



# Appendix N1

Aboriginal cultural heritage assessment



# **Aboriginal Cultural Heritage Assessment Report**

for the

## **Narrabri Gas Project**

Prepared by

Central Queensland Cultural Heritage Management Pty Ltd

**CQCHM**

**November 2016**

# Executive Summary

The Proponent is proposing to develop natural gas in the Gunnedah Basin in New South Wales (NSW), southwest of Narrabri.

The Narrabri Gas Project seeks to develop gas wells, gas and water gathering systems, and supporting infrastructure in the Project Area. The natural gas produced would be treated at a central gas processing facility on a rural property located southwest of Narrabri (the Leewood property) within the Project Area. The gas would then be piped via a gas transmission pipeline to market. The gas transmission pipeline would be part of a separate approvals process and is therefore not part of this proposal.

The Proponent has committed to proceeding with the Project on the basis of implementing best practice in relation to Aboriginal cultural heritage management, through implementation of the Avoidance Principle. It was considered that this was a possibility due to the flexibility inherent in the design of project infrastructure and components. The purpose of the assessment was to determine whether it would be possible to give effect to the Avoidance Principle so that the Project would result in minimal, if any, impact to Aboriginal cultural heritage sites and values. The answer to this question is deemed to be affirmative.

CQCHM conducted a cultural heritage assessment of the Project Area. The heritage assessment included literature and heritage database searches, reviews of previous studies including cultural values and oral histories, discussions with the OEH and the Narrabri Local Area Land Council (LALC) to obtain additional cultural heritage data, a data audit and field surveys to validate existing data and Aboriginal consultation.

This report is an Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the OEH's *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and the Secretary's Environmental Assessment Requirements which incorporates recommendations specified by the OEH.

Consultation in accordance with the OEH *Aboriginal cultural heritage consultation requirements for proponents* (DECCW 2010a) is well advanced. To date, there are over 500 Registered Aboriginal Parties (RAPs) including the registered native title applicant, several Local Aboriginal Land Councils (LALCs); other organisations and numerous individuals. The Aboriginal consultation process for the Project is ongoing.

The cultural heritage assessment has established that there are 16 types of sites likely to be found, and there are 90 known Aboriginal cultural heritage sites and potentially other sites of Aboriginal cultural heritage significance which may be present within the Project Area. These sites include archaeological sites, and places of traditional, historical and contemporary significance. At least 63 plants of cultural value have also been identified as existing in the Project Area.

The installation of well pads, linear infrastructure and other activities for the Project has the potential to impact on Aboriginal cultural heritage sites and values in the Project Area. The flexibility in the design of the Project will allow The Proponent to locate each well pad and connecting linear infrastructure to avoid or minimise impacts to known Aboriginal cultural heritage sites and values and to other sites and values identified through additional procedures recommended in this report. This includes conduct of an Additional Research Program to document other sites or values of ethnographic significance that may exist within the Project Area.

The Proponent has committed that the Project would not impact on known sites within the Project Area. The potential to impact on unknown sites within the Project Area can be reduced by implementation of a comprehensive and integrated management plan including Pre-

Clearance Surveys of all areas with the Aboriginal community prior to siting infrastructure. A Cultural Heritage Management Plan (CHMP) has been prepared for the Project. Primary to this management plan will be adoption of the Avoidance Principle.

The CHMP will require Santos to undertake a Pre-Clearance Survey with the Aboriginal community for the specific site for each well pad and other infrastructure prior to land disturbance occurring in that area to confirm whether there are further items of Aboriginal cultural heritage significance on the proposed site which have not been identified in the surveys undertaken to date.

The siting of the well pads and linear infrastructure required for the gas field will then be undertaken in accordance with the locational criteria set out in the CHMP and Field Development Protocol which includes infrastructure not to be located:

- in areas where the 90 known Aboriginal cultural heritage sites are located or within specified buffer distances around these areas;
- in areas where Pre-Clearance Surveys undertaken in accordance with the CHMP identify further Aboriginal cultural heritage sites (except for items of minor significance set out in the CHMP such as isolated stone artefacts);
- within 200m of Yarrie Lake; and
- the Pre-Clearance Surveys are undertaken by the Aboriginal community, and will identify previously unrecorded cultural heritage sites if such are present. The majority of site types and the most sensitive site types would be subject to complete avoidance, see Table 5-1. All currently known sites, plus a buffer, will be avoided and therefore will not be impacted by the Project. Only a minority of site types are not subject to complete avoidance although the first priority is to give effect to the Avoidance Principle and quantified criteria have been specified in this regard. Where impact to this limited corpus of site types cannot be avoided then the Project will be designed to minimise impact on Aboriginal object, place or value, and other management measures as appropriate are to be implemented.

Noting the flexibility inherent in the location of elements of the development program, the application of the Avoidance Principle to the site types specified in this report, the conduct of Pre-Clearance Surveys and other measures specified in this report, the impact of the Project on Aboriginal cultural heritage will be reduced to possible impact on the following site types:

- isolated stone artefacts;
- non-complex stone artefact scatters;
- shell middens; and
- hearths or ovens exposed during ground disturbing activities.

The CHMP is also to include details of:

- implementation of the plan including involvement of the Aboriginal community;
- Pre-Clearance Surveys' requirements;
- cultural heritage/site inductions for all Project staff;
- recommendations for appropriate buffer zones of sensitive areas;
- ongoing engagement with the Aboriginal community and opportunities for participation in the Project (such as pre-clearance surveys);
- ongoing site verification, sensitivity modelling and data capture;

- measures to review, refine or amend the management plan; and
- the process for dispute resolution.

The Proponent will report on the implementation of the CHMP to OEH annually. Every five years the CHMP will be reviewed, a part of this review process will be a third party audit, as well as updating the sensitivity or zone mapping.

The Proponent has also determined that the Project will have a very limited impact on access to sites and to other cultural values for the duration of the Project. For instance, an area constituting less than 0.2% of the Pilliga Forest will be affected by the Project (approximately 1,000ha of the 500,000ha that constitutes the forest). Thus, access to 99.8% of the forest, sites and values will not be restricted by the Project and the *status quo* of access will remain.

Moreover, the Project will be undertaken over a period of 25 years. While the cumulative impact will comprise an area of 1,000ha, because the Project is staged and because rehabilitation will likewise be carried out over the course of the Project's life, access would only be restricted to a percentage of the entirety of area to be affected by the Project at a point in time. This is to ignore the fact that, with implementation of the Avoidance Principle, and with this to include the identified curtilage of the place/value of significance, restriction of whatever duration will not include places or values of high significance. Finally, with the biodiversity offset to include Aboriginal cultural values (including culturally important plants) access will be afforded to areas that otherwise may currently not be accessible. This will see the Project deliver additional benefits. Consequently, the Project will not constrain access beyond that currently available and will actually afford additional access to some areas.

# Table of Contents

1.	Introduction .....	1
1.1	Overview .....	1
1.2	Description of the Project.....	1
1.3	Description of the Project Location .....	3
1.4	Planning Framework and Structure of this Report .....	5
2.	Methodology .....	8
2.1	Risk Assessment.....	8
2.2	Approach and Reasoning .....	8
2.3	Methodology .....	9
2.4	Concluding Comments .....	16
3.	Legislative Context.....	17
3.1	Background .....	17
3.2	Response to Consultation Requirements .....	18
4.	Existing Environment.....	23
4.1	Description of Environmental Conditions.....	23
4.2	Early Accounts and Ethnohistorical Background .....	28
4.3	Regional Archaeological Context.....	34
4.4	Cultural Heritage Research in the Local Area .....	39
4.5.	Oral History: Tradition, Use, Association and Significance .....	49
4.6	Cultural Heritage Data Audit .....	76
4.7	Landscape Sensitivity Mapping and Development of Zoning Scheme .....	82
4.8	AHIMS Sites within the Project Area and Site Significance.....	91
4.9	Comparative Assessment of the Data Audit Area and the Project Area .....	109
4.10	Site Verification Program.....	111
4.11	Enhanced Survey Methods.....	120
5.	Impacts and Management.....	125
5.1	Potential Impact on Cultural Heritage Sites.....	125
5.2	Minimization of Impact on Cultural Heritage Sites – General Observations.....	125
5.3	Management of Aboriginal Cultural Heritage Sites .....	125
5.4	Impact on Cultural Values.....	132
5.5	Management of Aboriginal Cultural Values .....	135
5.6	Cultural Heritage Management Plan and Additional Management Tools.....	140
5.7	Management Measures: Project as a Benefit.....	141
5.8	Management of Inter-generational Equity .....	141
6.	Conclusion .....	143
7.	References .....	145

## Tables

Table 1-1:	Key components of the Project	2
Table 2-1:	Aboriginal cultural heritage technical requirements and section of report where addressed	10-12
Table 4-1a:	Summary description of alluvial landforms	25
Table 4-1b:	Summary description of stable deep sand landforms	26
Table 4-1c:	Summary description of elevated landforms	26
Table 4-2:	Site descriptions from AECOM study for Eastern Star Gas, 2011	45
Table 4-3:	Summary of REF studies undertaken between 2005 and 2012	47-48
Table 4-4:	List of culturally important plants associated with Pilliga forests	64-75
Table 4-5:	Types and number of sites identified in the data audit	78
Table 4-6:	Size of buffer allocated to sites identified in the data audit	81
Table 4-7:	Distance class relationship and resulting sensitivity of Aboriginal cultural heritage places to stream order throughout the Data Audit Area	87
Table 4-8:	Landform units present throughout the Data Audit Area as proportions of the Data Audit Area and as the subject of Aboriginal cultural heritage survey and assessment	87
Table 4-9:	Aboriginal cultural heritage sensitivity assigned to the various landform units mapped throughout the Data Audit Area	89
Table 4-10:	Sites recorded on AHIMS in the Project Area	92
Table 4-11:	Summary of significance assessment by site type	99-108
Table 4-12:	Comparison of identified Aboriginal cultural heritage place types and their relative proportions by study area subset	110
Table 4-13:	Sites selected for site verification program	114-115
Table 4-14:	Results of pilot site verification program	116-118
Table 4-15:	Cultural heritage sites recorded for Leewood area	122
Table 5-1:	Application of Avoidance Principle to sites in the Project Area	127-128

## Figures

Figure 1-1:	Regional context and location of key infrastructure	4
Figure 2-1:	Relationship of the Project Area and Data Audit Area	14
Figure 3-1:	General location of the Project Area in relation to the Gomeroi Native Title Claim boundaries	20
Figure 3-2:	Geographical distribution of the RAPs	21
Figure 4-1:	General location of the Project Area in relation to features and places mentioned in text	35
Figure 4-2:	Location of sites within the Data Audit Area <i>(Removed following request made during consultation process with Registered Aboriginal Parties)</i>	77
Figure 4-3:	Aboriginal Cultural Heritage Zoning Scheme as it applies to the Project Area and Data Audit Area	83

Figure 4-4:	Status results of previously identified Aboriginal cultural heritage places Inspected as part of the verification pilot program ( <i>Removed following request made request made during consultation process with Registered Aboriginal Parties</i> )	119
Figure 4-5:	Proposed management zoning scheme for the Leewood area	124

## Appendices

Appendix 1:	RAP Consultation Materials	149
Appendix 2:	Analysis of Registered Aboriginal Parties	161
Appendix 3:	RAP Consultation Issues and Responses	169

# 1. Introduction

## 1.1 Overview

The Proponent is proposing to develop natural gas in the Gunnedah Basin in New South Wales (NSW), southwest of Narrabri (Table 1-1).

The Narrabri Gas Project (the project) seeks to develop and operate a gas production field, requiring the installation of gas wells, gas and water gathering systems, and supporting infrastructure. The natural gas produced would be treated at a central gas processing facility on a local rural property (Leewood), approximately 25 kilometres southwest of Narrabri. The gas would then be piped via a high-pressure gas transmission pipeline to market. This pipeline would be part of a separate approvals process and is therefore not part of this development proposal.

The primary objective of the project is to commercialise natural gas to be made available to the NSW gas market and to support the energy security needs of NSW. Production of natural gas under the project would deliver economic, environmental and social benefits to the Narrabri region and the broader NSW community. The key benefits of the project can be summarised as follows:

- Development of a new source of gas supply into NSW would lead to an improvement in energy security and independence to the State. This would give NSW gas markets greater choice when entering into gas purchase arrangements. Potential would also exist for improved competition on price. Improved competition on price would have flow on benefits for NSW's economic efficiency, productivity and prosperity.
- The provision of a reduced greenhouse gas emission fuel source for power generation in NSW as compared to traditional coal-fired power generation.
- Increased local production and regional economic development through employment and provision of services and infrastructure to the project.
- The establishment of a regional community benefit fund equivalent to five per cent of the royalty payment made to the NSW Government within the future production licence area. If matched by the NSW Government, the fund could reach \$120 million over the next two decades.

## 1.2 Description of the Project

The project would involve the construction and operation of a range of exploration and production activities and infrastructure including the continued use of some existing infrastructure. The key components of the project are presented in Table 1-1, and are shown on Figure 1-1.

The project is expected to generate approximately 1,300 jobs during the construction phase and sustain around 200 jobs during the operational phase; the latter excluding an ongoing drilling workforce comprising approximately 100 jobs.

Component	Infrastructure or activity
<b>Major facilities</b>	
Leewood	<ul style="list-style-type: none"> <li>• a central gas processing facility for the compression, dehydration and treatment of gas</li> <li>• a central water management facility including storage and treatment of produced water and brine</li> <li>• optional power generation for the project</li> <li>• a safety flare</li> <li>• treated water management infrastructure to facilitate the transfer of treated water for irrigation, dust suppression, construction and drilling activities</li> <li>• other supporting infrastructure including storage and utility buildings, staff amenities, equipment shelters, car parking, and diesel and chemical storage</li> <li>• continued use of existing facilities such as the brine and produced water ponds</li> <li>• operation of the facility</li> </ul>
Bibblewindi	<ul style="list-style-type: none"> <li>• in-field compression facility</li> <li>• a safety flare</li> <li>• supporting infrastructure including storage and utility areas, treated water holding tank, and a communications tower</li> <li>• upgrades and expansion to the staff amenities and car parking</li> <li>• produced water, brine and construction water storage, including recommissioning of two existing ponds</li> <li>• continued use of existing facilities such as the 5ML water balance tank</li> <li>• operation of the expanded facility</li> </ul>
Bibblewindi to Leewood infrastructure corridor	<ul style="list-style-type: none"> <li>• widening of the existing corridor to allow for construction and operation of an additional buried medium pressure gas pipeline, a water pipeline, underground (up to 132 kV) power, and buried communications transmission lines</li> </ul>
Leewood to Wilga Park underground power line	<ul style="list-style-type: none"> <li>• installation and operation of an underground power line (up to 132 kV) within the existing gas pipeline corridor</li> </ul>
<b>Gas field</b>	
Gas exploration, appraisal and production infrastructure	<ul style="list-style-type: none"> <li>• seismic geophysical survey</li> <li>• installation of up to 850 new wells on a maximum of 425 well pads <ul style="list-style-type: none"> <li>– new well types would include exploration, appraisal and production wells</li> <li>– includes well pad surface infrastructure</li> </ul> </li> <li>• installation of water and gas gathering lines and supporting infrastructure</li> <li>• construction of new access tracks where required</li> <li>• water balance tanks</li> <li>• communications towers</li> <li>• conversion of existing exploration and appraisal wells to production</li> </ul>
Ancillary	<ul style="list-style-type: none"> <li>• upgrades to intersections on the Newell Highway</li> <li>• expansion of worker accommodation at Westport</li> <li>• a treated water pipeline and diffuser from Leewood to Bohena Creek</li> <li>• treated water irrigation infrastructure including: <ul style="list-style-type: none"> <li>– pipeline(s) from Leewood to the irrigation area(s)</li> <li>– treated water storage dam(s) offsite from Leewood</li> </ul> </li> <li>• operation of the irrigation scheme</li> </ul>

Table 1-1: Key components of the Project

Subject to obtaining the required regulatory approvals, and a financial investment decision, construction of the project is expected to commence in early 2018, with first gas scheduled for 2019/2020. Progressive construction of the gas processing and water management facilities would take around three years and would be undertaken between approximately early/mid-2018 and early/mid-2021. The gas wells would be progressively drilled during the first 20 or so years of the project. For the purpose of impact assessment, a 25-year construction and operational period has been adopted.

### 1.3 Description of the Project Location

The project would be located in northwestern NSW, approximately 20 kilometres southwest of Narrabri, within the Narrabri local government area (LGA) (see Figure 1-1).

The project area covers about 950 square kilometres (95,000 hectares), and the project footprint would directly impact about one per cent of that area.

The project area contains a portion of the region known as 'the Pilliga', which is an agglomeration of forested area covering more than 500,000 hectares in north-western NSW around Coonabarabran, Baradine and Narrabri. Nearly half of the Pilliga is allocated to conservation, managed under the NSW *National Parks and Wildlife Act 1974*. The Pilliga has spiritual meaning and cultural significance for the Aboriginal people of the region.

Other parts of the Pilliga were dedicated as State forest, and set aside for the purpose of 'forestry, recreation and mineral extraction, with a strategic aim to "provide for exploration, mining, petroleum production and extractive industry" under the *Brigalow and Nandewar Community Conservation Area Act 2005*. The parts of the project area on state land are located within this section of the Pilliga.

The semi-arid climate of the region and general unsuitability of the soils for agriculture have combined to protect the Pilliga from widespread clearing. Commercial timber harvesting activities in the Pilliga were preceded by unsuccessful attempts in the mid-1800s to establish a wool production industry. Resource exploration has been occurring in the area since the 1960s; initially for oil, but more recently for coal and gas.

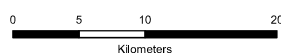
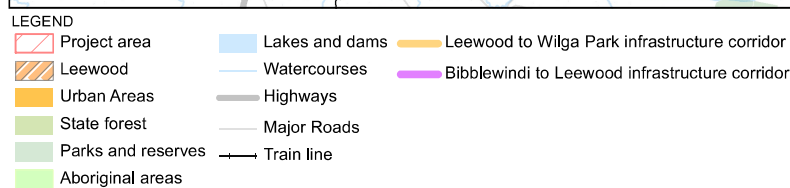
The ecology of the Pilliga has been fragmented and otherwise impacted by commercial timber harvesting and related activities over the last century through:

- the establishment of more than 5,000 kilometres of roads, tracks and trails
- the introduction of pest species
- the occurrence of drought and wildfire.

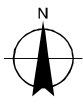
Within the Pilliga, the project would be developed in State forests identified as suitable for 'forestry, recreation and mineral extraction' under the Brigalow and Nandewar Community Conservation Area Act 2005.

The project area avoids the Pilliga National Park, Pilliga State Conservation Area, Pilliga Nature Reserve and Brigalow Park Nature Reserve. Brigalow State Conservation Area is within the project area but would be protected by a 50 metre surface exclusion zone.

Agriculture is a major land use within the Narrabri LGA; about half of the LGA is used for agriculture, split between cropping and grazing. Although the majority of the project area would be within State forests, much of the remaining area is situated on agricultural land that supports dry-land cropping and livestock. No agricultural land in the project area is mapped by the NSW Government to be biophysical strategic agricultural land (BSAL) and detailed soil analysis has established the absence of BSAL. This has been confirmed by the issuance of a BSAL Certificate for the project area by the NSW Government.



Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 55



Narrabri Gas Project  
EIS Technical Appendix Aboriginal Cultural Heritage

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Regional context  
and location of key infrastructure

**Figure 1-1**

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Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydney@ghd.com.au W www.ghd.com.au  
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Data source: NSW Department of Lands: DTDB and DCDB - 2012-13, Santos: Operational and Base Data - 2013, Created by: afoddy

## 1.4 Planning Framework and Structure of this Report

### 1.4.1 Planning Framework

The project is permissible with development consent under the *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007*, and is identified as 'State significant development' under section 89C(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *State Environmental Planning Policy (State and Regional Development) 2011*.

The project is subject to the assessment and approval provisions of Division 4.1 of Part 4 of the EP&A Act. The Minister for Planning is the consent authority, who is able to delegate the consent authority function to the Planning Assessment Commission, the Secretary of the Department of Planning and Environment or to any other public authority.

The project is also a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The project was declared to be a controlled action on 5 December 2014, to be assessed under the bilateral agreement between the Commonwealth and NSW Governments, and triggering the following controlling provisions:

- listed threatened species and ecological communities
- a water resource, in relation to coal seam gas development and large coal mining development
- Commonwealth land.

This report on Aboriginal cultural heritage values, impacts and management identifies the potential environmental issues associated with construction and operation of the project and addresses the Secretary's environmental assessment requirements for the project. The assessment will be used to support the EIS for the project. The requirements addressed in this report include:

The Secretary's Requirements regarding heritage:

. . . an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, having regard to OEH's requirements . . .

The OEH's requirements appended to the Secretary's Requirements:

- an Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which:
- demonstrates effective consultation with Aboriginal communities in determining and assessing impacts, and developing and selecting mitigation options and measures. The proponent must comply with the OEH 2010 Consultation Requirements for Proponents and consult with all Registered Aboriginal Parties (RAPs) not just Gomeroi Native Title Applicant and relevant LALC in relation to the development and implementation of the CHMP;
- an assessment of the impacts of the Project on Aboriginal cultural heritage; and
- outlines any proposed impact mitigation and management measures (including an evaluation of the effectiveness and reliability of the measures).
- Aboriginal Cultural Heritage sensitivity mapping for the Project Area
- Descriptions of the cultural heritage values inclusive of relevant archive and oral history transcriptions documented in the ACH Brigalow Belt South Bioregion assessment (RCAD 2002: LALC report).

- Significance statements about Aboriginal objects inclusive of the results of previous studies including the studies titled the Aboriginal cultural heritage Stage 1 Preliminary Assessment report (RACD 2000) including Appendix C titled, Aboriginal cultural heritage field survey of the Goonoo and Pilliga Forests.
- Description of the sensitivity of landforms affected by the Project inclusive of the geomorphic landforms described in the ACH Brigalow Belt South Bioregion assessment (RACD 2000: Appendix C (as titled above) and Appendix Ca titled, Geomorphology of the Goonoo and Pilliga Forests, Brigalow Belt South Bioregion as part of the Indigenous cultural heritage assessment and community consultation of the BBSB,).
- A review of Aboriginal Cultural data held by OEH and the Narrabri LALC, and strategic validation of this data.
- A Cultural Heritage Management Plan providing the framework for the management of Aboriginal cultural heritage during the implementation of the Project. The CHMP is proposed to:
  - incorporate the ACH sensitivity mapping; provide for an update of the mapping every five years as part of the CHMP review;
  - incorporate (sic) avoidance strategies and mitigation measures in the placement of infrastructure;
  - the participation of the Aboriginal community (being representatives of the Gomeroi Native Title Applicant and relevant LALC) in pre-clearance surveys for the placement of infrastructure in accordance with the avoidance strategies in the CHMP (sic) The proponent must comply with the OEH 2010 Consultation Requirements for Proponents and consult with all Registered Aboriginal Parties (RAPs) not just Gomeroi Native Title Applicant and relevant LALC in relation to the development and implementation of the CHMP;
  - the significance of any impacts and appropriate management response determined by the Aboriginal community (being representatives of Gomeroi Native Title Applicant and the relevant LALC) in discussion with the proponent;
  - provide a report on implementation of the CHMP to OEH every year; and
  - an independent dispute resolution process where the Aboriginal community and proponent cannot agree on matters under the CHMP.

Additionally, it has been recommended that:

Aboriginal cultural values, including cultural plants, and cultural activities are considered when the management arrangements for any biodiversity offset land are determined.

#### 1.4.2 Structure of this Report

The report is structured as follows:

- **Chapter 1 – Introduction** - This chapter introduces the project and the proponent and describes the project area.
- **Chapter 2 – Methodology** - This chapter defines the study area assessed in this report and describes the steps undertaken in the assessment. Further it outlines the primary management approach – which is the Avoidance Principle - and explains how this approach can be applied to the current project.
- **Chapter 3 – Legislative context** - This chapter outlines the relevant Commonwealth and State legislation relating to the assessment. In particular it describes the measures taken to meet the OEH consultation requirements with which the project is required to comply.

- **Chapter 4 – Existing environment** - This chapter describes the existing Aboriginal cultural heritage values of the study area; it describes both desktop studies and various field investigations that have been undertaken.
- **Chapter 5 – Impact assessment and management measures** - This chapter examines the potential environmental impacts associated with the construction and operation of the project. It notes that rigorous application of the Avoidance Principle using the measures specified in this chapter will avoid impacts on virtually all Aboriginal cultural heritage values in the Project Area.
- **Chapter 6 – Conclusion.** This chapter summarises the outcomes of this assessment, how impacts can be avoided and notes that the project generally can deliver improved management outcomes for Aboriginal cultural heritage.

## 2. Methodology

### 2.1 Risk Assessment

The following risks have been identified for the Project:

- previous development activities have had a profound impact on the cultural heritage sites that once existed throughout the region. This Project could result in further damage to significant sites. The avoidance of such impact is of the utmost importance; and
- while there has been a considerable amount of research undertaken over the last 30 years within the region it has been neither systematic nor comprehensive at the landscape scale. Thus, there is no single body of information to which one can turn to that definitively identifies the location of Aboriginal cultural heritage issues and how they are best managed to avoid or minimise impact.

### 2.2 Approach and Reasoning

The approach to the impact assessment presented here and for the management of risks for Aboriginal cultural heritage has to been to examine how effectively the Avoidance Principle can be applied to this project. That is, is it possible that we can, rather than mitigating impacts, actually avoid impacts to such an extent that the Aboriginal cultural heritage sites and values of the Project Area can be preserved so that on completion of this project they largely remain as they were prior to the commencement of the project? It is our view that the impact assessment presented here shows that, subject to implementing a range of management actions, it will be possible to apply the Avoidance Principle. Our reasoning for this is as follows.

It should be recognised that this project is fundamentally different to virtually all other energy resource extraction projects now operating in NSW. Those other projects are coal-related and it is worth considering them in further detail. A typical open-cut coal-related mining lease such as we see in the Hunter Valley or elsewhere in the Gunnedah Basin extends over an area of between approximately 30km<sup>2</sup> to 50km<sup>2</sup>. Of this area between 60% and 80% of the lease will be directly affected by mining, mining-related activities (such as spoil dumps) and related infrastructure (including roads, conveyors, workshops and administration facilities). This means that anywhere between 18 km<sup>2</sup> and 40 km<sup>2</sup> of land is directly affected by mining, associated activities and infrastructure on a typical coal mine. Moreover, the location of these impacts is tightly constrained by virtue of the fixed geographical location of the accessible mineral resource. Finally, the technology and basic approach to open-cut mining has been largely static since its inception and is unlikely to change in the foreseeable future. Because there is little flexibility in project design, approach and technology the opportunity to avoid impacts on the cultural heritage values within a coal mining lease is limited. One consequence of this has been the heavy emphasis on mitigation programs in these areas.

Contrast this picture with the proposed project. The area over which the project is to be located, at approximately 1,000 km<sup>2</sup>, is 20 to 30 times the size of the average open cut coal mine. Within that area the proposed project footprint will cover approximately 1% of the proposed Petroleum Lease, i.e. 10 km<sup>2</sup>. More than half of this footprint will consist of scattered pieces of infrastructure, such as drill pads. There is flexibility in the locations selected for these. Similarly, the alignment of most associated infrastructure such as flowlines and access tracks is highly flexible. This means the total project footprint is significantly less than that of even one average-sized open cut coal mine, the size of a single piece of infrastructure is small and its location is generally not fixed.

There are only three pieces of project infrastructure that are geographically fixed:

- the Bibblewindi facilities;
- the Bibblewindi to Leewood pipeline;
- the Leewood facilities.

Put another way, more than 90% of all infrastructure associated with this project is non-fixed and can be relocated to give effect to the Avoidance Principle. In relation to the fixed infrastructure we note that the pipeline will parallel the existing pipeline. No Aboriginal cultural heritage sites have been found on that existing alignment. Similarly, the Pre-Clearance Surveys undertaken in the Bibblewindi area, reported below when presenting results of enhanced survey techniques, failed to identify any Aboriginal cultural heritage, despite the systematic inspection of 29km of formal survey transects. The inspection of the Leewood area also reported below found four (4) separate cultural heritage sites. As will be seen, in each case, it proved possible to avoid any impact. Earlier inspections of other locations at Leewood did not identify cultural heritage sites. The prospects are therefore very high that the limited fixed infrastructure will not impact on cultural heritage sites.

Additionally, the project will make use of existing access infrastructure in an area that has been criss-crossed with vehicle tracks as part of earlier forestry operations and has been impacted in part by agricultural and pastoral activities. This will further reduce the need for new and additional impact, and access tracks also can be designed to avoid direct impact. Further, techniques such as horizontal directional drilling, narrowing of right of ways and pipe being 'dragged' along narrowed right of way are also available. These have been deployed on many gas field projects elsewhere and will be available for use on this one.

It might also be borne in mind that since being introduced to Australia in the mid-1990s, the technology and approaches available for the extraction of coal seam gas have greatly changed. The use of a single drill pad for multiple wells, the availability and use of directional drilling so that wells do not have to be placed over the resource being procured, that Santos does not currently plan use hydraulic fracture stimulation to release gas, are all demonstrations of technological innovation in the last 20 years. Further innovations can be expected. The fact that the project, and its footprint, is being developed over an extended period of time (25 years) will allow these innovations to be applied, offering even greater flexibility in design and thereby capacity to avoid impacts.

Collectively, these approaches and options mean that the project offers great opportunity to apply the Avoidance Principle to avoid the vast majority of impact on Aboriginal cultural heritage sites. It is, however, necessary to find ways to harness the inherent flexibility of the project by use of a comprehensive and integrated management program so that the possibility that the Project has a footprint that has negligible impact on Aboriginal cultural heritage sites of outstanding scientific or cultural significance is realised. This can only be done by ensuring that the project has access to, and makes use of, high quality site information on the location of Aboriginal cultural heritage sites and places of cultural heritage value. Accordingly, the remainder of the impact assessment is devoted to exploring this issue and the means by which data quality challenges can be addressed.

## 2.3 Methodology

The methodology adopted in this report to address the challenge of ensuring high quality data to give effect to the Avoidance Principle has various elements. The first element is to better define the range of issues and risks posed by the Project. The second is to improve the quality of the data immediately to hand to assist with the identification of specific risks and to develop management and mitigation measures and determine prospective management needs, notably

with regard to site locational information. The final element consists of a detailed consideration of comprehensive and integrated management tools that together will be used avoid or mitigate Project impacts. All this has been done while also giving suitable attention to OEHL's requirements in relation to the impact assessment of the impact of the Project to Aboriginal cultural heritage.

The assessment and management strategy presented in this report is designed to ensure full compliance with the terms recommended by OEHL. The assessment expressly addresses each of the points OEHL has made in its requirements – Table 2-1 lists the OEHL requirement and the relevant section of this report where that requirement has been addressed.

Santos is required to address the OEHL 2010 Consultation Requirements for Proponents and consult with all Registered Aboriginal Parties (RAPs) in relation to the development and implementation of the CHMP. This recommendation is met by implementing the consultation requirements in full.

<b>Party and/or Specification</b>	<b>Details</b>	<b>Report Section</b>
<b>Secretary's Requirements</b>	Heritage – including an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, having regard to OEHL's recommendations to the Secretary.	This technical report responds to assessment on likely Aboriginal heritage
<b>OEHL Recommendation</b>		
An Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which:		Sections 4 and 5
demonstrates effective consultation with Aboriginal communities in determining and assessing impacts, and developing and selecting mitigation options and measures. The proponent must comply with the OEHL 2010 Consultation Requirements for Proponents and consult with all Registered Aboriginal Parties (RAPs) not just Gomerioi Native Title Applicant and relevant LALC in relation to the development and implementation of the CHMP:	An assessment of the impacts of the Project on Aboriginal cultural heritage	Section 3.2
	Outlines proposed impact mitigation and management measures (including an evaluation of the effectiveness and reliability of the measures)	Section 5, and CHMP
Aboriginal cultural heritage sensitivity mapping for the Project Area	Descriptions of the cultural heritage values inclusive of relevant archive and oral history transcriptions documented in the ACH Brigalow Belt South Bioregion assessment (RCAD 2002: LALC report)	Sections 4.4 and 4.5

<b>Party and/or Specification</b>	<b>Details</b>	<b>Report Section</b>
	Significance statements about Aboriginal objects inclusive of the results of previous studies including the studies titled the Aboriginal cultural heritage Stage 1 Preliminary Assessment report (RACD 2000) including Appendix C titled, Aboriginal cultural heritage field survey of the Goonoo and Pilliga Forests	Sections 4.5 and 4.8.5
	Description of the sensitivity of landforms affected by the Project inclusive of the geomorphic landforms described in the ACH Brigalow Belt South Bioregion assessment (RACD 2000: Appendix C (as titled above) and Appendix Ca titled, Geomorphology of the Goonoo and Pilliga Forests, Brigalow Belt South Bioregion as part of the Indigenous cultural heritage assessment and community consultation of the BBSB)	Section 4.7
	A review of Aboriginal Cultural Data held by OEH and the Narrabri LALC, and strategic validation of this data	Sections 4.6, 4.8 and 4.10
A Cultural Heritage Management Plan (CHMP) providing the framework for the management of Aboriginal cultural heritage during the implementation of the Project. The CHMP is proposed to:	incorporate the ACH sensitivity mapping and provide for an update of the mapping every five years as part of the CHMP review	Section 5 and CHMP
	incorporate avoidance strategies and mitigation measures in the placement of infrastructure	Section 5 and CHMP
	the participation of the Aboriginal community (being representatives of the Gomeroi Native Title Applicant and relevant LALC) in pre-clearance surveys for the placement of infrastructure in accordance with the avoidance strategies in the CHMP The proponent must comply with the OEH 2010 Consultation Requirements for Proponents and consult with all Registered Aboriginal Parties (RAPs) not just Gomeroi Native Title Applicant and relevant LALC in relation to the development and implementation of the CHMP	Section 5 and CHMP
	the significance of impacts and appropriate management response determined by the Aboriginal community (being representatives of Gomeroi Native Title Applicant and the relevant LALC) in discussion with the proponent	Section 5 and CHMP

Party and/or Specification	Details	Report Section
	provide a report on implementation of the CHMP to OEH every year	Section 5 and CHMP
	an independent dispute resolution process where the Aboriginal community and proponent cannot agree on matters under the CHMP	Section 5 and CHMP
<b>Secretary's Requirement</b>	Consider of (sic) Aboriginal cultural values and cultural activities in the selection and conservation of land as part of the biodiversity offset strategy	Sections 4.5.7, 5 and CHMP

Table 2-1: Aboriginal cultural heritage technical requirements and section of report where addressed.

The assessment component of this study entailed completion of a number of steps. These are identified as follows.

*Review of previous work:* all research undertaken in areas pertinent to the Project Area has been reviewed and the results compiled into a single, integrated database housed in a Geographic Information System (GIS). A comprehensive database of all sites that have previously been identified and areas that have been the subject of previous study has been created. Importantly, this includes all sites that have been recorded whether they be of archaeological, traditional, historical or contemporary importance. All places that are of archaeological and anthropological significance have been included in this database. The data captured in this way includes all sites recorded as part of the ACH Brigalow Belt South Bioregion (RCAD 2002: LALC report), data held by OEH, the Narrabri LALC and in other reports, papers, monographs or books relevant to the Project Area. It should also be noted that this review captures data from a significantly larger area than the Project Area. This larger area is known as the Data Audit Area. The Data Audit Area encompasses approximately 203,163 ha, more than double the size of the Project Area (approximately 95,000 ha). This ensures that a comprehensive data set is available for comparison with the Project Area and the results of analyses for the Project Area can be suitably contextualised. Figure 2-1 shows the Data Audit Area.

Use of GIS technology enables accurate assessment and analysis of data as well as allowing the cultural heritage data to be integrated with other Project data so as to inform development of a comprehensive Field Development Protocol setting out criteria and locational principles for selecting the specific location of infrastructure within the Project Area.

Descriptions of the cultural heritage values inclusive of relevant archive and oral history transcriptions documented in the ACH Brigalow Belt South Bioregion assessment (RCAD 2002: LALC report) have been sought in the following manner. Firstly, the relevant archive and oral history transcriptions documented in the ACH Brigalow Belt South Bioregion assessment have been reviewed in detail and all relevant commentary captured and included in the assessment report, whether or not there is a geographical referent included – where there is a geographical referent they have included in the GIS. Secondly, commentary from all RAPs as to whether there are Aboriginal objects of cultural value and whether there are places of cultural value in the Project Area as part of its consultation requirements.

Significance statements about Aboriginal objects inclusive of the results of previous studies including the studies titled Aboriginal cultural heritage Stage 1 Preliminary Assessment report (RACD 2000) are tabled in this assessment report. These have been developed under

guidelines provided in the internationally-recognised Burra Charter, endorsed by UNESCO and Australia ICOMOS, and informed by commentary provided by community members and RAPs.

*Conduct of additional analyses:* In analysing the sensitivity of land forms it was necessary to undertake what is referred to as a data audit, including having regard to a previous OEH project that had mapped sensitivity in this area. This addressed the OEH recommendation for a review of Aboriginal Cultural Data held by OEH and the Narrabri LALC, and strategic validation of this data. All these data sets, and other information available on cultural heritage sites were captured in the GIS noted above. The strategic validation had two stages.

Stage 1 – it was recognised that a large body of data existed that was included in a wide range of sources but which is not readily available to the Project and others for important planning purposes. With that in mind the data audit compiled all data that was in the public domain. It was recognised that the quality of the data was likely to be variable and that treating it at face value would not necessarily deliver quality planning and management outcomes. Accordingly, the purposes of the data audit included:

- assessing the accuracy of site locational information, noting the period of time over which this data had been amassed and the differing technologies available over that time used to provide locational information;
- gathering a comprehensive body of pertinent cultural heritage data that would inform project planning;
- assessing the quality of that data to determine its limitations;
- identifying gaps in the data that would limit their value for planning purposes and that would need to be addressed to achieve objectives of ensuring that all project planning and construction programs would have available the best understanding of the cultural heritage issues that exist so that they could factored in to either avoid or minimise impacts;
- correcting obvious errors evident in the data sets available;
- establishing a single, integrated data set; and
- use of the data set to initiate modelling of the cultural heritage sensitivity zoning map of the Data Audit Area.

The data audit aimed to:

- Establish a single site datum for all sites;
- Determine the number and types of sites found in the Data Audit Area;
- Determine the number of AHIMS registered sites in the Data Audit Area;
- Determine locations where fieldwork has been undertaken;
- Determine the quality of the site locational data;
- Determine what size site buffers needed to be to give effect to the Avoidance Principle and Precautionary Principle.

Results of the data audit were directed towards:

- developing site verification programs – which is the second element in the validation program requested by OEH;
- improved site survey methodologies;
- better methodologies aimed at capturing higher quality data;
- consistency in the application of new approaches and methods; and
- use of improved and improving technology such as GPS and GIS.

