3 DESCRIPTION OF THE ACTIVITY

3.1 Survey location

The Eureka 3D MSS will take place within Commonwealth waters off the mid-west coast of WA, within the northern Perth Basin, in Exploration Permit Area WA-481-P, Production Licence WA-31-L and open acreage area (Figure 3-1).

For the purposes of this EP two areas have been defined for the survey based on the type of activities that will be undertaken and the discharge of seismic source. The following areas apply:

- Active source area (ASA)
- Operational area (OA).

The combinations of these two areas is referred to as the 'survey area'. These areas are presented in Figure 3-1 and Figure 3-2 and a description of each area is provided below. Water depths are:

- ASA: Range for the active source within the streamer area from approximately 20m – 52m and the Nodal area ranging from approximately 11 – 35m, although the source will not be activated in depths of less than 10m.
- Operational area: Range from approximately 1–65 m.

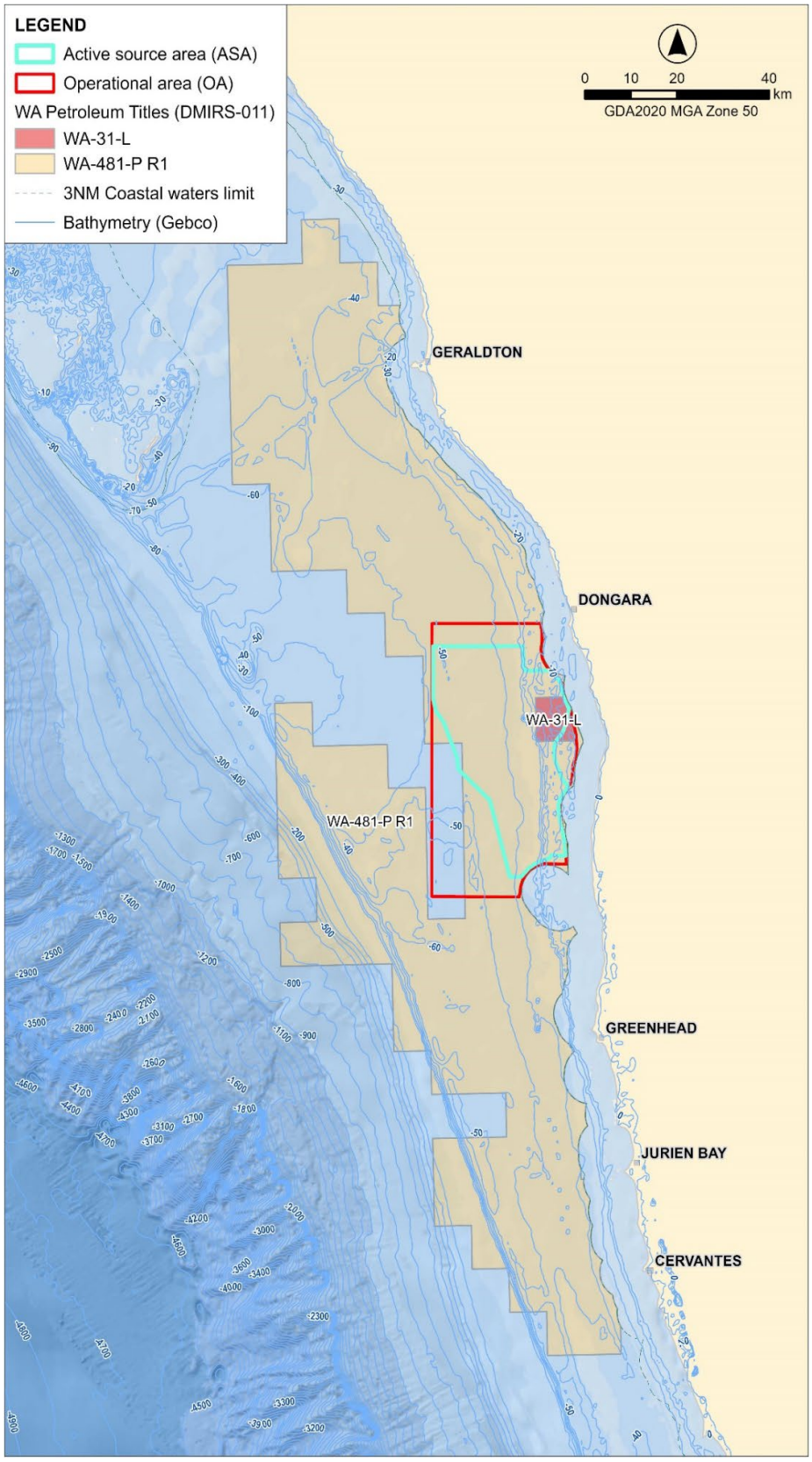


Figure 3-1: Eureka 3D MSS Active Source Area and Operational Area overlapping Petroleum Titles

