

Otway Offshore Gas Project

Calico Survey



Otway Gas Plant

Information Sheet | May 2023

Project Overview

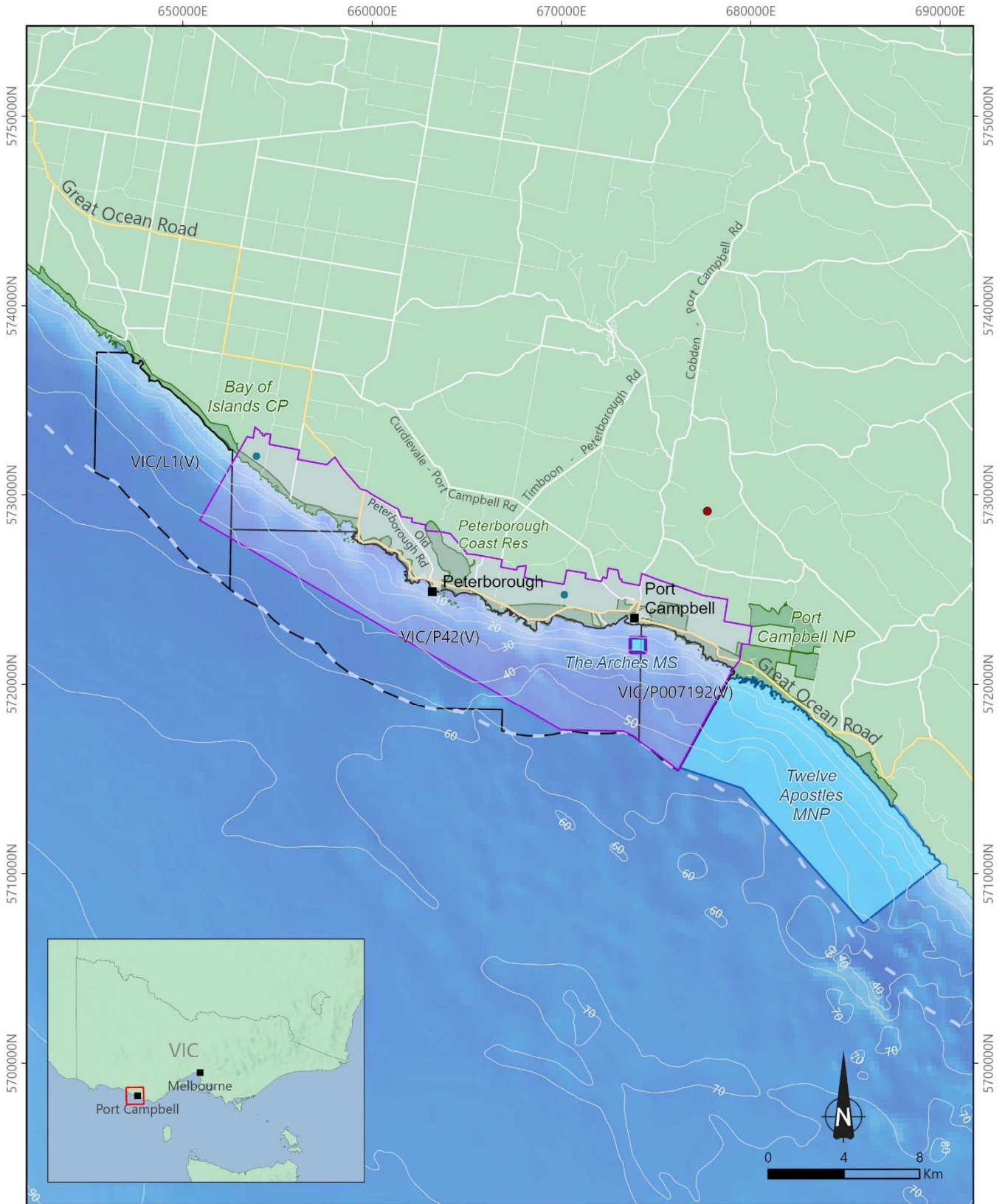
Beach Energy operates the Otway Gas Plant near Port Campbell. This Plant processes natural gas from nearby petroleum permits, to meet the ongoing demand for natural gas in Australian homes and industries.

