	Sodium
NEBA	Net Environmental Benefit Analysis
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
OGUK	Oil and Gas UK (formerly UKOOA)
OH	Hydroxide
OIM	Offshore Installation Manager
OIW	Oil in Water
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OSMP	Operational and Scientific Monitoring Plan
OSPAR	Oil Spill Prevention, Administration and Response
OWR	Oiled wildlife Response
P&A	Plug and Abandonment
PAH	Polynuclear Aromatic Hydrocarbons
PAM	Passive Acoustic Monitoring
pf	possible foraging

Term	Definition
PHPA	Partially Hydrolyzed Polyacrylamide
PK	Peak Pressure Levels
PLONOR	Pose Little or No Risk to the Environment
PMS	Planned Maintenance System
PMST	Protected matters search tool
PNEC	Predicted No effect
PPD	Pour Point Depressant
PTS	Permanent Threshold Shift
PSV	Platform Support Vessel
PSZ	Petroleum Safety Zone
PW	Produced Water
R_{MAX}	Maximum Horizontal Distance
RMS	Root-Mean-Square
ROV	Remotely Operated Vehicles
RPS	RPS Group
SEEMP	Ship Energy Efficiency Management Plan
SEL	Sound Exposure Level
SESSF	Southern and Eastern Scalefish and Shark Fisher
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
SPRAT	Species Profile and Threats
SRL	Southern Rock Lobster
SSF	Sustainable Shark Fishing
SSIA	Southern Shark Industry Alliance
TDS	Total dissolved Solids
TEC	Threatened Ecological Communities
TPC	Third Party Contractors
TRH	Total Recoverable Hydrocarbons
TRP	Tactical Response Plans
TSSC	Threatened Species Scientific Committee
TTS	Temporary Threshold Shift

Term	Definition
UAV	Unmanned Aerial Vehicles
UK	United Kingdom
UTA	Umbilical Termination Assembly
US	The United States of America
USBL	Ultra-Short Baseline
V	Vulnerable
VFA	Victorian Fishery Authority
VIC/RL	Victoria Retention Lease
VRLA	Victorian Rock Lobster Association
WBM	Water Based Mud
WOMP	Well Operations Management Plan

Appendix 1 Legislative Requirements Relevant to the Activity

Table A 1: Commonwealth Legislation/Requirements

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Related International Conventions	Authority
Australian Ballast Water Management Requirements	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).	Department of Agriculture Fisheries and Forestry
Australian Biofouling Management Requirements	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	Department of Agriculture Fisheries and Forestry
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 • 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.	AMSA
Biosecurity Act 2015 **Biosecurity Regulations 2016**	The *Biosecurity Act 2015* replaced the Q*uarantine 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	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).	Department of Agriculture Fisheries and Forestry

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Related International Conventions	Authority
	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. 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 • water trigger for coal seam gas and coal mining developments.	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 Species of Wild Animals (Bonn Convention) 1979 • convention on International Trade in Endangered Species of Wild Fauna and Flora 1973 (CITES)	DCCEEW

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Related International Conventions	Authority
	The assessment process is overseen by NOPSEMA as the delegated authority under the EPBC Act.		• 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
National Biofouling Management Guidance for the Petroleum Production and Exploration Industry 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 • UN 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	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***	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.	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:	• International Convention for the Prevention of Pollution from Ships 1973/78 (MARPOL 73/78)	AMSA

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Related International Conventions	Authority
Pollution from Ships) Act 1983 (Cth)	The Act regulates: • vessel survey and certification • vessel construction standards • vessel crew • personnel qualifications and welfare • 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 Part 21: Safety of navigation and emergency procedures • MO Part 30: Prevention of collisions • MO 31: SOLAS and non-SOLAS certification. • MO 47: Offshore industry units • MO Part 57: Helicopter operations • MO Part 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.	• International Regulations for Preventing Collisions at Sea 1972 (COLREGs)	
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)** **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 ecologically sustainable development as set out in section 3A of the EPBC Act • so that environmental impacts and risks of the Activity are reduced to ALARP. • 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 ecologically sustainable development, and that impacts and risks resulting from these activities are ALARP and acceptable is provided in Section 6.0 of this EP.	None applicable	NOPSEMA
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:	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.	• Montreal Protocol on Substances that Deplete the Ozone Layer 1987	DCCEEW

