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**ENVIRONMENT PLAN  
EXECUTIVE SUMMARY**

**SANTOS SOUTHERN MARGINS – SORELL BASIN (T/48P) 2D SEISMIC SURVEY**

Prepared for:

Santos Limited

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**Santos**

# CONTENTS

<b>ENVIRONMENT PLAN</b>	<b>1</b>
<b>EXECUTIVE SUMMARY</b>	<b>1</b>
<b>1 EXECUTIVE SUMMARY</b>	<b>1</b>
1.1 The Proponent	1
1.2 The Proposal	1
1.3 Stakeholder Consultation	1
1.4 Environmental Impact Assessment, Management and Mitigation	3
1.5 Contact Details	7
<b>Tables</b>	
Table ES1 Summary of environmental impact assessment results	4
<b>Figures</b>	
Figure ES1 Location of survey area	2

## **1 EXECUTIVE SUMMARY**

### **1.1 The Proponent**

Santos Limited (Santos) is the proponent for the Southern Margins – Sorell Basin (T/48P) 2D Seismic Survey.

Santos is a major Australian energy company with its headquarters in Adelaide, and is the largest producer of natural gas for the Australian market supplying all mainland States and Territories. The core business of the company is oil and gas exploration and production with interests in every major Australian petroleum province. Santos is also the operator for permit areas in Western Australia, Northern Territory, Victoria and Tasmania.

### **1.2 The Proposal**

Santos Limited (Santos) proposes to acquire approximately 710 km of 2D marine seismic data within Petroleum Exploration Permit T/48P. The survey will be undertaken entirely within Commonwealth waters in the Sorell Basin off the west coast of Tasmania (Figure ES1). The project is called the Southern Margins – Sorell Basin (T/48P) 2D Seismic Survey.

The T/48P seismic survey is scheduled to occur over approximately 9 days (2 of which are weather standby days), during the period March to May 2008. The Environment Plan covers the activities undertaken as part of the seismic survey.