Beach is continuing to develop natural gas within the Otway Basin to maintain supply the Otway Gas Plant. Within Victorian State permits, Beach is planning to carry out further assessment of the geological structures beneath the surface using advanced seismic surveying technologies.

Key Facts

- Beach is continuing natural gas development to meet demands of Australian homes and businesses
- A seismic survey is required to assess gas reservoirs in Victorian offshore permits
- Located around Port Campbell and Peterborough, SW Victoria
- Planning for February to May 2025
- The survey is to occur over State waters and adjacent land areas
- Advanced surveying techniques will be used
- Operating under stringent regulatory conditions and approvals

Calico Survey area map



Data sources: Victoria Government, DAWE, Beach operational data.

Coordinates: GDA2020 Zone 54

- Otway Gas Plant
- Beach operated wellsite
- ~ Coastal waters (3 nautical mile limit)
- Park/reserve
- Marine park
- Calico TZ 3D Seismic Survey
- Beach offshore permits in survey area



The features on this map are accurate at the time of publication and subject to change

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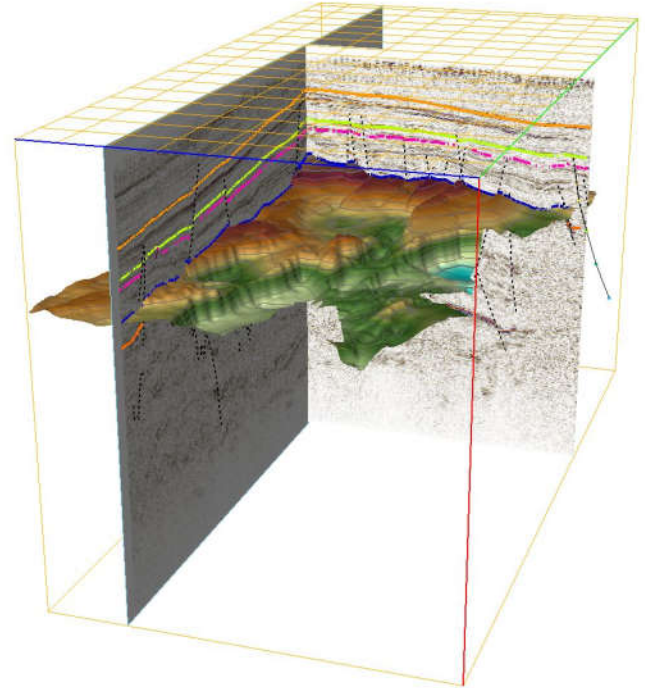
The Calico Survey

Beach will be conducting a *transition zone, three-dimensional* seismic survey named the **Calico Survey**. It is called '*transition zone*' because surveying is required on the land and ocean to enable creation of a complete image of the subsurface geological structures within the permit areas that follow the coastline.

The description '*three-dimensional*' refers to survey methodology that captures high-resolution data that enables a detailed visual 3-D map of the subsurface to be created. The map will show the geological layers below the land and seabed surfaces, determine the different layers and rock types, and structures that hold gas reservoirs.

Seismic surveys work by using a vibration on the land or acoustic energy in the water that travels several kilometres below the surface. The seismic energy reflects back like echoes off the distinct types of geological layers. The returning energy is recorded as data signals by receivers placed on the land, seabed and towed by the survey vessel.

Over 100 terabytes of data will be produced and loaded on a supercomputer. Over a 12-month period, Geophysicists will transform the data into a 3D image the subsurface layers.