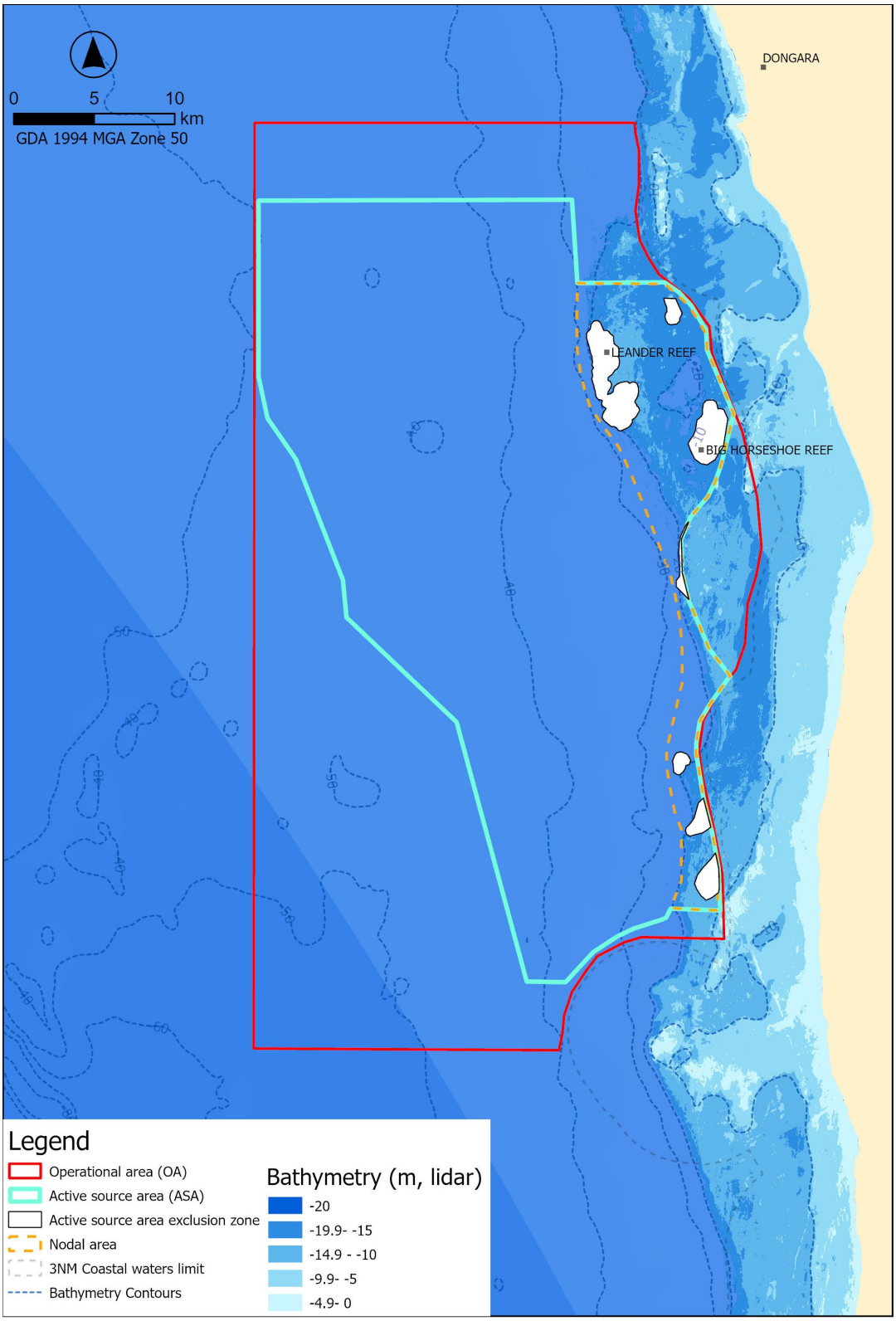


Figure 3-2: Eureka 3D MSS Active Source Area and Operational Area

3.1.1 Active source area

The ASA is defined as the maximum potential area within which seismic acoustic emissions may occur for the purpose of acquiring data. It includes vessel run-ins and runouts, and soft starts where the seismic source is active. Seismic source testing (i.e. bubble tests) will also occur in the ASA. The seismic source will not be discharged outside of the Active Source Area or within any designated exclusion zones delineating shallow reefs as shown on Figure 3-2.

The active source area is further split into two areas; an offshore area, where streamer acquisition will take place, where data will be acquired by a vessel towing the seismic source and streamers, and an inshore area (called the nodal area), where nodal acquisition will take place, where data will be acquired through the use of ocean bottom nodes in conjunction with a vessel towing the seismic source. Figure 3-2 demonstrates this with orange line bounding the approximate nodal area and the rest of the ASA is where streamer acquisition will occur. The actual extent of the towed streamer area will be defined following a full risk assessment with the chosen seismic contractor and will be adjusted accordingly. The streamer component of the survey will not be conducted in water depths of less than 20 m.

Within the nodal area there are designated exclusion zones (Figure 3-2). These are areas that the seismic source will not be discharged due to proximity to known large shallow reef areas, but ocean bottom nodes may still be placed. The reef exclusion areas have been defined through the usage of high resolution LiDAR bathymetry data, selecting the significant spatial features and applying a 300 m exclusion zone to the extremities. Whilst other shallow water areas are not specifically identified within the defined ASA, the seismic source will not be discharged in water depths of less than 10m.

Within the active source area, a shallow reef is characterized as a spatial feature with an area exceeding 0.25 square kilometers, rising more than 10 meters from the sea floor, located in water depths of 20 meters or less, and having a clearly defined edge, is defined as significant.

