

# Environment Plan Summary

## Mereenie Field Development

**Santos**

**Facility:** Mereenie Operations

**Project Title:** Mereenie Appraisal and Development Drilling (MADD) Project



## TABLE OF CONTENTS

1 INTRODUCTION .....	3
2 PROJECT DESCRIPTION .....	5
3 EXISTING ENVIRONMENT.....	6
4 ENVIRONMENTAL RISKS OF PROPOSED ACTIVITY .....	7
5 CONSULTATION.....	9

## 1 INTRODUCTION

Santos proposes to drill 8 development wells in Mereenie, Northern Territory. This project is known as the Mereenie Appraisal and Development Drilling (MADD) Project. The field lies 250km west of the town of Alice Springs, within the Amadeus Basin in the southern area of the Northern Territory. The field is located on Aboriginal land and contained within NT Petroleum Leases OL4 (Western Mereenie) and OL5 (Eastern Mereenie), both first granted in November 1981 and reissued in 2002.

The purpose of these wells is to further appraise and develop conventional oil in the Mereenie field. The focus will be predominantly in the western acreage of the field where activity and drilling to date has been sparse. The secondary objective is to evaluate the vast unconventional prospective resource known to exist within the Stairway and Horn Valley formations.

The nominated liaison personal for the project is Mr Mark Buckland, Manger Victoria and Mereenie, Santos Limited (mark.buckland@santos.com).

Wells will be drilled in the following locations:

East Mereenie 44:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
24° 01' 16.96" S	131° 36' 42.69" E	± 639 mRT	769.6 m	764.47 m	5.15 m

East Mereenie 45:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
24° 01' 36.63" S	131° 35' 52.59" E	± 800 mRT	738.2 m	733.09 m	5.15 m

West Mereenie 19:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
23° 55' 52.27" S	131° 23' 36.44" E	± 588 mRT	735.95 m	730.8 m	5.15 m

West Mereenie 20:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
23° 57' 50.49" S	131° 28' 14.72" E	± 608 mRT	791.5 m	786.34 m	5.15 m

West Mereenie 21:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
23° 56' 07.32" S	131° 24' 43.65" E	± 606 mRT	754.15 m	749.21 m	5.15 m

West Mereenie 22:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
23° 56' 35.88" S	131° 23' 58.03" E	± 603 mRT	747.73 m	742.58 m	5.15 m

West Mereenie 23:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
23° 58' 09.90" S	131° 26' 50.20" E	± 613 mRT	748.9 m	743.75 m	5.15 m