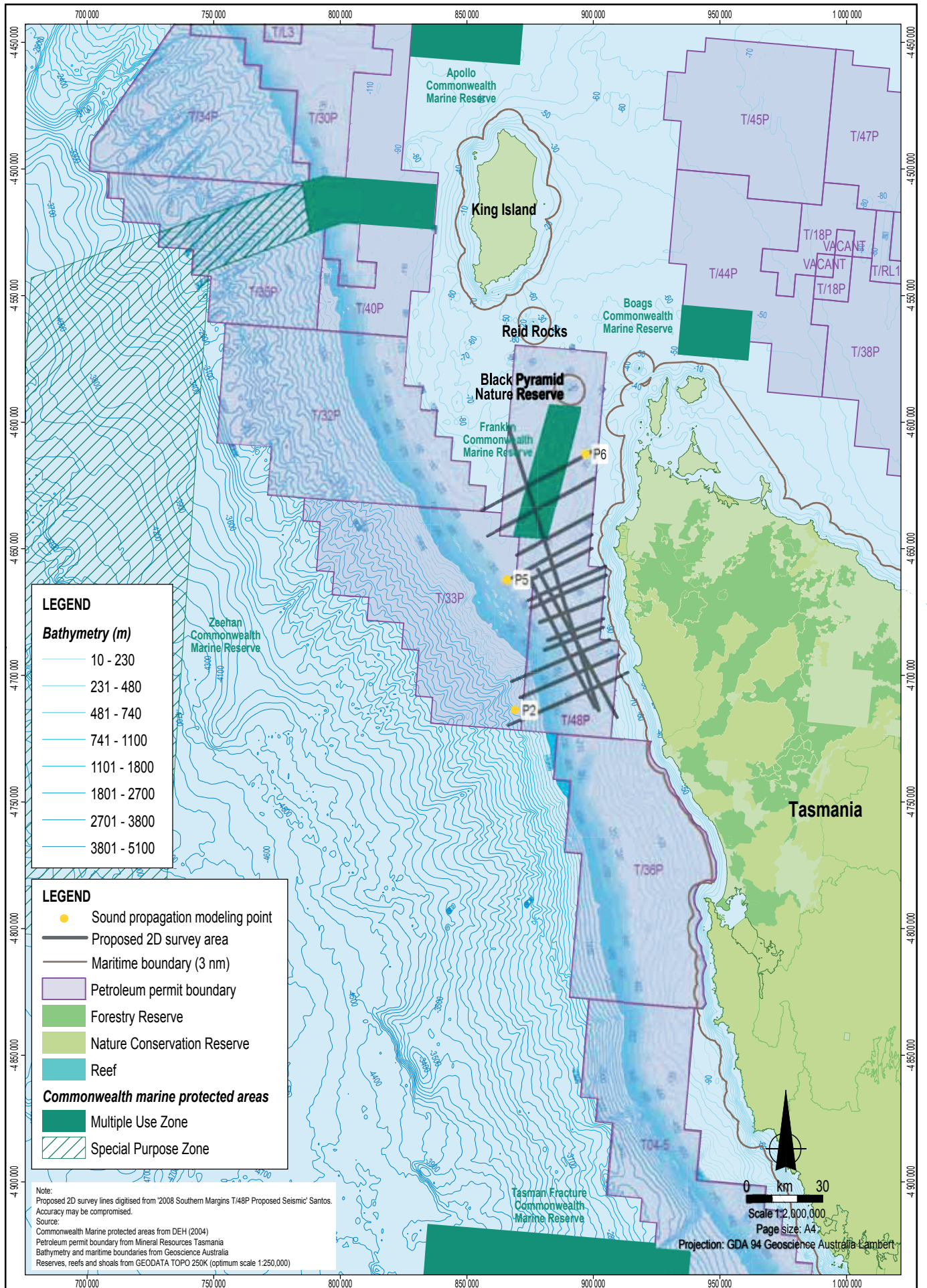
The seismic survey is typical of 2D seismic surveys conducted in Australian marine waters (in terms of technical methods and procedures). Sound waves are created through the rapid release of an underwater piston driven by compressed air in a series of devices that are configured into an acoustic source towed behind the vessel. The sound waves created from this rapid release travel through the water column downwards into the earth's surface. The sound reflects from underground geological features and is recorded by hydrophones towed behind the vessel on a streamer cable. The recorded reflections are analysed and interpreted to indicate the potential presence of oil and gas deposits within the earth's surface.

The MV Pacific Titan seismic survey vessel has been contracted to undertake the proposed seismic operations and this vessel will complete acquisition transects of the survey area by sailing along predetermined survey lines (hereafter referred to as the 'survey area').

The vessel will tow one hydrophone cable streamer, approximately 6,000 m long. The hydrophone cable streamer will travel about 7 m below the sea surface controlled by mechanical devices called 'birds' to maintain the travel depth, and prevent the equipment from making contact with the seabed. The vessel will be required to make some turns outside of the proposed exploration area at the completion of each transect pass.

### **1.3 Stakeholder Consultation**

In the course of planning the proposed seismic exploration program, Santos has undertaken a consultation program with relevant stakeholders in the region to identify regulatory processes, potential environmental issues and management requirements. Santos will undertake ongoing consultation to ensure the seismic survey management arrangements and communications are in place.



Stakeholders of relevance to the T/48P Seismic Survey include:

*Commonwealth Government*

- Department of the Environment, Water, Heritage and the Arts (DEWHA).
- Department of Industry, Tourism and Resources (DITR).
- Australian Fisheries Management Authority (AFMA).
- Border Protection Command.
- Australian Maritime Safety Authority (AMSA).

*Tasmanian State Government*

- Department of Infrastructure, Energy & Resources (DIER).
- Department of Primary Industries and Water (DPIW).

*Commercial fishing groups*

- Commonwealth Fisheries Association.
- Seafood Industry Victoria.
- Tasmanian Fishing Industry Council (TFIC).
- Tasmanian Abalone Council (TAC).
- South East Fishery Association.
- Tasmanian Rock Lobster Fishing Association.
- South East Trawl Fishing Industry Association.