The extent of the ASA is approximately 946 km^2 with boundary coordinates provided in Table 3-1. The nodal area within the ASA is 119 km^2.

3.1.2 Operational area

The OA includes the ASA and an additional area for operations ancillary to achieving survey coverage. This includes vessel approach, vessel line turns, and necessary maintenance operations. There will be no discharge of the seismic source within the area of the OA that is located outside the ASA. The extent of the OA is approximately 1,575 km^2 with boundary coordinates provided in Table 3-1.

Given the multiple shallow areas within the OA, and the potential tidal variations affecting known bathymetry databases, all vessels will operate with a minimum under keel clearance of 2m for a support vessel (unless specifically scouting water depths), and 5m for the seismic vessel at all times. Any vessel operating in water depths of less than 12m will be fitted with sonar and depth sounders.

Table 3-1: Operational and Active Source Area co-ordinates (GDA 94)

Operational area		Active source area	
Latitude	Longitude	Latitude	Longitude
-29.270842	114.606743	-29.7548	114.7702
-29.274973	114.849632	-29.6088	114.7284
-29.30962	114.851687	-29.5489	114.6592
-29.350656	114.856948	-29.5278	114.6573
-29.389779	114.895096	-29.4597	114.6288
-29.449083	114.915039	-29.4364	114.6111
-29.514094	114.92597	-29.4131	114.606
-29.568026	114.914272	-29.3145	114.6083
-29.596011	114.895846	-29.3174	114.8087
-29.627502	114.883474	-29.3641	114.8112
-29.696458	114.897106	-29.3646	114.8668
-29.733026	114.89746	-29.3919	114.893
-29.731198	114.844435	-29.4029	114.8934
-29.741452	114.815726	-29.439	114.9096
-29.761163	114.799096	-29.485	114.8922
-29.793673	114.790001	-29.4968	114.8806
-29.789274	114.593941	-29.5437	114.879
-29.270842	114.606743	-29.5857	114.9044
		-29.6228	114.8819
		-29.7171	114.8953
		-29.7155	114.8635
		-29.7205	114.8605
		-29.7391	114.8133
		-29.7557	114.7951
		-29.7548	114.7702

3.2 Schedule

Pilot has identified 1 February 2026 to 31 March 2026 as the survey window for acquisition of the Eureka 3D MSS. The survey timing has been based upon relevant person feedback and assessment of timing of biological, socio-economic and cultural sensitivities, and metocean constraints.