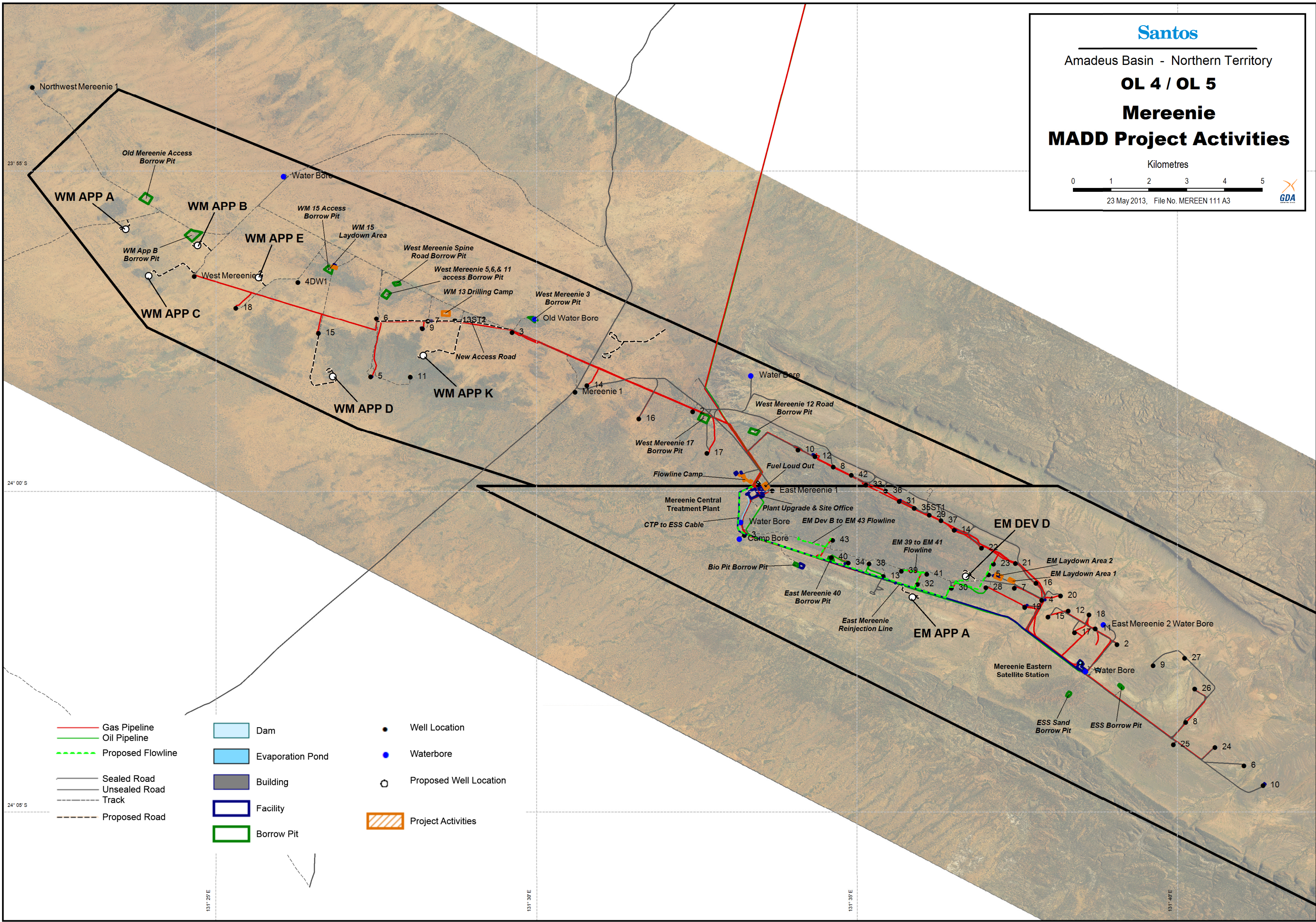
West Mereenie 24:

Surface Location		TD	Elevation		
Latitude	Longitude	Surface hole TVD	Ref RT (Ensign 918)	GL	RT-GL
23° 56' 37.30" S	131° 25' 40.75" E	± 590 mRT	749.01 m	754.16 m	5.15 m

Kilometres



23 May 2013, File No. MEREEN 111 A3



- Gas Pipeline
- Oil Pipeline
- Proposed Flowline
- Sealed Road
- Unsealed Road
- Track
- Proposed Road

- Dam
- Evaporation Pond
- Building
- Facility
- Borrow Pit

- Well Location
- Waterbore
- Proposed Well Location
- Project Activities

## 2 PROJECT DESCRIPTION

Leases will be constructed to a standard lease layout with variation occurring time to time with specific requirements. Large scale levelling and clearance of vegetation, especially the removal of trees and larger shrubs, has been avoided wherever possible. Pruning branches will be used instead of removing the whole tree.

The flowline gathering system transports well fluids from individual well sites and groups of wells to the processing facilities for initial processing and the transports processed gas from the plants to injection wells.

Existing roads and tracks have been used as far as practical on the site to avoid the creation of parallel and multiple access'. Roads have been designed to minimise their environmental footprint, with standards allowing only sufficient width to enable the ingress/egress of the rig and associated equipment, materials and service vehicles.

The main processing facilities are the Central Treatment Plant (CTP) and the Eastern Satellite Station (ESS) which are equipped for gas, oil and water separation, gas conditioning, dehydration and compression, oil pumping and water disposal. Facilities upgrades are required inside the plant to handle the anticipated appraisal and development volumes from the project.

The existing Liquids Storage Facility at the Central Treatment Plan (CTP) will be upgraded to increase the fluid handling capacity and allow for increased production. The existing fuel load out facility located adjacent the water treatment ponds will also be upgraded to allow for additional refuelling capacity during the project.

