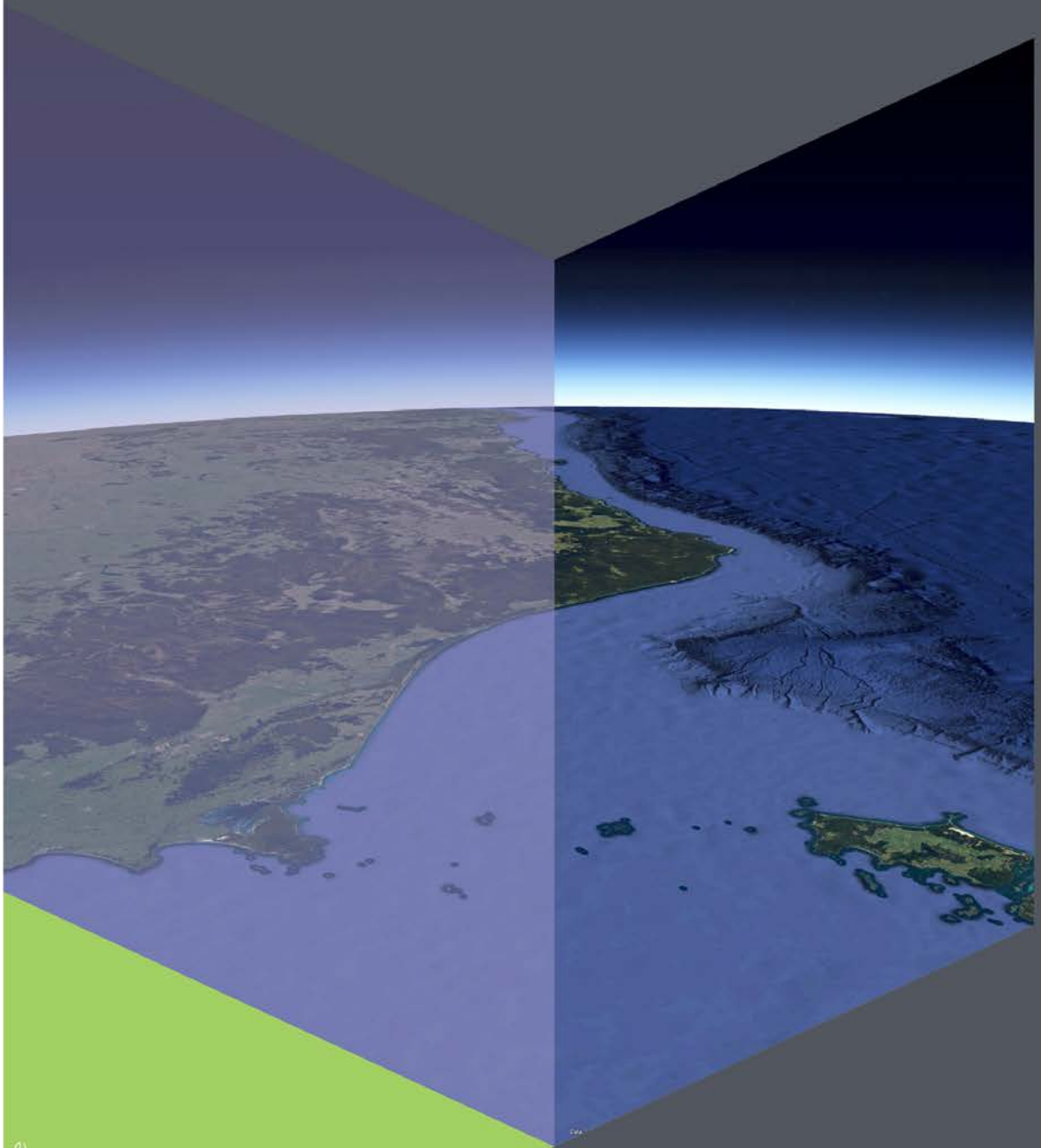
CarbonNet Project

Offshore Appraisal Well Environment Plan Summary



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29 April 2019

Australian Government
Department of Industry, Innovation and Science

VICTORIA State Government
Jobs, Precincts and Regions

DOCUMENT ACCEPTANCE and RELEASE NOTICE

This is Revision 0 of the CarbonNet Project's Offshore Appraisal Well (OAW) Environment Plan (EP). This is a managed document. Changes will only be issued as a complete replacement document. Recipients should remove superseded versions from circulation.

PREPARED FOR ACCEPTANCE DATE: 29/04/2019

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APPROVED FOR RELEASE DATE: 29/04/2019

Ross McGowan, Executive Director, Earth Resources Economic Development, Department of Jobs, Precincts and Regions

BUILD STATUS

Rev	Date	Author	Purpose	Reviewers
0	29/04/2019	G. Pinzone	Issued for acceptance	NOPSEMA
B	24/04/2019	G. Pinzone	CarbonNet review	I. Filby, S. Marshall, G. Murray, V. Mendes da Costa
A	23/04/2019	G. Pinzone	AGR review	P. Harrick

This document was prepared for the CarbonNet Project team within the Victorian Department of Economic Development, Jobs, Transport and Resources (DEDJTR). Due to recent machinery of government changes that came into effect on 1 January 2019, the former DEDJTR has transitioned into the new Department of Jobs, Precincts and Regions (DJPR), and the new Department of Transport. The CarbonNet Project team is now part of DJPR. DJPR has inherited the DEDJTR management systems and procedures discussed within this document.

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Acronyms

Acronym	Definition
2D	Two-dimensional
3D	Three-dimensional
3DMSS	Three-dimensional Marine Seismic Survey
ABS	Australian Bureau of Statistics
AFMA	Australian Fisheries Management Authority
AHO	Australian Hydrographic Office
ALARP	As Low As Reasonably Practicable
AMAR	Autonomous Multi-channel Acoustic Recorders
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
APPEA	Australian Petroleum Production and Exploration Association
AS/NZS	Australian Standard/New Zealand Standard
ASBTIA	Australian Southern Bluefin Tuna Industry Association
ATBA	Area To Be Avoided
BIA	Biologically Important Area
BML	Below Mud Line
BOD	Biological Oxygen Demand
BoM	Bureau of Meteorology
BOP	Blow Out Preventer
BPEM	Best Practice Environmental Management
CCS	Carbon Capture and Storage
CEFAS	Centre for Environment, Fisheries and Aquaculture Science (UK)
CER	Commission for Energy Regulation (UK)
CFA	Commonwealth Fisheries Association
CHARM	Chemical Hazard and Risk Management
CO_2	Carbon Dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
DAWR	Department of Agriculture and Water Resources (Cth)
DDR	Daily Drilling Report
DEDJTR	Victorian Department of Economic Development, Jobs, Transport and Resources (Vic) (*former*)

Acronym	Definition
DELWP	Department of Environment, Land, Water and Planning (Vic)
DIIS	Department of Industry, Innovation and Science (Cth)
DIRD	Department of Industry and Regional Development (Cth)
DJPR	Department of Jobs, Precincts and Regions (Vic)
DMC	Drilling Management Contractor
DNV	Det Norske Veritas
DoD	Department of Defence (Cth)
DoE	Department of the Environment (Cth) (*former*)
DoEE	Department of Environment and Energy (Cth)
DP	Dynamic Positioning / Dynamically Positioned
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities (Cth) (*former*)
DST	Drill Stem Test
EAC	East Australian Current
EARPL	Esso Australia Resources Pty Ltd
EIA	Environmental Impact Assessment
EIAPP	Engine International Air Pollution Prevention
EMBA	Environment that May Be Affected
EMB	Emergency Management Branch (of DJPR)
EMS	Environmental Management System
EP	Environment Plan
EPA	Environment Protection Authority (Vic)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ERA	Environmental Risk Assessment
ERC	Emergency Response Coordinator
ERP	Emergency Response Plan
ERR	Earth Resources Regulation (division of DEDJTR)
ERT	Emergency Response Team
ESD	Environmentally Sustainable Development
ETBF	Eastern Tuna and Billfish Fishery
FAQ	Frequently Asked Questions
FE	Formation Evaluation
FFG Act	*Flora and Fauna Guarantee Act 1988* (Vic)
FPSO	Floating Production Storage Offloading
G&G	Geophysical and Geotechnical
GHG	Greenhouse Gas

Acronym	Definition
GLaWAC	Gunaikurnai Land & Waters Aboriginal Corporation
GMDSS	Global Maritime Distress Safety System
GMP	Garbage Management Plan
GoM	Gulf of Mexico
GPS	Global Positioning System
HQ	Hazard Quotient
HSE	Health, Safety and Environment
IADC	International Association of Drilling Contractors
IAP	Incident Action Plan
IAP2	International Association for Public Participation
IAPP	International Air Pollution Prevention
IEE	International Energy Efficiency
ILUA	Indigenous Land Use Agreements
IMO	International Maritime Organisation
IMS	Invasive Marine Species
IMS	Integrated Management System
IMT	Incident Management Team
IOPP	International Oil Pollution Prevention
IPP	International Pollution Prevention
ISO	International Standards Organisation
ISPP	International Sewage Pollution Prevention
ITOPF	International Tanker Owners Pollution Federation Ltd
JAMBA	Agreement between the Government and Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment
KEF	Key Ecological Feature
LAT	Lowest Astronomical Tide
LWD	Logging While Drilling
MARPOL	International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978
MBC	Maritime Border Command
MDO	Marine Diesel Oil
MLS	Mudline Suspension
MMO	Marine Mammal Observer
MNES	Matter/s of National Environmental Significance
MNP	Marine National Park
MO	Marine Order
MoC	Management of Change

Acronym	Definition
MODU	Mobile Offshore Drilling Unit
MSS	Marine Seismic Survey
MSV	Maritime Safety Victoria
MWD	Measurement While Drilling
N/A	Not Applicable
NEBA	Net Environmental Benefit Analysis
NNTT	National Native Title Tribunal
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Authority
NRT	National Response Team
OAW	Offshore Appraisal Well
OCNS	Offshore Chemical Notification Scheme
ODS	Ozone-Depleting Substance
OHS	Occupational Health and Safety
OIM	Offshore Installation Manager
OIW	Oil-in-Water
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act* (Cth & Vic)
OPGGS(E)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2006 (Cth)
OSMP	Oil Spill Monitoring Program
OSPAR	Oslo-Paris Conventions
OSRA	Oil Spill Response Atlas
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled Wildlife Response
OWS	Oily Water Separator
P&A	Plug & Abandon / Plugged & Abandoned
PAH	Polyaromatic Hydrocarbons
PHB	Pre-hydrated Bentonite
PMM	Project Management Manual
PMS	Planned Maintenance System
PMST	Protected Matters Search Tool
PNEC	Predicted No Effect Concentration
PP/FG	Pore Pressure/Fracture Gradient
PSZ	Petroleum Safety Zone
RAMSAR	Convention on Wetlands of International Importance especially as Waterfowl Habitat

Acronym	Definition
RMF	Risk Management Framework
RO	Reverse Osmosis
ROKAMBA	Republic of Korea Migratory Birds Agreement
ROS	Regional Outfall Sewer
ROV	Remotely Operated (underwater) Vehicle
SBM	Synthetic-based Mud
SEC	Stakeholder Engagement Coordinator
SEEMP	Ship Energy Efficiency Management Plan
SEL	Sound Exposure Level
SEP	Stakeholder Engagement Plan
SESS	Southern and Eastern Scalefish and Shark
SETFIA	South-East Trawl Fishing Industry Association
SIMOPS	Simultaneous Operations
SIV	Seafood Industry Victoria
SMPEP	Shipboard Marine Pollution Emergency Plan
SPFIA	Small Pelagic Fishery Industry Association
SPL	Sound Pressure Level
SRT	State Response Team
SSFAssn	Sustainable Shark Fishing Association
SSIA	Southern Shark Industry Alliance
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
STP	Sewage Treatment Plant
SWOP	Saline Wastewater Outfall Pipeline
TA	Temporary Abandon / Temporarily Abandoned
TDS	Total Dissolved Solids
TEC	Threatened Ecological Community
TVDBRT	Total Vertical Depth Below Rotary Table
VADA	Victorian Abalone Divers Association
VBA	Victorian Biodiversity Atlas
VFA	Victorian Fisheries Authority
VGRMF	Victorian Government Risk Management Framework
VSFA	Victorian Scallop Fisherman's Association
VSP	Vertical Seismic Profiling
WBM	Water-based Mud
WDP	Well Delivery Process
WWC	Wild Well Control

Units of Measurement

Abbreviation	Measurement
°C	Degrees Celsius
bbl	Barrel
cui	Cubic Inches
dB	Decibel/s
ha	Hectare/s
Hz	Hertz
kHz	Kilohertz
km	Kilometre/s
km/hr	Kilometres per hour
m	Metre/s
m^3	Cubic metre/s
m/s	Metres per second
MM	Million
MMbbl	Million barrels
MMscf	Million Standard Cubic Feet
mT	Metric tonne/s
nm	Nautical mile/s
ppm	Parts per million
psi	Pounds per Square Inch
scf	Standard Cubic Foot/Feet
t	Tonne/s
tpa	Tonnes per annum

1. Introduction

1.1. Background

The CarbonNet Project ('CarbonNet') is investigating the potential for establishing a commercial scale carbon capture and storage (CCS) network in Gippsland. The network would bring together multiple carbon dioxide (CO_2) capture projects in Victoria's Latrobe Valley, transporting CO_2 via a shared pipeline and injecting it into deep underground, offshore storage sites in Bass Strait.

It is envisaged that the Project will capture and store between 1 and 5 million tonnes of CO_2 per annum and have the potential to expand to 20 million tonnes per annum (tpa) or more.

1.2. Purpose

The Crown in right of Victoria is proposing to drill an Offshore Appraisal Well (OAW), (hereafter referred to as the 'OAW' or 'the activity') in Greenhouse Gas (GHG) Assessment Permit VIC-GIP-002 in Commonwealth waters of the Gippsland Basin off eastern Victoria (Figure 1.1). This activity will not involve the injection of CO_2.

This Environment Plan (EP) relates to this activity, which will be conducted entirely within Commonwealth waters in accordance with the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act 2006) (Cth).

1.3. Proponent

CarbonNet was established in 2009 by the Victorian Government to investigate the potential for a large-scale CCS network in the Gippsland region, and was awarded Commonwealth CCS Flagship status in 2012. Since this time, CarbonNet has conducted a thorough evaluation of the Gippsland nearshore region to identify and assess possible CO_2 storage formations.

CarbonNet is managed by a project team within the Victorian Department of Jobs, Precincts and Regions (DJPR) (formerly the Department of Economic Development, Jobs, Transport and Resources [DEDJTR]) (Resources Division, Earth Resources Economic Development). CarbonNet has been developed using a stage-gated approach and is currently in Stage 3 (Project Development and Commercial Establishment).

CarbonNet manages a number of GHG assessment permits on behalf of the Crown in right of Victoria to investigate their potential for GHG storage. CarbonNet has identified three contingent CO_2 storage formations that it wishes to investigate further as part of a portfolio approach to CCS in the Gippsland region. CarbonNet's preferred contingent storage formation, Pelican, is located in the VIC-GIP-002 and GGAP006386(V) GHG assessment permits.

The VIC-GIP-002 GHG assessment permit was granted on 15 May 2015. As part of its Stage 3 appraisal activities, CarbonNet has already completed the Pelican 3-dimensional (3D) marine seismic survey (MSS) in February 2018 (a large portion of which was within the VIC-GIP-002 permit) and geophysical investigations in March 2019.

1.4. Titleholder and Liaison Person Details

The Titleholder's nominated liaison contact details are provided below:

Steve Marshall
CarbonNet Operations Director
DJPR, Resources Division, Earth Resources Economic Development
Telephone: 1800 312 966
Email: carbonnet.info@ecodev.vic.gov.au

1.5. Scope of this Plan

The activity will be conducted in accordance with all applicable legislation and regulations, and specifically to meet the requirements of the OPGGS Act 2006 (Cth), and its associated Regulations.

The activity (as defined in Regulation 6 of the OPGGS (Environment) Regulations 2009), hereafter referred to as the OPGGS(E), is defined as:

> *The physical process of drilling a well, from the time that the drilling rig first jacks down its legs on site until the time it jacks up its legs and departs the location.*

CarbonNet submitted the Environment Plan (EP) to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) for assessment on the 15th of February 2019 and it was accepted on the 18th of April 2019.

This document provides a summary of the full EP accepted by NOPSEMA in accordance with Regulation 13(E)(4) of the OPGGS(E).

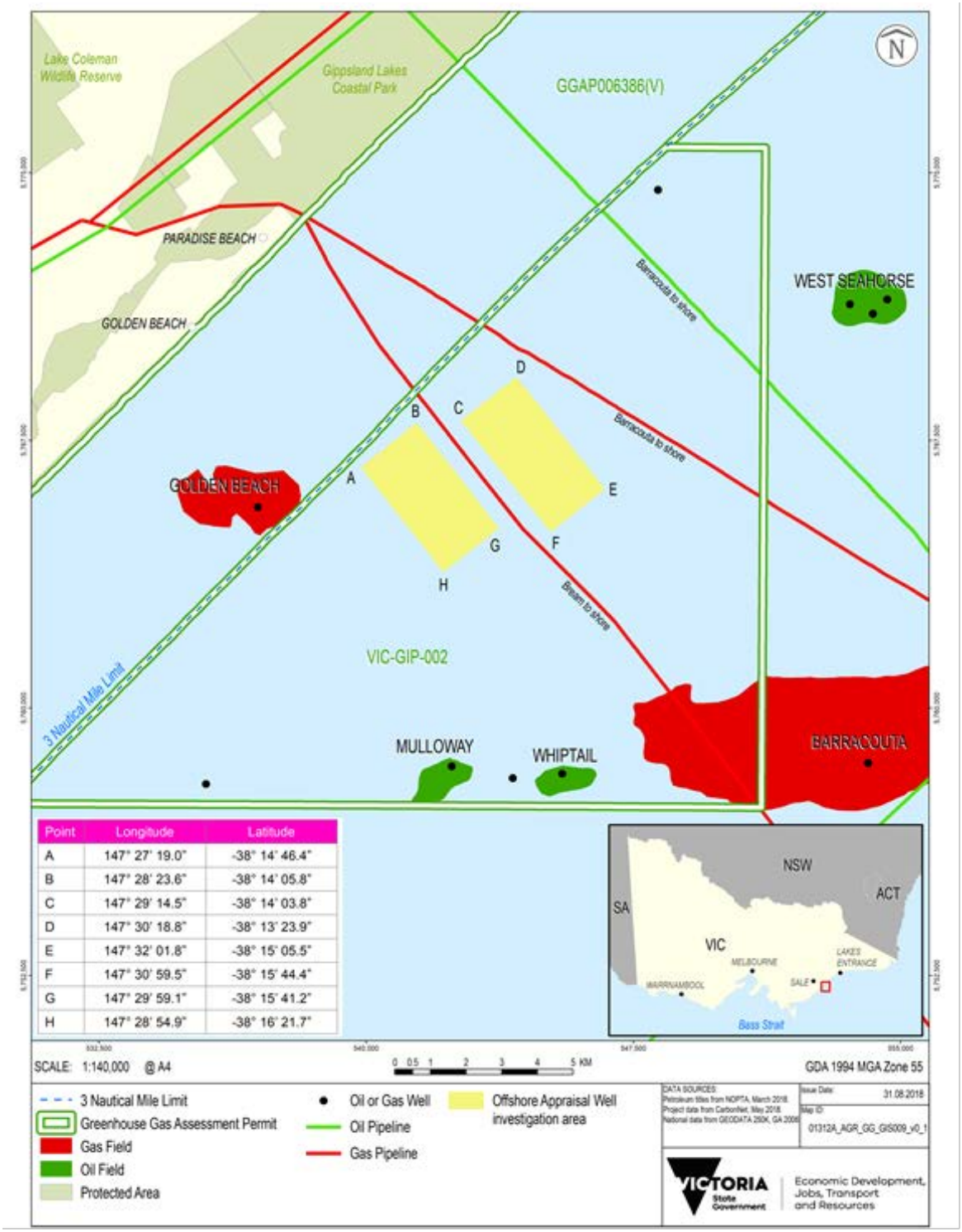


Figure 1.1 Location of the proposed OAW activity area

2. Activity Description

2.1. Activity Location

The VIC-GIP-002 GHG assessment permit is located in Commonwealth waters (adjacent to and contiguous with the GGAP006386(V) permit), covering an area of 223 km^2 in water depths ranging between 22 m and 40 m LAT.

The OAW activity area lies entirely within VIC-GIP-002 and is divided into two polygons of interest that occur either side of the Bream-A gas pipeline (see Figure 1.1), as follows:

- Western polygon – bounded by points A, B, G and H in Table 2.1. This polygon has an area of 7.5 km^2 (or 2.2 nm^2).
- Eastern polygon – bounded by points C, D, E and F in Table 2.1. This polygon has an area of 7.9 km^2 (or 2.3 nm^2)

The combined activity area is 15.4 km^2 (or 4.5 nm^2) with water depths ranging from 21 metres (m) to 33 m Lowest Astronomical Tide (LAT)

Table 2.1. Coordinates of the activity area

Point	Longitude	Latitude
A	147° 27’ 19.0”	-38° 14’ 46.4”
B	147° 28’ 23.6”	-38° 14’ 05.8”
C	147° 29’ 14.5”	-38° 14’ 03.8”
D	147° 30’ 18.8”	-38° 13’ 23.9”
E	147° 32’ 01.8”	-38° 15’ 05.5”
F	147° 30’ 59.5”	-38° 15’ 44.4”
G	147° 29’ 59.1”	-38° 15’ 41.2”
H	147° 28’ 54.9”	-38° 16’ 21.7”

GDA 94, MGA Zone 55

The activity area has been informed by extensive subsurface studies. A preferred location close to the eastern boundary of the western polygon has been chosen for well planning purposes (in a water depth of 26 m), though the final location will be refined based on the results of the geophysical and geotechnical (G&G) investigations, which will determine whether this location is suitable for the placement of a Mobile Offshore Drilling Unit (MODU).

At its closest point, the activity is located 6.1 km southeast and 6.3 km southeast offshore of the townships of Golden Beach and Paradise Beach, respectively, which are located midway along the Ninety Mile Beach between Loch Sport and Seaspray in south Gippsland. Distances from the activity to nearby features are provided in Table 2.2.

Table 2.2 Distance to key features from the activity area

Feature	Distance and direction from the nearest point of the activity area to the nearest point of the feature
Towns	
Golden Beach	6.1 km northwest
Paradise Beach	6.4 km northwest
Loch Sport	19 km northeast
Honeysuckles	23 km southwest
Seaspray	26 km southwest
Longford	34 km northwest
Sale	35 km northwest
Lakes Entrance	56 km northeast
Petroleum infrastructure	
Bream to shore pipeline: Vic/PL32 & Vic/PL32(V) (gas)	500 m either side of each polygon
Barracouta to shore pipeline: Vic/PL1 & Vic/PL1(V) (gas)	750 m east
Barracouta to shore pipeline: Vic/PL4 & Vic/PL4(V) (oil & condensate)	5.2 km east
Seahorse subsea wells (nearest) (oil)	9 km northeast
Tarwhine to Barracouta A pipeline (oil)	12 km south
Seahorse to Barracouta A pipeline (oil)	12 km east
Barracouta platform (oil & gas)	13.4 km southeast
Tarwhine subsea well (oil)	15 km south
Dolphin to shore pipeline (oil)	23 km southwest
Tasmanian gas pipeline	26 km southwest
Dolphin monopod (oil)	26 km southwest
Bream A platform (oil and gas)	35 km south-southeast
Perch monopod (oil)	35 km southwest
Non-petroleum infrastructure	
Regional Outfall Sewer (ROS) (Delray Beach)	6.7 km northwest
Saline Wastewater Outfall Pipeline (SWOP) (McGaurans Beach)	46 km southwest
Basslink electricity interconnector cable	46 km southwest
Australian Marine Parks	
Beagle	98 km southwest
East Gippsland	205 km east-southeast

Feature	Distance and direction from the nearest point of the activity area to the nearest point of the feature
Victorian marine parks	
Ninety Mile Beach Marine National Park	28 km southwest
Nooramunga Marine and Coastal Park	60 km southwest
Corner Inlet Marine Park	107 km southwest
Wilsons Promontory Marine Park	104 km west
Wilsons Promontory Marine National Park	124 km southwest
Natural features	
Lakes Entrance (channel)	55 km northeast
Hogan Island group	111 km south-southwest
Beware Reef (off Cape Conran)	120 km northeast
Wilsons Promontory (southern tip)	132 km southwest

2.2. Timing

Drilling is scheduled to commence any time from the start of Q4 2019 to the end of Q2 2020, contingent on the availability of a suitable MODU and the receipt of environmental approvals. The activity is estimated to take between 45 and 60 days to complete.

2.3. Objective of the Activity

The objective of the activity is to confirm the viability of carbon dioxide (CO_2) injection and storage capacity of the Pelican formation to inform a future application for an Injection Licence.

CarbonNet has developed an Appraisal Plan for its Pelican site (verified by the independent certification provider Det Norske Veritas (DNV) as meeting its recommended practice for CO_2 storage (DNV-RP-J203) and Australian legislative requirements). This Appraisal Plan recommends undertaking appraisal drilling to confirm the suitability and capacity of the preferred Pelican CO_2 storage site to support the Injection Licence application.

2.4. Project Management Arrangements

AGR Australia Pty Ltd (AGR) is the Drilling Management Contractor (DMC) appointed to this project by CarbonNet. AGR is responsible for providing project management and well delivery services for the activity, including the preparation of all documents required for regulatory approvals.

AGR is the world's largest independent well management consulting group and since 2000 has drilled over 500 wells in 26 countries for over 100 operators without any major health, safety and environment (HSE) incidents. In Australia, AGR has drilled over 40 offshore wells in all the major basins in water depths ranging from 40 m to 360 m.

2.5. Field Characteristics

2.5.1. Rationale for Pelican

Since CarbonNet's establishment in 2009 to investigate the potential for a large-scale CCS network in the Gippsland region, it has completed an extensive geological and geophysical analysis of the Gippsland nearshore area to identify and assess possible CO_2 storage sites. As a result of this work, CarbonNet has identified the Pelican site as the most prospective storage location to safely and securely store commercial volumes of CO_2. This is supported by independent peer review and certification by DNV under their recommended practice (DNV, 2012).

Since 2012, the CarbonNet Project has conducted four major storage risk reviews for the Pelican site with risk assessments updated progressively to reflect the project team's state of knowledge.

2.5.2. Reservoir and Hydrocarbon Characteristics

CarbonNet has conducted a sub-surface assessment to describe the fluids that may be encountered while drilling the well. The information presented herein indicates that CarbonNet is not expecting to intersect any hydrocarbons, nor are hydrocarbons the target of this activity.

Wells drilled in proximity to the Pelican structure have encountered under-saturated gas only and zero liquid hydrocarbons (no shows). Further outboard from the coastline, wells may intersect biodegraded oil-bearing formations but those closer to shore have only noted dry (probably biogenic) gas.

The Golden Beach West-1 well was drilled through the Lower Halibut, encountering small gas shows but no significant hydrocarbon volumes. There were no shows in the Cobia or Halibut Subgroups. The porous-permeable formations intersected in the Gippsland Limestone encountered approximately sea-water salinity fluids (35,000 ppm total dissolved solids [TDS]) whereas Latrobe Group formations below the Lakes Entrance formation (the regional seal for petroleum, and a major aquitard in the basin) produced water with salinity levels in the range of 300-800 ppm TDS and no hydrocarbon shows. Below about 1,900 m, in the deeper Golden Beach Subgroup, a more saline aquifer exists with salinity of 18,500 ppm TDS.

2.5.3. Hydrocarbon Quality, Volume and Flow Rates

The Golden Beach-1A well discovered a thin dry gas accumulation in the shallow formations below 2,000 ft (610 m) with a drill stem test (DST) performed on the interval between 2,040-2,045 ft (610-623 m). The gas is likely a biogenic gas, similar to that seen in the Sole and Baleen fields on the northern margin of the Gippsland Basin.

This assay confirms that any hydrocarbons present in the structure should be considered to be a very dry gas with methane content in excess of 96% and negligible higher hydrocarbons.

The OAW is located in a shadow zone for migration of petroleum where several dry holes have been drilled, including the Sea Lion-1 well (drilled in 2015). There is also no structural closure at the proposed location at either top Latrobe or intra-Latrobe levels, therefore it is highly unlikely that any trapped hydrocarbons would be encountered by the well. The Golden Beach-1A well evaluation indicated that unconstrained well deliverability was of the order of 28 MMscf/d following gas-loading of the well tubing.

Pressure depletion of the Latrobe aquifer has been well-documented in a series of CSIRO reports (e.g., Underschultz et al., 2006). The aquifer is no longer artesian in the nearshore area and has a modest pressure depletion equivalent of 0-10 m of freshwater hydraulic head.

Pore pressures in the region are consistent with a fresh water gradient. Well control equipment will be installed prior to drilling through the Lakes Entrance Formation, however even without well control equipment, if a water-filled section is encountered in the mildly under-pressured formations below the Lakes Entrance Formation regional seal, the well will not be able to flow to surface.

CarbonNet is confident that the seismic data shows that there is no gas accumulation greater than 10,000 m^3 (350,000 cubic feet) as measured under reservoir conditions. This applies to the depth range from 200 m to 1,500 m in the well. The gas volume measured in standard cubic feet will vary with depth from approximately 20 times this volume at 200 m depth (i.e., 7,000,000 scf) to 150 times this volume at a depth of 1,500 m (i.e., 52.5 million scf). Therefore, CarbonNet can confidently place a limit on undetected gas at 7,000,000 scf at 200 m and 52.5 MMscf at 1,500 m. At the maximum credible flow rate, in the event of a well blowout scenario, these gas volumes would fully deplete in less than 48 hours. CarbonNet is confident that there will not be any gas accumulation at any depth larger than ~ 52.5 MMscf.

In summary:

- It is anticipated that only water-charged intervals at a normal pressure gradient will be intersected with an extremely low likelihood of encountering hydrocarbons.
- The risk of encountering shallow gas is extremely low.
- Any hydrocarbons present in the structure would be a very dry gas with methane content of approximately 94% and negligible higher hydrocarbons.
- The proposed well is located in a shadow zone for migration of petroleum where several dry holes have been drilled. There is also no structural closure at the proposed location, therefore it is highly unlikely that any trapped hydrocarbons would be encountered by the well.
- Very low levels of natural gas liquids/condensate would be anticipated, even in the extremely low likelihood of hydrocarbons being encountered. Although no hydrocarbons are anticipated at the Pelican location, the Golden Beach-1A well evaluation indicated that unconstrained well deliverability from the Top Latrobe was of the order of 28 MMscf/d.

2.6. Operational Details

This section provides details on the MODU, support vessels, helicopters and supply base for the project.

2.6.1. The MODU

The OAW will be drilled using a jack-up MODU. Jack-up MODUs are typically used for drilling in water depths of less than 150 m. The characteristics of jack-up MODUs

are generally similar, regardless of which rig is used. As such, a generic description of jack-up MODUs is provided here.

The MODU will be towed into position by one or two support vessels. The MODU may be 'soft pinned' (legs extended to be in contact with the seabed with no jacking load on the legs) approximately 100 m from location. At this time the tow vessels are configured to facilitate the final positioning, which is routinely carried out to a tolerance of less than 1 m. Once the tow vessels have been correctly positioned, the legs are raised clear of the seabed and the MODU is slowly moved onto location. During this time the spud can pins may drag intermittently along the seabed creating shallow furrows. Once in the desired location and with the MODU stationary, the legs are lowered to be in complete contact with the seabed and the MODU raises itself approximately 15 m above the sea surface. At this point, the drilling derrick is cantilevered over the edge of the MODU in readiness for drilling. Figure 2.1 provides a simplified overview of this process.

Jack-up MODUs can typically accommodate up to 150 people. Crew changes to and from the MODU will involve transfer by helicopter.

An application for a temporary Petroleum Safety Zone (PSZ) (an area encompassing a 500-m radius) around the MODU will be submitted to NOPSEMA.

2.6.2. Support Vessels

The MODU will be supported by two support vessels for the duration of the activity. Support vessels will be used to supply fresh water, food, fuel, bulk drilling fluid materials and equipment to the MODU. They will also remove waste from the MODU, assist in emergency response situations and monitor the 500-m radius PSZ around the MODU (intercepting errant vessels as required). The support vessels will operate between the MODU and the port (which has yet to be determined).

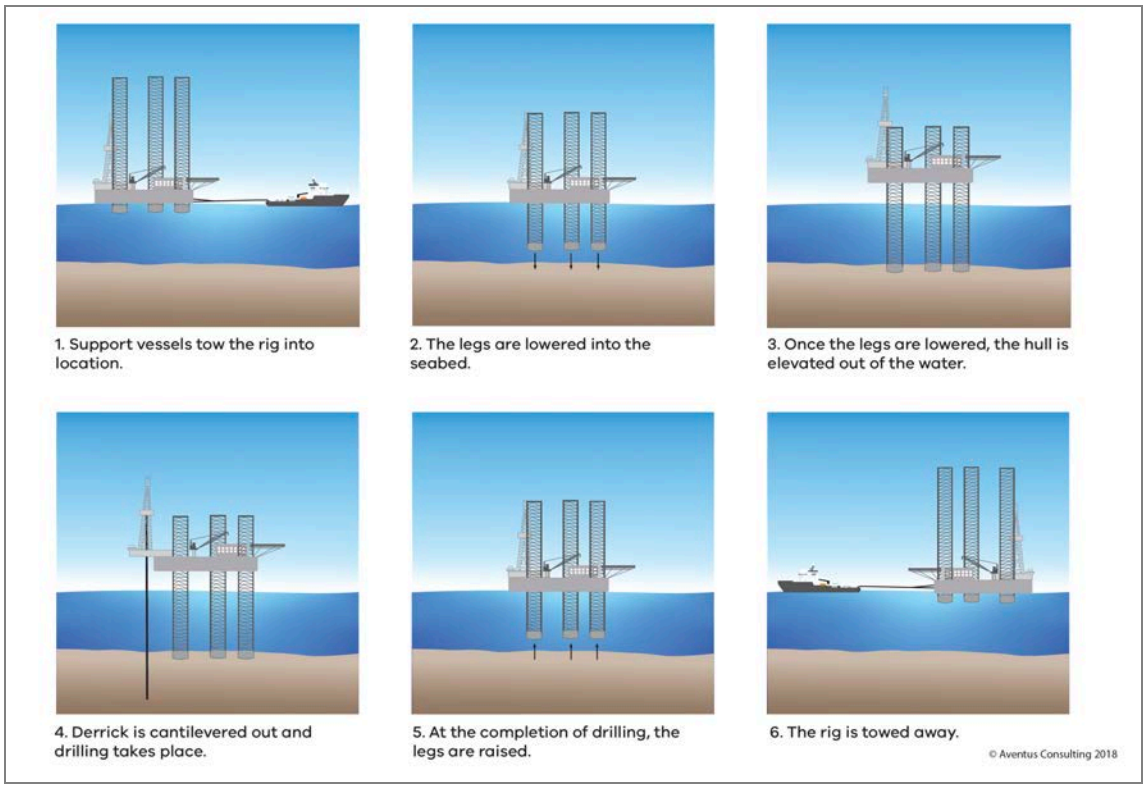


Figure 2.1. Simplified outline of the MODU positioning process

2.6.3. Aviation Operations

A base for helicopter operations will be selected from either West Sale, Tooradin or Essendon airports. These airports are commonly used for helicopter transfers to MODUs working offshore Gippsland.

There will be one primary and one back-up helicopter to support the activity. There will usually will be one return flight each weekday. Given the short travel distances between the nominated airport and the well location, it is unlikely that helicopter re-fuelling will be required to take place on the MODU.

2.6.4. Supply Base

Marine operations will be based out of the most suitable port, which includes either Lakes Entrance (59 km southwest of the activity area), Barry Beach (109 km southwest), Melbourne (230 km northwest) or Geelong (272 km northwest).

Drilling equipment, tubulars, fluids, bulks and cement will be stored at, or transit through, this supply base and subsequently be delivered to the MODU by the support vessels. All drilling mud and cement will be mixed on the MODU, with no requirement for an onshore mud plant.

2.7. Drilling Program

2.7.1. Well Design

The OAW will be drilled as a vertical well. It will not be completed as a CO_2 injector/ monitoring well in the initial well construction phase. However, the proposed well design provides the opportunity to do so at a future point if required. The proposed inclusion of a Mudline Suspension System (MLS) allows for future tieback to injection facilities to retain the option of completing the well as an injection or monitoring well.

This well has a 3-string design (Figure 2.2), with the:

- Surface casing (13⅜”) (340 mm) set in Gippsland Limestone;
- Production casing (9⅝”) (244 mm) set into the Lakes Entrance; and
- A single hole section drilled to total depth with a Production Liner (7”) (178 mm) set across the Halibut before cementing and perforating.

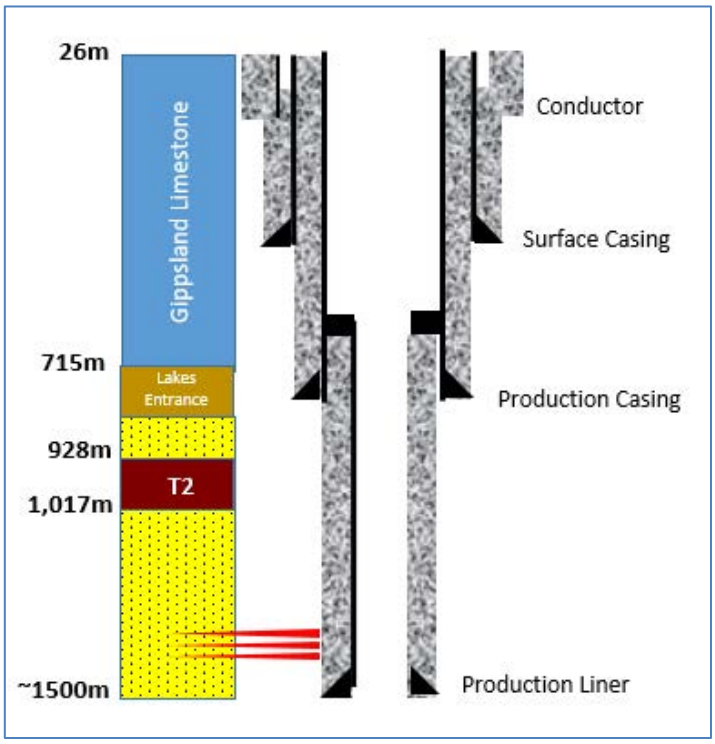


Figure 2.2. The 3-string well design

2.7.2. Drilling Fluids

Drilling fluids (or muds) will be used during the drilling program to provide a range of functions, including:

- Control of formation pressures (i.e., providing a hydrostatic head by managing mud density maintains well stability and prevent a blowout);
- Transport of drill cuttings out of the hole to the MODU;
- Maintenance of drill bit and assembly (i.e., lubrication, cooling and support); and
- Sealing of permeable formations to prevent formation invasion.