Acquisition will occur over 30 days within this window with an additional ten days allowing for downtime and survey infill, streamer and node deployment and streamer recovery. Downtime allows for inclement weather, avoiding interactions with other users and marine megafauna, and maintenance. The actual start date and year for the survey is subject to the availability of the survey vessels to conduct the survey, client data requirements, sea state conditions suitable for marine seismic acquisition, and granting of the required regulatory approvals and access authorities.

Seismic data will be acquired over a 24-hour period, with shutdowns for routine and reactive maintenance, repairs, transit and line turns and marine fauna and stakeholder avoidance. The exact start and end dates will be communicated to relevant persons in accordance with notification requirements described in Section 10.

3.3 Activity details

The core activity that forms the basis for this EP is the undertaking of the Eureka 3D MSS. Associated activities in support of the survey are likely to include use of support vessels as required, and crew changes within the Operational Area. Associated activities are described in this section as appropriate, with a focus on those considered relevant to the assessment of environmental impact and risk. Key details of the proposed seismic survey are summarised in Table 3-2 and described below.

The Eureka 3D MSS will be undertaken in 2 phases, one phase utilising a seismic survey vessel towing an underwater seismic source and up to a minimum of six streamers behind it. The seismic source will consist of an array of airguns of varying volumes (with a total volume of 2,495 cubic inches [in^3]). The survey vessel will tow the seismic source at 6m beneath the sea surface and the source will not be operated in depths of less than 20m. The other phase will utilise a source vessel towing the seismic source at a depth of 5m below the sea surface, whilst the receivers are comprised of nodes located on the sea floor in water depths of up to 30m. The seismic source for this phase will consist of an array of airguns varying in volume, with a total volume not exceeding 1420cuin, and will not be activated in water depths of less than 10m. The total volume of the airgun array has been chosen based on the water depths within the survey area and depth of the target within the subsurface to ensure adequate seismic imaging. The airguns emit high pressure pulses of sound, with the primary energy directed downwards into the subsurface (not horizontally away from the source). The streamers and ocean bottom nodes contain underwater microphones (known as hydrophones) that record the sound waves reflected off the seabed and underlying rock formations. These data are later processed to provide information about the structure and composition of geological formations below the seabed.

The streamers will extend approximately 7 km behind the survey vessel and be spaced 100 m apart. The streamers will be towed at a depth of approximately 7 m below the surface in offshore areas outside of the nodal area. Tail buoys will be used to maintain position in the water and clearly indicate the streamer ends. The tail buoys will be fitted with turtle guards (or will be of a design that does not represent an entrapment risk to turtles and other marine fauna), lights and radar reflectors. Depth monitoring and control devices (birds) positioned along the streamers will be used to maintain the preferred tow depth. The streamers will be fitted with streamer recovery devices (SRDs), which are self-inflating and will return to the surface if the streamer sinks beyond a certain water depth. The conservative case for streamers is for there to be six as a minimum which results in a 300m sail line separation. If the contractor were to suggest an eight-streamer vessel, line separation would increase to 400m.

Table 3-2: Key details of the Eureka 3D MSS

Parameter	Eureka 3D MSS
Survey area	
Permit area	WA-481-P
Other titleholders licence area that survey lines will enter (subject to Access Authority and Special Prospecting Authority)	WA-31-L and open acreage
Active Source Area	946 km^2
Node Survey Area	119 km^2
Operational Area	1575 km^2
Full fold area	750 km^2
Seismic activity	
Survey window	1 February 2025–31 March 2025, or 1 February 2026–31 March 2026
Duration of survey	30–40 days
Shotpoint Interval (Streamer)	12.5m shotpoint interval (approx. 5.4 sec) Sail lines will be approximately 300 m apart (dependant on # streamers)
Shotpoint Interval (Nodal)	100 m shotpoint interval (per source line), 50 m effective interval due to flip-flop shooting on staggered 50 m sail lines. Sail lines will be approximately 50 m apart
Speed when traversing a sail line	4.5 knots
Orientation of sail lines	North – south
Seismic source	
Type	Airgun array
Size	2495 in^3 towed streamer / 1420 in^3 nodal
Pressure	2000 psi
Source levels (at 0–2,000 Hz)	255.2 dB re 1 µPa m (peak source pressure level)
Sound source tow depth	6m towed streamer/5 m nodal
Streamers	
Number	Six minimum
Streamer length	~6150 m
Distance from seismic vessel bow to tail buoy	~7000 m
Distance between streamers	100 m (dependent on number of streamers)
Streamer tow depth	~7 m (+/-2 m)
Vessels	
Seismic vessel	One vessel – specific vessel yet to be determined
Support vessels	Two support vessels (one supply and one chase) – specific vessels yet to be determined