Example of 3-D map from seismic survey data

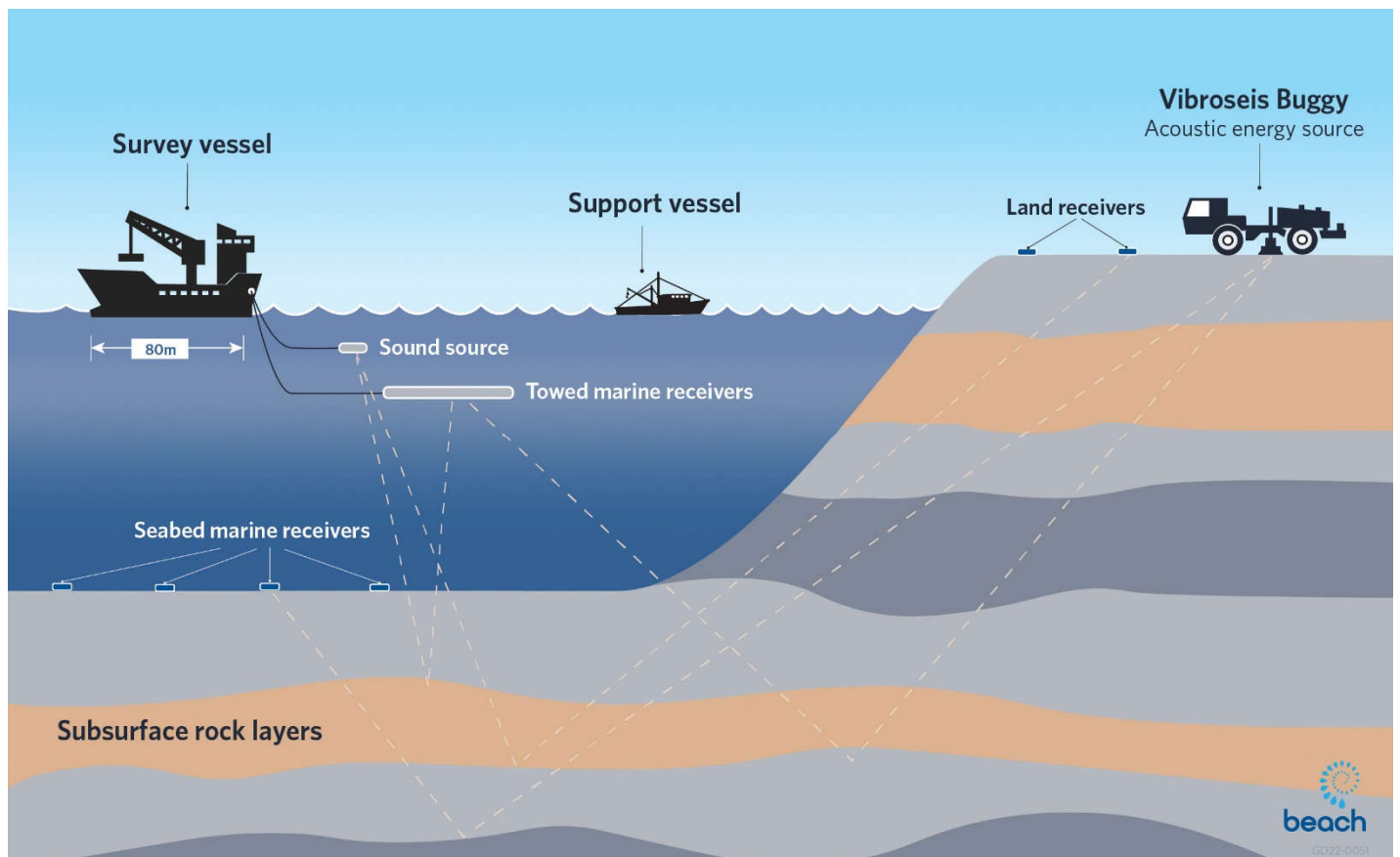


Diagram showing transition zone seismic survey (not to scale)

Land Survey

Small vibrations will be created by a *vibroseis* buggy approximately 10m long. The vibroseis buggies use hydraulics to lower a plate onto the earth and move it for about 10 seconds, similar to a compactor on a building site. Operating from farm tracks and roadsides, around 5 vibroseis buggies will operate about 1km apart, stopping to lower their plate approximately every 5 to 10 metres (subject to imaging test). The buggies have large sand tyres to minimise compression.



Example of a vibroseis buggy

On paddocks and roadsides, highly sensitive receivers will be placed in a grid pattern around 50m apart to enable broad coverage to record the returning signals. The land receivers are small (approximately 10cm²), battery-operated units that operate safely in any environment and weather conditions.



Example of a typical land receiver

Marine Survey

A survey vessel around 80m long will tow a set of compressed air chambers that release air bubbles to create pulses of acoustic energy into the water, travelling through rock layers beneath the seabed.