The selection of drilling fluids to be used during the drilling program is undertaken through an evaluation of the technical, safety and environmental attributes. A well-specific Drilling Fluid Program will be prepared by the drilling fluids contractor (not yet appointed) and endorsed by AGR prior to spud.

The drill cuttings generated by drilling will be circulated up the borehole and separated from the mud by the shale shakers (a sequence of vibrating screens). The recovered mud is returned to the mud tanks for reuse and the cuttings discharged overboard via a chute. Consideration may also be given for the use of a high-specification optimised water-based mud (WBM) system to reduce the risk of wellbore instability related problems (particularly in coals) that can lead to stuck pipe/tools and ensure that data acquisition objectives are not compromised.

The calculated volumes of drill cuttings to be generated and muds used for the OAW are outlined in Table 2.3.

Table 2.3. Approximate drilling cuttings and mud discharge volumes

Interval	Fluid Type	Dominant lithology	Metres drilled	Cuttings (mT)	Mud discharge	
					bbl	mT
26" x 36"	Seawater with hi-viscosity pre-hydrated bentonite (PHB) sweeps	Limestone	51	127.8	2,850	471
17½"	Seawater with PHB and guar gum sweeps	Limestone	424	256.8	17,585	2,908
12¼"	Potassium chloride (KCl) + Polymer, WBM	Clays	250	56.8	Closed system*	
8½"	KCl + Polymer, WBM	Sandstone	750	80.2		
		Totals:	**1,475**	**521.6**	**20,435**	**3,379**

** Sections will be drilled using a closed WBM system. At the end of the drilling campaign, the WBM will be discharged from the MODU and is estimated to be less than 2,500 bbl (TBC).*

Drilling Fluid Additives

Seawater is the primary constituent of drilling fluids. Inert drilling fluid additives are added to the seawater to form a WBM. The key WBM additives (by volume) likely to be used in the drilling program, and their toxicity ratings, are listed in Table 2.4.

Fluid Toxicity

In the absence of Australian standards regarding the suitability of drilling mud chemical additives, the Offshore Chemical Notification Scheme (OCNS) is generally used as a basis for selecting environmentally-acceptable chemicals in the Australian offshore petroleum industry. The OCNS manages chemical use and discharge by the UK and Netherlands offshore petroleum industries. The scheme is regulated in the UK by the Department of Energy and Climate Change using scientific and environmental advice from the UK's Centres for Environment, Fisheries and Aquaculture Science (CEFAS) and Marine Scotland.

The OCNS uses the Harmonised Mandatory Control Scheme (HMCS) developed through the Oslo-Paris (OSPAR) Convention 1992. This ranks chemical products according to Hazard Quotient (HQ), calculated using the Chemical Hazard and Risk Management (CHARM) model. The CHARM model requires the biodegradation, bioaccumulation and toxicity data of the product to be provided.

Under the OSPAR Convention, organic-based compounds used in production, completion and workovers, drilling and cementing are subject to the CHARM model. The CHARM model calculates the ratio of the 'Predicted Effect Concentration' against the 'No Effect Concentration' expressed as a HQ, which is then used to rank the product. The HQ is converted to a colour banding to denote its environmental hazard, which is then published on the Definitive Ranked Lists of Approved Products (by the OCNS on its website, https://www.cefas.co.uk/cefas-data-hub/offshore-chemical-notification-scheme/).

Gold has the lowest hazard, followed by silver, white, blue, orange and purple (having the highest hazard).

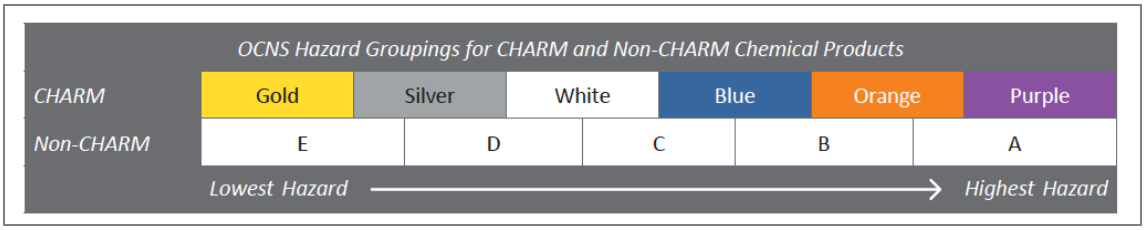
Table 2.4. Potential drill fluid additives and discharge volumes

Additive	Function	Indicative total volume	OCNS rating*	
			CHARM	Non-CHARM
Guar	Viscosifier. A high-yield organic xanthan gum polymer used to impart viscosity to the drilling fluid. It is readily biodegraded via bacterial activity.	~3,000 kg	-	E
Bentonite	Viscosifier. A naturally-occurring high-density mineral milled to a uniform particle size and used to increase fluid density. It is inert in the environment.	~100 kg	-	D - E
Barite	Weighting agent. A naturally-occurring high density mineral milled to uniform particle size and used to increase the fluid density. It is inert in the environment.	~200,000 kg	-	E

** Ratings current at December 2018.*

Products not applicable to the CHARM model (i.e., inorganic substances, synthetic-based muds (SBM), hydraulic fluids or chemicals used only in pipelines) are assigned an OCNS grouping A – E, with 'A' having the greatest potential environmental hazard and 'E' having the least. Products that only contain substances termed PLONORs (Pose Little or No Risk to the environment) are given the OCNS 'E' grouping (Figure 2.3). Data used for the assessment includes toxicity, biodegradation and bioaccumulation.

CarbonNet and AGR will specify in the drilling fluid tender that only chemicals highly ranked under the OCNS rating system (i.e., 'Gold' or 'Silver' [CHARM] and 'E' or 'D' [non-CHARM], or equivalent) may be used in the drilling fluid design. Where a chemical has not been ranked under OCNS, the drilling fluids contractor will conduct a 'pseudo rating' using toxicity and environmental data for the individual substances of a product. The rating is conducted following the hazard assessment process outlined by CEFAS for the OCNS scheme https://www.cefas.co.uk/cefas-data-hub/offshore-chemical-notification-scheme/hazard-assessment/.



Source: NOPSEMA (2015).

Figure 2.3. Illustration of hazard ranking bands for chemical products classified under the OCNS

At the end of the drilling program, any drilling fluid remaining in the mud tanks will be discharged overboard, with quantities likely to be minimal due to the shallow nature

of the well (and estimated to be 2,500 bbl). Any dry chemicals left over at the end of drilling are likely to be left on board for the next operator to use.

2.7.3. Cement Program

Well integrity is a critical objective for this OAW. The well is likely to be exposed to CO_2 due to the injection from a proximal location at a later date and as such the long-term integrity through adequate cement design is paramount. For this reason, CO_2-resistant cement will be used for any casing string, or suspension/abandonment plug, which could come into contact with CO_2 at a later date. This ensures that the integrity of the well is maintained and not affected by CO_2, which would be the case for standard Portland cements.

The key components of the CO_2-resistant cement are fly ash, Portland cement, aluminous cement, slag blend, silica sand and quartz sand. The CO_2-resistant cement is registered under the code of D985 and D986 and classified as non-CHARMable 'E' PLONOR under the OCNS.

Cement will provide the main barrier for isolation of the wellbore from reservoir conditions whether the well is utilised in the future for injection or P&A. The final cement plan will be confirmed once a cement service provider has been selected.

Cement Disposal

Cement is mixed as required to ensure minimal wastage. Flushing of lines and equipment is conducted at the end of each cementing operation (of which there will be six) with seawater, with an estimated release in the order of ~20 bbl (3 m^3) at each release (for a total of 120 bbl/18 m^3).

In addition, there may be some cement discharged at the seabed during the cementing of the conductor and surface casing strings. Although cementing details are yet to be finalised, planning 100-200% excess is common for conductor and surface casing cement jobs, to account for losses and over-gauge hole conditions. Typically, once quality cement returns are seen at the seabed, cement mixing will cease and displacement will commence, with a minimal quantity of cement being deposited around the wellhead during the displacement. It is estimated that in the order of 150 bbl (24 m^3) may be discharged during this process.

At the end of the drilling program, and assuming the MODU moves directly to another operator, the standard Class-G Portland cement will be transferred directly to them. Given the nature of the CO_2-resistant blend, any CO_2-resistant cement left over at the end of drilling cannot be passed on to the next operator. Efforts will be made to minimise the inventory of CO_2-resistant cement on board and if that is possible, left over CO_2-resistant cement slurry will be used in well plugs (which would otherwise use Class-G cement). Failing that, the cement will be discharged overboard as a slurry.

2.7.4. Formation Evaluation

As an appraisal well, CarbonNet is planning a significant Formation Evaluation (FE) Program for the OAW. The FE Program is planned to include the following key operational activities:

- Measurement/Logging While Drilling (MWD/LWD);
- Wireline Logging;
- Coring; and
- Water Injection Test.

The FE Program shall provide baseline geological and geochemical parameters for the identified injection and CO_2 storage site. Furthermore, the data shall be utilised to further update the representative and predictive modelling of the injected CO_2 performance in the subsurface.

MWD/LWD

As part of the drilling operation, the drilling Bottom Hole Assembly (BHA) will incorporate MWD and LWD sensors. The MWD tools will provide a directional survey log of the wellbore, plus key drilling dynamics parameters while drilling.

The LWD tools will be utilised to gather key geological parameters while drilling to inform progress and anticipate upcoming intervals for coring operations. The use of LWD tools also provides data redundancy (by replicating some of the data to be obtained through wireline logging).

Wireline Logging

As a subset of the wireline logging operation, CarbonNet intends to conduct zero offset vertical seismic profiling (VSP). The VSP will enable a high-resolution 2D image of the well and surrounding area to be obtained and improve tie-in to the recently acquired Pelican MSS dataset. The sound source will be held over the side of the MODU by the crane (Figure 2.4).

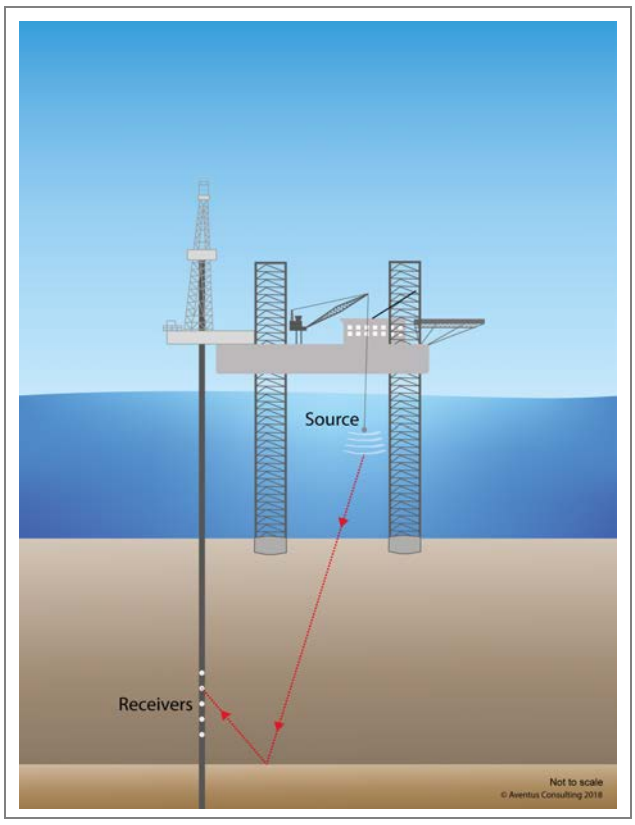


Figure 2.4. Illustration of zero-offset VSP process

Notionally, the VSP details are as follows:

- Number of airguns – 4;
- Sound source volume – 150 cubic inches (cui) each (for a total of 600 cui);
- Pressure – 2,000 psi;
- Number of shots – 150;

- Source effort – 13.8 Bar-m;
- Duration – 4 hours; and
- Depth below sea level – 4 m.

Coring

Core samples will be taken to fully evaluate the formation at key intervals and to collate the responses from the various MWD/LWD or wireline tools.

Water Injection Test

In the future development of the Pelican site, injection of CO_2 is planned to be in the mid-lower Halibut formations that occur below the T2 unit. The T2 formation acts as the seal for the Halibut formations, thus isolating any fluids injected in this horizon from other fluids (petroleum gas and low-salinity aquifers) in the shallower formations.

After logging and coring the Halibut formations, it is planned to perform a short duration injectivity test with water as the injection fluid. It is currently anticipated that up to 15,000 barrels (bbl) of water will be injected into the middle Halibut formations over a period of 24-72 hours. This timeline will include intervals where injection is suspended, and the formations monitored to better understand the pressure response (if any) to fluid injection.

The injectivity test shall verify localised porosity and permeability and further inform the dynamic modelling of the CO_2 plume performance.

2.7.5. Abandonment and Suspension Options

The decision on the need to either plug and abandon (P&A) or temporarily abandon (TA) the well after drilling is still pending. The options described below detail best practice for either scenario once a final decision is reached and will comply with the necessary regulatory requirements.

Plug & Abandonment

If the decision is made to P&A the well and forgo any future utility from the well, a possible final condition as per the schematic in Figure 2.5 is proposed. The final abandonment plan will be confirmed once the well has been drilled and logged to ensure that the barriers are located at the necessary depths.

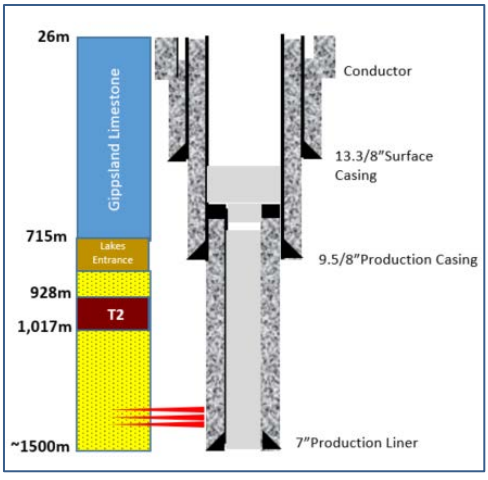


Figure 2.5. Potential P&A design

Temporary Abandonment

The case for TA would be based on the need to retain utility of the OAW as either an injection well or a monitoring well in a development scenario. Fundamentally, whether abandoning the well permanently or temporarily, the need to adequately isolate the perforated interval does not change. The key difference is the ability to re-enter and complete the well for whatever functionality is required. This is achieved through the use of a mudline suspension (MLS) and the installation of TA caps to casing threads at or directly below mudline (Figure 2.6).

To retain future optionality of the OAW being utilised as an injector/monitoring well for the development, the installation of an MLS is proposed to allow for future tieback to mudline/surface facilities.

In the event of a TA, and to minimise impacts to third-parties, CarbonNet will install a protective structure over the top of the conductor protuberance at the end of operations. No monitoring of the conductor protuberance is required as the well will have cement plugs isolating the reservoir from the surface.

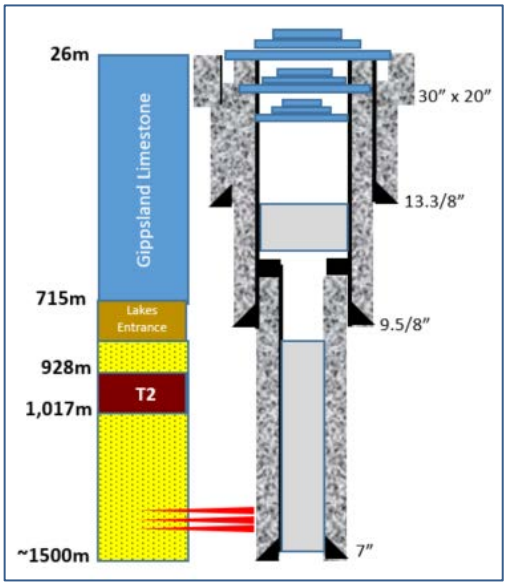


Figure 2.6. Potential TA design

2.8. Well Control

A blowout is an uncontrolled flow of formation fluids from a well that has suffered a failure of barrier systems such as the pressure control equipment, or when the well pressure has exceeded the working pressure of the pressure control equipment. Well control is the process implemented to prevent a blowout from occurring.

Blowouts are prevented during drilling by monitoring the formation pressure and controlling the density (or weight) of the drilling fluids. When a rise in formation pressure is observed, the density of the drilling fluid is increased to maintain an overbalance of pressure against the formation and to keep the wellbore stable. The drilling fluid density is considered the primary well control barrier. In the event that the primary well control system fails, the next line of defence is a blowout preventer (BOP) system, which is a secondary well control measure.

A BOP is a mechanical device designed to seal off a well at the wellhead when required. The system is made up of a number of different types of closing mechanisms consisting of:

- Rams (opposing pistons that move horizontally across the top of the well, creating a seal around the drill string);
- Blind shear rams that are capable of shearing drill pipe and sealing the wellbore; and
- Casing shear rams that are capable of shearing drilling pipe and casing to close the well when no pipe is present.

Annular preventers can also be used to close off the well around various sizes of pipe in the event of an unexpected or sudden increase in pressure.

2.8.1. Well Intervention Response

A BOP rated to a minimum of 10,000 psi working pressure will be installed at surface and pressure tested for the well. The BOP consists of a series of hydraulically-operated valves and sealing mechanisms that are open to allow the mud to circulate during drilling, but can be quickly closed if excessive pressure (a 'kick') enters the well.

The BOP will be pressure tested prior to deployment and upon initial latch-up with the wellhead and function tested and pressure tested in accordance with API Standard 53 (Blowout Prevention Equipment Systems for Drilling Wells) and the approved Vessel Safety Case.

2.9. Response to a Loss of Well Control

2.9.1. Well Intervention Response

As described in Section 2.5.2, the presence of hydrocarbons in the OAW is considered to be highly unlikely. Analysis of the seismic data estimates the maximum hydrocarbon accumulation that could possibly exist is around 52.5 MMscf. Such a small volume would deplete in less than 48 hours in the event of a loss of well control.

AGR has a contract in place with Wild Well Control (WWC) that allows AGR to access personnel and equipment to respond to a well control response anywhere in the world. Among other services, WWC provides relief well operations services to intercept and kill a blowout when surface intervention or capping requires an extended period of time and/or when such efforts may not succeed.

2.9.2. Capping and Containment

Subsea capping stacks are designed for subsea wellhead applications and are not suitable for jack-up surface stack systems that will be used on the OAW. In the event that hydrocarbons were intercepted and resulted in an uncontrolled release, the hydrocarbon accumulation would deplete long before any form of surface capping system could be installed.

As such, a capping and containment system is not considered a feasible option for the OAW in the event of a well blowout.

2.9.3. Relief Well

A relief well is a longer-term response option to stop uncontrolled flow from a well (i.e., 'kill' a well) and to permanently abandon the well. A relief well is drilled to

intersect the well that is out of control to provide a conduit to pump high density fluid into the well, and thus stop well flow. AGR would implement its relief well plan immediately after a well control incident and in parallel with other response activities.

It is important to note that the design of the OAW has taken into account the data for the offset wells, which reduces the risk of a blowout from occurring.

2.10. Activity Summary

Table 2.5 summarises the proposed activity parameters.

Table 2.5. Summary of the activity parameters

Parameter	Details
Location and timing	
Permit assessment area	VIC-GIP-002
Activity area	15.6 km^2
Water depths	21-33 m LAT (preferred location is 26 m)
Nearest landfall	6.1 km north
Timing	Q4 2019 to end Q2 2020
Duration of activity	45-60 days
MODU and support services	
MODU	Jack-up
Support vessels	Likely two vessels, not yet contracted
Marine base	Not yet contracted
Aviation support	Two helicopters, heliport location not yet decided
Drilling details	
Well depth	1,500 m TVDSS
Drill cuttings volume (est)	521 mT (163 m^3, 1,056 bbl)
Drilling fluid	WBM only
Muds discharge volume (est)	3,379 mT (20,435 bbl)
Cement discharge volume (est)	To be confirmed
Water injectivity test (est)	15,000 bbl (24-72 hrs)
VSP	600 cui for 4 hours, 4 m below sea surface

3. Stakeholder Consultation

CarbonNet has a strategic and systematic approach to stakeholder engagement.

CarbonNet has opened the channels of communication with stakeholders to provide an opportunity for open and honest communication that promotes integration of stakeholder values into its decision-making process. This provides the means for CarbonNet to identify individuals and groups as well as their needs, ideas, values and issues of concern regarding the environmental and/or social impacts of the activity.

In keeping with DJPR's Environment Policy, CarbonNet is also committed to open, ongoing and effective engagement with the communities in which it operates and providing information that is clear, relevant and easily understandable.

3.1. Stakeholder Consultation Objectives

CarbonNet's Stakeholder Engagement Plan (SEP) for this activity provides a structured approach to engagement activities in line with current best practice. CarbonNet has incorporated key learnings from its recent Pelican 3D marine seismic survey (3DMSS) into the SEP.

The key objectives of the SEP are to:

- Provide stakeholders with access to clear, up-to-date and timely information, and a point of contact for the project;
- Provide an opportunity for a two-way information exchange and meaningful stakeholder consultation;
- Build on the stakeholder engagement that CarbonNet has already undertaken in the Gippsland region;
- Demonstrate integrity and transparency in CarbonNet's approach to stakeholder engagement; and
- Meet the stakeholder consultation requirements for EPs.

3.2. Regulatory Requirements

Stakeholder consultation is required under the OPGGS(E), as summarised in this section.

Section 460 (*Interference with other rights*) of the OPGGS Act states that a person carrying out activities in an offshore GHG assessment permit should not interfere with other users of the offshore area to a greater extent than is necessary for the reasonable exercise of the rights and performance of the duties of the first person. In order to determine what activities are being carried out, and whether exploration or production activities may interfere with existing users, consultation is required.

In relation to the content of an EP, more specific requirements are defined in the OPGGS(E) Regulation 11A. This regulation requires that a Titleholder consult with 'relevant persons' in the preparation of an EP. A 'relevant person' is defined in Regulation 11A as:

1. Each Department or agency of the Commonwealth to which the activities to be carried out under the EP, or the revision of the EP, may be relevant;

2. Each Department or agency of a State or the Northern Territory to which the activities to be carried out under the EP, or the revision of the EP, may be relevant;
3. The Department of the responsible State Minister, or the responsible Northern Territory Minister;
4. A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP, or the revision of the EP; and
5. Any other person or organisation that the Titleholder considers relevant.

Further guidance regarding the definition of functions, interests or activities is provided in NOPSEMA's *Environment Plan decision making guideline (GL1721, Rev 5, June 2018)*, as follows:

- Functions – a person or organisation's power, duty, authority or responsibilities;
- Activities – a thing or things that a person or group does or has done; and
- Interests – a person or organisation's rights, advantages, duties and liabilities; or a group or organisation having a common concern.

Regulation 14(9) of the OPGGS(E) also defines a requirement for consultation in relation to the Implementation Strategy defined in the EP. In addition, Regulation 16(b) of the OPGGS(E) requires that the EP contain a summary and full text of this consultation.

3.3. Stakeholder Identification

CarbonNet has used a number of methods to determine the key stakeholders for this activity. This includes:

- Project team knowledge (especially leveraged from the Pelican 3DMSS and consultation for the G&G investigations);
- Information from consultants and contractors that CarbonNet has engaged;
- Discussions with oil and gas participants, regulators and peak bodies;
- Internet research;
- Existing networks; and
- Summary EPs published by NOPSEMA for activities undertaken in the Gippsland region.

Responses received during consultation for the G&G investigations were used to refine the original list of stakeholders.

Based on the feedback received during consultation for the G&G investigations, CarbonNet removed 18 individual stakeholders and three organisations (two at their own request) from the list of relevant persons for the purposes of consultation for the OAW activity.

CarbonNet has identified a range of relevant persons, as defined in Regulation 11A of the OPGGS(E) (listed in Table 3.1), with whom it has consulted. The stakeholders are grouped into five categories of relevant persons as outlined by the OPGGS(E) (as listed in Section 4.2).

The stakeholder list has been and will continue to be reviewed, as required, throughout the consultation process. Consultation with stakeholders may identify other relevant parties that CarbonNet may consult.

Stakeholders identified for this activity, divided into the categories defined under Regulation 11A of the OPGGS(E), are listed in Table 3.1.

Table 3.1. Stakeholders identified for the activity

Category 1 - Department or agency of the Commonwealth to which the activities to be carried out under the EP may be relevant	
Australian Maritime Safety Authority (AMSA) - Nautical and Regulation Section	Australian Fisheries Management Authority (AFMA)
Australian Hydrographic Office (AHO)	Department of Agriculture and Water Resources (DAWR) - Biosecurity
Department of Defence (DoD) – Defence Support Group	Department of Infrastructure and Regional Development (DIRD)
Department of Home Affairs (DHA)	Maritime Border Control (MBC)
Category 2 - Each Department or agency of a State to which the activities to be carried out under the EP may be relevant	
Environment Protection Authority (EPA)	Department of Environment, Land, Water and Planning (DELWP) - Oiled Wildlife Response team
Parks Victoria	
Maritime Safety Victoria (MSV)	
Category 3 - The Department of the responsible State Minister	
DJPR – Emergency Management Branch (EMB)	Victorian Fisheries Authority (VFA)
Category 4 - A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP	
Fisheries	
Commonwealth Fisheries Association (CFA)	Seafood Industry Victoria (SIV)
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	Eastern Zone Abalone Industry Association
South-East Trawl Fishing Industry Association (SETFIA)	Small Pelagic Fishery Industry Association (SPFIA)
Southern Shark Industry Alliance (SSIA)	VRFish
Sustainable Shark Fishing Association (SSFA)	Tuna Australia (ETBF Industry Association)
Victorian Abalone Divers Association (VADA)	Victorian Bays and Inlets Fisheries Association
Victorian Scallop Fisherman's Association (VSFA)	
Adjacent/overlapping petroleum Titleholders	
GB Energy (Vic) Pty Ltd – VIC/RL1(V)	Carnarvon Hibiscus Pty Ltd – VIC/P57
3D Oil – VIC/P57	Esso Australia Resources Pty Ltd (EARPL) – VIC/RL1
Lakes Oil – VIC/P43(V) & VIC/P44(V)	
Oil spill preparedness and response agencies	
AMSA – Marine Environmental Pollution	East Gippsland Catchment Management

Response	Authority (EGCMA)
Gippsland Ports	Gippsland Water
Lakes Entrance Coastguard	
Other local interests	
Gippsland Water Police	Paynesville Water Police
Category 5 - Any other person or organisation that the Titleholder considers relevant	
Local Government Authorities	
Wellington Shire Council	

CarbonNet (and AGR as the DMC) have engaged with onshore stakeholders, such as the Golden Beach and Paradise Beach communities, which have a strong interest in the CarbonNet Project more broadly.

CarbonNet also has an ongoing engagement program for the broader project with a number of other organisations, which are kept informed via community mail outs, e-Newsletters, the project website and meetings.

3.4. Engagement Method and Approach

3.4.1. Engagement Approach

Consultation has been broadly undertaken in line with the International Association for Public Participation (IAP2) spectrum, which is considered best practice for stakeholder engagement. In order of increasing level of public impact, the elements of the spectrum and their goals are as follows:

- Inform – to provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.
- Consult – to obtain public feedback on analysis, alternatives and/or decisions.
- Involve – to work directly with stakeholders throughout the process to ensure that public concerns and aspirations are consistently understood and considered.
- Collaborate – to partner with the public in each aspect of the decisions, including the development of alternatives and the identification of the preferred solution.
- Empower – to place final decision-making in the hands of the stakeholders.

The manner in which CarbonNet has informed, consulted and involved stakeholders is outlined throughout this section. Attempts to collaborate with stakeholders, including the commercial fishing industry, have been made and discussions on these proposals are ongoing, including liaising with SETFIA to notify local fishers prior to, during and after OAW operations.

Under the regulatory regime for the approval of EPs, the decision maker is the regulator. This being the case, the final step in the IAP2 spectrum, ‘Empower’, has not been adopted.

CarbonNet has a strategic and systematic approach to stakeholder engagement, which aims to foster an environment where two-way communication and ongoing, open dialogue is encouraged to build positive relationships. Key principles that guide CarbonNet in its stakeholder engagement activities include:

- Timely engagement;
- Transparency;
- Providing accurate and objective information;
- Monitoring stakeholder interests;
- Ongoing active consideration of stakeholder feedback; and
- Tailoring appropriate communications to meet audience needs.

CarbonNet has applied these principles to its stakeholder engagement since its inception in 2009 and has methodically recorded its engagement activities in the project's consultation database, Consultation Manager™.

CarbonNet has engaged with key stakeholders including the Latrobe Valley and Gippsland communities, local councils, community groups, industry bodies and potential partners, government sponsors, regulators, research partners, and international organisations supporting the development of CCS (such as the Global Carbon Capture and Storage Institute). Examples include the 2011 airborne gravity survey, 2012 soil hydrocarbon survey, 2018 Pelican 3DMSS and G&G investigations, for which activity-specific SEPs were developed and implemented with the assistance of highly competent industry experts.

This activity includes four phases of stakeholder engagement, these being:

1. Planning and conducting engagement activities, until the EP is accepted by NOPSEMA;
2. Pre-mobilisation communications;
3. Communications during the activity; and
4. Communications after the activity is completed.

Additional periods of engagement and communications activities may be required, depending on the needs of the activity and feedback from consultation.

3.4.2. Engagement Methodology

A range of stakeholder engagement and communications methods and tools have been used throughout the engagement process, including (but not limited to) the following:

- Emails;
- Letters;
- Fact sheet;
- Diagrams;
- Face-to-face meetings;
- Outgoing phone calls;
- Incoming project phone line;
- Community drop-in information sessions;
- CarbonNet e-newsletter; and
- Up-to-date information on the CarbonNet website (http://earthresources.vic.gov.au/carbonnet).

Overall, contact has been made with over 66 individual stakeholders from 40 organisations. The communications and stakeholder engagement for this activity is led by AGR's Stakeholder Engagement Coordinator (SEC) and assisted by the CarbonNet's SEC and project team subject matter experts. In undertaking this consultation, CarbonNet has considered the consultation guidelines released by various Commonwealth and Victorian government agencies and industry associations in response to the consultation requirements of the OPGGS(E).

Information Sheet and Invite to Comment to Stakeholders

An initial overview of the proposed activities was provided to relevant stakeholders on the 27th of September 2018. This overview consisted of an email with an attached 3-page information sheet and invited feedback to formally seek stakeholder views and provide an opportunity to ask questions. This information was also made available on the CarbonNet website (http://earthresources.vic.gov.au/carbonnet). The email was then followed by a phone call to confirm receipt of the original email, or a follow-up email should a phone number not be available. Consultation with stakeholders for this activity was conducted over an eight-week period, with consultation in this EP documented up to the 31st of January 2019. CarbonNet and AGR will continue to consult with stakeholders as required.

The key fisheries engaged include SIV, SETFIA, SSFA and the VSFA.

CarbonNet is mindful of the need to co-exist with other tenement holders. CarbonNet manages five GHG assessment permits on behalf of the State of Victoria, which are adjacent to or overlap existing petroleum tenement holders. CarbonNet has pre-existing and ongoing engagement with these tenement holders to provide them updates on the work program activities. Overlapping and adjacent tenement holders received an overview of proposed activities during workshops conducted in April and May 2018 and were contacted individually after the information flyer was distributed. Following the workshops, overlapping tenement holders confirmed they did not have any objections to CarbonNet undertaking the activity. Each of the nearby tenement holders responded to the email on 27th of September 2018 with no objection to this activity.

Invite to Comment to Local Community

In addition to engaging relevant stakeholders, a letter was sent to Golden Beach and Paradise Beach property owners on the 28th of August 2018 introducing the activity and inviting residents to attend information sessions at the Golden Beach community hall on the 22nd of September and the 20th of October 2018. Another letter was issued on the 30th of November 2018 to inform the same property owners of the information session to be held on the 22nd of January 2019.

The direct mail out (682 letters in total) was chosen to reach the greatest number of Golden Beach and Paradise Beach community members as a result of feedback received during the Pelican 3DMSS. Sending a letter to property owners was also consistent with how the consultation for the G&G investigations was conducted. The letter was distributed by Wellington Shire Council on behalf of CarbonNet (i.e., CarbonNet is not privy to residents' names and addresses). CarbonNet received no emails or phone calls from the community in response to these letters.

Community Fact Sheets

During consultation for the G&G investigations phase with the community, CarbonNet recognised a need to create fact sheets tailored to the level of understanding and specific concerns of the Golden and Paradise Beach communities, rather than distributing the 3-page information sheets designed for the list of 'relevant persons.'

Accordingly, CarbonNet created a community-specific fact sheet on the OAW that provided a general overview of the activity, information on appraisal wells, drilling process, timing, location and EP approvals process. Many of these community fact sheets were taken at the community drop-in sessions (see below), though no enquiries relating to the fact sheet have been received to date.

Community Drop-in Sessions

Two community drop-in information sessions were held for this activity. Based on a number of requests from Golden and Paradise Beach community members to run these drop-in sessions on the weekend, CarbonNet and AGR scheduled these events for Saturdays to reach a wider audience.

First Session

The first information drop-in session for the activity was held in Golden Beach from 12 to 2 pm on Saturday the 22nd of September 2018. The 22nd of September was the first Saturday of the September school holidays in Victoria and was chosen specifically to reach holiday-home owners who are not in Golden Beach during the school term. Thirty-five (35) members of the local community, including the nearby town of Loch Sport, attended the event (Photo 3.1). The event was delivered by AGR and supported by CarbonNet and CSIRO. For the first half of the session AGR, CarbonNet and CSIRO addressed community questions as a panel. Attendees were provided with the OAW information sheet and more detailed information sheets were available on CCS. AGR, CarbonNet and CSIRO each had a display at the event and were available to answer questions after the panel session.

Second Session

The second session for the activity was held in Golden Beach on Saturday the 20th of October. The second session was run as a presentation style meeting followed by a Q&A session and drop-in session. AGR and CarbonNet made the decision to begin this session with a formal presentation to ensure key project information was communicated effectively to the community. The presentations included an overview of the project by CarbonNet, overview of CCS and its applications by CO2CRC Ltd and the planned OAW activity by AGR. By beginning the session with a presentation, many common questions were addressed and the Q&A and drop-in sessions expanded on this foundational knowledge. Community fact sheets on the G&G activity and OAW activity were distributed at the event.

Third Session

The third session for the activity was held in Golden Beach on Tuesday the 22nd of January 2019, split into early afternoon and mid-afternoon sessions that were attended by 25 people. This session was timed to coincide with the holiday season when more property owners were likely to be in residence in Golden Beach and Paradise Beach, and prior to the geophysical investigations.

This was run as a presentation style meeting followed by a Q&A session and drop-in session for the same reasons as those discussed for the second session and included similar content, albeit with an update on the timing of the G&G investigations and the OAW. By beginning the session with a presentation, many common questions were addressed and there was little in the way of follow up questions during the drop-in phases. Community fact sheets on the G&G activity and OAW activity were available at the event.

	*First information session (Sept 2018)* CarbonNet, AGR and CSIRO addressing attendees.
	*First information session (Sept 2018)* Posters illustrating the activity area and how the jack up MODU will look from the Paradise Beach shoreline (using photos taken by CarbonNet for the 2015 Sea Lion-1 drilling campaign).
	*Second information session (Oct 2018)* AGR drilling information banners and presentation screen.
	*Second information session (Oct 2018)* CarbonNet's Operation Director addressing the audience after the presentation.

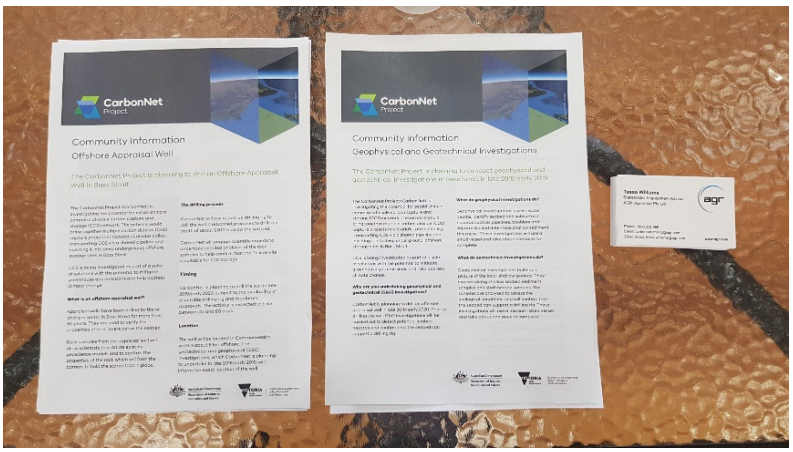
	*Second information session (Oct 2018)* New community fact sheets and AGR contact cards available at the entrance to the hall.
	*Third information session (Jan 2019)* AGR drilling information banners.
	*Third information session (Jan 2019)* AGR's Drilling Project Manager presenting an activity update.

Photo credits: G. Pinzone, L. Nelson & T. Williams.

Photo 3.1. Information displays and gatherings at the three information sessions held at Golden Beach

Ongoing Sessions

As part of ongoing consultation efforts with the Golden Beach and Paradise Beach communities, information sessions are planned to continue throughout 2019, timed to coincide with key activity milestones (e.g., completion of G&G investigations, confirmation of OAW timing, drilling, etc).

3.4.1. Record of Stakeholder Engagement

A record of all consultation is recorded in CarbonNet's consultation database, Consultation Manager™, including any objections and claims about possible adverse impacts of the activity raised by relevant persons. This includes meeting summaries, phone call summaries, logs of emails and letters.

Individual emails and letters are saved on DJPR's document management system.

3.4.2. Consultation with Fisheries Associations

CarbonNet has consulted with all relevant fishing industry groups who may be present in the area during the activity.