Parameter	Eureka 3D MSS
Other vessels	1–2 additional smaller vessels may be required for laying ocean nodes
Refuelling	No refuelling will occur in Operational Area
Crew changes	Via support vessel as required

3.3.1 Seismic source operation with streamers

When acquiring data, the vessel will travel along a series of pre-determined lines within the ASA at approximately 4.5 knots (8 km/hour), discharging the seismic source at 12.5 m intervals (approximately every 5.4 seconds).

The Eureka 3D MSS is a typical 3D survey using methods and procedures like others conducted in Australian waters. No unique or unusual equipment or operations are proposed. The survey will be conducted 24 hours a day. Survey and equipment parameters are provided in Table 3-2. Pilot will consider options for the optimal technology based on what contractors have available at the time of survey to allow for technical advances, within the scope of the parameters provided for in this EP.

The seismic survey vessel will typically acquire the data along a series of adjacent and parallel lines in a “racetrack”-like pattern. At the end of the first line in a racetrack sequence, the vessel will turn in a wide arc to position for another parallel line in the opposite direction, offset several kilometres from the previous line. The vessel will then turn again to position to return in the opposite direction along the third parallel line in the sequence. The distance between sail lines will be approximately 300 m based on a six-streamer vessel.

The survey area will be split into three areas, a western and eastern portion, and the nodal area. The western portion is currently planned to be completed first, followed by the eastern portion with the nodal area being acquired last (Figure 3-3). The vessel will sail lines that are typically in a north–south orientation. The time required to complete each sail line is dependent on vessel speed and currents. There may be some concurrent activities with nodes being laid in the nodal area whilst the western portion commences acquisition, however this will depend on vessel availability and weather conditions.

During line runouts, the seismic source will typically be operated at full volume for the equivalent of half a streamer length (approximately 3 km) before the source is shut down and the survey vessel commences the next line turn. Following completion of the line turn, the vessel will complete a run-in towards the ASA, which involves sailing in a straight line to allow the streamers to straighten prior to commencing acquisition. At the ASA boundary soft-start procedures will commence for a minimum of duration of 30 minutes (approximately 4 km). Soft-starts begin with the operation of the single smallest source element in the array and gradual ramp-up to include additional source elements until the seismic source is operated at full volume for the commencement of the acquisition line within the ASA.

The seismic source may also be operated for short durations in a controlled manner elsewhere in the ASA, for the purpose of source maintenance and testing. These activities are infrequent and typically involve short intermittent controlled discharges of individual source elements (i.e., single gun/cluster or single source array) for durations in the order of a short number of testing shots. Since this testing only involves a single gun or a small cluster of guns, the noise propagated from the source during this activity must logically be less than the whole array. Therefore, any impacts from noise emissions will not be greater than that predicted in the impact assessment.

Operation of the seismic source in all cases will be in accordance with control measures and performance standards specified in this EP.

3.3.2 Infill

When acquiring 3D marine seismic data, surface currents may shift the streamers away from their nominal positions. This shift, called feathering, can lead to holes in the data coverage. Holes in data coverage can also occur when the airgun

array is turned off due to technical or logistical reasons (e.g., technical problems or marine fauna interactions). These holes are typically filled by steering the vessel closer to the previous sail-line or by acquiring additional sail-lines along the holes. These extra sail-lines are known as infill. Infill can be a large part of the time and cost for a marine seismic survey. Without infill activity, seismic surveys would be incomplete, the data compromised, and contract requirements not fulfilled.

It is not possible to estimate what the amount of feather (and resulting coverage) will be. The western section of the ASA (blue lines on Figure 3-3) will be acquired and then infilled. Then the vessel will travel to the eastern section (red lines on Figure 3-3) and complete acquisition and then undertake any required infill.