Material will be extracted from eleven existing borrow pits and one new borrow pit to enable the construction of new well pads and new roads for the development drilling and also for ancillary activities such as laydown areas and camps. The borrow pits may also be used to provide soft earth for trench backfilling.

State-of-the-art drilling technology will be used for the MADD project. Each well will be drilled in two sections: a top hole to a depth of up to 800 metres, followed by a production hole which will be drilled to the target depth of approximately 1.6 kilometres. The Mereenie oil and gas is located between 1.3 – 1.7 kilometres underground in sandstone formations. To reach the oil and gas, Santos will drill through the Mereenie sandstone which contains an aquifer from about 150 – 750 metres deep.

### 3 EXISTING ENVIRONMENT

All activities are located within an undulating low sand dune land system with the dominant vegetation characterised by Desert Oak trees and dryland spinifex. Some rocky outcrops were identified within close proximity to the inspected locations. Owing to the sand soils of the proposed locations, some import of clay to the lease locations and access roads will be required to provide a safe stable working surface. During construction, clay use will be kept to a minimum resulting in the lowest possible extraction from new or existing borrow pits.

Waterways such as creeks and washes are more prevalent in Eastern Mereenie due to presence of the outcrop of strata known as the East Mereenie Range. Creeks lines result from drainage from ridges and crests. Western Mereenie is characterised by a more sandy terrain which is flat with the occasional outcrop. It is more densely populated with Desert Oak trees. Surface water at Mereenie is ephemeral, which rainfall falling heavily in short periods causing erosive flow events during these times. Significant water courses down gradient of the East Mereenie Range are characterised by riparian vegetation and large eucalyptus trees. Billabongs and water holes may provide some permanent water holes during times of heavy extended rainfall.

## 4 ENVIRONMENTAL RISKS OF PROPOSED ACTIVITY

### 4.1 Air Quality

<b>Environmental Values</b>	<ul style="list-style-type: none"> <li>Rural air environment with qualities conducive to suitability for the life, health and wellbeing of humans.</li> </ul>
<b>MADD Objectives</b>	<ul style="list-style-type: none"> <li>Minimise environmental nuisance due to dust for sensitive receptors as a result of petroleum activities.</li> <li>Minimise greenhouse gas emissions.</li> </ul>
<b>Performance Measures</b>	<ul style="list-style-type: none"> <li>Minimal complaints regarding dust/air quality</li> <li>Amicable resolution of complaints.</li> </ul>
<b>Records</b>	<ul style="list-style-type: none"> <li>All complaints and any subsequent actions are to be recorded in accordance with the Stakeholder Management Plan.</li> </ul>

### 4.2 Water

<b>Environmental Values</b>	<ul style="list-style-type: none"> <li>Biological integrity of modified riverine ecosystems and natural waterways</li> <li>Suitability for recreational use</li> <li>Suitability for agricultural use</li> <li>Suitability for human consumption</li> <li>Suitability for industrial use</li> </ul>				
<b>MADD Objectives</b>	<ul style="list-style-type: none"> <li>To avoid degradation in water quality and maintain surface, groundwater and aquifer values.</li> <li>To minimise erosion and sedimentation of any waters as a result of petroleum activities.</li> </ul>				
<b>Environmental Aspects</b>	<table border="1"> <thead> <tr> <th>Potential Impacts</th> <th>Management Controls</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>No surface or ground water contamination identified</li> <li>No scouring and flow unaltered</li> <li>Diversion mechanisms in place, regularly checked and maintained to redirect natural stormwater movement where required</li> <li>Watercourse banks effectively reinstated</li> </ul> </td> <td></td> </tr> </tbody> </table>	Potential Impacts	Management Controls	<ul style="list-style-type: none"> <li>No surface or ground water contamination identified</li> <li>No scouring and flow unaltered</li> <li>Diversion mechanisms in place, regularly checked and maintained to redirect natural stormwater movement where required</li> <li>Watercourse banks effectively reinstated</li> </ul>	
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<b>Performance Measures</b>					
<b>Records</b>	<ul style="list-style-type: none"> <li>Records of spills, leaks and associated clean ups are to be managed using the Incident Management System</li> <li>Rectification work requirements and actions will be recorded using the Incident Management System</li> </ul>				