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Related International Conventions	Authority
	• 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.	Relevant management measures are presented in Section 6.0 of this EP.	• United Nations Framework Convention on Climate Change 1992.	
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. This Act also requires that Australian ships must hold 'anti-fouling certificates', provided they meet certain criteria.	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. The management of risk is discussed in Section 6.0.	International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001	AMSA
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 place	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. Shipwreck database identifies a historical shipwreck site within the Operational Area, however consultation with DAWE (now	• 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
	a particular site at risk of interference. The Act prohibits any activities within this zone unless a permit has been obtained.	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
***Emergency Management Act 2013* & Regulations 2003**	The regulations provide for the establishment of governance arrangements for emergency management in Victoria, including 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.	Emergency response structure for managing emergency incidents within Victorian waters. Emergency management structure will be triggered in the event of a spill threatening State waters. Emergency response arrangements are detailed in 0 and the OPEP.	Department of Justice and Regulation (Inspector General for Emergency Management)
***Environment Protection Act 1970* and amendments & Regulations**	This is the key Victorian legislation that controls discharges and emissions (air, water) to the environment within Victoria (including state and territorial waters). It gives the Environment Protection Authority (EPA) powers to licence premises discharges to the marine environment, control marine discharges and to undertake prosecutions. Provides for the maintenance and, where necessary, restoration of appropriate environmental quality. This legislation provides the regulatory framework by imposing restrictions and controls on waste related activities of individuals and corporate bodies, as well as setting out the responsibilities of certain government agencies involved in regulating waste. The State Environment Protection Policy (Waters of Victoria) designates: • spill response responsibilities by Victorian Authorities to be undertaken in the event of spills (DTP) with EPA enforcement consistent with the *Environment Protection Act 1970* and the Pollution of Waters by Oil & Noxious Substances Act 1986	No vessels involved in petroleum activities for the activity will be located in Victorian waters. Requirements of this act are triggered if an oil spill event threatens state waters.	Environment Protection Authority (EPA)

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
	• requirements for vessels to not discharge to surface waters sewage, oil, garbage, sediment, litter or other wastes which pose an environmental risk to surface water beneficial uses. • the SEPP (Air Quality Management) implements MARPOL Annex VI requirements by the following: - Clause 33 – Management of Greenhouse Gases - Clause 35 – Management of Ozone Depleting Substances - Clause 36 – Management of other mobile sources.		
Environment Protection Act 2017	From July 2021, the EPA will enforce new laws aimed at preventing harm to public health and the environment from pollution and waste. Following the recommendations of a public enquiry, this new Act gives the EPA enhanced powers to prevent risks to the environment and human health. A key element to the new Act is the general environmental duty GED), which shifts the expectation to businesses to: • reduce the risks of harm to the environment. • manage activities to avoid the risk of environmental damage. • respond to a pollution event if it occurs.	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 0.	EPA
***Flora and Fauna Guarantee Act 1988 (FFG Act) &* Regulations 2011**	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 4.4.1. 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* & Heritage (Historical Shipwrecks) Regulations 2007**	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 zones, and the prohibition of certain activities in relation to historic shipwrecks.	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 the area of the proposed activities are described in Section 4.4.2 of this EP. Where relevant, management measures are presented in Section 6.0 of this EP.	Heritage Victoria (DEECA)

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
***Marine Safety Act 2010* & Regulations 2012**	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 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 10.0.	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. 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)	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 any potential overlaps or gaps in emergency response planning. Relevant Person consultation undertaken is detailed in Section 10.0. Emergency response arrangements are detailed in Section 7.0 and the OPEP.	Jointly administered by Environment Protection Authority of Victoria; the Director, Transport Safety; and the Health and Safety Organisation
***Wildlife Act 1975* & Regulations 2013**	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 2009 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 9.0 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
Marine Parks Act 1997	This Act provides for the protection and management of marine areas.	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 10.0.	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.	All ships involved in petroleum activities in NSW waters are required to abide to the requirements under this Act. 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 10.0.	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 10.0. 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 10.0. 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	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.	NSW National Parks and Wildlife Service

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
	limiting activities likely to damage flora, fauna and cultural heritage.	Reporting requirements provided in Section 9.0 of this EP.	

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 8.0 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 4.0of this EP. Relevant management measures are presented in Section 8.0 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 safe operation of vessels in Tasmanian waters and managing its marine facilities.	Applicable to vessel masters, owners, crew operating vessels in Tasmanian State waters. 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 8.0 of this EP.	Marine and Safety Tasmania
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.	Parks and Wildlife Service Tasmania

Legalisation/ Requirement	Scope	Applicability to the Activity (*under the OPGGS(E)R*)	Authority
		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 10.0.	
Pollution of Waters by Oil and Noxious Substances Act 1998	This Act is the Tasmanian state legislation giving effect to the requirements of MARPOL 73/78 within state waters, and is responsible for ensuring preparedness for and response to oil and chemical spills in Tasmania	All ships involved in petroleum activities in Tasmanian waters are required to abide to the requirements under this Act. 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 (COE-EN-EMP-0001)

Appendix 3 Protected Matters Search Report (PMST)

Appendix 3.1 PMST (Operational Area)

Appendix 3.2 PMST (EMBA)

Appendix 3.3 PMST (Light EMBA)

Appendix 3.4 PMST (Noise Exposure Area)

Appendix 3.5 PMST (Spill EMBA – Surface)

Appendix 3.6 PMST (Spill EMBA – Shoreline)

Appendix 3.7 PMST (Spill EMBA – In water)

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 (under assessment

Appendix 5 Relevant Person Consultation

Appendix 5 Provides Summary and Assessment of Merit of Claims

Appendix 5.1 to 5.4 [Full consultation records including sensitive information]

Appendix 6 BMG Field Architecture Deconstruction Report