With proper infill management, unnecessary infill lines may be reduced or avoided. The on-board navigator steers the seismic vessel for coverage to minimise the amount of infill. Additionally, steerable streamers and fan-mode techniques for the streamer spread are used to minimise infill requirements. In the nodal area the static placement of the receivers allows greater control over the source/receiver interaction which results in a much lower likelihood of requiring infill, though it may occur.

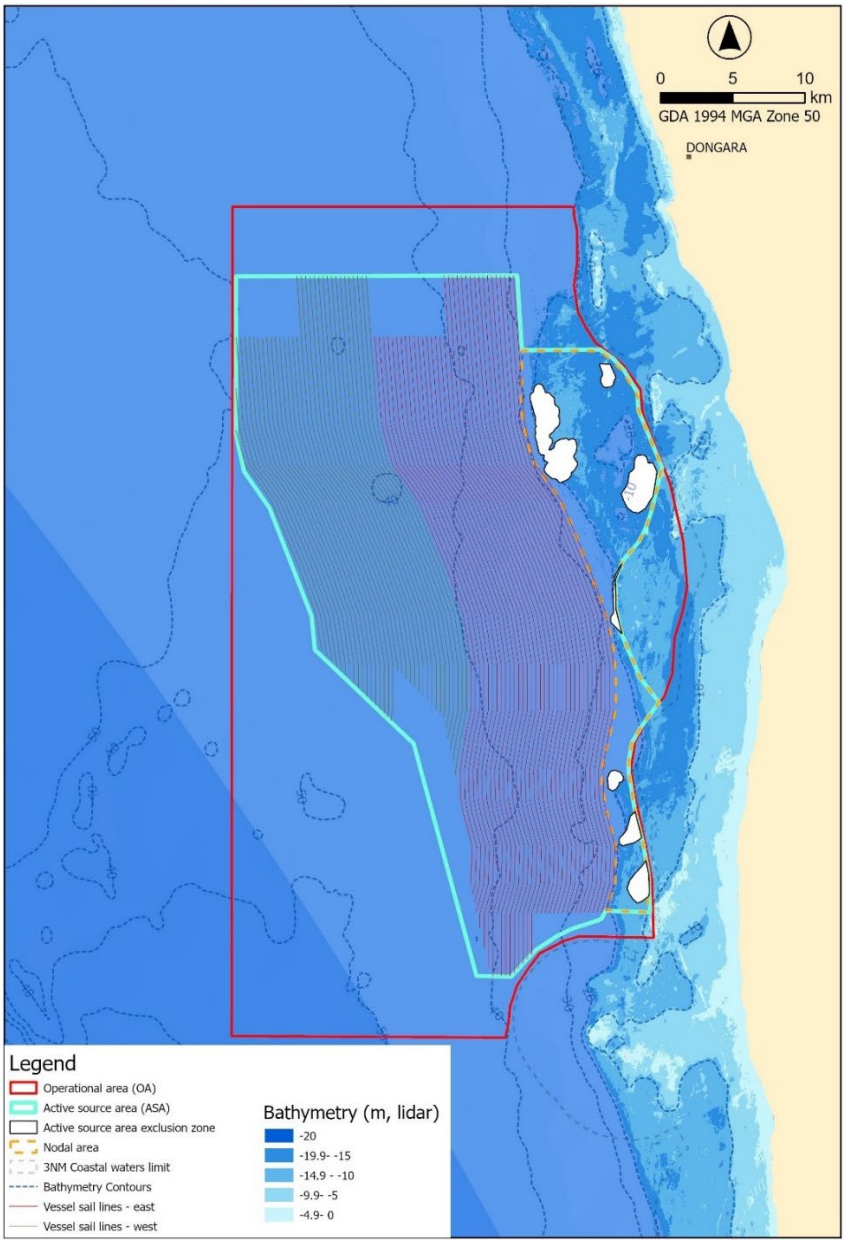


Figure 3-3: Sail lines in the east and west and nodal area showing exclusion zones

3.3.3 Ocean bottom nodes

The shallow waters within the survey area present a potential technical and safety challenge for the survey vessel towing a large streamer array. These sections, referred to as the nodal area for nodal acquisition (Figure 3-2 and Figure 3-3), will be acquired using Ocean Bottom Node (OBN) technology rather than towed streamers.