A smaller support vessel of around 30m long will place seabed marine receivers in a grid pattern around 200 to 400m apart.

The seabed marine receivers are approximately 30cm diameter by 10cm high, battery-operated, fully sealed units that operate safely in the marine environment. The advanced designs include remote controls used to release floats that return each receiver to the surface when the support vessel is ready to collect them. The survey vessel will also tow marine receivers between 5m to 15m below sea level.



Example of a typical marine receiver

Calico survey activities

Activities will follow a typical sequence below:

- Over a 6-week period, surveyors will mark out where the land receivers will be located, using blue water-based surveyor marker spray
- Over a 4-week period, around 20 people will deploy the land receivers on a 50m x 50m grid with approximately 5-9 receivers per hectare (depending on terrain and locations)
- Receivers will be buried so the top is just below the surface, to minimise disruption to farming activities and curiosity from animals



Example of land receiver placement

- At the same time, marine receivers will be deployed from the side of the survey vessel and sink to the sea floor
- After all the receivers are deployed, the vibroseis buggies will operate on tracks and roadsides for approximately 4 weeks
- Whilst all of the receivers are deployed, the survey vessel will sail over the survey area to activate the acoustic energy source and tow the marine receivers
- After the seismic survey is completed, land receivers will be collected over a 3-week period, and the support vessel will release the marine receivers to float to the surface and collect them
- Over 100 Terabytes of data from the receivers will then be processed and transformed into a 3D image, taking around 12 months. That information will be used to plan further natural gas onshore to offshore wells within the permit areas.

Location

The Calico Survey will take place in Victorian state waters within three nautical miles of the shoreline, covering approximately 135km². It will also cover approximately 60km² onshore along the Victorian coast to around 3km inland. The area follows the coastline from Nirranda South in the west to approximately 6km south-east of Port Campbell.

The survey will be conducted in offshore petroleum permits: VIC/L1(V); VIC/P42(V); VIC/P007192(V) and open acreages (see map). Onshore, the survey area will include parts of several onshore permits.

Timing

Beach is in the preliminary planning stages for the Calico Survey, for the work to begin in February 2025, and be completed in May 2025.

The vibroseis buggies will operate during the day and the marine acoustic energy source will operate between 6pm and 6am.

Project plans will be finalised after Beach has received all regulatory and internal approvals and

confirmed contractor availability. Exact timings will be subject to weather conditions.

Stakeholders will be notified of project commencement at least four weeks before activities begin.

Regulations and approvals

The Australian oil and gas industry is regulated by Commonwealth and State legislation and regulators to some of the most stringent environmental and safety global standards. Approvals will be required for the Calico Survey under the following legislation:

- *Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (Cwth)*
- *Offshore Petroleum and Greenhouse Gas Storage Act 2010 (Vic)*
- *Petroleum Act 1998 (Vic)*
- *Marine and Coastal Act 2019 (Vic)*
- *National Parks Act 1975 (Vic)*
- Various local planning regulations.

The Acts and regulatory requirements will operate in addition to Beach's *Operational Excellence Management System* that includes procedures to ensure Beach operates in an environmentally responsible and safe manner.

To meet these regulatory requirements and operational standards, Beach is preparing an Operations Plan that will include an onshore Environment Management Plan. There will also be a separate offshore Environment Plan, along with other consent applications.

The Operations Plan and related environment plans will be submitted to the Victorian Department of Jobs, Precincts & Regions (DJPR) for review and acceptance. Operations and environment plans must include:

- Description of the seismic survey activities
- Description of the existing marine and land environments
- The identification and evaluation of impacts and risks of the activities on the environment
- Environmental performance outcomes and control measures to reduce potential impacts

- An implementation strategy and reporting requirements

Environment plans must demonstrate that any impacts and risks will be managed to acceptable levels, and how activities will be conducted to ensure that potential impacts and any residual risks will be managed and reduced to “As Low As Reasonably Practicable” (ALARP).

Once DJPR is satisfied that the operational and environment plans meet the criteria set out in the acts and regulations, the plans will be accepted by the Regulator, and summaries of the plans will be published on the DJPR website. See further DJPR information [here](#).