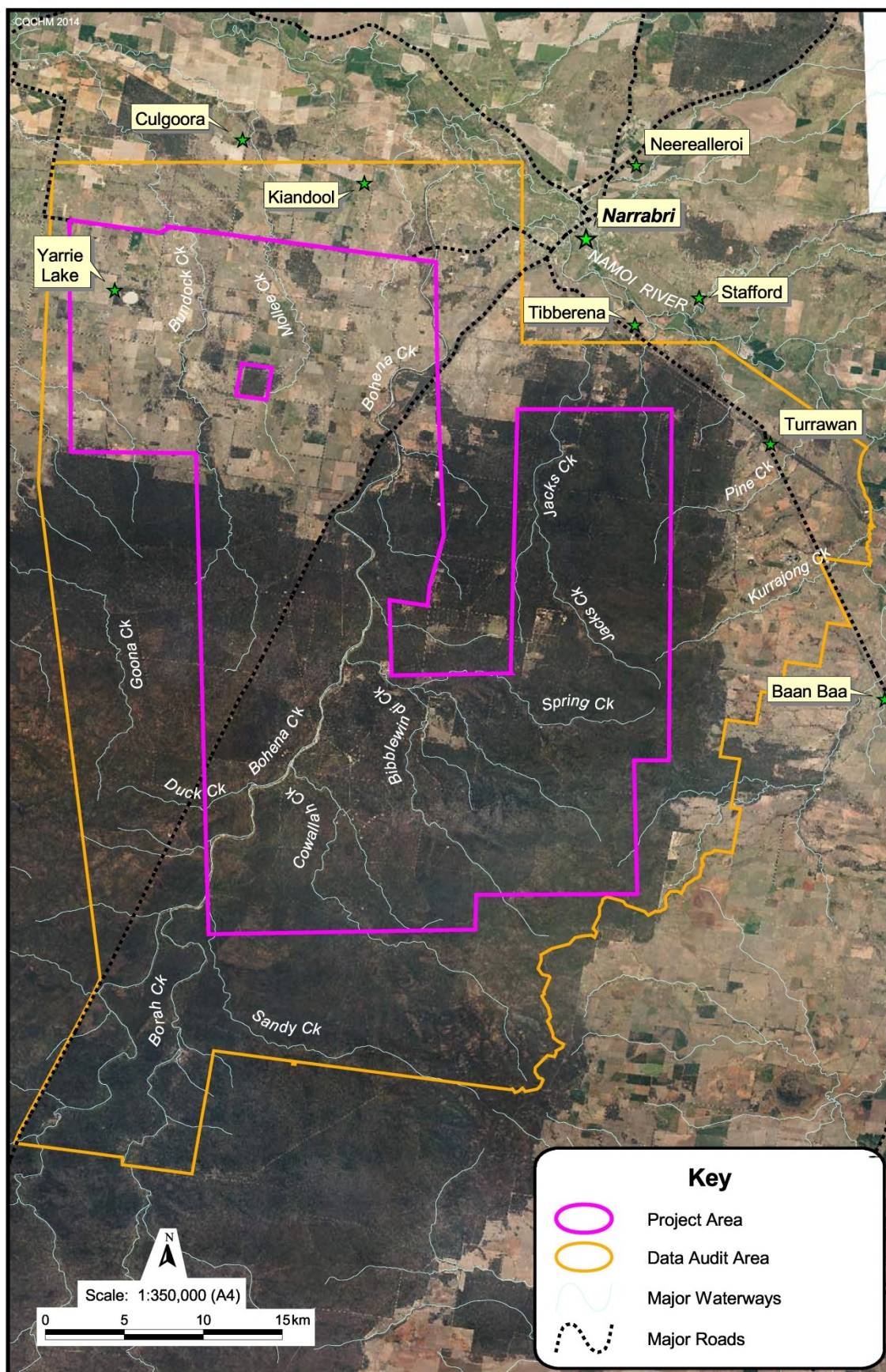


Figure 2-1: Relationship of the Project Area and the Data Audit Area

The above program and objectives were achieved by the detailed review of all data sets and the comparison of data sets: for instance, comparing AHIMS site cards with the original site recordings and reports to determine if there are transcription errors; assessing the date when recordings were made to establish the accuracy of the technology used to ascertain site coordinates; comparison of site records for the same site to establish if additional data is available for particular sites; examination of reports to determine what areas have been subject of systematic research; and capture of all results in the GIS for further analysis and use.

Stage 2 – following completion of the data audit a pilot program of site verification could be initiated. The outcomes of this verification (pilot) program included the following:

- improved recording of cultural heritage places with that data immediately included within the Project GIS;
- refined understanding of the issues relating to site locations and descriptions, and identification of suitability of data sets to inform future management and could then be targeted as a priority in completion of the verification program;
- opportunity to work with OEH to upgrade AHIMS data; and
- improved data for design of management programs for specific cultural heritage places.

In the pilot program, each selected site location, based on the data available, was visited and a comprehensive sweep made of that location – with a buffer of approximately 100m being allowed as a tolerance for locational error. If relocated, the sites were recorded in detail. The recording of places ensured that a record of data was made sufficient to complete the site recording table established for the data audit. A record of the location of the site using differential GPS and site attributes and condition was made in real time with a comprehensive photographic record also captured, and all this was linked to the Project GIS. The methodology has been found to be effective and can therefore be applied more generally.

*Sensitivity Mapping:* a model of the Data Audit Area that describes the sensitivity of the landforms has been created in accordance with the direction from OEH. This was done using the results of the review and additional analyses described above along with additional data. As further work occurs the model will be refined, with the model reviewed and revised at least every five years, as recommended by OEH.

The modelling is based on geomorphic landforms described in the ACH Brigalow Belt South Bioregion assessment (RACD 2000: Appendix C (as titled above)) and Appendix Ca titled, Geomorphology of the Goonoo and Pilliga Forests, Brigalow Belt South Bioregion. To that purpose, all the digital data available for those landforms was loaded into the GIS created for the Project.

Using the refined data an assessment has been made of known cultural heritage sites within the Project Area and a comparative analysis has been undertaken of sites in the Project Area and the Data Audit Area.

Using data collated as part of the Brigalow Belt South Bioregion, a list of all plants that have been identified as being of cultural value was created.

A Cultural Heritage Management Plan has been developed in consultation with the RAPs. It specifies the procedures by which Santos will give effect to its management program. The phased growth of the gas field will be undertaken in accordance with the Field Development Protocol. The Protocol requires the implementation of the CHMP including the Pre-Clearance Surveys of sites prior to disturbance.

Relevant data was reviewed and consultation undertaken with RAPs to allow a comprehensive estimate to be made of cultural values identified for the Project Area. These will be managed in various ways over the life of the Project.

All field assessment work was undertaken by suitably qualified personnel and informed by the provisions of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (OEH).

## 2.4 Concluding Comments

The assessment undertaken in this report demonstrates that while there are certain challenges in using existing data, these can be overcome. Further, it is demonstrated that with information currently to hand, and using the proposed additional management measures such as Pre-clearance Survey and the Additional Research Program along with others described in more detail in chapter 5, and by implementation of the prescriptions of the CHMP, it will be possible in those limited parts of the Project Area that will actually be for subject of development to give effect to the Avoidance Principle. The verification and enhanced survey methods recommended will generate highly accurate data that will be used in the management program, subject to its development, thereby ensuring that implementation of the Avoidance Principle will be both reliable and effective. Noting that the Avoidance Principle directly aligns with best practice for cultural heritage management as described in instruments such as the Burra Charter, this will result in there being negligible cumulative impact arising from this project in relation to Aboriginal cultural heritage.

## 3. Legislative Context

### 3.1 Background

This Project is being undertaken as a State significant development assessable under Division 4.1 of Part 4 of the NSW *Environmental, Planning and Assessment Act 1979* (EP&A Act) – application number SSD 14 6456. If development consent for State significant development is granted, an Aboriginal Heritage Impact Permit is not required under Part 6 of the *National Parks and Wildlife Act*. The OEH recommendations to the Secretary's state that there must be 'effective consultation with Aboriginal communities in determining and assessing impacts, and developing and selecting mitigation options and measures' and that in so doing 'The proponent must comply with the OEH 2010 Consultation Requirements for Proponents'. Moreover, the Secretary's Requirements expressly state that the proponent is to refer to the OEH Aboriginal cultural heritage consultation requirements for proponents.

The OEH Consultation Requirements state:

The purpose of this document is to establish the requirements for consultation with the registered Aboriginal parties as part of the heritage assessment process to determine potential impacts of proposed activities on Aboriginal cultural heritage and to inform decision making for any application for an Aboriginal Heritage Impact Permit (AHIP).

All AHIP applicants are required by DECCW (sic) to undertake consultation with Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places as relevant to the proposed Project Area in accordance with these Requirements.

The major elements of these requirements are summarised:

Stage 1: The proponent must compile a list of Aboriginal people who may have an interest in the proposed Project Area and hold knowledge relevant to determining the cultural significance of Aboriginal *objects* and/or *places* from reasonable sources of information. This includes writing to the following entities:

- the relevant DECCW EPRG regional office;
- the relevant Local Aboriginal Land Council(s) (LALC);
- the Registrar, *Aboriginal Land Rights Act*;
- the National Native Title Tribunal;
- Native Title Services Corporation (NTSCorp);
- relevant local council(s); and
- relevant catchment management authorities.

It also requires the placement of advertisements in relevant local, regional and other newspapers. Aboriginal people have a minimum of 14 days after the letter was sent or the notice was published in the newspaper to register an interest. The proponent is required to record names of Aboriginal people who have registered an interest in being involved in consultation – the 'registered Aboriginal parties' (RAPs).

Stage 2: The proponent presents and/or provides proposed Project information to RAPs. The proponent provides a copy of the notification and record of the RAPs to DECCW and relevant LALC within 28 days of the closing date for registering an interest. An auditable trail of the provision of this information should be maintained for provision to relevant parties.

Stage 3: Proponent presents and/or provides the proposed methodology(s) for the cultural heritage assessment to the RAPs for comment. RAPs have a minimum of 28 days after the proponent provides the methodology(s) to provide written or oral comment. The proponent considers input provided by RAPs and finalises methodology for implementation. The proponent documents how the input has been considered. The proponent is to seek information from RAPs to identify: a. whether there are Aboriginal objects of cultural value; b. whether there are places of cultural value (whether or not they are Aboriginal places declared under Section 84 of the NPW Act). Proponent seeks input from RAPs on potential management options.

Stage 4: Proponent prepares draft cultural heritage assessment report and provides it to the RAPs for review and comment. RAPs have a minimum of 28 days after the proponent provides the draft report to review and provide written or oral comment. The proponent finalises cultural heritage assessment report. The final report is submitted to DECCW for consideration with the proponent's AHIP application. The proponent provides/makes available the final cultural heritage assessment report and AHIP application to the RAPs and relevant LALCs within 14 days of an AHIP application being made to DECCW.

The proponent also seeks information from RAPs to identify:

- whether there are Aboriginal objects of cultural value; and
- whether there are places of cultural value (whether or not they are Aboriginal places declared under Section 84 of the NPW Act).

The proponent seeks input from RAPs on potential management options. There are specified timeframes for consultation. Section 3.14 provides further clarity on the meaning of the term consultation:

The consultation process involves getting the views of, and information from, Aboriginal people and reporting on these. It is not to be confused with other field assessment processes involved in preparing an impact assessment. Consultation does not include the employment of Aboriginal people to assist in field assessment and/or site monitoring. Aboriginal people may provide services to proponents through a contractual arrangement; however, this is separate from consultation.

### 3.2 Response to Consultation Requirements

The response to these consultation requirements is as follows:

#### *Stage 1*

- Letters were sent to all relevant agencies on 8 April 2014 requesting they nominate any person they considered should be a RAP for this Project. Responses had been received from the OEH dated 2 May 2014, Native Title Services Corporation dated 17 April 2014, Office of the Registrar of Aboriginal Land Rights Act dated 22 April 2014, Narrabri Shire Council dated 23 April 2014, National Native Title Tribunal dated 23 April 2014 and Baradine Local Aboriginal Land Council dated 24 April 2014;
- An advertisement seeking parties to nominate as RAPs was placed in the Narrabri Courier newspaper on Tuesday 8 April 2014. Letters were sent to all individuals who, in response to the advertisement, nominated as RAPs or were nominated by other agencies as possible RAPs on 2 June 2014.

Copies of the advertisements and correspondence are included in Appendix 1 of this report.

The consultation guidelines make specific mention of the role of LALCs in this process. They are given opportunity with two separate functions. Firstly, they must be consulted on who might constitute RAPs. Secondly, they can also assume the role of a RAP if they nominate for the same. Those LALCs, being Narrabri, Wee Waa and Red Chief have formally nominated as RAPs. It should also be noted that the Project Area falls within the area subject to native title claim through the registered native title claim of the Gomeroi People. Although the claim has not been determined, the Gomeroi assert an interest in cultural heritage. Santos is also negotiating a s31 agreement with them, under provisions of s29 of the Native Title Act (Cth). The Gomeroi are registered as a RAPs for this Project. Figure 3-1 shows the Gomeroi native title claim and the Project Area.

The period from 2 June 2014 to 18 June 2014 was provided for responses to advertising and correspondence. Correspondence was sent and advertisements placed. At the time of report preparation in excess of 550 persons had requested they be recognised as RAPs. Correspondence concerning the Project has been forwarded to all such persons. A register has been compiled of these individuals and provided to parties as required on 18 June 2014 and updated on 13 August 2014. The locations of the RAPs are shown in Figure 3-2. Appendix 2 provides further analysis of the RAPs for this Project.

## Stage 2

The information included in Appendix 1 of this report was forwarded to all RAPs in compliance with Stage 2 of the Consultation Requirements. Material in Appendix 1 was sent on 5 September 2014. Additional Project information was provided in writing to all RAPs in correspondence sent on 5 September 2014. In the interests of procedural fairness and good faith all reasonable efforts were made to ensure all RAPs are consulted and provided information at the same time. Practicalities linked to number of RAPs, their geographical spread, the varying nature of the RAPs (individuals as against legal, corporate or cultural structures) and the mechanisms for engagement associated with these considerations (e.g. meetings) may, however, reasonably influenced these attempts such that not all parties received correspondence on the same day.

As noted, the Gomeroi native title applicants are RAPs and have received copies of all information mentioned above. Consultation with the Gomeroi native title applicants as RAPs also continued through meetings at which both native title and cultural heritage issues would be discussed. Noting that confidential commercial information was tabled at these meetings, and that they derive from specific rights and obligations arising from the *Native Title Act*, they are be exclusively between Santos and the named applicants (and their legal advisers), with no other persons entitled to participate and no further reports can be tabled on them at this time.

Three meetings were held on 2-4 September 2014 in Wee Waa, Narrabri and Gunnedah respectively. All RAPs received written invitations to attend these meetings. As a principle, Santos ensured that all meetings had a structured format with facilitators appointed, an agenda consistent with advertisements and correspondence and the purpose of the meetings was followed. Additional Project information was provided at these meetings, with copies of this information sent to all RAPs on 5 September 2014.

## Stage 3

This commenced on 2 September 2014, with the meeting held in Wee Waa. The methodology adopted for the assessment was outlined at this and subsequent meetings, using a PowerPoint format. All issues raised for consideration at this and subsequent meetings were formally noted. A register of issues and responses was established. This register has been expanded as additional meetings were held, issues raised and as additional comments have been received.

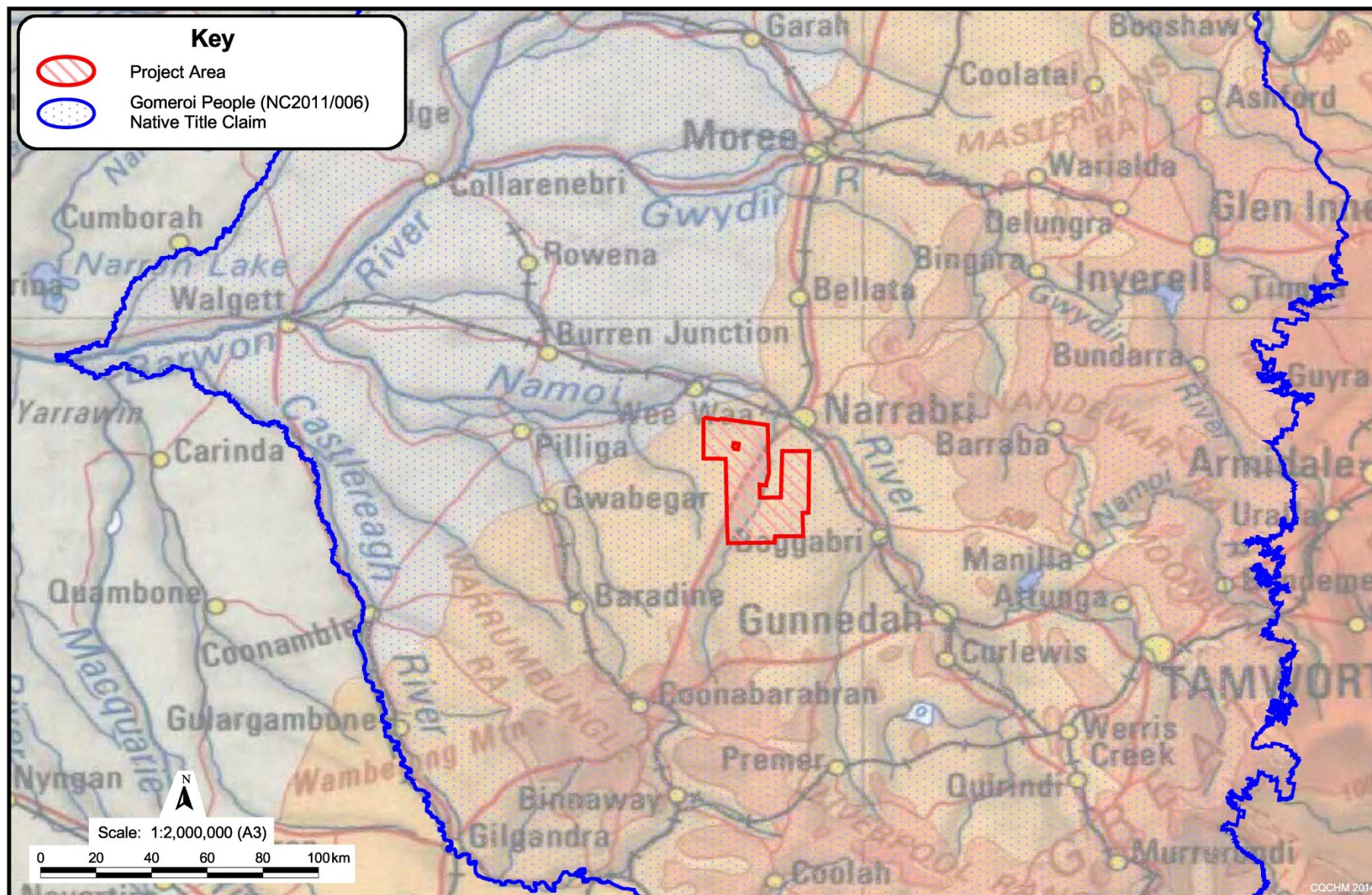


Figure 3-1: General location of the Project Area in relation to the Gomeroi Native Title Claim boundaries

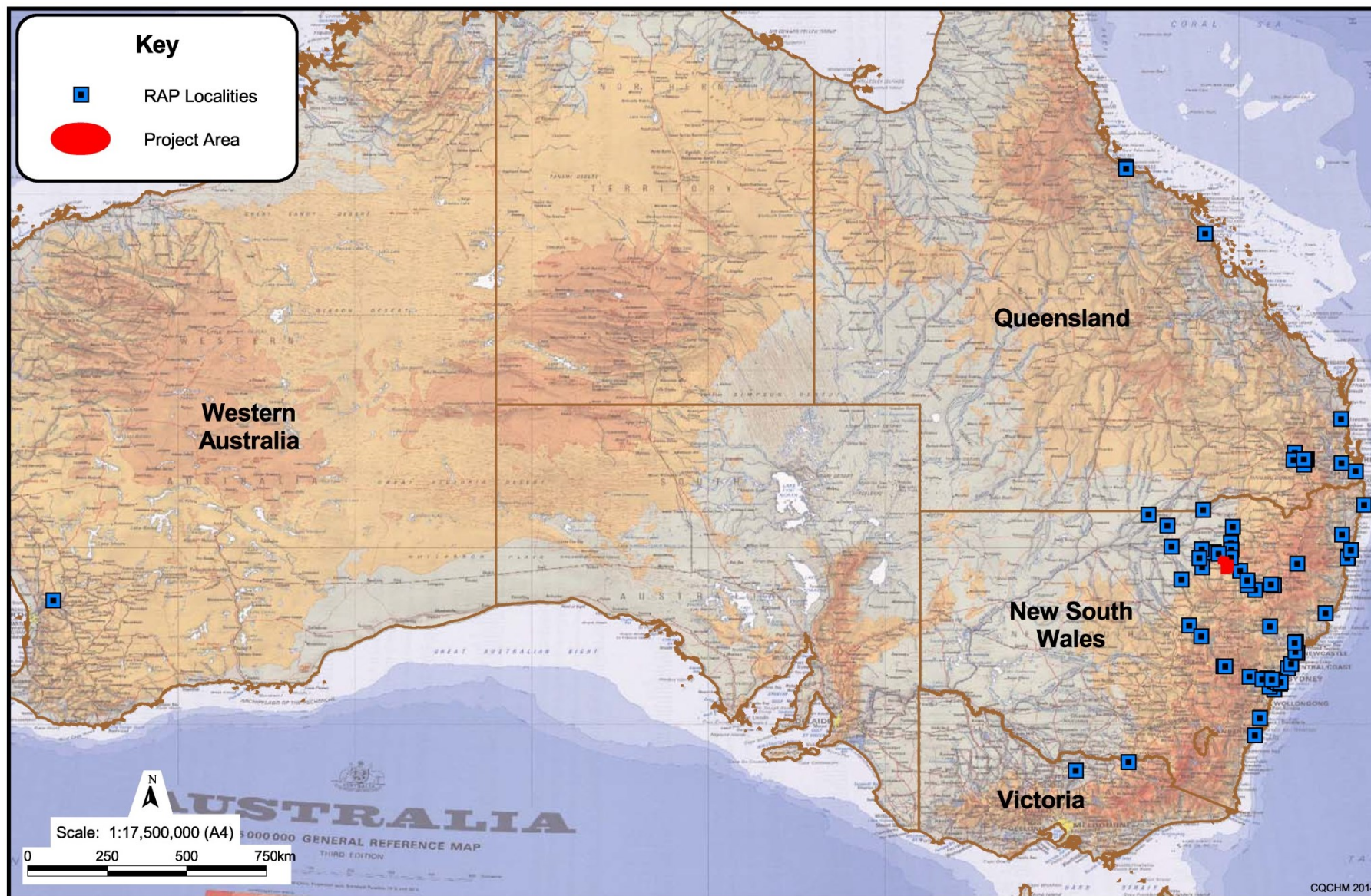


Figure 3-2: Geographical distribution of RAPs

Copies of the PowerPoint including the outline of the methodology were sent in correspondence to all RAPs on 5 September 2014.

A second series of meetings were also held. During these series of meetings a comprehensive schedule of the issues raised was collated. The itinerary for these meetings was as follows: Gunnedah on 15 September 2014, Wee Waa on 16 September 2014 and Narrabri 17 September 2014. Two field trips were proposed and advised at the September 02, 03 and 04 RAP meetings and included in letters to all RAP's. They were on Sunday, 14 September 2014 and Wednesday, 17 September 2014. Due to lack of take up, only the Wednesday, 17 September field trip proceeded. Based on a commencement date of 2 September 2014, and allowing a minimum of 28 days for receipt of comment, as specified in the Consultation Requirements, the comment period was to close on Monday, 6 October 2014. Noting that this was a public holiday in NSW and Queensland, an additional day, Tuesday, 7 October 2014 was allowed for receipt of comments.

Consideration has been given to all issues raised at meetings and to other submissions made. A register of response to these issues and submissions has been created and is appended to this technical report. Issues relating to methodology have been considered. The response to these is included in the register, and where appropriate has been given effect in this report.

#### *Stage 4*

A meeting of RAP's to present this draft report and the draft CHMP was held in Narrabri on Tuesday 18 November 2014, after the first meeting was postponed because another resource proponent had invited over 150 Aboriginal people to a meeting the same day. A single meeting in Narrabri with transport provided from Wee Waa and Gunnedah was requested by RAP's at the previous meetings in September. Copies of this report along with a draft CHMP have been provided to all RAPs. The report, draft CHMP and response to issues from previous meetings was sent to all those that did not attend on 18 November 2014. Additional meetings were held in Wee Waa and Narrabri on 9 December 2014 and Gunnedah on 10 December 2014. All issues raised have been tabulated. Responses to the issues raised have also been developed. The issues raised and responses are included in Appendix 3 of this report.

## 4. Existing Environment

### 4.1 Description of Environmental Conditions

#### 4.1.1 Introduction

Hughes and Sullivan (1985: 35) have noted that:

The results of numerous investigations throughout Australia have shown that the nature and distribution of archaeological sites across the landscape are generally very strongly influenced by environmental factors such as bedrock geology, landforms and associated soils and vegetation and climate. . . . These factors influenced the availability of plant and animal foods and other organic raw materials, water, raw materials for stone artefacts, suitable campsites, and landforms and rock surfaces on which rock art could be executed.

It is further noted that the Secretary's Requirements and appended OEH recommendations specified that Santos was to provide:

Description of the sensitivity of landforms affected by the Project inclusive of the geomorphic landforms described in the ACH Brigalow Belt South Bioregion assessment.

As a consequence, review of these environmental factors and landforms is warranted in the present context and the following sections cover these matters.

#### 4.1.2 Region

*The Interim Biogeographic Regionalisation of Australia* (IBRA) defines regions based on ecological criteria. These are useful for the examination of the archaeological record. The proposed Project falls within the Brigalow Belt - Southern Bioregion (BBSB). Within this region there are a number of sub-regions of which the Pilliga and Pilliga Outwash are relevant here. The elevation of the Project Area is typically between 250 and 300masl.

#### 4.1.3 Geology

The southern part of the BBSB bioregion is made up of basalt and quartz sandstone, with some shale. Soils and therefore vegetation are variable, and are determined by the underlying rock or sediment. The main rock formation is basalt of the Liverpool Range and Warrumbungles (an ancient volcano). Quaternary sediments form alluvial fans and outwash slopes. These are formed from coarse sediments. The geology of the Project Area is dominated by Pilliga sandstone, a coarse red to yellow Jurassic sandstone containing about 75% quartz, 15% plagioclase and 10% iron oxide although local variations in soil type do occur. Sandstone outcrops with basalt-capped ridges are common in the south, while the Pilliga outwash areas in the north and west are dominated by alluvium from flooding creeks.

These sandstones lend themselves to providing materials that can be used as part of grinding technology: manufacture of axes and other ground edge implements and the production of grinding slabs used to prepare food stuffs or grind up nodules of ochre. In areas, Pilliga Sandstone overlies the Walloon Coal Measures, which comprise claystone, shale, siltstone (Geoscience Australia 2012: Online). These materials, where exposed, offer excellent material for the production of flaked stone artefacts.

#### **4.1.4 Soils**

Variation in soils is based on both location and basement rock type. Hills and slopes tend to have thin soils with more gravel, while those in valleys tend to have more clay content. Soils on basalt tend to be heavier and more fertile. Alluvial deposits are found along the Namoi River and tributaries upstream of Narrabri. Soils across the Project Area are typically shallow black earths and red loams on basalts. Extensive texture contrast duplex soils with linear patterns of deep yellow sands and stony red broom earths are typical, as are cracking clay sub-soils. These soils are typical of those derived from the Pilliga Sandstone and are described as highly siliceous. The cracking clays which are self-mulching can lead to the disaggregation of archaeological sites as they expand and contract.

#### **4.1.5 Water and Rainfall**

Pardoe (2010) has usefully summarised river conditions as follows:

River flow during the last 10,000 years has been fairly consistent. River courses of the region have not changed significantly during that time. During the last Glacial period prior to 13,000 years ago, rivers flowed more strongly. Even though rainfall was reduced, glaciers and snow fields in the Dividing Range held water as snow during the winter months, releasing it in large pulses during the spring. The rivers of that time were generally larger and wider, carrying up to nine times the volume of water. Flow would have been faster . . .

The implication of this is that rivers and their major tributaries now existing in the Project Area can be presumed to have existed for upwards of 10,000 years. We do not need to make allowance for rapid and radical shifts and changes in hydrology with consequent impacts on Aboriginal demography and settlement patterns. This not to say that there have not been changes in these but simple explanations relating to large-scale environmental change stemming from hydrological change need not be seen as the dominant cause of these. There possibly have been shifts in alignment of minor streams, and these may have taken place over very short time periods. It is unlikely that these would have seen significant reorientation of economic practices although they could have influenced minor shifts in camp site location at the local level.

Rainfall varies between 40mm to 80mm at Narrabri and rainfall is greatest during the summer months. Periods of drought occur regularly if not with predictable regularity. Nine periods of drought have been recorded between 1889 and 2012 in the Narrabri area. Rainfall and river flow are related to a degree and failure of both has occurred – three episodes of this have been recorded in the Narrabri area in the last century. Water would be retained in billabongs and rock pools, as well as gilgai areas immediately after rain. It would also be available from the springs dotted through the area. The quantities rapidly diminish from evaporation in the ephemeral sources and while available from the springs was never in great quantities. Population would rapidly have to spread to prevent exhausting sources in one location by over-concentration of population.

#### **4.1.6 Landforms**

The following land system provinces are found within the Project Area. The following descriptions have been taken from the BBSB study (RCAD 2002) to ensure comparability. Table 4-1a-c provides a summary of each of these land systems.

Alluvial landforms in this region are almost exclusively those of the rivers: tributary creeks, channels, billabongs, gilgai, swamps, lakes, and chains of ponds. Size of landforms varies with the alluvium being the largest.

There are two stable deep sand landform types, both of which are associated with fluvial deposits: Sand Monkey and Yellow Sand Sheet. These occur within the Pilliga Outwash Province. These landforms are expected to be encountered only rarely in the current Project and together account for approximately 1% of the Data Audit Area.

There are three types of landform in elevated areas. Soil Mantled Slope is the most dominant landform in size of area within the bioregion. It can vary from undulating to hilly with large areas of nearly flat ground. Many of the sites recorded among lower order streams seemingly exposed by erosion of the creek banks.

These landform units have been mapped and used in the development of the draft cultural heritage zoning model discussed below.

Alluvial Terrace	Abandoned floodplains of streams or rivers (abandoned because the stream has eroded its bed and floodwaters can no longer reach the old floodplain). Usually a natural process although gullying can have the same effect.
Alluvium	Deposited by streams or rivers. The mapped areas will usually surround a channel and include both the channel and floodplain. Where the floodplain is too small to map, the creek lines may indicate small pockets of alluvium. Soils range from sand to clay, usually deep. Creek beds may erode to bedrock in some areas. In this survey distinguished from floodplains of larger rivers by their relatively featureless and infrequently flooded surfaces (see below). Some alluvial areas have only poorly defined drainage lines or discontinuous channels (chains-of-ponds).
Channel	River channel. Only mapped where the true channel width (from top of bank to top of bank) is much greater than that shown on map (usually a tracing of the streambed or water-covered area at the time of the photography).
Gilgai	Areas of deep, black cracking clay where the surface has a pattern of mounds and hollows (formed by expansion and contraction of the clays as they wet and dry). The hollows often gather water after rain and can hold it for some time. In the cleared areas of the Pilliga outwash the mounds are bare and a source of sediment in runoff. Associated with Brigalow in the northern Pilliga Outwash and Belah ( <i>Allocasuarina cristata</i> ) in smaller pockets in the Pilliga Forest.
Palaeochannel	An old channel (abandoned). Usually as the result of natural processes and the creation of new channels elsewhere on the floodplain. Conspicuous because they retain the characteristic meandering channel pattern. They range from being permanently dry and largely filled in, to some with widely spaced waterholes to some which are often full of water and which act as flood channels.

Table 4-1a: Summary description of alluvial landforms.

Yellow Sand Sheets	Deep, uniform medium to coarse yellow sand. Possibly in-situ weathering product of a particular stratum within the Pilliga Sandstone Formation with or without subsequent reworking by wind into sand dunes.
Sand Monkey	Local term for a sandy palaeochannel 'stringer' in the Pilliga Outwash. Unlike palaeochannels, which retain a concave shape and hold water, sand monkeys are convex at the surface. The channels are filled with deep medium sand, either yellow or red, depending on drainage. The channel outline can only be determined by excavating, but in air photographs the sand bodies are long, continuous bodies with low sinuosity and characteristic vegetation (sparse, cypress dominates).

Table 4-1b: Summary description of stable deep sand landforms.

Soil Mantled Slope	Low to steep slopes with a continuous cover of soil and no rock outcrop. Soils range from shallow to deep and a range of textures. Soils formed largely by in situ weathering of rock. Subject to sheet erosion and gully erosion only in extreme cases, but only usually with cultivation.
Colluvial Slope	Deposits of slope processes, usually sheet (rather than channel) flow, accumulating on the lower slope, below a soil mantled or rocky slope. Slopes range from steep (>15°) to very low (< 1°). Colluvium slopes towards the creek line from the slope, distinguishing it from alluvium which slopes down the valley parallel to the creek. Often a deep coarse or medium (sand to loam) soil. Highly susceptible to erosion especially where vegetation has been disturbed (such as by cultivation, forestry, road-building etc.)
Rocky Ground	Bare rock surfaces or thin soils with abundant rock. Can range from cliffs to flat benches.

Table 4-1c: Summary description of elevated landforms.

#### 4.1.7 Fauna and Flora

The forest contains at least 900 plant species, including some now widely grown in cultivation as well as many threatened species. Some areas of the forest, particularly in the western Pilliga, are dominated by cypress-pine (*Callitris* spp.). However, there are a variety of distinct plant communities in the forest, some of which do not include *Callitris*. Another prominent sub-canopy genus are the she-oaks, while eucalypts dominate the canopy throughout the forest.

Common tree species include bumble box, white cypress pine, Blakely's red gum, white box, bull oak and wilga are typical, as are various species of wattle. Wire-grasses are also dominant in these areas, and rough speargrass and slender bamboo grass may also be present. On the alluvial plains, grassland is dominant, with typical species including curly windmill grass, nardoo, common rush, various species of roly-poly and wild turnip. A sparse tree population is also present; belah, a *Casuarina* species is prominent, though bumble box, silver-leaved ironbark, wilga, white cypress pine and bull oak are also typical. Along Galathera Creek, vegetation predominantly comprises common rush, while along the Namoi River, river red gum is common (Ward 1999: 11-12). The box trees provided bark commonly used to manufacture a wide range of items including canoes, gunyahs, coolamons and other utilitarian items. Many of the other plants and trees were also culturally useful. Nardoo, for instance, provides vast quantities of grass seed which was one of the staple foods of Aboriginal populations in this region prior to European settlement.

The various landform units support the dense growth of trees and shrubs and high species diversity (Norris 1996: 1). This, in concert with the floral diversity present, results in a highly inter-digitated environment, with a considerable degree of ecotonal development. The consequence of this is that it affords a wide range of resources to hunter-gatherers readily exploitable by strategic placement of camp sites within the forest. This picture is somewhat at odds with Balme's (1986) description of a monotonous environment that would have afforded few opportunities to Aboriginal people in terms of subsistence activities.

Fauna recorded includes at least 40 native mammals, 50 reptiles and at least 15 frogs. Squirrel Gliders, Koalas, Rufous Bettongs and Pilliga Mice are present. The forest supports a significant avian fauna including: Painted Honeyeaters and Diamond Firetails, some endangered species such as Swift Parrots and Regent Honeyeaters, and near threatened Bush Stone-curlews. Other woodland birds present in good numbers include Barking Owls, Glossy Black-Cockatoos, Grey-crowned Babblers, Speckled Warblers, Brown Treecreepers, Hooded Robins and Turquoise Parrots. A wide range of waterfowl can be found along the waterways and on swamps.

Fires play a major role in the ecology of the forest with many plant species depending on fire to regenerate. On occasion, fires can be extremely intense, spread very quickly and threaten nearby properties as well as laying waste to entire ecosystems. If intense fires occur less than 15 years apart there can be a loss of plant and animal biodiversity. The ethnohistorical references to Aboriginal use of mosaic burning may well have gone a long way to reducing the occurrence of intense fires as well as enhancing environmental diversity and species succession, both of which served to create ecotonal variability and thus a richer environment for hunter-gatherers to exploit.

#### 4.1.8 Recent Land Use Impacts

The Pilliga area has suffered from four major land use impacts stemming from European occupation:

- large-scale clearing for agricultural purposes;
- impact of grazing animals;
- impact of timber getting; and
- changes in fire regime.

European settlement had huge and obvious impacts on the Aboriginal community, presaging as it did a shift from an independent hunter-gatherer lifestyle to integration into the regional rural economy, and the whole-scale disruption and dismemberment of long-established social systems, economic marginalisation, discriminatory attitudes and policies. These have been documented in detail elsewhere: RCAD (2002), for instance, covers this issue very well from the perspective of the Aboriginal community. But settlement has had a profound and direct impact on the survival of heritage sites. This is considered further below.

Clearing for agriculture has resulted in the loss of large areas where culturally important plants and animals could be collected or hunted. In addition, the clearing of the vegetation will have resulted in the destruction of numerous examples of carved and scarred trees. Many types of archaeological sites, including stone artefact scatters, hearths, mounds and ovens will have been destroyed during the initial clearing and pulling of scrub as well as ploughed under or otherwise increasingly disaggregated year after year. The loosening of top soil and increased erosion that has resulted will have seen further sites, particularly near watercourses, washed away during floods or otherwise buried under sedimentary wash.

Grazing animals with their hard hooves will have caused waterholes to fill with sediment or other changes in the local hydrology around waterholes and watercourses. Site in the vicinity of such areas will have been subject to trampling and disaggregation.

Because the soils do not favour agricultural use, significant parts of the Pilliga forest have never been subject to agricultural activity, and the broad-scale clearing that typically precedes this. However they have been used for other purposes. Primary among these has been timber getting including cutting railway sleepers and harvesting of forest product for other purposes. This will have had a direct impact on the survival of scarred trees as well as other culturally important species. For instance, box species and kurrajongs, which provided bark and fibre used for a variety of purposes would also have been heavily cleared by timber getters and for fodder during droughts. The secondary consequences have been the creation of extensive road networks to facilitate access to and removal of the forest products.

Changes in fire regime, with a reduction in low-scale but frequent Aboriginal firing have undoubtedly resulted in a loss of a mosaic environment. This will be less obvious as broad-scale clearing and agriculture will have masked this. But more intense fires in the forest itself will have exacerbated the destruction of scarred trees. The destabilisation of soils will also have increased as the root systems that bind these together have been impacted causing increased erosion, with consequent loss of sites in locations subject to this.

Consequent on changes in fire regimes as Aboriginal people could no longer influence the environment with traditional firing practices, Rolls (1981) argued that the Pilliga forest used to be an open woodland forest and that European influence has enabled the cypress pine to dominate. However, others disagree with Rolls' analysis, citing historical records including those of Oxley and Cunningham (see Section 4.2) that indicate that the plant communities in the scrub and elsewhere probably have not undergone the level of alteration that Rolls suggests.

## 4.2 Early Accounts and Ethnohistorical Background

The first detailed description of the environment in the vicinity of the fieldwork survey area was provided by John Oxley, who passed through the region in 1818. Oxley set out from a base camp at Wellington on a new expedition down the Macquarie River. He abandoned the Macquarie River in the marshes and struck east, crossing and naming the Castlereagh River before skirting the Warrumbungle Range and entering the Pilliga Scrub. This expedition took place during the winter months. Oxley's (1820) published account describes awful conditions with teeming rain storms, flooding of rivers, and extensive areas of heavy, boggy country. He pushed through the Pilliga Scrub, noting that the country was badly waterlogged. He then turned north to Garawilla Creek, Mullaley and the Liverpool Plains. The route he followed thus provides us with a travelogue covering a transect north from the Western Slopes into the Brigalow Belt, and through part of the Pilliga Forest, before he headed across the Liverpool Plains and onto the New England Tablelands.