### 4.3 Noise

<b>Environmental Values</b>	<ul style="list-style-type: none"> <li>A rural acoustic environment conducive to the wellbeing of the community, including its social and economic amenity, and an individual, including the opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise.</li> </ul>				
<b>MADD Objectives</b>	<ul style="list-style-type: none"> <li>To minimise the environmental nuisance for sensitive receivers as a result of petroleum activities.</li> </ul>				
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### 4.4 Land

<b>Environmental Values</b>	<ul style="list-style-type: none"> <li>Suitability and stability of land for existing uses</li> <li>Stability of land to preserve existing water quality, landscapes and ecosystems</li> </ul>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>To minimise disturbance to land and land use (including soils and terrain, flora and fauna)</li> <li>To avoid site contamination and remediate land areas disturbed by petroleum activities, including contaminated land</li> <li>Optimise (in order of least preferable) waste avoidance, reduction, reuse, recycling, treatment and</li> </ul>



	<p>disposal and remove and disposal of regulated waste as soon as practicable to a licensed waste disposal facility or recycling facility</p> <ul style="list-style-type: none"> <li>To return disturbed areas to a stable condition such that they are returned to a condition as close as practicable to the surrounding area (or pre-disturbance state) within an acceptable time frame</li> </ul>
<b>Performance Measures</b>	<ul style="list-style-type: none"> <li>Land disturbance minimised</li> <li>Rehabilitation of disturbed areas</li> </ul>
<b>Records</b>	<ul style="list-style-type: none"> <li>The area of all disturbances will be determined and placed within Santos' Geographic Information System (GIS)</li> </ul>

## 4.5 Flora and Fauna

<b>Environmental Values</b>	<ul style="list-style-type: none"> <li>Maintain the integrity of significant ecosystems</li> </ul>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>To minimise disturbance to flora and fauna</li> <li>To minimise disturbance to sensitive areas</li> </ul>
<b>Performance Measures</b>	<ul style="list-style-type: none"> <li>Construction activities will be regularly inspected to assess the effectiveness of protection measures, with particular attention to management of flora and fauna protection and clearing boundaries.</li> <li>Ongoing monitoring will be undertaken to assess the success and integrity of construction and rehabilitation measure and ensure appropriate follow-up rehabilitation measures are implemented</li> </ul>
<b>Records</b>	<ul style="list-style-type: none"> <li>Santos internal environmental clearance by Environmental Advisers</li> <li>Records of disturbance are maintained within Santos' GIS</li> <li>Records of inspections will be maintained.</li> <li>All incidents will be reported internally and corrective action initiated</li> </ul>

## 4.6 Community

<b>Environmental Values</b>	<ul style="list-style-type: none"> <li>Livelihood and well-being of local communities and towns</li> <li>Aboriginal and non-Aboriginal heritage</li> </ul>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>To minimise impacts upon environmental values of the local community</li> <li>To minimise impacts on cultural heritage</li> <li>To regularly measure regulatory compliance and company conformance, and undertake corrective actions as necessary</li> <li>Minimise any safety risk to the public and other third parties.</li> <li>Maintain and enhance partnerships with the local community</li> </ul>
<b>Performance Measures</b>	<ul style="list-style-type: none"> <li>No disturbance to cultural heritage sites</li> <li>No unresolved reasonable complaints</li> </ul>
<b>Records</b>	<ul style="list-style-type: none"> <li>Cultural Heritage Clearance documents</li> <li>Complaints register</li> </ul>

## 5 CONSULTATION

To date, consultation has included discussions with the CLC and the Department of Mines and Energy in relation to the project. Additional consultation will be undertaken through discussion with the CLC at future Advisory Body meetings and specific strategies detailed in the Stakeholder Management Plan.

Santos has engaged in stakeholder liaison over the past several months, intended to increase support for activities, identify community issues and find ways to address any issues or concerns. Santos will continue to engage with stakeholders on an ongoing basis throughout the life of the MADD project as a way of keeping key stakeholders informed about our activities, educating the community, landowners, traditional owners and government about the project, and building and maintaining stakeholder confidence through long-term relationships.

A detailed cultural heritage assessment and clearance process has been undertaken involving representatives of the Traditional Owners including field assessment and development of effective protection measures.