Consent applications to work within the Port Campbell National Park (foot access to deploy receivers) and to work within coastal areas will be submitted under the *National Parks Act 1975* and the *Marine and Coastal Act 2019 (Vic)* to the Department of Environment, Land, Water & Planning (DELWP).

A whole-of-project assessment in accordance with the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (Cwth)* will be submitted to the Department of Agriculture, Water & the Environment (DAWE).

Environment protection

Beach recognises the environmental, heritage, social and economic value in our operating areas and has a proud record of meeting environment performance outcomes.

The environment plans will address potential impacts to the environment, social and economic factors, and how any impacts will be managed.

Offshore environment

A variety of marine fauna may occur in the project area, including the potential presence of:

- Blue and humpback whales, particularly during the summer months
- Southern right whales, particularly during the winter months
- Common dolphin and shark species throughout the year

- New Zealand and Australian fur seals throughout the year
- Various commercial fishing species including southern rock lobster
- Marine flora is dominated by phytoplankton, with red, green and brown algae occurring on rocky reefs

Economic values within the shared marine area include commercial fishing and tourism activities.

Onshore environment

The onshore landscape within the survey area is dominated by open pastures used primarily for dairy farming and cattle and sheep grazing.

Native vegetation is present with the Port Campbell National Park and elsewhere it is concentrated within roadside reserves.

Common native flora species include tea-tree, paperbarks, coast beard-heath, coast wattle, sword-sedge and coast tussock grass. Several native orchid species occur within the Port Campbell National Park and may occur in roadside corridors.

This vegetation provides home to several native animal species, including birds such as honeyeaters, egrets, musk duck (with plovers and terns on the beaches), and may contain habitat suitable for species such as the southern brown bandicoot, swamp antechinus, long-nosed potoroo, common bent-wing-bat, growling grass frog and various skinks.

Economic values within the onshore area includes agriculture, tourism and energy industries, and a range of service industries.

Project emissions

Beach is committed to sustainably delivering energy for communities. Beach recognises that climate change is one of the global challenges of this century and understand the role we must play in managing our carbon emissions.

Environment plans will include environmental performance standards for minimising greenhouse gas emissions from the project, that would primarily be from operating vehicles and marine vessels.

These standards will be in accordance with the commitments set out in the [Beach Environment Policy](#) and the [Beach Climate Change Policy](#).

Beach has an aspiration to reach net zero Scope 1 and 2 emissions by 2050 and is committed to reducing emissions across its operations. Beach's FY22 Sustainability Report outlines a new emissions reduction framework, taking into account the investment Beach is making in the Moomba Carbon Capture and Storage Project, one of Australia's largest emission reduction projects.

Operating safely

Beach has an enviable safety performance record across its Australian and New Zealand operations. In February 2023, Beach announced that the Otway Gas Plant achieved a major milestone of 8 years without a recordable injury.

The Calico Survey activities and all contractors engaged on the project must comply with the conditions in the Operations Plan and environment plans, also the health, safety and environment standards and procedures in Beach's *Operational Excellence Management System*.

Maritime safety

The survey vessels will operate in accordance with Australian Maritime Standards, regulated by Maritime Safety Victoria and the Australian Maritime Safety Authority (AMSA) This includes:

- Vessel Masters issuing Notifications to Maritime Safety Victoria and AMSA before mobilising to the operational area
- Communicating with other vessels using standard maritime protocols.

Vessels in the area will be required to observe temporary safety exclusion zones (as specified in the Notice to Mariners) around the survey vessels to reduce any safety risks from entanglement of survey equipment and fishing vessels and gear.

Beach will consult directly with commercial fishers in the area for avoidance of impacts on each other's activities. Before the survey commences, a notice of activities and vessel contact details will be provided to stakeholders.

Community safety

A small number of vehicles will be required for the Calico survey and the majority of activities will be on private lands and tracks. Where activities are required on roadsides, depending on the location, roadside traffic management may be used. Road closures will not be required.

There will be minimal impacts to recreational activities including swimming, snorkelling and surfing as the survey vessels will not operate in water depths of less than 5m. The offshore seismic source will not operate between the hours of 6am and 6pm. The survey will also avoid the main surf breaks.