The following attempts to focus on commentary directly pertinent to the Project Area. Oxley skirted north of the Warrumbungle Range on 17 August 1818 and entered the Pilliga Scrub. He described the landscape as:

. . . barren, rocky country, consisting of low stony ranges, divided by valleys of pure sand, and usually wet and marshy: latterly we appear to be descending from a considerable height, to a lower country to the north-east. The whole was a mere scrub covered with dwarf iron barks, apple trees, and small gums; the soil scarcely anything but sand, on which grass grew in single detached roots. The horses fell repeatedly in the course of the day, and they were now so weak that they sank at every soft place. (Oxley 1820)

The next day, his party continued on, describing the country in the following terms:

. . . a very thick forest of small iron barks which had been lately burnt; and their black stems and branches, with the dull bluish colour of their foliage, gave the whole a singularly dismal and gloomy appearance. So thick was the forest that we could hardly turn our horses, nor could the sun's rays penetrate to the sandy desert on which these trees grew'.

Oxley observed that while the apple tree flats tended to be firm hard ground, the iron-bark, pine, and box country was loose sand. Rain transformed this into what Oxley described as quicksand. Oxley commented that conditions were likely such that 'this region must at all times be impassable from opposite causes: in wet seasons it is a bog; in dry ones, there is no water (19 August, 1818). But at the same time he noted the large number of kangaroo rats that they observed throughout the woodland. His dismissive comments on their quality might well have been influenced by the effect of weather and environment on his general disposition. Elsewhere, such a resource was greatly valued as a source of meat.

After another three days of slogging through the scrub the explorer's party saw ahead of him country to the east which he described as 'fine forest hills' and 'extensive flats, bare of timber'. The contrast between the Pilliga and the plains could not have been more profound. On 24 August, he first appreciated the extent of the Liverpool Plains and the pastoral opportunities they offered. On 25 August, with sweeping views now open to him, Oxley was 'delighted' and 'exhilarated'.

In the course of his journey, Oxley saw and indeed encountered parties of, and individual, Aboriginal people, and he made notes of these encounters. Thus, when he reached the Castlereagh River on 27 July, he wrote:

The natives appear to be numerous; their guniahs (or bark-huts) are in every direction, and by their fire-places several muscle-shells of the same kind as those found on the Lachlan and Macquarie Rivers were seen. Game (kangaroos and emus), frequenting the dry banks of the river, were procured in abundance.

While still to the south and west of the Pilliga in early August, Oxley's party saw many fires near what is now called Mt Bullaway. As he moved closer he wrote on 11 August that:

The natives continue in our vicinity unheeded, and unheeding: even the noise of their mogo [stone axe] upon the trees is a relief from the otherwise utter loneliness of feeling we cannot help experiencing in these desolate wilds.

He had direct encounters. So, on August 4, 1818 as Oxley approached the Project Area, he wrote:

The natives appear pretty numerous: one was very daring, maintaining his ground at a distance armed with a formidable jagged spear and club, which he kept beating against each other, making the most singular gestures and noises that can be imagined: he followed us upwards of a mile, when he left us, joining several companions to the right of us.

Intriguingly, while making no direct comment on the Pilliga, after moving on to what he named the Liverpool Plains, he regularly commented that the area seemed to be very thinly inhabited, with just a few wandering families. We can only speculate that he was struck by the difference between this and country to the south and west. But whether this included the Pilliga or not we do not know. He made few express references to any encounters during his struggles in this area but with the weather so atrocious this is perhaps of little wonder. Only after debouching

from the plains did he again report seeing the smoke of what he took to be numerous campfires, by which time he was probably in the vicinity of the Peel River.

In 1827 the botanist, Allan Cunningham, took up the challenge of exploration. After turning west at Muswellbrook, he traversed the southern edge of the Liverpool Range near present-day Merriwa. Heading north into the vastness of the Liverpool Plains, he travelled to Mullaley, and climbed the mountain. Turning west again he journeyed almost to the Namoi River, guided by Cox's Creek. Near the junction of these two water courses he observed that Aboriginal people seemingly had been using metal axes that could only have been obtained by trading with others closer to the bounds of European settlement to the south and east. This attests to the effectiveness of traditional exchange networks. Leichhardt (1847) had similar experiences in central Queensland during his journeys of exploration in that region. The existence of exchange and trade networks of considerable antiquity through these regions is known from archaeological evidence.

Cunningham, also travelling in the winter months, generally expressed surprise at the small number of Aborigines he came across. But he also provides descriptions of encountering evidence of Aboriginal groups using the forest country. Thus, midway between Mullaley and Boggabri, in the now Kerringle State Forest, he came across 14 large bark huts among the woodland. This description approximates what might in other circumstances be called a village. The huts had apparently been abandoned quite some time before he saw them. These huts apparently had been used during times of heavy rain in the area as there was evidence of people's footsteps in mud around the huts, which had floors of bark. The larger huts, which he estimated were big enough to house a family of six, were constructed with forked sticks supporting a conical bark roof (O'Rourke 2009).

Villages of this kind were not uncommon. Oxley (1820) reported a similar village on July 27, 1818 near the Castlereagh River. With the Aboriginal men absent and the women and children frightened, he chose not to stay long. He did offer a description of the material culture he saw:

(W)e found there eight women and twelve children, just on the point of departing with their infants in their cloaks on their backs. ... In the camp were several spears, or rather lances, as they were much too ponderous to be thrown by the arm; these were jagged: there were also some elamongs (shields), clubs, chisels, and several workbags filled with everything necessary for the toilet of a native belle; namely, paint and feathers, necklaces of teeth, and nets for the head, with thread formed of the sinews of the opossum's tail for making their cloaks.

About four years later, Mitchell (1839) was another early observer of the region. His travels confirmed the Liverpool Plains were a vast open parkland, thinly treed, well before any European settlement: He noted:

This expanse of open level country, extended in a northerly direction, as far as human vision could reach; and being clear of trees, presented a remarkable contrast to the settled districts of the colony.

He reached Boggabri and the Namoi River and then turned west and encountered the Pilliga Forest which he described thus.

At 15 miles we met an impenetrable scrub of forest oak (casuarina) through which no passage appearing near, we were compelled, hot as the day was, to cut our way with axes where the trees were smallest and least numerous.

Mitchell (1839) observed that possums were found in the hollow trunks of upper branches of tall trees. These were climbed by cutting new notches asserting that old notches were never re-used. He wrote that cutting marks were very common on trees and described their distribution:

[O]n my journeys in the interior I knew, by their being in a recent state, when I was approaching a tribe; or when they were not quite recent how long it was since the natives had been in such parts of the woods; whether they had any iron hatchets or used still those of stone only; The notches made in climbing trees are cut by means of a small stone hatchet and, as already observed, with each hand alternately. By long practice a native can support himself with his toes on very small notches, not only in climbing but while he cuts other notches, necessary for his further ascent, with one hand, the other arm embracing the tree. The elasticity and lightness of the simple handle of the mogo or stone hatchet employed are well adapted to the weight of the head and assist the blow necessary to cut the thick bark with an edge of stone.

According to Mitchell (1839), people often carried, as part of their tool kit, a small wooden shovel and used one end to dig up different roots, and the other to break into the large anthills for the larvae, which they ate.

Some (such as Rolls) have argued that this dense forest rapidly expanded as traditional fire regimes were suppressed. The forest regrowth was unsuitable for grazing and pastoral attention shifted elsewhere. Others do not subscribe to this model of environmental change.

O'Rourke (2009) offers a lengthy discussion as to why early explorers saw so few Aboriginal people. After considering several options, he suggests that the most likely reason was that the plains and rivers became uninhabitable in the flood season and that people moved to higher ground:

In the warmer half of the year it seems that large 'super-bands' of several hundred people came together on one stretch of their major watercourse to exploit the fish, yabbies and mussels. Fish net-traps, often very large, were made from the fibre of kurrajong bark. The early settler Bucknell remarked that a single net-haul sometimes yielded enough fish to feed a group of 40 people for one day. Short excursions away from the rivers and major creeks gave them access to 'woodland foods' such as possums and honey, while the women in particular would also gather plant foods. A very important food was grass-seed, ground on grindstones and cooked in the form of tiny loaves or cakes. It was collected and threshed as a communal effort.

In the cooler half of the year it seems that the communities separated into 'hearth-groups' (one to two families: 10 people or fewer) and travelled into the back-country to allow the men to hunt land mammals and the bigger birds, i.e. kangaroos, wallabies, possums, emus, bustards, and so on. Again the women would collect lesser animals, e.g. bandicoots, lizards and snakes, and plant foods, yams and roots including the famous yam daisy, *Microseris lanceolata*. (O'Rourke 2009).

The early anthropological accounts leave no doubt that this country was occupied by people commonly called the Kamilaroi. There numerous alternative spellings and these people now refer to themselves as the Gomeroi. Their descendants have registered the native title claim that covers 111,429km<sup>2</sup>, and includes the Project Area.

Howitt (1996[1904]), an early anthropologist with research interests in this region, described the Kamilaroi as 'a large nation consisting of many tribes under the same designation'. In Howitt's opinion different subdivisions of Kamilaroi people occupied different portions of tribal territory, each claiming its own *taurai* or food/hunting grounds. These areas were well defined and known and groups acted to defend their interests.

With his intense interest in kinship systems, Howitt (1996[1904]) described in detail the complex subdivisions and marriage rules. In addition to their own personal name, each person belonged to one of two moieties, further divided into made up of four sections (which Howitt and others called 'skin names'). Individuals were also allocated to a totem group, named after a bird or

animal (often called 'meats'). Examples of totems given by Howitt (1996[1904]: 202-205) and others (e.g. Ridley 1856) include: kangaroo, possum, bandicoot, black duck, pademelon, eaglehawk, scrub turkey, yellow fish, honey fish and bream; and in the other moiety: emu, carpet snake, black snake, red kangaroo, wallaroo, frog, goanna and cod fish. These various groupings influenced patterns of marriage and links to other groups as well as association with and access to country.

The Kamilaroi also gathered into large groups for ceremony and used these gatherings for meetings of senior individuals to resolve disputes and decide on what penalties should be meted out to individuals, and possibly to plan collective action between the groups. These large meetings were called 'bora' in Kamilaroi, were invariably held on special ceremonial grounds within the wider Kamilaroi territory, often on a rotating basis (Howitt 1996[1904]: 302-3). The axe quarry near Moore Creek to the northeast of Tamworth was also a ceremonial centre, and the exchange networks that criss-crossed the region, and in which axes from this location featured, were no doubt facilitated by these ceremonial events. Invitations announcing the date and place of the 'burbung' or 'bora' were sent around by message stick, often carried by a special herald (Howitt 1904: 689). The ceremonial grounds often had one or two earthen ring mounds associated with them, and in some instances were surrounded by carved trees (Etheridge 1918). Black (1944) discusses a number of bora grounds in the Narrabri – Wee Waa area observing:

They resolved at one of their Boras or Corroborees to send a challenge and fight the new comers, the white fellows – which they did informing them that they intended to fight them in two weeks and appointing a day. The major rivers and associated tributaries were their livelihood and supplied a variety of consistent and plentiful food including fish, water fowl and shellfish. Food from the rivers was supplemented with kangaroos, wallabies, bandicoots, emus, turkeys, snakes and lizards, especially in those seasons when people moved from the rivers into the ranges or plains. According to Thomas Mitchell, possums formed a significant part of people's diet, as well as being used for making warm winter cloaks, arm bands and other items of clothing.

As was common across the continent, vegetable foods constituted the larger part of the diet. In Kamilaroi country, people living on the plains had access to a wider range of grasses. Early European explorers and settlers in the region gave accounts of mosaic burning to encourage fresh herbage for animals and the stacking of grass seed for future winnowing and harvesting (McGarry 2004). The presence of grinding slabs and top stones as well as pestles and mortars for the preparation of harder seeds are testimony to this reliance.

Wood and trees provided a wide range of resources and tools central to Aboriginal subsistence and economy: a source of fuel, the manufacture of tools and implements such as spears, shields, axe hafts, digging sticks, clubs and shovels. Bark was another important resource that was readily accessible and used to build huts, to make canoes and manufacture coolamons and other containers. The scarred trees (otherwise referred to as culturally modified trees) are material evidence of these activities on some of the remaining older trees in the area.

According to Mitchell (1839), people often carried, as part of their tool kit, a small wooden shovel and used one end to dig up different roots, and the other to break into the large anthills for the larvae, which they ate.

Honey was an important source of seasonal nutrition. When near Goobang Creek, admittedly well to the south, Mitchell (1839) described people demonstrating how they procured large quantities of honey:

We were now in a land flowing with honey, for our friendly guides, with their new tomahawks, extracted it in abundance from the hollow branches of the trees, and it seemed that, in the proper season, they could find it almost everywhere. To such inexperienced clowns, as they probably thought us, the honey and the bees were inaccessible, and indeed invisible, save only when the natives cut the former out, and brought it to us in little sheets of bark, thus displaying a degree of ingenuity and skill in supplying wants which we, with all our science, could not hope to attain. Their plan was to catch a bee, and attach to it, with some resin or gum, the light down of a swan or owl; thus laden the bee would make for its nest in the branch of some lofty tree, and so betray its store of sweets to its keen-eyed pursuers, whose bee-chase presented, indeed, a laughable scene. (Mitchell 1839).

The Gomeroi (Kamilaroi) would do same thing and, again, scarred trees would result.

A wide variety of reeds and rushes grew on and around the rivers and creeks. The shoots and tubers of many of these could not only provide food but also provided raw material for the manufacture of mats, bags, baskets, nets, belts and headbands. Kurrajong bark was also extensively used to make string and fibre. The massive hunting nets used in hunting kangaroo in northern NSW were manufactured from this.

People chewed the fibre to soften it and then ran it between their teeth to make the fibre. This, along with the silicon in the plants themselves and eating food with high grit content generated by grinding, resulted in the heavy wear seen in the dentition of Aboriginal people reared on a traditional diet and manufacturing these objects in a traditional way. Loss of enamel and exposure of dentine, leading to abscess, is commonly observed in skeletal remains more than 150 years old. Grooving of teeth from repeatedly drawing plant fibre across and between them is also seen.

Trade in raw materials as well as manufactured items was common between neighbours. McGarry (2004) refers to trade in grass tree gum (for hafting) and weapons and artefacts manufactured on the plains from Myall wood (a type of acacia) being particularly prized as trade items in the Hunter Valley. As noted, the archaeological record provides direct evidence of trade and exchange: axes and axe fragments documenting dispersal of axes from known quarries across large areas of northwestern NSW are found in deposits of excavated sites which have been dated to 4,000bp as well as on open sites (Binns and McBryde 1972).

Kamilaroi country was also well known for the elaborate burial ceremonies conducted on the death of important members of the group. Certain types of burials were described in considerable detail by Oxley (1820), Mitchell (1839) and Howitt (1996[1904]:465-467). The tumuli of presumably important people often featured a large, raised central tomb. These were sometimes topped with a hut, made of poles and bark sheets. There are descriptions and drawings of tombs surrounded by three raised ridges of earth. Oxley (1820) described them as raised 'seats', but Mitchell (1839) described them as being small. It was common for trees facing these burials to be elaborately carved with designs that were either specific to the individual or to their clan or group (Etheridge 1918). Family members could mourn and keep vigil, seeking signs of the cause of death at the tomb. Death was never the result of mere natural causes: evidence of the enmity of others who had deployed magic was sought. This in turn would generate payback and revenge killings, which in turn would be one of the subjects of investigation and resolution at the bora ceremonies mentioned beforehand.

### 4.3 Regional Archaeological Context

#### 4.3.1 South

To the south of the Project Area, there has been considerable research in the Warrumbungle region. Here the excavation of the Crazy Man rock shelter (Figure 4-1) has provided dates extending back 17,000 years BP. Substantial amounts of cultural deposit are found in this site including large numbers of stone artefacts. Other analyses indicate that the site has considerable internal integrity. Other rock shelters including Tara Cave, Chalkers Mountain and Kawamabrai have also been excavated but these date to the mid Holocene or younger. Importantly, and probably related to the relatively dryness and low humidity in these shelters, organic material that often does not survive in archaeological context has been recovered from some of these sites. Thus, a wooden boomerang has been found on the floor of a rocky cavity known as Burbie Gap Cave. In other sites floral material including plant fibre and macrozamia nuts are found. On Blackman's Mountain a piece of abraded ochre, together with a cached pebble hammer stone, a grindstone fragment and quartz artefacts were found (Balme 1986:169, 172). Over 19 Aboriginal sites have been recorded in Warrumbungle National Park. These consist predominantly of artefact scatters consisting of quartz and less commonly silcrete, chert, quartzite and silicified wood. Typically, the stone tool assemblage from these sites includes debitage from anvil-split quartz, resultant bi-polar cores and flaked quartz debitage. Workshops or flakes from microblade production are present in sites on lower creeklines as well as within the high country (Balme 1986:186). Other sites within the park include rock shelters with cultural deposit, axe grinding grooves (in two locations) and a stone quarry (Balme 1986:168-180). The pattern of occupation includes extensive Aboriginal campsites along major creeks such as Wambelong Creek; artefact scatters at confluences on the branches of minor tributaries in the ranges; sites with stone tools associated with soaks and springs on mountain slopes; artefact scatters on ridge crests and mountain tops (including extensive scatters above 620masl); and occupation of scarce rock shelters and fissures in valley sides and cliffs. While permanent water is available in Wambelong Creek, it has been suggested that use of this area may have been focused on specific food resources for short periods of time (Balme 1986:180).

Limited archaeological investigation has been undertaken in the area. The available physical evidence consists of a range of open campsites and open artefact scatters across the landscape, with some evidence of quarrying and stone axe working (grinding grooves). This would appear typical of the range of archaeological evidence occurring in the broader region and elsewhere in the state in similar environments, although limited comparative work has been undertaken in the region. The stone artefact assemblages are from the small tool tradition, which Balme (1986:183) notes are uniformly represented across the north-central rivers region and date from the mid-Holocene (c.4,500bp) through to approximately 1,500bp.

In the review of the area for entry on the National Estate a statement is made that virtually no information regarding Indigenous traditions associated with Warrumbungle National Park has been identified through the desktop assessment. It observes, for instance, that Fox (1996:48) noted that one consequence of the arrival of European people in the region from 1830 was the loss of the creation stories associated with the mountains.

Purcell suggested that, while the local Indigenous community places special value on places in the park, in particular Tara Cave, very little information has been documented about Aboriginal traditions associated with the Warrumbungles. But in our experience this is not dissimilar to situations we have encountered elsewhere in NSW and Queensland. The absence of such sites from site registers reflects various processes. The current legislation has direct focus to material cultural heritage: archaeological sites where physical remains can be found. There also can be a not unwarranted reluctance on the part of Aboriginal people to divulge all that information and

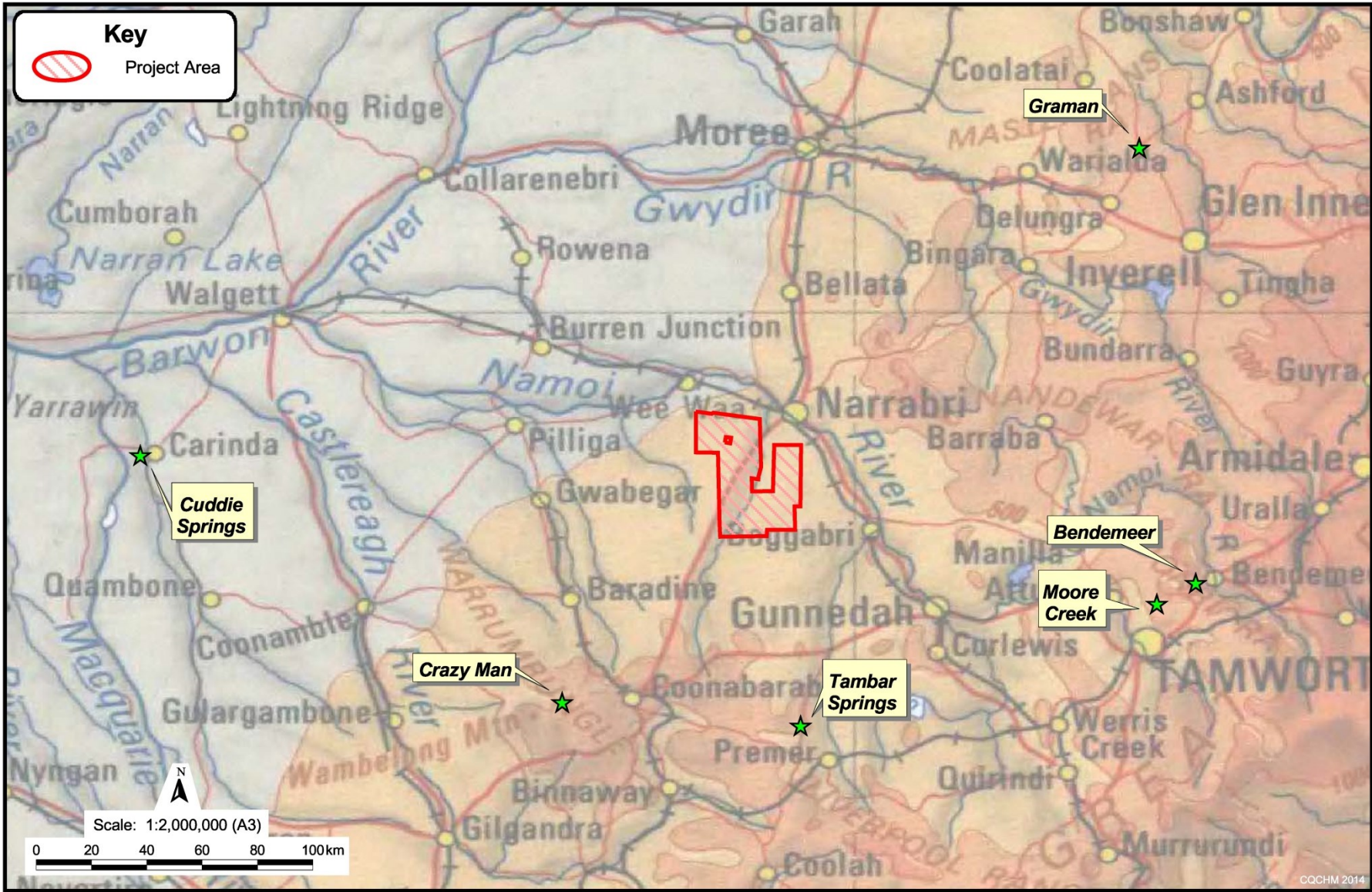


Figure 4-1: General location of the Project Area in relation to features and places mentioned in text.

their cultural beliefs to others who may not value it. Indeed, there may be cultural prohibitions on doing so. The absence of large-scale anthropological research which routinely documents cultural landscapes built on such information has been lacking in this region. These sites constitute what is sometimes referred to as 'hidden heritage'. The Sites of Significance Program which ran in NSW from the mid-1970s to the early 1980s demonstrates what can be achieved with careful, sympathetic and patient research. It recorded over 500 sites including many places that were of traditional significance. We urge caution against too quickly moving to a view that knowledge of such sites has been lost.

#### 4.3.2 Northwest

To the northwest, Cuddie Springs (see Figure 4-1) is a notable archaeological and paleontological site in the semi-arid zone. It is an open site, with the fossil deposits preserved in a claypan on the floor of an ancient ephemeral lake. It is claimed that the site provides the first unequivocal association of stone artefacts with fossil remains of Australian megafauna. Extensive excavations were conducted between 1991 and 2009. Full scale excavations at the site in 1991 uncovered a high concentration of bone and a dense layer of flaked stone artefacts, indicating the site had archaeological as well as paleontological potential. This included the presence of grindstone fragments in deposits apparently dating back 30,000 years, which would make them the oldest discovered in Australia.

The Pleistocene age of the site and the presence of artefacts, notably grindstones, of great antiquity makes the site of particular interest. The greatest attention, however, has been afforded to the site in relation to arguments surrounding the extinction of the megafauna. Wroe and Field (2006) took the evidence from Cuddie Springs to argue that humans were not the primary cause of megafaunal extinctions. They concluded that the 10,000 years of co-habitation of humans and megafauna at Cuddie Springs suggested that climate change was more likely responsible cause of megafaunal extinctions.

In light of the significance of the site to questions that have been an ongoing research interest in Australia for more than 40 years, Wroe and Field's argument have been the subject of intense review by others. These critics point to a number of details that seem to weaken arguments relating to the integrity of the association between humans and megafauna. Considerable evidence has been cited that points to the deposits being much older than the dates obtained suggest and that there also has been admixturing and bioturbation of deposits over an extended period of time. Thus, attention has been drawn to the grinding stones in Pleistocene-age layers (Fullagar and Field 1997), as well as tula-adze-like flakes (David 2002). The Pleistocene grinding stones imply a broad-spectrum plant-processing economy operating here much earlier than previously known from elsewhere in Australia. The finds are anomalous to other parts of Australia where this tool type is restricted to late Holocene contexts (Gillespie and David 2001). The presence of the tooth of a crocodile (*Pallimnarchus* sp.) that became extinct long before 40,000 years ago (Gillespie and David 2001) seemingly indicates the mixing of very old deposits with more recent ones. The presence of stone artefacts with hair and blood adhering (suggesting relatively recent interment) in the same layers there are megafauna bones with not even traces of protein remaining (indicating breakdown of organic remains and intense leaching of the bone, indicative of a long period of burial) represent inconsistencies most easily explained by admixing of older and more recent deposits. Cow bones (definitely of recent origin) mixed with megafaunal bones continues the argument for bioturbation of the sediments. It has been suggested that cattle visiting the well may have pushed stone artefacts down into the Pleistocene layers during waterlogged conditions, creating the apparent association of old bones with more recent artefacts.

Others suggest that the megafaunal bones might derive from much older sediments and have been reworked into the stone artefact bearing layers. There is little direct evidence, such as cut marks at Cuddie Springs (Field *et al.* 2001: 69). The dates themselves also suggest the possibility of mixed Pleistocene deposits. So far, there are 20 radiocarbon dates and seven luminescence dates published for Cuddie Springs. Some of the radiocarbon dates from the Pleistocene layers (28-33kyr) have been subject to statistical analysis. The data indicate they do not increase in age as depth increases as would be expected in a non-disturbed stratigraphy. There is, however, some geochemical data that stands in contrast these arguments of admixing and bioturbation. It suffices to note that the site is hugely problematic and does not offer definitive evidence of the sort argued by Field and others.

#### 4.3.3 North

McBryde (1974 1977) excavated four sites at Graman (see Figure 4-1), between Inverell and Moree to the north of the Project Area. These consist of rock shelters with occupation deposit present (stone artefacts, faunal and floral material as well as charcoal), and rock art is also present in these shelters. The oldest of these sites has dates extending back 9,000 years. However, there is a view that this oldest date, while from charcoal, is not directly associated with any evidence of occupation. Consequently, it is now generally the view that the earliest occupation was 6,000bp. Similarly, while it was thought that some of the earliest evidence of a particular form of artefact, known as backed blades, was also found in these sites dating to 5,450BP (McBryde 1977: 229) others (Johnson 1979; Hiscock 2008) have cogently argued that the real dates are significantly younger – probably 4,500BP. The mid-Holocene deposits in the sites indicate an emphasis on grass seed use, as indicated by the presence of large number of grind stone fragments as well as plant remains. McBryde (1977) has cautiously suggested that there are changes in the subsistence patterns seen in these sites over time. In the stratigraphic units from which backed blades are recovered there are also significant amounts of marsupial bone, notably those of various large kangaroo species. As backed blades decrease in number there is increasing number of ground edge axes and fragments thereof. In these later layers we see a concomitant increase of possum bone.

McBryde (1977) suggests we are seeing a shift in emphasis from the hunting of macropods using spears possibly barbed with backed blades to a subsistence economy in which there is greater emphasis on the hunting of possums with axes used to cut them out of trees (as was observed ethnographically). Others (Sutton 1990; David 1991), while critiquing elements of each's case, have observed that the apparent shift and correlation noted by McBryde has been greatly overstated and that the patterns suggested disappear when more refined analyses of the data are undertaken. Boot (1990) has undertaken an analysis of function. He examined over 2000 stone artefacts from two rock shelters for the presence of use wear and residues. The resultant data produced from this research have led to interpretations of tool and site use at Graman which indicate substantial change in function over time. He argues the sites appear to have been base camps in which stone tools were manufactured, used (predominantly for plant working), and discarded in distinct activity areas. These activity areas and the ways in which stone tools were used appear to have changed over time at both sites (although not simultaneously). Importantly, however, and consistent with Sutton and David, he concludes that the general subsistence strategies appear to have remained relatively unchanged for the duration of time the sites were occupied.

#### **4.3.4 Southeast**

To the southeast, at Tambar Springs (see Figure 4-1), stone artefacts have apparently been found in association with extinct megafauna bones, with these possibly dating to 25,000 years ago. But very similar arguments to those pertaining to Cuddie Springs likewise intrude in relation to this site: these large open sites forming in swamps that are catchments to quite large surrounding areas invite critical evaluation of their integrity by virtue of the site formational processes.

#### **4.3.5 East**

To the east, McBryde recorded and excavated sites in the vicinity of Moore's Creek and Bendemeer (see Figure 4-1). These sites had both art and occupation deposit present. Those at Moore's Creek were also associated with one of the largest axe quarries in northeastern New South Wales as well as ceremonial sites – in this case a bora ring. Axes made from material quarried at Moore's Creek have been found on sites more than 600km to the west near Wilcannia on the Darling River (Binns and McBryde, 1972). Gragin Peak axe quarry, near Warialda, was also a part of this exchange network. The exchange network which facilitated this widespread pattern of dispersal dates back 3,800bp. Stone from this quarry was retrieved from occupation deposits of this age in the Graman sites, several hundred kilometres to the north.

The occupation deposits at Moore's Creek and Bendemeer date back approximately 4,000bp and were occupied through to about 1,000 years ago. They contain numerous backed artefacts which disappear from the sequence about 1,500 years ago. The art in these sites includes both simple figurative representations both animal and human in form, animal and bird tracks and geometric shapes. They have been painted (wet pigment) using red ochre. These forms are found in the art found elsewhere on the northwestern slopes. But the art sites on the northwestern slopes also include features not found at either Bendemeer or Moore's Creek. Thus, the stencils found at art sites such as Warialda and Graman were absent from both Bendemeer and Moore's Creek, as well as other art sites on the New England Tablelands (Godwin 1990: 184). Graman and Moore's Creek share another characteristic. They represent the highest concentrations of art/ceremonial sites in northwestern New South Wales (Godwin 1990: 188). Moore's Creek was known at contact as Burkenbandean and was a major ceremonial centre. Hundreds of people gathered at this location for ceremony, and these gatherings which drew people from across the region no doubt facilitated the exchange system of which the axes from this quarry were a part.

#### **4.3.6 Summary**

The possibility of sites of considerable antiquity cannot be dismissed. While the open sites of Cuddie Springs and Tambar Springs are problematic in this regard, the Crazy Man site establishes a definite Pleistocene occupation in the region. The numerous sites dating from the mid Holocene onwards are also of considerable significance. The possibility of art sites cannot be dismissed although their density does appear to diminish the further south one proceeds. There was an extensive exchange network operating across the region from perhaps 4,000 years ago. Sites in the region contain evidence that links the people of those areas into this network. The bounds of that network are uncertain but may have extended south to the Project Area. Sites in this area may contain evidence germane to this issue: they may provide evidence that it did extend south or alternatively that there were separate networks operating, and provide evidence of where the boundaries between these lay.

## 4.4 Cultural Heritage Research in the Local Area

### 4.4.1 Balme (1986)

In 1986 Balme prepared a regional desktop study of northwestern New South Wales for the then NPWS. This study included the Warrumbungle area, and the results of that have been mentioned above. The study also included commentary on the Pilliga forest. Balme (1986) drew heavily, if not exclusively, on data held in the site register of NPWS and, in any case, little research had been undertaken in the Pilliga itself. Her primary observation was that there were very few sites in the forest when compared to the larger region. Arguing that there was little permanent water along with a comparatively depauperate flora, she suggested that little use was made of the forest. What use was made of it probably involved short term visits for the purpose of hunting smaller macropods and other marsupials found there. The lack of grindstone material (either grooves or portable objects) used in preparation of vegetable founts and notably the grinding of grass and other seeds was, to her, a notable absence. More recent studies, however, suggest that Balme's observations may offer something of a simplified view of the use made of the forest and reflect as much an absence of evidence at the time she made her observations rather than archaeological reality.

### 4.4.2 Roberts (1991)

Subsequent to Balme, Roberts (1991) undertook a survey of sections of the forest in the course of which he identified 89 new sites. These included 62 Scarred Trees, 24 open sites, some of these extending in a linear fashion along creeks, and three rock shelters. Some of these sites lie within the Data Audit Area. Roberts also recorded the presence of ovens, grinding materials and ochre associated with these sites. The presence of grinding equipment and more variability in site types suggests a wider variety of activities occurring than was contemplated by Balme (1986). Even the relatively small piece of work undertaken by Roberts suggested that Balme's observations were perhaps an oversimplification of the picture based as they were on limited data and that further work would result in a more complex pattern of sites and use emerging.

Roberts (1991) made the following predictions in relation to site location:

- site types will include scar trees, open campsites, shelters with deposit, rock paintings, rock engravings and axe grinding grooves. Geochemical conditions will limit the likelihood of finding burials. River pebbles provide the main source of raw material for artefact manufacture. Variation in the artefact material between sites reflects variations in the raw material found as river pebbles in nearby watercourses;
- the presence of shelters away from water suggests the presence of water did not necessarily limit use of the landscape. But it is likely that occupation was more intense around creeks;
- the majority of scarred trees are indicative of post-contact use, being found in proximity to old European settlement within the forest. Trees scarred as a result of pre-contact bark removal activity are likely more wide spread in the forest;
- different land units will contain specific site types; and
- topographic features do not limit the extent of open campsites, but their current visibility is limited to areas of erosion.

#### 4.4.3 Trindall (2002)

An assessment of cultural heritage values was carried out as part of a petroleum exploration license application in the Pilliga Forest (Trindall 2002). It was noted that fires had burned through the area in 1997 and again in 2002 ensuring good ground surface visibility during the survey. Approximately 36km of linear transects were examined, resulting in the documentation of 4 Isolated stone artefacts (1 core and 3 flakes) and 1 scarred tree. Several locations where culturally significant resource plants occurred also were identified.

#### 4.4.4 RCAD (2002)

The most comprehensive study yet undertaken that is directly pertinent to this Project is the Brigalow Belt South Bioregion (RCAD 2002). This covered an area of 52,409km<sup>2</sup>. The project aimed to increase understanding of the Aboriginal cultural links between Aboriginal people and the Brigalow Belt South bioregion and to use that information for improving the evaluation of land management by:

- consulting with Aboriginal communities associated with the bioregion;
- undertaking an oral history and archival investigation; and
- undertaking a cultural field survey to sample representative areas, using identified landforms as the basis for sample area selection.

The cultural heritage assessment considered various facets of Aboriginal cultural heritage including Aboriginal archaeological sites and historical, social and spiritual association with areas within the bioregion.

The Project recorded and transcribed 110 oral history interviews, retrieved and researched numerous documents highlighting Aboriginal association with forests, travelling stock reserves, station properties and towns, located and recorded Aboriginal sites and documented 60 traditionally used plant species. Purcell notes that the project noted the recording of 1,802 sites in the region. Prior to the initiation of this project there were 893 sites in the State site register, and so an additional 909 sites were added to the register. Of the total number of recorded sites, 609 are situated within the Pilliga and another 303 within the Pilliga Outwash.

A large component of this report consisted of transcribed interviews from Aboriginal people. Project team members sought general information from informants that would assist in highlighting and understanding of the cultural affinity of Aboriginal people to the area covered by the Brigalow Belt South bioregion. Culturally sensitive information, however, was not directly sought. However, the project has amassed a great deal of information of considerable value on a wide range of issues that are of direct relevance to the Project.

We note that the study was aimed at compiling data for a massive biogeographical unit and with such a large regional picture, not all its results are directly relevant to the Project Area. Stage 1 of the project focused on the Goonoo and Pilliga State Forests and interviews focused on Aboriginal use of these forests and their importance to the Aboriginal community. The interviews were not intended to elicit details of specific cultural places. However, some locations were expressly noted and have been mapped. Others offer tantalising hints. Because of the wealth of information relating to the Pilliga area and its relationship to the Project Area the oral testimony has been reviewed in detail elsewhere in this report – see Section 4.5.

RCAD (2002) reporting on the results of stage 1 of the project provides the following statistics and observations:

- a total of 154 Aboriginal sites of various types were recorded in the Pilliga;
- a total of at least 38 native plant species of known traditional use were identified in the Pilliga – this from a total of 63 plant species used by Aboriginal people in the bioregion;
- approximately 96 ha of forest areas were sampled in the Pilliga;
- 13 landform types were identified and digitised for the Pilliga State Forest;
- approximately 50% of all Aboriginal sites recorded were associated with alluvium landforms;
- distribution of sites demonstrates a strong association with water features within each landform category;
- sites are distributed in all landforms in varied frequencies; and
- artefact distribution is widespread in areas of major creek systems.

The assertion that there is a strong association of sites with water can only be tested by careful review of the survey methodology: for instance, to what extent did it sample areas away from water and what factors may have influenced the results of the surveys? In this regard, RCAD (2002: 15) observed:

The cultural field survey team aimed to produce indicative rather than absolute results about the location and number of Aboriginal sites and their relationship with landforms. By defining landforms as having likely association with cultural heritage it is not intended to assert Aboriginal affinity with the landscape is limited to these areas but, (sic) areas of association were identified for the purposes of management and conservation.

Further to this, we note the recent work of Bryant (2014) in western NSW. Here, she has undertaken research documenting open sites by conducting systematic and comprehensive surveys of selected areas. Her results from Rutherfords Creek are pertinent to the discussion above:

Across the valley floor there were no consistent differences in assemblage composition that indicated a settlement system based on distance from the lake was operating within the single catchment. . . . Transect surveys across seven catchments . . . were used to record artefact presence/absence and density, as well as a range of environmental variables including dominant geomorphic process, surface visibility, distance from water and landform unit. Statistical tests were used to investigate the relationship between artefact density . . . and the different environmental parameters . . . While there was a relationship between some variables, particularly the dominant geomorphic process . . . overall none of these variables could account for the current distribution of stone artefacts across the catchments surveyed . . . Based on these analyses, the distribution of the surface archaeological record and current environmental conditions is not as simple as generally assumed. . . .

In her research area, and one of the few we know where the data have been collected in a manner suitable for detailed statistical analysis, we can note that distance to water apparently is not the dominant factor determining the location of sites.

The results of the fieldwork undertaken within the Project Area have also been captured in the Aboriginal cultural heritage data audit presented elsewhere in this report. Accordingly, these are not analysed separately here. However, various comments are of particular note. For instance,

Purcell notes that scarred trees are common around Yarrie Lake. The field survey also recorded a large flaked tool that has been retouched along its edges and made from jasper. RCAD (2002) noted that it constituted a very large and rare example for the region. In comparison to Yarrie Lake, Old Harbour Lagoon (near Balladoran) had large numbers of artefacts along its foreshore. He attributed this to the fact that Old Harbour Lagoon had been less developed suggesting taphonomic factors influenced site preservation and thus the apparent differing rates of discard between these locations. But we also note that very different geomorphological conditions also prevail. Thus, Old Harbour Lagoon is surrounded by a series of lunettes thousands of years old. These are well known throughout central and western NSW as locations where large concentration of archaeological material can be expected.

In relation to the Pilliga forest itself RCAD (2002: 19) observed that:

Aboriginal occupation may have occurred for prolonged periods under the right conditions, made possible by a different array of water features (chains of ponds) that existed prior to European usage of the forests. From what is understood, the chains of ponds and the relationship between vegetation and the morphological structure of the soils, resulted in water being available for prolonged periods. A diversity of plant foods would have been associated with these features.

He went on to note that since European occupation of the area there have been significant changes in hydrology within the forest, masking the pattern he described above.