CarbonNet will liaise closely with all fishing representative groups to notify their membership of when the activity will take place. To date, SETFIA has offered to provide a text message service to its membership on behalf of CarbonNet to inform its membership of the exact timing of the activity. CarbonNet intends to take SETFIA up on this offer.

3.4.3. Dedicated Project Email and Hotline

A project-specific email address (carbonnet.drilling@agr.com) and free call telephone number (1800 312 966) were established to facilitate stakeholder consultation. These details are provided in all stakeholder consultation material.

The email inbox is managed by AGR's SEC, with data provided to CarbonNet on a regular basis. Enquiries are answered with the assistance of a Frequently Asked Questions (FAQ) document or referred to subject matter experts to provide further information.

All correspondence is recorded in Consultation Manager™.

3.4.4. CarbonNet Website

In August 2018, CarbonNet made a number of improvements to its website (http://earthresources.vic.gov.au/carbonnet) to include general project information along with more specific information on the project activity, such as the planned OAW activity, events and other updates.

Information on the OAW is available on a dedicated page on the CarbonNet website (http://earthresources.vic.gov.au/earth-resources/victorias-earth-resources/carbon-storage/the-carbonnet-project/offshore-appraisal-well). The page includes a description of the OAW, a diagram and location map of the activity area. It also includes a link to the OAW information sheet.

As part of the website improvements, CarbonNet created a News and Events page (http://earthresources.vic.gov.au/earth-resources/victorias-earth-resources/carbon-storage/the-carbonnet-project/news-and-events) with information on upcoming and previous events. CarbonNet listed the community information sessions on this page.

This website is updated regularly and promoted in all stakeholder and community communications. Flyers prepared for future project milestones are also available on the website.

3.4.5. CarbonNet Email Distribution List

CarbonNet has established a project e-newsletter to assist in ongoing community and stakeholder consultation. Throughout consultation for this activity, community and stakeholders have been encouraged to subscribe to the e-newsletter via the project website.

3.5. Summary of Stakeholder Consultation

Stakeholder consultation has involved extensive consultation with a broad range of stakeholders, as listed in Table 3.1. Key themes during consultation for this activity include:

- Keeping local fishers informed of the activity immediately prior to and during drilling;
- Consultation fatigue; and
- Public information on environmental impacts of project.

Table 3.2 summarises the key themes and outcomes from stakeholder consultation, and Table 3.3 summarises the key themes and outcomes from the community information sessions undertaken in Golden Beach.

A summary of key stakeholder consultation undertaken to date, together with CarbonNet's responses and assessment of merit is included in Table 3.4. This table focuses on stakeholders who have been identified as 'relevant persons' whose functions, interests or activities may be affected by the activity. It also includes key stakeholders with whom engagement has taken place to enable CarbonNet to determine whether they are 'relevant persons' for the survey.

Table 3.2. Key themes and outcomes from stakeholder consultation

Theme	Key stakeholders	Issues and outcomes
OAW		
Keeping local fishers informed of the activity immediately before and during the activity	SETFIA, AFMA and Maritime Safety Victoria	• Stakeholders emphasised the need to inform local fishers of the OAW operations. • Stakeholders made offers to use databases or distribution lists in order to reach local fishers. • CarbonNet will use text messaging services offered by SETFIA, Notices to Mariners and Maritime Safety Victoria's distribution list to reach local fishers prior to conducting the activity. • Consultation with SETFIA on how best to engage local fishers is continuing.
The CarbonNet Project		
Consultation fatigue amongst fishing stakeholders	SETFIA, AFMA	• Consultation being undertaken concurrently among various titleholders in Bass Strait (including EARPL, Cooper Energy and GB Energy) has led to fishing representative groups and their membership experiencing consultation fatigue. • CarbonNet acknowledges the circumstances and has adapted its communication strategy to mitigate this, including providing information sessions at Golden Beach at weekends for the convenience of local residents.

Theme	Key stakeholders	Issues and outcomes
		• CarbonNet removed several stakeholders from the list of relevant stakeholders (see Section 3.3) to reduce unnecessary consultation, as it was deemed that they were not 'relevant' persons.
Concerns regarding environmental impact from non-OAW activities	VSFA	• Continuing concerns regarding the environmental impact of the Pelican MSS conducted in early 2018 were apparent during OAW consultation. • The primary concern raised by stakeholders was the need for evidence of impact from CarbonNet's activities. • CarbonNet undertook pre- and post-MSS habitat assessments and summaries of these assessments are publicly available on the CarbonNet website and in the G&G Investigations EP Summary on the NOPSEMA website. • CarbonNet co-funded the Victorian scallop stock assessment that is publicly available on the VFA website (https://vfa.vic.gov.au/commercial-fishing/scallop).

Table 3.3. Key themes and outcomes from community information sessions

Theme	Issues and outcomes
OAW	
The OAW	• The planned OAW was not a key concern among the community and there were few questions or concerns raised about the OAW. • AGR provided a presentation on the OAW activity at the second information session. The presentation included an explanation of the purpose of drilling an OAW, overview of the drilling program and explanation of jack-up rig positioning.
Location of the OAW	• Community members wanted to know why the OAW site was chosen; there was concern that it is too close to shore and should be further offshore. • During the first information session, CarbonNet and AGR addressed several questions as to how the activity area was chosen. This was communicated again during the second information session.
The CarbonNet Project	
Risk of CO_2 leaks	• Similar to the information sessions in July and August, concerns regarding the risk and impact of CO_2 leaks were raised during both information sessions. There was a particular interest in how potential leaks from a future injection well and pipeline would be monitored and responded to. • CarbonNet addressed the community concern about leaks, ways CarbonNet will monitor leaks and examples of other successful CCS projects in the presentation at the second information session, which appeared to address most concerns.
Environmental impact of CCS	• Several concerns were raised about the impact of CCS on the environment. These were not related to the OAW specifically. Primarily they related to the impact of the MSS on fish stocks. • CarbonNet referred to the environmental studies that were conducted as part of the MSS and referred the community to the MSS EP

Theme	Issues and outcomes
	summary on the NOPSEMA website.
Onshore impact of the project	• There was significant interest in the onshore component of the CarbonNet Project during the first information session, including the location of a pipeline pumping station and pipeline route. • At the second information session, CarbonNet explained the project phases and timeline, emphasising that the project is in early stages and that no decision has been made about a pipeline route or associated infrastructure at this stage. CarbonNet and AGR emphasised that these information sessions were about the OAW and that further consultation would occur about future phases if the project reaches that stage.

3.6. Ongoing Consultation

CarbonNet defined a 'reasonable period' (as specified in Regulation 11A(3) of the OPGGS(E)) as 30 business days for stakeholders to provide comments. This is in line with the NOPSEMA guidelines for stakeholder consultation and long-standing and well-established industry practice. Key milestones that will trigger further consultation for this activity include:

- Phase 2:
    - Confirmation of activity timing.
    - Future optimisation activities (e.g., changes to the activity area); EP acceptance and the availability of the EP Summary on the NOPSEMA website.
    - Operational planning aspects.
- Phase 3:
    - Any significant incidents (e.g., large hydrocarbon spill).
- Phase 4:
    - Completion of the activity.

Any claims or objections from stakeholders will be assessed and the EP then modified if required. If this relates to the identification of a new or significantly increased risk, the revised EP will be submitted to NOPSEMA for assessment.

Consultation Manager™ remains a live database and is updated regularly.

As detailed in the SEP, CarbonNet has planned ongoing consultation with the Golden Beach and Paradise Beach communities independent of the regulatory approvals process. This involves hosting community information sessions and providing additional communication materials at these sessions and through the CarbonNet website and e-newsletter.

Table 3.4. Summary of stakeholder consultation undertaken

Stakeholder	Functions, interests and/or activities	Date	Concerns, impacts or claims raised by stakeholder	CarbonNet's assessment of merit to claims or objections
Category 1 - Department or agency of the Commonwealth to which the activities to be carried out under the EP may be relevant				
AMSA	Key regulator for marine safety, advises on shipping lanes and safety in Commonwealth waters	27/9/18	CarbonNet emailed AMSA (Senior Advisor Nautical and Hydrographic) with a letter that invited comment, information sheet and contact details.	Refer to AHO response.
		4/10/18	AGR called AMSA (Senior Advisor, Nautical and Hydrographic) and left a voicemail requesting a call or email back regarding the proposed OAW activity.	Refer to AHO response.
		24/10/18	AGR emailed AMSA (Senior Advisor, Nautical and Hydrographic) with information sheet attached. Requested confirmation whether AMSA has any comments or questions regarding the proposed OAW activity.	Refer to AHO response.
		16/11/18	AGR HSE Manager emailed AMSA (Manager Environment Pollution Response) requesting comments or questions about the proposed OAW activity and the OPEP. Attached OAW information sheet and OPEP. Explained that CarbonNet/AGR are not expecting any comments from AMSA because the OPEP is largely unchanged from the G&G investigations, but encouraged AMSA to get in touch if they have any comments or questions. To date, no response has been provided.	CarbonNet believes sufficient consultation has been undertaken with AMSA in developing the OPEP (which hasn't changed substantially from that prepared for the G&G investigations). CarbonNet will send through the final version of the OPEP following acceptance by NOPSEMA.
AFMA	Manage Commonwealth Fisheries	27/9/18	CarbonNet emailed AFMA (petroleum section) with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR emailed AFMA (petroleum section) referencing email sent in September. Attached OAW information sheet and requested AFMA get in touch if they had any comments or questions about the activity.	N/A

		20/11/18	AGR called AFMA and spoke with a staff member who was previously responsible for the petroleum email address. Staff member took details on OAW and return contact details and said they would follow up the new staff member responsible.	N/A
		21/11/18	AFMA (Policy, Environment Economics and Research) responded to CarbonNet email on the OAW. AFMA explained that they didn't have the resources to review and provide a response to the proposal in detail. AFMA advised CarbonNet that it is important to consult with fishers in the area and that AFMA can provide information on the fishers and their contact details if required.	CarbonNet believes it has consulted with all relevant local fishers through the consultation process.
		22/11/18	AGR replied to AFMA (Policy, Environment Economics and Research) thanking them for taking time to respond. Advised AFMA that CarbonNet are consulting with fishing organisations, local fishers and other relevant stakeholders as part of the OAW consultation process. AGR informed AFMA that CarbonNet would continue to send them updates on the activity and encouraged AFMA to contact if they require any further information.	N/A
AHO	Issue Notice to Mariners	27/9/18	CarbonNet emailed AHO (Manager Nautical Assessment and Maintenance) with a letter that invited comment, information sheet and contact details.	N/A
		27/9/18	AHO (Manager Nautical Assessment and Maintenance) responded to CarbonNet confirming they had no issues with the proposed activity. AHO requested to be kept informed of the project progress and to be notified three weeks prior to activities commencing to issue notice to mariners.	CarbonNet will notify AHO once operations are scheduled, with at least four weeks' notice (longer than requested). The regulatory reporting requirements are included in the EP.
		23/11/18	AGR emailed AHO thanking them for their response to CarbonNet's plans to drill an OAW, informing them that the formal consultation period is now closing and confirming that CarbonNet will be in touch prior to operations commencing so AHO can issue a Notice to Mariners.	N/A

DAWR – Biosecurity	Provide quarantine clearance for foreign vessels entering Australian waters	27/9/18	CarbonNet emailed DAWR (Senior Biosecurity Inspector, Service Delivery Inspection Services - South) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called DAWR (Senior Biosecurity Inspector, Service Delivery, Inspection Services - South). Left a voicemail message requesting a call back if they had any questions or comments on the recent email from CarbonNet regarding plans to drill an OAW.	N/A
		5/10/18	DAWR (Senior Biosecurity Inspector, Service Delivery, Inspection Services - South) called AGR. DAWR is liaising with AMSA and preparing a response to send CarbonNet. Provided additional contact to include on all future communication.	Response detailed below (12/10/18).
		27/9/18	CarbonNet emailed DAWR (Travellers & Vessels Section, Pathway Compliance Division) with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	DAWR (Director, Conveyances and Ports section, Compliance Division) emailed AGR confirming that the activity poses minimal impact to DAWR's biosecurity functions and activities because the well is within the Australian Territorial Sea. DAWR explained that other activities may be subject to biosecurity requirements and provided details on these, including: • All conveyances, goods or people arriving from overseas. • Any movement between an exposed OAW and the Australian mainland. • Supplies to the OAW from overseas. DAWR provided a link to the latest Offshore Installations Biosecurity Guide (October 2018). DAWR suggested CarbonNet consider contacting the Victorian office to discuss logistics and operations and provided a weblink for more information.	CarbonNet has reviewed the latest Offshore Installation Biosecurity Guide and incorporated relevant controls into the EP. CarbonNet will continue to liaise with DAWR during the planning process.

		23/11/18	AGR emailed DAWR (Director, Conveyances and Ports section, Compliance Division) to thank them for their response and information. AGR confirmed the team has reviewed their recommendations and will implement the applicable parts of the Offshore Installations Biosecurity Guide 2018. Informed stakeholder that CarbonNet will contact them closer to the time of drilling. It was explained that formal consultation was now closing for the purposes of the EP submission, but consultation will continue as planning progresses.	N/A
DoD - Defence Support Group	Manage all Australian defence activities. The DoD has operations in Sale, Gippsland.	27/9/18	CarbonNet emailed DoD (Project Manager, Property Acquisition, Mining and Native Title) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called and spoke with DoD (Project Manager, Property Acquisition, Mining and Native Title). DoD confirmed they received the email and had sent to Navy and Airforce departments within DoD. No concerns had been raised by Navy or Airforce. DoD confirmed at this stage they have no concerns or questions.	Defence activities are addressed in the EP and CarbonNet believes further consultation is not required.
DIRD	Potential for overlapping projects and/or activities	27/9/18	CarbonNet emailed DIRD (Maritime Safety and Environment) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called DIRD (Maritime Safety and Environment). Stakeholder did not believe they were the appropriate person to be consulted with on this issue and suggested the email be sent to management level.	AGR resent original email to Director.
		4/10/18	AGR emailed DIRD (Director, Maritime Safety and Environment) and referred to conversation with their colleague. The email included a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	DIRD (Director, Maritime Safety and Environment) emailed AGR with a thank you for the information. Confirmed they would look through the information, share with their colleagues at AMSA and be in touch with any further comments or questions.	N/A
		10/10/18	DIRD (Maritime Safety and Environment) emailed AGR confirming DIRD has no comments on this activity. DIRD suggested sending this information to a contact at the Department of Home Affairs,	N/A

			which is now responsible for offshore facility security plans. Explained that AMSA would reply separately.	
		10/10/18	DIRD (Maritime Safety and Environment) emailed CarbonNet with a contact at DHA.	CarbonNet sent information sheet and invitation to comment to DHA.
		11/10/18	AGR emailed stakeholder thanking them for their response. Confirmed that AGR would contact DHA regarding this activity.	N/A
DHA	Emergency management, transport security and border-related functions	12/10/18	AGR emailed DHA (Aviation and Maritime Security Division) with a letter describing the activity, attached the OAW and G&G information sheets and contact details.	N/A
		1/11/18	DHA replied to AGR confirming that DHA does not have any positive or negative feedback to provide at this stage and that the activity will not impact on the DHA functions, interests or activities.	AGR emailed DHA to thank them for their response. CarbonNet does not believe further consultation is required with DHA for the OAW. CarbonNet will include DHA as a relevant stakeholder for future consultation.
MBC	Security and customs stakeholder within Commonwealth waters	27/9/18	CarbonNet emailed MBC (Border Protection Command) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called MBC but there was no answer or opportunity to leave a message.	N/A
		12/10/18	AGR called MBC and left a voicemail message encouraging them to email or call if they wished to provide comment on the activity.	CarbonNet does not believe follow up is required as there will be no conflict between the activity and MBC operations in Bass Strait.
Category 2 - Each Department or agency of a State to which the activities to be carried out under the EP may be relevant				
DELWP – Oiled Wildlife Response	Manage the foreshore adjacent to the activity area and is responsible for	27/9/18	CarbonNet emailed DELWP (Oiled Wildlife Response) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called DELWP (Oiled Wildlife Response). Reached department switch board and was unable to leave message.	CarbonNet does not believe further follow up is required. During consultation for the G&G investigations,

	oiled wildlife response in Victorian jurisdiction in the event of a hydrocarbon spill.			DELWP explained that it receives information about offshore activities from DJPR EMB and will usually make comment on approved EPs. CarbonNet has consulted extensively with DJPR EMB.
DELWP – Regional Planning and Approvals	Manage onshore environmental planning and approvals for large-scale projects.	27/9/18	CarbonNet emailed DELWP (Program Manager, Regional Planning and Approvals) with a letter that invited comment, information sheet and contact details.	N/A
		1/10/18	DELWP (Program Manager, Regional Planning and Approvals) called CarbonNet project line. Left voicemail requesting call back to provide more information on what is included in the EP.	N/A
		2/10/18	AGR returned call to stakeholder. Requested call back and left AGR project line number.	CarbonNet has consulted with DELWP as part of the OPEP preparation via meetings held with DJPR EMB, who coordinate reviews with relevant government agency stakeholders. This feedback has been incorporated into the OPEP.
		4/10/18	AGR returned call to stakeholder. Requested call back and left AGR project line number.	
		12/10/18	AGR returned call to stakeholder. Requested call back and left AGR project line number.	
		23/10/18	CarbonNet Project Director called stakeholder. Stakeholder requested further information on the status of the CarbonNet EPs in light of recent news coverage on NOPSEMA's request that CGG resubmit their EP for the Gippsland marine seismic survey. CarbonNet Project Director committed to email stakeholder with links to NOPSEMA website and more information.	N/A
		23/10/18	CarbonNet Regulatory Approvals Strategy Manager emailed stakeholder, providing information on the status of G&G EP approvals and a link to the NOPSEMA website. Explained the difference between NOPSEMA's request for further information for the G&G EP and NOPSEMA's request for CGG to resubmit their EP for the Gippsland marine seismic survey. The stakeholder responded to say that the information provided was	It is apparent that this part of DELWP is interested in the EP approvals process rather than the activity per se. Based on the stakeholder's response, CarbonNet considers that no further consultation is required.

			very helpful and will be shared with the Gippsland Planning team for information in case enquiries are received.	
Parks Victoria – Central Gippsland	Manage Gippsland Lakes Coastal Park, including Golden Beach Foreshore	27/9/18	CarbonNet emailed Parks Victoria Central Gippsland (District Manager) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called Parks Victoria Central Gippsland (District Manager). No answer. Left voicemail message explaining the call was regarding a recent email from CarbonNet on a planned OAW. Requested call back.	N/A
		10/10/18	Parks Victoria Central Gippsland (District Manager) called AGR and left voicemail requesting call back.	N/A
		12/10/18	AGR called Parks Victoria Central Gippsland (District Manager). Stakeholder explained they had not had an opportunity to read the email. AGR explained the email contained information on CarbonNet's planned OAW and encouraged stakeholder to read email and get in contact if they had any comments or concerns. To date, no additional feedback has been received.	CarbonNet does not believe further follow up is required after speaking with stakeholder and confirming they had received the email.
MSV – Waterway Safety	Victorian government agency responsible for maritime safety	27/9/18	CarbonNet emailed MSV (Manager, Waterway Safety) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called MSV (Manager, Waterway Safety). No answer.	N/A
		12/10/18	AGR called MSV (Manager, Waterway Safety) to follow up on email. No answer. Left voicemail requesting a call or email back if they have any comments or questions. Provided email address and phone line.	N/A
		12/10/18	MSV (Manager, Waterway Safety) called AGR and explained that MSV does not have any concerns because all work is happening in Commonwealth waters. They offered CarbonNet the use of the MSV database to distribute the Notice to Mariners.	CarbonNet will take up the offer to use send MSV details of the activity closer to the time so that MSV can distribute the information via the Notice to Mariners.
		23/11/18	AGR emailed MSV (Manager, Waterway Safety) to thank them for the offer to distribute information via the Notice to Mariners. AGR	N/A

			confirmed CarbonNet would like to use the distribution list and informed MSV that the project team would be in touch once operations were scheduled.	
EPA	Victorian government agency responsible for environment management	27/9/18	CarbonNet emailed EPA (Executive Director, Regional Services) with a letter that invited comment, information sheet and contact details.	CarbonNet has consulted with the EPA as part of the OPEP preparation via meetings held with DJPR EMB, who coordinate reviews with relevant government agency stakeholders. This feedback has been incorporated into the OPEP.
		4/10/18	AGR called EPA (Executive Director, Regional Services) to follow up on email. No answer. Left a voicemail message requesting a call or email back if they have any comments or questions. Provided email address and phone line.	
		12/10/18	AGR emailed EPA (Executive Director, Regional Services). Introduced the OAW activity and attached the information sheet. Requested call or email to provide any comments.	N/A
		12/10/18	AGR received email from EPA (Regional Manager, Gippsland) who explained that the EPA does not have a regulatory approvals role in this activity, but they do have an interest in this activity and would like to be kept informed of the project. EPA provided several new contacts for future consultation.	CarbonNet updated the stakeholder list to include additional contacts for future consultation. CarbonNet will continue to keep EPA informed of the activity.
		15/10/18	AGR replied to EPA thanking them for their response and advice. Confirmed that AGR and CarbonNet would update the stakeholder database with their new contacts and encouraged the EPA to get in touch if they had any questions.	N/A
Category 3 - The Department of the responsible State Minister				
DJPR – EMB	Control agency for marine pollution emergency in State waters	27/9/18	CarbonNet emailed DJPR EMB (Manager, Marine Pollution) with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR emailed DJPR EMB Marine Pollution mailbox with a letter that invited comment, information sheet and contact details.	Bounce-back received. Updated email address.
		16/10/18	AGR emailed DJPR EMB Marine Pollution mailbox with a letter that invited comment, information sheet and contact details.	
		23/10/18	AGR emailed DJPR EMB (Manager, Marine Pollution). Referred to email from 27/9/10, requested comments or questions and provided	N/A

			contact details.	
		16/11/18	AGR HSE Manager email DJPR EMB (Manager, Marine Pollution). Referred to email from CarbonNet on 27/9/10 inviting comments on the planned OAW. Explained that the OPEP for the OAW activity is essentially the same as that for the G&G Investigations OPEP because the credible hydrocarbon release scenarios are the same. A copy of draft OPEP and OAW information flyer was provided.	N/A
		16/11/18	DJPR EMB (Manager, Marine Pollution) responded to AGR HSE Manager confirming they had passed the email on to their colleague for review. Requested deadline for comments.	AGR HSE Manager responded to DJPR EMB (Manager, Marine Pollution) requesting comments by 23/11/18 (one week).
		27/11/18	AGR HSE Manager emailed DJPR EMB (Manager, Marine Pollution) to follow up on responses.	N/A
		28/11/18	DJPR EMB (Senor Project Officer, Marine Pollution) responded to AGR HSE Manager confirming they would collate comments from all departments and return them to AGR by 6 December.	AGR HSE Manager replied with thanks.
		6/12/18	DJPR EMB (Senior Project Officer, Marine Pollution) responded to AGR HSE Manager confirming the OPEP has been shared with DJPR EMB, DJPR ERR, DJPR Maritime Safety Victoria, DELWP, EPA and Parks Victoria and that there are no further comments on the OPEP.	AGR HSE Manager replied thanking DJPR EMD for liaising with the agencies and providing responses.
DJPR EMB – Ports, Shipping and Maritime Emergencies	Victorian government agency that manages ports and emergencies in Victorian waters	27/9/18	CarbonNet emailed DJPR EMB (Manager, Ports, Shipping and Maritime Emergencies) with a letter that invited comment, information sheet and contact details.	N/A
		4/10/18	AGR called DJPR EMB (Manager, Ports, Shipping and Maritime Emergencies). Original email recipient left the organisation so the email was not received. Provided new contact.	CarbonNet updated stakeholder list with new contact and re-issued the email.
		4/10/18	AGR emailed new contact for DJPR EMB (Manager, Ports, Shipping and Maritime Emergencies). Included original letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR called DJPR EMB (Manager, Ports, Shipping and Maritime	N/A

			Emergencies). Stakeholder had not read email but committed to do so today and send a response.	
		12/10/18	DJPR EMB (Manager, Ports, Shipping and Maritime Emergencies) emailed AGR. Stakeholder was satisfied that everything had been covered as part of consultation with MSV.	CarbonNet will continue to consult with DJPR EMB – Ports, Shipping and Maritime Emergencies throughout the OAW planning and operations, and throughout future stages of the project.
		12/10/18	AGR responded to DJPR EMB (Manager, Ports, Shipping and Maritime Emergencies) confirming that consultation had been undertaken with MSV and thanking the stakeholder for response.	CarbonNet has consulted with Gippsland Ports as part of the OPEP preparation via meetings held with DJPR EMB, who coordinate reviews with relevant government agency stakeholders. This feedback has been incorporated into the OPEP.
VFA	Victorian fisheries and individual fishers	4/5/18	CarbonNet emailed the VFA to request information on what fisheries operate in the activity area.	N/A
		4/5/18	VFA (Principal Policy Analyst) responded by email stating that data could be provided for the two cells intersected by the activity area.	N/A
		31/5/18	CarbonNet emailed the VFA requesting confirmation of the fisheries that operate in the area intersected by the oil spill EMBA.	N/A
		22/6/18	The VFA emailed data for the fishing catch and effort cells requested. Much of the data was not able to be provided due to confidentiality reasons, but it provided information on what fisheries operate in the area.	The information provided by the VFA has been incorporated in to Section 5.6.3 of the EP.
		27/9/18	CarbonNet emailed VFA (Executive Director, Fisheries) with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR called VFA (Executive Director, Fisheries). No answer. Left voicemail requesting a call back. Provide contact details.	N/A

		2/11/18	AGR emailed VFA (Executive Director, Fisheries) advising that consultation for the OAW would be closing in the next few weeks for the purposes of the EP submission, but consultation will continue as planning progresses. Requested VFA contact AGR with any comments or questions on the activity. Provided contact details. Attached OAW information sheet.	CarbonNet believes sufficient effort has been made to consult with VFA. Relevant information for the activity area has been previously for the G&G investigations (with the activity area for that being the same as the OAW activity).
Category 4 - A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP				
Adjacent/overlapping petroleum Titleholders				
GB Energy (Vic) Pty Ltd	Adjacent titleholder (Vic/RL1(V)) in Victorian state waters	9/5/18	CarbonNet held a risk assessment workshop with GB Energy to understand if there would be any risks that this activity may have on their current and future operations in their permit. Following the workshop, they issued correspondence to CarbonNet stating that they have no objections to CarbonNet undertaking the activity as planned. There was general correspondence in the lead up to and following this event (not included in Appendix 3 for confidentiality reasons).	CarbonNet is satisfied that this activity will not have any impacts or risks on this stakeholder's activities.
		27/9/18	CarbonNet emailed GB Energy (CEO) with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	CarbonNet emailed GB Energy (CEO) to follow up on the original email, invited comments and provided information sheet.	CarbonNet will continue to engage GB Energy for this and future activities.
		Ongoing	Commercial-in-confidence discussions are ongoing with GB Energy regarding the potential overlapping developments and operations.	N/A
EARPL	Overlapping titleholder for VIC/RL1	17/4/18	CarbonNet held a risk assessment workshop with EARPL to understand if there would be any risks that this activity may have on their current and future operations in their tenements. Following the workshop, EARPL issued correspondence to CarbonNet stating that they have no objections to CarbonNet undertaking the activity as planned. There was general correspondence in the lead up to and following this event.	CarbonNet is satisfied that this activity will not have any impacts or risks on this stakeholder's activities.

		27/9/18	CarbonNet emailed EARPL (Manager, Public and Government) with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	AGR sent follow up email to EARPL (Manager, Public and Government) inviting comments and feedback. Re-issued the OAW information sheet.	CarbonNet will continue to engage EARPL for this and future activities.
		Ongoing	Commercial-in-confidence discussions have been ongoing with EARPL regarding the potential for sharing vessels for the G&G investigations and MODU sharing.	N/A
3D Oil Ltd	Nearby titleholder	27/9/18	CarbonNet emailed 3D Oil Ltd (Managing Director and Petroleum Systems Analyst) with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	AGR called 3D Oil (Petroleum Systems Analyst) who confirmed there were no issues with the proposed activity for 3D Oil. Stakeholder advised that 3D Oil relinquished some nearby titles so may no longer be considered a relevant stakeholder. Nevertheless, 3D Oil wishes to be kept informed of this activity.	CarbonNet will continue to engage 3D Oil for this and future activities.
Carnarvon Hibiscus	Nearby titleholder (VIC/L31)	2/5/18	CarbonNet held a risk assessment workshop with Carnarvon Hibiscus to understand if there would be any risks that this activity may have on their current and future operations in their permit. Following the workshop, they issued correspondence to CarbonNet stating that they have no objections to CarbonNet undertaking the activity as planned. There was general correspondence in the lead up to and following this event.	CarbonNet is satisfied that this activity will not have any impacts or risks on this stakeholder's activities.
		27/9/18	CarbonNet emailed Hibiscus Petroleum (Australian Assets) with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	AGR sent follow up email to Hibiscus Petroleum (Australian Assets) inviting comments and feedback and re-issued the OAW information sheet.	N/A

		6/10/18	Hibiscus Petroleum replied to AGR thanking them for their advice on the OAW.	CarbonNet will continue to engage Carnarvon Hibiscus for this and future activities.
Lakes Oil	Nearby titleholder (Vic/P43(V) and Vic/P44(V))	27/9/18	CarbonNet emailed Lakes Oil (Operations Manager) with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	AGR spoke to Lakes Oil who said they had no concerns at this stage. Stakeholder asked whether CarbonNet had decided an exact location. Stakeholder was also interested in whether CarbonNet had analysed the results from the MSS. Lakes Oil have a general interest in the activity and expressed an interest in being informed once the MODU had been procured.	AGR explained the OAW would be drilled about 8 km off the coast of Golden Beach and referred Lakes Oil to the map in the information sheet. AGR explained that the results of the MSS were still being processed. CarbonNet will continue to keep Lakes Oil informed of the OAW and consult with them as planning progresses.
Other local interests				
Gippsland Water Police	Search and rescue, law enforcement	27/9/18	CarbonNet emailed Gippsland Water Police with a letter that invited comment, information sheet and contact details.	N/A
		1/10/18	Gippsland Water Police (Sergeant) emailed AGR confirming that CarbonNet's proposed activities will not have an impact on Gippsland Water Police functions. Gippsland Water Police advised that CarbonNet should ensure a Notice to Mariners is issued prior to commencing the activity that includes details on location and lighting. Noted that email had been forwarded by Paynesville Water Police (Sergeant).	CarbonNet will issue a Notice to Mariners prior to commencing activity (see notes for MSV). CarbonNet will continue to keep Gippsland Water Police informed of project activity.
		23/11/18	AGR emailed Gippsland Water Police (Sergeant). Thanked stakeholder for response and informed them that formal consultation is now closing. Confirmed that CarbonNet will ensure a Notice to Mariners is issued via MSV and explained that CarbonNet has taken extra steps to notify fishers via SETFIA.	N/A

Paynesville Water Police	Search and rescue, law enforcement	27/9/18	CarbonNet emailed Paynesville Water Police (Sergeant) with a letter that invited comment, information sheet and contact details.	Paynesville Water Police forwarded email to Gippsland Water Police. CarbonNet therefore understands that the email was read by Paynesville Water Police and deemed not relevant.
Oil spill preparedness and response agencies				
Gippsland Water	Water and wastewater management in Gippsland	27/9/18	CarbonNet emailed Gippsland Water (Customer Service and Communications) with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	AGR called Gippsland Water (Customer Service and Communications). Stakeholder said they did not receive the email but is no longer the best contact at Gippsland Water. Advised of new contact.	CarbonNet resent email to new contact.
		5/10/18	AGR emailed Gippsland Water (Business Transformation) with a letter that invited comment, information sheet and contact details. Explained that stakeholder details had been passed on from Customer Service and Communications. Also attached the G&G information sheet.	N/A
		12/10/18	AGR sent follow up email to Gippsland Water (Business Transformation) requesting comments. Attached OAW information sheet.	N/A
		12/10/18	Gippsland Water (Business Transformation) replied to AGR saying that the executive team would be discussing this activity and would reply after this discussion.	N/A
		17/10/18	Gippsland Water (Business Transformation) replied to AGR saying that they would like to continue to receive information on the project and that they are the correct contact within Gippsland Water.	CarbonNet will continue to send Gippsland Water updates on the project.
		19/10/18	AGR responded to stakeholder thanking them for confirming they are the best person to receive future communication.	N/A

Gippsland Ports	Local authority responsible for managing ports and waterways in Gippsland	27/9/18	CarbonNet emailed Gippsland Ports (Executive Manager, Maritime Services) and the Gippsland Ports mailbox with a letter that invited comment, information sheet and contact details.	N/A
		5/10/18	AGR called Gippsland Ports (Executive Manager, Maritime Services). No answer and no opportunity to leave voicemail.	N/A
		12/10/18	AGR called Gippsland Ports (Executive Manager, Maritime Services). No answer but was able to leave voicemail message. Requested call back if Gippsland Ports has any concerns or comments on the proposed OAW. To date, no response has been received regarding the OAW information flyer. CarbonNet has consulted with Gippsland Ports as part of the OPEP preparation via meetings held with DJPR EMB, who coordinate reviews with relevant government agency stakeholders. This feedback has been incorporated into the OPEP.	CarbonNet does not believe further follow up is required because the MODU is likely to be mobilised from outside Gippsland and is unlikely to pass through Gippsland ports or waterways. CarbonNet will engage Gippsland Ports prior to and during operations if their specific interests are impacted.
East Gippsland CMA	Waterways, catchment and flood management	27/9/18	CarbonNet emailed East Gippsland CMA (CEO) with a letter that invited comment, fact sheet and contact details.	N/A
		5/10/18	AGR called East Gippsland CMA (CEO). Left voicemail requesting a call back.	
		12/10/18	AGR called East Gippsland CMA (CEO). Left message with personal assistant to CEO requesting they call or email back if there are any comments or concerns about the OAW. Referred to email sent on 27/9/10.	CarbonNet does not believe follow up is required as the activity will not have any impacts on the CMA's onshore activities.
VF18 Lakes Entrance Coast Guard	A volunteer coast guard that assists with maritime safety and rescue	27/9/18	CarbonNet emailed VF18 Lakes Entrance Coast Guard with a letter that invited comment, fact sheet and contact details.	N/A
		23/11/18	AGR sent VF18 Lakes Entrance Coast Guard a follow up email informing them that formal consultation is closing and encouraged them to get in touch with any comments or questions. Explained that the end of formal consultation does not close ongoing consultation	CarbonNet does not believe further follow up is required at this stage. CarbonNet will keep VF18 Lakes Entrance Coast Guard informed during

			with stakeholders and CarbonNet will continue to keep stakeholder informed of the project activity.	planning and operations.
Fisheries				
CFA	Peak body representing commercial fishers in Commonwealth waters	27/9/18	CarbonNet emailed CFA (Executive Officer) with a letter that invited comment, fact sheet and contact details.	N/A
		12/10/18	AGR called CFA (Executive Officer). No answer. AGR left voicemail requesting a call back to provide any comments or questions on the CarbonNet OAW.	N/A
		1/11/18	AGR emailed CFA (Executive Officer) informing them that formal consultation for the OAW will be closing in the next few weeks. Consultation will continue after this date. Please contact AGR with any comments or questions. Provided contact details. Attached OAW information sheet.	Bounce-back received.
		7/11/18	AGR called CFA (Executive Officer) and left a voicemail message. Explained AGR had received a bounce-back from their last email. Requested CFA call back to provide updated email address and discuss the OAW. To date, there has been no response.	CarbonNet does not believe follow up is required as all relevant Commonwealth-managed fisheries are being consulted.
ASBTIA	Peak body representing bluefin tuna fishers	27/9/18	CarbonNet emailed two contacts at ASBTIA with a letter that invited comment, fact sheet and contact details.	N/A
		12/10/18	AGR called ASBTIA, with the ASBTIA representative confirming that they did not have any objections to CarbonNet drilling an OAW.	N/A
		1/11/18	AGR emailed other contact at ASBTIA to follow up on email and request any comments or questions. Informed stakeholder that formal consultation for the OAW would be closing shortly, but ongoing consultation would continue throughout the project. To date, no response has been received.	CarbonNet does not believe follow up is required as no tuna fishing is undertaken in the activity area or the EMBA.