The underwater sound levels will be much lower than traditional deep ocean seismic surveys. Nevertheless, as part of the environmental impact assessments, a sound impact study is being undertaken by globally recognised acoustic consultants at Jasco Applied Sciences. The study will be used to finalise recommended safe distances from the Calico Survey to SCUBA diving. A set of sensors will be installed within the survey area to monitor vibrations and sound levels resulting from the survey activity. Vibration sensors in place during the Enterprise 3D streamer survey in 2014 showed that vibration levels from the seismic sources (0.5 to 1.5mm/s) were slightly higher than the background levels (0.5mm/s) but significantly less than the vibrations induced during wave action on cliffs during a storm (1 to 4.5mm/s).

Community matters

To inform recreational fishers and other marine users of the survey activities, signage will be placed at key foreshore areas and Community Advisers will be available to answer any questions.

There will be minimal amenity impacts in the community such as dust, noise or traffic issues due to the low impact nature of the activities, the small number of vehicles operating, and the land activities taking place mainly on private land.

The Calico Survey will have limited social or economic impacts due to the relatively short time of the project and limited activities. Nevertheless,

socio-economic impacts will also be assessed along with other environmental impacts.

Land agreements

Beach will seek voluntary access agreements with landholders for the temporary placement of land receivers in paddocks and access to tracks. Due to the low impacts from the activities, there will be minimal land remediation required.

Questions and Answers

Why are you doing the seismic survey here?

The Otway Basin is a large sedimentary basin containing hydrocarbons (oil and gas). Exploration in the Otway Basin began in the late 1950s and the first exploration well was drilled in 1961. Since then, the eastern Otway Basin around Port Campbell has continued delivering natural gas and LPG to Victorian homes and businesses.

Beach is required to continue searching and developing hydrocarbons in its various exploration permits and production licenses in the Otway Basin, in accordance with requirements set out by DJPR for Victorian titles and the National Offshore Petroleum Titles Administrator (NOPTA) for Commonwealth titles.

Industry and regulators continue to see tight gas supply for south-east Australia. To positively impact declining production from existing fields as reservoirs deplete, new gas projects are required.

Hasn't that area been surveyed before?

Yes, there have been previous seismic surveys undertaken in the region by other companies. However, the existing data is incomplete across the Beach permit areas and does not enable a seamless and complete detailed map to be created. There is also an area within the Calico Survey boundary that has not been surveyed before, permit- VIC/P007192(V).

If potential natural gas reservoirs are identified, the geological map will enable additional wells to be drilled safely and increase location accuracy, thereby requiring fewer wells.

Why do we still need natural gas?

Natural gas has a wide variety of uses in our daily

lives. This includes generating electricity, residential heating, hot water and cooking. In the industrial sector, gas is a primary heat source for manufacturing glass, steel, cement, bricks, wood, ceramics, tiles, paper and in producing food.

Gas is a common ingredient in the manufacturing of fertilisers, plastics, pharmaceuticals and fabrics.

The Australian Competition and Consumer Commission's (ACCC) latest [Gas Inquiry](#) highlights risks of peak-day gas supply shortfalls as early as winter 2023.

What role is natural gas playing as Australia transitions to renewable energy?

Carbon emissions of natural gas are significantly lower than coal. As old coal fired power stations are removed from Australia's energy mix, electricity powered from natural gas ensures a stable energy supply as our economy transitions to renewable energy sources for electricity generation.

The Australian Energy Market Operator's ([AEMO | 2022 Integrated System Plan \(ISP\)](#)) has forecast more gas-fired generation is required to reach Net Zero by 2050. In its "Step Change" scenario which achieves that objective, 40% more gas-fired generation capacity is required to enable energy from wind and solar to increase nine-fold, and battery storage to increase by a factor of 30.

Is Beach exporting gas from the Otway Basin?

No. The gas Beach produces from the offshore Otway Basin is processed at the Otway Gas Plant near Port Campbell in Victoria. From there it is directly supplied via an existing pipeline into the Australian east coast gas market to meet existing demands by residential, commercial, industrial, manufacturing and service industries.

How does Beach support the local economy?

Beach is an active supporter of local communities through grants and partnerships that deliver many community benefits across health, education, environment initiatives and projects for community and emergency services infrastructure.