#### **4.4.5 Hughes (2002)**

As part of the Southern Brigalow Belt, independent peer review of the reports was sought. These peer reviews included commentary from Dr Phil Hughes, a highly experienced geomorphologist with well-founded archaeological credentials. His comments were provided in a short report. The commentary is noteworthy in regard to interpretation of the results of other archaeological studies because of the highly experienced and informed position the reviewer holds in Australian archaeology. Hughes did not further elaborate why he had formed the following opinion:

The geomorphic report by Dr Hesse is good and if its findings are properly understood and applied this report will be of great value to future cultural heritage management strategies.

One implication from the geomorphic report is that only a very small proportion of archaeological sites/materials in the form of stone artefact scatters will be exposed at the ground surface and that these can only be poorly characterised by field surveys. More and more survey will provide more and more 'dots on the map', but the quality and quantity of data collected for the recorded sites will almost always be poor.

Targeted (sic) excavations will be needed to more adequately characterise these kinds of sites.

This cautionary note and recommendation, however, needs to be borne in mind in the design of future survey and management strategies.

#### **4.4.6 Archaeological Surveys and Reports (2007)**

In 2007 an investigation was undertaken of a proposed coal mine well to the east of the Project Area between Boggabri and Gunnedah (Archaeological Surveys and Reports 2007). The results are of at least comparative interest to this study. An area of 403km<sup>2</sup> was subject of study. A total of 7 sites were recorded during the survey. These consisted of 4 scarred trees, 2 stone artefact scatters and 1 isolated find. Stone used for artefact manufacture consisted of quartz, quartzite

and jasper. Sites were located near stone sources, on river banks and on ridges and spurs near water but given the tiny sample the results are of limited value.

#### **4.4.7 Appleton (2009)**

In 2009 an Aboriginal heritage assessment was undertaken as part of EIS studies for a proposed coal mine carried out on the northeastern corner of the Data Audit Area 30 km southwest of Narrabri. An area of approximately 256 km<sup>2</sup> was inspected (Appleton 2009). A total of 121 sites were recorded, consisting mainly of isolated finds and low density artefact concentrations. Pardoe (2010 – see 4.4.8) undertook statistical analysis of the finds, notably of the number of lithic items per site. He observed that the resultant graph was typical of site size distributions for central western NSW. Pardoe (2010: 84) in his comprehensive desktop study prepared for Eastern Star Gas pipeline project observed that: ‘the number of large sites is very small compared to the number of smaller sites. The implications for site prediction are that larger sites should be encountered less often on a linear transect’. This, of course, has important implications for survey design and interpreting the results of other surveys that have been linear in form.

#### **4.4.8 Pardoe (2010)**

As noted, Pardoe (2010) prepared a wide ranging review of data as a desktop study for the Eastern Star Gas pipeline project. This project extended from the Project Area through to Wellington. As a result, considerable elements of the data compiled by Pardoe in his report, and the analyses he undertook, are not directly relevant here. However, his study has been reviewed and relevant observations are summarised.

Pardoe (2010: 77-8) analysed numbers of sites to the area of biogeographic province. Interestingly this seems to show a direct correlation between size of the province and the number of sites that have been recorded. Pardoe notes:

The number of registered sites is proportional to the area of each province within the BBS IBRA region; the larger the area of the province, the greater the number of sites. While this may be statistically correct it is counter to any proposition that site numbers would vary according to intensity of use of a province by Aboriginal people or to a range of other factors, including site taphonomy linked to nature of land use practices. Or it could mean that there is no simple relationship between apparent number of sites and Aboriginal use of a particular province.

Pardoe (2010:78) also notes that the number of lithic items in stone artefact concentrations varies across the region. He specifically observes that studies in the Goonoo and Pilliga forests have documented many sites with few objects and a small number of larger sites noting that this pattern is typical of site size distributions in many parts of the country. There is a geometric relationship between the number of sites and the number of artefacts per site: approximately 73% of sites have 10 artefacts or less, dropping to approximately 20% of sites having 11-50 artefacts, about 7% of sites having 50 to 250 artefacts and only 1% of sites having more than 250 artefacts.

An analysis of the number of sites by IBRA sub-region shows that most sites are to be found in the southern part of the Project Area, followed by Pilliga Forest (Pardoe 2010:97). Pardoe attributes this pattern as resulting from study bias of previous studies, observing that what he calls the southern region and the Pilliga Forest have been the subject of more studies, some of which have been more comprehensive in nature. Pardoe (2010: 101) notes that, in his analysis of data relating to the Southern Brigalow Belt, the number of sites decreases rapidly as distance from water increases. Again, the decrease is geometric in nature. The degree to which this is a

function of previous study methodologies cannot be, and has not been, estimated. The question of defining what constitutes a watercourse and the consistency of application of such definition when sites were recorded is another issue that requires examination. Ignoring this issue of definition, none of the studies cited by Pardoe seem to give any indication of just what distance it is possible to go in any direction before encountering a 'watercourse'.

Pardoe (2010: 103) then goes on to consider the influence of land form variability on site types and density. He observes, however:

Variation of site number by landform provides a summary view of the distribution of sites across the land. While it would be very useful to carry out an analysis of site type by landform, in practice large numbers of sites are required to see patterns emerge. This is so because site types vary across landforms rather than being present or absent – it is usually a matter of degree. In some cases our expectations follow common sense [more scarred trees would be expected in the Pilliga Forest than on the treeless Liverpool Plains], but sometimes our analyses are rewarded by either confirming common sense, or confounding it . . .

He then compares the number of sites in each major landform in his Project Area to several other studies. Importantly, he notes that:

Most of these are large area studies and so provide a slightly different sampling strategy that may affect results.

That is, without careful analysis of sampling methodology and correction for this in an analysis the results may not be comparable at all.

#### **4.4.9 Pardoe (2011)**

In 2011, Pardoe undertook fieldwork of the proposed Eastern Star Gas Pipeline route options. This complimented the desktop study he had undertaken. Much of the preliminary elements of the report duplicate the desktop study. As is the case with the earlier report, it can prove difficult to isolate those elements of the study relating expressly to the Pilliga, and to the Project Area in particular. The results of the fieldwork appear, however, to largely confirm his earlier observations. Very few sites were found in the course of the field investigations. None are directly pertinent to this study and need not concern us further here.

#### **4.4.10 AECOM (2011)**

As part of EIS preparations, AECOM conducted a cultural heritage survey for the Eastern Star Gas Project. The survey was conducted over a period of 13 days: 14 November to 26 November 2010 with Aboriginal community participation. The field survey consisted of a series of transects across representative landforms targeting gas well site locations within the Stage 1 Area. While the Stage 1 Area was the focus of this survey, AECOM also undertook to examine a small sample of what were deemed sensitive landforms and known archaeological sites within the Stage 2 area. In certain areas they observed that transects encountered impassable vegetation with limited or no ground surface visibility. In these areas, only the individual well sites were inspected. They apparently inspected all mature trees along these transects. Additionally, the locations of a number of previously identified archaeological sites were to be reinspected. These sites included Indigenous archaeological sites identified in DECCW's AHIMS database and in the Pilliga Forest Aboriginal Management Committee (PFAMC) records.

Prior to conduct of the fieldwork AECOM undertook a review of the AHIMS records for the general area. A total of 42 archaeological sites were recorded of which nine occur within the

Project Area boundary. Of the nine sites, four were axe grinding grooves, two were rock shelters, one was a grinding dish and one unidentified. Two of these registered sites were near the immediate survey area. It apparently proved impossible to relocate any of them during the survey.

During the 2010 AECOM cultural heritage field survey, 20 indigenous archaeological sites were identified. They noted that the majority were found within approximately 200 metres of major creek lines and adjacent sand dune areas. Of the 20 archaeological sites identified, 11 sites were within the Stage 1 Area and seven sites were within the Stage 2 Area and an additional two sites identified within the full Project Area Boundary. AECOM estimated that four of the sites they recorded had been previously recorded as part of surveys conducted by the PFAMC but were not in AHIMS. These results are summarised in Table 4-2 below.

Site Name	Site Type	Comment
Cowallah Creek AS1	Artefact Scatter	Grindstone and unique raw materials present
Cowallah Creek IA1	Isolated Artefact	
Cowallah Creek IA2	Isolated Artefact	
Cowallah Creek IA3	Isolated Artefact	
Cowallah Creek IA4	Isolated Artefact	
Bohena Creek ST1	Scarred Tree	Likely PFAMC ST1
Cowallah Creek ST1	Scarred Tree	
Cowallah Creek ST2	Scarred Tree	
Cowallah Creek ST3	Scarred Tree	
Cowallah Creek ST4	Scarred Tree	
Cowallah Creek ST5	Scarred Tree	
Bohena Creek AS1	Artefact Scatter	Likely PFAMC AS4
Bohena Creek AS2	Artefact Scatter	
Bohena Creek AS3	Artefact Scatter	Likely PFAMC AS5
Bohena Creek AS4	Artefact Scatter	Likely PFAMC AS2
Bohena Creek ST2	Scarred Tree	
Bohena Creek ST3	Scarred Tree	
Bohena Creek ST4	Scarred Tree	
Bohena Creek ST5	Scarred Tree	
Bohena Creek ST6	Scarred Tree	

Table 4-2: Site descriptions from AECOM study for Eastern Star Gas, 2011.

AECOM noted that ground surface visibility during the survey was significantly reduced following substantial rain events in late 2010. They also suggested that the majority of artefact scatters identified were in areas of creek bank erosion, had been exposed by that erosion and were originally sub-surface in original context. By implication there was likely a strong prospect of sub-surface material in such areas. They further observed that scarred trees were found in close proximity to creek lines and permanent waterholes. They further noted, however, that additional scarred trees might be present in the Project Area.

Based on these observations they argued that potential archaeological deposits associated with creek lines were considered at risk from being impacted by the proposed works.

Adopting the precautionary principle they recommended that:

- construction of gas wells, pipelines and other infrastructure should be avoided wherever possible within 200 metres of major creek lines and/or permanent waterholes; and
- the same strictures should be placed on minor creeks and drainage lines but with a buffer reduced to 100m.
- They observed that higher order (larger) creek lines and confluences i.e. where two or more major creek lines meet, were of particular sensitivity and every effort should be undertaken to avoid these landforms.
- But then noting that works might be undertaken in such areas they further recommended that if works were to be undertaken within 200 metres of major creek lines/waterholes or 100 metres from minor creeks and drainage lines, a program of sub-surface testing was recommended.

It is noteworthy that Pardoe's observations regarding the effectiveness of linear transect surveys have not been factored into the above results or commentary as this has considerable implications in light of the use of linear transects in the survey methodology. Attention is also drawn to the comments that results are related to creek lines and watercourses, and that additional sites might be found in areas away from such landscape features. A map of what were considered to be major and minor watercourses was provided. It is unclear if the definition of major and minor was based on some objective assessment such as stream order analysis, although this may have been done in an informal manner.

#### **4.4.11 REF Surveys (2005 to 2012)**

Between them, Eastern Star Gas and Santos have between 2005 and 2012 commissioned a number of surveys as part of their Review of Environmental Factors (REF) process. In most instances these cover small areas proposed for use as drill pads, project infrastructure such as logistics centre and gas flowlines. Rather than describe each separately these have been summarised in the following table. The results of these surveys have been captured in the data audit, and each area examined has been included in the cultural heritage GIS. It should be noted that while there are 29 records, there have not been 29 separate surveys. Some of the surveys have been subject of formal reporting while the results of others are included in correspondence to the proponent. This means that there has been some duplication of reporting reflected in the table. It was thought better to include all references even if this has resulted in some duplication. This avoids missing an area that has not been subject of a formal report but which has been subject of survey. It also allows cross-referencing of reported results for the same location to determine consistency. Table 4-3 summarises the results of each of these studies.

<b>Date</b>	<b>Location</b>	<b>Nature of Report</b>	<b>Outcomes</b>	<b>Company</b>	<b>Party</b>	<b>Personnel</b>
2005	Bibblewindi Nine Spot Project	Report	Nil cultural sites or values	ESG	Trindall 2005	n/a
2007	Gas gathering line and Wilga Park power station	Report	One scarred tree	ESG	Trindall 2007	2
Jun 2008	Dewhurst 5 and 7, monitor Dewhurst 6	Letter	Nil cultural sites or values	ESG	Narrabri LALC	1
May 2009	Bibblewindi Pads 22, 23 and 24	Letter	Nil cultural sites or values	ESG	Narrabri LALC	1
Jun 2012	Dewhurst 8, 8A, 14, 15, 16H, 17H and 18H	Report	Nil cultural sites or values	Santos	RPS	1
Jun 2012	Dewhurst 8, 8A, 14, 15, 16H, 17H and 18H	Report	Nil cultural sites or values	Santos	RPS	n/a
Jun 2012	Wilga Park 6 and Kiandool 1	Letter	Nil cultural sites or values	Santos	RPS	1
Aug 2012	Leewood Ponds	Letter	Nil cultural sites or values	Santos	RPS	1
Sep 2012	Proposed Yarrie Lake Road Logistics Centre	Letter	Nil cultural sites or values	Santos	RPS	1
Oct 2012	Dewhurst 20-25	Letter	Nil cultural sites or values	Santos	RPS	1
Oct 2012	Dewhurst 20 and Dewhurst 21	Report	Nil cultural sites or values	Santos	RPS	1
Oct 2012	Dewhurst 20-25	Letter	Nil cultural sites or values	Santos	RPS	1
Oct 2012	Southern Flowline, Dewhurst Flowlines and Tintfield Flare	Letter	Nil cultural sites or values	Santos	RPS	1
Oct 2012	Galathera 1, Narrabri West 1 and Kananaskis Workers Camp	Letter	Nil cultural sites or values	Santos	RPS	1

<b>Date</b>	<b>Location</b>	<b>Nature of Report</b>	<b>Outcomes</b>	<b>Company</b>	<b>Party</b>	<b>Personnel</b>
Oct 2012	Narrabri West 1	Report	Nil cultural sites or values	Santos	RPS	1
Oct 2012	Tintfield Flare Exclusion Zone	Report	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Manitou 1	Letter	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Bohena (South Ponds, 2, 3, 4 and 7)	Report	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Manitou 1, Bibblewindi 31 and 32, Dewhurst 24	Letter	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Dewhurst 22-25	Report	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Leewood Ponds Activity Area, Bibblewindi Flowline Activity Area	Report	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Manitou 1	Report	One isolated stone artefact	Santos	RPS	1
Nov 2012	Dewhurst 26-31 Pilot Wells and Dewhurst	Letter	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Dewhurst Northern Flowlines	Report	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Galathera 1	Report	Nil cultural sites or values	Santos	RPS	1
Nov 2012	Kiandool 1	Report	Nil cultural sites or values	Santos	RPS	1
Dec 2012	Bibblewindi 31 and 32	Report	Nil cultural sites or values	Santos	RPS	1
Dec 2012	Dewhurst 8a	Report	Nil cultural sites or values	Santos	RPS	1
Dec 2012	Santos Logistics Centre - Yarrie Lake	Report	Nil cultural sites or values	Santos	RPS	1

Table 4-3: Summary of REF studies undertaken between 2005 and 2012.

## 4.5. Oral History: Tradition, Use, Association and Significance

### 4.5.1 Background

As noted in Section 4.4.4 above, RCAD (2002) contains large amounts of information captured in oral testimony that is directly pertinent to the Project Area. This section of the report reviews these data in detail to draw out relevant threads and observations. It is important to note, however, the limitations of these data. They do not constitute a definitive and integrated statement of either the Pilliga area or the bioregion. Rather, they were statements freely offered by those willing to provide oral testimony. They ranged over a wide spectrum of issues. Importantly, culturally sensitive information was not sought. The team involved in the project made this limitation and the reasons from which it arose explicit in the report (RCAD 2002: 13):

. . . the project team identified that the assessment required an historical research approach, which included gathering oral histories from Aboriginal people affiliated with the bioregion. This approach differs from anthropological research, which attempts to understand the family history of individuals, including their traditional descent to specific areas, relationship with other groups and individuals, language diversity and their relationship with traditional land owning groups. . . . An anthropological approach would have accessed a different body of information that would provide additional insights into the cultural heritage of the bioregion. However, the willingness of community members to be interviewed for this project depended largely on their understanding of the project as one that was concerned with an historical rather than an *anthropological or sites-based approach* (emphasis added). This was made explicit by a large number of interviewees. It reflected a widespread dissatisfaction with site management and previous research outcomes that were regarded as responding to academic and bureaucratic, rather than community needs.

The research team then went further (RCAD 2002: 163):

The oral histories collected of specific sites of significance were limited. This was due to four factors: communities desire for an historical approach; the limited time to develop relationships of trust with informants; the disinclination to provide specific information to government agencies for fear of information becoming public and leading to site destruction; the understanding of those spoken to that the landscape in its entirety is significant.

We do not, therefore, treat the oral testimony as though it provides a comprehensive cultural landscape of the Project Area. We also remain acutely aware that this means that additional work will be required as part of the ongoing study program anticipated for cultural heritage management associated with this development project. Santos notes that in developing such a program it will be essential that the concerns of informants in relation to issues noted above will need to be suitably addressed with the informants. It will also need to mediate these concerns with the expectations of the regulator in relation to disclosure of site information.

The stories that appeared in the report were related with the permission of the informants. But there were special contract conditions signed by the interviewer and interviewee (RCAD 2002: 13):

Information obtained from Informants, which is the property of the Informants (underlining in original), will remain the property of the individual person(s) providing the information. This includes cassette tapes used to record information and any transcriptions from tape recording interviews.

Santos has, however, been expressly directed to make use of this information by OEH, who has provided such information to Santos for this purpose:

It is freely acknowledged that the following information derives from this report. In making use of it, it can be noted that there is an unreserved recognition that no claim to ownership of this information is being made.

The following conventions apply in relation to the quotes that follow. The name of person quoted is provided in the preceding commentary. Their initials are then provided at the start of the quote. Where the interviewer asks a question or makes a comment pertinent to the quote or intended to elicit further information, they are quoted with 'Int' preceding the question or comment.

#### **4.5.2 Sites of Traditional Significance**

While RCAD (2002) stated in unalloyed terms that culturally sensitive information was not directly sought, closer review of the material shows it to contain some direct observations pertinent to the Project Area.

Take, for instance this quote from Lionel Peckham (LP) and corroborated by Terry Doolan (TD) (RCAD 2002: 166), describing the location of a major ceremonial area near the old Pilliga Mission. While its location was known the site apparently had not been used in recent times:

LP: This here, this is the Cubbo Creek. See this here, Cubbo Creek. Well that's where the Mission was, there. And, that's our little road there. Come out here. That's where the big Boorl ground was there, see on that creek there. There used to be a big Boorl ground there. But that's all... white man knocked that all down and burnt it. The carved trees and everything, see. That's where they had their, used to make men out of 'em, young fellas. Put 'em through the mill [laughs]. Make men out of 'em. Oh yes, there on that creek there. Cubbowandi [?] name of that there. Oh yes.

TD: There was also our initiation ground, four miles from the mission, it wasn't active when I was growing up but I saw it, I knew it, and ah . . . Markin's and stones and whatever and that's where they used to make 'em into young warriors. Initiation grounds, Cubbowandi [?] they used to call it. Yeah, and they told us about it... we often went past it but we weren't able to go there and touch anything or take anything away from there.

There are other references to what were in probability ceremonial sites. Of particular interest in this regard is oral testimony to a carved tree removed from Bohena Creek. Mrs. Nell Harradine provided the following testimony:

NH: When I was a coordinator of Narrabri Land Council I found a document talking about a carved tree that was taken from Bohena Creek. It was on Aboriginal land and it was 1903, I think. They took this carved tree from the land down the river, in Narrabri, called Bohena, which is Aboriginal reserve. It was a camping area, it still is... It was taken to the museum in Sydney. It's still there, I saw it. I saw it in '91. They took me into the museum, down under the museum, and it was covered over with a sheet.

This particular issue needs additional research with the Australian Museum, to which Mrs. Harradine refers, with a view to determining if further information on the provenance of this tree is available. Reference to the presence of carved trees at this location and that described by Lionel Peckham and Terry Doolan is also noted.

It is noted that totemic associations are provided for the Goonoo Forest (RCAD 2002: 27). A totemic association for the region of the Goonoo State Forest has been asserted for 'possum'

and 'mugga iron bark' (oral interviews in Stage 1, app:B) None are given for the Pilliga area but information for this may exist, noting the constraints on information collection mentioned above.

The origin of Yarrie Lake is told in a story recounted by Archie Leonard. An interesting dimension of this is interweaving that combines what seems a traditional narrative with historical figures. This is by no means an uncommon feature among Aboriginal people in rural and remote Australia (e.g. Godwin and L'Oste-Brown 2002) and so this story should not be dismissed simply because it includes an example of this. We note, however, that the transcript expressly mentions Archie laughing as he gets to what might seem the punchline (RCAD 2002: 165):

AL: I never ever had a go at it myself, catchin' the brumbies. But I heard quite a lot about it. As a matter of fact there used to be a yarn, I don't know whether you ever heard about it, about that Yarrie Lake. There used to be a story kickin' around that that was really made there by one or two of the old timers, the Dangars I think they said, chasin' a mob of brumbies round and round in a circle there tryin' to catch 'em.

Int: And they made a hole in the ground?

AL: (Laughing) Because that's how that lake got there.

There also are some general allusions to sites of cultural significance within the Forest. Thus, Lloyd Sutherland (RCAD 2002: 140) notes the following:

LS: They just mainly talked about where the old campsites out in the scrub, where the people, what they found, where the old people used to hold ceremonies and that out there in the scrub. Mostly, they found things out around the scrub, out around the properties, artefacts and that. And then they found, like they'd tell you the stories that was handed down to them by the old people. I mean, where they people'd travel and which way they'd come through and that.

Similarly, Margaret Adams also spoke of sites, burial grounds and other areas of significance:

MA: You got all the sites there, burial grounds and everything in the scrub... they used to have a mud woman there, that was a ceremonial place, that was all around Pilliga there.... They still had initiation grounds of the men and the women in the scrub, I don't know if the trees are still there, and burial grounds in the Pilliga there . . . I only know the stories the old people told me . . . We know that they're sacred sites there... this old fellow from Baradine told me you can go up on top and you can feel this thumping... they know where the burial grounds are, the burial caves

Mark Allen offered commentary both on the existence of locations where access was restricted. These are commonly referred to in the anthropological literature as 'dangerous places' (Biernoff 1974). He also makes reference to locations that were gender-restricted:

MA: Yeah, there's some places we're not meant to go. Some places, some areas that we've told not to go say in night time, some areas, places we're not allowed to go of the night but of the day, yes. Some areas we're told that only men are allowed in which is an initiation ground, some other huntin' grounds and so forth that men only go to. There's other places for women, that women use that men aren't allowed to go either. So there was a...a level, level part on both women and men's side of it. Where they had their beliefs and customs and still have 'till today, where men's business is men's business and women's business is women's business. And the women treat the women's business and the men treat the men's business. We still do that today. It's slowly changing. We all look into different things, but if it is a man's business, we get men to handle it. If it's a women's business, we will lend a hand, but we would rather the women do it. I think the women think the same way. So we do try keep the cultural heritage there. That point of

teaching and learning... [where you] can and can't go. Points of what we're not supposed to do.

Santos takes particular note of this comment and is aware of its implications in the design and implementation of fieldwork.

The theme of 'dangerous places' is further explored in material recorded with Monty Ruttley. He also makes reference to transformation of humans to animals and translation from place to place. Thus:

MR: Lot of taboo stuff. Yep. Oh yes. All... round the creeks and... waterholes. Like out here at Lagoon station. A blue crane land on the water. They have seen it. . . . Come here as a Aboriginal, fly away as a blue crane. They have seen it. Yeah, not far up the road here. They have seen it, they have seen it over the years. See that happen, where a dark man walk in, real old tribal sorta bloke, up the top end of the waterhole, he bend down get a drink of water, then he'll flap his wings, fly away as a blue crane. It's not old myth. That is a true story 'cause a lotta people, old people have seen that.

Lagoon Station comes in for further reference this time in relation to its dangerous qualities:

MR: Well the head bullock, he run flat out for the green pick, he's in front. As you got in there, he's just dropped outa sight. Never seen again. That's why I'm terrified today that the kids'll say, "Black hole opened up again". That's at Lagoon Station . . . They go out there swimmin', yabbyin'. I said, "Don't run in there. You never know, that could open up". Had a big drop there, a black hole in the ground there. Covered over, over the years. But that bullock went in the hole. "Be careful if you go there." They'd be there shepherdin' the cattle about y'see. Straight down, whoosh, down he went. He'd gone. Never been seen again. Keep all the cattle away from it. Scared they're goin' down, just in a big hole there. . . . That's where that old Aboriginal walks in the top end. They've seen him, many a time they seen him. Georgie's seen him. Walk in, stoop down, have a drink of water, as he stood up he's flap his wings, he's a blue crane. A blue crane, he fly away, across out there. That is another ghostly place, eerie place.

There were also general comments on the existence of, and danger posed by, two spirit beings in the forest: the Yowie (or Yourie) and the Hairy Man. Both these beings are widely known in Aboriginal Australia, occurring in the mythology of many regions. No precise locations were mentioned.

#### **4.5.3 Use of Traditional Resources within the Forest**

As people worked in and travelled through the Forest they continued to make use of places where important resources were known to exist. Prominent among these, of course, was water. Dan Trindall (RCAD 2002: 68) also described travelling through the Pilliga Forest in the 1940s and '50s in the course of which he mentions preferred camping locations and sources of water:

Int: We've just stopped at a place called Lucky Flat in the Pilliga scrub. It's one of the places where Dan used to stop for water on your way to Baradine in the sulky years ago, is that right?

DT: Yeah, that's right. We used to stop here, fill up our water bag and whatever else water we needed, give the horse a drink. Go on then from here, then to what they call Bert's Mill, camp that night. . . . Sometimes we'd have one [sulky], sometimes we'd have two. . . . There was only the one road through here then. Now there's roads everywhere . . . Yeah, there used to be a lot of [white kookaburras] here years ago when the water was here, but I don't know where they'd go now. But going down that way, about three mile down there, going back to Yarrie Lake, Billy Reids Road, that takes you

back to Yarrie Lake. And down there a few mile there used to be big waterhole, I don't know if it's still down there or not, I suppose it would be. But they used water there all the time, y'know, bit of a spring there . . . No, not a real lot of foods through this scrub. Like, all this pine tree scrub. Most of the food's over the Baradine end, along what they call the Baradine Creek, out along there.

In this account we can see how people mapped out their landscape and the knowledge possessed about the location of water. The reference to the spring is instructive as is the mention that bush food was more generally available closer to Baradine than it was in this location.

In a similar vein, Theresa Stanford (RCAD 2002: 169) notes:

TS: Yeah I know, along the road and different roads and things that have happened there. And I've been to some of the waterholes and Dad's actually showed me the trees where they used to camp up in and stuff like that.

Allan Hall who lived in the Pilliga Mission describes being taught to hunt. The food may have been introduced but the hunting technique is purely traditional (RCAD 2002: 45). The importance of hunting in the diet was also stressed:

AH: I lived in Pilliga for many years, in the early days. That's towards the end of the depression. It done us very good there. We lived off rabbits there. And the Pilliga Mission, the older people, old people learnt me how to throw woomera and bundis to get rabbits. The little creek'd come down and y'know it washed the rabbits from the island. . . . Y'know we knew nothin' else, only hunt. Those days we had little to do. We'd get, they'd all get a bit of a ration at the, from the Mission manager. And I was... you had to do a bit of hunting for yourself.

Mrs Thelma Leonard is explicit in her description of the traditional foods that were hunted in the Forest until the recent past (RCAD 2002: 145). The reference to the continuing use of bark in the building of huts is instructive as it points to continuing use of a traditional resource. We note, however, that similar use was made of bark by white settlers:

TL: But my husband and his father and brother they worked out in the Pilliga forest practically all their lives so they'd know a fair bit about it, but they've passed on now, my father-in-law and husband. . . .in our days if you didn't have a tent you'd have to make some sort of camp . . . And my husband's father he used to bark the trees, when they'd bark all the trees that they cut for logs and that, he'd keep the bark and he'd make a bark humpy out of it, out in the Pilliga scrub, and it was good, kept the weather out and everything. That's what he'd camp in, so it was different then, no camps or nothing, you'd just make your own. . . . We'd take food and we'd get food there, whatever food we could get, y'know, wild food. Goanna or emu or something, winter time we'd have the emu eggs. Just scramble 'em. Some, I know me father used to boil them, well it would take about two hours to boil an emu egg. But they were lovely too boiled, about two hours to boil a (sic) egg. But most of the time it was scrambled eggs and very nice too. We never used to collect the plants but some duck eggs, wild duck egg, big as a fowl's egg, we used to get those, not all the time but some of the time. Rabbits and maybe a porcupine or a goanna, but ah, old emu. I reckon the emu was a bit tough so we never used to get them much.

Joyce Sutherland described hunting in the vicinity of Pilliga as a child,

JS: We'd go over the lagoon and play. And in the scrub, we used to go out and we'd catch birds and porcupines, goannas and that, we'd bring 'em home. And the old fellas'd take it off, take 'em off us. Yeah, we were lucky to get a piece of porcupine or a

goanna (laughing). But yeah, I remember sittin' around an havin' a feast with 'em, havin' a feed with 'em. Yeah.

Int: Do you remember how you were taught to catch porcupine, or goanna and that?

JS: Oh we.... We'd have a bag, a hessian bag or somethin'.... Oh, we were just with the bigger kids, yeah. And we'd just get the porcupine and put 'em in. Goannas, we'd just throw sticks and whatever with 'em, drag 'em home

As a general comment in this regard RCAD (2002: 28) notes that:

Stage 1 found that the Goonoo and Pilliga State Forests were one of the main areas where food and other items were to be gathered. Foraging in the Goonoo and Pilliga State Forests by Aboriginal people occurred frequently as late as the 1950s and provided critical dietary needs for the communities of missions in the region (see transcribed interviews in NPWS 2000 and this report).

There is further testimony regarding use of plant resources and hunting animals. Thus, Lionel Peckham, Mark Allen, Sam Connelly, Theresa Nicholls, Monty Ruthley, Elizabeth Simoen, Terry Doolan, Nancy Doolan, Roy Barker and Jacky Toomey all described the edible resources that were gathered and hunted in the forest by themselves and their families. Nancy Doolan, Jean Hamilton, June Barker and Terry Doolan also provide information regarding plants that were used for medicinal purposes.

#### 4.5.4 Contextualizing Information

Some of the oral history makes express reference to particular types of sites known from, or expected within, the Project Area and thus provides additional information regarding these site types.

Hearth sites and ground ovens are two site types noted in the archaeological literature that are found in the Project Area. Dan Trindall provides some further information regarding them and the taphonomic factors that have resulted in the loss of large numbers of this site type. The location to which he refers is not, however, in the Project Area:

DT: Back fifty years, sixty years ago, when I was a kid, there'd have been at least fifteen or twenty fireplaces around this area. But then the fifty five flood come along and it destroyed most of 'em. Now you've got a job to find 'em. But before then it was just a scalded flat and that's where they made 'em. And some of them was even eight ten feet wide, y'know big round ones. But these days now, well they're all washed away mainly.

Further information was also provided by Frank Beal (FB) on one form of scarred trees (RCAD 2002: 67). While he mentions that a number of these are found very close to Moree, the descriptions have wider currency to the region:

FB: They had possum trees, what they call a possum tree, where they used to get possums and things out. Trees marked, you know how they mark 'em? I don't know what ever become of 'em . . . Well there was a few out in the scrub [around Walhollow]. But we never ever really looked for 'em y'know. You'd see 'em and say, "Well that's a marked tree there". We used to call 'em possum trees where they used to cut a lot of possums out in them days. Big possum trees, y'know, you can tell by the cuts.

Int: To climb up the tree?

FB: No just, it might be down here, like cut a hole down the bottom so the possum can get into it and go up. So they knew where they could catch possums, see . . . They'd always cut that way see, with the stone axes. You see a lot down here in the, down the back of Coles here [in Moree], y'know, possum trees. Yeah, they're marked trees. Whether people recognise them or not I don't know. Yeah, they made them on purpose like that. They'd know where they'd get a feed and that. I think they were pretty shrewd about where food was, y'know. They looked after it and that, yeah. But we were the ones that were destructive, as we grew up, see.

Dan Trindall (RCAD 2002) also provides additional information regarding scarred trees and offers some cautionary notes in relation to their interpretation. He observes that many scarred trees found can actually result from recent timber-getting activities rather than traditional practices:

DT: You can tell a scarred tree from a surveyor's mark. I've had people tellin' me, in Pilliga scrub where there've been scarred trees. Pine trees, well they don't scar pine trees, Aboriginals. The scarred trees in the forest that are pines, because the old time timber workers, they'd blaze a tree so they could find their way back to camp. My old uncle, he was a dingo trapper in the Pilliga scrub for years and years. Uncle Harry, and his grandfather . . . I can remember back sixty years ago, we'd go out there with 'em. He'd set his dingo traps and then he'd drag a stick with him. Only way he could find his way back to the camp, the scrub was that thick. He'd drag a stick so he was markin' the ground. And the old sleeper cutters, they didn't drag a stick, just scarred a pine tree where they'd been.

Scarred trees were the subject of special mention in relation to their significance to the local Aboriginal community. In relation to this, RCAD (2002: 34) stressed that there were strong, sometimes even direct links, with some trees recorded by the descendants of those known to have removed the bark in the first place. Specific comments included:

For today's Aboriginal people, scarred trees represent a cultural association that is somewhat different to that in other places, where material evidence or spiritual attachment is reported. Scarred trees provide a tangibly recent link for Aboriginal people to there (sic) past. The coolmon (sic) cut from a Coolibah tree, or canoe cut from a River Red Gum are only a few generations old and in some instances, within reach of living memory.

It is clear from the oral history that the Forest was home to larger numbers of people than now live in that area. They eked their living from timber getting, notably sleeper cutting, and other rural occupations supplementing their diet with traditional foods. Mrs Joyce Sutherland, while describing life at the Top Camp at Pilliga provides a good description of the huts they would have lived in (RCAD 2002: 46). The remnants of these and associated material culture can be expected in the Project Area:

JS: Yeah, there was a lot of tin shacks. We had dirt floors. We used to go out, our brooms and that, we used to go out and get the bushes from the trees and tie 'em all together with wire or somethin', and sweep the floors. The old kerosene lamps, that's what we had. I used to remember cartin' the water, we used to have to push 44s up to the bore. And fill 'em up and push 'em all the way back. And that was half a mile nearly, yeah, from where the camp was.

People did have some knowledge of certain sites, including historic sites, which demonstrates their close affinity with and detailed knowledge of the area. Locations of historic graves are known. Monty Ruttley took the project team members to some of these. In the course of this visit he provided further information about one of the graves, who was buried there and how

they came to die (RCAD 2002: 121). According to the project team this grave dated to 1860 – 1880, indicating if this is the case the longevity of the oral testimony held within the community:

MR: It was just here I think. The horse bolted on him and then he come down the embankment over here, up in front of us here. The elbow of the apple tree like that, wacked into his head. Yeah. Very close to ... Oh this is back in the eighteen hundreds, I think it was. Yeah.

Int: How did you hear about this?

MR: Well from our people, the old people. They worked all here. They was runnin' the show here.

#### 4.5.5 Associations

It is evident from the oral testimony that people have a strong and enduring association with the Pilliga Forest. There are two primary forms of association demonstrated: living in the Forest and on the mission at Pilliga (and subsequent camp) and through the work of either themselves or their forebears. Turning to the latter first, we have numerous accounts describing work in the Forest. This focused mostly on timber getting, extracting timber for sleepers used in railway construction, but also for other purposes (fencing) and there were other rurally-based pursuits such as mustering brumbies as well.

So, for instance, we have the account of Donny Sutherland (DS) describing the working life of his father and others (RCAD 2002: 139):

DS: He came from a family of sleeper cutters from Baradine.... He used to cut sleepers in the Yarrigan State Forest and over to Bugaldie, and then they moved to Coonabarabran and worked out in the Pilliga scrub. 32 mile out on the Narrabri Road, you turn off towards Falls Creek. That's some of the early memories. Then in them days they used to cut sleepers with the old squaring axe. Fall the tree with a cross cut saw, cut the logs, measure the logs, cut 'em, broke the logs, spread 'em with a sledge hammer and wedges and then square 'em up with a squaring axe, before the power saws come in.

Int: So they did all that out in the scrub?

DS: In the scrub. Yeah, in the scrub. And then ... well that was early days, that's how they used to cut sleepers. With an old squaring axe. Well it was a family of sleeper cutters from Baradine, I think they was all sleeper cutters.

Donny took up the same occupation and provided the following observations:

DS: When I was working for my father, I got ten bob a week. Yeah. Two pound a month. He got paid for each sleeper. I'm not sure of the prices, but it was under a dollar. It might have been 75 cents, or seven and sixpence or around that, I don't know what a square was I can't remember. A square was a square, a round back is like the shoulders, so, different prices for sleepers, round back and square. The old fellas that are here they could tell you all about that.

Int: So when did you start going out with your Dad cuttin'?

DS: 14. I used to bark the logs and set them up you call it, set them up... hammer, and knock the bark off with a crow bar and tie them up, count 'em and nail them out, put some bark underneath them, both ends, get the chalk, mark both sides of it, put the power saw straight through them, turn them over, same again, up the middle...power saw, simple. A lot easier.

Lionel Peckham (RCAD 2002: 122) described the various occupations he and others followed when working in the Pilliga area in the 1930s and '40s,

LP: Oh well there was different stations and station hands and that worked all through there. Worked everywhere. There was always plenty of work then. None of this dole, goin' to get your dole. All workers they were. Shearers and.... all, mostly all station hands, see. Well I worked three years on one station, from fifteen till eighteen. That's over near Burren, I was, Burren Junction. See that's in the district. I was there three years on one place. Station hand. They used to come and go. They all had the drovers. Two old fellows were drovers all their lives... sons and that. Oh yeah, it was a good place. Plenty of work and everything place.

Lloyd Sutherland observes that in his family there was almost a tradition of working as timber getters and sawmillers RCAD 2002: 140):

LS: Me father, he was a mill worker, sawmill worker. And me grandfather, he was a old sleeper cutter in the forest, and the old square adze. All me uncles and that, they all went into sawmills.

Similarly, Mrs Thelma Leonard the work of her husband and his father and brother working as log cutters in the scrub. She provides a lucid description of camp life away from town (RCAD 2002: 141) drawing on memories of camping out in the Forest with them:

TL: But my husband and his father and brother they worked out in the Pilliga forest practically all their lives so they'd know a fair bit about it, but they've passed on now, my father-in-law and husband. They come from Pilliga, practically worked out in the forest all their lives, sleeper-cutters and that. And then me husband was a log cutter, and his brother. We camped out in the Pilliga forest, used to love it out there, nice and peaceful. Remember the father-in-law. When you went out, not like today you got a tent or you go to shed, a shearing shed, or station hands hut . . . that's what they do now, but in our days if you didn't have a tent you'd have to make some sort of camp and most of the time we'd have just the tarps and fixed up a little place with the tarps, just string 'em up. And my husband's father he used to bark the trees, when they'd bark all the trees that they cut for logs and that, he'd keep the bark and he'd make a bark humpy out of it, out in the Pilliga scrub, and it was good, kept the weather out and everything. That's what he'd camp in, so it was different then, no camps or nothing, you'd just make your own.

Int: Would you stay in the same spot for a while?

TL: Yeah, until they had to move up the forest a bit or wherever they were, we'd have to move on with 'em, pitch another camp . . . We'd take food and we'd get food there, whatever food we could get, y'know, wild food.