These devices are small and light (ranging from 3–12 kg, with dimensions between 200–400 mm × 200–400 mm and an approximate height of 100 mm – dependant on manufacture) and have flexible placement and retrieval options including autonomous vehicles, nodes on a rope (NOAR) and commercial divers. The final design of the nodal survey is dependent on the seismic contractor awarded the activity as it relates to the number of nodes available, and the deployment method proposed to acquire the survey in the most efficient and timely manner. However, it is expected that they will be placed in grids of 250 m × 250 m, which would result in the deployment of approximately 2,500 nodes across the entire nodal

area. This results in a node density of approximately 200/km^2. Pilot will use a smaller source, of max volume 1420 in^3, for acquisition in the shallow waters where nodes may be used. The nodes would be placed at the start of the survey and collected at the end of the survey timeframe.

No nodes will be deployed within the 500 m radius petroleum safety zone (PSZ) around the Cliff Head development wellhead platform.

Once the nodes have been deployed, a seismic source vessel will tow the source along source lines 50 m apart. While the shot point interval along each individual source line is 100 m, the use of staggered source lines and flip-flop shooting results in an effective shot point interval of 50 m across the area. This firing pattern aligns with the assumptions used in the acoustic modelling by JASCO and reflects the expected operational approach. Where there are the source exclusion zones, the source vessel will deviate around these zones, with the source points being offset laterally. Given the cumulative nature of the noise emitted there will be a 24hr restriction on each subsequent pass that goes within a 200m distance of the exclusion zone boundary.

Whilst it is expected that the streamer component of the survey will be acquired prior to the nodal phase, given the short acquisition window, the final decision on order of acquisition will be dependant on environmental factors such as weather forecasts. Regardless of the order of acquisition, the nodes are expected to be deployed for the majority of the survey duration. Timing for acquisition of this area will be based on the Vessel Masters assessment and may occur before, during or after streamer acquisition.

Dependent on the assessment of the Vessel Contractor, with regards to the safe acquisition of the towed streamer component of the survey, and the conditions at the time of survey, this nodal area may increase in size. The increase would be limited to sections of the western boundary of the nodal area, with the nodal deployment being expanded into these deeper waters.

3.3.4 Simultaneous surveys

It is unlikely that seismic surveys will operate simultaneously in the region as there are limited titleholders nearby to the survey area and the high cost of mobilising a survey vessel means that titleholders are driven to share a vessel sequentially rather than to operate individual vessels simultaneously. As of the date of submission no EPs have been submitted for surveys within proximity to the OA.

In addition, the goals of a survey can be compromised by simultaneous operations (SIMOPS). The sound generated from one survey will interfere with the seismic data acquisition of the other survey, limiting the value of the acquired data for interpretation.

3.3.5 Seismic vessel

A purpose-built survey vessel will be used for the Eureka 3D MSS and will carry up to approximately 70 people. The specific vessel for the survey has yet to be determined.

The seismic vessel and towed arrays, comprising the acoustic source array and streamer array (including the streamer header buoys, starboard and port deflectors or bara-vanes, streamers and tail buoys) are surrounded by a Safe Navigation Area (SNA). The SNA will extend to three nautical miles (nm) around the seismic vessel and towed equipment. The support/chase vessel will be used to ensure third party vessels are prevented from entering the SNA.

Potable water, primarily for accommodation and associated domestic areas, will be generated on the seismic and support/chase vessels using a reverse osmosis (RO) system. This process will produce brine, which is diluted and discharged at the sea surface in accordance with controls detailed in Section 7.5. The project vessels will also discharge deck drainage from open drainage areas, bilge water from closed drainage areas, putrescible waste and treated sewage and grey water. Any hazardous and non-hazardous waste will be appropriately stored and transported to shore for disposal.

3.3.6 Support vessels

A minimum of two support vessels will be engaged for the Eureka 3D MSS. These comprise:

- One chase vessel accompanying the seismic vessel to assist with managing potential interactions with other marine users.
- One supply vessel responsible for resupply and other support functions.
- Additional vessels may be required for laying ocean nodes.
- There will be no refuelling of the survey vessel in the OA.
- Crew changes are expected to be undertaken by a supply vessel approximately every 4–6 weeks so are unlikely to occur during the survey period, except in mitigating circumstances.