The Otway Gas Plant has a multiplier effect in the local economy by employing around 40 people from immediate and surrounding regional communities. Beach uses several local contracting

firms for ongoing support services, purchase of local goods where possible and pays substantial rates to the local shire.

The Calico Survey project will help ensure supply of natural gas to the plant, thereby continuing to support the local and State economy.

Does the local gas industry harm tourism?

No. The small local gas industry has successfully co-existed with tourism, agriculture and other industries around the Shipwreck Coast region for over 20 years.

In fact, the local gas industry has been an active user of accommodation in the region, whilst tourism was in a slump during COVID-19 restrictions. And locally produced natural gas is used heavily in local industries such as dairy processing plants, timber mills and other manufacturing.

Five onshore to offshore wells have been successfully drilled at Beach well sites in the Otway Basin since 2014. The use of advanced directional drilling techniques avoids the need for a large offshore drilling rig, and the temporary use of onshore drill rigs has little to no negative impacts to the tourism industry.

Will I see or hear the survey activities?

At times, you may see the survey and support vessels in the water. Onshore, you may see a slow-moving vibroseis buggy, which looks similar to a large garbage truck. The seismic survey will be no more noisy than regular traffic.

Will I hear or feel any vibrations on the land?

No. Vibrations from the land seismic survey activity are not audible in the immediate surrounds, are only detectable under foot if standing in close proximity of the vehicle and become undetectable at distances beyond 10m.

The vibroseis buggies will not operate in close proximity to any residences, public buildings or coastal formations and pose no threat to animals, livestock or people.

What time of the day will the survey operate?

Survey activities on the land will be done in daylight hours. In the water, vessels will remain operational 24 hours a day but the compressed air chambers that release air bubbles to create

pulses of acoustic energy into the water will only operate after 6 pm and before 6 am.

Will there be road closures?

No, road closures will not be required. Some roadside activity will be required and will be planned and carried out in consultation with State and local government authorities. If required, roadside activity will be subject to Traffic Management Plans that include the deployment of licensed traffic control to ensure the operation is safe and to minimise any disturbance to traffic.

Will there be heavy traffic?

No, there won't be heavy traffic. Only a slow-moving vibroseis buggy, similar to a garbage truck, and a small number of 4WDs.

Can I swim, snorkel or surf near the survey?

Yes. Vessels will not operate in water depths less than 5 m and the marine seismic source will only be used between 6 pm and 6 am to minimise potential impacts to swimmers snorkellers.

The survey will avoid surf breaks and for surfing between 6 pm and 6 am, the underwater sound is not expected to impact surfers as they are not submerged at any great depths or for any extended length of time.

Can I SCUBA dive near the seismic survey?

SCUBA diving is generally not allowed close to seismic surveys as the sound pressure released underwater may cause discomfort to divers and risks to hearing if the diving occurs too close to the survey, or for too long, depending on the sound pressure levels.

The underwater sound levels for the Calico Survey will be much lower than traditional deep ocean surveys. Nevertheless, as part of the assessment of environmental impact, a sound impact study is being undertaken by globally recognised acoustic consultants at Jasco Applied Sciences. The study will be used to finalise recommended safe distances for any SCUBA diving from the Calico Survey.

Beach will then consult with recreational dive companies that may operate in the area and professional SCUBA diving associations, to jointly develop a plan that assesses any risks, prioritises activities and minimises or eliminates simultaneous seismic and diving activities.

As an added precaution, Beach will place signage at key foreshore areas and Community Advisers will be available to provide information and answer questions.

Will the survey damage the Twelve Apostles?

No. The energy output from a seismic source is very localised (within tens of metres) and does not result in vibrations large enough to damage houses, roads, the coastline or rock formations.

The Enterprise 3D marine seismic survey acquired in 2014 used a 2,380 cubic inch seismic source. Geophysical sensors were placed at two Port Campbell coast locations to measure the vibrations before and during that survey. The measurements showed that the vibrations from the activation of seismic sources between 1 and 5 kilometres offshore were considerably smaller than vibrations created by waves during storms.

The Calico Survey will only require between 250 to 750 cubic inch seismic sources. Geophysical sensors will be positioned to verify vibration levels.