Bill Rutter (RCAD 2002: 142) describes his own work career and the other occupations pursued by those who lived in the Forest. The camaraderie of those who lived a sometimes lonely life is captured in the picture he paints. The detailed knowledge he holds of the area derives from the years spent working over the land:

BR: But I went out there and that's where I worked on this place called Wilga Park, just sort of on the edge of the Pilliga scrub... it was closer to Pilliga than it was to Coonamble. And I worked there for, oh I just don't know how long, but I think it was round about forty three or four, or something like that. It was a drought time and the old fella put the cattle out in the scrub y'see, for feed and that sort of thing. In the dry time they used to put their cattle into the Pilliga scrub. And used to be, come musterin' time, and then we'd go into scrub musterin' cattle and so on. The younger stock for branding and for sales and that sort of thing. And that's how I got to know the scrub, I rode all through

there. And there were sawmills all through the Pilliga scrub and there was a big one at a place called Gwabegar, just on the edge of the scrub. And the Pilliga scrub . . . It run I think from the other side of Pilliga towards Coonamble, right up towards Coonabarabran that way, up through there. I mustered cattle all through there and that's how I come to know it. And I've forgotten the names of the waterholes now where we used to ride to find the cattle. In forty six I think it was, when I went to this bloke's brother's place in the scrub. He lived in the scrub, he had a little property there. Cause he wanted me to look after the cattle and the place while they went away and so on. So I did that . . . In the finish, there was an old sawmill and everything right there y'see. But it was just about peterin' out at that time...

BR: But that was the virtually the last time, I can't remember much more about the Pilliga scrub. But it was a wonderful place to work in. Y'know, there was old sleeper cutters, log fallers . . . And you'd ride up to a log faller or a sleeper cutter and he'd put his axe down and he'd put the billy on and you'd sit down and have a yarn with him. And they would just stop out there in the scrub cuttin' timber about three weeks or a month or somethin'. And then they'd go into Gwabegar and then they'd spend a week or somethin' in there drinkin' . . . And things like that y'see. And then they'd come back out for another three weeks or a month or somethin' and start cuttin'. And that's the way it used to be you see.

Int: It sounds like there were a lot more people in around there than what there is now.

BR: Yes, there was. There was a lot of sawmills in the scrub. And of course there was a lot of sleeper cutters there too. And no fences and things like that . . . No, no fences then. You'd run into people anywhere in the scrub. Sleeper cutters, log fallers, timber carters and people musterin' and that sort of thing.

Others described elements of their lives on the Minnom Mission and then subsequently in what was called the Top Camp at Pilliga itself. Allan Hall (RCAD 2002: 45) described his life there in these terms:

AH: I lived in Pilliga for many years, in the early days. That's towards the end of the depression. It done us very good there. We lived off rabbits there. And the Pilliga Mission, the older people, old people learnt me how to throw woomera and bundis to get rabbits. The little creek'd come down and y'know it washed the rabbits from the island. We'd get what rabbits we could; we'd skin the rabbit, we'd sell them... in Pilliga. And many other things happened there. Y'know, we had old chap by the name of Dudley Dennis was the manager at that time on the sawmill. And they had their own sawmill, they employed a lot of people. And it was in the hard time . . . But, a lot of memories for people there. So there's many thing . . . Y'know we knew nothin' else, only hunt. Those days we had little to do. We'd get, they'd all get a bit of a ration at the, from the Mission manager. And I was . . . you had to do a bit of hunting for yourself.

The Peckham family lived on the Mission in Pilliga. Once it closed, they frequented the general area (RCAD 2002: 45). Here Peter Peckham provides some background of where his family came from and the work they undertook:

PP: My mother, she come from Dandaloo, out on the Bogan River. And my father, he was born at Wellington on a Mission there. And I was born in Narromine in 1953. And from the early sixties we moved to Pilliga where I spent most of my childhood, grew up there. And me relations and everything used to go out in the Pilliga scrub and catch the wild horses. And we used to ride 'em, break 'em in, help break 'em in. And I went to high school in Wee Waa... Dad, my father's family, they lived on the old Pilliga Mission with a lot of other Aboriginal people. And I think, after it closed, the Mission there, a lot went to Pilliga itself, Coonamble, Wee Waa, Narrabri, Coonabarabran. So they're all over the place.

Despite the time and the demands of work and family requiring people to live elsewhere the strong emotional ties that were formed in younger days persist to the present. The close association of people with and concern for the Pilliga area is stressed in the following quote from Theresa Stanford (RCAD 2002: 169) talking of her childhood and current attitude towards the forest:

TS: When we drive, I go to Narrabri quite a bit and I always drive through the scrub. I don't drive through the, around the other way, I always go through the scrub and the dirt roads. . . . Yeah I know, along the road and different roads and things that have happened there.

This theme of returning to reinforce past ties to country also comes to the fore in the reminiscences of Mick Allen (MA) and Sam Connelly (SC) (RCAD 2002: 169):

MA: I always keep goin' home. I always keep comin' back. I'll go away somewhere, go live, always come back to Pilliga.

SC: And I'm always... I'll go to Queensland, Victoria and all that, and I'm always comin' back. They reckon you can't get the sand out in between our toes [laughing]. We're sand goannas.

For Mrs June Barker those who lived in the Pilliga saw themselves as set apart from others, almost a separate group (RCAD 2002: 169):

JB: Pilliga scrub is very special to the people over there. Because, y'know, they used to take pride in sayin' "Oh we come from the Pilliga scrub", y'know what I mean. Like that yeah. "Oh where you black fellas come from?" "Oh, we come from the Pilliga scrub." Not from the Pilliga mission, "We're Pilliga scrub people", you understand what I mean? Ye . . . Often if I run into, meet someone with those names, any of those names that was there when I was girl. Well I'd often say "Oh Pilliga scrub fella aye" "Yeah Aunt I'm a Pilliga scrub fella" they'll say see? Even though they never lived on the mission there, but they still identify because of their parents.

It is important to note, however, that others emphasised the links that served to bind them to a large community within the region. Thus, trips were made to family living elsewhere as in the case of Mrs Thelma Leonard (TL) describing journeys from Pilliga to Walgett (in horse drawn carriages) (RCAD 2002: 63):

TL: Well everyone went in horse and sulkies, 'cause I remember we had two sulkies and two horses, we travelled, we used to go to Walgett, from Pilliga to Walgett, Dad and Mum would say Oh we're going to Walgett for a few days. So we'd just pack a sulky up and . . .

Int: So was there a lot of connections between the people in Walgett and the Pilliga?

TL: Oh yes, people that you knew, a lot of people knew us, even now people know you from, they know your father, just got to look at us and they know who you are . . . a lot of the same families were out there on the mission, the Peckhams and the Wests they all went to Dubbo and Wellington...

TL: . . . that was just, I suppose my father had little holidays I suppose, they used to say oh pack up we're going to Walgett and because they had so many children they had to take the two sulkies . . . My sister was 'prenticed out, they used to 'prentice them out when they turned 16, out on to properties and they weren't allowed to leave until they were 21. So my two eldest sisters worked out, one in Walgett and one in Coonamble.

#### 4.5.6 Significance

Various people offered direct commentary on the significance of the cultural values of the Pilliga to them. Thus, Mrs Nora Fernando (NF) and Mrs Thelma Leonard (TL) explicitly noted the environmental values, citing it as a refuge for plants and animals, now that large areas of the region have been cleared for agricultural purposes, and notably the production of cotton, in the last 50 years (RCAD 2002: 155). Particular mention is made that this may now be the last area where traditional foods and resources might be secured. That they feel a strong personal responsibility to protect these values cannot be doubted:

TL: So that'd be the only place now, like you said with all the cotton and things and the ploughing and the wheat crops takin' over the country, that the forest would be the only place now for our fruit and like our food and that?

NF: Yeah, well like nearly, like over towards . . . anywhere now you drive around the countryside now, different towns, wherever you look now is cotton. It's all taken over by cotton. Because, where I was years ago when I was a kid it was scrubs. There's no scrubs no more. It's just plain cotton wherever you look. And all the things taken away now, all the old trees, fruit trees. And I'd say now the Pilliga forest is the only thing that Aboriginal people has got left . . . now. There's nothin' left, only the Pilliga forest. So, y'know people, like the Aboriginal people's gotta protect this forest because it's the only thing we got left . . .

TL: So trees are very important.

NF: Oh yeah . . . Yeah, well I think there's still a lot of animals in the Pilliga scrub. I know there's a lot of possums and koalas in the Pilliga scrub, because I've seen koalas myself in the Pilliga scrub. We were drivin' to Narrabri and we took the short cut road and we seen a koala and a possum. And I think there's still a lot of native animals live in that forest that's still there.

TL: That's all we got left now really is the forest. We got to protect our forest.

NF: That's really all we got left now, is that Pilliga forest. Because, since I been a kid, and I'm seventy one, so... I been around many years and there's not much left now. Nothin'.

Protecting and presenting cultural heritage sites and values to both Aboriginal and non-Aboriginal children are seen as highly important. Some people are involved in running cultural tourism made particular mention of this issue. So, Bill Robinson, who conducts tours of sites in the Warrumbungles and Pilliga Nature Reserve, spoke in the following terms (RCAD 2002: 160):

BR: I reckon it's very important for kids to know their heritage and the non-Aboriginal kids to know about Aboriginal culture.

Int: And do you think actually seeing sites helps them to understand?

BR: I think so yeah. That they see a site and see something like that, well they say, "Oh gee, y'know, that's how they used to live in them days". They had everything y'know hard but I think, the way they lived, they were happy with the way they lived. They just loved living that way. And I used to tell them that they didn't worry about time, they didn't have a watch on their arm and say "I've gotta be here at a certain time", they had all the time in the world to do what they wanted to do y'know. Go from here to there, they picked their own time. I think it's a pity that, if it gets lost.

Ella Allen expressed concern about the loss of plants that has already occurred in the scrub and about the continued survival of the forest. She referred to the necessity of the forest existing in order for the knowledge to be able to continue to be transmitted to future generations. That is, the forest affords the opportunity to sustain a living heritage:

EA: Cause if they do that [destroy the forest] you can't take your kids or that out there. Or your grandchildren, or anything like that, to show 'em all that... all that culture, see, what's in the bush. . . . Say, "Come on, we'll go out yam diggin'", or somethin' like that. You'd have miles away to go and find a yam I'd say.

This opportunity to teach by example is a theme that a number of participants mentioned in their testimony. It features, for instance, in commentary from Monty Ruttle, Sam Connelly, Mark Allen and Terry Doolan.

In summarizing the results of the oral history program, the report (RCAD 2002: 38) drew on the above following observations, and others for the general region to distil the following points that are directly pertinent in relation to the current project:

- the oral history material demonstrates that Aboriginal communities across the bioregion express a common understanding of the cultural landscape. In the context of this study the key feature of this understanding is that the historical events and locations that structure and give meaning to the communities understanding of landscape are overlaid on traditional cultural meanings embodied in the landscape;
- that the areas of the bioregion (and beyond) are interconnected through complex patterns of movement that are centered on kinship ties and frequently facilitated through work patterns. These patterns of movement are understood to be the continuation of traditional patterns into the historical period and through to the current day;
- the changing labour patterns of recent years have led to a marked decline in Aboriginal involvement in the paid labour force. This is a source of considerable concern to communities for a number of reasons, including loss of economic independence, loss of pride, and reduced access to country;
- widespread concern was expressed regarding the loss of places and sites are of importance and the impact of development throughout the region on cultural values, and the urgent need to protect what remains. Such loss of known landscapes is a serious threat to Aboriginal cultural heritage, both traditional and historical, as stories and knowledge are linked to country;
- the interviewees whose cultural and environmental interests were interwoven in their concern for country consistently expressed concern regarding the environmental deterioration occurring in the bioregion. The decline of waterways and the loss of tree cover and indigenous vegetation were the two environmental issues consistently highlighted by interviewees across the bioregion. Lagoons, rivers, and forests were

repeatedly spoken of by interviewees as places of importance for their traditional, historical and current cultural uses and meanings; and

- the decline of bush foods, animal and plant, as a result of the loss of indigenous vegetation, the increase in agriculture and the degradation of the waterways was a source of concern in many communities. An associated concern was the restrictions on access to land on which to hunt or gather bush foods. A constant concern in relation to this issue was with the loss of opportunities for knowledge to be passed down from the older to the younger generations. These issues will be addressed by implementation of an offsets program.

The Aboriginal communities of the bioregion also expressed throughout the consultation and interview process the linked desires to record their history and heritage in their own words and to control access and use of that information once it was recorded.

In respect of the Pilliga Forest, the following observations were made on their significance:

- the Pilliga forests are the source of a range of food plants that have been utilized by Aboriginal people in the area historically and continue to be regularly utilized today;
- the Pilliga forests are the source of a range of medicinal plants that have been utilized by Aboriginal people in the area historically and continue to be utilized today to a limited extent;
- the Pilliga forests are the source of a range of animals that have been hunted by Aboriginal people in the area historically and continue to be regularly hunted today;
- the Pilliga forests are a source of timber and other materials for the making of artefacts, historically and currently;
- the Pilliga forest was the location of Minnom Mission, an important historical centre for Aboriginal people now resident throughout the state;
- the Pilliga forests are the historical location for involvement in the timber and pastoral industries;
- the Pilliga forests are utilized as a place of beauty and recreation;
- the Pilliga forests provide a physical link to the pre-European traditional landscape;
- the Pilliga forests are the location of a high density of sites of cultural significance;
- the Pilliga forests are a landscape invested with spiritual meaning and power;
- the Pilliga forests are a landscape inhabited by a range of spirit beings;
- the Pilliga forests are vital to the continuing transmission of cultural knowledge and understanding as part of a living tradition; and
- the Pilliga forests are the location of identity for Aboriginal people of, and from, the area.

These points must inform the planning process for the current project. The challenge before the project is how it can proceed in a manner that is both environmentally sustainable and responsive to the above concerns. A framework of Pre-Clearance Surveys in advance of disturbance, complete avoidance of the most sensitive sites, and that the Project will disturb a small fraction of the overall Pilliga, (less than 0.25%) are relevant to many of the identified issues.

#### **4.5.7 Ethnobotanical Research**

In the course of the BBS research program (RCAD 2002), 63 plant species of cultural value were identified in the Pilliga and Goonoo State Forests. These plants and the uses to which they were put are included in Table 4-4 below. It is noted that oral testimony was collected on:

- the cultural importance of these plants;
- the concern that people had that their descendants have access to and be about these plants;
- the increasing rarity of some of these plants; and
- the increasing difficulty people have in accessing locations where these plants are available.

Consistent with the importance of these plants and the concerns evinced regarding them, Santos has, in its commitments (see Section 5), made provision the association of these plants to the mapped vegetation communities will be provided by Santos' ecological consultants to the Aboriginal community before gas production commences.

Scientific Name	Common Name/s	Use
<i>Grevillea striata</i>	Western beefwood, beef oak, beef silky oak, silvery honeysuckle	The sap is scrapped from the damaged beefwood tree then grated into powder and sprinkled on sores, burns and cuts. It is said to dry them out and cause them to heal rapidly. Mixing the grated sap with charcoal from the beefwood and stuffing it into wounds is used to stop bleeding and promote healing. The beefwood provides a dark-reddish resinous exudate from the trunk and from the roots, this is used as cementing material. The root extract requires complex preparation involving baking, pounding and firing before it is ready for use. The seeds are edible. The timber is close grain and highly durable, this made it suitable for many purposes.
<i>Eucalyptus populnea</i>	Popular box, round-leaf box, bimble box, red box, bimble, white box, egolla, nankeen gum, round-leaved box, shiny-leaf box, popular-leaved box	The roots were tapped for water.
<i>Acacia melanoxydon</i>	Murray's wattle	A hot infusion of the roasted bark was used for bathing rheumatic joints, and the inner bark was used to make string. Very hard seeds high in energy, protein and carbohydrates were roasted then ground to make damper. The very hard and close-grained wood was used in Victoria for making spear throwers, boomerangs clubs and shields.
<i>Myoporum montanum</i>	Water bush, western boobialla, bush boobialla, boomeralla, native daphne, native myrtle	The plant is left in hot or boiling water for several minutes, the liquid is then used to scrub the head to treat general ailments. Leaves boiled for external use.
<i>Ajuga australis</i>	Austral bungle	This plant was used to bathe sores and boils. Fresh leaves were bruised and soaked in hot water to create the infusion. Leaves were also placed in shoes to remove bad odours.
<i>Pittosporum phylliraeoides</i>	Western pittosporum, berrigan, locketbush, native willow, poison-berry tree, inland pittosporum, cheesewood, meimeei, cumby cumby, cattle bush, weeping pittosporum, wild apricot, narrow-leaved pittosporum, dessine	During autumn a gum is collected from the branches and eaten, the gum contains high amounts of carbohydrates, but does not offer much in the way of taste. The seeds are pound into flour for food usage or ground to form an oily paste, which is then rubbed on sore areas of the body. An infusion of leaf, fruit and wood was prepared, the brew is taken internally or applied externally for a variety of illnesses including internal pains, sprained limbs and skin irritations such as eczema. In some parts of New South Wales the leaves are warmed then placed on a mother's breast to induce the first flow of milk following childbirth.

Scientific Name	Common Name/s	Use
<i>Typha orientalis</i>	Broad-leaved cumbungi, cat's-tail, reed-mace, wonga, miranda	The rhizomes were collected by aborigines and ground to make a type of flour from which cakes were produced, the glutinous rhizome also provided starch, sugar, and a considerable amount of fibre seasonally to the people of Victoria and New South Wales. The strap-like leaves have been used in the production of mats and baskets. In the Marshlands of southwestern Australia and the Murray Darling system of New South Wales the very new white to green shoots of these rushes are gathered during spring and early summer and either eaten raw or cooked. The fluffy seed heads were once collected along the Murray River and sold as stuffing for pillows. According to the Explorer Thomas Mitchell, bulrushes were the principle food of Aborigines of the Lachlan River. He observed the Aborigines gathering large bundles and carrying them in net bags on their heads. String was made from bulrushes by steaming the stems in an earth oven. After steaming, the stems were chewed removing any starch and the remaining fibre was used to make the string.
<i>Capparis mitchellii</i>	Bimbi, bumbil, native pomegranate, native orange, bumle tree, mondo, karn-doo-thal, small native pomegranate	The fruit is filled with a brightly coloured orange pulp, which is eaten raw and the taste is very sweet. The seeds inside the pulp can be ingested and are best to be swallowed without chewing. This fruit is still a favourite bush tucker today providing moderate energy, water, and carbohydrates. It is a good source of vitamin C and thiamine. Mrs Jean Hamilton spoke of growing up at Cuttabri and around the Pilliga and she remembers going out and collecting the bumle fruit. Mrs Thelma Leonard also spoke of the old bumle tree she was taught about as a child on Minnom Mission at Pilliga. Mrs Mavis Dennison grew up at Old Toomelah and she described the bumle like an apple or orange and very tasty.

Scientific Name	Common Name/s	Use
<i>Macrozamia hetromera</i> <i>Macrozamia secunda</i> <i>Macrozamia diplomera</i> <i>Macrozamia stenomera</i>	<p>Commentary applies to this and following <i>Macrozamia</i> species found in the Southern Brigalow Belt</p>	<p>Traditionally, the cycad plant is used for its seeds as a food source. However, the cycad seed contains cycasin which is an acutely toxic substance. Two to three seeds are sufficient to cause vomiting, diarrhoea and abdominal cramps (Beck <i>et al.</i> 1988). The part of the seed used is the softer kernel which lays inside a hard outer shell. Usage of the cycad is one of the more interesting of known Aboriginal plants, because of its toxicity and the skill required in selecting and preparing the seeds. Information of Aboriginal usage of cycad seeds comes from Northern Australia where it still forms a significant part of the diet among the Donydji people of northeast Arnhem Land. Three different methods of preparing the seeds for use are as follow. In northern Australia, the most common technique used is to gather dead fallen seeds from under the cycad plant. The fallen seeds are gathered after prolonged periods during which the seeds have often been subjected to fires and fungus, decreasing the levels of toxicity. The gathered seeds (called munbuwa) are still vigorously inspected and sorted using an acquired skill with smell and touch to determine the least toxic seeds for food preparation. The other technique involves leeching of the fresh nuts collected from the tree. These seeds will be highly toxic. Preparing the seeds for safe usage involves cracking the outer shell of the seed open to expose the softer kernel, which is then crushed and leached in running water for a week. After this it is ground into a paste, wrapped in paperbark and roasted in ashes for one hour. This method enables the cycad plant to be used during seasons when less dead seeds are available. A less known method involves rolling the removed kernels in hot sand mixed with charcoal, and then placed in a bag with charcoal. The contents of the bag are dried in the sun for several days, then leached in water. After 4-7 days the kernels are made into a long cake and roasted in a fire. Fragments of used <i>macrozamia</i> have been discovered in archaeological deposits in the Warrumbungles (Kawambrai Cave). How the seeds were prepared is unknown. However, one theory is that whole cones were gathered from the plants and cached in caves to dry the seeds prior to use.</p>
<i>Owenia acidula</i>	<p>Native peach, gruie, sour plum, native nectarine, mooley apple, rancooran, warrongan, colane, moalie apple, gruie-colane, kangaroo apple, gooya</p>	<p>A wood decoction was used to bathe sore eyes. Emu apple apparently was used to treat malaria although there is no mention to which part of the tree was used. The fruit was also eaten.</p>
<i>Styphelia triflora</i>	Five corners	<p>The edible berry found growing on this species is quite favoured among Aboriginal people within the BBS. Mrs Maureen Sulter (Coonabarabran) as a child remembers collecting five corners in little tins or jars at Burra Bee Dee. Dan Trindall (Narrabri) mentioned his uncle Barry Williams who worked in the Pilliga scrub as a dingo trapper</p>

Scientific Name	Common Name/s	Use
		teaching him about the five corners and many other bush fruits. Five corners is a plant food commonly known to the Toomelah/Boggabilla community.
<i>Thysanotus tuberosus</i>	Fringed violet, violet lily, 1bulb, and 2bulb (depending on amount of bulbs produced), goomei or goomyeye.	Under the ground the roots swell into small sugary tubers that are dug up with digging sticks, the roots and base of the stem can both be eaten. A hard shell surrounds the roots, which splits open when the tuber is cooked in hot ashes.
<i>Persoonia curvifolia</i>	Geebung	The Geebung is a famous heathland plant. The word geebung is a traditional name thought to originate from New South Wales. Geebung fruit was an important food source. Mrs Maureen Sulter and her brother Mervyn Cain spoke of collecting Geebung berries at Burra Bee Dee Mission in Coonabarabran.
<i>Xanthorrhoea australis</i>	Grass trees	Grass trees were once a multiple source of food. Flowers contain a considerable amount of nectar and were soaked in water to make a sweet drink. The soft basal parts of the leaves, as well as the stem were eaten. Nutty tasting starch was gouged from the top of the trunk. The tall straight stems of the flower spikes, which were up to 3 m long, made excellent light spear shafts. They were attached to the lower end of spears to extend their length and, therefore, range. The section of the spear closest to the tip was of harder wood that could withstand impact. To haft the spears, the gum from the grass tree was used. The gum when slightly heated would form a liquid and then reharden when cooled, fibrous material such as wood shavings were added during the process. This method helped to shape the resin making it easier to attach stone flakes to spears, to make handles for numerous stone implements, and to fasten stone axe-heads to wooden handles. At Bunbury in southwest Australia, soaking the flower heads or cones of grass trees made a drink called mangaitj. The mixture was allowed to ferment for several days in water in a bark trough. It was reported to make people excited and voluble. The tree age can be determined by the height of the trunk, early photos show trees twice the height of a human. It is quite rare to find specimens of such height today. Grass trees are now a protected species. To make a fire, the dry stalk from the flowering part of the grass tree ( <i>Xanthorrhoea australis</i> ) was used serving as a base in which a stem of Austral Mulberry ( <i>Hedycarya angustifolia</i> ) was spun or drilled rapidly, both of these species are found within the boundaries of the BBS.
<i>Indigofera australis</i>	Austral indigo, native indigo	The leaves are crushed then added to water to kill or stun fish (Murray Cod) and eels. It usually takes a few days to effect the fish. The seed pod contains a chemical capable of producing hallucinations called hallucinogen.

Scientific Name	Common Name/s	Use
<i>Banksia marginata</i>	Silver banksia, warrock, dwarf honeysuckle	The flower-cones are soaked in wooden or bark containers with water, the liquid turns sweet from the nectar then is ready for drinking or the nectar may be sucked directly from the flower. Victorian Aborigines used the dried flowers from the Banksia as strainers for drinking water.
<i>Themeda australis</i>	Native kangaroo grass	The seeds are ground and baked. A closely related species, <i>Themeda aenacea</i> known as Native oatgrass is similar but larger & has larger needs. The seeds of this species may also have been used. It grows in depressions and floodways and good soils in drier regions of the Brigalow Belt South Bioregion and the north west slopes & plains of NSW.
<i>Dodonaea viscosa</i>	Giant hopbush, watchupga, switch-sorrel, sticky hopbush, akeake, apiri, hopbush	It has been recorded that Aborigines used the wood of larger plants for making clubs. For toothaches and cuts, the boiled roots or juice of roots was applied. Hopbush was burnt to smoke newborn babies. On the coast the chewed leaf and juice was used for stonefish and stingray stings. The juice was placed directly on the sting and bound up for 4-5 days.
<i>Acacia aneura</i>	Mulga wattle, mulga acacia	Mulga wood was used for making implements and weapons of great strength such as boomerangs, digging sticks, spears and shields. Damper was produced from ground seeds. Each mulga pod contains 3 seeds. Pods were threshed and winnowed to separate the seeds. In some areas the seeds were first soaked or roasted before being ground and eaten. Other accounts indicate the seed is ground into coarse flour then mixed into a paste and eaten raw. When rainfall is reasonable Mulga bushes seed prolifically and the mulga looks 'green', not its usual dull grey. On a mulga seed gathering trip Maude Peterson, from Mt Liebig in the MacDonnell Ranges, scanned the horizon and said, 'when we go for tucker; we look for green mulga'. The small waxy red lumps that are in fact the shells of tiny sap-sucking bugs called mulga lerp ( <i>Austrochardia acaciae</i> ) were once gathered, the shells were pounded up and infused in water then drunk as a sweetish tea. Small green galls formed by wasp larvae, known as mulga 'apples' were also collected from the tree, they are slightly sweet and very reminiscent of dried apple. On the lower mulga twigs lumps of glistening gum occur, candy hard on the outside, syrupy sweet within. These sticky treats ooze from mulga branches following insect attack. Whichitty grubs are also extracted from the roots.

Scientific Name	Common Name/s	Use
<i>Brachychiton populneus</i>	Black Kurrajong, common kurrajong	The pods contain edible seeds, which are collected and in most cases roasted. Mr Brad Sulter while on a bush tucker survey conducted in Coonabarabran spoke of a drink made from the crushed seeds that is quite like coffee. During the oral histories Mrs Delma Brennan from Narrabri talked about how when she was a kid they used to collect and eat the seeds. She was taught never to eat them green but only when the pod had cracked. Delma also made little birds out of the pods as toys sitting around the camp with the other children. Roots once were tapped for water in times of drought, the young roots are eaten as well as the gum produced on the tree. Mrs Maureen Sulter from Coonabarabran told how dilly bags were made from the inner bark. Fish and bird nets and net bags were also made from the fibrous bark.
<i>Flindersia maculosa</i>	Spotted tree, spotted dog, leopard tree	This tree produces a good quality gum used for sticking things together. During the summer large masses of clear amber-coloured residue come from the stem & branches. It has a pleasant taste and forms a very common bushman's remedy for diarrhoea.
<i>Acmena smithii</i>	Lily pilly	The fruits on this tree are eaten and are a good source of water, and some minerals. The fruit was also popular with early day settlers for making jam. The tree is often cultivated as an ornamental in Victoria and New South Wales.
<i>Cassytha melantha</i>	Slender dodder-laurel, tangled dodde-laurel, dodder, devil's twine	The small fruits are edible but resinous. The flesh surrounding the central stone is said to taste very aromatic and tangy.
<i>Sonchus oleraceus</i>	Sowthistle, annual sowthistle, thalaak, common sowthistle	This species is eaten raw in western Victoria to ease pain and induce sleep. Leaves roots and stems of the common milk thistle were eaten. European settlers cooked the shoots as a vegetable. Villagers in Asia and Africa also eat this species. E. Stephens, a settler near Adelaide, even witnessed a thistle feast: "the Aborigines" saw about a quarter of an acre of luxuriant sow thistle on our land. Some of them asked if they might have them. I obtained the requisite permission, and told them that they could take the lot. In a moment they had climbed the fence, and this little plot was one mass of seething men, women and children. Ten minutes later the ground was bare of thistles, and the tribe passed on gratefully devouring the juicy weed."
<i>Acacia farnesiana</i>	Prickly moses, prickly mimosa, northwest curara, sponge wattle, cassy, sheep's briar, thorny acacia, thorny feather-wattle	The pods from the mimosa bush were once sucked and the seeds eaten raw as though they were green beans. The thorns were used to pick out splinters.

Scientific Name	Common Name/s	Use
<i>Astrelba pectinata</i>	Barley mitchell grass, cow mitchell grass	The seeds were gathered, ground and made into damper. Aboriginal seed grinding dishes are a reminder of the important usage of grasses.
<i>Allocasuarina verticillata</i>	Drooping sheoak	Leaves and young cones were chewed raw to quench thirst. Ngarrindjeri people of the lower Murray River made shields, clubs and boomerangs from the hard wood. As a main source of food for Glossy Black Cockatoos, areas where these plants are common were used to hunt birds. Archaeologists found a boomerang 10,000 years old made from sheoak wood in Wyrie Swamp, South Australia.
<i>Marsilea drummondii</i>	Nardoo, Southern cross	Aboriginal women gathered Nardoo spores-cases once the water had dried up. The spore-cases were broken up on grindstones, and the spores were separated then ground between stones, removing the black husks the remaining yellow powder was mixed in with water to produce damper or porridge. Usually made when food was scarce or in hard times such as drought.
<i>Phragmites australis</i>	Phragmites, cane grass	Underground shoots from the common reed are eaten. People from the lower Murray River made rectangular rafts by layering and bounding the long stems together; they were used for collecting mussels on inland lakes. The bamboo-like stems made excellent light spears, when the stem was cut into short lengths it was used to stick through the septum of the nose as an ornament or it could be threaded onto fibre or animal fur and worn around the neck for both women and men. Baskets and bags were made from the leaves.
<i>Cissus hypoglauca</i>	Native grapes	These edible grapes are eaten raw. They taste sweet and pleasant though normally eaten in moderation due to the after-burning sensation in the throat.
<i>Mentha satereioides</i>	Creeping mint, squeejit, and penneroi, native pennyroyal	Pennyroyal was placed on floors and in beds, it was very efficient in keeping insects, bugs and fleas away. In the south districts of NSW, pennyroyal was used by females as a tea or decoction for irregular periods, with most satisfactory results.
<i>Exocarpos cupressiformis</i>	Wild cherry, cherry ballart, native cherry.	The sap was applied from the native cherry as a cure for snakebites and the wood was used for making spears, spearthrowers and bull-roarers (a ceremonial instrument). Edible juicy fruits are also produced on the tree. In Gomeroi country, trees in this family are used for smoking for protection.
<i>Astroloma humifusum</i>	Cranberry heath, Fiery hogs, native cranberry	The sweet edible berries from the native cranberry were eaten. During the oral histories Mervyn Cain and Maureen Sulter told how as children they would collect fiery hogs at Burra Bee Dee.

Scientific Name	Common Name/s	Use
<i>Callitris glaucophylla</i>	Murray pine, white pine, cypress pine, native pine	The fresh needle leaves are used as a 'washing' medicine for the treatment of sores and scabies; the leaves are ground quite finely with a stone and boiled in water. It can also be rubbed on the chest to relive coughing, rather like Vicks Vaporub. When used as a smoking medicine, a hole is dug and filled with leafy branches, which smoke profusely when lit. The sick person stands over the hole in the smoke and the sickness comes out with the sweat, leaving them feeling strong. The resin from <i>Callitris</i> species was used as a type of glue for fastening barbs to reed spears and axe-heads to handles, fish spears were also made from the long branches.
<i>Hakea leucoptera</i>	Silver needlewood, needle hakea, pin bush, water tree, needlewood	The roots contain a drinkable watery sap, used as a substitute for pure water. The roots can be cut into lengths and stood on end to allow the liquid to drain out. The ends of the roots were also plugged with clay, and carried around while hunting or food gathering. The roots may also be blown at one end to expel the water. The summer flowers are white with edible nectar.
<i>Capparis lasiantha</i>	Nipan, slip-jack, maypan, honeysuckle, napan, nepine	For coughs honey is used from the flowers. For the relief of swellings, snake bites, insect bites and stings, the whole plant including the roots is mixed up with water then applied to the affected area. The unripe fruit were picked and placed in sand to ripen away from ants. During the oral histories Mrs Jean Hamilton spoke of plants kids used to eat growing up in Cuttabri and around Pilliga and napans were one of the plants that Jean had mentioned. Mrs Thelma Leonard from Minnon Mission at Pilliga described the napans as being egg shaped but only tiny, they start out green then turn yellow like a banana when ready to be picked.
<i>Tetragonia tetragonoides</i>	Native spinach, warrigal cabbage, warrigal greens, New Zealand spinach	The young shoots on this green leafed plant are eaten like green vegetables, cooked or raw.
<i>Citrullus colocynthis</i>	Colocynth, paddymelon	Although this plant species is poisonous in some regions the juice from the melon is heated and once warm, rubbed onto skin infections such as ringworm and scabies.
<i>Calandrinia balonensis</i>	Parakeelya	The leaves were an important food source to Aborigines and were eaten as greens or as a thirst quencher. The seeds are also useful as they could be ground up into a paste, eaten raw or cooked.
<i>Lepidium muelleri-ferdinandi</i>	Mueller's peppercress, peppercress	The leaves and stems from this plant were steamed on hot stones and eaten. The leaves are very peppery. Peppercress was available at a time of year when other more favoured foods were scarce.

Scientific Name	Common Name/s	Use
<i>Portulaca oleracea</i>	Munyeroo, Purslane, pigweed	Common pigweed was eaten by Aborigines, early Australian explorers and settlers, both raw and as a cooked vegetable. It contains high amounts of protein, water, dietary fibre and trace elements. Pigweed actually contains 18.5 per cent protein compared with 11.5 per cent for wholemeal bread and only 6.9 per cent for brown rice. Although pigweed was quite a good source of minerals European settlers believed it to cure scurvy, recent tests by the Department of Defence showed only traces of vitamin C. After collecting the seeds in a coolamon they were ground in between stones, adding water the mixture was ready to be baked in hot ashes to produce damper or cakes, similar tasting to linseed. Seeds could be stored for long periods of time making them a stable and reliable source of food especially in times of drought. In some cases the whole plant, stem and leaves were ground with stones to create a thick green edible paste. The mush was eaten immediately. This food source could also be rolled into balls dried and then re-hydrated later by soaking in water.
<i>Santalum acuminatum</i>	Sweet quandong, native quandong, desert quandong, quandong	Quandongs were a useful source of food. Due to the high content of water contained in the fruit quandongs were often gathered during droughts. Dehydrated fruit may also have been pounded in to a paste. The kernel was extracted when it could be heard knocking from inside the stone. It may be eaten raw or pounded so the oil can be removed and used as a cosmetic to smooth the skin of face or body. Aborigines were able to distinguish trees that may have 'good' kernels and which may be toxic. The stones were made up into necklaces and ornaments. Aboriginal people interviewed in the oral history project as part of the cultural heritage assessment for the Brigalow Belt South Bioregion often talked about quandongs. Quandongs have high cultural value among Aboriginal people.
<i>Alstonia constricta</i>	Quinine tree, quinine, bitter-bark, fever-bark, Peruvian bark	Latex from the quinine bush was used to cure infectious sores, though rather harsh on the skin and considered poisonous. Also said to assist in the case of diabetes and blindness.
<i>Alphitonia excelsa</i>	Shampoo tree, soap tree, red ash	The leaves from the red ash are used very similarly to soap and having much of the same effect. The young leaf tips were chewed for an upset stomach and a decoction of bark and wood was used as a liniment for muscular pains or gargled to relieve toothache. Commonly used as a fish poison, crushed leaves and berries were placed in water, the plant contains saponin, which removes oxygen from the water, causing the fish to flounder to the surface. The water is then undrinkable, usually done towards the end of the dry season or in an emergency.

Scientific Name	Common Name/s	Use
<i>Eucalyptus viminalis</i>	Manna gum, rough bark ribbon gum, ribbon gum	During summer to early spring insect exudations are collected which are found mostly on the leaves of eucalypts. The exudations are a sugary substance which were eaten raw or mixed in a wooden vessel with gum from <i>Acacia</i> trees dissolved in water. The sugar-like substance called manna is made from mannitol, which is the laxative principle. The manna works as a mild laxative. Ribbon gum is the best known source of manna, from a single tree up to nine kilograms could be collected. The wood from the tree was used for making implements such as shields and wooden bowls.
<i>Melaleuca trichostachya</i>	River paperbark	For the relief of headaches, coughs and runny nose, the young tips of paper-bark were sniffed deeply. The leaves were also boiled then the steam inhaled, after which the leaves and liquid were rubbed on the forehead. The leaves of broad-leafed paper-barks were also made into an infusion and drunk in small quantities for coughs, this infusion can be poured over the body for generalised aches and pains. This medicine was once used all throughout Australia. Melaleuca species have an effect similar to eucalyptus oil when used in such ways. The flexible and absorbent barks from all Melaleuca species were quite useful, shelters, bandages and a type of food wrapping or container are all examples of such usages. The nectar can also be sucked from the flowers or added to water to produce a sweet drink.
<i>Eucalyptus camaldulensis</i>	Red river gum, flooded gum, forest gum, yarrah, biall, creek gum, blue gum, Murray red gum, river gum	River red gums offer a powerful antiseptic. The dark inner bark is boiled until the red gum comes out, when cool it is used as a rubbing medicine for sores such as scabies. For children with diarrhoea the heartwood is boiled in water, then drunk. The seeds are edible and can be ground to make damper. Also used for the treatment of burns. The bark from the river red gum was commonly used to make canoes. On some old 'canoe trees' the scares are still present to this day.
<i>Enchylaena tomentosa</i>	Creeping saltbush, Barrier saltbush, plum puddings, berry cottonbush, ruby saltbush	The juicy sweet tasting berries from the salt bush were eaten they contained a small black seed, which was also eaten. The young leaves, which are quite fleshy, were boiled and eaten like vegetables. Soaking the fruits in water made a drink. The fruit was also used as a red dye.
<i>Smilax australis</i>	Sarsparila	Extract used to treat sore eyes. The fibrous stems were used as rope and required no further treatment.
<i>Pimelea linifolia</i>	Granny's bonnet, queen-of-the-bush, flax-leaf rice-flower, white rice flower, native candy-tuft, buttons, slender rice flower	String was made from rice flower bark and was known as 'Bushman's Bootlace'. The bark was first stripped off the shrub, dried, then placed in a stream for about a week then dried once more. Next, the bark was softened by chewing or beating with sticks and stones then rolled on the thigh and spun to a fine strong thread. The string could be used for numerous purposes such as net making.