Consultation and information dissemination has been, and will continue to be undertaken through a range of processes including:

- Meetings with regulators.
- Meetings with TFIC and TAC.
- Correspondence with key stakeholders.
- Provision of detailed project maps.
- Communication of schedule to fishing operators.
- Information notices placed in fishing industry publications.
- Provision of a detailed seismic brochure.

Consultation with commercial fishing groups will follow APPEA and DEWHA Guidelines where applicable.

## **1.4 Environmental Impact Assessment, Management and Mitigation**

The main potential environmental hazards associated with the seismic surveys include:

- High intensity sound discharge.
- Physical presence of the vessel.
- Waste discharge.
- Ballast water discharge.

- Hydrocarbon and/or chemical spills.

The Environment Plan provides a detailed assessment of potential impacts. The key points of the assessment, and management and mitigation measures are summarised in Table ES1 below. For the summary risk ranking shown in Table ES1, there are a total of 10 environmental risk assessments, seven of these were assessed as having low risk and three assessed as having a moderate risk.

**Table ES1 Summary of environmental impact assessment results**

Impact Assessment	Management and Mitigation	Risk Ranking
<p><b>Acoustic discharge: High Intensity sound discharges</b> Pathological damage to cetacean hearing systems or other organs.</p>	<p>The timing of the T/48P seismic survey coincides with blue and humpback whale activity, and is removed from breeding/feeding locations. DEWHA management guidelines for seismic vessels will be implemented. Highly unlikely cetaceans will be within 2 km of an active acoustic source, due to the implementation of soft start procedures. Highly unlikely cetaceans would be exposed for sufficient duration to cause hearing damage.</p>	<p>Low</p>
<p><b>Acoustic discharge: High Intensity sound discharges</b> Behavioural / lifecycle change to cetaceans. Complete avoidance by whales at some levels. Cetaceans may implement avoidance measures.</p>	<p>Stand-off or avoidance measures not expected to cause gross changes in behaviour or normal activities. DEWHA management guidelines for seismic vessels will be implemented. Highly unlikely whales will be within 2 km of an active acoustic source, due to implementation of soft start procedures.</p>	<p>Moderate</p>
<p><b>Acoustic discharge: High Intensity sound discharges</b> Behavioural change to pinnipeds.</p>	<p>Surveys will not occur during known nesting / breeding season. Surveys will remain distant from known breeding or nesting areas. Soft start requirements to minimise impacts to cetaceans will also minimise potential impacts on any transient seals in the survey areas. Highly unlikely that a seal will be affected whilst located in an important habitat area.</p>	<p>Low</p>
<p><b>Acoustic discharge: High Intensity sound discharges</b> Behavioural / lifecycle change to fish species. Potential pathological effects. Behavioural changes and startle response.</p>	<p>Behavioural changes likely to be localised and temporary (alarm, avoidance, tighter schooling). Any 'flight' response likely to be localised and short term. Effects of seismic on larval fish and invertebrate populations negligible compared to total population sizes and natural mortality rate for eggs and larvae. Impacts will be limited to the duration of the survey (approximately 9 days including potential standby time). Soft-start procedures will prevent sudden exposure. The Franklin Commonwealth Marine Reserve is a Multiple Use Zone that allows seismic surveys. Soft-start procedures will prevent sudden exposure to marine life.</p>	<p>Low</p>