What about disturbance to native plants or animals?

Clearing of native vegetation is not required due to the small size of the receivers. Foot access will be required through parts of the Port Campbell National Park and conducted in accordance with approved environment plans and access permits. The receivers will not disturb native animals and there will be minimal disturbance during placement of the receivers during daylight hours.

What about impacts to whales?

Avoidance and disturbance of whales will be managed in accordance with the Environment Protection and Biodiversity Conservation (EPBC) Regulations (2000). This includes adhering to required speeds and distances from whales, and in accordance with mitigation measures set out in the environment plan which importantly includes conducting the survey at times of the year to minimise impacts to whale aggregations.

The survey and support vessels will move very slowly, and each vessel will have a trained marine mammal observer whose specific task is to notify the vessel Master of the presence of any whales

and advise the approved protocols to avoid potential impacts. Any whale sightings and actions taken will be recorded and reported to regulators.

What about impacts to rock lobsters?

It is not expected that southern rock lobsters will be impacted as the sound pressure levels to be used in the Calico Survey will be much smaller than those used in traditional 3D marine seismic surveys. Beach will undertake an underwater sound study to assess the potential impacts to rock lobsters as part of the development of the environment plan. Direct consultation will be undertaken with the commercial fishing sector.

What about impacts on commercial fishing?

There will be temporary and localised access restrictions for commercial fishing using set pots or nets in order to avoid risks of vessel collisions and any safety risks from entanglement of fishing gear with survey equipment.

Beach is aware of the different State and Commonwealth fisheries that operate in the Calico Survey area, has a long engagement history, and will continue to consult in order to minimise potential impacts of its activities which may include short term displacement of local commercial fishers who regularly fish in the survey area.

In the event that a commercial fisher suffers a direct economic loss due to the Calico Survey, Beach has a procedure called *Fair Ocean Access* that sets out Beach's commitment to consultation, minimising impacts, circumstances in which a fisher may claim compensation, evidence required and the claim process.

Can recreational fishing continue?

Yes, provided any fishing vessels remain at safe distances from the survey vessel and do not place set pots or nets in the area during the survey. Survey vessels will communicate directly with other vessels as required and standard maritime protocols and precautions will be followed.

Signage will be placed at key local boat ramps and Beach will have community advisers in attendance to answer questions and provide information.

Traditional Custodians

Beach would like to respectfully acknowledge the Eastern Maar Peoples, who are the Traditional Custodians of the lands and waters on which the Calico Survey will be located, we pay our respects to Elders both past and present.

We recognise and respect the Eastern Maar's cultural, spiritual, physical and emotional connection with their land, waters and community and we acknowledge that these are of continued importance to the Eastern Maar people today.

"Eastern Maar" is a name adopted by the people who identify as Maar, Eastern Gunditjmara, Tjap Wurrung, Peek Whurrong, Kirrae Whurrung, Kuurn Kopan Noot and/or Yarro waetch (Tooram Tribe) amongst others.

Supporting our community

Beach is committed to supporting the communities in which we operate and where our people live too. We focus on partnerships and programs that build sustainable and resilient communities.

Over the last year, Beach has supported:

- Port Campbell Surf Life Saving Club: nipper and leadership programs to reinforce surf awareness and vital lifesaving skills
- Timboon Recreation reserve: contribution to upgrade of netball courts
- Port Campbell Progress Group: new generator for use in emergency situations to provide power in a place of last resort
- Timboon Bowling Club: new kitchen facilities
- Timboon Health District: joint contribution for a new accessible community bus

Stakeholder Consultation

Beach values stakeholder consultation and feedback, which is an important part of the process of preparing environment plans.

Beach invites consultation with stakeholders potentially affected by the project activities including those stakeholders with specific local knowledge or an interest in the environmental performance of this project.

If you are seeking further information about this project or wish to provide feedback, please contact us. Beach will consider all feedback, including any concerns or objections. Measures will be explored to reduce any impacts and risks, and responses will be provided to stakeholders.

Please be advised that all stakeholder feedback, records of consultation, copies of correspondence, including emails, will be retained by Beach to be used in the preparation of the Environment Plans and communicated to regulators where required.

We welcome your questions and feedback

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