Scientific Name	Common Name/s	Use
<i>Sarcostemma australe</i>	Caustic bush, milk bush, tableland caustic bush, caustic plant, ley bush, snake plant, milk vine, pencil caustic, snake vine	A rubbing medicine. <i>Kiji kiji</i> is used on scabies and irritating sores by breaking the stem and dabbing the white sap on to the affected area. It is best to use the sap after rain because the flow is much stronger. The whole vine as well as the sap were also warmed and rubbed on women's breasts to induce lactation.
<i>Centipeda cunninghamii</i>	Scent weed, old mans weed, common sneeze weed	It has been noted that this species has been used to alleviate cases of sandy blight (inflammation of the eyes) in humans. Boiling the plant in water creates a black liquid. This substance can be either drunk for tuberculosis or used as a lotion for skin infections.
<i>Chenopodium cristatum</i>	Crested crumbweed, crested goose foot	Poultice of leaf and stem were applied for septic inflammation and breast abscess.
<i>Amyema miquelii</i>	Drooping mistletoe, stalked mistletoe, snotty gobbles, boxed mistletoe	Edible fruit. Mrs Jean Hamilton grew up at Cuttabri and around Pilliga and she remembers collecting snottygobbles from different trees. Mr Dan Trindall and Mrs Delma Brennan during the oral histories told how they used to get snottygobbles off the vines on horseback, it made it easy to reach the fruit while astride horses. Delma described snottygobbles as a thing that was full of moisture.
<i>Opuntia stricta</i>	Common pest-pear, pest-pear, erect prickly pear, gayndah pear, common prickly pear, spiny prickly pear	Although an introduced species and considered a pest Aboriginal people interviewed in the oral history project as part of the cultural heritage assessment for the Brigalow Belt Bioregion often talked about prickly pear as a delicious refreshing fruit. Use of this fruit is especially common among Aboriginal drovers. It has a high cultural value among Aboriginal people.
<i>Lomandra longifolia</i>	Spiny headed matrush	From the strap-shaped leaves women made baskets, nets and net-bags. After splitting each rush the women would then tie them into bundles to be soaked allowing the fibres to become suitable for weaving. Some usages for the baskets were fish and eel traps. The flowers are edible – tasty and starchy. Fruit are also edible – tough, ground into meal first.
<i>Urtica incisa</i>	Tall nettle, scrub nettle, stinging nettle	It is known in some areas that stinging nettle was used for rheumatism, the affected area is beaten with a bunch of leaves to cause a nettle rash. Another usage was for sprains, an infusion of leaves was created to bathe the sprain in, and boiled leaves were also used as a poultice.

Scientific Name	Common Name/s	Use
<i>Acacia ligulata</i>	Dune wattle, small cooba, marpoo, little cooba, small coobah, umbrella bush	Aboriginal people mixed ashes of this species with dried, powdered and broken leaves of pituri ( <i>Dubosia hopwoodii</i> ) before using or trading this narcotic preparation. The Umbrella bush was used as a 'smoking medicine' when a person is very sick a hole is dug placing embers and coals at the bottom, the hole is then covered with a thick layer of branches and leaves so there will be plenty of smoke. The sick person is laid on the branches and covered with more leaves. The smoke and heat will cause the person to sweat profusely; the sickness then comes out of the person. A general medicine, especially good for dizziness, nerves and fits.
<i>Arthropodium milleflorum</i>	Pale vanilla lily, vanilla lily	Edible tuberous roots, juicy though slightly bitter.
<i>Geijera parviflora</i>	Australian willow, dogbush, sheep bush, gingerah, wilga	For relief of pain an infusion of leaves has been used internally as well as externally. Wilga leaves are used for toothaches, chewed leaves are placed into the cavities. This method alleviates the pain. When used for ceremonial purposes leaves are baked, powdered and smoked in sequence with other narcotic plants this mixture induces drowsiness and drunkenness. Wilga makes an excellent windbreak and provides good shelter.

Table 4-4: List of culturally important plants associated with Pilliga forests.

## 4.6 Cultural Heritage Data Audit

### 4.6.1 Audit Process

It was established early in the assessment process that there was a need to understand the currency of existing data, as well as the development of an integrated data set that could be used for sensitivity mapping.

In response to this, an audit of all Aboriginal cultural heritage information relating to the Data Audit Area was undertaken. The following summarises the results of this audit. The sources of information included the reports and studies that have been summarised earlier in this report as well as data held by the OEH (both that held on AHIMS and elsewhere by that organisation), the Narrabri Local Aboriginal Land Council and databases established by Eastern Star Gas. All data relating to an area of 203,163 ha (2,031.6 km<sup>2</sup>) was reviewed and is termed the Data Audit Area. This area totally surrounds the Project Area. The study or Project Area constitutes a subset of 46.9% of the Data Audit Area.

It was recognised that a large body of data was available in a wide range of sources, but it was not necessarily easily applicable to the Narrabri Gas Project. The data audit sought to compile all data that was in the public domain. It was also recognised, however, that the quality of the data was likely to be variable and careful consideration given to its applicability to cultural heritage planning and management outcomes. Accordingly, the purposes of the data audit included:

- gathering a comprehensive body of pertinent cultural heritage data that would inform project planning;
- assessing the quality of that data to determine its limitations;
- assessing the accuracy of site locational information, noting the period of time over which this data had been amassed and the differing technologies available over that time used to provide locational information;
- identifying gaps in the data that would limit their value for planning purposes and that would need to be addressed to achieve Santos' objectives of ensuring that all project planning and construction programs would have available to them the best understanding of the cultural heritage issues that exist and could factor those in to either avoid or minimise impacts;
- correcting obvious errors evident in the data sets available;
- establishing a single, integrated data set; and
- use of the data set to initiate modelling of the cultural heritage sensitivity zoning map of the Data Audit Area

To facilitate completion of these tasks and to make the data readily available for these purposes, a custom GIS was created. This GIS has been used in the analyses that follow. The following constitutes a summary of the results of the data audit. Figure 4-2 shows the location of sites in the fieldwork survey area.

### 4.6.2 Results of the Audit

#### *Site Datum*

The various site data sets used different coordinate data: sites were in UTM as well as latitude and longitude. A variety of projections (AGD66, GDA94) were used and data covered both zones 55 and 56. In creating the GIS these were all standardised to a single projection (GDA94)

REMOVED FOLLOWING REQUEST MADE  
DURING CONSULTATION PROCESS WITH  
REGISTERED ABORIGINAL PARTIES

Figure 4-2: Location of sites within the Data Audit Area

and data form, which was possible using the information provided for each site, and then integrated into a single data set.

#### *Number of Sites*

After review of all data sets available, 573 separate site recordings were identified. Some of these sites fell outside the Data Audit Area and have been excluded from further analysis in this report. After comprehensive review of those that were apparently situated within the Data Audit Area a total of 268 individual sites were catalogued. Table 4-5 below has a breakdown of these data.

<b>Place Type</b>	<b>No</b>	<b>%</b>
Stone Artefact Scatter	121	45.1
Isolated Stone Artefact	81	30.2
Scarred Tree	39	14.6
Grinding Grooves	6	1.9
Historic Camp	5	1.9
Hearth	3	1.1
Historic Burial	2	0.7
Other Historic Place	2	0.7
Resource Place	2	0.7
Aboriginal Ceremony / Historic Burials	1	0.4
Ceremonial Ring / Scarred Tree	1	0.4
Ochre Source	1	0.4
Rockshelter / Cave	1	0.4
Rockshelter / Stone Artefact Scatter	1	0.4
Shell	1	0.4
Stone Arrangement	1	0.4
<b>Total</b>	<b>268</b>	

Table 4-5: Types and number of sites identified in the data audit.

There were multiple recordings of the same site between data sets. By analysis of, among other things, locational data and site descriptions it was possible, in most cases, to identify where duplication existed and to remove it from further analysis. There were, however, some cases where this was not possible to do with certainty. In those instances the data were included as separate recordings which means that this will have resulted in an over-estimate of site numbers. The number of instances of this is few (less than 10) and thus will not grossly affect analyses. This approach also is warranted when viewed through the prism of the precautionary principle in management: it is far better to err on the side of caution and later remove the error than to adopt a less conservative approach and thereby allow uncontrolled activities that could result in damage or destruction of cultural sites. Where there were multiple recordings of the same site the most recent site locational information was also used. There was, however, one important caveat to this: where there were multiple recordings of the same site but the site was in AHIMS, the locational data provided in AHIMS was used even if other data provided an alternative location. This was done for strictly legal reasons. Sites now on AHIMS attract particular legal protections that cannot be ignored and the locational information included in AHIMS stands as their legal position (even if erroneous). We have, of course, kept all the other

locational information for a site in the GIS. If updated or enhanced data about an individual site were available these have been added to the original site description.

#### *AHIMS Registration*

AHIMS currently has 176 sites in the Data Audit Area. Two of these 176 are restricted files – one scarred tree and one isolated stone artefact. All of these are valid – that is they are extant as far as OEH is concerned. Review of all data sets has allowed us to expand the highly limited data available from AHIMS for some of the sites. Ninety two (92) sites not included in AHIMS have been incorporated into the integrated sites database. Additional information has also been gleaned for many of the sites on AHIMS.

Of the 382 sites (minimum) recorded during the OEH Southern Brigalow Belt cultural heritage study (stages 1 and 2) only 77 lie within the Data Audit Area set for this project. Of these 77, only 8 are also found on AHIMS. AECOM subsequently re-recorded 3 of the 77 sites during their 2011 study. The AECOM study identified a further 21 new sites. An additional two sites have been found during all other inspections undertaken by either ESG or Santos for which reports are held.

#### *Site Types*

There are 16 site classifications within the Data Audit Area. Four of these have multiple values: for instance, one site is a ceremonial ring with scarred trees found there.

We conclude there is a high diversity of site types in the Data Audit Area demonstrating a wide range of activities taking place.

The site types are dominated by stone artefacts. However, we suggest that this likely is an underrepresentation of this site type, particularly in relation to isolated finds. As additional work is undertaken using a standard methodology in which all Aboriginal objects including isolated stone artefacts are recorded, it is our view that these site types as a percentage of the total will rise.

#### *Locations of Fieldwork*

There were two types of data that were provided either as digital data sets or could be created from data in reports for locations for fieldwork. These were:

- polygon data sets;
- transect data sets – effectively lines.

Due to the accuracy issues identified as part of the audit process, Santos has not attempted to use the data as the basis of statistically based predictive modelling or impact assessment. Rather, a conservative sensitivity zoning scheme with suitable buffers to take into account accuracy has been adopted.

A direct intersect analysis reveals only 8 (c.10%) of the sites actually fall within a nominated fieldwork location. (We note that such data are not available for the AHIMS sites and so have not factored them into this analysis). A further 25 sites fall within 50m of a nominated fieldwork location. At this level of analysis, 33 of 77 (43%) lie within 50m of a nominated field location. One of the factors at play in this may well be imprecise field methodology: no truly accurate record of the all areas actually inspected during fieldwork has been made at the time the fieldwork was undertaken.

Two additional points can be made:

- we have not made modifications or amendments to these data despite in some cases significant inconsistencies between site descriptions and the supplied digital data. There is no obvious explanation, such as datum shift, for these inconsistencies; and
- the intensity of the survey that was undertaken is not always provided although in some cases the width of transects inspected within an area is provided.

These issues have been taken into account in the development of the Zoning Plan. Areas where fieldwork is known to have been undertaken but where no cultural heritage was identified constitute Zone 3 in the zoning scheme.

### *Site Locations*

One of the major tasks of the data audit was to review the quality of the site locational data. It is always possible to revisit a site and collect additional information. But this presupposes that the locational information is accurate.

Of the 268 sites located within the Project Area, 138 of the sites (all from AHIMS) have no data available on the quality of the site location information. A range of factors militate against presuming they are highly accurate – mostly the date when they were recorded. If GPS technology was used it probably was before the removal of selective availability. If the location data predate GPS or were recorded without GPS technology then even minor errors in identifying the location on a map or generating coordinates from a map will have had a significant impact on accuracy. The remainder (130) have been recorded using GPS technology. However, there is no reference to the use of differential GPS. This means that even without issues of selective availability we must reasonably presume that locations generated using this technology potentially have some level of error inherent in their recording the scale of which we cannot infer from the data available. Transcription errors also are a real possibility for all these site locations.

We also observe that measurements of site extent are not consistently available. Nor can we presume that the site location provided actually constitutes the centre point of the site even if site extent is provided. There are examples where multiple points are provided representing the extent of the feature but one has been arbitrarily entered in the data sets as the site location. Where we have identified these, amendments to the original grid reference have been made. But we are uncertain of the extent of this problem in the remainder of the data set.

### *Site Buffers*

To facilitate application of the avoidance and precautionary principles of site management we have applied a buffer to all sites in the integrated data base. This is intended to minimise the opportunities for harm to cultural heritage by presuming a degree of precision that, taking account of the limitations noted above, is unwarranted. The type of site, and value attaching to it, can also demand that a greater level of security is provided to certain site types. So, the buffers vary from site to site.

We also note that the site locational data for 138 of the AHIMS sites in this study do not offer the same level of reliability that applies to the remainder of the sites due to the absence of contextual information allowing us to improve the accuracy and detail of the site information. For these reasons a larger buffer has been consistently applied to those AHIMS sites for which we do not have the necessary contextual information. This also addresses the legislative protection and prescriptive management requirements applying to these sites irrespective of the quality of the locational information.

The zoning scheme will be updated and refined over time as new and more information is collected as part of the Pre-Clearance Surveys and other research. For the first iteration of the zoning scheme, discussed in more detail in Section 4.7 below, the following buffers have been attached:

Category 1 AHIMS sites lacking contextual information – 100m in all directions from the site location registered in AHIMS;

Category 2 All other sites – a graduated buffer based on the type of site and values adhering to it. The buffer applies either to the site location cited or to the boundary of the site where extent has been provided or generated.

Table 4-6 presents the zoning scheme site types and buffers ascribed to each.

Site Type	Category 2 Buffer Size
Isolated artefacts	20m
Artefact scatters	40m
Scarred trees, Resource places, Rockshelter/cave, Rockshelter/stone artefact scatter, Hearths, Historic camps, Historic place	50m
Grinding grooves	75m
Historic burials, Aboriginal ceremony and dreaming/historic burials, Ceremonial rings/scarred tree, Ochre source, Shell, Stone arrangements	100m

Table 4-6: Size of buffer allocated to sites identified in the data audit.

These buffering systems and zoning scheme are discussed in Section 4.7 below.

#### 4.6.3 Concluding Comments

The commitments to Pre-Clearance Surveys before placement of infrastructure, along with the commitments to avoidance (including but not limited to complete avoidance of the most sensitive site types) are the key components of minimising Project impacts and indeed the impact assessment of the project. The CHZS as proposed, and therefore the available data on which it is based, assist in minimising the overall impact of the project as other project data can be overlaid and then re-sited to avoid buffered areas. It is apparent from the results of the data audit that there are many challenges interpreting the available data and thus a very conservative approach has been taken in the development of the zoning scheme. As new information comes to hand, the zoning scheme will be updated. These issues are discussed further in the context of the sensitivity zoning scheme and the proposed site verification program.

It is obvious that there are a variety of factors which effect the currency of the data, and that there is no single body of data that can be compiled that can be taken, at this stage, as constituting a definitive statement of the Aboriginal cultural heritage sites and values of the Project Area.

The data on archaeological sites will be improved and expanded by:

- ongoing site verification within the Project Area;
- Pre-Clearance Surveys prior to locating infrastructure;
- fit for purpose site survey methodologies;
- capturing higher quality data;

- consistency in the application of new adopted approaches and methods; and
- use of improved and improving technology such as GPS and GIS.

It's been observed that there have been a considerable number of archaeological sites recorded in the Data Audit Area. It is equally obvious that places of traditional, anthropological, historical and contemporary significance to Aboriginal people are probably under-represented. This is in part due to a range of historical factors. There had not, for instance, been an ongoing program of anthropological research in the region. Research that was undertaken was driven by the paradigms and interests then current (e.g. Howitt 1996[1904]) which did not have a focus on mapping of cultural landscapes. The Sites of Significance surveys (Creamer 1983) recorded some sites, but this work was not of an integrated form focusing on one particular region – resources were spread across the state and results reflect this. None of the places recorded during that program were in either the Data Audit or Project areas. The BBS study sponsored by NPWS (RACD 2002) recorded large volumes of important information. Some of this is directly relevant to the Data Audit and Project areas and has been included here. However, it was expressly not the purpose of that study to capture culturally sensitive information and so we cannot expect to find large quantities of the same in it. It is readily apparent from this study that a body of information of this type does exist and will inform project planning and cultural heritage management program. More recent anthropological research undertaken as part of the native title process undoubtedly does have a cultural landscape mapping component. However, and not unreasonably, this material is highly confidential at this stage.

Santos will work with relevant entities such as the native title claim group, relevant LALCs and others, to improve relevant data in the Project Area and where appropriate, to be used in the management of Aboriginal cultural heritage when the CHMP is periodically reviewed. Of course, consideration will be given to the sensitivity of this information, issues of confidentiality surrounding it, and design of systems that manage such issues while ensuring that the data can be used.

## 4.7 Landscape Sensitivity Mapping and Development of Zoning Scheme

### 4.7.1 Aboriginal Cultural Heritage Zoning Scheme

The review of a broad range of baseline data conducted for this EIS through the data audit and its integration into a comprehensive data set has allowed the generation of a sensitivity map based on an Aboriginal Cultural Heritage Zoning Scheme (CHZS) for the Data Audit Area which includes the study and Project Area (Figure 4-3). As it currently stands it contains three general sets of zones. What these are and how each has been developed is discussed below.

#### *Zone 1 – Identified Aboriginal Cultural Heritage Places*

The cultural heritage data audit reviews collated information on 268 individual places containing Aboriginal cultural heritage material and values within the Data Audit Area. These have been grouped into two sub-zones (Zone 1a and 1b) based around the source of this information.

There is presently no information available with respect to the quality of the site location information for the 138 places currently registered on AHIMS. A range of factors, most notably the methods of collection of locational data for these - generally earlier - places militate against automatically assuming that they are particularly accurate. It is clear that locational information for the remaining 130 has been recorded using GPS technology. There is no reference, however, as to whether use was made of either standard 'hand-held' or more accurate differential GPS. This means that even without issues of selective availability (which will have

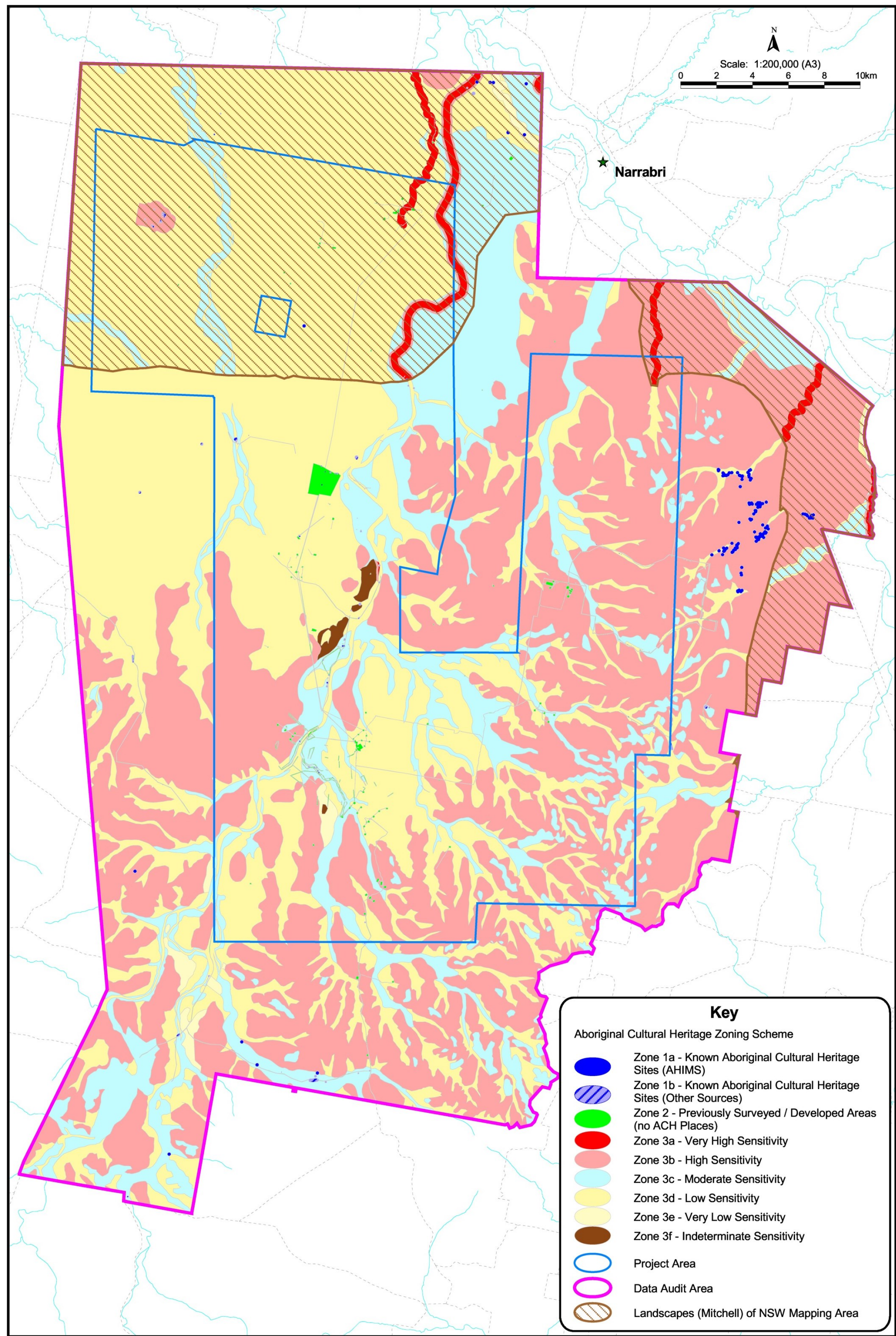


Figure 4-3: Aboriginal Cultural Heritage Zoning Scheme as it applies to the Project Area and Data Audit Area

been an issue for GPS recordings made prior to 2000) we must reasonably presume that locations generated using this technology have, nonetheless, some level of error inherent in their recording and the size of which we cannot be certain.

The high variability in the levels of information provided about the cultural material or values present at each of these places and, particularly, their extent compound the difficulties in ascribing levels of accuracy to the recorded 'point-based' location of these cultural heritage places. To the degree that information was available with regard the extent of these places, such were created as polygons.

These issues have been discussed elsewhere in this report. It should be noted that they have been factored into the creation of Zone 1 within the CHZS through the application of a series of buffers around both the point-based and, where available, the extent data. The desire to facilitate application of the avoidance and precautionary principles of site management (discussed in more detail in Section 6) has also been considered. Finally, different types of Aboriginal cultural heritage values identified at each place can also demand a greater level of security. As a result of the above factors, the final buffers constructed vary from place to place and are based on the precautionary principle.

Buffers for each of these two sub-zones have been generated as follow (see also Table 4-6):

- Zone 1a includes a 100m buffer (radius) of all places currently included on AHIMS – this buffer will, of course, be revised down as additional data becomes available from the site verification program (see Section 4.10):
- Zone 1b includes a graduated buffer based on the place-type and values adhering to it for the remaining identified Aboriginal cultural heritage places. The buffer has been applied to both the point-based data and, where available, the extent of the place where such has been provided or able to have been generated. Five buffer categories have been applied as follows:
  - 20m around isolated stone artefact/s;
  - 40m around stone artefact scatters;
  - 50m around places including scarred trees, resource places, rockshelters / caves, hearths and general historic places (such as camps);
  - 75m around grinding grooves; and
  - 100m around places including those associated with Aboriginal ceremony (such as stone arrangements and rings) and burials, as well as the considerably undefined places identified as being an ochre source and that containing shell.

Zone 1 of the CHZS covers approximately 357 ha (3.6km<sup>2</sup>), or 0.18%, of the Data Audit Area. All known sites so buffered will be avoided by the Project until subject of site verification at which time revised buffers will be used for avoidance.

#### *Zone 2 – Previously Surveyed / Developed Areas*

This zone has been created from an amalgam of various sources (discussed elsewhere in this report) relating to portions of the Data Audit Area which have been the subject of Aboriginal cultural heritage survey and assessment and within which areas have subsequently been developed as part of CSG (both ESG and/or Santos) development programs. There were two types of data that were provided either as digital data sets or which could be created from information provided within reports, and which represented areas that had been inspected during fieldwork: actual survey areas (polygons) or survey transects (lines). The transect

records were buffered using the widths nominated within the associated reporting and added to the existing polygons. These records were then merged together to remove overlap.

Zone 2 of the CHZS covers approximately 861.2 ha (8.6km<sup>2</sup>), or 0.4%, of the Data Audit Area. Expressly excluded from this are areas which have been included within Zone 1 – the size of each area is exclusive and does not constitute a cumulative total. Zone 2 thus represents areas where Aboriginal cultural heritage survey and assessment has been undertaken but within which no Aboriginal cultural heritage has been identified.

Zone 1 and 2 areas together combined give the total amount of the Data Audit Area which has been subject to Aboriginal cultural heritage survey and assessment. This amounts to approximately 0.59% of the area.

### *Zone 3 – Aboriginal Cultural Heritage Sensitivity*

This has been broken down into six sub-zones (Zones 3a - 3f). The first five identify portions of the Data Audit Area which have been identified as having an Aboriginal cultural heritage sensitivity graduated from very high (Zone 3a) to very low (Zone 3e). The sixth sub zone (3f) relates to four small portions of the Project Area (approximately 362 ha or <0.2% of the Data Audit Area) for which information was not sufficient to make an adequate assessment of its likely sensitivity with respect Aboriginal cultural heritage.

A two stage process was undertaken to develop these zones for the Data Audit Area. The first related to the development of a stream order sensitivity model. Proximity to water and the nature of that water source has long been identified as being a critical element in the distribution and nature of Aboriginal cultural heritage places likely to be present across the Data Audit Area (although elsewhere we have suggested caution in relation to this point). The second, and a common theme within regional studies undertaken previously within Central NSW (and more generally), is the relationship between Aboriginal cultural heritage places and environmental landform units and their usefulness as a predictive statement of what may likely be present in other areas which have not been the subject of field-based survey and assessment.

It was readily identifiable that there were some limitations with the Aboriginal cultural heritage data collected as part of the data audit and these are discussed elsewhere in this report. In summary, the data cannot be and has not been used for statistically informed 'predictive modelling'. It can however, be used to develop a 'sensitivity' model for the Data Audit Area and this is the approach taken. It is possible to make informed estimates of the likelihood of encountering Aboriginal cultural heritage places along various types of watercourses.

Rather than simply examining the relationship of sites to watercourses globally, we have undertaken analysis based on stream order. It should be noted that this is not based on a classic Strahler analysis, rather it is an analytical tool aimed at examining the possibility of differential Aboriginal cultural heritage sensitivity throughout a known drainage system. Our reasons for approaching it in this way are as follows. Santos has commissioned a Strahler stream order analysis using high resolution LiDAR data. This analysis focuses exclusively on the Project Area. If we were to use these data it would reduce the number of sites available for inclusion in analyses from 269 for the Data Audit Area to just 88 (or 32.7% of the available sample) for the Project Area: the area of analysis is reduced by approximately 50% but the decrease in site number of sites is 67%. Analysis based on the smaller number of sites presents its own limitations in terms of the strength of the conclusions. We further note that, under the Strahler analysis, more than 50% of all sites associated with watercourses can be allocated to two or three different streams – so, for instance, in one example we have a site that lies within 200m of a first order stream, within 300m of a second order stream, and within 50m of a fifth order stream. As another example, 7 sites within 50m of a Strahler first order stream are also

within 50m of a watercourse with at least another stream order. The question that then arises is which, if any, of these associations is influencing decision making relating to site location: was it a strategic decision to locate near a confluence, or is some other factor (perhaps reflecting in some way availability of water) at play with proximity to water a secondary consideration?

In our analysis for the sensitivity model, the Namoi River is taken as the first order stream and all others in the Data Audit Area have been allocated an order calculated from this, increasing in number upward to headwater tributaries. On this basis, the waterways of the Data Audit Area have been allocated a stream order number from 1 to 6.

Results of this analysis are instructive and can be seen in Table 4-7. The first point that might be noted is that while it is often asserted as a truism that Aboriginal cultural heritage places are generally closely associated with proximity to water, this is somewhat overstated within the Data Audit Area. On current indications, approximately 26% (n=71) of the identified and recorded Aboriginal cultural heritage places are within 100m of watercourses. This rises to 35% (94 places) within 200m and 38.5% (103 places) within 300m. In a comparative sense, very low numbers are found on the first order waterway, probably reflecting significant taphonomic factors affecting the survival of cultural materials – high energy flood events are the most obvious of these. Second order streams (such as Bohena, Jacks, Narrabri, Pig, Pine, Sandy and Tulla Mullen) offer the greatest likelihood for the presence of Aboriginal cultural heritage places, along which it is at least three times as likely that one would find sites within 200m of a stream as it is on a third order stream (the next most likely order). The likelihood of place encounter drops away quickly as one moves further towards the headwaters of drainage systems with there being a very low likelihood to nil on fourth, fifth and sixth order waterways. These results were used to create a series of sensitivity buffers around and moving out at the distance classes away from the waterways.

It should be noted that the analyses undertaken and resulting model refers exclusively to streams and not to static water bodies such as billabongs or 'lakes', or areas of impeded drainage where Gilgai (paddymelon holes) dominate. At present there is no comprehensive digital data set for these sources across the Data Audit Area. As this becomes available this may alter analyses looking at site association with water (but not with watercourses). An exception to this is Yarrie Lake, located in the northeast of both the Data Audit and Project areas. This is well-known as an important water body for Aboriginal people and a considerable body of Aboriginal cultural heritage has been identified and recorded around it. This area has been included as such within the CHZS. Project infrastructure will be excluded from Yarrie Lake and a 200m buffer established around the lake.

The second stage in the development of the Aboriginal cultural heritage sensitivity model for the Data Audit Area was to analyse the currently known distribution of Aboriginal cultural heritage against detailed landform mapping data which has been compiled across the years by OEH as part of their broader Brigalow Belt studies. Although currently being expanded, to date this fine-grained landform data has been generated for approximately 75% of the Data Audit Area.

Areas for which this mapping has not been completed are most prominent in the northwest but also include smaller areas in the east (see Figure 4-3).

A total of ten landform systems have been mapped throughout the Data Audit Area. As a first step to understanding the relationship between the identified and recorded Aboriginal cultural heritage places, it was essential to obtain an understanding of the relative proportions of each of these to both the overall Data Audit Area and areas which had been the subject of field assessment. It is quite clear from this analysis (Table 4-8) that various landforms, such as those associated with alluvial terraces, plains and floodplains are considerably overrepresented in the heritage fieldwork which has been undertaken across the Data Audit Area.

Stream Order	No Streams	Stream Order %	Places within 100m	%	Sensitivity	Places within 200m	%	Sensitivity	Places within 300m	%	Sensitivity
1	1	2.3	1	1.4	Very low	2	7.4	Very low	0	0.0	Nil
2	7	15.9	36	50.7	Very high	13	48.1	Very high	6	54.5	High
3	18	40.9	31	43.7	Moderate	10	37.0	Moderate	3	27.3	Low
4	16	36.4	3	4.2	Very low	2	7.4	Very low	2	18.2	Nil
5	1	2.3	0	0.0	Nil	0	0.0	Nil	0	0.0	Nil
6	1	2.3	0	0.0	Nil	0	0.0	Nil	0	0.0	Nil
<b>Total</b>	<b>44</b>		<b>71</b>			<b>27</b>			<b>11</b>		
<b>Overall site totals</b>			<b>71</b>	<b>26.1</b>		<b>94</b>	<b>35.1</b>		<b>103</b>	<b>38.4</b>	

Table 4-7: Distance class relationship and resulting sensitivity of Aboriginal cultural heritage places to stream order throughout the Data Audit Area.

Landform Unit	% Data Audit Area	% Surveyed
Alluvium (A)	2.3	18.1
Alluvium (AT)	12.4	22.3
Alluvium 2 (AT2)	21.6	20.8
Alluvium (AT3)	0.5	1.2
Gilgai (G)	0.8	0.0
Rocky Ground (B)	3.2	3.0
Colluvial Slopes (C)	11.2	10.2
Sand Monkeys (M)	0.2	0.0
Soil-Mantled Slopes (S)	47.7	24.4
Yellow Sandsheet (Y)	<0.01	0.0

Table 4-8: Landform units present throughout the Data Audit Area as proportions of the Data Audit Area and as the subject of Aboriginal cultural heritage survey and assessment.

Although representing only 1% of the Data Audit Area, there has presently been no heritage assessment work undertaken within three of these landforms. Despite this, two places containing Aboriginal cultural heritage have been identified within the Sand Monkeys landform. The lack of cultural heritage work within the Gilgai landform is a significant gap in the existing understandings of the Data Audit Area given its size (in excess of 1,100 ha) and the generally accepted importance of such secondary water sources to Aboriginal people.

Although almost one quarter of all of the survey work completed has been located within portions of the Data Audit Area described as being Soil-Mantled Slopes, this landform constitutes almost half of the Data Audit Area. As such, at present it is considerably underrepresented in terms of Aboriginal cultural heritage.

These analyses provided a reasonable baseline indication of the bias that would need to be considered in developing sensitivity criteria for each of these landforms. Importantly in this respect, however, the results of Aboriginal cultural heritage fieldwork conducted throughout landforms identified as being associated with Rocky Ground, Colluvial Slopes and one of the alluvial units (AT3), which comprise just over one third of the Data Audit Area, can be considered as reasonable indicators of the nature and scale of Aboriginal heritage which could be expected within these areas more generally.

A series of more direct analyses were then undertaken with respect to the proportions and types of identified Aboriginal cultural heritage within each of these landforms. As noted above, this detailed mapping data was available for such analyses for around 75% of the Data Audit Area. This area included 219 (~82%) of the total number of Aboriginal cultural heritage places. Importantly, this included 14 of the total 16 individual place-types. Of the two missing place-types, these are single examples only and contain multiple recorded values, some of which on their own (such as a scarred tree) are also represented within the remaining areas which have been covered by the detailed mapping.

Beyond the three most commonly identified and recorded Aboriginal cultural heritage place types (stone artefacts found either as isolated examples or as scatters, and scarred trees), which together represent 90% of the total number of places, sample sizes from which to examine place-type distribution across the various landforms is such as not to be statistically informative. Additionally, these most common place-types have been found, although in varying proportions, in almost all landforms where survey work has been undertaken. Where this is not the case, amounts of survey work and associated place identification have been very low.

Despite these constraints each landform was assessed against a series of criteria, based on these analyses, with a view to assigning an Aboriginal cultural heritage sensitivity rating to each. Where such could be ascertained, these were ranked from high to very low. Additional details and notes around each landform are provided in Table 4-9 below.

For the remaining portions of the Data Audit Area where detailed OEH landform mapping has yet to be completed (see Figure 4-3), the existing Landscapes (Mitchell) of NSW (Version 2) was utilised. Unlike the OEH data which was created at a lowermost scale of 1:50,000 (and many areas as high as 1:25,000) and has been subject of ground-truthing fieldwork, this mapping has a maximum resolution of 1:250,000 and has not been subject of on-ground verification. This issue of resolution is most evident in the coarseness of the resulting polygon configuration.

Despite this, obvious similarities were present between the five landform categories and their associated features / composites as described for this dataset, and those derived from the more detailed OEH mapping. In the first instance, the general sensitivity developed was carried across into the equivalent Mitchell landform with the general trends with respect Aboriginal cultural

Landform Unit	% Data Audit Area	% Surveyed	Places (%)	Place Types	Notes	Sensitivity
Alluvium (A)	2.3	18.1	43 (19.6%)	4	Compared to AT it would be expected that there would be four times as many places and less variability	Low
Alluvium (AT)	12.4	22.3	44 (20.1%)	6	Based upon place concentration and variability would have a reasonable sensitivity and higher than A	Moderate
Alluvium 2 (AT2)	21.6	20.8	14 (6.4%)	6	Less sensitive than AT in terms of place concentration but possibly higher in terms of variability	Low
Alluvium (AT3)	0.5	1.2	1 (0.5%)	1	Low sensitivity in terms of both concentration and diversity	Very Low
Gilgai (G)	0.8	0	0	0	No survey work undertaken but known to be important sources of seasonal / ephemeral water	Low
Rocky Ground (B)	3.2	3	5 (2.3%)	4	High similarity to AT in terms of concentration but appears to have lower variability. In this however, it does include a number of place types with high significance	Moderate
Colluvial Slopes (C)	11.2	10.2	35 (16.0%)	2	Has at least as high a concentration of places as AT but less variability. Of note is the lack of scarred trees	Low
Sand Monkeys (M)	0.2	0	2 (0.9%)	2	Unable to be assessed owing to lack of survey or contextual data	Indeterminate
Soil-Mantled Slopes (S)	47.7	24.4	75 (34.2%)	6	Has the highest concentration of places by a considerable factor (at least two times that of AT) and at least as great a variability	High
Yellow Sandsheet (Y)	<0.01	0	0	0	Unable to be assessed owing to lack of survey or contextual data	Indeterminate

Table 4-9: Aboriginal cultural heritage sensitivity assigned to the various landform units mapped throughout the Data Audit Area.

heritage places outlined above examined for consistency – which was generally, although not exclusively, considered to be the case. A resulting continuity in the ‘flow’ of sensitivity zones across this data boundary was also noted.

A more detailed analysis of these zones against the stream order sensitivity modelling and the Aboriginal cultural heritage data, however, indicated that portions of two of the Mitchell landform mapping units were sufficiently different to warrant differential sensitivities. As a result, the westernmost portions of the Baradine – Coghill channels and floodplains were reassigned from moderate to low, and the easternmost area of the Coghill Alluvial plains was elevated from low to moderate.

The differential levels of resolution and hence confidence in the Mitchell NSW data compared to that emanating from the OEH Brigalow Belt studies has seen further adoption of the precautionary principal with respect the development of the sensitivity zones in those portions of the Data Audit Area where it had to be utilised. As noted above, survey work undertaken to date across the Data Audit Area has been heavily skewed towards watercourses. Thus, the results of the stream order analysis is considered as having a more informed base and applicability to the assignment of sensitivity criteria than is the case where sole reliance is placed on the Mitchell NSW mapping. In such areas, the stream order sensitivities have been given precedence as a result. The result of this, however, has seen corridors of very high sensitivity run through broad swathes of country that are otherwise moderate and even low.

The 202,087 ha which together constitute Zone 3 (99% of the Data Audit Area) of the CHZS is broken into the following sensitivity classes as follows (see Figure 4-3):

- Very High (Zone 3a) – 2,107 ha (1.0% of the total Data Audit Area);
- High (Zone 3b) – 81,511 ha (40.1%);
- Moderate (Zone 3c) – 30,708 ha (15.1%);
- Low (Zone 3d) – 86,537 ha (42.6%); and
- Very Low (Zone 3e) – 1,075 ha (0.5%).

It should be noted that this does not include the 362 ha outlined above for which there was not enough information available to make an informed Aboriginal cultural heritage sensitivity assessment (Zone 3f - Indeterminate).

#### **4.7.2 Concluding Comments with Respect to the CHZS**

This CHZS, particularly Zones 1 and 3, has been developed conservatively and, given the limitations of the available data, with caution. The precautionary principle and preference for avoidance has seen the Zone 1 areas include substantial buffers to allow for the levels of uncertainty associated with current knowledge of these places, their location, values and extent.

The differential sensitivity attributes which constitute Zone 3 should not be viewed as being an accurate reflection of the probable or even possible cultural landscape of either the Data Audit or Project areas. They are a reasoned and reasonable statement of the relative sensitivity of various portions of the Project Area based upon the analysis of such information as has been available to this EIS. Importantly, however, the sensitivity modelling is an adaptive approach in which the model itself is eminently testable and can be adjusted as additional data, collected in a more systematic and controlled manner, become available. The phased growth of the gas field will be undertaken in accordance with the Field Development Protocol. The Field Development Protocol requires the implementation of the CHMP including the Pre-Clearance Surveys of sites prior to disturbance. The Zone will be considered when sites are selected.