Eastern Zone Abalone Industry Association	Peak body representing Victorian abalone fishers	27/9/18	CarbonNet emailed Eastern Zone Abalone Industry Association with a letter that invited comment, fact sheet and contact details.	N/A
		12/10/18	AGR called CFA (Executive Officer). AGR left a voicemail message requesting a call back to provide any comments or questions on the CarbonNet OAW.	N/A
		1/11/18	AGR emailed CFA (Executive Officer) informing them that formal consultation for the OAW will be closing in the next few weeks, noting that consultation will continue after this date and attached OAW information sheet. To date, no response has been received.	CarbonNet does not believe follow up is required as no abalone fishing is undertaken in the activity area or the EMBA.
SIV	Peak industry body for Victorian Fisheries	27/9/18	CarbonNet emailed SIV (Executive Director) with a letter that invited comment, fact sheet and contact details.	N/A
		16/10/18	AGR called SIV (Executive Director). Explained that AGR was following up on an email about CarbonNet's planned OAW. Stakeholder confirmed they had received email and committed to reviewing it and sending comments to AGR. Stakeholder asked when AGR required comments. AGR suggested they reply in this next week to allow time to provide additional information if required.	N/A
		1/11/18	AGR emailed SIV (Executive Director) to follow up on comments about the OAW. Informed stakeholder that formal consultation would be closing in the next few weeks, however, consultation for the project will be ongoing. Provided contact details and attached OAW information sheet. To date, no response has been received.	CarbonNet does not believe follow up is required as consultation with individual fishers is being undertaken and because previous concerns regarding potential impacts to commercial scallop beds have been allayed through several surveys that have confirmed the absence of scallop beds in the activity area.
SETFIA	Peak industry body	27/9/18	CarbonNet emailed SETFIA (Executive Director) with a letter that invited comment, fact sheet and contact details.	N/A

	representing trawl fishers in southeast Australia	16/10/18	AGR called SETFIA (Executive Director). Left a voice-to-text message requesting call back regarding the CarbonNet Project and provided contact details.	N/A
		2/11/18	AGR emailed SETFIA (Executive Director) informing them that formal consultation for the OAW will be closing in the next few weeks, though consultation on the project will continue after this date. Provided contact details and attached OAW information sheet.	N/A
		15/11/18	AGR received email from SETFIA (Executive Director). Explained that SETFIA was struggling to provide enough resources to comment on all the planned oil and gas activities. Explained that SETFIA is supportive of the oil and gas industry and the CarbonNet Project. SETFIA acknowledged that CarbonNet has done well engaging the industry and keeping fishers informed of operations. Suggested that CarbonNet use the SETFIA SMS service to notify fishers of the OAW activity. Suggested CarbonNet also use a local contractor to notify fishing vessel potters of the OAW activity.	CarbonNet intends to use the SETFIA SMS service for the OAW activity (see next row).
		22/11/18	AGR replied to SETFIA (Executive Director) with thanks for responding. CarbonNet thanked stakeholder for the offer to use the SETFIA SMS service and confirmed they would like to take SETFIA up on this offer for both the G&G investigations and the OAW. CarbonNet advised it would be in touch as planning progresses.	Consultation with SETFIA will be ongoing in the lead up to drilling with regard to the SMS notification service.
		26/11/18	SETFIA (Executive Director) reiterated they would like to be informed once the drilling date is confirmed and explained that vessel plotters will only need to be updated if there is a permanent safety zone in place.	AGR will determine whether a permanent exclusion zone is required for the OAW well site and inform fishing vessel plotters if required.
		28/11/18	AGR replied to SETFIA (Executive Director) and confirmed that they will be informed of the drilling start date. It was explained that G&G investigations will only require a temporary exclusion zone and that the project is in the process of determining whether a permanent exclusion zone will be required for the OAW, confirming that AGR will provide this information closer to the time. AGR also stated that it would appreciate SETFIA's support identifying appropriate fishing	N/A

			vessels for the purposes of updating their plotters.	
		28/11/18	SETFIA (Executive director) responded confirming they can assist with identifying fishing vessels, otherwise will assist with an SMS notification service.	N/A
		29/11/18	AGR replied thanking SETFIA (Executive Director) for support and confirming AGR and CarbonNet would be in touch.	Consultation with SETFIA will be ongoing in the lead up to drilling with regard to the SMS notification service.
SPFIA	Peak industry body representing pelagic fishers	27/9/18	CarbonNet emailed SPFIA (Executive Director) with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR called SPFIA (Executive Director). A voicemail message was left requesting a call back to confirm they had received the email and provide any comments or questions.	
		1/11/18	AGR emailed SPFIA (Executive Director) informing them that formal consultation for the OAW will be closing in the next few weeks but that consultation for the project will continue after this date. Provided contact details and attached OAW information sheet. To date, no response has been received.	CarbonNet does not believe follow up is required as the fishing effort in and around the activity area is well known and there is little pelagic fishing.
Southern Shark Industry Alliance	Shark fisheries representative	N/A	President of the Southern Shark Industry Alliance is also the President of the SPFIA. As such, information about the activity was not issued separately to this alliance.	CarbonNet believes consultation with the Southern Shark Industry Alliance President was sufficient to cover the interests of both the shark fishers and small pelagic fishers.
SSFAssn	Peak industry body for shark gillnetters	27/9/18	CarbonNet emailed SSFAssn (Executive Officer) with a letter that invited comment, fact sheet and contact details.	N/A
		16/10/18	AGR called SSFAssn (Executive Officer). Stakeholder confirmed that SSFAssn does not have any issues with CarbonNet drilling an OAW. SSFAssn is quite happy with what CarbonNet did with previous activity and expects CarbonNet to continue to be diligent in their	N/A

			activity.	
Tuna Australia (ETBF Industry Association)	Peak industry body for tuna fishers in the eastern tuna billfish fishery	27/9/18	CarbonNet emailed Tuna Australia with a letter that invited comment, fact sheet and contact details.	N/A
		16/10/18	AGR called Tuna Australia. The phone rang out without an opportunity leave a message.	N/A
		16/10/18	AGR emailed Tuna Australia. Referred to email sent on 27/9/18. Included letter requesting comment on the planned OAW, provided contact details and attached the OAW information sheet.	N/A
		2/11/18	AGR emailed SPFIA (Executive Director) informing them that formal consultation for the OAW will be closing in the next few weeks but that consultation for the project will continue after this date. Provided contact details and attached OAW information sheet. To date, no response has been received.	CarbonNet does not believe follow up is required as no tuna fishing is undertaken in the activity area or the EMBA.
VADA	Peak industry body for abalone divers	27/9/18	CarbonNet emailed VADA (Chairman) with a letter that invited comment, information sheet and contact details.	N/A
		16/10/18	AGR called VADA (Chairman). No answer. Left a voicemail message requesting call back regarding the recent email from CarbonNet. Provided contact details.	N/A
		2/11/18	AGR emailed VADA (Chairman) informing them that formal consultation for the OAW will be closing in the next few weeks but that consultation for the project will continue after this date. Provided contact details and attached OAW information sheet.	Bounce-back received.
		7/11/18	AGR called VADA (Chairman) and left a voicemail message. Explained that AGR had received a bounce-back from the email regarding CarbonNet's plans to drill an OAW. Requested they call back to confirm their email address.	CarbonNet does not believe follow up is required as no abalone fishing is undertaken in the activity area or the EMBA.
Victorian Bays and	Peak industry body for fishers	27/9/18	CarbonNet emailed Victorian Bays and Fisheries Association with a letter that invited comment, information sheet and contact details.	N/A

Inlets Fisheries Association	working in bays and inlets along the Victorian coast	16/10/18	AGR called Victorian Bays and Fisheries Association and left a voicemail message requesting call back regarding the recent email from CarbonNet. Provided contact details.	N/A
		2/11/18	AGR emailed Victorian Bays and Fisheries Association informing them that formal consultation for the OAW will be closing in the next few weeks but that consultation for the project will continue after this date. Provided contact details and attached OAW information sheet. To date, no response has been received.	CarbonNet does not believe follow up is required as the activity will not have any impacts to bays and inlets.
VSFA	Scallop Fisheries representative	27/9/18	CarbonNet emailed VSFA (President) with a letter that invited comment, fact sheet and contact details.	N/A
		16/10/18	AGR called VSFA (President). Stakeholder advised that the VSFA does not support the CarbonNet Project. VSFA are concerned by the environmental impact of the project, particularly the Pelican 3DMSS (undertaken in February 2018), and other proposed oil and gas projects. The President requested more information on what studies and analysis has been undertaken on the environmental impacts of the activity, and analysis of the outcomes of the Pelican MSS.	CarboNet committed to come back to VSFA with more information on environmental assessments undertaken.
		26/10/18	AGR emailed VSFA, thanking them for their time on the phone the previous week. Confirmed that AGR are following up more information on the studies undertaken with the project team and will come back to stakeholder with this information. Encouraged stakeholder to get in touch if they had any information in the meantime.	N/A
		15/11/18	CarbonNet emailed stakeholder addressing their request for more information. CarbonNet explained they commissioned a habitat assessment to understand the marine environment prior to conducting the MSS. This study indicated a low abundance of scallops. The outcomes of this study were included in the MSS and G&G investigations EPs. Explained that CarbonNet also considered all available science on the impact of MSSs on fisheries in developing the EPs, referring the	Given the lack of response to the information provided, CarbonNet assumes the VSFA has no additional concerns. CarbonNet will continue to engage with the VSFA as required.

			stakeholder to the MSS EP summary on the NOPSEMA website. CarbonNet referred to a Victorian scallop stock assessment study that CarbonNet co-funded. This study confirmed the low abundance of scallops in the MSS area, referring the stakeholder to the VFA for a copy of the study report. CarbonNet referred to the pre- and post-MSS marine habitat assessments undertaken by CarbonNet, which also observed a low abundance of scallops in the area. No conclusions were able to be drawn about the impact of the MSS due to the low numbers of scallops. CarbonNet referred the VSFA to the G&G Investigations EP Summary on NOPSEMA's website that contains information on the existing environment for the activity area, including the results of the pre- and post-MSS habitat assessments.	
		27/11/18	AGR called VSFA (President) to confirm they had received the email dated 15 November. Stakeholder confirmed it had been received and that they are in the process of preparing a response and will send it to CarbonNet in the next day or two. AGR explained that formal consultation on the OAW was closing at the end of November, however, consultation will continue after this date. The stakeholder was encouraged stakeholder to send the response before the 30th of November.	N/A
		29/11/18	AGR called VSFA (President) to follow up on the email response discussed above. Stakeholder explained that they are still preparing the response. The response will address the impact to scallop spawning as a result of the CarbonNet Pelican MSS and other seismic activity. Stakeholder explained they would send the response on the 1st of December. AGR asked stakeholder whether their response would include any comments on the OAW. Stakeholder explained that VSFA had no issues or comments with the OAW. Their only comment is that they would like to be more involved with CarbonNet.	CarbonNet will prepare a response to VSFA regarding the impact to scallop spawning from seismic surveys. Since the VSFA has no issues or comments with regards to the OAW, no further consultation is required for this activity. VSFA will be kept informed of the dates and progress of the OAW operations. CarbonNet will continue to engage with the VSFA as required.

VRFish	Victorian recreational fisheries representative	27/9/18	CarbonNet emailed VRFish (CEO) with a letter that invited comment, information sheet and contact details.	N/A
		16/10/18	AGR called VRFish (CEO). No answer. Left voicemail requesting call back regarding the recent email from CarbonNet. Provided contact details.	N/A
		2/11/18	AGR emailed VRFish (CEO) informing them that formal consultation for the OAW will be closing in the next few weeks but that consultation for the project will continue after this date. Provided contact details and attached OAW information sheet. To date, no response has been received.	CarbonNet does not believe further follow up is required. During consultation for the G&G investigations, VR Fish expressed that their main concern about CarbonNet was the impact of the MSS on fish stocks. CarbonNet will continue to keep stakeholder updated on activities.
Local fisher	Scallop fisher	27/9/18	CarbonNet emailed stakeholder with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR emailed stakeholder following up on CarbonNet's earlier email. Included a copy of the letter, contact details and fact sheet. To date, no response has been received.	CarbonNet does not believe additional consultation is required with stakeholder due to the low abundance of scallops in the activity area.
Local fisher	Owner, Mitchelson Fisheries	27/9/18	CarbonNet emailed stakeholder with a letter that invited comment, fact sheet and contact details.	N/A
		12/10/18	AGR called stakeholder following up on CarbonNet's earlier email. Requested return call to confirm they had received the email and if they had comments on CarbonNet's planned OAW.	CarbonNet does not believe additional consultation is required with stakeholder. As a local commercial fisher, CarbonNet believes that stakeholder will be notified of CarbonNet's plans to drill through SETFIA.

Category 5 - Any other person or organisation that the Titleholder considers relevant				
Wellington Shire Council	Local Government Area Council that includes the towns of Golden Beach and Paradise Beach	7/8/2018	CarbonNet briefed several Wellington Shire Council staff and councillors, proving a general project update, an update on OAW planning and on stakeholder engagement. Wellington Shire Council staff assisted CarbonNet with arranging the hire of the Port of Sale facility for the mid-August information session.	N/A
		28/8/18	Wellington Shire Council assisted with a mail out to 682 property owners in Golden Beach and Paradise Beach using their property database. The letter advised residents of the September and October information sessions at Golden Beach and the upcoming OAW activity.	N/A
		27/9/18	CarbonNet emailed three stakeholders at Wellington Shire Council (Manager Business Development, Emergency Services Coordinator and General Manager Development) with a letter that invited comment, information sheet and contact details.	N/A
		12/10/18	AGR sent a follow up email to the same three stakeholders at Wellington Shire Council with a project overview, information sheet and invitation to comment.	N/A
		14/10/18	Wellington Shire Council (Emergency Services Coordinator) replied to AGR email with a thank you.	CarbonNet is satisfied the Emergency Services Coordinator has no comments or questions on the OAW activity. The Emergency Services Coordinator represents the interests of the Gippsland Emergency Management Planning Committee and other council interests.
		Ongoing	CarbonNet continues to liaise with the Wellington Shire Council as part of the project's ongoing stakeholder engagement. The council has assisted CarbonNet with regular mailouts of letters to almost 700 property owners in Golden Beach and Paradise Beach.	N/A

4. Description of the Existing Environment

The 'environment that may be affected' (EMBA) by the activity is described in this chapter, together with its values and sensitivities. While each environmental aspect for the activity has its own unique EMBA, the most significant one has been chosen for this chapter, which is that relating to a diesel spill.

This diesel spill EMBA has been established through hydrocarbon spill modelling and is based upon the area that could be affected by the largest credible vessel spill. The EMBA (Figure 4.1) is therefore defined as:

> *The extent of low level hydrocarbon exposure to the sea surface (1 µm) and contact to shorelines (>10-100 g/m^2) as a result of the loss of 155 m^3 of marine diesel oil over 6 hours from a project vessel within the proposed activity area using annualised metocean conditions.*

Where appropriate, descriptions of the regional environment are provided for context. The 'environment' is defined in the OPGGS(E) as:

- Ecosystems and their constituent parts, including people and communities;
- Natural and physical resources;
- The qualities and characteristics of locations, places and areas;
- The heritage value of places; and
- The social, economic and cultural features of these matters.

The key external sources of information utilised in developing this chapter include the:

- EPBC Act Protected Matters Search Tool (PMST) database (DoEE, 2018a);
- Victorian Biodiversity Atlas, VBA (DELWP, 2018a);
- South-east Marine Region Profile (DoE, 2015a);
- Marine Natural Areas Values Study Vol 2: Marine Protected Areas of the Flinders and Twofold Shelf Bioregions (Barton *et al*., 2012);
- National Conservation Values Atlas (DoEE, 2018b);
- Victorian Oil Spill Response Atlas (OSRA) (DEDJTR, 2017);
- Pelican MSS Habitat Survey (Advisian, 2017);
- Pelican MSS Habitat Assessment (Advisian, 2018);
- Eastern Victorian Ocean Scallop Fishery 2017-18 Abundance Survey (Koppman *et al*., 2018); and
- Pelican 3D Seismic Survey Sound Source Characterisation (Jasco Applied Sciences, 2018).

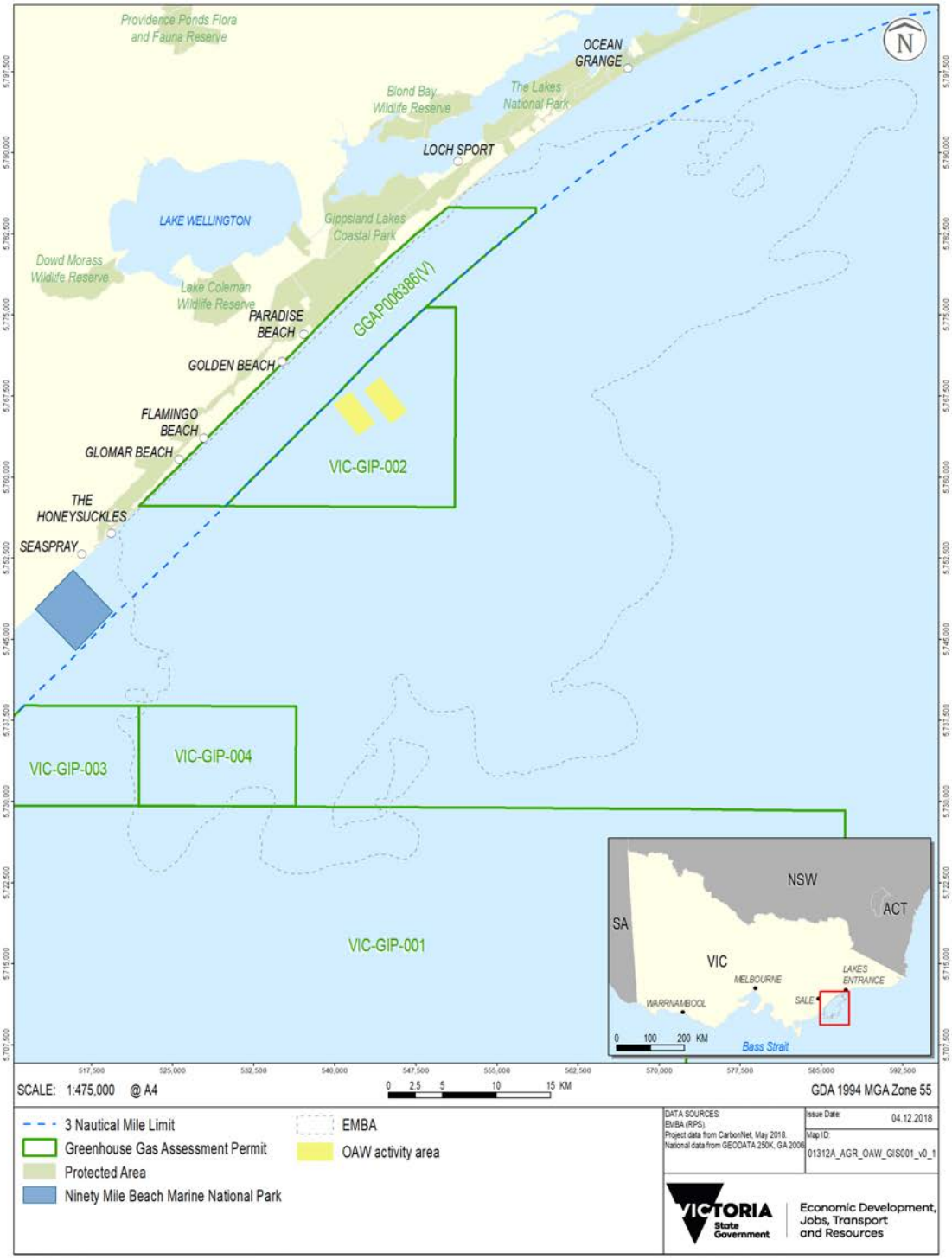


Figure 4.1. The EMBA for the activity

Table 4.1 summarises the presence or absence of receptors and sensitivities within the proposed activity area.

Table 4.1. Presence of receptors within the activity area and EMBA

Receptor	Activity area	EMBA
Physical		
Low profile rocky reef	Patchy	Patchy
Sponge garden	Patchy	Likely
Conservation values		
Australian Marine Parks (AMPs)	No	No
World Heritage-listed properties	No	No
National Heritage-listed properties	No	No
Threatened Ecological Communities (TECs)	No	No
Key Ecological Features (KEFs)	No	Upwelling East of Eden
Nationally Important Wetlands	No	No
Victorian marine protected areas	No	No
Onshore protected areas	No	No
Biological environment		
Plankton		
Benthic species:		
- commercial scallops	Isolated individuals	No beds that are commercially viable
- rock lobsters	No	
Seagrass beds	Isolated & sparse	
Fish:		
- Biologically Important Area (BIA) for great white shark		
Cetaceans:		
- BIA for pygmy blue whale		
- BIA for southern right whale	No	State waters only
- BIA for humpback whale	No	No
Pinnipeds	Foraging only	Foraging only
Reptiles	Vagrants only	Vagrants only
Seabirds		
Shorebirds	No	
Marine pests	Possible	Possible
Cultural Heritage Values		
Shipwrecks	No	No
Indigenous heritage	No	No
Socio-economic Environment		

Receptor	Activity area	EMBA
Native Title	No	No
Tourism	Possible game fishing	
Petroleum infrastructure	One gas pipeline	
Commercial fishing	Shark gillnet/hook (Cth) Ocean access (Vic) Ocean purse seine (Vic)	Shark gillnet/hook (Cth) Trawl (Cth) Rock lobster (Vic) Ocean access (Vic) Ocean purse seine (Vic) Inshore trawl (Vic)
Recreational fishing	Possible game fishing	
Commercial shipping		

Green shading denotes presence.

4.1. Regional Context

The activity area is located within the Southeast Shelf Transition provincial bioregion within the South-east marine region. The coastline adjacent to the bioregions (as classified at the Commonwealth and state scales) is exposed, with long sandy beaches broken by rocky headlands and numerous coastal lagoons.

4.1.1. Climate

The region's climate is moist cool temperate (Barton *et al.*, 2012), with cool wet winters and cool summers. It is influenced by rain bearing cold fronts that move from south-west to north-east across the region, producing strong winds from the west, north-west and south-west.

Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. Occasionally, intense meso-scale low-pressure systems occur in the region, bringing very strong winds, heavy rain and high seas. These events are unpredictable in occurrence, intensity and behaviour, but are most common between September and February (McInnes and Hubbert, 2003). Winds from the west dominate the September to April period.

4.1.2. Physical Environment

The activity area overlaps the seafloor 'slope' geomorphic unit as classified in the South-east Marine Region Profile (DoE, 2015a).

The gradient of the activity area is a very flat 0.2°, with the seabed depth difference being 12 m over a distance of 4.8 km perpendicular to the coast.

Intermittent and very narrow areas of low-profile reefs (about 0.5 m to 1.5 m in height above the surrounding seabed) running parallel to the coast are scattered through the nearshore sandy sediments along the Ninety Mile Beach. These reefs comprise calcarenite and occur immediately behind the surf zone, in water depths ranging from 7 to 25 m (Burton *et al.*, 2012), and are likely to be often covered by mobile sand. These occur shoreward of the activity area.

A marine habitat assessment (using a non-intrusive towed camera) was commissioned by CarbonNet and conducted in early April 2017 by Advisian, to provide information for the MSS EP. The primary aim of the assessment, among others, was to determine broad seabed substrate types. Of the 71 sites sampled in the MSS acquisition area, seven sites occur within the activity area (numbers 28, 36, 37, 38, 39, 46 and 47). The results of this sampling indicate that fine sand is the dominant substrate of the activity area. Sampling locations are presented in Figure 4.2.

4.1.3. Oceanography

The activity area is located in shallow water depths ranging from 21 to 33 m in the Gippsland Basin. The bathymetry contours run consistently parallel to the coast across the activity area.

Water Currents

Currents within Bass Strait are primarily driven by tides, winds and density-driven flows (RPS, 2018). The region is oceanographically complex, with sub-tropical influences from the north and sub-polar influences from the south (DoE, 2015a). There is a slow easterly flow of waters in Bass Strait and a large anti-clockwise circulation (DoE, 2015a).

Surface currents in the area flow in the northeast to southwest axis parallel with the coastline. The average monthly surface current speed is 0.30 metres per second (m/s), with the maximum surface current speeds ranging between 1.0 and 1.5 m/s.

Sea Temperature

The shallowness of Bass Strait means that its waters more rapidly warm in summer and cool in winter than waters of other nearby regions (DoE, 2015a).

Waters of eastern Bass Strait are generally well mixed, but surface warming sometimes causes weak stratification in calm summer conditions. Sea surface temperature in the region varies annually from a minimum of 13°C (August/September) to a maximum of 19°C (March). The average annual sea surface temperature is 16°C.

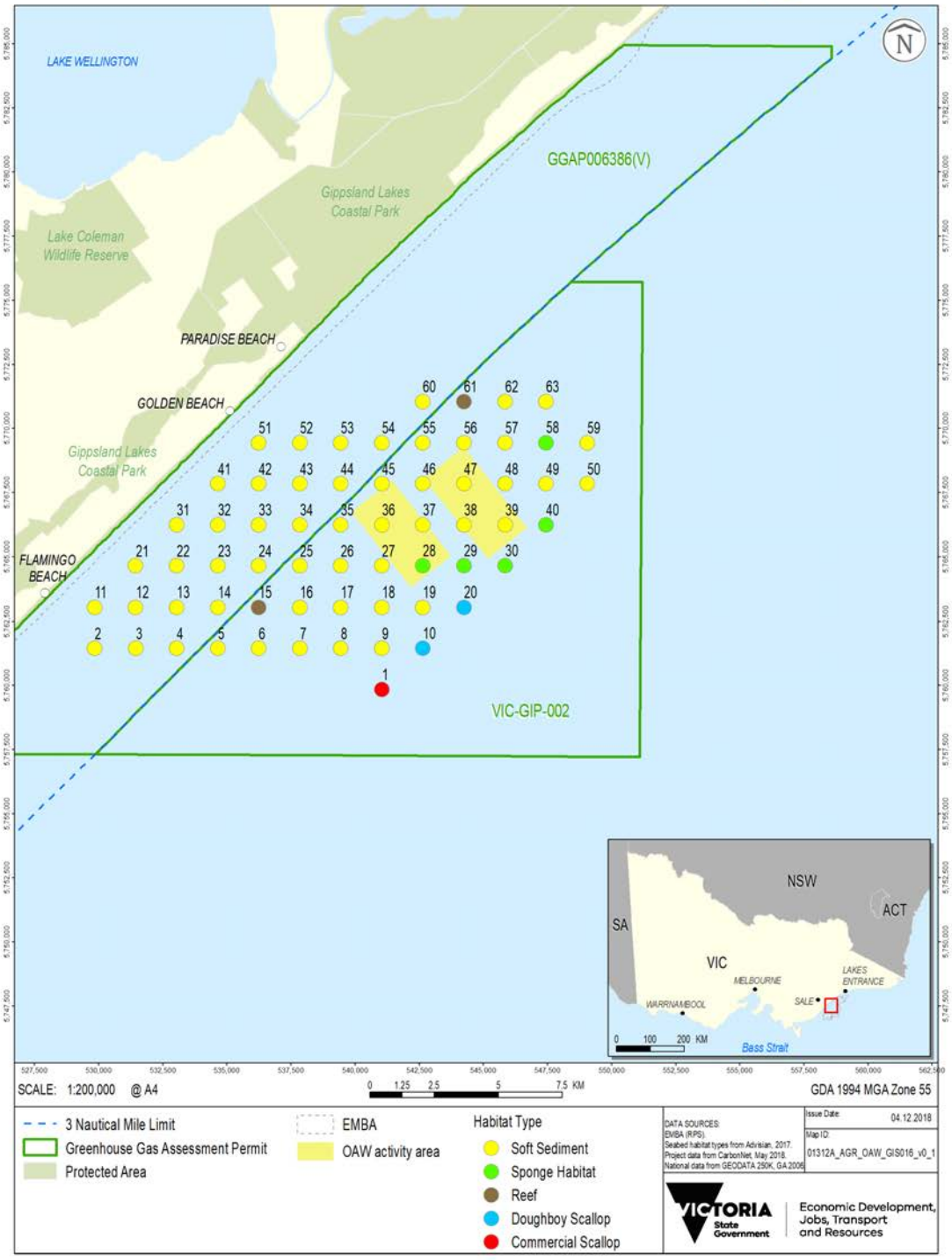
Tides

Tidal currents run parallel to the coast and follow a semi-diurnal pattern (Barton *et al*., 2012), with some diurnal inequalities (Jones and Padman, 1983) and speeds generally ranging from 0.1 to 2.5 m/s (Fandry, 1983). However, Barton et al (2012) report that strong tidal currents (2 to 2.5 knots, or 1-1.3 m/s) are characteristic of the area. Tidal variation is 0.9 m for spring tides and 0.6 m for neap tides (Barton *et al*., 2012).

The main tidal components in Bass Strait vary in phase by about three to four hours from east to west. Most of this phase change occurs between Lakes Entrance and Wilson's Promontory. Tidal flows in Bass Strait come in from the east and west during a rising (flood) tide and flow out to the east and west during a falling (ebb) tide.

Waves

Bass Strait is a high-energy environment exposed to frequent storms and significant wave heights (Jones, 1980), though Barton et al (2012) report wave energy in the Twofold Shelf Bioregion as relatively low.



Source: Advisian (2017).

Figure 4.2. Sampling locations for the Pelican 3DMSS marine environmental assessment, indicating seabed types and habitat, in relation to the activity area

4.1.4. Ambient Ocean Sound

Physical and biological processes contribute to natural background sound. Physical processes include that of wind, waves, rain and earthquakes, whilst biological noise sources include vocalisations of marine mammals and other marine species.

Ambient underwater sound characterisation of the Pelican 3DMSS acquisition area was undertaken immediately prior to the MSS taking place in February 2018. Jasco Applied Sciences (Jasco) conducted this work on behalf of CarbonNet in late January and early February 2018.

The study involved four deployment locations (Figure 4.3), with sites 2 and 3 being the closest to the activity area (about 750 m to the west in water depths of 26 m and 27 m, respectively).

Autonomous Multi-channel Acoustic Recorders (AMAR) were used for this study, which recorded on two channels simultaneously. The AMARs were fitted with up to three different hydrophones (out of four hydrophone models used overall) (Jasco, 2018).

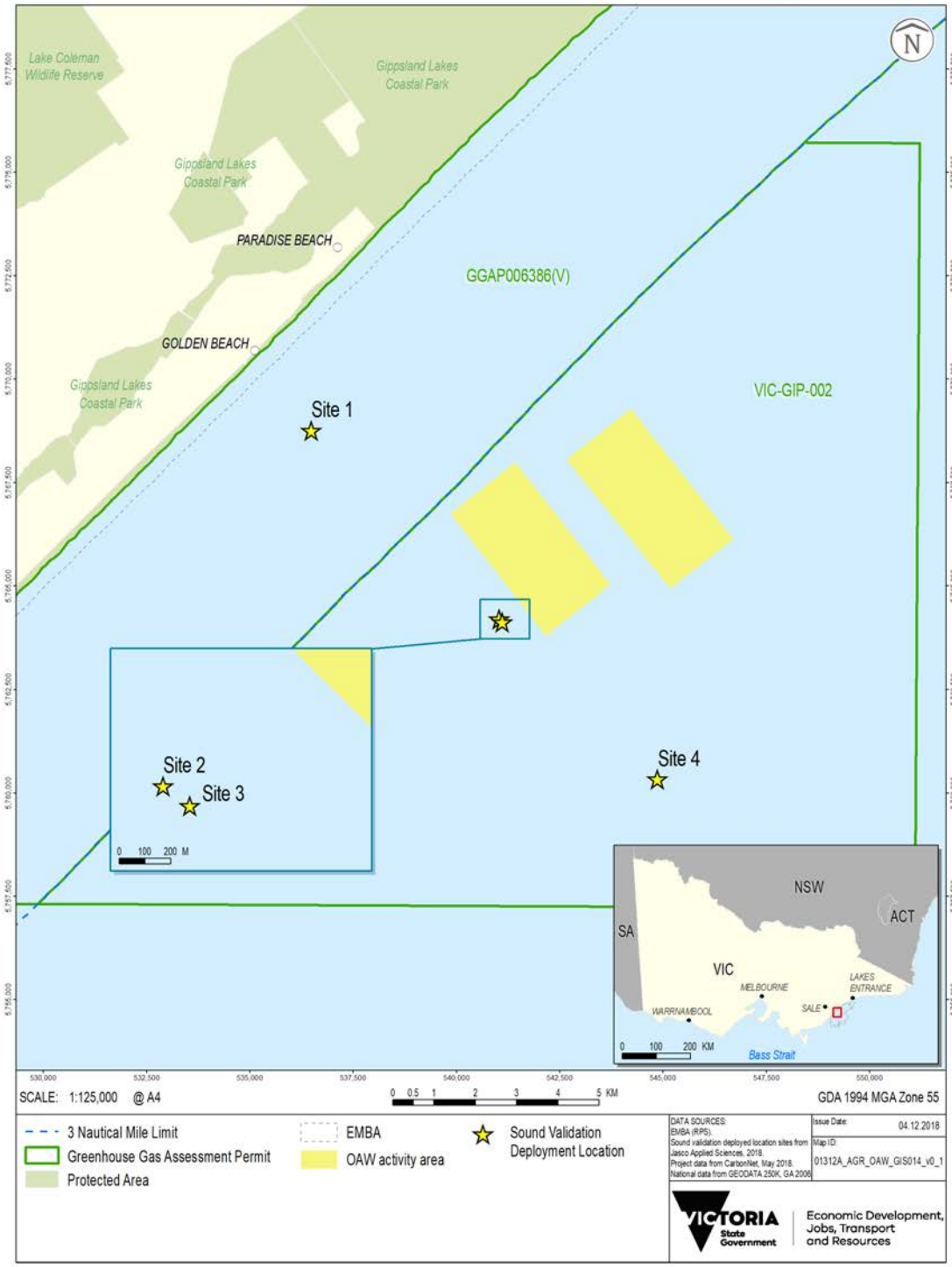
The ambient soundscape of the Golden Beach region prior to the MSS was contributed to strongly by weather events (wind and wave noise correlated with tidal state), with low levels of shipping and biological sound. Both Stations 3 and 4 show the presence of snapping shrimp, with elevated power spectral density levels above 1.5 kHz due to their contributions at night. Biological sources are primarily evident in recordings from Station 3 in the 1-10 kHz and 10-32 kHz bands as elevated night time levels, which are likely linked to increased biological activity at the nearshore reef, as they are not evident at Station 4. Increased noise levels in the 10-100 Hz band (primarily at Station 3) occur on a 6-hourly cycle, aligning with the tidal cycle. The highest levels occur as the tide rises from low to high at night early in the week, with similar noise levels for all tidal cycles at the end of the week as the moon approached the last-quarter on the 8th of February 2018. The tidal cycles are more noticeable at Station 3 as it is in shallower water than Station 4, and also because it is closer to the coast, and the sound levels are more influenced by wave action on the beach.

The daily sound exposure level (SEL) values for the pre-MSS period varied between a minimum of 162.5 and maximum of 163.7 at Station 3, and a minimum of 158.3 and a maximum of 163.6 at Station 4.

4.2. Conservation Values and Sensitivities

The conservation values and sensitivities in and around the activity area particularly, but also within the EMBA, are described in this section.

- Australian Marine Parks – The Beagle Australian Marine Park (AMP) and East Gippsland AMP are located 98 km southwest and 206 km east of the activity area, respectively. Neither of these AMPs are located within the EMBA.
- World Heritage Listed-properties – are examples of sites that represent the best examples of the world's cultural and heritage values, of which Australia has 19 properties (DoEE, 2018c). No properties on the World Heritage List occur within the EMBA.



Source: JASCO Applied Sciences (2018a).

Figure 4.3. Location of the four underwater sound measurement stations in relation to the activity area

- The National Heritage List is Australia's list of natural, historic and Indigenous places of outstanding significance to the nation (DoEE, 2018d). There are no National Heritage-listed places in Bass Strait.

- Wetlands of international importance ('Ramsar wetlands') – are representative, rare or unique wetlands, or are important for conserving biological diversity, and are included on the List of Wetlands of International Importance developed under the Ramsar Convention. There are no Ramsar wetlands in the EMBA (DoEE, 2018e).
- Threatened Ecological Communities (TECs) – provide wildlife corridors and/or habitat refuges for many plant and animal species, and listing a TEC provides a form of landscape or systems-level conservation (including threatened species). The nearest TEC to the activity area is the *Giant Kelp Marine Forests of South East Australia*, mapped as possibly occurring within the nearshore parts of eastern Gippsland, and is protected as a matter of NES under the EPBC Act. Mapping indicates that this TEC does not occur within the activity area or the EMBA (with the nearest occurrence being east of the mouth of the Snowy River, 111 km northeast of the activity area and 56 km northeast of the nearest boundary of the EMBA).
- Commonwealth Heritage-listed places are natural, indigenous and historic heritage places owned or controlled by the Commonwealth (DoEE, 2018f). No properties on the Commonwealth Heritage List occur within the EMBA.
- Nationally important wetlands – are considered significant for a variety of reasons, including their importance for maintaining ecological and hydrological roles in wetland systems, providing important habitat for animals at a vulnerable stage in their life cycle, supporting 1% or more of the national population of any native plant or animal taxa or for its outstanding historical or cultural significance (DoEE, 2018g). Several nationally important wetlands occur along the Victorian coast, although none of these occur within the EMBA.

4.2.1. Key Ecological Features

Key Ecological Features (KEFs) are elements of the Commonwealth marine environment that, based on current scientific understanding, are considered to be of regional importance for either the region's biodiversity or ecosystem function and integrity. KEFs have no legal status in decision-making under the EPBC Act, but may be considered as part of the Commonwealth marine area (DoEE, 2018h).

The National Conservation Values Atlas indicates that the EMBA intersects the western-most portion (~12 km) of the 'Upwelling East of Eden' KEF, located 44 km to the northeast of the activity area (Figure 4.4).

Upwelling East of Eden

Dynamic eddies of the EAC cause episodic productivity events when they interact with the continental shelf and headlands. The episodic mixing and nutrient enrichment events drive phytoplankton blooms that are the basis of productive food chains including zooplankton, copepods, krill and small pelagic fish (DoE, 2015a). Therefore, the key value of the KEF is its high productivity and aggregations of marine life.

The upwelling maintains regionally high primary productivity that supports fisheries and biodiversity, including top order predators, marine mammals and seabirds. This area is one of two feeding areas for blue whales and humpback whales, known to

arrive when significant krill aggregations form. The area is also important for seals, other cetaceans, sharks and seabirds (DoE, 2015a).