**Table ES1 Summary of environmental impact assessment results (cont'd)**

Impact Assessment	Management and Mitigation	Risk Ranking
<p><b>Vessel travelling through permit area: Physical presence of the vessel</b> Behavioural change to marine animals.</p>	<p>Possible behavioural changes in response to the physical presence of the vessel are considered to be similar, although less intense, than those associated with sound discharges.</p>	<p>Low</p>
<p><b>Vessel travelling through permit area: Physical presence of the vessel</b> Collision with marine mammals causing death or injury.</p>	<p>Due to size and speed of vessel, noise generated by engines and acoustic array, considered that animals would be able to easily avoid the vessel. DEWHA management guidelines for seismic vessels will be implemented. Highly unlikely a whale will be within 2 km of an active acoustic source, due to the implementation of soft start procedures.</p>	<p>Low</p>
<p><b>Vessel travelling through permit area: Physical presence of the vessel</b> Interference to fishing or third party activities. Potential exists to temporarily exclude fishing activities during the surveys. May require minor modification to the course of third party vessels during the surveys. Adverse impacts will be localised and short term.</p>	<p>Possible that commercial fishing vessels operating in survey areas during time of surveys, although fishing activity expected to be limited. Possible that shipping operators wish to travel through the survey areas during time of surveys, although permit area is removed from major shipping lanes. Consultation strategy shall be in place to advise of the location and schedule of the seismic surveys and to ensure that any impacts on other users are minimised. Seismic Contractor shall remain vigilant for fishing and other commercial vessels during the surveys. Utilise radar and satellite navigation systems to ensure sufficient warning of other vessels approaching the survey areas and establish communications to avoid conflict. Record of consultation with commercial fisheries groups shall be kept and made available to regulatory authorities upon request. AMSA will be formally contacted regarding the surveys and standard maritime safety procedures will be adopted.</p>	<p>Moderate</p>
<p><b>Vessel travelling through permit area: Routine waste discharges to sea Changes to water quality.</b> Minor changes to water quality and nutrient level that are short term and localised. Minor changes to feeding patterns of fish species. Low level contamination or toxic effects to fish species and plankton.</p>	<p>Dilution and decomposition will reduce nutrient levels over time. No discharge to sensitive environments (i.e. within 12 nm of any land, in areas of environmental sensitivity or shallow waters). All other waste shall be retained onboard for appropriate disposal on-shore. Waste discharges limited to food scraps and sewage. Sewage treated prior to disposal offshore and food scraps shall be macerated (&lt;25 mm). Disposal will conform to the requirement of MARPOL Annex IV.</p>	<p>Low</p>
<p><b>Vessel travelling through permit area: Ballast water discharges.</b> Introduction of foreign organisms. Foreign organisms may compete with native species, introduce disease or modify local ecological processes.</p>	<p>Ballast water will not be discharged or exchanged during the surveys. Ballast water will be managed in strict accordance with the AQIS guidelines.</p>	<p>Low</p>

**Table ES1 Summary of environmental impact assessment results (cont'd)**

Impact Assessment	Management and Mitigation	Risk Ranking
<p><b>Vessel travelling through permit area: Physical presence of the vessel</b> Contamination of marine environment. Pathological effects to fish larvae and ingestion by marine organisms. Smothering of marine flora and fauna. Contamination of landforms.</p>	<p>Streamers are segmented and each segment contains a synthetic gel-solid, designed not to leak if streamers holed, cut or severed. Cable reel, cable storage area and cable deck will be contained. Seismic cables will be fit for purpose, not outside design life and regularly checked for leaks. Where possible, cable weights will be used that do not require tape. Oil spill repose procedures detailed in the Shipboard Oil Pollution Emergency Plan (SOPEP). All necessary oil spill contingency equipment shall be maintained to ensure it is functional and accessible. Major event resulting in large release of fuel not considered likely. Refuelling will be undertaken in port.</p>	<p>Moderate</p>

In summary, the offshore seismic survey is located entirely within Commonwealth waters in the Sorell Basin off the west coast of Tasmania. The transient nature and short duration of the survey (9 days, including weather standby days) means that the activity has a low to moderate impact on the marine environment.

Stakeholders have been consulted, especially fishing groups, and mitigation measures have been put in place to manage interaction with whales that may be present at the time of the surveys.

Detailed management and mitigation measures that will be followed during the project are provided in the Environment Plan. The implementation strategy for the Environment Plan specifically details the measures needed to ensure that the environmental performance objectives and standards are met, and identifies:

- Systems, practices and procedures.
- Specific roles and responsibilities.
- Employee training.
- Monitoring, auditing and recording requirements.
- Emergency response planning.
- Consultation with government and stakeholders.



## **1.5 Contact Details**

Please direct all queries, comments or requests for a copy of the approved T/48P 2D Seismic Survey Environment Plan to:

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