## 4.8 AHIMS Sites within the Project Area and Site Significance

### 4.8.1 Introductory Comments

The following assessment has two objectives. Firstly, it identifies those sites that are currently registered in AHIMS for the Project Area. Secondly, it offers commentary on the significance of sites and objects that are known or may exist within the Project Area. It does the latter by taking account of the various types of significance that such places may have. To this it draws on the types of sites that may occur in the Project Area, identifies the type of significance it may have and makes an assessment of its level of significance. However, it also notes that there are several cultural values that are also associated with the Project Area and makes an assessment of these as well. Table 4-10 summarises these data.

### 4.8.2 AHIMS Sites

A search has been undertaken of the Project Area. This has identified that there are 24 sites registered on AHIMS within the Project Area. A description of these along with their registration number is also included in Table 4-10. All these sites are, according to AHIMS, 'valid'. This means that they still exist *in situ*. These sites will be managed in accordance with Santos' management strategy which is aligned with current OEH consultation requirements. To the greatest extent possible, effect will be given to the Avoidance Principle – see below – and this will be applied to these sites as well. All these sites have been included in the data audit and analyses discussed below.

### 4.8.3 Commentary on Site Significance

Assessments of the significance of sites/places, both potential and realised, are fundamental to Cultural Heritage Management Planning. They can be assigned to particular sites/places, or to a grouping of sites/places within an area. In the case of the latter, the importance of a cultural heritage area or precinct may be greater than the sum of its individual sites/places. Put simply, cultural heritage significance is the value of cultural heritage sites/places to us and our society. The major criteria by which the significance of cultural heritage sites/places is usually assessed:

- scientific;
- social;
- historical;
- educational and economic; and
- aesthetic.

Each of these significance criteria can be assigned a relative value from low to very high at the regional, State or national level. This process of significance assessment forms the basis of the Burra Charter (Australian ICOMOS charter for the conservation of places of cultural significance) which is employed nationally by heritage consultants and by the Australian Heritage Commission in Canberra.

#### *Scientific Significance*

The scientific significance of sites/places represents their ability to furnish data on, and insights into, either past cultural activities (social, technological and ecological) and/or past natural/environmental conditions. For example, archaeological sites provide information on human activities, particularly everyday lifeways, which are often not always available in documentary sources. Such insights apply equally to literate and non-literate societies. Similarly, such insights may concern questions of local culture history, span tens or even

<b>AHIMS No</b>	<b>Site Name</b>	<b>Site Type</b>	<b>Recorder</b>	<b>AHIMS Status</b>
19-3-0017	WN18 Narrabri	Stone Artefact Scatter	Rex Silcox	Valid
19-3-0027	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0028	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0029	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0030	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0031	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0032	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0033	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0034	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0035	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0036	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0037	BBS; Wee Waa LALC; Yarrie Lake recreational	Isolated Stone Artefact	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0038	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0039	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0040	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0041	BBS; Wee Waa LALC; Yarrie Lake recreational	Scarred Tree	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0042	BBS; Wee Waa LALC; Yarrie Lake recreational	Isolated Stone Artefact	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0043	BBS; Wee Waa LALC; Yarrie Lake recreational	Stone Artefact Scatter	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0044	BBS; Wee Waa LALC; Yarrie Lake recreational	Stone Artefact Scatter	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0045	BBS; Wee Waa LALC; Yarrie Lake recreational	Stone Artefact Scatter	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0046	BBS; Wee Waa LALC; Yarrie Lake recreational	Isolated Stone Artefact	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-3-0047	BBS; Wee Waa LALC; Yarrie Lake recreational	Stone Artefact Scatter	Purcell, Wee Waa LALC - BBS Survey team	Valid
19-6-0014	Biblewindi State Forest; Womba	Grinding Grooves	Ahearn	Valid
19-6-0036	BBS; Pilliga East SF; Bohena Creek Drainage	Isolated Stone Artefact	Jan Wilson	Valid

Table 4-10: Sites recorded on AHIMS in Project Area.

thousands of years, and reflect more general and theoretical questions relating to the evolution of cultural systems. Archaeological sites can also supply information on past climates and vegetation patterns (e.g. pollen grains) and past fauna (e.g. shell and bone remains). In general, the scientific significance of sites increases as their potential information content increases.

The archaeological significance of sites can be determined 'according to timely and specific research questions on the one hand, and representativeness on the other' (Bowdler 1984:1). In terms of the former, detailed knowledge is required on the current state of play in academic archaeology - both in terms of local culture history and more general substantive, methodological and theoretical issues at the national and even international scale. Representativeness relates to the ability of a sample of sites from a particular area to represent as accurately as possible the range (and often frequency) of site types from a particular area.

As a general rule, the rarer a site the greater its significance. It is in this sense that older sites tend to have greater significance given that older sites tend to be rarer due to the vagaries of time and decay. However, an area exhibiting numerous similar (read common) sites can have considerable significance as it may provide a rare opportunity to investigate past land-use patterns. In this instance, the significance of the area is greater than the sum of its constituent sites.

From a different perspective, representativeness also relates to maintaining the diversity of archaeological sites for future generations. This notion helps compensate for the biases inherent in academic research agendas that may ignore certain site types today but focus on these in the future.

#### *Social Significance*

If a site/place has importance for a particular cultural or ethnic group, either a majority or minority group for religious, spiritual, or other symbolic reasons it has social significance. Sites/places of social significance are usually important in maintaining a community's integrity and sense of place. For most Aboriginal groups, Aboriginal archaeological sites (e.g. burials) and European-Aboriginal contact sites (e.g. missions) have strong social significance. In recent years, such associations have become increasingly important as Aboriginal people regain control of their ancestral lands and re-establish their sense of place following the devastating effects of European invasion and colonisation.

#### *Historical Significance*

A site or place has historical significance if it is associated with significant person(s), event(s) or themes. Historical significance may also include the ability of a site/place to be representative of major historical themes or cultural patterns from a particular historical period. As a rule, the greater the degree of physical intactness of a site and its setting, the greater its significance.

#### *Educational and Economic Significance*

Cultural heritage sites/places may have important educational significance by providing opportunities for people to visit, examine and better appreciate the nature of these sites for themselves. Such opportunities not only have important or indeed profound social consequences in terms of maintaining a community's identity, authenticity and sense of place, but also can have significant economic consequences in terms of cultural tourism. From another perspective, economic significance of sites is increasingly becoming an issue of competing with alternative land-use activities (e.g. development). Although traditionally seen as mutually exclusive pursuits, cultural heritage preservation and economic development may work

together. Best results occur where heritage issues are considered and accommodated for in the early stages of development planning.

#### *Aesthetic Significance*

The aesthetic qualities of sites/places relate to the visual appeal, however subjective, of sites/places and their setting. Despite the poorly defined nature of aesthetic significance, it remains one of the most important criteria for official registration of heritage sites in Australia.

#### **4.8.4 Management of Expected Site Types**

The review of previous research and the results of the data audit allows us to make an informed assessment of the types of cultural heritage sites that may be expected in the Project Area. These include:

- stone artefact concentrations;
- grinding equipment and ground-edge tools;
- grinding grooves;
- isolated stone artefacts;
- scarred trees;
- quarries;
- hearths and ovens;
- burials;
- mounds;
- recent historic and contact sites;
- places of traditional and anthropological significance;
- rock shelters;
- rock art;
- shell middens;
- carved trees; and
- stone arrangements and earthen circles

#### *Stone Artefact Concentrations*

Stone artefact concentrations represent areas where there has been discard of artefactual material and are the most common form of open site that will be encountered. This is commonly believed associated with occupation of an area but this is not necessarily the case. The density of discard and types of stone tools are commonly interpreted as demonstrating different activities in an area and intensity of occupation. However, the level of discard can also be closely related to the amount of raw material available and to the technology used to reduce the raw material and manufacture specific tool types.

Quartz is a common raw material in this area. Various techniques are used in its reduction: bipolar flaking, lamellate reduction, shatter along natural flaws as well as conchoidal percussion. Identification of quartz artefacts can prove difficult dependent on technique used and the degree of natural flawing present in a block. Other stone materials likely present will include: silcrete, chert, quartzite, basalt and various other volcanic and metamorphosed materials.

### *Grinding Equipment and Ground-edge Tools*

Grinding equipment including slabs or dishes (the bottom stone), top stones, mortars and pestles, pieces of stone used for axe sharpening and preparation of ochre are possible. So, too, are edge ground axes and fragments of such axes. These are important for various reasons. They can provide direct evidence of the activities undertaken in the general area where they have been left. This can come from the type of tool itself and the residues that may adhere to them: the residue and phytoliths of various seeds ground or pounded; particles of ochre. Axes themselves provide a broad date for sites on which they are found, dating from about 4,000 years b.p. Grinding equipment, notably grinding slabs, have been found in deposits at Cuddie Springs dating to the Pleistocene. However, there are on-going doubts about these dates – not least that such equipment has typically been found in deposits at most sites dating to the mid-Holocene. Sandstone is the most common material used for grinding equipment but various other materials can be used. Edge-ground axes are manufactured using hard volcanic and metamorphosed material to preserve the edge achieved after great effort grinding the blank with a suitable paste of sandstone and water.

### *Grinding Grooves*

Wherever there are suitable large slabs of stone (typically sandstone) axes and other tools such as wooden spear points can be ground. This grinding results in creation of grooves on the large slabs. Grooving may also result from seed grinding. Grooves associated with axe production are typically associated with a source of water to allow creation of suitable grinding paste

### *Isolated Stone Artefacts*

Isolated stone artefacts usually are simple stone flakes but can include edge ground axes, grinding equipment, retouched flakes and cores. While individual artefacts can look unprepossessing they may well be indicators of subsurface materials. RCAD (2002) notes this possibility and it is a point made by Roberts (1991) and Hughes (2002).

### *Scarred Trees*

These are sometimes referred to as culturally modified trees. They result from various types of activities:

- trees that have been scarred as a result of removing bark for the manufacture of various implements (coolamons), for construction of gunyahs and canoes or to mark particular trees associated with important events or places;
- trees where wood has been removed for the manufacture of particular tools such as bowls, spears, shields and clubs;
- trees where the bark has been removed as an ancillary to cutting into tree to retrieve a resource such as honey or possums from hollow limbs.

Scarred trees should not be confused with carved trees where there has been removal of bark followed by figurative and geometric patterns on the trunk or major branches of a tree.

The size and shape of a scar may provide some indication of the use made of the bark or reason for scarring. It is sometimes possible to identify whether axes made of stone and steel have been used, usually in the form of the presence of cut marks and the definition of those marks. But there can be significant amounts of regrowth as the tree responds to the wound and this can obscure the size and shape of the scar as well as cut marks.

Many scarred trees have been registered. Trees will be found in areas where there has not been complete clearing of vegetation. The banks of creeks and watercourses and corridors of remnant vegetation in stock routes and along roads offer opportunity for their discovery. We note that both Roberts (1991) and oral testimony (RCAD 2002) urge caution in attributing all scarred trees to traditional practices of Aboriginal people.

#### *Quarries*

Quarries [stone sources] are locations where stone used in manufacture of stone artefacts has been found and there is evidence of manufacture in the form of stone artefacts such as debitage or blanks of the tools themselves. Quarries of various raw materials are found and these relate to the tools or equipment that is to be manufactured. Sources where highly siliceous, crypto-crystalline and isotropic material are available are used for flaked tools. Hard volcanic and metamorphic material provides axes. Well-stratified outcrops of sandstone can provide material for grindstones. But materials can also be found as floaters or collected from gravel beds in watercourses and palaeochannels.

Ochre quarries can also be found. These can take two forms: locations where strata of clays with high content of iron compounds are found, and locations where there are large concentrations of stone nodules within which talc-like iron oxide is found – the nodules are cracked open and the iron oxide then ground to a powder. Kaolin (white clay) also was used for purposes of painting as was charcoal.

#### *Hearths and Ovens*

Hearths are surface features while ovens have been excavated. Heat retainers in the form most usually of pieces of baked clay but less commonly small cobbles of stone along with charcoal can be found in them. Other organic material may also be found. The charcoal and organic material offers the opportunity to date these features.

#### *Burials*

Burials are the most sensitive site type that can be encountered: they are of immense importance to Aboriginal people as the remains of their ancestors. They can also be of considerable scientific significance by virtue of their antiquity, evidence of genetic development of the Aboriginal population, evidence of cultural practices (care for wounded or aged individuals, tooth evulsion, mortuary practices such as cremation or painting of bone) and the goods that may be buried with the individual. In some areas what can only be described as cemeteries have also been identified. Interment can take place as burials in locations such as watercourse-bordering dunes or lunettes, areas where soft sand is available, in rock shelters and within the limbs and trunks of hollow trees. Evidence of complex burial practices including maceration of flesh prior to final interment is also known. The geochemistry and base geology of an area has a major impact on the likelihood of finding burials and the locations in which they will be discovered. Tree burials are susceptible to destruction by bushfires and clearing. The study of burials in the region has provided information on where burials might be expected, how these are related to residential patterning and some interpretations of social patterns (McBryde 1974; Pardoe 1986, 1988; Witter *et al.* 1993).

RCAD (2002 Appendix C: 15) notes oral testimony from Monty Ruttley that burials were found on 'a sandy creek in the Pilliga in the 1920's'. However, it is also noted that portions of the Pilliga have acidic soils. With this biochemistry it is unlikely that bone will survive for long. Therefore, burials encountered in such areas are not likely to have great antiquity.

### *Mounds*

Mounds might be encountered but the probability is low and will be limited to the largest watercourses in the Project Area in the extreme northwest as they are found in floodplain country. Mounds may contain by-products of occupation including food debris, stone artefacts tools, charcoal and baked clay heat retainers. Burials are occasionally found in mounds. Mounds are raised areas typically measuring 10m to 20m in diameter, although larger examples have been recorded. Earthen mounds have been recorded to the west of the Project Area at the Macquarie Marshes (Balme and Beck 1996) and to the south and west along major rivers and watercourses. Excavation of mounds demonstrate they are of fairly recent origin, generally the late Holocene.

### *Recent Historic and Contact Sites*

Archaeological evidence of Aboriginal life from the contact period of the 1800s has been documented in the region: RCAD (2002) demonstrates there is plenty of scope for this type of site in the Project Area.

### *Resource Places*

RCAD (2002) records many examples of plants used as traditional foods, medicines and resources, associated with the Project Area. Some locations where these foods, medicines and resources are available have been identified. There is every likelihood that additional locations will be identified as further fieldwork is undertaken. RCAD (2002) demonstrates that the local Aboriginal community continues to make use of these plants for a variety of purposes.

### *Places of Traditional and Anthropological Significance*

Again, RCAD (2002) contains statements that such places exist. These may be associated with a range of beings and events: important creator beings and culture heroes, places associated with important dreaming stories, dangerous places where the creator beings or dreaming characters may be encountered, places where important ceremonies were performed, birthing locations etc. There may be no material markers of such locations and they will be known only to suitably enculturated individuals who may choose to disclose the location and significance of these places.

### *Rock Shelters*

Examples of this site type have been identified in the Project Area, but none are within the Project Area for the proposed Narrabri Gas Project. Where sediment has been trapped in the rock shelter and the shelter occupied and the site geochemistry favours it, there can be deep, stratified deposits containing a wide range of cultural materials including: stone artefacts; organic equipment (e.g. dilly bags, boomerangs) and decorative items (e.g. grass necklaces and beads); remains of food stuffs both faunal and vegetable; charcoal from camp fires; and interred human remains. Rock art can sometimes be found rendered on the walls of shelters

### *Rock Art*

Rock art can be found as drawings (dry pigment) and paintings (wet pigment) in rock shelters and overhangs. Engravings, both in rock shelters and on large expanses of rock of suitable composition, are known in the region but are unlikely in the Project Area due to the nature of the landscape. McBryde (1974) recorded engravings at Bullawa Creek, near Narrabri. RCAD (2002, Appendix C: 15) notes that rock art is also found in shelters in the Pilliga Nature Reserve and Wilderness Area.

### *Shell Middens*

Shell middens will be found close to rivers, lakes and other watercourses. Composed of mussel shells, they may be in stratified deposits or found as exposures in eroded areas. They vary in size from small dinner time camps to extensive and stratified lens of shell. Stone artefacts, hearths, animal bones, other organic material, and burials can be found in larger examples or associated with them. The high carbonate content of the midden creates an excellent micro-environment for the preservation of organic material.

### *Carved Trees*

Examples of this type of site have been reported for Bohena Creek. Carved trees result from the removal of bark and the carving of both figures and geometric patterns on the wood with axes or sharp stone tools. They were associated both with ceremonial sites such as bora grounds and to mark the boundaries of burial sites. In recognising these dual functions, Etheridge (1918) referred to them as teletglyphs and taphoglyphs. Numbers of carved trees (including apparently the Bohena Creek example) were cut and removed to national and local museums and to other keeping places or have otherwise been destroyed by bushfires.

### *Stone Arrangements and Earthen Circles*

Stone arrangements have been located in the region, typically at higher elevations, both where stone is available and perhaps so that they are less accessible. These are commonly presumed to be associated with ceremonial activities, including initiations of young boys.

## **4.8.5 Estimate of Site Significance**

This estimate draws on the site types and cultural values that are known or that might be expected in the Project Area. The estimates are included in Table 4-11. The table makes use of the five types of significance noted above. It notes whether a particular site type possesses a particular type of significance (Yes – Y) and then makes an estimate of value: low (L), medium (M) and high (H) informed by commentary on the site types in the earlier review and assessments. Additional commentary to explain estimates is included in the table. It should also be noted that certain values, as against specific sites, have also been included in this table.

## **4.8.6 Implications and Response to Significance Estimate**

It can be seen that the significance estimates for the various types of significance for particular site types in some cases range from low to high. This reflects that significance needs to be assessed on a case by case basis. We know from the data audit undertaken that the sites in the AHIMS register do not constitute a realistic estimate of the sites that probably exist within the Project Area: we do not have a comprehensive picture of all the sites that exist within that area although we have good indications of what they could include. Accordingly, it is appropriate to adopt the Precautionary Principle. In the present case this would be to assume that the significance of all sites falls within the category of high significance, notwithstanding significance ascribed to them above. It would then be appropriate to adopt the Avoidance Principle towards them.

The management strategy outlined in Section 5 of this report is designed to give effect to these principles. However, certain categories of sites do range in significance value. Accordingly, conditions have been incorporated in the assessment of these sites to guide significance assessment and management decisions.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Stone artefact concentrations	Y	M-H	Y	M-H			Y	L-H			These sites have potential to yield quality scientific information on a range of issues. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area.
Grinding equipment and ground-edge tools	Y	M-H	Y	H			Y	M-H			These sites have potential to yield quality scientific information on a range of issues. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area.
Grinding grooves	Y	M-H	Y	H			Y	M-H			These sites have potential to yield quality scientific information on a range of issues - production of tools and food. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Isolated stone artefacts	Y	L-H	Y	M-H			Y	M-H			These sites have potential to yield quality scientific information on a range of issues - may be indicators of sub-surface deposits and at least provide evidence of patterns of use of the forest. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area. Do not really have an aesthetic dimension.
Scarred trees	Y	L-H	Y	H	Y	L-H	Y	M-H	Y	L-H	These sites have potential to yield quality scientific information on a range of issues - production of equipment etc. but identification of trees that have been scarred by cultural practices can be difficult at times with a high degree of subjectivity. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The trees may result from activities of known individuals in the recent historic past. The trees may be able to be used in educational programs on Aboriginal use of the area. Trees themselves may be aesthetic.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Quarries	Y	M-H	Y	H			Y	M-H			These sites have potential to yield quality scientific information on a range of issues. Rarity can increase importance. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area. Do not really have an aesthetic dimension.
Hearths and ovens	Y	M-H	Y	H	Possible		Y	M-H			These sites have potential to yield quality scientific information on a range of issues, notably datable material. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. Possible historical dimension as they may date from historical use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Burials	Y	M-H	Y	H	Possible		Y	M-H	Possible		These sites have potential to yield quality scientific information on a range of cultural practices. The sites are of importance to the Gomeroi as they are the remains of their ancestors. Possible historical dimension as they may date from historical use of the forest. The sites may be able to be used in educational programs on Aboriginal use of the area but respect that there could be reluctance to use them in this way.
Mounds	Y	M-H	Y	H			Y	M-H	Possible		These sites have potential to yield quality scientific information on a range of cultural practices. The sites are of importance to the Gomeroi as they are evidence of their ancestors' use of the area. The sites may be able to be used in educational programs on Aboriginal use of the area. There may be some aesthetic value dependent on their location.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Recent historic and contact sites	Y	M-H	Y	H	Y	H	Y	M-H	Possible		These sites have potential to yield quality scientific information on the use made of the area over the last 200 years and as elements of a larger cultural landscape. The sites are of importance to the Gomeroi as they are evidence of their families' and forebears' use of the area. The sites may be able to be used in educational programs on Aboriginal use of the area. There may be some aesthetic value dependent on their location.
Rock shelters	Y	H	Y	H	Possible		Y	H	Y	L-H	These sites have potential to yield quality scientific information on a range of issues, and possibly of great antiquity. Rarity increases importance. The sites are of importance to the Gomeroi as evidence of their old people's use of the forest. The shelters may have been used for temporary residence by known individuals in the recent historic past. The sites may be able to be used in educational programs on Aboriginal use of the area. The sites may be situated in an area with good views or the formations themselves may be aesthetic.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Rock art	Y	H	Y	H	Possible		Y	H	Y	M-H	These sites have potential to yield quality scientific information of cultural practices. Rarity increases importance. The sites would be of importance to the Gomeroi as evidence of their old people's use of the forest, demonstrating traditional artistic endeavours and items of cultural importance. The art could date from the recent historic past. The sites may be able to be used in educational programs on Aboriginal use of the area. The sites may be situated in an area with good views or the art itself may have high aesthetic values.
Shell middens	Y	H	Y	M-H	Possible		Y	M-H			These sites have potential to yield quality scientific information of cultural practices. The sites would be of importance to the Gomeroi as evidence of their old people's use of the forest. The middens could date from the recent historic past and be associated with known individuals. The sites may be able to be used in educational programs on Aboriginal use of the area. The sites may be situated in an area with good views or the art itself may have high aesthetic values.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Stone arrangements and earthen circles	Y	H	Y	H	Possible		Y	H	Possible		These sites have potential to yield quality scientific information of cultural practices. Their rarity also increases their importance. The sites would be of importance to the Gomeroi as evidence of their old people's use of the forest and their association with traditional ceremonial activities. The middens could date from the recent historic past and be associated with known individuals. The sites may be able to be used in educational programs on Aboriginal use of the area. The sites may be situated in an area with good views or the art itself may have high aesthetic values.
Aesthetic value of forest			Y	H					Y	H	The Gomeroi oral testimony make it clear that the forest itself is seen to have high social value because of the aesthetic value they attach to it.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Educational value of the forest			Y	H			Y	H			The Gomeroi oral testimony make it clear that the forest itself is seen to have high social value because of the educational value they attach to it through the opportunity to teach children and others about a range of matters: culturally important foods and resources and how they can be used or procured, places of cultural and historical significance etc.
Carved trees	Y	H	Y	H	Possible		Y	H	Y	H	These sites have potential to yield quality scientific information of cultural practices. Their rarity also increases their importance. The sites would be of importance to the Gomeroi as evidence of their old people's use of the forest and their association with traditional ceremonial activities. The carvings could date from the recent historic past and be associated with known individuals but this is considered a low possibility. The sites may be able to be used in educational programs on Aboriginal use of the area. The sites may be situated in an area with high aesthetic values or the carvings themselves may have high aesthetic value.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Places of traditional and anthropological significance	Y	H	Y	H	Possible		Y	H	Y	L-H	These sites have potential to yield quality scientific information on the use made of the area and as elements of a larger cultural landscape. The sites are of importance to the Gomeroi as they are of direct importance in native title claims as well as being elements of their cultural landscape. There may well be overlap or integration with historical events of significance to the Gomeroi. The sites may be able to be used in educational programs on Aboriginal use of the area although gender issues and accessibility due to other cultural restrictions will need to be considered. There may be some aesthetic value dependent.

Place or Value	Significance										Commentary
	<i>Scientific</i>	<i>Est</i>	<i>Social</i>	<i>Est</i>	<i>Historical</i>	<i>Est</i>	<i>Education / economic</i>	<i>Est</i>	<i>Aesthetic</i>	<i>Est</i>	
Cultural use of traditional resources	Y	H	Y	H			Y	H			The Gomeroi oral testimony make it clear that the forest itself is seen to have high social value because of the ongoing cultural uses to which sites found there, and resources procured there, can be put: educational opportunity to teach children and others about a range of matters; culturally important foods and resources and how they can be used or procured; places of cultural and historical significance etc; the maintenance of cultural practices. These uses are vital to Gomeroi capacity to sustain an argument for their native title focusing on there being a body of law and custom which they continue to practise. The opportunity to collect information about these things provides important opportunities for social research.

Table 4-11: Summary of significance assessment by site type.

#### 4.9 Comparative Assessment of the Data Audit Area and the Project Area

An assessment has been made comparing the types of sites found in the Data Audit Area with those found in the Project Area. Although a process of site verification has commenced, the data here has not yet been modified in line with the results of that program. There are two related reasons for this: only a sub-set are currently validated and the precautionary principle would dictate that the largest sample of sites be used in this comparative assessment.

A total of 268 individual places containing Aboriginal cultural heritage have been identified within the Data Audit Area. These include a diverse range of place-types which cover both subsistence and ceremonial aspects from both the pre and post-contact periods. These are detailed in Table 4-12 below.

Although a substantial number of the place-types are represented by only one or two examples, this is a situation which is far from uncommon in the context of such studies. While this largely reflects what would have been the generally uncommon incidence of places such as those associated with ceremony within the cultural landscape, others such as resource places and those relating to the historic period more reflect a general lack of consideration in the conduct of standard 'archaeological' field investigations.

Given their durability and integral place within Aboriginal subsistence patterns, it is unsurprising that places containing stone artefacts (in excess of 75% of the total number) dominate the cultural record of the Data Audit Area. Although still in excess of 50% of the total number of identified places, stone artefacts are present in considerably fewer numbers within the Project Area as opposed to either the entire review area including the Project Area, or those portions specifically excluding it (which sees the incidence of places containing stone artefacts rise to in excess of 85%).

This difference as evidenced within the Project Area is almost entirely reflected in the number of places ascribed as being stone artefact scatters as against containing isolated examples. Although comprising 45% of places identified in the entire region, stone artefact scatters represent less than 19% of places within the Project Area (see Table 4-12).

These later elevated numbers result from a single cultural heritage study (Appleton 2009) undertaken on the grazing country immediately adjacent and to the east of the Pilliga Forest. The analysis of such information regarding the composition (artefact types, numbers, raw materials and extent) of these stone artefact scatters as is available (and it is acknowledged that this is highly variable) does not seem to indicate a substantially different cultural signature between the two, otherwise adjacent, areas. These results reflect the scale and intensity of the investigations conducted in this eastern area as opposed to those conducted to date within the Project Area.

The next most common Aboriginal cultural heritage place identified was that of scarred trees, sometimes also referred to as culturally modified trees. Such features represent almost 15% of the total number of places identified within the broader review area. Of the 40 examples identified, however, 34 (85%) are located within the Project Area. This is almost 38% of all of the places in this area and compares starkly to the remaining portions of the broader area in which scarred trees (n=6) comprises less than 3% of the total number of places (see Table 4-12). Again, this would largely appear to show no substantial differences in Aboriginal land and resource use patterns between the Project Area and immediately surrounding lands. Rather, this more likely reflects the differential nature of post-European land-use practices which have (despite the conduct of logging activities inside) involved the wholesale clearing of trees outside of the forest areas. In this it is worth noting that three of the six scarred trees identified outside the Project Area are located in the southwest, also within the forest.

Total Data Audit Area			Project Area		Data Audit Area less Project Area	
Place Type	No	%	No	%	No	%
Stone Artefact Scatter	121	45.1	17	18.9	104	58.4
Isolated Stone Artefact	81	30.2	31	34.4	50	28.1
Scarred Tree	39	14.6	34	37.8	5	2.8
Grinding Grooves	6	2.2	1	1.1	5	2.8
Historic Camp	5	1.9	1	1.1	4	2.3
Hearth	3	1.1	1	1.1	2	1.1
Historic Burial	2	0.7	1	1.1	1	0.6
Other Historic Place	2	0.7	1	1.1	1	0.6
Resource Place	2	0.7	2	2.2	-	-
Aboriginal Ceremony / Historic Burials	1	0.4	-	-	1	0.6
Ceremonial Ring / Scarred Tree	1	0.4	-	-	1	0.6
Stone Arrangement	1	0.4	-	-	1	0.6
Rockshelter / Cave	1	0.4	-	-	1	0.6
Rockshelter / Stone Artefact Scatter	1	0.4	1	1.1	-	-
Shell	1	0.4	-	-	1	0.6
Ochre Source	1	0.4	-	-	1	0.6
<b>Total</b>	<b>268</b>		<b>90</b>		<b>178</b>	

Table 4-12: Comparison of identified Aboriginal cultural heritage place types and their relative proportions by study area subset.

Within the Project Area, scarred trees have been recorded most commonly along the major waterways such as the Bohena, Cowallah and Bundock creek systems although examples have also been identified in other contexts. A large number have been identified in the remnant timbered country surrounding Yarrie Lake but also in other areas such as timbered road reserves. Although these areas have been the focus of the Aboriginal cultural heritage work which has been undertaken throughout the Project Area to date, creek and other natural water features would seem to be the most likely locations for such features to remain in any case.

Places containing grinding grooves seem considerably more prevalent (between two and three times) in the areas immediately surrounding the Project Area than within it where only one example has been currently recorded. This is not directly associated with, but lies several hundred metres to the west of, Bohena Creek. Of the remaining five such places, four are also located within the forested areas between six and twelve kilometres south of the Project Area. The southernmost of these places is located on Borah Creek while the remaining three are to the northeast along Sandy Creek.

Two of the Sandy Creek recordings are probably duplicate recordings of the same set of three grinding grooves. The later recording was undertaken as part of the Brigalow Belt Study (RCAD 2002) and undoubtedly is an updated recording of the location of this place that had previously been included on AHIMS (#19-6-0040).

The remaining place was identified on by Appleton (2009). It was located on a tributary of, and near its confluence with, Pine Creek approximately 3.5km east of the Project Area. It is noteworthy that no other examples of grinding grooves are found any further north. This site occurrence thus tends to conform to the boundary between the sandstone country and the

Brigalow-dominated heavier clay country which dominates the northern portions of the Project Area.

Although likely to be a mixture of both cultural patterning, and survey methodologies and resulting coverage, areas containing grinding grooves tend to be found in reasonable proximity to other classes of Aboriginal cultural heritage, notably extended scatters of stone artefacts and scarred trees. The patchy nature of the information available does not allow for detailed exploration of the matter, but there are hints that the presence of grinding grooves may be a reasonable indicator of more intensive use of areas and as such the presence of cultural 'precincts or complexes' within parts of the Project Area. The dynamic nature of the sand-bottomed creeks throughout the Project Area, however, makes the identification of grinding grooves (which tend to be within the beds and banks) problematic as wash of sediments will as easily cover grinding grooves with dense layers of sand and silt. If there were a true association of grinding grooves and these other types of sites it may be that grinding grooves exist in areas where they are not currently observed but where there are nearby high concentrations and diversity of other cultural heritage place-types.

Differences in the percentages of the total site numbers between the Project Area and the Data Audit Area for the vast majority of the remaining Aboriginal cultural heritage place-types relate to the presence or absence of these between the Project and Data Audit areas. Although including eight (50%) of the total number of identified place types, these represent only nine individual locations – less than 3.5% of the total number of places identified. Of these, six of the place-types identified in other areas have not to date been identified within the Project Area. This is a factor of the multivalent nature of the values which have been recorded as individual places containing historic burials, scarred trees and rock shelters, have been identified within the Project Area.

Of the remaining identified values at these places, those associated with ceremony (such as the stone arrangement and ring) constitute the bulk. One of these places, located approximately 6km to the northwest of Narrabri (AHIMS #19-3-0003), has been identified as being Dangar Village and as including the old mission cemetery. A number of places identified with the Aboriginal use of the Project Area during the historic period have however, been identified.

The remaining two places identified from the broader area which are not present within the Project Area include a place at which two shells (possibly the result of Aboriginal use) and another containing ochre.

## **4.10 Site Verification Program**

### **4.10.1 Background**

The audit of all cultural heritage sites within the Data Audit Area identified three primary issues:

- the locational information provided for a significant number of sites is either not accurate or was collected at a time when technology was not able to deliver high resolution locational information;
- the descriptions of a significant number of sites are lacking in detail so it can be difficult to ascertain the exact nature and condition of the sites; and
- there are a significant number of recordings of what seem to be the same site but with slight variations in location or description.

These issues required resolution if these sites are to be effectively managed, preferably by implementation of the Avoidance Principle. Given the location of almost all Project surface infrastructure is not fixed, and that it will be located using pre-clearance surveys with the

Aboriginal community in accordance with the CHMP, the validation of existing sites is the highest priority and the most effective use of resources.

To this end, a pilot program was designed to explore the general mechanics of this task. It aimed to test methodology as well as collect additional information about cultural sites in the Project Area and its surrounds. Based on its implementation, Santos is committed to the validation of all sites in the Project Area within 1 year of approval.

The intention is to, if at all possible, precisely locate sites and collect a consistent range of information about each place in a standard form. When completed this will be used to update the Project GIS, the associated zoning scheme (including reducing buffers where appropriate) and to develop management programs that expressly respond to the needs of each particular place.

#### **4.10.2 Rationale, Selection and Methodology**

It was considered that 40 sites constituted a good sample for the pilot study. These 40 sites included 28 that are deemed as Priority 1. The remainder (12) are deemed Priority 2 sites. The rationale for this division is explained below. However, an additional 10 sites were selected to provide for alternatives should access to some of those identified not be possible or other impediments present during the course of the fieldwork. Thus, a total of 50 sites (28 priority 1 sites and 22 priority 2 sites) were included as possibilities for this pilot study. It should also be noted that, particularly with reference to the Priority 2 sites, there were a number of examples where two places have been identified at the same locality (sometimes with the same grid references).

##### **Priority 1**

- There are 90 places currently identified within the Project Area. Of these, 28 (~30%) were selected as Priority 1 locations for verification;
- Sites were chosen to reflect the different sites types that could be encountered, the variability in the nature and quality of site locational data and for comparative purposes between the Project Area and greater Data Audit Area. Consequently, sites were selected from a variety of sources including AHIMS (10 of the 24 – in excess of 40% -that fall in this area), 12 from the BBS, and 6 identified as part of previous surveys and other studies (such as AECOM);
- Those selected covered all the major place types and include: 9 scarred trees; 8 stone artefact scatters; 5 areas containing isolated stone artefacts; and one each of a rock shelter with stone artefacts, a hearth, an area containing grinding grooves, an historic burial, an historic camp, and a resource place associated with a significant waterhole feature;
- In the case of those containing stone artefacts, they included a range of materials, artefact types and examine both isolated examples up to the most extensive scatters identified;
- The sites that fall within the Project Area were chosen to ensure broad geographical spread within the Project Area and include forest areas, creeks, open farming country, on tracks, or were associated with other features such as Yarrie Lake;
- They included a selection of places for which there is associated contextual information (such as detail about the stone artefacts or scar present), and others where there currently is none;
- They also included two places that lie on the boundaries of the Project Area.

## Priority 2

- Although it was not anticipated that all places in this category could be inspected within the time available to the verification fieldwork, an additional 22 places were identified to allow alternatives for reasons noted above. The final selection from this subset was made once there was a better understanding of access;
- It should be noted that although these were 22 individual places, they essentially represented 15 separate areas (and even then many were in close proximity to one another). Part of the fieldwork aimed to ascertain if some of these were in fact multiple or updated (e.g. more accurate locational data) recordings of the same place;
- As currently chosen, however, these included 16 places currently included on AHIMS and 6 identified during the BBS;
- Again, they included a broad range of the Aboriginal cultural heritage place-types which have been identified and recorded throughout this area and included some which were not represented within the Project Area (such as places identified as being associated with Aboriginal ceremony and dreaming / historic burials, a ceremonial ring and an ochre source).

There were other identified and recorded cultural heritage places immediately adjacent to a number of the places which were selected and it was intended that some of these could also be inspected should they be encountered during the conduct of the priority places, or time allowed.

A table of the Priority 1 and 2 places as identified is provided (Table 4-13).

Each site location, based on the data available, was visited and a comprehensive sweep made of that location – with a buffer of approximately 100m being allowed as a tolerance for locational error. If the sites were relocated, they were recorded in detail. The recording of places ensured that a record of data will be made sufficient to complete the site recording table established for the data audit. A record of the location of the site using differential GPS and site attributes and condition was made in real time with a comprehensive photographic record also captured, and all this is linked to the Project GIS.

### **4.10.3 Expectations**

It was expected that the outcomes of this verification program would include the following:

- improved recording of selected cultural heritage places with data immediately included within the Project GIS;
- refined understanding of the issues relating to site locations and descriptions, and which data sets that pose the greatest challenges in terms of accuracy for future management and which can then be targeted as a priority in the future verification program;
- opportunity to work with OEH to upgrade AHIMS data including the removal of 'phantom' or duplicate sites that will unnecessarily complicate management programs; and
- improved data for design of management programs for specific cultural heritage places.

<b>Place No</b>	<b>Place Type</b>	<b>Place Name / Summary ID</b>	<b>AHIMS ID</b>	<b>Priority</b>
1	Stone Artefact Scatter	Pilliga SF; Bohena CDA4	-	1
3	Isolated Stone Artefact	Pilliga SF; Bohena CDA6	-	1
5	Isolated Stone Artefact	Pilliga East SF; Bohena CDA1	19-6-0036	1
6	Isolated Stone Artefact	Pilliga SF; Bohena CDA2	-	1
18	Stone Artefact Scatter	Pilliga SF; Bundock CDA1	-	1
195	Isolated Stone Artefact	Pilliga SF - Jacks Creek 2 (8)	-	1
198	Hearth	Pilliga SF - Jacks Creek 2 (11)	-	1
203	Historic Burial	Trindall Oral History Sulky Story – B	-	1
205	Resource Place	Trindall Oral History Sulky Story – D	-	1
216	Historic Camp	Trindall Oral History Sulky Story – O	-	1
331	Stone Artefact Scatter	Sandy CDAN1	-	1
345	Isolated Stone Artefact	Spring CDA1	-	1
358	Rockshelter / Stone Artefact Scatter	Sandy CDA North RS1	-	1
383	Scarred Tree	PFST2	-	1
384	Stone Artefact Scatter	Cowallah Ck AS1	-	1
392	Scarred Tree	Cowallah Ck ST3	-	1
398	Stone Artefact Scatter	Bohena Ck AS4	-	1
403	Scarred Tree	Bohena Ck ST6	-	1
409	Scarred Tree	Yarrie Lake recreational area 2	19-3-0028	1
411	Stone Artefact Scatter	Yarrie Lake recreational area 21	19-3-0047	1
412	Grinding Grooves	Biblewindi State Forest; Womba	19-6-0014	1
422	Scarred Tree	Yarrie Lake recreational area 5	19-3-0031	1
424	Stone Artefact Scatter	Yarrie Lake recreational area 19	19-3-0045	1
426	Scarred Tree	Yarrie Lake recreational area 12	19-3-0038	1
431	Scarred Tree	Yarrie Lake recreational area 14	19-3-0040	1
435	Stone Artefact Scatter	WN18 Narrabri	19-3-0017	1
445	Scarred Tree	Yarrie Lake recreational area 9	19-3-0035	1
573	Scarred Tree	Tree B	-	1
13	Stone Artefact Scatter	Pilliga East SF; Borah CDA2	19-6-0034	2
20	Isolated Stone Artefact	Pilliga SF; Bundock CDA3	-	2

Place No	Place Type	Place Name / Summary ID	AHIMS ID	Priority
57	Stone Artefact Scatter	Pilliga SF; Goona CDA3	-	2
63	Historic Camp	Sid Ruttle's Camp Historical Site	19-3-0072	2
213	Historic Burial	Trindall Oral History Sulky Story – L	-	2
214	Historic Camp	Trindall Oral History Sulky Story – M	-	2
330	Stone Artefact Scatter	Sandy CDA4	-	2
341	Grinding Grooves	Stage 1 Remnants	-	2
408	Scarred Tree	RESTRICTED	19-6-0045	2
413	Hearth	Rutherfords Creek-cluster 11(18041)	19-6-0039	2
414	Grinding Grooves	Grinding Grooves #1 PNR Sandy Creek off Delwood Road	19-6-0040	2
415	Grinding Grooves	Sandy Creek Grooves 1	19-6-0062	2
416	Isolated Stone Artefact	Sandy Creek Grinding Dish 1	19-6-0094	2
419	Ochre Source	OMPSS1	19-6-0060	2
420	Scarred Tree	Borah Creek Double Scar Tree 1	19-6-0065	2
425	Stone Artefact Scatter	Turalin; Narrabri	19-3-0001	2
430	Ceremonial Ring / Scarred Tree	Bohena Creek; Brigalow Creek	19-3-0005	2
438	Scarred Tree	Wee Waa LALC; Federal Land 1	19-3-0064	2
439	Aboriginal Ceremony and Dreaming / Historic Burials	Dangar Village, Old Mission Cemetery	19-3-0003	2
441	Stone Artefact Scatter	WN22 Narrabri	19-3-0014	2
442	Stone Artefact Scatter	WN20 Narrabri	19-3-0018	2
449	Stone Artefact Scatter	Wee Waa LALC; Federal Land 2	19-3-0065	2

Table 4-13: Sites selected for site verification program. Place numbers are as depicted on Figure 4-4.