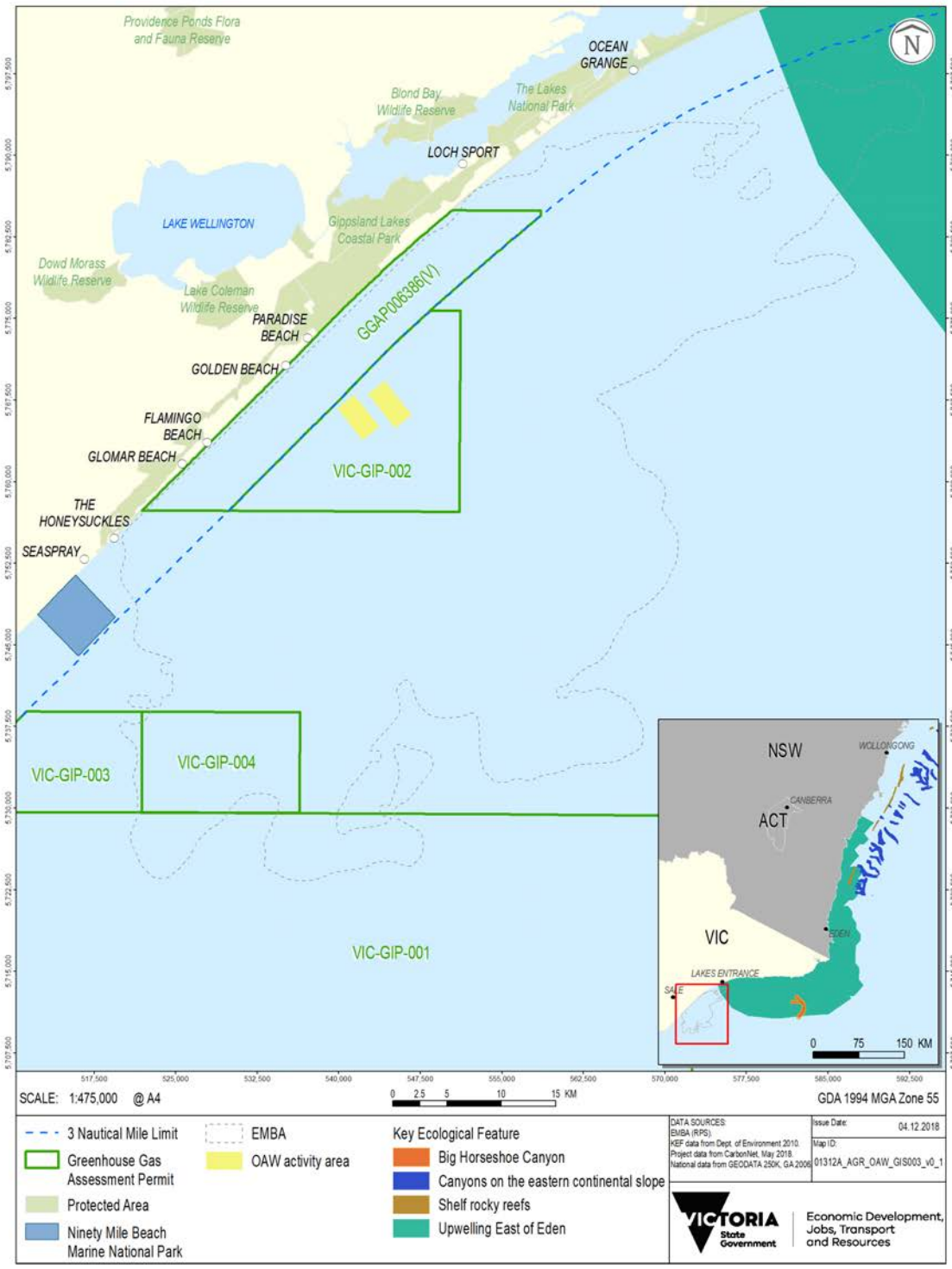


Figure 4.4. The 'Upwelling East of Eden' KEF

4.2.2. Victorian Marine Protected Areas

Victoria has 24 marine national parks and sanctuaries that are protected and managed under the *National Parks Act 1982* (Vic) by Parks Victoria.

There are no marine protected areas located in the EMBA, with the nearest being the Ninety Mile Beach Marine National Park (MNP), 28 km southwest of the activity area (and 2 km from the nearest point of the EMBA) (see Figure 4.1). Given its close proximity to the EMBA, the marine park is described below.

Ninety Mile Marine National Park

The Ninety Mile Beach MNP covers an area of 2,750 ha and extends along approximately 5 km of coastline and offshore for 5 km from the high-water mark (ParksVic, 2006). The park protects an internationally significant sandy environment, recognised for its exceptionally high diversity of marine invertebrates.

The park's key natural values are listed as:

- Very high diversity of marine invertebrates, including the large endemic southern Australian seastar (*Coscinasterias muricata*) and the soft coral *Pseudogorgia godeffroyi*;
- Scattered low calcarenite reefs providing habitat for a distinctive marine invertebrate fauna, especially sponges, with sparse flora communities of small red algae; and
- Important habitat for threatened shorebird species such as the threatened hooded plover (*Thinornis rubricollis*) and other species listed under international migratory bird agreements.

The waters of the park have aggregations of juvenile white shark (*Carcharodon carcharias*), snapper (*Pagrus auratus*), Australian salmon (*Arripis* spp.), long-finned pike (*Dinolestes lewini*) and short-finned pike (*Sphyaena novaehollandiae*). The southern right whale, Australian fur seals and New Zealand fur-seals are known to frequent the park.

The Ninety Mile Beach is a potentially important area for the endangered hooded plover (listed as vulnerable in Victoria). However, their numbers between McLoughlins Point and Seaspray on biannual counts between 2000 and 2006 declined markedly from 40 to three, with none observed during the 2004 and 2006 survey. The loss of roosting and nesting areas due to beach erosion may be a major factor. The area is also used by other threatened shorebirds, including crested terns, Caspian terns, pied oystercatchers and sanderlings (ParksVic, 2006).

4.3. Coastal Environment

The physical coastal environment described in this section is defined by the extent of the EMBA, which stretches for 50 km from The Honeysuckles in the west to Loch Sport in the east.

The environmental features of the coast immediately adjacent to the activity area are dominated by sandy sediment with sparse reef (low-profile carbonate reef). This section of the coastline is entirely sandy beach, which provides important nesting habitat for the hooded plover.

The western part of the coastline within the EMBA is dominated by the Ninety Mile Beach, a 90-mile (145 km) long stretch of sandy beach on the seaward side of a narrow, tall, vegetated sand dune system. These sand dunes provide important habitat for hooded plovers and roosting sites for other shorebird species.

There are no estuaries along the coastline of the EMBA, with the nearest being Merriman Creek (at Seaspray). This is only intermittently open. There are also no offshore islands in the EMBA.

Sand is the dominant intertidal substrate within the EMBA.

4.4. Biological Environment

The results of the PMST and VBA database searches provide the key means by which species are identified for the area and are discussed in this section.

Additionally, BIAs are identified for those species that may occur within the survey area and EMBA. BIAs are spatially defined areas, defined by the DoEE based on expert scientific knowledge, where aggregations of individuals of a species are known to display biologically important behaviour such as breeding, foraging, resting or migration (DoEE, 2018i). The BIAs do not represent a species' full distribution range.

4.4.1. Benthic Assemblages

Regional knowledge

The seascape of the region is composed of a series of massive sediment flats, interspersed with small patches of reef, bedrock and consolidated sediment (Wilson and Poore, 1987).

The sediment flats are generally devoid of emergent fauna but benthic invertebrates such as polychaetes, bivalves, molluscs and echinoderms are present (Wilson and Poore, 1987). There are also a number of burrowing species that inhabit the soft seabed, including tubeworms, small crustaceans, nematodes, nemerteans and seapens (OMV, 2001).

Bass Strait

Surveys of benthic invertebrates in Bass Strait (Poore *et al*., 1985; Wilson and Poore, 1987) have shown:

- Crustaceans and polychaetes dominate the infaunal communities, many of which are unknown species.
- The high diversity of a wide range of invertebrate groups has been a recurrent observation of all surveys in Bass Strait and diversity is high compared with equivalent areas of the northern hemisphere.
- Many species are widely distributed across the Strait, suggesting heterogeneous sediments and many microhabitats.
- Some invertebrate groups are allied with fauna from Antarctic seas. In winter, when the east coast of Tasmania is supplied with water from the sub-Antarctic, the overlap with the EAC contributes to the high diversity.

Barton et al (2012) report that in the Ninety Mile Beach Marine National Park (28 km west-southwest of the activity area at their nearest points), reefs are dominated by invertebrates (70% coverage), including sponges, ascidians (sea squirts) and smaller bryozoans (resembling coral) and hydroids (colonies of tiny jellies attached to a feather-like base).

Activity area

A marine habitat assessment (using a non-intrusive towed camera) was commissioned by CarbonNet and conducted in early April 2017 by Advisian. Of the 71 sites sampled in the MSS acquisition area, seven sites occur within this activity

area. The results of this sampling indicate that, in general, the seabed is dominated by fine sand with biota that varies from very little epibiota to a sparse cover of sponges.

In the wider area of the habitat assessment (which occurs within the EMBA), the following benthic assemblages were found:

- Isolated and sparse seagrass beds (sampling sites 4, 13, 16, 44 and 60);
- Isolated occurrences of sponge gardens (sampling sites 28-30, 40, 58, 69).
- Isolated occurrences of *Pseudogorgia godeffroyi* (sampling sites 27, 32, 34, 50 and 51), an unusual soft coral found only in Victoria between McGaurans Beach and Delray Beach (ECC, 2000).
- A small patch of unmapped, flat low-profile offshore reef with no ledges or crevices, immediately seaward of the 30 m isobath and on the western side of Esso's Bream to shore gas pipeline. This reef is dominated by sponges and ascidians (such as stalked ascidian *Pyura spinifera*) and smaller bryozoans, hydroids and the odd clump of red algae, with the occasional *Chlamys* scallop attached to the reef (not commercial scallops). The offshore reefs at sites 61, 66 and 68 are described as being less than 50 cm in height above the surrounding seabed, while the inshore reefs at sites 64, 65 and 67 are described as being about 0.5 m to 1.5 m in height above the surrounding seabed.
- Live commercial scallops (*Pecten fumatus*) were noted in low abundance at site 1 (32 m water depth) with dead scallops observed at site 62 (23 m water depth).

Of the 71 sites sampled in the marine habitat assessment, 58 of them (82%) are classified as soft sediment (fine to coarse sand and gravels/shell) (Advisian, 2017), so it is reasonable to conclude that the majority of the activity area has a sandy seabed.

Scallops

Commercial scallops (*Pecten fumatus*) are present throughout Bass Strait, with a distribution along the southeast Australian coast from central NSW, Victoria, SA and Tasmania. They are found partially buried in soft sediment ranging from mud to coarse sand. Scallops aggregate into beds, with healthy scallops recessing their convex right valve beneath the sediment such that the flat left valve is level or slightly below the sediment surface (AFMA, 2017a; Przeslawski *et al*., 2016). Commercial scallops are mainly found at depths of 10-20 m, but may also occur at depths of up to 120 m. While mainly sedentary, scallops can swim by rapidly opening and closing their shells, usually when disturbed by predators (AFMA, 2018). Scallops feed on prey and detritus, while they are prey for starfish, whelks and octopus (AFMA, 2018).

Scallops reach reproductive maturity after one year but do not spawn until the second year. Commercial scallops usually have a life span of less than 7 years, but wild populations have been known to die off rapidly after 3-5 years (AFMA, 2018). Adult scallops normally spawn over an extended period between June and November (a sudden increase in water temperature is thought to trigger spawning), with individuals producing up to one million eggs (AFMA, 2018). In Victoria, a spawning peak appears to take place in spring (September, October and November) (DPI, 2005). Information provided by SIV indicates spawning occurs from September to December. Larval scallops drift as plankton for up to six weeks before first settlement, with peak settlement occurring in mid-late September (AFMA, 2018;

Przeslawski *et al*., 2016). They attach to a hard surface such as seaweed or mussel and oyster shells, and remain attached until reaching around 6 mm in length. The small scallops then detach themselves, settle into sediments and bury in so that only the top flat shell is visible. The juvenile scallops grow quickly and reach marketable size within 18 months (VFA, 2018a). Scallop settlement is highly variable both temporally and spatially (VFA, 2018a).

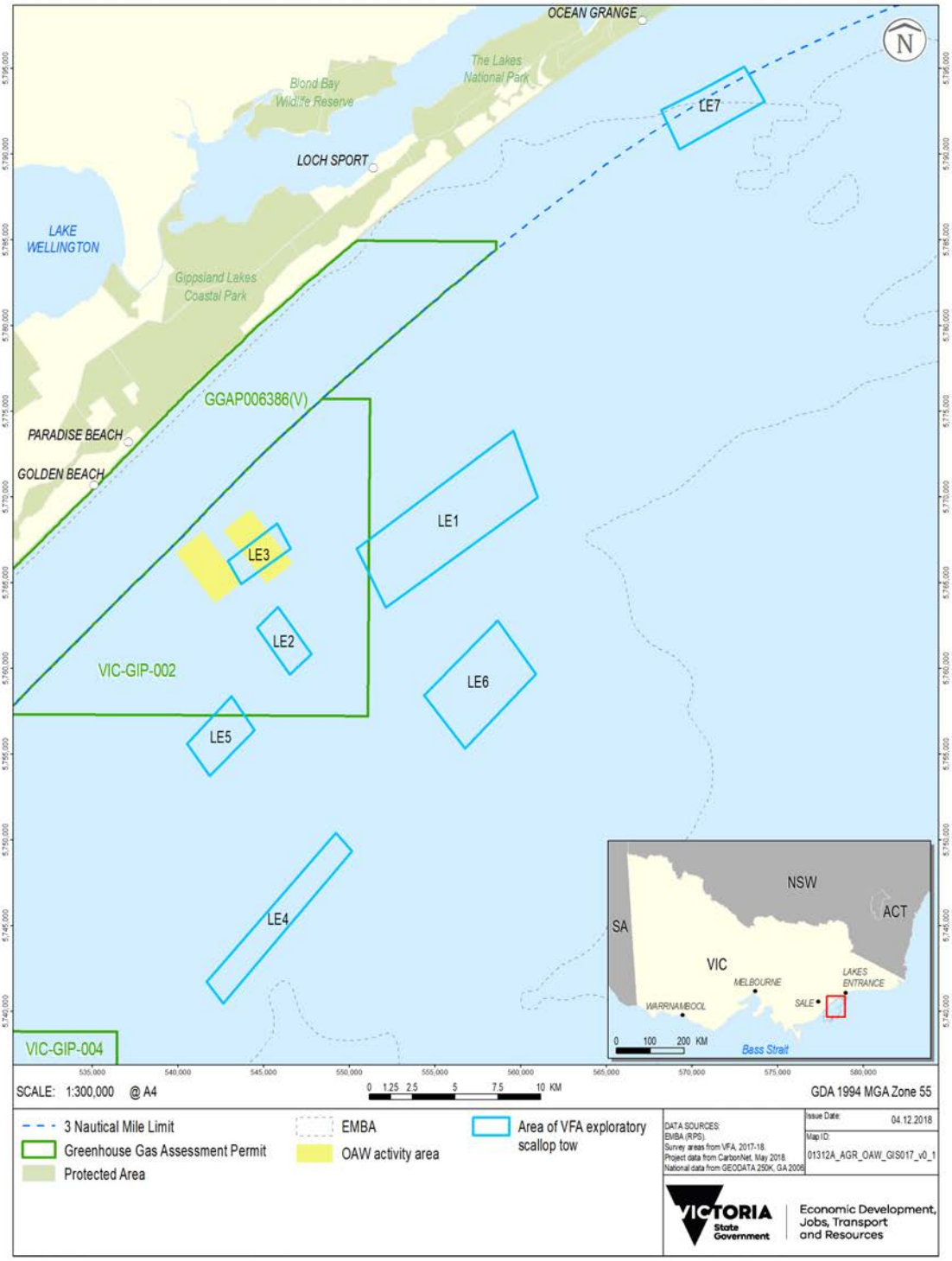
Natural mortality for commercial scallops is variable, with a study from Port Phillip Bay indicating an annual mortality rate of 40%, with other studies in the 1980s indicating a mortality rate of 11-51% (DPI, 2005).

The VFA has advised CarbonNet that very little commercial fishing for scallops has been undertaken in the activity area in the last five years, with SIV indicating that no scallop harvesting has occurred over the last 7-8 years.

While the dominance of sandy sediments throughout the activity area provides abundant suitable scallop habitat and makes it possible that scallops could occur, recent surveys indicate that the presence of commercial scallops is nil to low and commercially viable scallop beds are not present:

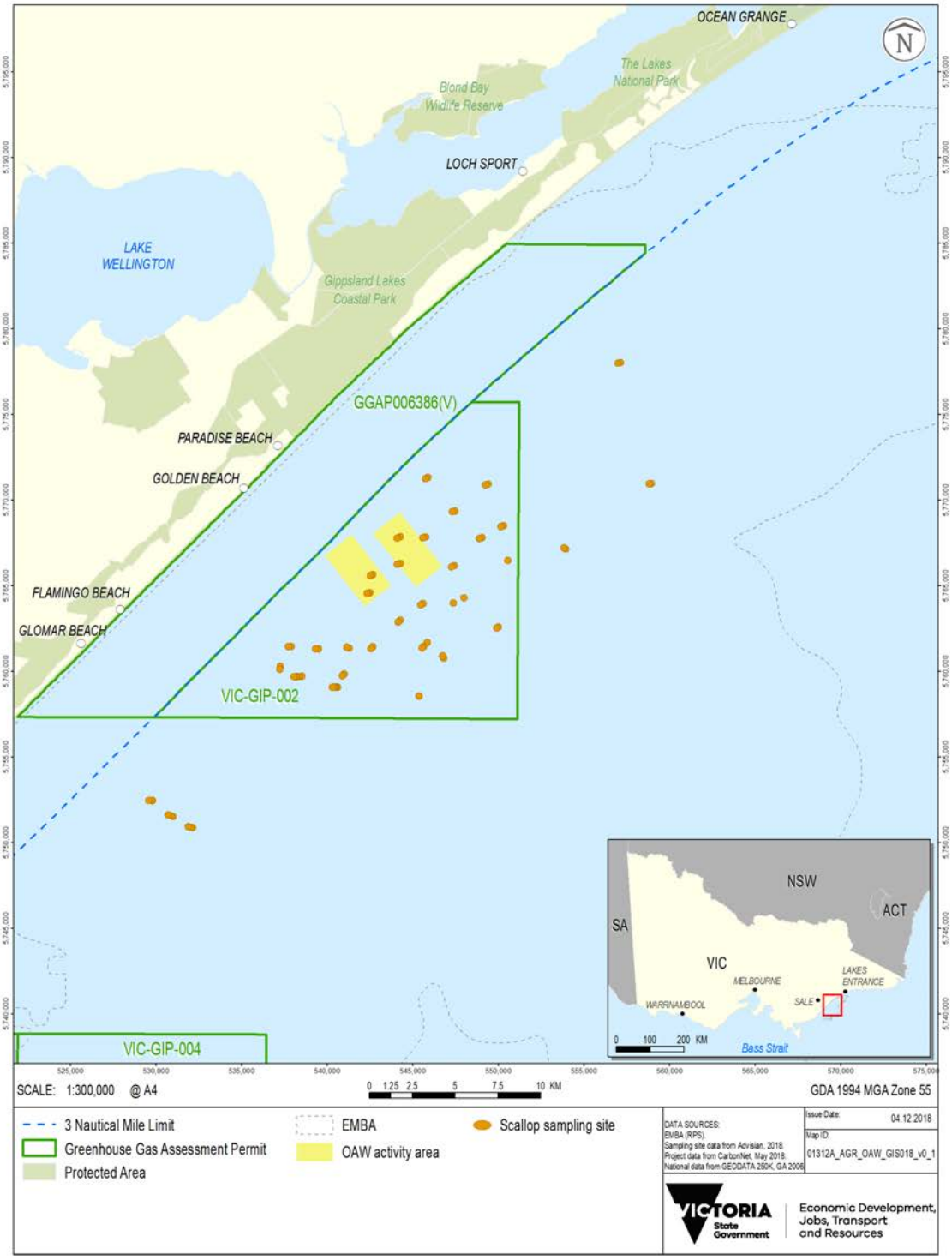
- The CarbonNet-commissioned marine habitat assessment observed only one location within the former Pelican 3DMSS acquisition area where commercial scallops were present (outside of this activity area) (Advisian, 2017; 2018) (see Figure 4.2), but in very low abundance that would not be considered a commercial bed for fishing purposes.

- The VFA undertook a scallop stock assessment survey in December 2017 and January 2018 (extending from the shoreline out to 20 nm and between Wilsons Promontory in the east and Point Hicks in the west, with a total area of 4,859 km^2) (Koopman *et al*., 2018). Of the 148 survey tows in this area, 17 tows were undertaken within the former Pelican 3DMSS acquisition area. There was zero scallop catch reported. The tow area referred to as LE3 was undertaken within the proposed G&G investigations area and caught no scallops (Koopman *et al*., 2018) (Figure 4.5). Of the nine potential scallop beds identified in the former Pelican 3DMSS area, only one was considered worthy of additional survey (being 'LE1', 16.5 km^2 in area), located immediately to the east of the Pelican 3DMSS area (and 3.6 km east-southeast of the activity area). Twenty-five (25) random tows were undertaken in this area, with a mean density of 27.7 kg/1,000 m^2 from all tows, or 0.51 individuals per square metre based on non-zero tows, with an estimated total biomass of 456 tonnes.
- A pre-Pelican 3DMSS marine habitat assessment (using a non-intrusive towed camera) was commissioned by CarbonNet and conducted in mid-January 2018 by Advisian to provide additional information on the presence or absence of commercial scallops from the acquisition area. Sixty (60) transects were run (including four within the activity area) (Figure 4.6). Commercial scallops were only detected in only six sites; one of these sites is located in the activity area and found two commercial scallops. No beds of commercial scallops were observed.



Source: Koopman et al (2018).

Figure 4.5. Location of VFA scallop investigation sites in relation to the activity area



Source: Advisian (2018).

Figure 4.6. Location of scallop sampling sites in relation to the activity area

Southern Rock Lobster

The southern rock lobster (*Jasus edwardsii*) is found on coastal reefs from the south-west coast of WA to the south coast of NSW, including Tasmania and the New Zealand coastline. Southern rock lobsters are found to depths of 150 m (DEDJTR, 2015). In the Gippsland region, southern rock lobster habitat occurs as patchy, discontinuous low-profile reef running parallel to the coast.

The life cycle of the rock lobster is complex. After mating in autumn, fertilised eggs are carried under the tail of the female for approximately three months before being released, typically between September and November. Once released, rock lobster larvae, or phyllosoma, live in the plankton and undergo eleven developmental stages over a period of one to two years while being carried by ocean currents. During metamorphosis, juvenile rock lobster shift from a planktonic to a benthic existence (DEDJTR, 2015).

Rock lobsters grow by moulting or shedding their exoskeleton. The frequency of the moulting cycle declines with age from five moults a year for newly settled juveniles to once a year for mature adults. Males grow faster and larger than females, reaching 160 mm in carapace length after ten years. Females generally reach 120 mm in the same period. Growth rates also vary spatially, with growth faster in the east than in the west (DEDJTR, 2015).

Adult rock lobsters are carnivorous and feed mostly at night on a variety of bottom dwelling invertebrates such as molluscs, crustaceans and echinoderms. Major predators include octopus and various large fish and sharks. In Victoria, the abundance of rock lobster decreases from west to east reflecting a decreasing area of suitable rocky reef habitat (DEDJTR, 2015). Rocky reef is present as scattered patches shoreward off the activity area in waters less than 20 m deep.

4.4.2. Flora

Literature searches indicate that marine flora, such as seagrasses and kelp, are generally not abundant in the extensive areas of subtidal sand flats in the nearshore waters of the EMBA. This is likely to be due to the high-energy nature of the Gippsland coastline and the mobile nature of sands, which prevents many species being able to anchor themselves.

Of the 71 sites sampled in the MSS acquisition area during the CarbonNet-commissioned marine habitat assessment, the seven sites located within the activity area did not encounter any vegetation. However, outside the activity area, some isolated and sparse seagrass beds were noted at five sites and large brown algae (*Ecklonia radiata* and *Sargassum*) was noted at the inshore reef area.

4.4.3. Plankton

Plankton is a key component in oceanic food chains and comprises two elements; phytoplankton and zooplankton, as described herein.

Phytoplankton (photosynthetic microalgae) comprise 13 divisions of mainly microscopic algae, including diatoms, dinoflagellates, gold-brown flagellates, green flagellates and cyanobacteria and prochlorophytes (McLeay *et al*., 2003). Phytoplankton drift with the currents, although some species have the ability to migrate short distances through the water column using ciliary hairs. Phytoplankton biomass is greatest at the extremities of Bass Strait (particularly in the northeast) where water is shallow and nutrient levels are high.

Zooplankton is the faunal component of plankton, comprising small crustaceans (such as krill) and fish larvae that feed on zooplankton. Zooplankton includes species that drift with the currents and also those that are motile. More than 170 species of

zooplankton have been recorded in eastern and central Bass Strait, with copepods making up approximately half of the species encountered (Watson & Chaloupka, 1982).

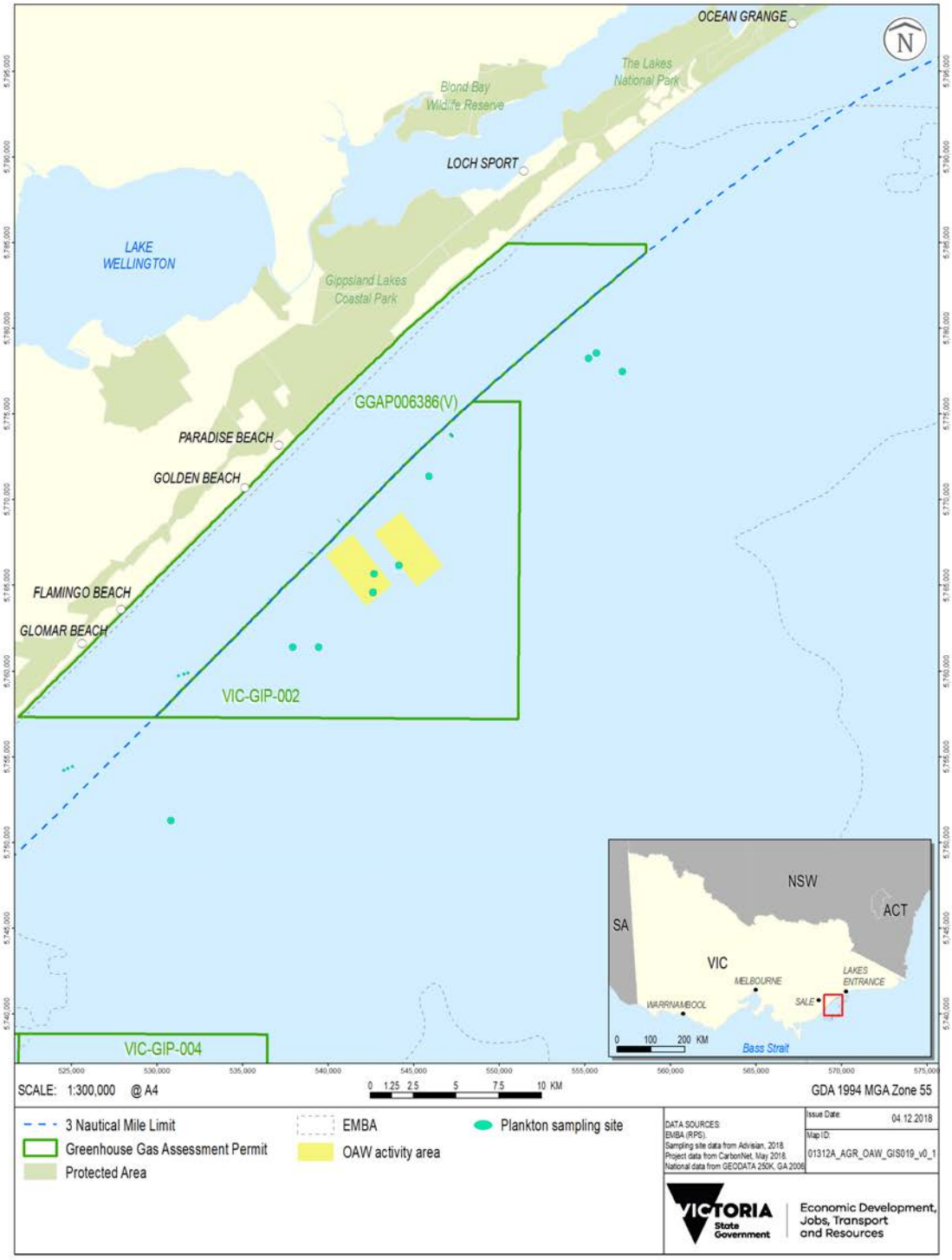
In order to determine the composition of zooplankton in the Pelican 3DMSS operational area, CarbonNet commissioned Advisian to undertaken pre- and post-MSS plankton sampling. Six sites were sampled within the Pelican 3DMSS acquisition area and three reference sites were sampled to the northeast in late January 2018 (Figure 4.7 shows all locations in relation to the activity area). The results of this work found that:

- The composition of zooplankton was a typical healthy example of those expected for temperate coastal waters;
- Copepods were the dominant group, with varying proportions of appendicularians, cladocerans and doliolids. Numerous other groups occurred in small numbers, including siphonophores, fish larvae, fish eggs, polychaetes, ghost shrimps and cnidarians (jellies); and
- No southern rock lobster or scallop larvae were present.

4.4.4. Fish

It is estimated that there are over 500 species of fish found in the waters of Bass Strait, including a number of species of importance to commercial and recreational fisheries (LCC, 1993). Fish species commercially fished in and around the activity area are listed in Section 5.6.2.

There are 32 fish species (28 of which are seahorses and pipefish) recorded in the EPBC Act PMST (DoEE, 2018a) as potentially occurring in the activity area, with an additional two fish species recorded within the EMBA (as marked with an asterisk in Table 4.2). The key threatened and migratory species are described in this section.



Source: Advisian (2018).

Figure 4.7. Plankton sampling sites in relation to the activity area

Table 4.2. EPBC Act-listed fish that may occur in the EMBA

Scientific name	Common name	EPBC Act status			BIA within the EMBA?	Recovery Plan in place?
		Listed threatened species	Listed migratory species	Listed marine species		
Freshwater						
*Galaxiella pusilla**	Dwarf galaxias	V	-	-	-	AS
Prototroctes maraena	Australian grayling	V	-	-	-	RP, AS
Oceanic						
Carcharodon carcharias	Great white shark	V	Yes	-	B/N	RP, AS
*Isurus oxyrinchus**	Shortfin mako	-	Yes	-	-	-
Lamna nasus	Porbeagle	-	Yes	-	-	-
Rhincodon typus	Whale shark	V	Yes	-	-	Expired
Pipefish, seahorses and seadragons						
Heraldia nocturna	Upside-down pipefish	-	-	Yes	-	-
Hippocampus abdominalis	Big-belly seahorse	-	-	Yes	-	-
Hippocampus breviceps	Short-head seahorse	-	-	Yes	-	-
Hippocampus minotaur	Bullneck seahorse	-	-	Yes	-	-
Hippocampus whitei	White's seahorse	-	-	Yes	-	-
Histiogamphelus briggsii	Crested pipefish	-	-	Yes	-	-
Histiogamphelus cristatus	Rhino pipefish	-	-	Yes	-	-
Hypselognathus rostratus	Knifesnout pipefish	-	-	Yes	-	-
Kaupus costatus	Deepbody pipefish	-	-	Yes	-	-
Kimblaeus bassensis	Trawl pipefish	-	-	Yes	-	-
Leptoichthys fistularius	Brushtail pipefish	-	-	Yes	-	-
Lissocampus runa	Javelin pipefish	-	-	Yes	-	-
Maroubra perserrata	Sawtooth pipefish	-	-	Yes	-	-
Mitotichthys semistriatus	Halfbanded pipefish	-	-	Yes	-	-
Mitotichthys tuckeri	Tucker's Pipefish	-	-	Yes	-	-
Notiocampus ruber	Red pipefish	-	-	Yes	-	-

Scientific name	Common name	EPBC Act status			BIA within the EMBA?	Recovery Plan in place?
		Listed threatened species	Listed migratory species	Listed marine species		
Phyllopteryx taeniolatus	Common seadragon	-	-	Yes	-	-
Solegnathus robustus	Robust pipehorse	-	-	Yes	-	-
Solegnathus spinosissimus	Spiny pipehorse	-	-	Yes	-	-
Stigmatopora argus	Spotted pipefish	-	-	Yes	-	-
Stigmatopora nigra	Widebody pipefish	-	-	Yes	-	-
Stigmatopora olivacea	A pipefish	-	-	Yes	-	-
Stipecampus cristatus	Ringback pipefish	-	-	Yes	-	-
Syngnathoides biaculeatus	Double-end pipehorse	-	-	Yes	-	-
Urocampus carinirostris	Hairy pipefish	-	-	Yes	-	-
Vanacampus margaritifer	Mother-of-pearl pipefish	-	-	Yes	-	-
Vanacampus phillipi	Port Phillip pipefish	-	-	Yes	-	-
Vanacampus poecilolaemus	Longsnout pipefish	-	-	Yes	-	-

* *Listed only from the EMBA.*

Definitions

Listed threatened species:	A native species listed in Section 178 of the *EPBC Act* as either extinct, extinct in the wild, critically endangered, endangered, and vulnerable or conservation dependent.
Listed migratory species:	A native species that from time to time is included in the appendices to the Bonn Convention and the annexes of JAMBA, CAMBA and ROKAMBA, as listed in Section 209 of the *EPBC Act*.
Listed marine species:	As listed in Section 248 of the *EPBC Act*.

Key

EPBC status	V	Vulnerable
	E	Endangered
	CE	Critically endangered
BIA	A	Aggregation
	D	Distribution (i.e., presence only)
	F	Foraging
	M	Migration
Recovery plans	CA	Conservation Advice

(under the EPBC Act 1999)	CMP	Conservation Management Plan
	RP	Recovery Plan
(under the FFG Act 1988)	AS	Action Statement

Great white shark (*Carcharodon carcharias*)

The great white shark is widely distributed and located throughout temperate and sub-tropical waters, with their known range in Australian waters including all coastal areas except the Northern Territory (DSEWPaC, 2013).

Studies of great white sharks indicate that they are usually solitary animals, largely transient and only temporarily resident (e.g., days to weeks) in areas it inhabits (DSE, 2003b; DSEWPaC, 2013). However, individuals are known to return to feeding grounds on a seasonal basis (Klimley & Anderson, 1996). The species moves seasonally along the south and east Australian coasts, moving northerly along the coast during autumn and winter and returning to southern Australian waters by early summer.

Observations of adult sharks are more frequent around fur seal and sea lion colonies, including Wilsons Promontory (approximately 123 km southwest of the activity area) and the Skerries (approximately 185 km northeast of the activity area) (DSE, 2003).

Juveniles are known to congregate in certain key areas including the Ninety Mile Beach area (including Corner Inlet and Lakes Entrance), where a BIA for breeding is overlapped by the activity area (Figure 4.8). A BIA ('distribution' only) for the great white shark covers the entire southeast marine region, with the nearest feeding BIA being around Kangaroo Island in South Australia (875 km to the west-northwest).

Given their transitory nature and the proximity of known congregation areas, great white sharks may occur within the activity area and EMBA, and they may have a seasonal overlap if the activity is conducted during early summer.

Shortfin mako shark (*Isurus oxyrinchus*)

The shortfin mako shark is a pelagic species with a circum-global, wide-ranging oceanic distribution in tropical and temperate seas (Mollet *et al*., 2000), though the timing of occurrence is not reported. It is widespread in Australian waters, commonly found in water with temperatures greater than 16°C (Museums Victoria, 2018).

Due to their widespread distribution in Australian waters, shortfin mako sharks may be encountered in the activity area and EMBA, albeit in low numbers.

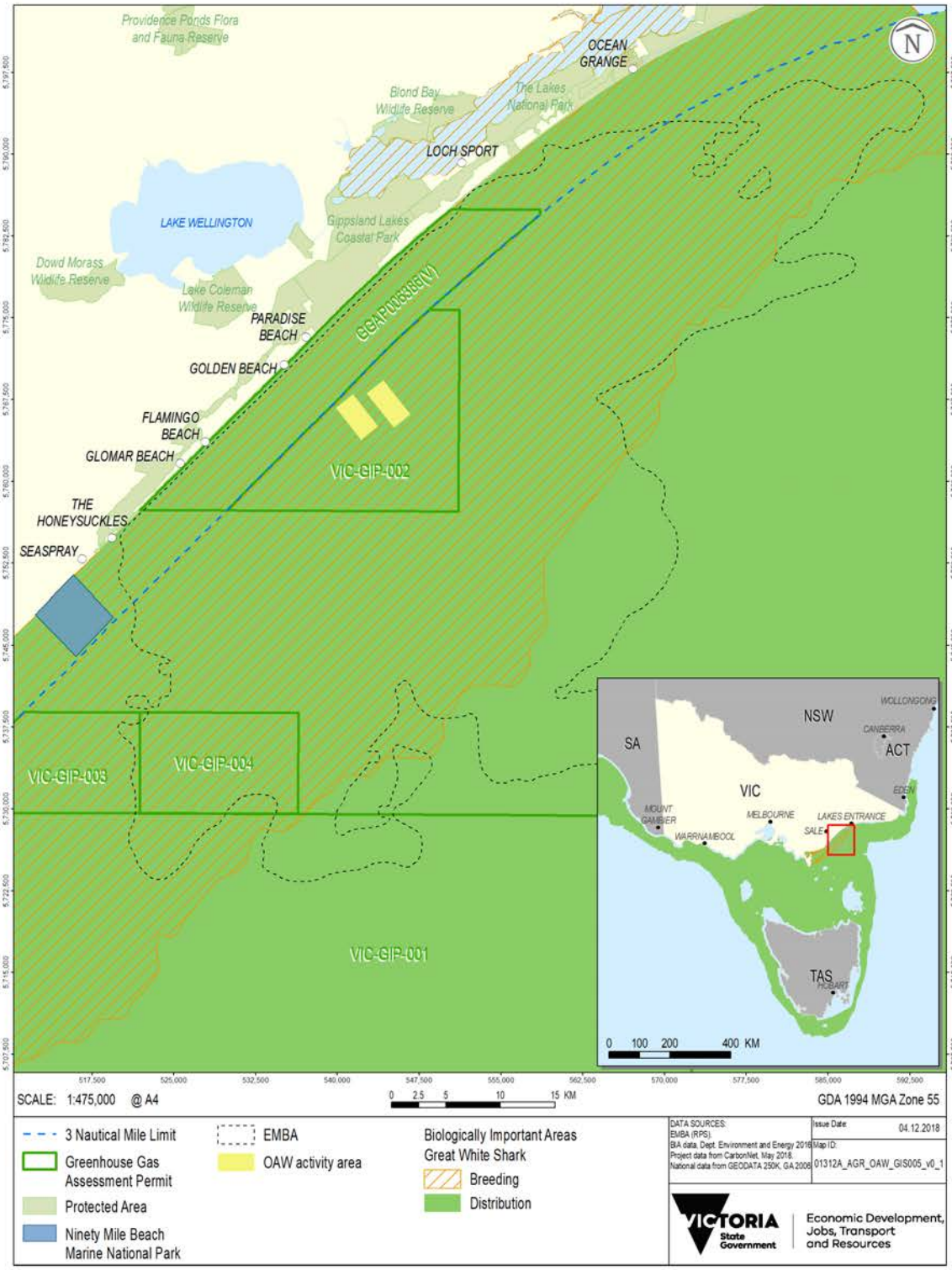


Figure 4.8. BIA for the great white shark

Sygnathids (EPBC Act: Listed marine species, FFG Act: Not listed)

Twenty-eight of the 34 marine ray-finned fish species identified in the EPBC Act PMST (82%) are sygnathiformes, which includes seahorses, seadragon, pipehorse and pipefish. The majority of these fish species are associated with seagrass meadows, macroalgal seabed habitats, rocky reefs and sponge gardens located in shallow, inshore waters (e.g., protected coastal bays, harbours and jetties) less than 50 m deep (Museums Victoria, 2018).

The PMST species profile and threats profiles indicate that the sygnathiforme species listed for the EMBA are widely distributed throughout southern, south-eastern and south-western Australian waters. The diverse range of ecological niches afforded by the shallow waters shoreward of the activity area would be expected to provide suitable habitat for these listed species, whereas the absence of reef and seagrass habitat observed within the activity area would suggest the diversity and abundance of these species would be far less in the activity area.

4.4.5. Cetaceans

The PMST (DoEE, 2018a) indicates that five whale species and seven dolphin species may reside within or migrate through the activity area, with an additional three whale species recorded within the EMBA (as marked with an asterisk [*] in Table 4.3). A description of species listed in Table 4.3 is focused on threatened and migratory species known to occur in the nearshore Gippsland region.

Table 4.3. EPBC Act-listed cetaceans that may occur in the EMBA

Scientific name	Common name	EPBC Act status			FFG Act status	BIA within the EMBA?	Recovery Plan in place?
		Listed threatened species	Listed migratory species	Listed marine species			
Whales							
Balaenoptera acutorostrata	Minke whale	-	-	Yes	-	-	-
*Balaenoptera borealis**	Sei whale	V	Yes	Yes	-	-	CA
Balaenoptera musculus	Blue whale (pygmy)	E	Yes	Yes	T	F	RP, AS
*Balaenoptera physalus**	Fin whale	V	Yes	Yes	-	-	CA
Caperea marginata	Pygmy right whale	-	Yes	Yes	-	F	-
Eubalaena australis	Southern right whale	E	Yes	Yes	T	M/R	CMP, AS
Megaptera novaeangliae	Humpback whale	V	Yes	Yes	T	-	CA, AS
*Pseudorca crassidens**	False killer whale	-	-	Yes	-	-	-

Dolphins							
Delphinus delphis	Common dolphin	-	-	Yes	-	-	-
Grampus griseus	Risso's dolphin	-	-	Yes	-	-	-
Lagenorhyn-chus obscurus	Dusky dolphin	-	Yes	Yes	-	-	-
Orcinus orca	Killer whale	-	-	Yes	-	-	-
Tursiops aduncus	Indian Ocean bottlenose dolphin	-	-	Yes	-	-	-
Tursiops truncatus	Bottlenose dolphin	-	-	Yes	-	-	-

* *Listed only from the EMBA.*
Legend as per Table 4.2, with the exception that 'T' in the FFG Act column is 'threatened' under the *FFG Act 1988* (Vic).

Pygmy blue whale (*Balaenoptera musculus*)

Blue whales are the largest living animals on earth, growing to a length of over 30 m, weighing up to 180 tonnes and living up to 90 years (DoE, 2015b). The Tasman-Pacific pygmy blue whale (*B. musculus. brevicauda*) is the sub-species that migrates through Bass Strait, found in waters north of 55°S (DoE, 2015b). Blue whales are a highly mobile species that feed on krill (euphausids, *Nyctiphane australis*).

A BIA for 'likely foraging' for the pygmy blue whale covers most of Bass Strait, including the activity area, with known foraging areas (abundant food source/annual high use area) occurring off the southwest Victorian coast (Figure 4.9).

The time and location of the appearance of blue whales in the South-east Marine Region generally coincides with the upwelling of cold water in summer and autumn along the southeast South Australian and southwest Victoria coast (the Bonney Upwelling) and the associated aggregations of krill that they feed on (DoE, 2015b; Gill and Morrice, 2003). This is a key feeding area for the species.

Blue whale migration patterns are thought to be similar to those of the humpback whale, with the species feeding in mid-to high-latitudes (south of Australia) during the summer months and moving to temperate/tropical waters in the winter for breeding and calving. Pygmy blue whale migration is oceanic and no specific migration routes have been identified in the Australasian region (DoE, 2015b).

Given the intersection of the foraging BIA with the activity area, it is possible that pygmy blue whales may occur in the activity area and the EMBA, though this possibility is low, and sightings would be most likely to occur during autumn.

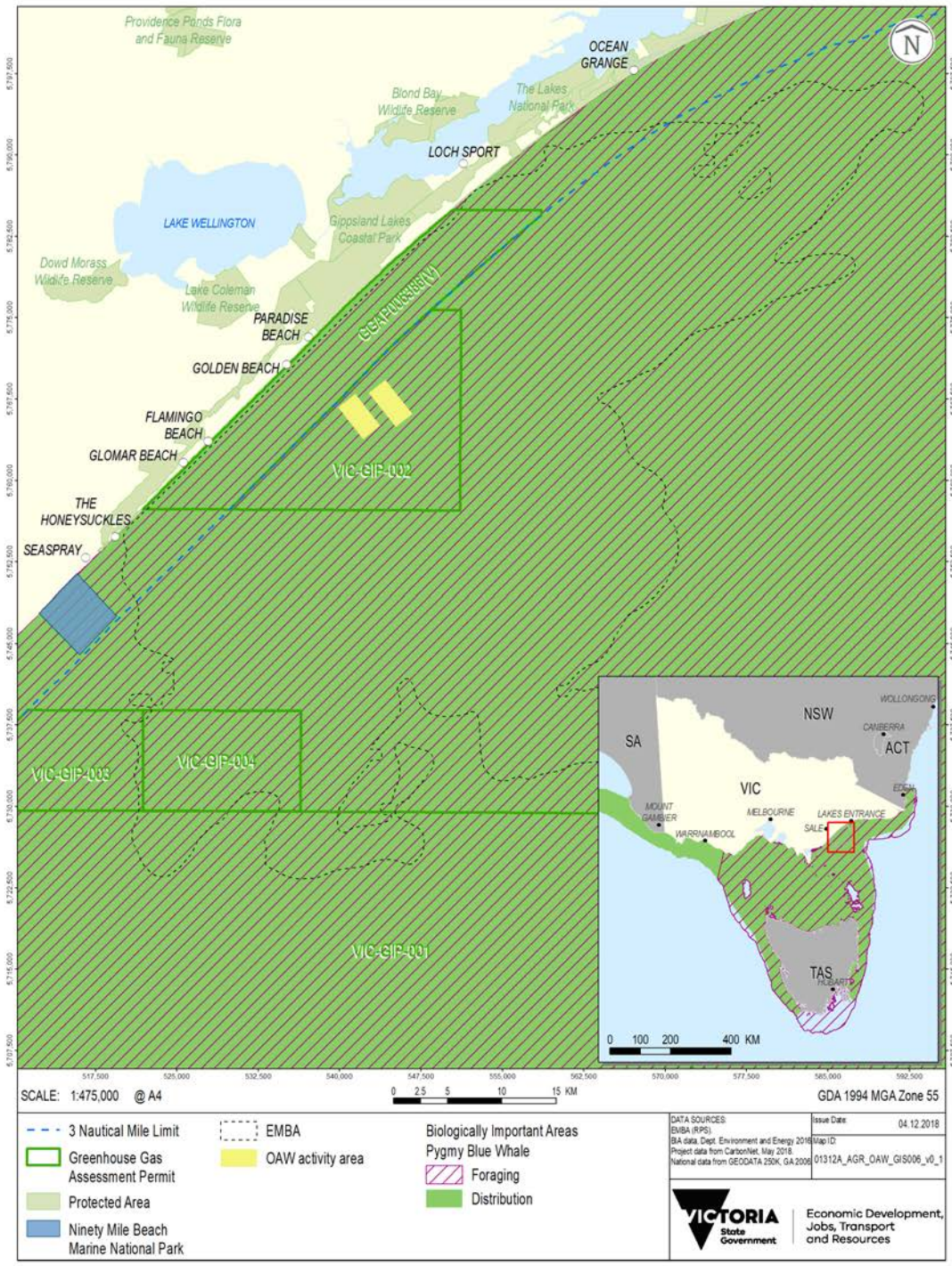


Figure 4.9. Pygmy blue whale BIA

Fin whale (*Balaenoptera physalus*)

The fin whale is the second-largest whale species after the blue whale, growing up to 27 m long and weighing up to 70 tonnes (TSSC, 2015a). It is a cosmopolitan species and is found from polar to tropical waters (more commonly in temperate waters) (TSSC, 2015a).

They are considered rare in Australian waters (Bannister *et al*., 1996), with available information suggesting they are more common in deeper water (TSSC, 2015a). They show well-defined long annual migrations between higher latitude feeding grounds in summer to lower latitude breeding ground in winter (TSSC, 2015a). Migratory movements are essentially north–south with little longitudinal dispersion.

Based upon the species preference for offshore waters, the absence of a BIA in Australian waters and the nearshore location of the activity area, it is considered unlikely that this species occurs within the activity area or the EMBA.

Southern right whale (*Eubalaena australis*)

Southern right whales are medium to large black (or less commonly grey-brown) baleen whales (DSEWPC, 2012). They reach a maximum length of approximately 17.5 m and a weight of around 80 tonnes, with mature females slightly larger than males (DSEWPC, 2012). The Australian population is estimated at 3,500 individuals (Charlton *et al*., 2014).

The southern right whale is present off the Australian coast between May and October (sometimes as early as April and as late as November) (DSEWPC, 2012) (Figure 4.10).

Small but growing numbers of non-calving whales regularly aggregate for short periods of time in coastal waters off Peterborough, Port Campbell, Port Fairy and Portland in Victoria, located more than 400 km west of the activity area, with waters less than 10 m deep preferred (DSEWPC, 2012).

The closest known calving/nursery grounds to the activity area occurs at Logan's Beach off the coast of Warrnambool in southwest Victoria (approximately 432 km west of the activity area) (DSEWPC, 2012).

The BIA for migration/resting on migration for the southern right whale occurs through all Victorian state waters, including those around the activity area, as they are known to generally occur within 2 km of shorelines (DSEWPC, 2012). However, a defined near-shore coastal migration corridor is considered unlikely given the absence of any predictable directional movement for the species (DSEWPC, 2012).

Due to the uncertainties associated with the exact migratory paths in eastern Bass Strait, there is a low potential that southern right whales may be encountered through the activity area and EMBA between May and October.

Humpback whale (*Megaptera novaeangliae*)

The humpback whale is a moderately large (15-18 m long) baleen whale that has a worldwide distribution but geographic segregation. Humpback whales are found in Australian offshore and Antarctic waters, feeding primarily on krill in Antarctic waters. The eastern Australian population of humpback whales is referred to as Group E1 by the International Whaling Commission, one of seven distinct breeding stocks in the southern hemisphere (TSSC, 2015b).

Bass Strait represents part of the core range of the E1 Group, but feeding, resting or calving is not known to occur in Bass Strait (TSSC, 2015b), though migration through Bass Strait may occur.

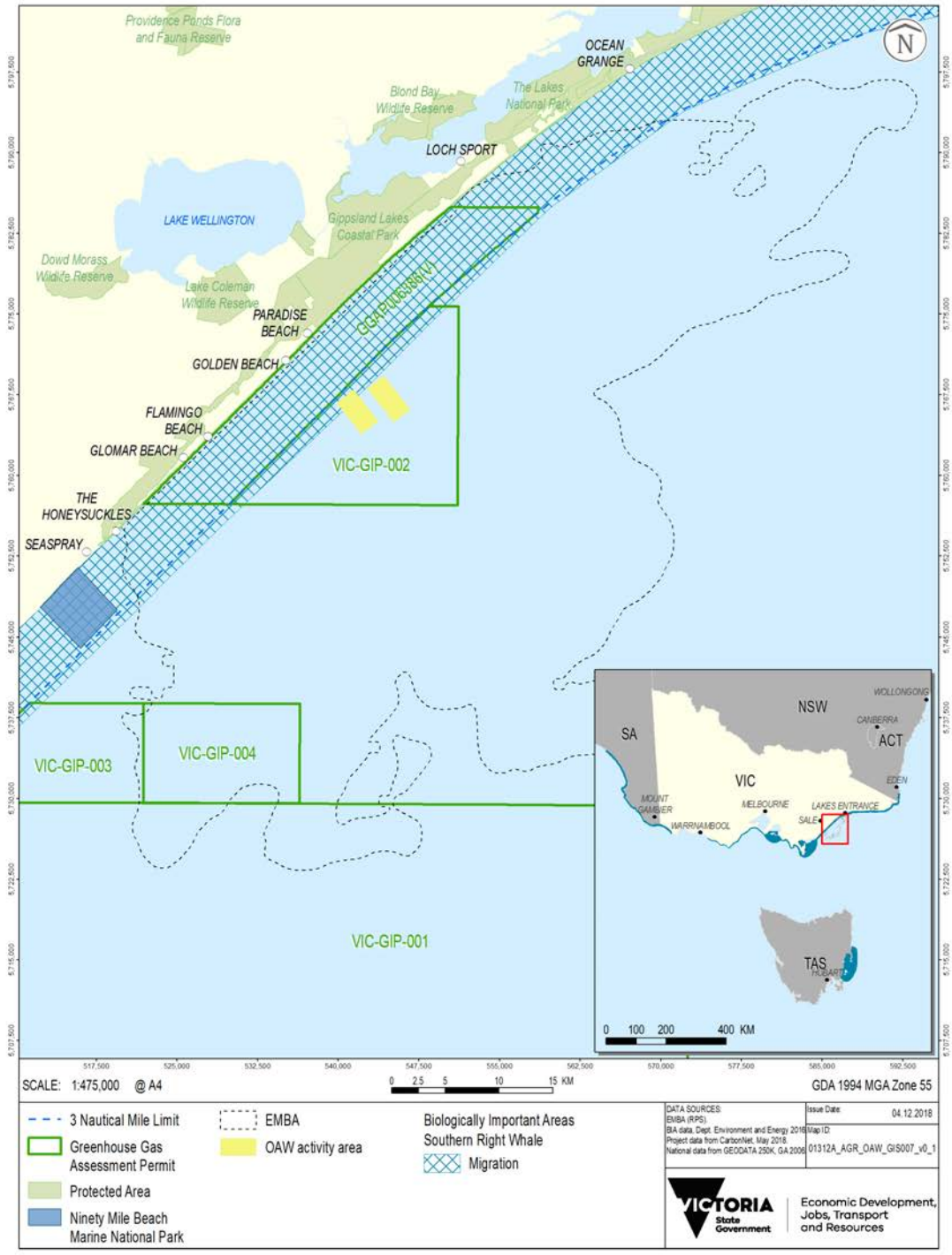


Figure 4.10. Southern right whale BIA

The nearest area that humpback whales are known to congregate (forage) is at the southern-most part of NSW (near the eastern border of Victoria), approximately 232 km northeast of the activity area. Twofold Bay (Eden) off the NSW south coast is the nearest known feeding area (a BIA) for humpback whales, located 250 km northeast of the activity area.

Humpback whales undertake annual migrations between their summer feeding grounds in Antarctic waters to their breeding and calving grounds in sub-tropical and tropical inshore waters, migrating up the Australian east coast (TSSC, 2015b). The northern migration off the southeast coast starts in April and May, with the southern migration occurring from November to December. This migration tends to occur close to the coast, along the continental shelf boundary in waters about 200 m deep (TSSC, 2015b).

As the activity area and the EMBA represent a core range for humpback whales, there is a likelihood that they may be encountered, particularly during April, May, November and December, though this likelihood is considered low due to their preference for migrating along the edge of the continental shelf.

Dolphins

None of the six dolphin species listed in the PMST are listed as threatened under the EPBC Act or FFG Act. Many dolphins are cosmopolitan species that are generally restricted to continental shelf environments. The common dolphin (*Delphinus delphis*) and the bottlenose dolphin (*Tursiops truncatus*) are the two most common dolphin species in the region, and are present throughout southern Australia.

The Burrunan dolphin (*Tursiops australis*) is a species of bottlenose dolphin only recognised as a separate species in 2011 that is present in the Gippsland Lakes (not listed in the EPBC PMST or the VBA for the EMBA). This species is listed as threatened under the FFG Act. Only two resident populations of Burrunan dolphin are known to occur, comprising about 50 individuals in the Gippsland Lakes and 100 individuals in Port Phillip Bay (Charlton-Robb *et al*., 2011). It is unclear whether migration occurs between these sites, though researchers from the Marine Mammal Foundation released information in mid-2017 indicating that there are genetic similarities between the dolphins in the Gippsland Lakes and around Tasmania's Freycinet Peninsula (ABC, 2017). The Marine Mammal Foundation believes a transient group of male dolphins swim between Gippsland and eastern Tasmania to breed with two different populations of female dolphins. The taxonomic validity of this new species has been questioned by the Committee for Taxonomy for the International Society for Marine Mammology (DRI, 2016).

4.4.6. Pinnipeds

There are two pinniped species recorded under the EPBC Act PMST as potentially occurring within the activity area and EMBA (DoEE, 2018a), these being the New Zealand fur-seal (*Arctocephalus forsteri*) and Australian fur-seal (*Arctocephalus pusillus*). These species are not listed as threatened under the FFG Act. There are no breeding or haul-out sites in the activity area or EMBA for both species, though the area may provide year-round foraging habitat. There is no BIA for these species in the EMBA. Australian fur-seals are regularly seen resting and foraging on and around the petroleum production platforms in the region.

4.4.7. Reptiles

Three species of marine turtle are listed under the EPBC Act as potentially occurring in the activity area and EMBA, these being the loggerhead turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*) and green turtle (*Chelonia mydas*). The two former species are listed as endangered, and the latter listed as vulnerable under

the EPBC Act. All three species are listed as migratory and marine species under the Act.

No BIAs for turtles occur within Bass Strait, with turtles in Victorian waters considered to be rare vagrants outside their usual range (EA, 2003) of tropical and sub-tropical waters.

4.4.8. Avifauna

Forty-nine (49) bird species (seabirds and shorebirds) are listed under the EPBC Act as potentially occurring in the activity area, with an additional 19 species recorded within the EMBA (as marked with an asterisk [*] in Table 4.4). The majority of these are listed as migratory and marine species.

Table 4.4. EPBC Act-listed bird species that may occur in the EMBA

Scientific Name	Common Name	EPBC Act status			FFG Act status	BIA within the EMBA?	Recovery Plan in place?
		Listed threatened species	Listed migratory species	Listed marine species			
True seabirds (27 species)							
Albatross							
Diomedea antipodensis	Antipodean albatross	V	Yes	Yes	-	Foraging	Generic RP in place for all albatross in Australia, + AS for all albatross
Diomedea gibsoni	Gibson's albatross	V	Yes	Yes	-	-	
Diomedea epomophora (sensu stricto)	Southern royal albatross	V	Yes	Yes	T	-	
Diomedea exulans (sensu lato)	Wandering albatross	V	Yes	Yes	T	Foraging	
Diomedea sanfordi	Northern royal albatross	E	Yes	Yes	-	-	
Phoebetria fusca	Sooty albatross	V	Yes	Yes	T	-	
Thalassarche bulleri	Buller's albatross	V	Yes	Yes	T	Foraging	
Thalassarche bulleri platei	Northern Buller's albatross	V	-	-	-	Foraging	
Thalassarche cauta	Shy albatross	V	Yes	Yes	T	Foraging	
Thalassarche cauta steadi	White-capped albatross	V	Yes	Yes	-	-	
Thalassarche chrysostoma	Grey-headed albatross	E	Yes	Yes	T	-	
*Thalassarche eremita**	Chatham albatross	E	Yes	Yes	-	-	
Thalassarche impavida	Campbell albatross	V	Yes	Yes	-	Foraging	
Thalassarche melanophris	Black-browed albatross	V	Yes	Yes	-	Foraging	
Thalassarche salvini	Salvin's albatross	V	Yes	Yes	-	-	

Thalassarche sp. nov.	Pacific albatross	V	Yes	Yes	-	-	
Thalassarche steadi	White-capped albatross	V	Yes	Yes	-	-	
Petrels							
Fregetta grallaria grallaria	White-bellied storm-petrel	V	-	-	-	-	-
Halobaena caerulea	Blue petrel	V	-	Yes	-	-	-
Macronectes giganteus	Southern giant petrel	E	Yes	Yes	T	-	Generic RP and AS for giant petrels
Macronectes halli	Northern giant petrel	V	Yes	Yes	T	-	
Pterodroma leucoptera leucoptera	Gould's petrel	E	-	-	-	-	RP
Other seabirds							
Ardenna carneipes	Flesh-footed shearwater	-	Yes	Yes	-	-	-
Catharacta skua	Great skua	-	-	Yes	-	-	-
*Haliaeetus leucogaster**	White-bellied sea-eagle	-	-	Yes	T	-	-
Pachyptila turtur subantarctica	Fairy prion (southern)	V	-	-	-	-	CA
Pandion haliaetus	Osprey	-	Yes	Yes	-	-	-
True shorebirds (41 species)							
Actitis hypoleucos	Common sandpiper	-	Yes	Yes	-	-	-
Ardea alba	Great egret	-	-	Yes	-	-	-
*Ardea ibis**	Cattle egret	-	-	Yes	-	-	AS
Arenaria interpres	Ruddy turnstone	-	Yes	Yes	-	-	-
*Botaurus poiciloptilus**	Australian bittern	E	-	-	T	-	CA
Calidris acuminata	Sharp-tailed sandpiper	-	Yes	Yes	-	-	-
Calidris canutus	Red knot	E	Yes	Yes	-	-	
Calidris ferruginea	Curlew sandpiper	CE	Yes	Yes	T	-	-
Calidris melanotos	Pectoral sandpiper	-	Yes	Yes	Yes	-	-
*Calidris ruficolis**	Red-necked stint	-	Yes	Yes	-	-	-
Charadrius bicinctus	Double-banded plover	-	-	Yes	-		
Charadrius leschenaultii	Greater sand plover	V	Yes	Yes	-	-	CA

Charadrius mongolus	Lesser sand plover	E	Yes	Yes	-	-	CA
*Charadrius ruficapillus**	Red-capped plover	-	-	Yes	-	-	-
*Gallinago hardwickii**	Latham's snipe	-	Yes	Yes	-	-	-
*Gallinago megala**	Swinhoe's snipe	-	Yes	Yes	-	-	-
*Gallinago stenura**	Pin-tailed snipe	-	Yes	Yes	-	-	-
Heteroscelus brevipes	Grey-tattler	-	Yes	Yes	T	-	-
*Himantopus himantopus**	Black-winged stilt	-	-	Yes	-	-	-
Hirundapus caudacutus	White-throated needletail	-	-	Yes	-	-	-
*Lathamus discolour**	Swift parrot	CE	-	Yes	-	-	AS
*Limosa lapponica bauera**	Bar-tailed godwit	V	Yes	Yes	-	-	-
*Limosa lapponica menzbieri**	Northern Siberian bar-tailed godwit	CE	Yes	Yes	-	-	-
Limosa limosa	Black-tailed godwit	-	Yes	Yes	-	-	-
*Neophema chrysogaster**	Orange-bellied parrot	CE	-	Yes	T	-	RP, AS
Numenius madagascariensis	Eastern curlew	CE	Yes	Yes	T	-	CA
*Numenius minutus**	Little curlew	-	Yes	Yes	-	-	-
Numenius phaeopus	Whimbrel	-	Yes	Yes	-	-	-
Philomachus pugnax	Ruff (Reeve)	-	Yes	Yes	-	-	-
Pluvialis fulva	Pacific golden plover	-	Yes	Yes	-	-	-
Pluvialis squatarola	Grey plover	-	Yes	Yes	-	-	-
Recurvirostra novaehollandiae	Red-necked avocet	-	-	Yes	-	-	-
*Rostratula australis**	Australian painted snipe	E	-	Yes	T	-	CA
*Sterna (Sternula) albifrons**	Little tern	-	Yes	Yes	T	-	AS
Sterna (Sternula) fuscuta	Sooty tern	-	-	Yes	-	-	-
Sterna (Sternula) nereis nereis	Australian fairy tern	V	-	-	T	-	CA
*Thinornis rubricollis rubricollis**	Hooded plover (eastern)	V	-	Yes	T	-	AS
Tringa glareola	Wood sandpiper	-	Yes	Yes	-	-	-
*Tringa nebularia**	Common greenshank	-	Yes	Yes	-	-	-

Tringa stagnatilis	Marsh sandpiper	-	Yes	Yes	-	-	-
Xenus cinereus	Terek sandpiper	-	Yes	Yes	T	-	-

Legend and key as per Table 4.2.

Exclusively Seabirds

Albatrosses (and giant-petrels) are among the most dispersive and oceanic of all birds, spending more than 95% of their time foraging at sea in search of prey and usually only returning to land (remote islands) to breed. These species breed in remote islands of Antarctica and the Southern Ocean (DSEWPC, 2011).

All Australian waters can be considered foraging habitat for albatross and petrels, with the most important habitat considered to be south of 25°S (DSEWPC, 2011), which includes the activity area. Given these species' ability to cover vast ocean distances while foraging, it is possible they may overfly and forage in the vicinity of the activity area.

The albatross and petrel species listed have a widespread distribution throughout the southern hemisphere.

BIAs for foraging exist within various parts of the EMBA for six of the albatross species (black-browed, Buller's, Campbell, Indian yellow-nose, shy and wandering albatross), with foraging taking place throughout all of Bass Strait.

Other seabirds listed in the PMST may occur within the activity area and EMBA as their ecological niches dictate.

Shorebirds and Coastal Species

The plovers, terns, sandpipers, snipes, godwits and other shorebird species feed on a range of molluscs, worms, crustaceans and insects along the shoreline or the wetlands behind the coastal dunes, some breeding overseas before returning to Australia, while others breed in Australia and nest along the sandy beaches of the Ninety Mile Beach.

4.4.9. Marine Pests

Marine pests known to occur in South Gippsland, according to ParksVic (2017) and Butler et al (2012) include:

- Pacific oyster (*Crassostrea gigas*) – small number of this oyster species are reported to occur in Western Port Bay and at Tidal River in the Wilsons Promontory National Park.
- Northern pacific seastar (*Asterias amurensis*) – prefer soft sediment habitat, but also use artificial structures and rocky reefs, living in water depths usually less than 25 m (but up to 200 m water depths).
- New Zealand screw shell (*Maoricolpus roseus*) – lies on or partially buried in sand, mud or gravel in waters up to 130 m deep. It can densely blanket the sea floor with live and dead shells and compete with native scallops and other shellfish for food. This species is present in eastern Bass Strait, forming extensive and dense beds on sandy seabeds (Patil *et al*., 2004).
- European shore crab (*Carcinus maenas*) – prefers intertidal areas, bays, estuaries, mudflats and subtidal seagrass beds, but occurs in waters up to 60 m deep. It is presumed to occur on the intertidal reefs of all the marine

national parks in Gippsland, except the Ninety Mile Beach MNP (which has no intertidal reef).

The Pacific oyster and European shore crab are known to occur in the Gippsland Lakes (Hirst & Bott, 2016).

4.5. Cultural Heritage Values

4.5.1. Aboriginal Heritage

The coastline adjacent to the activity area is occupied by the *Gunaikurnai* language group. The Gippsland coastline is of significant Aboriginal cultural heritage significance. There are numerous areas containing Aboriginal shell middens (i.e., the remains of shellfish eaten by Aboriginal people) along the sand dunes of the coast. Coastal shell middens are found as layers of shell exposed in the side of dunes, banks or cliff tops or as scatters of shell exposed on eroded surfaces.

4.5.2. Maritime Archaeological Heritage

Shipwrecks (together with their associated relics) over 75 years old are protected within Commonwealth waters under the Historic *Shipwrecks Act 1976* (Cth) and in Victorian waters under the *Victorian Heritage Act 1995* (Vic).

Shipwrecks

There are no shipwrecks mapped as occurring in the activity area or the marine portion of the EMBA. The Australian National Shipwreck and Relic Database (DoEE, 2018j) lists four shipwrecks occurring nearby but outside the EMBA.

Shipwreck Protection Zones

Of the 650 shipwrecks in Victoria, nine have been placed within protected zones (a no-entry zone of 500-m radius [78.5 ha] around a particularly significant and/or fragile shipwreck) (DELWP, 2018b). None of these are located within the activity area or EMBA.

4.6. Socio-economic Environment

This section describes the social and economic environment of the activity area and the EMBA.

4.6.1. Coastal Settlements

The coastline adjacent to the activity area is sparsely populated, with the adjoining townships of Golden Beach and Paradise Beach being the closest. These towns are located within the Wellington Shire Council.

The populations for Golden Beach and Paradise Beach are 293 and 160, respectively. In Golden Beach, 68% of the 461 private dwellings are unoccupied, while 72% of the 308 private dwellings in Paradise Beach are unoccupied (ABS, 2017).

Camping among the sand dunes is also available along this section of coastline. Golden Beach has a small group of retail shops, a community hall, church, caravan park, football oval, bowling green and 9-hole golf course.

4.6.2. Native Title

The National Native Title Tribunal (NNTT) database identifies that there is Native Title Determination registered over much of the coastline adjacent to the activity area, this being for the Gunai/Kurnai People (VCD2010/001) (NNTT, 2018).

There are no Native Title Claims over the activity area or adjacent coastline (NNTT, 2018). There are no Indigenous Land Use Agreements (ILUA) registered by the NNTT along the coastline adjacent to the activity area (NNTT, 2018).

4.6.3. Commercial Fishing

Several Commonwealth and Victorian commercial fisheries are licensed to operate in and around the activity area and the EMBA.

Commonwealth-managed Fisheries

Commonwealth fisheries are managed by the AFMA under the *Fisheries Management Act 1991* (Cth). Their jurisdiction covers the area of ocean from 3 nm from the coast out to the 200 nm limit (the extent of the AFZ). Commonwealth commercial fisheries with jurisdictions to fish the EMBA are the:

- Bass Strait Central Zone Scallop Fishery;
- Eastern Tune and Billfish Fishery;
- Eastern Skipjack Tuna Fishery;
- Southern Bluefin Tuna Fishery;
- Small Pelagic Fishery (eastern sub-area);
- Southern Squid Jig Fishery; and
- Southern and Eastern Scalefish and Shark (SESS), incorporating;
    - Gillnet and Shark Hook sector.
    - South East Trawl sector.
    - Scalefish Hook sector.

The only Commonwealth-managed fishery currently operating in the activity area is the SESS Fishery.

Victorian-managed Fisheries

Victorian-managed commercial fisheries with access licences that authorise harvest in the waters of the activity area and the EMBA include the following (noting that not all actually operate in the area):

- Ocean Scallop;
- Rock Lobster (Eastern zone);
- Ocean Access (general, all species);
- Ocean Purse Seine (noted by VFA as being the most active fishery in the region);
- Trawl (inshore);
- Abalone (central zone) (does not operate in the activity area);
- Wrasse (does not operate in the activity area); and
- Banded Morwong (by permit) (does not operate in the activity area).

The activity area intersects small portions of the VFA catch and effort grid cells E39 and E40. These grid cells are based on divisions of 10' latitude (approximately 10 nm) and 12.1' longitude (approximately 12.1 nm).

Table 4.5 provides a presence/absence of fishing activity for catch and effort grid cells E39 and E40 for the last five financial years (2012-13 to 2016/17, inclusive). This data indicates that the ocean scallop fishery has not been active in the activity area and immediate surrounds for the last two financial years, and that the inshore trawl has not operated for a number of years.

Table 4.5. Fisheries catch data from the activity area (grid cells E39 & E40)

Year	Catch (tonnes)	Fisheries fished				
		Ocean scallop	Rock lobster	Ocean access	Ocean purse seine	Inshore trawl
2012/13	ID	1 day		25 days		
2013/14	ID	31 days				
2014/15	ID	1 day	6 days			
2015/16	ID		19 days			
2016/17	ID		3 days	5 days		

ID = Insufficient data to report (where there are fewer than 5 licence holders in a fishing grid cell, VFA policy is that data is not publicly released in order to protect confidentiality).

Green cells denotes fishing activity.

Table 4.6 summarises the key facts for each for the Commonwealth and Victorian fisheries that actively fishes in the activity area and/or the EMBA.

4.6.4. Recreational Fishing

Recreational fishing along the Gippsland coast typically targets snapper, King George whiting, flathead, bream, sharks, tuna, calamari, and Australian salmon.

Recreational fishing and boating is largely confined to the Gippsland Lakes and nearshore coastal waters. As Bass Strait is relatively shallow, the water currents through the Bass Strait can create unpredictable seas, reducing the numbers of recreational boats from venturing long distances into the Bass Strait from shore. Small boats are likely to fish around the nearshore reef area, while larger game fishing boats are likely to fish further out to sea and use nearby ports and boat ramps for launching. There are no boat ramps adjacent to the activity area.

The Golden Beach Surf Fishing Competition takes place over the weekend nearest Australia Day and during the Easter long weekend (midnight Good Friday to midnight Easter Sunday) each year between Seaspray and Loch Sport. The period of time between Christmas and Australia Day weekend are generally the busiest for recreational fishing.

4.6.5. Tourism

Marine-based tourism and recreation in the Bass Strait is primarily associated with recreational fishing and boating (see previous section).

The Gippsland Lakes (comprising Lake Victoria, Lake King, and Lake Wellington, together with other smaller lakes, marshes and lagoons) are the primary tourist attraction in the region. The communities adjacent to this network of lakes are popular tourist towns for their boating and fishing activities, along with bushwalking, bird watching and other nature-focused activities.

The beaches adjacent to the activity area are not patrolled and the Golden Beach Surf Life Saving Club is not active, with swimmers encouraged to go to Seaspray where there is a patrol. There is no surf break, although some surfing is observed from time to time.

Table 4.6. Commercial fisheries known to fish within the activity area and/or EMBA

Fishery	Target species	Geographic extent fishery	Fishing season	Fishing methods, vessels and licences	Catch data and other information
Commonwealth-managed fisheries					
Shark Gillnet and Shark Hook Sector	Gummy shark (*Mustelus antarcticus*) is the key target species, with bycatch of elephant fish (*Callorhinchus milii*), sawshark (*Pristiophorus cirratus, P. nudipinnis*), and school shark (*Galeorhinus galeus*).	Waters from the NSW/Victorian border westward to the SA/WA border, including the waters around Tasmania, from the low water mark to the extent of the AFZ. Most fishing occurs in waters adjacent to the coastline in Bass Strait, with a low to medium fishing intensity over the activity area. *Activity area intersects 0.0014% of the fishery and the EMBA intersects 0.165% of the fishery.*	12-month season, beginning 1st May.	Demersal gillnet and a variety of line methods. 2016-17 – 74 permits and 62 active vessels. 2015-16 – 74 permits and 61 active vessels. 2014-15 – 74 permits and 69 active vessels. Landing ports in Victoria are Lakes Entrance, San Remo and Port Welshpool.	2016-17 – 2,118 tonnes worth $18.3 million. 2015-16 – 2,233 tonnes worth $18.4 million. 2014-15 – 2,005 tonnes worth $16.9 million. In 2015-16, the SESS Fishery is the largest Commonwealth fishery in terms of volume produced (there is no 2016-17 data available).

Fishery	Target species	Geographic extent fishery	Fishing season	Fishing methods, vessels and licences	Catch data and other information
Commonwealth Trawl Sector (CTS)	Key species targeted are eastern school whiting (*Sillago flindersi*), flathead (*Platycephalus richardsoni*) and gummy shark (*Mustelus antarcticus*).	Covers the area of the AFZ extending southward from Barrenjoey Point (north of Sydney) around the New South Wales, Victorian and Tasmanian coastlines to Cape Jervis in South Australia. Effort increasingly concentrated on the continental shelf, rather than historical areas of the slope. *Activity area intersects 0.0017% of the fishery and the EMBA intersects 0.20% of the fishery.*	12-month season, beginning 1st May. Highest catches from September to April.	Multi-gear fishery, but predominantly demersal otter trawl and Danish-seine methods. 2016-17 – 57 trawl fishing rights with 50 active trawl and Danish-seine vessels. 2015-16 – 57 trawl fishing rights with 51 active trawl and Danish-seine vessels. 2014-15 – 57 trawl fishing rights with 50 active trawl and Danish-seine vessels. In the activity area, between 7 and 13 vessels have operated since 2007. Primary landing ports are in NSW, and Lakes Entrance and Portland in Victoria.	2016-17 – 8,691 tonnes, with no value assigned. 2015-16 – 9,025 tonnes, worth $41.5 million. 2014-15 – 8,264 tonnes worth $37.7 million. Logbook catches have been gradually declining since 2001. Danish seine activity is the key method in Gippsland, with low fishing intensity in the activity area in the last few years.

Fishery	Target species	Geographic extent fishery	Fishing season	Fishing methods, vessels and licences	Catch data and other information
Victorian					
Bass Strait Scallop Fishery (Victorian zone)	Commercial scallop (*Pecten fumatus*). The 2017-18 VFA stock assessment found no scallops within the activity area or EMBA in commercial quantities, so it is unlikely that the EMBA will be fished for many years.	Extends 20 nm from the high tide water mark of the entire Victorian coastline (excluding bays and inlets where commercial scallop fishing is prohibited). Management of the Bass Strait Scallop fishery was split between the Commonwealth, Victoria and Tasmania in 1986 under an Offshore Constitutional Settlement, whereby Commonwealth central, Victorian and Tasmanian zones were created. *Activity area intersects 0.0552% of the fishery and the EMBA intersects 0.089% of the fishery.*	12-month season, beginning 1st of April. Fishing usually occurs during the winter months, but can occur from May to the end of November. The 2017/18 scallop stock assessment found that they are present in much lower numbers than historically, with a total biomass of about 5,107 t (from Wilson's Promontory to the Victoria/NSW border). Scallops have highly variable levels of natural mortality, with an historical 'boom' or 'bust' nature. Fishing activity in the area is currently low.	Towed scallop dredges (typically 4.5 m wide) that target dense aggregations ('beds') of scallop. A tooth-bar on the bottom of the mouth of the dredge lifts scallops from the seabed and into the dredge basket. As of September 2017, there are 90 fishery access licences available. Only a few vessels fishing these licenses operate in any one year (generally between 12 and 20). Vessels are typically based out of Lakes Entrance or Port Welshpool, although licence holders may fish the entire coastline. Some licence holders also have entitlements to fish the Commonwealth scallop fishery, inshore trawl, Commonwealth SESS fishery and the southern squid jig fishery. The fishery operates to its own Scallop Management Plan (i.e., not one developed by the VFA).	There has been no catch in the activity area during 2016/17 and 2015/16, with little effort prior to this and very low catches (less than 1 tonne over the period 2011-16). Zero quotas were in place for the 2010/11, 2011/12 and 2012/13 seasons due to a lack of commercial scallop quantities. The total allowable commercial catch has been set at 135 tonnes for the 2013/14, 2014/15, 2015/16, 2016/17 and 2017/18 fishing seasons, and is likely to remain at this level for the foreseeable future. Scallop spawning normally occurs from late winter to early spring, with larvae drifting as plankton for up to six weeks before first settlement. Juvenile scallops reach marketable size within 18 months.

Fishery	Target species	Geographic extent fishery	Fishing season	Fishing methods, vessels and licences	Catch data and other information
Rock Lobster Fishery (eastern zone; Lakes Entrance region)	Southern rock lobster (*Jasus edwardsii*). Very small bycatch of species including southern rock cod (*Lotella* and *Pseudophycis* spp), hermit crab (family Paguroidea), leatherjacket (*Monacanthidae* spp) and octopus (*Octopus* spp). SETFIA has stated that octopus is now being sighted in the area for the first time since the 1990s and that Moreton Bay bugs (*Thenus orientalis*) are spawning near the Ninety Mile Beach MNP, though it is not clear whether these are fished.	The eastern zone stretches from Apollo Bay in southwest Victoria to the Victorian/NSW border. Rock lobster abundance decreases moving from western Victoria to eastern Victoria. Larval release occurs across the southern continental shelf, which is a high-current area, facilitating dispersal. The pelagic phyllosoma larval phase lasts around 12–18 months. *Activity area intersects 0.03% of the fishery (eastern zone) and the EMBA intersects 3.97% of the fishery (eastern zone).*	Closed season for: • Female lobsters – 1 June to 15 November to protect females in berry during spawning period. • Male lobsters – 15 September to 15 November to protect males during their moulting period when soft shells increase their vulnerability. Catches are generally highest from August to January.	Fished from coastal rocky reefs in waters up to 150 m depth, with most of the catch coming from inshore waters less than 100 m deep. Baited pots are generally set and retrieved each day, marked with a surface buoy. As of September 2017, there were 36 fishery access licences in the eastern zone. Only one lobster fisher operates in the EMBA (shoreward of the activity area), fishing a small section of mapped reef in water depths between 15-20 m.	In the eastern zone, catches for the last five seasons were: • 2015/16 – 58 t valued at $5.1 million. • 2014/15 – 59 t valued at $5 million. • 2013/14 – 51 t valued at $3.6 million. • 2012/13 – 48 t valued at $2.7 million. • 2011/12 – 65 t valued at $3.9 million.

Fishery	Target species	Geographic extent fishery	Fishing season	Fishing methods, vessels and licences	Catch data and other information
Multi-species Ocean Fishery					
Ocean Access (or Ocean General) Fishery	Gummy shark (*Mustelus antarcticus*), school shark (*Galeorhinus galeus*), Australian salmon (*Arripis trutta*), snapper (*Pagrus auratus*). Small bycatch of flathead (*Platycephalidae* spp).	Entire Victorian coastline, excluding marine reserves, bays and inlets.	Year-round. Most fishing undertaken off Lakes Entrance occurs between April and July.	Utilises mainly longlines (200 hook limit), but also haul seine nets (maximum length of 460 m) and mesh nets (maximum length of 2,500 m per licence). As of September 2017, there are 171 fishery access licences. Fishing usually conducted as day trips from small vessels (<10 m in length).	There is insufficient catch data (catch data is combined with other fisheries and therefore unable to be distinguished on a stand-alone basis).
Ocean Purse Seine Fishery	Australian sardine (*Sardinops sagax*), Australian salmon (*Arripis trutta*) and sandy sprat (*Hyperlophus vittatus*) are the main species. Southern anchovy (*Engraulis australis*) caught in some years.	Entire Victorian coastline, excluding marine reserves, bays and inlets.	Year-round.	Purse seine, which is generally a highly selective method that targets one species at a time, thereby minimising bycatch. Purse seines do not touch the seabed. A lampara net may also be used. Only one licence is active in Victorian waters (based out of Lakes Entrance), with fishing focused close to shore and during the day. This licence is held by Mitchelson Fisheries Pty Ltd, a family business that catches primarily sardines, salmon, mackeral, sandy sprat, anchovy and white bait using the *Maasbanker* purse seine vessel.	

Sources: VFA (2017; 2018a;b), FRDC (2017), Koopman et al (2018), Sen (2011) and consultation with VFA.

4.6.6. Petroleum and GHG Infrastructure, Exploration and Production

In 2016, Victoria accounted for 20% of Australia's petroleum liquids production. Victoria accounted for 17% of Australia's conventional gas production in 2016, much of which is from the Gippsland Basin (APPEA, 2017).

The Gippsland Basin has 24 offshore production licenses, 5 exploration permits and 5 retention leases (NOPTA, 2018) and a total of 22 offshore petroleum production platforms have been installed in Bass Strait since first production was established (excluding subsea production wells).

The activity area overlaps one gas pipeline (Bream A to shore) operated by Esso Australia Resources Pty Ltd (EARPL) and is located in close proximity to two other EARPL pipelines located to the east of the activity area (see Figure 1.1).

There are no wells within the activity area. The nearest well is Golden Beach-1 (dry hole), located 3.1 km to the west, which has been suspended (with the wellhead remaining). The wellhead for the associated Golden Beach-1A well (gas show) also remains.

4.6.7. Commercial Shipping

The South-east Marine Region (which includes Bass Strait) is one of the busiest shipping regions in Australia (DoE, 2015a). Lakes Entrance is an important fishing port for the region (DoE, 2015a).

The activity area is located entirely within the Bass Strait 'Area to be Avoided' (ATBA). This area is a routing measure that ships in excess of 200 gross tonnes should avoid due to the high concentration of offshore petroleum infrastructure (oil and gas platforms and pipelines, as described in Section 4.6.6) that can provide a navigational hazard. Operators of vessels greater than 200 gross tonnes must apply to NOPSEMA to enter and be present within the ATBA (DIBP, 2017).

Very light shipping activity occurs through the activity area, with higher traffic volume shipping areas located to the south of the activity area and immediately south of the ATBA.

4.6.8. Defence Activities

There are no defence training areas within the EMBA (DoE, 2015a). The activity area is located beneath Defence Restricted Airspace R258D.

4.6.9. Other Infrastructure

Other infrastructure present within the EMBA includes the ocean outfalls for Regional Outfall Sewer (ROS) at Delray Beach (6.7 km northwest of the activity area) and the Saline Wastewater Outfall Pipeline (SWOP) at McGaurans Beach (46 km southwest of the activity area). These outfalls dispose large volumes of highly saline treated wastewater.

There are no submarine cable protection zones in the vicinity of the activity area.

5. Impact and Risk Assessment Methodology

While ‘impacts’ and ‘risks’ are acknowledged as having different definitions, the term ‘risk’ is used throughout this chapter when describing the overall methodology of assessing impacts and risks given that AS/NZS 31000:2009 uses the term ‘risk’ (but is intended to also describe the approach to assessing impacts).

5.1. Risk Assessment Approach

The Victorian Government requires that all Departments approach to risk management be compliant with the Australian New Zealand Risk Management Standard ISO31000:2009 (Risk management-Principles and guidelines), the directions issued under the *Financial Management Act 1994* (Vic) and the Victorian Government Risk Management Framework (VGRMF) (Department of Treasury and Finance, 2015).

The Department’s policy recognises that the approach to implementation of some requirements may need to be varied, to reflect different structures and staffing arrangements within the different business areas within the Department. The CarbonNet Project: Project Risk Management Strategy (Version 4.0) outlines this approach.

5.2. CarbonNet Risk Management Process

The CarbonNet risk management process (CNRMF) is based on a 7-step risk management process as shown in Figure 5.1, which is consistent with ISO AS/ANZ 31000:2009, the VGRMF and DJJPR RMF.

5.3. Risk Identification

In order to identify the environmental risks associated with this activity (together with recommendations for their control), CarbonNet held an environmental risk assessment workshop, which identified the impacts and risks of the activity and associated control measures involving people from various disciplines. The outcomes of these workshops were recorded in a risk register, which has been used as the basis for the impact and risk assessment.

5.4. Risk Analysis

The OPGGS(E) require that the environmental impacts and risks of an activity are evaluated and documented in an EP. Definitions of impacts and risks according to regulations and relevant risk management guidelines are:

- Impact - Any change to the environment, whether adverse or beneficial, that wholly or partially results from an activity.
- Risk - The effect of uncertainty.

The key process used for analysing risk is to determine the likelihood and the consequence of the risk occurring.

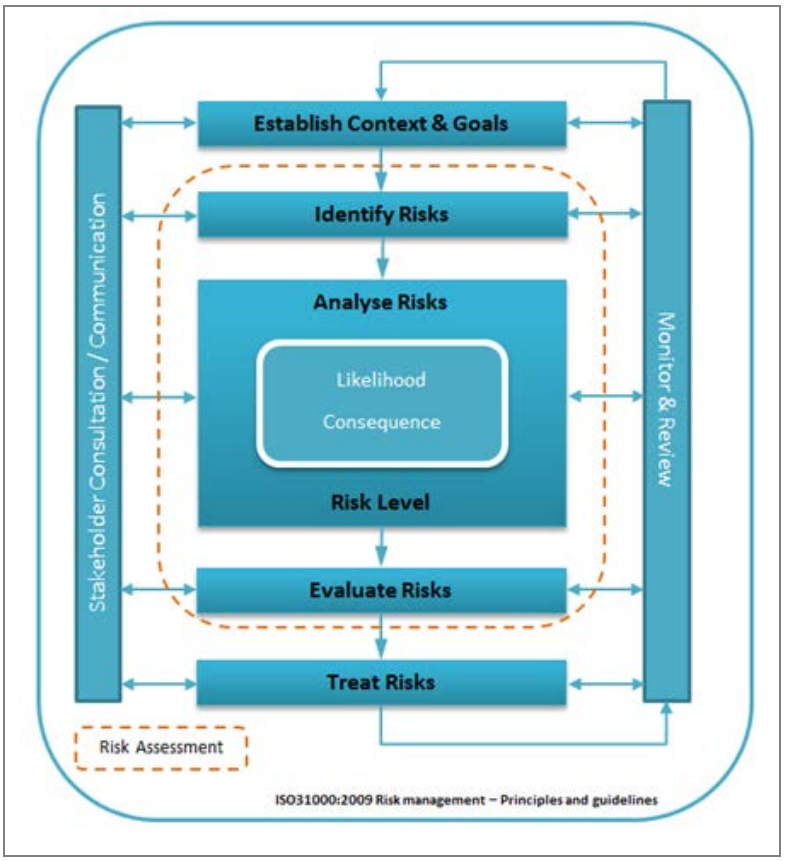


Figure 5.1. Risk management process

5.4.1. Determining Likelihood of Risk

Likelihood is defined as: *the chance of something happening.*

Existing controls (what is in place now to deal with this event if it does happen) must be considered when the level of likelihood is selected. The likelihood is selected as per Table 5.1.

Chapter 6 presents the 'inherent' likelihood for each hazard (pre-treatment) and the 'residual' likelihood (assuming the successful implementation of controls).

Table 5.1. DJPR environmental risk framework – likelihood of occurrence

Rating	Description	Probability
Almost certain	Is expected to occur in most circumstances.	>95-99%
Likely	Will probably occur in most circumstances.	>60-95%
Possible	Might occur at some time.	>40-60%
Unlikely	Could occur at some time.	>5-40%
Rare	May occur only in exceptional circumstances.	<5%

** The probability column assigns a general percentage likelihood of the hazard occurring as a general guide to accompany the description of likelihood.*

5.4.2. Determining Consequence of Risk

Consequence is defined as:

> *the possible impact and the extent the risk/event would have in nine categories, these being strategic, safety, environment, service delivery, reputation, financial, people cultural & wellbeing, social, and legal & legislative.*

The effectiveness of existing controls and likelihood (data available) must be taken into consideration when assessing the extent of the consequences. The consequence is selected as per Table 5.2 (with the environment category highlighted for ease of reference). Chapter 6 presents the 'inherent' consequence for each hazard (pre-treatment, or assuming that multiple controls fail) and the 'residual' consequence (assuming the successful implementation of controls).

DJPR's risk framework considers existing controls when determining risk (i.e., normally 'inherent' risk is not considered). However, for this EP, 'inherent' risk and/or consequence has been presented to provide an indication of what the risk and/or consequence would be in the event that the controls fail.

A minimum of one category must be selected (in the case of the EP, this will be 'environment'). If more than one category is assessed, there are likely to be a number of different consequence ratings. The overall consequence rating is that which is the highest consequence in any of the categories assessed.

Table 5.2. DJPR consequence scale

Risk Focus	**Insignificant** Can be managed with no change in operations or additional resources	**Minor** Can be managed with no change in operations, but may need resources and priorities to be reallocated	**Moderate** Changes in operations may be required, additional resources needed, and priorities reallocated	**Major** Changes in operations and additional resources may be greater than those available to the Group / Division	**Critical** Changes in operations impacts the wider Department, resources required may exceed the Department's resource capability
Strategic Risk event impacts on the ability of the Project to deliver financial & non-financial outcomes	• Failure to meet up to 1% of stated financial or non-financial outcomes.	• Failure to meet 1-5% of stated financial or non-financial outcomes.	• Failure to meet 5-10% of stated financial or non-financial outcomes.	• Failure to meet 10-20% of stated financial or non-financial outcomes.	• Failure to meet greater than 20% of stated financial or non-financial outcomes.
Safety Risk event impacts the safety and wellbeing (injuries, illness, death, displacement, resilience) of DJPR staff, visitors, contractors or the public	• Slight health effect/injury not effecting work performance or causing disability to work (including first aid case and medical treatment case).	• Minor health effect/injury affecting work performance such as restriction to activities or a need to take a few days to recover (up to 10 days off). • Offsite medical treatment or Lost Time Injury (LTI).	• Major health effect/injury effecting work performance in the longer term such as a prolonged absence from work (up to 30 days off). • More than 1 LTI.	• Extensive and/. or permanent total disability in the work force. • Industrial Relations challenges and costs. • Work cover claims/sanctions. • Insurance Premium penalties.	• Single or Multiple fatalities or multiple permanent disability or illness. • Department prosecuted under OHS legislation.
Financial Risk event impacts the financial position/budget of the Project	• Project expenditure, or budget impacted by up to 1%. • Insignificant financial loss to industry/ environmental stakeholder.	• Project expenditure, or budget impacted by 1-5%. • Minor financial loss to local economy/industry/ environmental stakeholder.	• Project expenditure, or budget impacted by 5-10%. • Moderate financial loss to region/industry/ environmental stakeholder.	• Project expenditure, or budget impacted by 10-20%. • Major financial loss to region/industry/environmental stakeholder.	• Project expenditure, or budget impacted by more than 20%. • Critical financial loss to primary/ industry/ environmental stakeholder or the broader state.

Risk Focus	**Insignificant** Can be managed with no change in operations or additional resources	**Minor** Can be managed with no change in operations, but may need resources and priorities to be reallocated	**Moderate** Changes in operations may be required, additional resources needed, and priorities reallocated	**Major** Changes in operations and additional resources may be greater than those available to the Group / Division	**Critical** Changes in operations impacts the wider Department, resources required may exceed the Department's resource capability
Environment Risk event impacts the natural environment or infrastructure	• Effect is highly localised (e.g., individual or small number of plants or animals, or up to tens of square metres). • No threatened species are affected. • There is no damage at the habitat or ecosystem level. • Environmental impact is reversible/ negligible and/or under 1 year. • No active rehabilitation is required. • A spill of hydrocarbons that requires no active clean up.	• Localised effects on the environment (e.g., several plants or animals, or up to one square kilometre). • No threatened species are affected. • There is minor damage at the habitat level, but no damage at the ecosystem level. • Environmental impact is reversible and recovery is possible in 1-5 years. • Minimal active rehabilitation may be required (e.g., days or weeks). • A spill of hydrocarbons that may require active clean up.	• Moderate effects on the environment (e.g., small to large group of plants and/or animals, up to 10 square kilometres). • Threatened species or habitat suffer injury. • There is moderate damage at the habitat or ecosystem level. • Environmental impact is reversible, with recovery possible over the medium-term (5 to 10 years). • Active rehabilitation is required over months. • A spill of hydrocarbons that requires active clean up (days to weeks).	• Major effects on the environment (e.g., large group of plants and/or animals, 10 to hundreds of square kilometres). • Threatened species or habitats suffer mortality. • There is major damage at the habitat or ecosystem level. • Environmental damage is wholly or partially reversible, with recovery possible over a period of 10-20 years. • Active rehabilitation is required over months. • A spill of hydrocarbons that requires active clean up (weeks to months).	• Very serious effects on the environment (e.g., hundreds of square kilometres/ landscape level scale). • Threatened species population or habitat/s suffer mortality. • There is extensive damage at the habitat or ecosystem level. • Environmental damage is long-term (>20 years) or permanent, with recovery unlikely to be successful. • Active rehabilitation is required over years but may not be successful. • A spill of hydrocarbons that requires active clean up (months to years).
Service Delivery Risk event impacts ability to deliver the day-to-day operations of the Project	• Insignificant impact to the Department's ability to deliver its services/functions. • No inconvenience to customers/ stakeholders. • Effect on systems and processes	• Minor short-term temporary impact to the department's capability in providing its services/functions. • Customers/stakeholders slightly inconvenienced. • Effect on systems and processes contained to	• Moderate impact to the department's capability in providing its services/functions. • Customers/stakeholders inconvenienced. • Inability to deliver services for up to one week in at least one Division or	• Continuing difficulties in delivering the department's critical services/ functions. • Major impact on customers/ stakeholder. • Inability to deliver services for between 1-3 weeks across the Department. • May impact on multiple	• Long-term detrimental effect on the department's capability in providing critical services/functions. • Serious impact to customers/stakeholders. • Inability to deliver services for more than 3 weeks across the Department.

Risk Focus	**Insignificant** Can be managed with no change in operations or additional resources	**Minor** Can be managed with no change in operations, but may need resources and priorities to be reallocated	**Moderate** Changes in operations may be required, additional resources needed, and priorities reallocated	**Major** Changes in operations and additional resources may be greater than those available to the Group / Division	**Critical** Changes in operations impacts the wider Department, resources required may exceed the Department's resource capability
	minimal and contained to one Business Unit. • Impact may be confined to a single business area. • Minimal management resources required to address event over days.	one Division. • Impact may be confined to a single Division. • Some management resources required to address event over days.	Group. • Impact may be confined to a single Division or Group. • Some management resources required to address event over several weeks.	Division or Group &/or single locations. • Significant management resources required to address event over several weeks or months.	• May impact on multiple Division or Group, whole Department &/or multiple regions. • Complete suspension of normal management activities for several weeks or months in order to address event.
Reputation Risk event has a sustained impact on the reputation of the Department (or of specific Group, Divisions or Programs within the Department) either within Government or external stakeholders.	• Very limited public or political interest. • Minimal adverse local attention (1 day only). • Relationship with central agency remediated promptly. • Complaint from one stakeholder. • Complaint or public criticism resolved promptly by day-to-day management processes.	• Adverse localised public or political interest. • Limited attention on a single issue in local media over a short period (up to 1 week). • Relationship with central agency requires some management attention. • Complaint or public criticism resolved promptly by day-to-day management processes.	• Adverse localised negative public or political interest. • Short-term local media attention (up to 2 months). • Relationship with central agency requires specific management attention. • Local community concern on a single issue over a sustained period (up to 2 months). • Short-term (1-2 week) loss of confidence in the Department.	• Serious adverse public attention at State/National level (6-12 months). • Serious adverse State/National media on one or more issues over a prolonged period (6-12 months). • Media attention escalates, calls for public enquiry and Ministerial accountability. • Medium-term negative public interest. • Medium-term loss of Government or central agency confidence in the Department.	• Very serious public outcry at State/National level (longer than 1 year). • Negative State/National media over a prolonged period (greater than 1 year). • Ministerial enquiry / Royal Commission. • Long-term loss of Government or central agency trust in the Department.

Risk Focus	**Insignificant** Can be managed with no change in operations or additional resources	**Minor** Can be managed with no change in operations, but may need resources and priorities to be reallocated	**Moderate** Changes in operations may be required, additional resources needed, and priorities reallocated	**Major** Changes in operations and additional resources may be greater than those available to the Group / Division	**Critical** Changes in operations impacts the wider Department, resources required may exceed the Department's resource capability
People, Culture and Wellbeing Risk event impacts the Department's people and culture or their mental well being	• Minor non-compliance with code of conduct. • Lack of consistency in some practices by staff across department.	• Complaints, passively upset, and uncooperative. • Some staff do not engage and collaborate vertically within a group. • Minimal staff turnover with minimal loss of skills, knowledge and expertise.	• Low morale, disengagement, increased absenteeism and workplace conflict. • Some staff are not engaged and there is only partial collaboration vertically within a group and horizontally across groups/divisions. • Minimal turnover of key staff with skills, knowledge and expertise.	• Major morale issues and high absenteeism. • Most staff are not engaged and there is no collaboration vertically within a group and horizontally across groups/ divisions. • Resignations of key staff with skills, knowledge and expertise. • Staff are not up skilled to meet Business Plan priorities and commitments.	• Department wide morale issues and mass absenteeism. • Staff are not engaged and there is no collaboration vertically within a group and horizontally across the Department. • Resignations of large numbers of key management level staff with skills, knowledge and expertise. • Staff are not up skilled to meet department corporate objectives and key strategic priorities.
Social Risk event reduces the community's: • Ability to function normally (social fabric, cultural values and heritage, resourcing). • Environmental values of interest (recreational facilities, local art gallery, events).	• Community disruption, reprioritisation or relocation of resources. Minor damage to objects of identified significance. • Minor delay to major community event. • Inconsequential damage to environmental values of interest.	• Community damage, requiring external resources to return to normal function. • Localised parts of the community affected. • Delay or reduced scope of major community event. • Minor damage to environmental values of interest.	• Isolated cases of displaced people. • The community requires significant external resources to return to normal function. • Widespread inconveniences to affected community. • Significant damage to environmental values of interest.	• Large numbers of people displaced. • Adverse coronial findings linking the department action to death or injury. • Significant loss/damage to objects of cultural significance, impacts emotional & psychological capacity in large parts of the community. • Temporary cancellation/ significant delay to major event. • Severe damage to environmental interests.	• Displacement of people beyond ability to cope. • Irreparable damage to whole community, impacts beyond social and psychological capacity and relying on external support. • Permanent cancellation of major event. • Permanent destruction of environmental interests.

Risk Focus	**Insignificant** Can be managed with no change in operations or additional resources	**Minor** Can be managed with no change in operations, but may need resources and priorities to be reallocated	**Moderate** Changes in operations may be required, additional resources needed, and priorities reallocated	**Major** Changes in operations and additional resources may be greater than those available to the Group / Division	**Critical** Changes in operations impacts the wider Department, resources required may exceed the Department's resource capability
Legal & Legislation Risk event results in legal consequences	• Non-compliance with legislation, identified internally and resulting in internal acknowledgement and process review. • Minor breach of internal policies and procedures with minimal management resources required. • Breach of contract with minimal management resources required. • Issue resolved internally with no further escalation.	• Internal investigation. • Prosecution or civil action involving exposure to minor compensation, and/or minor negative precedent. • Regulatory or contract breach requiring some management resources to address event over days.	• External investigation or report to responsible authority (of moderate level). • Prosecution or civil action, with one of moderate level of compensation or moderate level. • Regulatory or contract breach requiring some management resources to address event over several weeks.	• External investigation or report to responsible authority (of major level). • Public enquiry (i.e. Royal Commission/ Parliamentary Committee). • Prosecution or civil action with high-level compensation and high-level negative precedent. • Sanctions imposed by external regulator. • Regulatory or contract breach leading to financial penalties of 10-20% total Department revenue.	• Prosecution or civil action leading to imprisonment of an officer. • Public enquiry (i.e. Royal Commission/Parliamentary Committee). • Un-insured compensation payments. • Negative precedent requiring very serious impact and major reform to the Department. • Severe sanctions imposed by external regulator. • Major prosecution or litigation with potential financial penalties of greater than 20% total Department revenue.

Consequence scale current as at September 2018.

5.4.3. Determining Risk Rating

The risk is determined by 'multiplying' likelihood and consequence, as per Table 5.3. The recommended form of action, escalation and monitoring for each risk level is provided in Table 5.4. Chapter 6 presents the 'inherent' risk rating (pre-treatment) and 'residual' risk rating (with controls adopted) for each risk (unplanned events).

Table 5.3. Risk matrix

Consequence	Likelihood				
	Rare	Unlikely	Possible	Likely	Almost certain
5 – Critical	Medium	Significant	High	High	High
4 – Major	Medium	Medium	Significant	High	High
3 – Moderate	Low	Medium	Medium	Significant	High
2 – Minor	Low	Low	Medium	Medium	Significant
1 – Insignificant	Low	Low	Low	Medium	Medium

Table 5.4. Recommended actions and reporting requirements for each risk level

Rating level	Recommended action	Reporting requirements
High	Highest priority in research, planning, decision-making, allocation of resources, treating and monitoring. Immediate action required by the Executive Manager. Active Management response required.	The Governing Body (i.e., Steering Committee or Board) must review all high-rated risks. Consideration should be given by Programs/Projects for the inclusion of all high-rated risks in the Division's risk register.
Significant	High priority in planning, allocation of resources, treatment plans and monitoring. Action required by the Executive Manager. Regular monitoring response required.	The Governing Body (i.e., Steering Committee or Board) must review all significant-rated risks.
Medium	Existing controls, treatment plans and monitoring can be managed within existing operational routines. Action required by the relevant Executive Manager and the Manager of the risk. Periodic monitoring required.	The Project will review all medium-rated risks and determine appropriate treatment plans to lower the target risk rating.
Low	It is expected that the existing controls are effective with minor additional action required. Routine day-to-day management required by the Manager of the risk.	The Project will review all low-rated risks and determine appropriate controls and monitoring frequency.

5.5. Risk Evaluation

Table 5.5 outlines the appropriate management response and the activities required based upon the risk levels identified in Table 5.4.

Table 5.5. Appropriate management responses for each risk level

Appropriate management response	Activities required
HIGH Active Management	• A risk treatment plan(s) must be established and implemented. • These risks should be embedded in the CarbonNet Project Steering Committees. • The risk should be entered on Periscope. • A treatment can be entered on Periscope stating that the risk is being monitored. Progress reports should be entered on Periscope. • Risks should be reported to the DJPR Risk and Audit Committee.
SIGNIFICANT Regular Monitoring	• Existing good treatments should be maintained. • Additional risk treatments as required should be established and implemented. • These risks should be embedded in the CarbonNet Project Steering Committees. • The risk should be entered on Periscope. • A treatment can be entered on Periscope stating that the risk is being monitored. Progress reports should be entered on Periscope. • Risks should be reported to the DJPR Risk and Audit Committee.
MEDIUM Periodic Monitoring	• Risks should be monitored over a quarterly period to ascertain as to whether there are any incidents that could increase the severity of the risk. • A treatment plan should be generated in the project risk register. Once treatment plan actions are closed, risk is to be re-evaluated.
LOW No major concern	• Risks should be reviewed quarterly to ascertain whether the severity of the risk has changed.

The difference between environmental impact assessment (EIA) and environmental risk assessment (ERA) is that EIA is concerned with events that are reasonably certain to occur (such as planned discharges to the air or water), while ERA is concerned with events that may possibly occur (such as hydrocarbon spills, introductions of marine pests, loss of waste overboard).

For this activity, CarbonNet has determined that impacts and risks are defined as follows:

- **Impacts** result from activities that are an inherent part of the activity and will result in a change to the environment or a component of the environment, whether adverse or beneficial. For example, acoustic discharges from the VSP and disturbance to seabed sediments are impacts on the marine environment that cannot be avoided for the activity to achieve its aims.
- **Risks** result from activities where a change to the environment or component of the environment *may* occur as a result of an event associated with the activity (i.e., there may be impacts if the event actually occurs). Risk is a combination of the consequences of an event and the associated likelihood of the event occurring. For example, a hydrocarbon spill may occur if a vessel's fuel tank is punctured by a collision during the activity. The risk of this event is determined by assessing the consequence of the impact (using factors such

as the type and volume of fuel and the nature of the receiving environment) and the likelihood of this event happening (which may be determined qualitatively or quantitatively).

5.6. Risk Treatment

Each of the impacts and risks identified and evaluated in Chapter 6 have associated control measures. The manner in which ALARP and acceptability for each impact and risk is described in this section.

5.6.1. Demonstration of ALARP

All impacts and risks need some form of management. Factors to be considered when determining treatment options include:

- The cost of implementing risk treatment options against the potential benefits – this may take the form of a cost-benefit analysis.
- Legal, legislative compliance and social responsibility – these may override cost, especially with regard to occupational health and safety requirements.
- Availability and suitability of ways to eliminate or reduce the hazard – the availability of resources such as infrastructure, equipment and capability need to be considered in light of State policies, procedures, values and behaviours.

The ALARP Principle states that it must be possible to demonstrate that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The ALARP Principle arises from the fact that infinite time, effort and money could be spent attempting to reduce a risk or impact to zero.

There is no universally accepted guidance to applying the ALARP principle to environmental assessments. For this EP, the guidance provided in NOPSEMA's Environment Plan decision making guideline has been applied and augmented where deemed necessary.

The level of ALARP assessment is dependent upon the:

1. Residual impact and risk level (high versus low); and
2. The degree of uncertainty associated with the assessed impact or risk.

Impacts and risks are considered to be lower-order and ALARP when, using the CarbonNet risk matrix (see Table 5.3 and Table 5.4), the impact consequence is rated as 'insignificant' or 'minor' or risks are rated as 'low' or 'medium'. In these cases, applying 'good industry practice' is sufficient to manage the risk and ALARP does not need to be demonstrated.

When an impact consequence is rated as 'moderate', 'major' or 'critical', or when the risk is rated as 'significant' or 'high', ALARP must be demonstrated. Doing so must consider:

- Alternative controls – potentially more effective control measures are adopted as a replacement;
- Additional control measures – that add to the suite of control measures to reduce the environmental impact; and

- Improved control measures – evaluated for improvements they could bring to the effectiveness of the adopted control measures in terms of functionality, availability, reliability, survivability, independence and compatibility.

As none of the impacts for this activity are rated above 'insignificant' and none of the risks are rated above 'medium', a detailed demonstration of ALARP does not need to be addressed. As such, this process is not described here.

5.6.2. Demonstration of Acceptability

CarbonNet has considered a range of factors to demonstrate the acceptability of the environmental impacts and risks associated with this activity. This evaluation considers several factors, with the impacts or risks considered to be at an acceptable level if the following questions are answered affirmatively:

- Policy conformance – is the proposed management of the risk or impact aligned with the DJPR Environmental Policy?
- Management system conformance – is the proposed management of the risk or impact aligned with DJPR's environmental management system and associated procedures?
- Stakeholder engagement – have stakeholders raised any concerns about activity impacts or risks. For concerns of merit, are measures in place to avoid, mitigate for or manage these?
- Legislative context – is the impact or risk being managed in accordance with existing Australian or international laws or standards such as MARPOL, AMSA Marine Orders, etc?
- Industry practice – is the impact or risk being managed in line with industry best practice environmental management (BPEM), such as the Australian and international guidelines and codes of practice?
- Environmental context – is the impact or risk being managed pursuant to the nature of the receiving environment (e.g., sensitive or unique environmental features generally require more management measures to protect them than environments widely represented in a region)?
- Ecologically Sustainable Development (ESD) principles – does the impact or risk comply with the APPEA Principles of Conduct (APPEA, 2008), which includes that ESD principles be integrated into company decision-making?

6. Environmental Impact and Risk Assessment

This chapter presents the EIA and ERA for the environmental impacts and risks identified for the project using the methodology described in Chapter 5.

A summary of the residual impact and risk ratings for each impact and risk identified in this chapter is presented in Table 6.1.

Table 6.1. Summary of OAW environmental residual consequence and risk ratings

Known hazards (impacts)		Residual consequence
1	Seabed disturbance	Insignificant
2	Generation of underwater sound	Insignificant
3	Discharge of drill cuttings and muds	Insignificant
4	Discharge of cement	Insignificant
5	Atmospheric emissions	Insignificant
6	Light emissions (biological and social)	Insignificant
7	Discharge of sewage and grey water	Insignificant
8	Discharge of cooling and brine water	Insignificant
9	Discharge of putrescible waste	Insignificant
10	Discharge of bilge water and deck drainage	Insignificant
11	Water injection	Insignificant
Potential hazards (risks)		Residual risk
12	Accidental overboard disposal of waste – environmental	Low
	– social	Low
13	Introduction of IMS – environmental	Low
	– social	Low
14	Displacement of or interference with third-party vessels (*using financial consequence*) – displacement	Low
	– interference	Low
15	Damage to Bream-A subsea gas pipeline	Medium
16	Vessel strike with megafauna – individuals	Low
	– population	Low
17	Bulk chemical or drilling mud spills	Low
18	Diesel spill	Low
19	Loss of well containment	Low
Hydrocarbon spill response activities (risks)		Residual risk
20	Relief well drilling	Low

	Surveillance and tracking	Low
	Protection and deflection – nearshore habitat	Low
	– shoreline habitat	Low
	– fauna disturbance	Low
	Shoreline assessment and clean-up – shoreline habitat	Medium
	– recreational users	Medium
	– cultural heritage	Low
	Oiled wildlife response – fauna injury	Low
	– fauna death	Low

Table 6.2 presents a summary of the environmental hazards associated with the activity, the impacts and risks of these hazards, the impact and risk ratings and the environmental performance standards (EPS) required to manage the identified impacts and risks. An EPS is defined as a statement of the performance required of a control measure.

Table 6.2. Environmental impact and risk assessment for the OAW

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
Known hazards (impacts)			Residual consequence rating
Seabed disturbance from drilling activities.	Localised turbidity of the water column at the seabed, removal/ disturbance of seabed sediments.	• The results of the G&G investigations will be used to inform the MODU location and confirm the proposed OAW location is free from seabed obstacles. • Support vessel Masters use bathymetric mapping (obtained during the geophysical and geotechnical investigations) and Global Positioning System (GPS) to avoid mapped seabed obstacles and monitor vessel clearances to ensure there is clearance at all times between the vessel and the seabed. • The MODU will be pinned directly on location and will not undergo a soft-pinning exercise, thereby preventing the creation of scour channels in the seabed. • MODU-specific jack-up procedures are used to ensure compliance with stability criteria, reduce the risk of foundation shift or failure. • Large bulky items are securely fastened to or stored on the MODU deck and vessel decks to prevent loss to sea. • A crane handling and transfer procedure is in place and implemented by crane operators (and others, such as dogmen) to prevent dropped objects. • The crane operators are trained to be competent in the handling and transfer procedure to prevent dropped objects. • Visual inspection of lifting gear is undertaken by a qualified competent person (e.g., maritime officer) and lifting gear is tested regularly in line with the vessel planned maintenance system (PMS). • The ROV is deployed to search for (and retrieve, where possible), non-buoyant dropped objects so that there are no obstacles on the seabed at the completion of the activity. • Dropped objects left behind at the end of the activity (that cannot be retrieved) will be reported internally and to NOPSEMA.	Insignificant
Generation of underwater sound from support vessel movements, drilling and VSP	Temporary and localised physiological or pathological impacts to local populations of marine fauna, including plankton, fish,	• MODU and support vessel engines and thrusters are maintained in accordance with the manufacturer's instructions via the PMS to ensure they are operating efficiently. • The VSP contractor will used personnel trained and experienced in undertaking Marine Mammal Observation duties to implement EPBC Act Policy 2.1 Part A Standard Management Procedures (Section A.3) during VSP operations, which involves the following:	Insignificant

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
	cetaceans, pinnipeds, avifauna, benthic invertebrates and turtles.	A.3.1-3.2: Start-up procedures: • Pre-start visual observations - for 30 minutes out to 3 km. • Soft start, increasing power over a 30 minute period, with visual observations out to 3 km. Delay start up procedures/power down any operating acoustic source if whales are observed within 3 km of the source and shut down if they approach within 500 m (the 'shut down zone'). Resume soft start procedures once the whale has been observed to move outside the 'low power zone' (2 km). A3.3: Start-up delay procedures • If during the soft start procedure a whale is observed to enter the 'low power zone' (within 2 km of the source), the acoustic source will be reduced to minimum power. • If a whale is observed within the shutdown zone of the source, the power source will be shut down. Soft-start procedures will only resume after the whale has been observed to exit the low power zone or if the whale has not been sighted for 30 minutes. A.3.4-3.5: Operations procedure • If a whale is sighted within or about to enter the low power zone (2 km), the acoustic source will be reduced to minimum power. • If a whale is observed within or about to enter the shutdown zone (500 m), the acoustic source will be shut down. Soft-start procedures will only resume after the whale has been observed to move outside the low power zone or if the whale has not been sighted for 30 minutes. A.3.6: Night-time and low visibility procedure • Wherever practicable, commence operations during daylight hours. Where due to operational requirements, operations must commence during night time or low visibility conditions, the soft start procedure outlined previously will be implemented providing that during the previous 24-hour period: ○ There have not been 3 or more whale instigated power-down or shut-down situations. ○ 2 hours of continual observations were undertaken in good visibility (to the extent of the 3 km observation zone) and no whales were sighted. • Operations may proceed if there have not been 3 or more whale instigated power downs or shut-downs during the preceding 24 hr period.	
Discharge of drill cuttings	Localised increased turbidity of the water	• Only PLONOR, 'D'/'E' (non-CHARM) or 'Gold'/'Silver' (CHARM) OCNS-rated base fluids and	Insignificant

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
and muds	column, smothering of benthic habitat and fauna, alteration of benthic substrate, potential toxicity impacts to fauna and reduction of visual amenity from turbidity plumes.	additives are used in the drilling fluid system to minimise ecotoxicity impacts to marine fauna. • Where for technical reasons an additive is required that has not been registered with CEFAS (and therefore does not have a rating), AGR will apply the CHARM, or in the case of non-CHARMable products, the OCNS process to calculate the CHARM rating or OCNS grouping. Only additives with a hazard quotient of <30 (silver/gold ranking) or an OCNS grouping of D/E will be used. • In accordance with the Fluid Program, the shaker screens and hydro-cyclone are used during drilling the 12.5" and 8.5" well sections to maximise fluid separation from cuttings prior to overboard disposal. • Operation of the separation treatment system is monitored on a full-time basis by the Derrickman/Shaker Hand to ensure efficient system performance. • Drilling fluid testing is performed by the Mud Engineer working under the supervision of the Drilling Supervisor at least twice per day. • A minimum 4-hour duration of mud discharge will be enforced at the completion of drilling.	(for water column, seabed habitats and visual amenity)
Discharge of cement	Localised and temporary increased turbidity of the water column, smothering of benthic habitat and fauna, alteration of benthic substrate, potential toxicity impacts to fauna and reduction of visual amenity from turbidity plumes.	• The cement engineer ensures that only PLONOR, 'D'/'E' (non-CHARM) or 'Gold'/'Silver' (CHARM) OCNS-rated cement additives are used to minimise ecotoxicity impacts to marine fauna. • Where for technical reasons an additive is required that has not been registered with CEFAS (and therefore does not have a rating), AGR will apply the CHARM, or in the case of non-CHARMable products, the OCNS process to calculate the CHARM rating or OCNS grouping. Only additives with a hazard quotient of <30 (silver/gold ranking) or an OCNS grouping of D/E will be used. • Once good cement returns are noted at the seabed by the ROV Technician, the mixing and pumping of cement will cease, and displacement of the string with drilling fluid will begin. • Bulk cement remaining onboard the MODU at the completion of drilling will be disposed of by either transferring dry Class-G cement to next operator, minimising the inventory of CO_2-resistant cement on board, or if that is not possible, then using leftover CO_2-resistant cement slurry in well plugs (which would otherwise use Class-G cement).	Insignificant
Atmospheric emissions from the MODU and vessels	Decrease in air quality due to gaseous emissions and particulates from diesel combustion and	• Only low-sulphur (<3.5% m/m) MDO will be used in order to minimise SOx emissions (or <0.5% m/m if the activity takes place after 1st January 2020). • All combustion equipment is maintained in accordance with the PMS (or equivalent). • Vessels with gross tonnage >400 tonnes possess equipment, systems, fittings,	Insignificant

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
	contribution to the incremental build-up of GHG in the atmosphere (influencing climate change).	arrangements and materials that comply with the applicable requirements of MARPOL Annex VI. • Vessels >400 gross tonnes and involved in an international voyage implement their Ship Energy Efficiency Management Plan (SEEMP) to monitor and reduce air emissions. • Vessels >400 gross tonnes must ensure that firefighting and refrigeration systems are managed to minimise Ozone Depleting Substances (ODS). • Only a MARPOL VI-approved incinerator is used to incinerate solid combustible waste (food waste, paper, cardboard, rags, plastics). • On support vessels, incineration is only conducted when they are in Commonwealth waters (>3 nm from the shore). • Oil and other noxious liquid substances will not be incinerated. • The heating, ventilation and air conditioning (HVAC) system is maintained in accordance with the PMS (or equivalent). • Fuel use will be measured, recorded and reported for abnormal consumption, and in the event of abnormal fuel use, corrective action is taken to minimise air pollution.	
Light glow from the MODU and support vessels	Attractant to fauna, temporary and localised increase in predation rates on fauna attracted to lights. Temporary reduction in visual amenity for residents in and visitors to Golden Beach and Paradise Beach.	• Light glow is minimised by managing external vessel lighting in accordance with: ○ AMSA Marine Orders Part 30 (Prevention of Collisions). ○ AMSA Marine Orders Part 59 (Offshore Support Vessel Operations).	Insignificant

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
Discharge of treated sewage and grey water from MODU and support vessels	Temporary and localised increase in the nutrient content of surface waters around the discharge points.	• Sewage and grey water are treated in a MARPOL-compliant sewage treatment plant (STP) prior to overboard discharge. • The STP is maintained in accordance with the vessel's PMS. • In accordance with Regulation 11 of MARPOL Annex IV, as defined by Marine Order 96, sewage is comminuted, disinfected and discharged when the vessel is >3 nm from nearest land and sewage originating in holding tanks is discharged at a moderate rate while the vessel is proceeding en route at a speed not less than 4 knots. • In accordance with Regulation 11 of MARPOL Annex IV, as enacted by AMSA Marine Orders Part 96, untreated sewage and grey water is only discharged when the vessel is greater than 12 nm from shore (e.g., in the event of STP malfunction).	Insignificant
Discharge of cooling and brine water from MODU and support vessels	Temporary and localised elevation in sea surface water temperature and salinity levels and potential toxicity impacts to marine fauna from ingestion of residual biocide and scale inhibitors.	• Engines and associated equipment that require cooling by water will be maintained in accordance with the MODU and vessel PMS' so that they are operating within accepted parameters. • Only 'D'/'E' (non-CHARM) or 'Gold'/'Silver' (CHARM) OCNS-rated chemicals are used in the cooling and brine water systems. • The Electrolytic Marine Growth Protection System is maintained in accordance with the MODU's PMS to ensure it is operating efficiently (without the use of chemicals).	Insignificant
Discharge of putrescible waste from MODU and support vessels	Temporary and localised increase in nutrient content of surface and near-surface water quality (up to 100 m horizontally and 10 m vertically from the discharge point). Temporary increase in scavenging behaviour of pelagic fish and seabirds.	• Putrescible waste discharges will comply with MARPOL Annex V requirements: ○ A Garbage Management Plan is in place for the MODU (and for vessels >100 gross tonnes or certified to carry 15 persons or more) that sets out the procedures for minimising, collecting, storing, processing and discharging garbage. ○ A MARPOL Annex V-compliant macerator is on board the MODU and support vessels, functional, in use and set to macerate to <25 mm prior to discharge. ○ Macerated putrescible waste will only be discharged in Commonwealth waters (>3 nm from shore). ○ In the event of macerator malfunction, un-macerated putrescible waste will be discharged when >12 nm from shore. ○ For support vessels without a macerator and for non-putrescible galley waste, waste is returned to shore for disposal.	Insignificant

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
Discharge of bilge water and deck drainage from MODU and support vessels	Temporary and localised reduction in surface water quality around discharge point and acute toxicity to marine fauna through ingestion of contaminated water in a localised mixing zone	• For the MODU and support vessels greater than 400 gross tonnes, all bilge water passes through a MARPOL-compliant oily water separator (OWS) set to limit oil-in-water (OIW) to <15 ppm prior to overboard discharge. • The OWS is maintained in accordance with the PMS. • The OWS is calibrated in accordance with the PMS to ensure the 15 ppm OIW limit is met. • The residual oil from the OWS is pumped to tanks and disposed of onshore. • Deck cleaning detergents are biodegradable. • Hydrocarbon and chemical storage areas (process areas) are bunded and drain to the bilge tank (or equivalent). • Portable bunds and/or drip trays are used to collect spills or leaks from equipment that is not contained within a permanently bunded area (non-process areas). • The vessel crews are competent in spill response and have appropriate response resources in order to prevent or minimise hydrocarbon or chemical spills discharging overboard. • Fully stocked SMPEP response kits and scupper plugs or equivalent drainage control measures are readily available to the deck crews and used in the event of a spill to deck to prevent or minimise discharge overboard. • The vessel-specific SMPEP is implemented in the event of a large spill of hydrocarbons or chemicals overboard.	Insignificant		
Water injection	Contamination of the reservoir.	• Injected water is appropriately treated with biocides to avoid microbiological contamination of the reservoir. • The injected water will be filtered to avoid 'clogging' up the reservoir.	Insignificant		
Potential hazards (risks)			Residual risk assessment		
			C	L	RR
Accidental overboard release of hazardous and/or non-hazardous waste from MODU or	Marine pollution (litter and a temporary and localised reduction in water quality). Injury and entanglement of individual animals	• A MARPOL Annex V-compliant Garbage Management Plan (GMP) is in place for the MODU (and for support vessels >100 gross tonnes or certified to carry 15 persons or more) that sets out the procedures for minimising, collecting, storing, processing and discharging garbage. • Waste is stored, handled and disposed of in accordance with the GMP. This will include measures such as: ○ No discharge of general operational or maintenance wastes or plastics or plastic	*Envtl* Insignif-icant *Social* Insignif-	Rare Rare	Low Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
support vessels	(such as seabirds and seals) and smothering or pollution of benthic habitats.	products of any kind. ○ Waste containers are covered with secure lids to prevent solid wastes from blowing overboard. ○ All solid wastes are stored in designated areas before being sent ashore for recycling, disposal or treatment. ○ Any liquid waste storage on deck must have at least one barrier to minimise the risk of spills to deck entering the ocean. This can include containment lips on deck (primary bunding) and/or secondary containment measures (bunding, containment pallet, transport packs, absorbent pad barriers) in place. ○ Correct segregation of solid and hazardous wastes. • Vessel crews and visitors are inducted into the GMP at the start of the activity to ensure they understand how to implement the GMP. • Solid waste that is accidentally discharged overboard is recovered if reasonably practicable. • A chemical locker is available, bunded and used for the storage of all greases and non-bulk chemicals (i.e., those not in tote tanks) so as to prevent discharge overboard.	icant		
Introduction of invasive marine species from the support vessel ballast water or MODU and support vessel hulls	Reduction in native marine species diversity and abundance. Displacement of native marine species. Socio-economic impacts on commercial fisheries. Reduction of conservation values of protected areas.	• A vessel contractor pre-qualification is undertaken to ensure vessel biofouling and ballast water controls meet these EP requirements. <u>Biofouling</u> • The MODU and support vessels are managed in accordance with the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry. This means: ○ Conducting in-water inspection by divers or inspection in drydock if deemed necessary. ○ Biofouling risk will be assessed, with cleaning of hull and internal seawater systems undertaken if deemed necessary. ○ Anti-fouling coating status taken into account, with antifouling renewal undertaken if deemed necessary. • The MODU and any support vessel >400 gross tonnes carries a current International Anti-fouling System (IAFS) Certificates and is complaint with and Marine Order Part 98 (Anti-fouling Systems). • For the MODU and support vessels (and heavy lift vessel or tow vessels, if it/they enter the activity area), an IMS evaluation takes place prior to the MODU mobilising to site based on	*Envt* Moderate *Social* Moderate	Rare Rare	Low Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
		the following: ○ Inspecting the IAFS certificates to ensure they are current. ○ Inspecting recent MODU/vessel inspection/audit reports to ensure that the risk of IMS introduction is low. ○ Determining recent ports of call to determine the IMS risk of those ports. ○ Determining the need for in-water cleaning and/or re-application of anti-fouling paint if neither has been done recently in line with the Anti-fouling and in-water cleaning guidelines (DoA/DoE, 2015). ○ Implementing the biofouling guidance provided in Part 5 of the Offshore Installations Biosecurity Guideline (v1.3, DAWR, Feb 2019). • Submersible equipment will be cleaned (e.g., fouling is removed) prior to initial use in the activity area. <u>Ballast water</u> • Support vessels will fulfil the requirements of the Australian Ballast Water Management Requirements (DAWR, 2017, v7). This includes requirements to: ○ Carry a valid Ballast Water Management Plan. ○ Submit a Ballast Water Report (BWR) through the Maritime Arrivals Reporting System (MARS). ○ Hold a Ballast Water Management Certificate. ○ Ensure all ballast water exchange operations are recorded in a Ballast Water Record System. • Non-compliant discharges of domestic ballast water will be reported to the DAWR immediately.			
Displacement of or interference with third-party vessels and activities	Collision between MODU and third-party vessels. Localised diversion from navigation paths. Vessel damage. Damage to or loss of fishing equipment and	• CarbonNet has undertaken thorough consultation with fishing stakeholders to ensure that commercial fishers are aware of the activity operations, timing and PSZ. • The AHO will be notified of the activity no less than four weeks prior to the activity commencing to enable the promulgation of Notice to Mariners and AusCoast navigational warnings. • The MODU and support vessels are readily identifiable to third-party vessels. • The temporary PSZ is gazetted through NOPSEMA, effective from the MODU's arrival on location.	*Displace* Insignif-icant *Interfere* Moderate	Rare Rare	Low Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
	loss of commercial fish catches.	• Visual and radar watch is maintained on the bridge of the support vessels at all times. • The Vessel Master and deck officers have a valid SCTW certificate in accordance with AMSA Marine Order 70 (seafarer certification) (or equivalent) to operate radio equipment to warn of potential third-party spatial conflicts. • Constant communications between the MODU and support vessels are maintained to ensure the vessels are patrolling the PSZ at all times. • The Vessel Masters issue warnings (e.g., radio warning, flares, lights/horns) to third-party vessels approaching the safety exclusion zone in order to prevent a collision with the vessel/s or equipment. • One of the support vessels will remain with the MODU at all times and will intercept approaching vessels that have not heeded radio advice about the presence of the MODU. • CarbonNet will apply to NOPSEMA and obtain permission for the MODU and support vessels to enter and work within the Bass Strait ATBA. • The Vessel Master will sound the general alarm, manoeuvre the vessel to minimise the effects of the collision and implement all other measures as outlined in the vessel or structure collision procedure (or equivalent). • Vessel collisions will be reported to AMSA if that collision has or is likely to affect the safety, operation or seaworthiness of the vessel or involves serious injury to personnel. • In the event the well is P&A, the wellhead will be cut and pulled back to surface and the depth of the cut will be measured. • Within one week of drilling completion, the location of the conductor protuberance will be provided to commercial fisheries stakeholders via direct communications from CarbonNet. • Within one week of drilling completion, the location of the conductor protuberance will be provided to the AHO so that navigation charts can be updated. • Once drilling is complete, a protective structure will be installed over the conductor and debris casing to minimise the potential for snagging with trawl gear. • CarbonNet will use SETFIA's SMS service to notify fishers about the drilling activity at least 2 weeks prior to drilling.			

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
Damage to the Bream-A subsea pipeline (from soft pinning of the MODU across the pipeline, insufficient vessel freeboard or VSP pulses)	Loss of pipeline integrity and disruption to commercial petroleum production.	• CarbonNet has undertaken thorough consultation with EARPL to understand the implications of simultaneous operations (SIMOPs). • CarbonNet and EARPL will undertake continued SIMOPs communications prior to the activity commencing to ensure that all hazards to both parties are understood and communicated between the parties. • CarbonNet will advise EARPL of the activity commencement dates and maintain ongoing communications during the activity. • The geophysical investigations will be undertaken prior to deciding the final location of the OAW to ensure that the MODU is located a minimum of 500 m away from the pipeline. • CarbonNet will ensure that the MODU contractor (and therefore the tow vessel contractor) has the coordinates of the Bream-A pipeline (obtained from the geophysical investigation) marked in the MODU's navigation displays to ensure that MODU is not pinned to location within 500 m of the pipeline. • The Barracouta pipeline will be included on support vessel and MODU navigation equipment so that any emergency support vessel anchoring activities avoid the pipeline. • A pipeline exclusion zone of 500 m will be entered into the MODU and support vessels' navigation systems in order to prevent anchor contact with, and therefore potential damage to the Bream-A pipelines. • Support vessels will be instructed to avoid incursion into the pipeline exclusion zone. <u>Incident response</u> • CarbonNet will report damage to the pipeline to EARPL as soon as possible after becoming aware of the incident. • CarbonNet will report damage to NOPSEMA within 2 hours of becoming aware of the incident.	*Damage* Critical *Product loss* Critical	Rare Rare	Med Med

Support vessel strike with megafauna (e.g., whales, dolphins, seals)	Injury or death of individual animals.	• Support vessel crews will implement *The Australian National Guidelines for Whale and Dolphin Watching* (DoEE, 2017), which means:
		  ○ Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at speeds <6 knots within this zone.
		  ○ No approach zone (100 m either side of whales and 50 m either side of dolphins) – vessels must operate at speeds <6 knots within this zone and should not enter this zone and should not wait in front of the direction of travel or an animal or pod/group.
			Individual
			Insignif-icant
			
			Population
			Minor
				Unlik ely
				
				Rare
					Low
					
					Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
		○ Do not encourage bow riding. ○ If animals are bow riding, do not change course or speed suddenly. ○ If there is a need to stop, reduce speed gradually. • Support vessel crew will complete an environmental induction covering the above-listed requirements. <u>Incident response</u> • Vessel strike causing injury to or death of a cetacean is reported via the online National Ship Strike Database within 72 hours of the incident. • Injury to megafauna serious enough to require intervention/rescue is reported to the Whale and Dolphin Emergency Hotline on 1300 136 017 as soon as possible. No attempts to assist/rescue megafauna should be made by vessel crew.			
Accidental bulk discharge of drilling fluids, chemical or hydrocarbons from MODU or support vessels	Temporary and localised reduction of water quality. Acute toxicity to marine fauna through ingestion or absorption.	• AGR's pre-acceptance inspection of the MODU confirms that storage tanks, equipment, bunding and machinery spaces are free of defects. • All hydrocarbons and chemicals are stored in secure receptacles within bunded areas or dedicated chemical lockers that drain to bilge tanks. • Where hydrocarbons and chemicals are stored within open draining decks, receptacles are stored on/in temporary bunds. • The mud dump valve/s are locked, with the keys remaining secure in a key locker. A PTW will be required to unlock the dump valve/s, which involves an assessment by the Offshore Installation Manager (OIM) regarding the need for a specific operation. • Planned maintenance is undertaken to the PMS schedule. • The MODU OIM ensures that crew undertake spill response training every three months in accordance with the SMPEP and training matrix. • In accordance with the SMPEP, oil spill response kits are available in relevant locations around the MODU, are fully stocked and are used in the event of hydrocarbon or chemical spills to deck. <u>Reporting</u> • The MODU OIM will report a bulk spill to the AGR Drilling Supervisor and lead the onboard response in line with the SMPEP. • The Oil Spill Response Team (OSRT) Incident Controller will report to AMSA and NOPSEMA	Minor	Rare	Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
		within 2 hours of CarbonNet becoming aware of the spill.			

Diesel spill, from a collision of the support vessel with the MODU, with another support vessel or with a third-party vessel, or a MODU refuelling incident	Temporary and localised reduction in water quality.
	Tainting of commercial fisheries species.
	Injury and death of species such as seabirds and turtles exposed to the MDO.
	Habitat damage where the spill reaches the shorelines.
		• No support vessel refuelling will be undertaken at sea (this will be done in port).
		• The MODU Bunkering Procedure will be implemented in order to prevent an MDO spill. This will include (but is not limited to):
		  ○ A Job Safety Analysis (JSA) and Permit to Work (PTW) is signed off for each bunkering event, taking into account spill response considerations.
		  ○ Ensuring that the dry-break refuelling hose couplings assembly is in order to minimise the risk of a spill and hose floats are installed on the refuelling hose so that a hose leak is quickly and easily visible
		  ○ Ensuring that communications (visual and/or audio) between the MODU and the vessel are tested by the MODU Chief Mate and Vessel Master prior to bunkering commencing.
		  ○ Ensuring that fuel transfer hoses are replaced in accordance with the PMS or when they are visibly degraded.
		  ○ The bunkering operation is supervised at all times.
		  ○ Ensuring that bunkering only commences during daylight hours and in calm sea conditions.
		  ○ Ensuring that tank level indicators and level alarms are provided in the control room for the bunkering tanks.
		• The MODU and vessels have approved SMPEPs (or equivalent appropriate to class) that is implemented in the event of a large MDO spill.
		• MODU and support vessel crews are trained in spill response techniques in accordance with their SMPEP.
		• In accordance with the SMPEP, oil spill response kits are available in relevant locations around the MODU, are fully stocked and are used in the event of hydrocarbon or chemical spills to deck.
		• Within 4 weeks of the MODU and support vessels mobilising to site, a desktop oil spill response exercise will be conducted to test interfaces between the SMPEPs, OPEP, NatPlan and VicPlan.
			Minor	Rare	Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
		Reporting • CarbonNet will report a spill to regulatory authorities within 2 hours of becoming aware of the spill. Response • The Vessel Master will authorise actions in accordance with the vessel-specific SMPEP (or equivalent according to class) and the activity-specific Oil Pollution Emergency Plan (OPEP) to limit the release of diesel. • CarbonNet will undertake operational and scientific monitoring in accordance with the Operational and Scientific Monitoring Program (OSMP).			
Loss of well containment (small volume of dry gas only)	Release of methane to atmosphere and oxygen depletion in water column.	Preparedness • The results of the Pelican 3DMSS and the G&G investigations are be used to confirm the OAW location is free from gas hazards. • An independent survey ensures the BOP is compliant with API Standard 53 (Blowout Prevention Equipment Systems for Drilling Wells). • The AGR Drilling Supervisor accepts the IAT Part 2 as complete prior to use of the BOP. • The following plans are implemented in order to minimise the possibility of a well blowout: AGR Drilling Program, WOMP (NOPSEMA-accepted), Safety Case and/or Safety Case revision (NOPSEMA accepted), Well control bridging document between the MODU contractor and AGR, Drilling fluid program, Cement program, P&A and suspension program and BOP testing procedure. • The BOP is installed with the riser and is not removed until the well is plugged in order to prevent a well blowout. • The BOP is pressure tested prior to deployment, upon initial latch-up with the wellhead and every 21 days thereafter. The BOP is function tested every 7 days. • The well casing is pressure tested after installation prior to drilling ahead. • The driller continuously monitors mud flow parameters (pressure, pump rate, return liquid volumes, alarms, etc) to ensure that the primary well control barrier (the mud system) is operating as designed. • Cement testing (for strength, etc) will take place in accordance with the Cement Program prior to downhole use to ensure it will cure properly and isolate the well from formations.	Insignif-icant	Rare	Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
		• All senior offshore personnel are trained and qualified to IWCF/IADC WellCap well control standards and AGR Well Standards so that well control emergencies are efficiently and properly managed. • The Drilling Supervisor monitors and ensures that two barriers are maintained at all times after installation of the BOP. • The Drilling Superintendent will run at least one (frequency determined by the ERP) well control exercise (e.g., BOP drill) during the drilling campaign in accordance with the Drilling Program. • A desktop emergency response exercise is undertaken within 4 weeks prior to drilling commencing. <u>Response</u> • The Relief Well Plan will be implemented to stop the loss of well containment. <u>Reporting</u> • AGR will report the incident to CarbonNet as soon as possible after becoming aware of the incident. • CarbonNet will report the incident to regulatory authorities within 2 hours of becoming aware of the loss of well containment.			
Hydrocarbon spill response activities (risks)					
Relief well drilling	Impacts and risks as previously outlined	• Relief well drilling preparedness measures are in place. • The relief well is drilled in accordance with the relief well plan. • Relevant stakeholders (such as nearby titleholders and government maritime agencies) will be consulted on the exact location of the relief well prior to drilling it to ensure their current or planned operations are not compromised.	Insignif-icant	Rare	Low
Diesel spill response activities	<u>Spill surveillance and tracking</u> – disturbance to marine and coastal fauna from increased vessel and aerial activity.	<u>Preparedness</u> • Access to operational response capabilities is maintained through the Maritime Emergencies NSR Plan. • DJPR undertakes regular desktop drills to test response capability. • DJPR ensures that regular inspection and testing is undertaken for its oil spill response equipment. • An oil spill-tracking buoy is available and maintained in operational condition on each of the	Insignif-icant	Poss-ible	Low
	<u>Protection and deflection booming</u> –		Insignif-icant	Poss-ible	Low

Hazard	Potential impacts & risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
	disturbance to marine and coastal fauna and habitats and to coastal Aboriginal heritage.	support vessels. Response • An Incident Action Plan (IAP) is prepared by the IMT Planning Officer within the first 24 hours after the spill starts, which is used to guide response activities. • Visual observations from aircraft are initiated within 12 hours of request (subject to daylight hours). • Surveillance aircraft will ensure buffer distances of 500 m (helicopters) and 300 m (fixed wing) are maintained around cetaceans in accordance with EPBC Regulations 2000 (Part 8). • An operational NEBA is prepared to determine the net benefits of each response strategy. • Personnel and equipment resources are deployed to site to undertake responses activities within timeframes outlined in the IAP.			
	Shoreline assessment and clean-up – disturbance to coastal fauna and habitats, Aboriginal cultural heritage, temporary exclusion of the public from beaches, secondary contamination.		*Shoreline habitat* Minor	Poss-ible	Med
			Recr. users Minor	Likely	Med
			Cultural heritage Minor	Unlik ely	Low
	Oiled wildlife response – distress, injury or death of fauna through inappropriate		Insignif-icant	Rare	Low

7. Implementation Strategy

The Crown in right of Victoria retains full and ultimate responsibility as the Titleholder of the activity and is responsible for ensuring that the environmental performance outcomes and standards outlined throughout Chapter 6 are adequately implemented.

AGR is responsible to CarbonNet who has overall responsibility for the management of the activity to ensure that design and execution of the activities is in accordance with industry best practice and legislated standards, that contractors have appropriate equipment to undertake the activity and that the day-to-day direction of work and the monitoring and auditing of work by contractors is undertaken in accordance with the accepted EP.

The MODU and vessel contractors will have the day-to-day control and management of their vessels through the OIM and respective Vessel Masters. They have over-riding authority and responsibility to make decisions with respect to environment protection and pollution prevention and to request assistance as may be necessary.

As the Titleholder, the Crown in right of Victoria (via CarbonNet) has entered into an agreement with AGR to use its Integrated Management System (IMS) (i.e., health, safety and environment) and support (resource) services and incident management capabilities associated with this activity.

7.1. Environmental Management Systems

7.1.1. DJPR

The DJPR has in place an Environmental Management System (EMS) that is aligned with ISO 14001:2004 (Environmental Management Systems – requirements with guidance for use). The EMS is outlined in the department's EMS Manual (Version 1, July 2015).

The EMS is a program for identifying, managing and reducing the department's impact on the environment, based on the principle of continual improvement and the 'plan-do-check-act' cycle in line with ISO14001. The EMS is subject to biennial audits.

7.1.2. AGR

AGR's management system is accredited with ISO 9001:2015 and ISO 14001:2015, and governs all of the group business as documented in the AGR Management System Manual.

AGR uses a standardised management system process to ensure that project activities are planned and managed efficiently and with due consideration to good oilfield practice, local and international standards as they relate to well design, operations planning, construction and then subsequent suspension or abandonment operations. This process is known as the Well Delivery Process (WDP). The AGR WDP is a central component of the AGR Management System and is being used by CarbonNet for this activity.

7.2. Training and Awareness

7.2.1. Recruitment and Training

During its contractor selection process, AGR will conduct a due diligence review to ensure that the chosen contractors have procedures in place to ensure the correct selection, placement, training and ongoing assessment of employees, with position descriptions (including a description of HSE responsibilities) for key personnel being readily available.

7.2.2. Environmental Induction

An activity-specific HSE induction for all personnel working on the activity will be undertaken prior its commencement. This is likely to take place during a pre-spud meeting, with additional inductions undertaken on the MODU and support vessels to take account of any crew change-outs.

7.2.3. Oil Spill Response Training

Quarterly training of MODU and vessel crews in SMPEP procedures is a MARPOL requirement for vessels over 400 GRT.

During its contractor audit process, AGR will assess the MODU and support vessel contractors' implementation of their SMPEPs (or equivalent, relevant to class).

An office-based desktop spill response exercise of the activity-specific OPEP will be conducted by AGR, with the involvement of CarbonNet, DJPR EMB, MODU and support vessel contractors within four weeks of the activity commencing.

7.2.4. Toolbox Talks and HSE Meetings

Environmental matters will be included in daily toolbox talks as required by the specific task being risk assessed (e.g., waste management), in daily operations meetings and weekly HSE meetings.

7.2.5. Communications

The MODU contractor, support vessel Masters and AGR Drilling Supervisor are jointly responsible for keeping their personnel informed about HSE issues, acting as a focal point for personnel to raise issues and concerns, and consulting and involving all personnel in the following:

- Issues associated with the implementation of the EP;
- Any proposed changes to equipment, systems, or methods of operation of equipment, where these may have HSE implications; and
- Any proposals for the continuous improvement of environmental protection, including the setting of environmental objectives and training schemes.

7.3. Environmental Emergencies and Preparedness

In the event of an emergency of any type, the MODU OIM and support vessel Master/s will assume overall on-site command and act as the Emergency Response Coordinator (ERC). All persons aboard the MODU and support vessels will be required to act under the ERC's directions. The AGR Drilling Supervisor will maintain communications with DJPR EMB in the event of an emergency involving an oil spill. Oil spill emergency response support will be provided by DJPR EMB. Overall

emergency management will be via AGR's Drilling Incident Management Team based in CarbonNet's office during program execution.

7.3.1. Adverse Weather Protocols

It is the duty of the MODU OIM and the support vessel master to act as the focal point for all actions and communications with regards to any emergency, including response to adverse weather or sea state, to safeguard his vessel, all personnel onboard and environment.

7.3.2. MODU and Support Vessel Emergencies and Oil Spills

Activity-specific emergency response procedures will be included in the MODU and support vessel contractors' ERPs. The ERPs will contain instructions for MODU and support vessel emergency, medical emergency, search and rescue, reportable incidents, incident notification and emergency contact information.

Prior to the conduct of the activity, Part 7 of the Emergency Management Manual Victoria (EMMV) and AMSA's NatPlan (2017) will be reviewed with the MODU and support vessel contractors to ensure that appropriate emergency procedures considered in those plans have been put into place for all relevant environmental emergency events (including the assignment of emergency management roles for particular events).

SMPEPs and ERPs typically include MODU- and vessel-specific procedures for the following:

- Fire and explosion;
- Incidents – collision, grounding, hull damage, man overboard, equipment failure;
- Helicopter crash;
- Waste management;
- Hazardous materials and handling; and
- Hydrocarbon and chemical spills.

The MODU OIM and support vessel Masters will ensure that their crews are fully aware of their requirements and that exercises for MODU or vessel-related incidents are conducted.

7.3.3. Emergency Response Training

Activity-specific training

The readiness and competency of DJPR EMB, CarbonNet, AGR, the MODU contractor and support vessel contractors to respond to incidents and emergencies will be tested by conducting a desktop emergency response exercise within four weeks of the MODU's arrival on location.

A scenario will be chosen that combines an emergency with risk to human life (such as fire) and risk to the environment (large hydrocarbon spill). This way several plans (i.e., the ERP and OPEP) can be tested simultaneously.

This exercise has the objectives of:

- Developing and testing the response arrangements as outlined in the emergency response procedures;

- Ensuring the skills and teamwork of the Emergency Response and Command Teams to respond to major emergency events are up-to-date. In particular, ensuring individual roles, responsibilities and reporting requirements are understood;
- Testing interfaces between all key parties involved in emergency response (DJPR EMB, CarbonNet, AGR, MODU and support vessel contractors); and
- Ensuring the correct communications are known and used and that contact details (e.g., phone numbers) are correct.

Any learnings, findings or recommendations identified as part of the testing exercise will be addressed and incorporated into the relevant emergency response plans and procedures to ensure they remain effective.

MODU-specific training

The MODU OIM is responsible for ensuring that personnel fulfilling emergency response roles are competent in crisis and emergency procedures related to the protection of health, safety, environment and integrity. The level of training and associated competency demonstration is dependent on individual roles in a crisis or emergency situation.

The MODU OIM is also responsible for ensuring relevant personnel undertake oil spill preparedness and response training in line with the MODU's personnel training and qualifications matrix. This includes identification and development of approved competency and non-competency based courses, and ensuring training is undertaken to schedule and records are maintained.

7.4. Oil Spill Preparedness and Response

Project-specific oil spill preparedness and response plans have been prepared, as outlined herein.

7.4.1. OPEP

The OPEP outlines details the oil spill response arrangements to be undertaken in the event of a Level 2 or 3 MDO spill associated with the activity. It outlines the reporting arrangements and response structure, and essentially bridges to the Victorian Government's State Maritime Emergencies (non-search and rescue) Plan (EMV, 2016).

The responses outlined in the OPEP are:

- Source control – the responsible Vessel Master will ensure that the impacted fuel tank/s are managed so as to minimise the volume of MDO lost to sea (as per the SMPEP).
- Surveillance and tracking – vessel-based and aerial monitoring will be undertaken to determine the trajectory of the spill in order to ascertain receptors that may be at risk.
- Protection and deflection – relates to booming estuaries that may be open in order to protect their values.
- Shoreline assessment and clean-up – involves undertaking a survey of shoreline impacts and allocating resources to clean up stranded diesel oil, where possible.

- Oiled wildlife response – the DELWP is the agency responsible for responding to oiled wildlife. CarbonNet would work with DELWP to provide resources as necessary.
- Decontamination and waste management – this process involves responsibly decontaminating oiled equipment used in the spill response, and disposing of waste to suitable facilities.

7.4.2. SMPEP

The MODU and vessels will have in place a SMPEP (or equivalent, according to class). This document is required under MARPOL Annex 1, Regulation 37. This plan outlines reporting procedures and the steps that should be undertaken to control the discharge. This document does not outline on-water or shoreline oil spill response actions; the OPEP fills this void.

7.4.3. OSMP

An Operational and Scientific Monitoring Program (OSMP) has been prepared for the activity, which is designed to provide a framework for operational and scientific monitoring in the event of a Level 2 or 3 hydrocarbon release. Such a program aims to assess the impacts of a hydrocarbon spill. The OSMP is divided into a description of operational and scientific studies, as follows:

Operational monitoring (or Type 1 monitoring, response phase) studies

1. Predictive oil spill trajectory modelling.
2. Surveillance and reconnaissance to detect hydrocarbons and resources at risk.
3. Detecting and monitoring for the presence and properties of hydrocarbons.
4. Monitoring of contaminated resources.

Scientific Monitoring (or Type 2, recovery Phase) studies

1. Assessment of the presence, quantity and character of hydrocarbons in marine waters.
2. Assessment of the presence, quantity and character of hydrocarbons in seabed sediments.
3. Assessment of impacts and recovery of subtidal and intertidal benthos.
4. Assessment of impacts and recovery of seabird and shorebird populations.
5. Assessment of impacts and recovery of pinniped populations.
6. Desktop assessment of impacts to marine megafauna.
7. Assessment of impacts and recovery of marine fish.
8. Assessment of physiological impacts to commercially important fisheries species (fish health and seafood quality/safety) and recovery.

Consultancies and government organisations suitable to undertake this monitoring work, and the resources required, are presented in the OSMP Framework and associated OSMP Implementation Plan.

7.5. Incident Recording and Reporting

All environmental near-misses and incidents, including non-compliances with the EP EPO and EPS, must be communicated immediately to AGR's HSE Manager, who will report to CarbonNet's Operations Director. This expectation will be reinforced at inductions, daily toolbox meetings and weekly HSE meetings.

All environmental near-misses and incidents will be recorded in the DJPR SIMS by the CarbonNet Environment Manager within 8 hours of being notified of the incident. The MODU OIM and/or support vessel Master/s will lead an investigation into the cause, effects and learnings of the incident as per the contractor's investigation procedures. Where circumstances warrant it, this investigation will be conducted jointly with the AGR Drilling Supervisor. Following an investigation, the MODU and/or vessel contractor and AGR (with input from CarbonNet as required) will develop remedial actions and communicate these to project personnel (and wider organisations, as appropriate) to prevent recurrence. These actions will be tracked to completion.

7.6. Management of Change

CarbonNet's Project Management Manual (version 1.5) (PMM) will be used as the overarching document that will guide the Management of Change (MoC) process for the activity.

AGR will utilise the AGR Management of Risk and Control of Change for all activity changes that may impact on environmental performance. Permanent or temporary changes to organisation, equipment, plant, standards or procedures that have potential HSE and/or integrity impacts are subject to formal review and approval prior to initiating the change to ensure risks remain acceptable and are reduced to ALARP. The level of management approval for each change is commensurate with the risk. Changes are classified as minor, significant or major.

7.7. Monitoring

7.7.1. Field Environmental Monitoring

CarbonNet will maintain a quantitative record of emissions and discharges, and other environmental matters generated on location during the activity.

The MODU contractor is responsible for collecting this data and reporting it to the AGR Drilling Supervisor. This is facilitated, in part, by completing a daily environmental monitoring register that will be provided by AGR to the contractor, which captures the commitments made in Table 7.1. These results will be reported in the end-of-program EP performance report submitted to NOPSEMA.

Table 7.1. Summary of the OAW environmental monitoring requirements

Hazard	Monitoring requirement	Frequency	Record
Seabed disturbance	ROV survey for dropped objects.	At the completion of drilling.	Daily drilling report (DDR).
Underwater sound	Megafauna visual observations.	During VSP.	VSP report.
Drill cuttings and muds	Chemicals used in the mud system.	Daily.	DDR & mud report.
	Volume of muds discharged overboard.		
	Observations of the separation treatment system.	Constantly while drilling.	DDR.
Cement	Real-time ROV observations.	During conductor	DDR.

Hazard	Monitoring requirement	Frequency	Record
		cementing operations.	
	Chemical additive use.	As required.	Cement report.
Atmospheric emissions	Fuel consumption.	Tallied at end of activity from daily reports and/or bunker receipts.	Activity-specific discharges and emissions manifest.
Putrescible waste discharges & waste disposal	Weight/volume of wastes sent ashore (including oil sludge, solid/hazardous wastes).	Recorded at each offloading. Tallied at end of activity. Garbage Record Book updated during backloading at port.	Activity-specific discharges and emissions manifest. Garbage Record Book.
Bilge water	Volume of bilge water discharged during the activity.	During discharge.	Oily Water Logbook.
Introduction of IMS	Volume and location of ballast water discharges.	During discharge.	Ballast water log.
Displacement of or interaction with third-party vessels	Continuous bridge watch for (and communications with, as necessary) third-party vessels.	Continuous during activity.	Bridge log.
Damage to the Bream-A gas pipeline	Geographic coordinates of the position of the Bream-A pipeline used in the heavy lift vessel navigation system.	During tow to location and when pinning on location.	Navigation records.
Vessel strike with cetaceans	Megafauna observations by vessel crews.	Continuous while in activity area.	DDRs.
Diesel spill	Operational monitoring in line with the OPEP and OSMP.	In the event of a Level 2 or 3 hydrocarbon spill.	Incident reports.
Loss of well containment	BOP pressure testing.	Every 21 days.	BOP testing reports.
	BOP function testing.	Every 7 days.	
	Well casing pressure testing.	After installation.	Well casing pressure test reports.

7.7.2. Auditing, Assurance and Inspection

Environmental performance assurance of the activity will be undertaken in a number of ways. Performance assurance is undertaken to ensure that:

- EPS to achieve the EPO are being implemented;
- Potential non-compliances and opportunities for improvement are identified; and

- All environmental monitoring requirements have been met before completing the activity.

The following arrangements will be established to ensure environmental performance is in line with this EP:

- Pre-activity HSE due diligence inspection;
- Onboard environmental audit; and
- Onboard inspections.

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