#### 4.10.4 Results

The results of the program are summarised in Table 4-14 and are shown on Figure 4-4. A team consisting of 1 technical adviser, 4 Aboriginal field officers and 2 Santos representatives spent 9 days in the field in July 2014. Of the 50 sites nominated for the pilot, 45 were examined by the team: the other 5 could not be inspected due to weather and access conditions. Six categories of sites were identified in the course of the fieldwork.

Verification Category 1: the description and the location matched the record;

Verification Category 2: there was a minor variation in description but a match for the location;

Verification Category 3: there was a major variation in description but a match for the location;

Verification Category 4: the description matched but there was a minor variation in location (by definition less than 100m but typically much less than this);

Place No	AHIMS ID	Place Name	Place Type	Inspected	Result Category
1	n/a	Bohena CDA4	Stone Artefact Scatter	Yes	5 - description not present at the location or within 100m
3	n/a	Bohena CDA6	Isolated Stone Artefact	Yes	5 - description not present at the location or within 100m
5	19-6-0036	Bohena CDA1	Isolated Stone Artefact	Yes	2 - minor variation in description, location match
6	n/a	Bohena CDA2	Isolated Stone Artefact	Yes	2 - minor variation in description, location match
13	19-6-0034	Borah CDA2	Stone Artefact Scatter	Yes	2 - minor variation in description, location match
18	n/a	Bundock CDA1	Stone Artefact Scatter	Yes	5 - description not present at the location or within 100m
20	n/a	Bundock CDA3	Isolated Stone Artefact	Yes	5 - description not present at the location or within 100m
57	n/a	Goona CDA3	Stone Artefact Scatter	Yes	3 - major variation in description, location match
63	19-3-0072	Sid Ruttle's Camp Historical Site	Historic Camp	Yes	5 - description not present at the location or within 100m
195	n/a	Jacks Creek 2	Isolated Stone Artefact	Yes	5 - description not present at the location or within 100m
198	n/a	Jacks Creek 2	Hearth	Yes	5 - description not present at the location or within 100m
203	n/a	Place B - Trindall Oral History Sulky Story	Historic Burial	Yes	1 - description and location match
205	n/a	Place D - Trindall Oral History Sulky Story	Resource Place	Yes	5 - description not present at the location or within 100m
213	n/a	Place L - Trindall Oral History Sulky Story	Historic Burial	No - rain	n/a
214	n/a	Place M - Trindall Oral History Sulky Story	Historic Camp	No - rain	n/a
216	n/a	Place O - Trindall Oral History Sulky Story	Historic Camp	Yes	1 - description and location match

Place No	AHIMS ID	Place Name	Place Type	Inspected	Result Category
330	n/a	Sandy CDA4	Stone Artefact Scatter	Yes	5 - description not present at the location or within 100m
331	n/a	Sandy CDAN1	Stone Artefact Scatter	Yes	3 - major variation in description, location match
341	n/a	(Stage 1 Remnants)	Grinding Grooves	Yes	1 - description and location match
345	n/a	Spring CDA1	Isolated Stone Artefact	Yes	5 - description not present at the location or within 100m
358	n/a	Sandy CDAN RS1	Rockshelter / Stone Artefact Scatter	Yes	2 - minor variation in description, location match
383	n/a	PFST2	Scarred Tree	Yes	1 - description and location match
384	n/a	Cowallah Ck AS1	Stone Artefact Scatter	Yes	2 - minor variation in description, location match
392	n/a	Cowallah Ck ST3	Scarred Tree	Yes	1 - description and location match
398	n/a	Bohena Ck AS4	Stone Artefact Scatter	Yes	2 - minor variation in description, location match
403	n/a	Bohena Ck ST6	Scarred Tree	Yes	1 - description and location match
408	19-6-0045	RESTRICTED	Scarred Tree	Yes	4 - description match, minor variation in location
409	19-3-0028	Yarrie Lake Recreational Area 2	Scarred Tree	Yes	4 - description match, minor variation in location
411	19-3-0047	Yarrie Lake Recreational Area 21	Stone Artefact Scatter	Yes	5 - description not present at the location or within 100m
412	19-6-0014	Bibblewindi State Forest; Womba	Grinding Grooves	Yes	5 - description not present at the location or within 100m
413	19-6-0039	Rutherfords Creek - cluster 11(18041)	Hearth	Yes	5 - description not present at the location or within 100m
414	19-6-0040	Grinding Grooves #1 PNR Sandy Creek off Delwood Road	Grinding Grooves	Yes	6 - New Site or AHIMS Amendment
415	19-6-0062	Sandy Creek Grooves 1	Grinding Grooves	Yes	1 - description and location match
416	19-6-0094	Sandy Creek Grinding Dish 1	Isolated Stone Artefact	Yes	4 - description match, minor variation in location

Place No	AHIMS ID	Place Name	Place Type	Inspected	Result Category
419	19-6-0060	OMPSS1	Ochre Source	Yes	6 - New Site or AHIMS Amendment
420	19-6-0065	Borah Creek Double Scar Tree 1	Scarred Tree	Yes	1 - description and location match
422	19-3-0031	Yarrie Lake Recreational Area 5	Scarred Tree	Yes	4 - description match, minor variation in location
424	19-3-0045	Yarrie Lake Recreational Area 19	Stone Artefact Scatter	Yes	3 - major variation in description, location match
425	19-3-0001	Turalin; Narrabri	Stone Artefact Scatter	Yes	5 - description not present at the location or within 100m
426	19-3-0038	Yarrie Lake Recreational Area 12	Scarred Tree	Yes	4 - description match, minor variation in location
430	19-3-0005	Bohena Creek; Brigalow Creek	Ceremonial Ring / Scarred Tree	No - rain	n/a
431	19-3-0040	Yarrie Lake Recreational Area 14	Scarred Tree	Yes	5 - description not present at the location or within 100m
435	19-3-0017	WN18 Narrabri	Stone Artefact Scatter	Yes	5 - description not present at the location or within 100m
438	19-3-0064	CSIRO - Federal Land 1	Scarred Tree	Yes	1 - description and location match
439	19-3-0003	Dangar Village, Old Mission Cemetery	Aboriginal Ceremony and Dreaming / Historic Burials	Yes	5 - description not present at the location or within 100m
441	19-3-0014	WN22 Narrabri	Stone Artefact Scatter	No - rain	n/a
442	19-3-0018	WN20 Narrabri	Stone Artefact Scatter	No - rain	n/a
445	19-3-0035	Yarrie Lake Recreational Area 9	Scarred Tree	Yes	4 - description match, minor variation in location
449	19-3-0065	CSIRO - Federal Land 2	Stone Artefact Scatter	Yes	6 - New Site or AHIMS Amendment
573	n/a	Tree B	Scarred Tree	Yes	4 - description match, minor variation in location

Table 4-14: Results of pilot site verification program. Place numbers are as depicted on Figure 4-4.

REMOVED FOLLOWING REQUEST MADE  
DURING CONSULTATION PROCESS WITH  
REGISTERED ABORIGINAL PARTIES

Figure 4-4: Status results of previously identified Aboriginal cultural heritage places inspected as part of the verification pilot program.

Verification Category 5: nothing matching the site description was found at the location or within 100m, nor was anything else identified;

Verification Category 6: New Site or AHIMS Amendment – both the location and the description varied to such an extent that either a new site has been found or significant amendments to AHIMS would be required.

The results can be summarised as follows (calculations exclude the sites that could not be examined):

Verification Category 1: 20% of sites;

Verification Category 2: 13% of sites;

Verification Category 3: 6.5% of sites;

Verification Category 4: 15.5% of sites;

Verification Category 5: 38% of sites; and

Verification Category 6: 6.5% of sites.

If we group Verification categories 1-4 together, which is a reasonable approach as there is a cultural site either matching or closely matching the description at a location, or there is a cultural site at that location or close to that location, we find that 55.5% of sites fall within those verification categories. Thus, 44.5% of sites either could not be found or another site could be found but it lay more than 100m from the nominated location. As a general statement, sites that had been recorded without GPS technology made the greater contribution to category 5 sites. Verification Category 3 sites, where there were significant variations in site description, represent 12% of sites in Verification categories 1-4, meaning that where a site could be found within close proximity to the nominated location, what could be identified matched the description, or matched it within only minor variation, 88% of the time. These preliminary results demonstrate the value of the verification program in improving overall data quality. As additional data become available they will be incorporated into the landscape mapping and sensitivity modelling, leading to revision of the zoning scheme where this is necessary. In this regard, the results of the verification program also demonstrate that the zoning scheme is suitably predicated on the Precautionary Principle, in that significant areas where it is possible that no direct threat exists have been set aside for protection.

#### 4.11 Enhanced Survey Methods

The existing level of survey results across the Project Area is limited to certain areas. Furthermore, and as outlined previously, it was impractical to survey all 95,000 ha of the Study or Project Area. The approach being taken is to carry out Pre-Clearance Surveys to confirm the presence or otherwise of Aboriginal cultural heritage items prior to the siting of well pads and other infrastructure and then select the final location to avoid identified Aboriginal heritage items (except minor items as identified in the CHMP). The process includes the following components:

- all ground-disturbing works will be subject to Pre-Clearance Surveys in accordance with the CHMP prior to ground disturbing works;
- fieldwork will be designed prior to entry into the field to ensure a systematic and comprehensive Pre-Clearance Survey of the area to be subject of investigation;
- the system will involve the use of differential GPS to provide highly accurate locational information;
- all data generated by each study will be included in a custom-built GIS for ease of use in subsequent management programs and revision of sensitivity mapping; and

- management strategies will be predicated on application of the Avoidance and Precautionary Principles and other relevant elements of the general management program specified above.

Prior to broad-scale adoption it was decided that they should be trialled in real field conditions. The following outlines the results of these trials.

The first study was in the Dewhurst-Bibblewindi area about 40km southwest of Narrabri, where a series of pilot wells, a core hole and associated linear infrastructure were planned. The total area to be affected by the pilot wells is 3.15ha and the core hole will impact 1.17ha.

Prior to entering the field, digital data was prepared for use with a differential GPS and PDA device so the Project Area could be accurately and systematically surveyed. Differential GPS affords an accuracy of 0.6 metres under ideal conditions. A transect pattern was prepared for each well and stored in a transect database. These data are held by Santos. A cultural heritage sites database was also prepared and uploaded to the PDA device for use in the field in the event of finds being made. In addition, large scale maps were prepared to be used for field orientation.

There were three blocks of fieldwork for this assessment: October 2013, March 2014 and May 2014. The majority of the fieldwork was undertaken in October 2013 and finalisation of access corridors occurred in March 2014 and May 2014 (CQCHM 2014a).

During the October 2013 fieldwork the field team consisted of four people: the technical adviser; a representative from Santos on the first day; and two experienced Gomeroi field officers. The survey was conducted by first driving to, or near, one of the nominated well pads and then walking the transect pattern for the well to other well pads to ensure systematic coverage. Each transect was designed to cover a swathe 20m in width. Having completed the survey of the well pad the area between the inspected well pad and the adjacent well pad was also inspected before examining the adjacent well pad. Due to previous clearing and the resultant thick herbage regrowth, in some cases vegetation was so thick at some wells that it was not possible to walk the pre-planned survey transects. In these cases, the planned transects were examined as closely as possible with some diversions to avoid dense, to the point of impenetrable, thickets of regrowth. The diversions were recorded using the GPS.

This area was covered with the typical Pilliga Forest on very sandy soils. The area for this pilot provided a particular challenge for survey due to extremely thick regrowth of different types of shrubs (largely various species of *Acacia sp.*) which has been promoted by previous logging activity. This impeded the survey and reduced ground surface visibility in places to very low levels (<10%) although ground surface visibility at other times and over approximately 70% of the area was reasonable (>50%). The well pads, including Bibblewindi 34 core hole, were examined as well as areas in between them.

In examining these pilot wells and associated access corridors, a total of approximately 29 km of transects was walked in the Project Area or their near vicinity (although the length of transects walked expressly for the Project Area was less than this). There is, therefore, a good sample of the Project Area and its immediate environs. No Aboriginal cultural heritage was recorded in the course of these inspections. Previous surveys of other areas within the Pilliga have recorded Aboriginal cultural heritage, but sites have been limited in size and extent and most commonly associated with the larger watercourses. AECOM noted that most sites they encountered in the vicinity of the Project Area were on Cowallah Creek. The sites they recorded had probably been exposed by erosion following recent flood events. These conditions apply neither to Dewhurst 32-33 and 36-37 nor to Bibblewindi 34 core hole.

Repeated blocks of fieldwork were required due to revised plans being developed for these locations. While the revised plans required inspection of new areas, they also resulted in a significant diminution in the areas to be affected by the proposed works. This means that the coverage achieved by the field team in relation to the area to be affected increased as a result of the re-design.

The second study was in the Leewood area, approximately 25km southwest of Narrabri. Santos is currently constructing produced water and brine management ponds and associated infrastructure there (CQCHM 2014b). Again, data preparation and methodology were similar to that for Bibblewindi. The Gomeroi and LALC nominated two representatives each for the Cultural Heritage Survey Team (CHST). The fieldwork was undertaken on 10- 11 April 2014.

Eight transects were designed consisting of an outward leg and a return leg with each transect line designed to cover a width of 100 m per leg. The total planned length of transects to be walked was 14.485km for an area approximately 1.2km<sup>2</sup> in size.

Part of the cultural survey methodology was to undertake a search of the Aboriginal Heritage Information Management System (AHIMS) to determine if other Aboriginal cultural heritage sites had been recorded in the area around the Project Area. This search found that no other Aboriginal cultural heritage sites had previously been recorded in the vicinity of the Project Area.

However, during this fieldwork, a total of four (4) cultural heritage places were recorded. These included two stone artefacts made with quartz and two scarred trees. Details of these Aboriginal objects are included in Table 4-15.

The two quartz flakes were small in size and approximately 1 cm or less in total length. Gomeroi representatives advised at the time that the quartz material was not local and was likely to be introduced to the area by Aboriginal people. Consistent with the observations of the Gomeroi representatives, sources of quartz were not observed in surface deposits in the Project Area during the survey. However, the weathered sediments on which the Leewood site is located may contain quartz material below the ground which could be brought to the surface by farming activities or the excavation of post holes for fences. The flakes were clearly fractured off a larger block of quartz. However, no clear features which would identify the flakes as being produced anthropomorphically could be identified. Quartz artefacts can be difficult to identify. In these circumstances, adoption of the precautionary principle was deemed appropriate and these flakes were deemed to be Aboriginal objects.

Two scarred trees were recorded in the remnant woodland at the northern end of the Leewood site (Sites 3 and 4; see Table 4.15).

Site ID	Date Recorded	Site Type	Extent	Notes
1	10/04/2014	Isolated Stone Artefact/s		Single unmodified quartz flake
2	11/04/2014	Isolated Stone Artefact/s		Single unmodified quartz flake
3	11/04/2014	Scarred Tree	1.4 by 0.25m	Live standing grey box, single scar, regrowth 0.3m across scar
4	11/04/2014	Scarred Tree	1.9 by 0.5m	Live standing grey box, single scar, 1m girth

Table 4-15: Cultural heritage sites recorded for Leewood area.

The Project Activities could proceed through rigorous implementation both of the Avoidance Principle and the Precautionary Principle. In relation to the Avoidance Principle:

- The scarred trees were in a zone at the northern end of Leewood previously identified not to be impacted to protect native vegetation. The site was already fenced.
- The isolated stone artefact (quartz) flakes could be avoided by installation of fencing around each location to ensure no disturbance of those areas was to occur during Project Activities.

These measures are depicted in Figure 4-5. These were considered to constitute reasonable and practicable management measures. While the isolated stone artefacts could have been salvaged and relocated such an action was not necessary if the Avoidance Principle was implemented.

These studies confirmed that a comprehensive process that directly involved representatives of the local Aboriginal community, with systematic survey of the areas in question, and that saw the application both of the Avoidance and Precautionary Principles as standard management tools was feasible in the context of this Project.

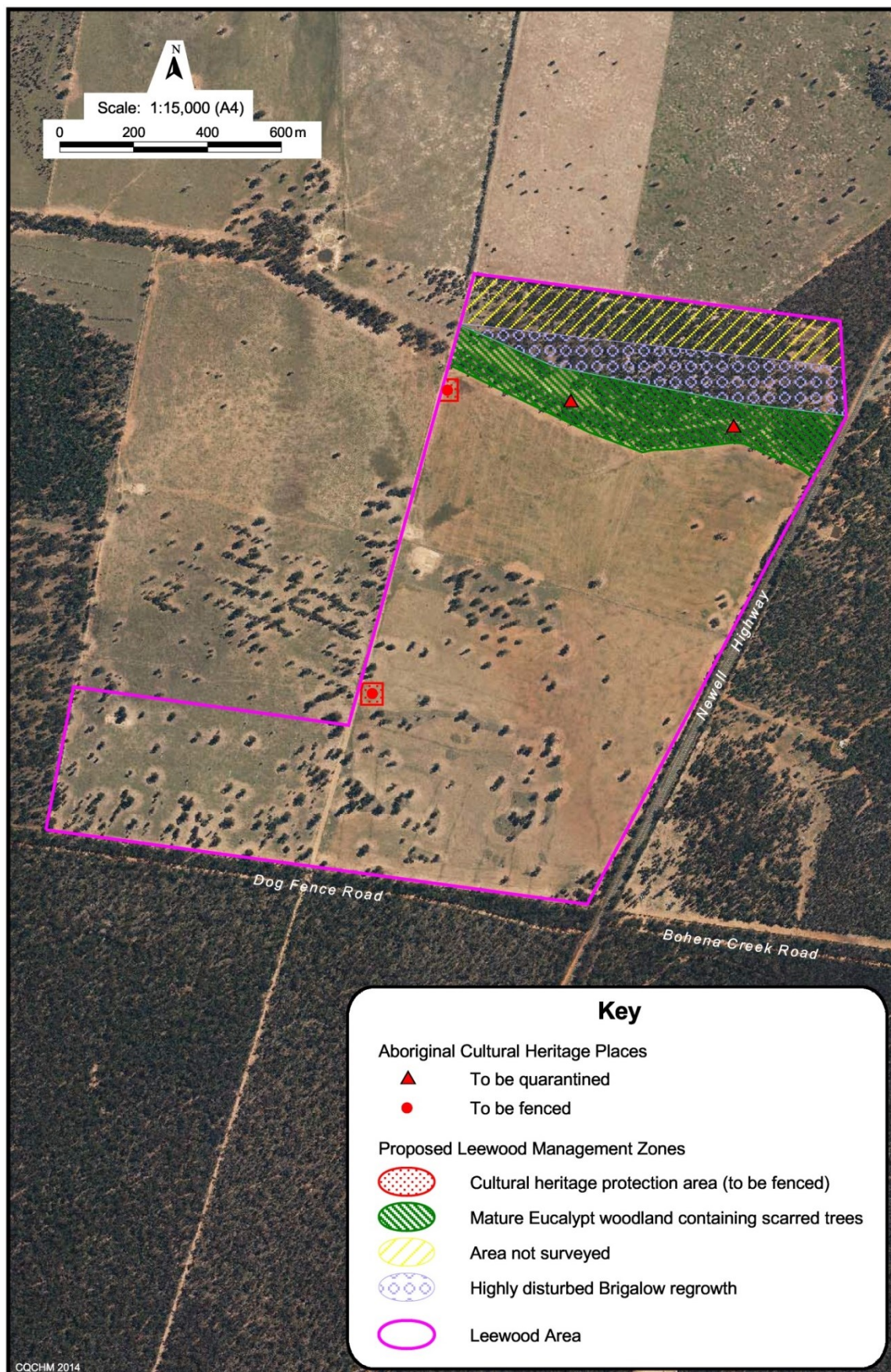


Figure 4-5: Proposed management zoning scheme for the Leewood area

## 5. Impacts and Management

### 5.1 Potential Impact on Cultural Heritage Sites

- The project has the potential to impact Aboriginal cultural heritage sites.
- A total of 90 sites are currently known in the Project Area. Using buffered extents, these cover approximately 0.01% of the Project Area. Even a doubling of this area would mean that only 0.02% of the Project Area contains cultural sites. Noting this and the fact that the project will only affect 1% of the Project Area, the likelihood of impacts is considered generally low.
- The assessment demonstrates that the project has the potential to impact on at least 10 categories of cultural heritage sites.
- The project could impact on areas that currently are zoned as being of very high, high and moderate cultural sensitivity.
- These cultural heritage sites are of significance for a range of reasons, with social and scientific significance both featuring.
- The assessment further demonstrates that there are likely to be more sites than those currently recorded within the Project Area.
- The assessment similarly shows that the data available on sites currently known is constrained in various ways (but the assessment also shows that these constraints can be rectified).
- All elements of the project (including but not limited to the gas field, central processing facility, project-associated infrastructure such as in-field compression and staff facilities, infrastructure corridor and other supporting infrastructure) could affect cultural heritage sites.
- Impacts on cultural heritage sites would most likely occur during the exploration and construction phases of the project when physical works occur in specified locations.

### 5.2 Minimization of Impact on Cultural Heritage Sites – General Observations

After due consideration, it has been determined that by harnessing the inherent flexibility of the project, noting that the vast majority of all infrastructure is not fixed in its location, with high quality locational data, which can be generated both for existing and new cultural heritage sites and places of cultural value, articulated through the use of technology such as GIS, the Project should be able to give effect to the Avoidance Principle. This will, however, be contingent on implementing a comprehensive management program that includes all the elements described in the following sections of this report.

### 5.3 Management of Aboriginal Cultural Heritage Sites

#### 5.3.1 Management Principles

Two guiding principles are to be adopted. The first of these is the Avoidance Principle.

This is defined in the following terms:

Project Activities will be designed such that, to the greatest extent possible, there is no impact on Aboriginal cultural heritage. Where impact cannot be avoided then the Project Activity will be designed to minimise impact on Aboriginal objects, places or values, and other management measures as appropriate are to be implemented to minimise or mitigate harm.

The Avoidance Principle constitutes best practice for cultural heritage management. In this case, and noting there is some flexibility available in the placement of some elements of infrastructure, it is a feasible management option. Attention is drawn to commitments to practice complete avoidance for many categories of highly significant sites and specific objective conditions for those categories where avoidance may not be possible. Mitigation programs would be designed contingent on the application of the Avoidance Principle. It would include provision of a keeping place should this prove necessary.

The second principle that has been adopted is the Precautionary Principle.

This is defined as:

The implementation of actions that are reasonable and practicable to minimise causing harm to known Aboriginal objects; and/or

Identifying Aboriginal objects so they can be managed in accordance with the provisions of relevant legislation and regulations, and by implementing reasonable and practicable management measures for these Aboriginal objects.

Reasonable and practicable measures are determined on a case by case basis

### **5.3.2 Management of Site Types and the Avoidance Principle**

It is proposed to manage the site types in line with the significance assessment made for each category of site and by application of the Avoidance Principle. Table 5-1 summarises the proposed approach for all cultural heritage site types. One additional site type is included, this being places where subsurface deposits may be encountered.

With the exception of isolated finds, non-complex stone artefact scatters and non-complex shell middens (see definitions provided earlier) no mitigation programs will be required as there will be complete avoidance of impacts. In those cases where mitigation of isolated finds, non-complex stone artefact scatters and non-complex shell middens may be required, standard procedures consistent with best archaeological practice will be implemented on a case by case basis.

It should be further noted that, subject to completion of the verification program in the Project Area, all **currently identified** sites, irrespective of site type, will be avoided.

### **5.3.3 Definition of Aboriginal Cultural Heritage**

The adoption of a broad definition of Aboriginal cultural heritage sites has been identified as necessary for several reasons. It is recognised that an overly narrow definition of Aboriginal cultural heritage that could exclude types or categories of cultural heritage site or cultural value would be detrimental to an effective management program. To that end, Aboriginal cultural heritage sites identified as all places of archaeological, traditional, historical and contemporary significance to which a geospatial referent can be attached.

### **5.3.4 Conduct of Pre-Clearance Surveys**

Pre-Clearance Surveys will be commissioned to assist in the design of proposed elements of the development program to give effect to the Avoidance Principle and related commitments, in circumstances where that part of the Project Area has not previously been subject to a comprehensive cultural heritage survey. A Pre-Clearance Survey will be undertaken before any ground disturbing activities are initiated and will be undertaken pursuant to the issue of a Work Notice by Santos regarding those ground disturbing activities. The results of all Pre-Clearance Surveys will be captured in an Aboriginal cultural heritage register to be established for the Project.

Site Type	Management Commitment	Comment
Burials	Complete Avoidance	
Stone Arrangements and Earthen Circles	Complete Avoidance	
Carved Trees	Complete Avoidance	
Rock Shelters	Complete Avoidance	
Grinding Grooves	Complete Avoidance	
Rock Art	Complete Avoidance	
Quarries	Complete Avoidance	
Mounds	Complete Avoidance	Subject to confirmation as a cultural feature
Scarred Trees	Complete Avoidance	Subject to confirmation as a cultural feature
Hearths and Ovens	Complete Avoidance of this site type where identified during pre-construction activities.	Subject to confirmation as a cultural feature. If identified during construction, mitigation in line with the New Find Measures contained in the CHMP.
Places of Traditional and Anthropological Significance	Complete Avoidance	Sites previously identified by Santos as a Place of Traditional and Anthropological Significance or otherwise identified in the Additional Research Program will be completely avoided.
Recent Historic and Contact Sites	Complete Avoidance	Sites previously identified by Santos as a Place of Traditional and Anthropological Significance or otherwise identified in the Additional Research Program will be completely avoided.
Stone Artefact Concentrations	Maximise avoidance or otherwise manage through processes of CHMP.	Conditions to be set for management decisions. The Avoidance Principle will be adopted. Stone Artefact Concentrations, where two or more artefacts are within 1m of each other, may be subject to relocation except where complex sites are encountered. Where complex sites are encountered they will be avoided. Complex sites are defined as places where a specific knapping event can be identified, grinding equipment (or fragments thereof) and/or ground edge tools (or fragments thereof) are present or form an element of the stone artefact concentration, there is any sub-surface material that may be <i>in situ</i> , or the stone artefact concentration is directly associated with any other site type.

Site Type	Management Commitment	Comment
Shell Middens	Maximise avoidance or otherwise manage through processes of CHMP.	Conditions to be set for management decisions. The Avoidance Principle will be adopted. Shell Middens may be subject to mitigation except where complex sites are encountered. Where complex sites are encountered they will be avoided. Complex sites are defined as where the shell midden material has not been subject to any process that has caused any disaggregation of the material, where a defined concentration of more 10 shells or shell fragments over an area of more than 2m <sup>2</sup> , there is a definable lens of shell, there is any sub-surface material that may be <i>in situ</i> or the shell midden is directly associated with any other site type.
Sub-surface Cultural Material	Maximise avoidance or otherwise manage through processes of CHMP.	Conditions to be set for management decisions. The Avoidance Principle will be adopted. Potential Archaeological Deposits (POADs) will be subject of testing in line with OEH specifications for same. Where it is confirmed to exist, all Sub-surface Cultural Material will be avoided. This will apply irrespective of whether the material is <i>in situ</i> or not.
Isolated Stone Artefacts	Maximise avoidance or otherwise manage through processes of CHMP	Where they cannot be avoided, isolated finds may be relocated.

Table 5-1: Application of Avoidance Principle to sites in the Project Area.

### 5.3.5 Establishment of Aboriginal Cultural Heritage Register

All data captured as part of the data audit whether or not subject to verification, as well as any data that are captured as part of Pre-Clearance Surveys or Additional Research Program, will be entered into the Aboriginal Cultural Heritage Register. This Register will then be available for use in the review and modification of the cultural heritage sensitivity model and the cultural heritage zoning scheme developed for the Project. Use made of the data for these purposes will be subject to provisions relating to confidentiality that are specified in the CHMP.

### 5.3.6 Sensitivity Modelling, Buffering and Cultural Heritage Zoning Scheme

The point was made earlier that the inherent flexibility in much of the development program affords great opportunity to avoid impact on cultural sites and thereby further minimise the impact footprint. The question then becomes one of how our knowledge of the location of cultural heritage sites can be articulated with the proposed development so as to take advantage of this opportunity. This can be done by use of the sensitivity modelling and cultural heritage zoning scheme.

Drawing on the results of data currently to hand, a cultural heritage sensitivity model has been developed. This model includes locations of known cultural heritage sites that have been buffered as described in Section 4 of this report. Additionally, the relative sensitivity of different parts of the Project Area and the Fieldwork Survey Area has also been ranked. By making use of GIS technology, it will be possible to create a Cultural Heritage Zoning Scheme in which the buffered locations of currently known sites will be avoided – consistent with a commitment enunciated earlier. By creating this as a layer within the Project GIS, other elements of the

Project can be overlaid on this and can then be designed to avoid those locations. Similarly, the areas of sensitivity can be identified as a layer in the GIS and all reasonable efforts made to avoid those areas as well. It should be noted that all proposed ground disturbing works will be subject of Pre-Clearance Surveys in any case, irrespective of the sensitivity ascribed to the area within which they fall.

It is necessary that sensitive cultural heritage information can be partitioned or subject to access hierarchies to preserve the confidentiality and access constraints that are part and parcel of Aboriginal society in relation to such information (see L'Oste-Brown *et al.* 2001 for further discussion of these issues). As long as these issues are understood, GIS protocols can be designed that allow the production of interpreted layers of data, rendering cultural details opaque while still allowing effective use of interpreted data for land management purposes, in this case the management of cultural heritage sites by application of the Avoidance Principle. It is possible to create a cultural heritage zoning scheme that describes which land may or may not be accessed on cultural heritage grounds but is devoid of detail to those parties who are not authorised to access that information. In recognition of this, data will be suitably partitioned and managed to protect its confidentiality while still allowing its use for valid and agreed management purposes. The CHMP includes provisions relating to confidentiality and the use and interpretation of data to take account of this need – see Section 5.6.

It is noted that the Project will extend over a period of approximately 25 years. Noting that the sensitivity model as currently developed is subject to certain limitations, it will be subject of review and modification as necessary, no more than every five years, for the life of the Project. This process of review and modification will be carried out subject to the results of various additional management programs designed to improve the quality of data and address constraints and limitations described earlier in the report. We now turn our attention to these.

#### **5.3.7 Site Verification**

It is in the interests of all parties that an accurate record of what is currently known is created. Accurate locations are also required even if there is no immediate threat to a site: the Aboriginal stakeholders will wish to manage such sites into the future. The pilot has proved that the program is feasible and effective. Accordingly, the pilot verification program described earlier in the report will be continued. All sites within the Project Area will be subject to a verification program undertaken in line with the methodology described earlier. The program will be completed within a period of 12 months of project approval but it is anticipated that it will be done well before this date. All revised data will be added to the cultural heritage site register and used in the conduct of the review of the sensitivity model and necessary amendment subsequent to this. Until verification is complete, the conservative buffers now in place will remain and will be used for purposes of avoidance.

#### **5.3.8 Additional Research Program**

As described in Section 4, an assessment of a wide range of data has been completed in conformity with OEH requirements. This assessment has concluded that:

- there are particular places of cultural value in the Project Area that are of significance as particular places of traditional and historical value to RAPs; and
- that there may be additional places of this type in the Project Area.

The impact assessment has determined that the Project can avoid impacts on these places by application of the Avoidance Principle as enunciated in this report. That is, this category of site can be completely avoided over the life of the Project by harnessing the inherent flexibility that exists within the project to design elements of the Project around these particular locations. In

order to give best effect to this approach, and adopting the Precautionary Principle, supplementary research will be undertaken to confirm existing data sets and, where it proves necessary, augment those data. This will be done by the conduct of an Additional Research Program. The major features of this Additional Research Program are described below.

The Additional Research Program will involve commissioning additional research targeted at identifying and recording places and values of **particular** traditional, anthropological, historical and contemporary significance to Aboriginal people. The program will not be expressly linked to a proposed program of works. It will be completed within a period of 12 months of commencement. The aim will be to collate a body of data on places and values that can be integrated into general project planning such that the locations where these places and values are identified can be managed by the Avoidance Principle described above. The methodology will be developed in collaboration with the RAPs through mechanisms given effect in the CHMP. This will be captured in a brief specifically developed for this program. Implementation of the program can then be audited against the provisions of the brief. The brief and research program will give effect to the confidentiality provisions of the CHMP pertaining to this program.

Consistent with the role of the RAPs specified in the OEH 2010 Consultation Requirements for Proponents, Santos sought information on places of cultural significance known to RAPs. No specific information was forthcoming at meetings, subsequent consultation or in submissions. However, some general observations with regard cultural values were made (see Appendix 3). Accordingly, the additional research program will look to clarify and illicit further detailed information relating to these.

#### **5.3.9 Confidentiality Provisions**

It is recognised that the RAPs cannot be treated as a single, homogenous entity with a single set of interests. There is an awareness that cultural heritage information, notably the knowledge of sites by enculturated members of the claim group, is not something that ever was or should necessarily be available to a person. Access was associated with membership of sodalities created through age, initiation status and gender. Experience and success or talent in certain areas also was a factor in access to cultural information. Individuals and parties may be unwilling to release such data where they have legitimate concerns that it might enter the public domain or that others, who are not currently enculturated, may have access to the data and potentially either misrepresent their own level of knowledge and understanding to the potential detriment of the knowledge holders.

These concerns will be addressed in two ways. Firstly, all data will be subject to the confidentiality provisions of the CHMP which specifically provide that access constraints informed by cultural protocols and individual requirements must be developed for all cultural information that is not already in the public domain. Secondly, informed by these provisions and specific requirements, use will be made of GIS technology to partition data and to impose controls and limits on who can access such information, and for what purposes. The CHMP makes express provision in relation to this matter.

#### **5.3.10 Enhanced Survey Processes**

New systems have been developed for the examination of areas where it is proposed to undertake works. All future work will adopt these processes in fieldwork and management programs associated with a Pre-Clearance Surveys. These systems include the following components:

- all ground disturbing works will be subject of Pre-Clearance Surveys prior to ground disturbing works being initiated;

- the measures to be adopted will be stipulated in a brief developed for individual work programs or blocks of work programs;
- fieldwork associated with the Pre-Clearance Surveys will be designed prior to entry into the field to ensure a systematic and comprehensive examination is made of the area to be subject of investigation;
- the system will involve the use of differential GPS to provide highly accurate locational information;
- all data generated by each Pre-Clearance Surveys will be entered in the Aboriginal cultural heritage register and included in a custom-built GIS for ease of use in subsequent management programs and revision of sensitivity mapping, development of cultural heritage zoning scheme and so on; and
- management strategies will be predicated on application of the Avoidance and Precautionary Principles and other relevant elements of the general management program specified above.

These systems have been trialled at Dewhurst-Bibblewindi and Leewood and have been demonstrated to be effective in yielding high quality data and allowing the Avoidance and Precautionary Principles to be applied.

#### **5.3.11 Management of Proposed Work Programs**

The development of this gas field is likely to extend over a period of approximately 25 years. It will be undertaken to the greatest extent possible on the basis of the Avoidance Principle. Further, noting the issues raised in the audit and verification programs, there will be no reliance on existing raw data sets, but rather a program of on-going Pre-Clearance Surveys will be undertaken of each area to be subject of development where a comprehensive survey or clearance has not already been undertaken. It is also intended that each Pre-Clearance Surveys will be undertaken with the participation of the RAPs in line with provisions of the CHMP. The challenge in this approach is to maintain a clearly auditable trail of actions and outcomes, in which areas they were applied, and the logistical arrangements that pertained.

The response to these challenges will be to develop a work notice and brief for each work program or block of work programs. The brief will be developed in accordance with processes specified in the CHMP subject to consultation with the RAPs as required under consistent conditions pertaining to the Project. The brief will make express reference to the Avoidance Principle. Where avoidance is not possible, then Santos will, consistent with the Avoidance Principle and its application to particular site types as enunciated above, engage with the RAPs, consistent with the requirements of consultation requirements and consistent conditions, to settle specific management requirements for sites in the relevant area. The management requirements will be developed in line with consent conditions and the significance described earlier in this report.

#### **5.3.12 Commitment to all Regulatory Requirements**

In the conduct of all field investigations as well as the development and implementation of management programs a commitment is made to refer to the following regulations and apply them as required:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a); and
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b)

There is awareness that an Aboriginal Site Impact Recording Form must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted. Santos commits to complying with this requirement.

There is awareness that under Section 89A of the *National Parks and Wildlife Act* 1974, it is an offence for a person not to notify DECCW (now OEH) of the location of an Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). Accordingly, an AHIMS Site Recording Form will be completed and submitted to the AHIMS Registrar for each Aboriginal site found during investigations.

#### **5.3.13 Response to Legislative Change**

A process responsive to legislative change is seen as essential to effectively addressing management needs over the life of the project. Accordingly, where there emerge new opportunities or approaches, or as otherwise stipulated in amendments to legislation or in new legislation, the CHMP will be amended accordingly. This will be undertaken in line with in the CHMP provisions that allow variation and amendment in such circumstances.

#### **5.3.14 Capacity Building**

Commitment will be made to providing leadership in, and resources for, the creation of structures that offer ongoing opportunity to RAPs to participate in land management projects in the region, as well as manage cultural heritage data arising from this project. This will be done through capacity building and training in the use of technology such as GIS and GPS, and the provision of relevant data subject to confidentiality provisions of the CHMP, that will assist in the management of data and engagement more generally in land management processes in the region.

### **5.4 Impact on Cultural Values**

#### **5.4.1 Identification of Impacts**

In addition to potential impact on Aboriginal cultural heritage sites, the project could have an impact on a range of Aboriginal cultural heritage values associated with the Project Area.

In the course of the assessment, including the consultation program with RAPs, it has been identified that parties have suggested the Project could impact on Aboriginal cultural values that include:

- general loss of access to land;
- loss of access to traditional resources including both plants and animals;
- a diminution of the ability to pass on traditional knowledge about cultural heritage sites and resources;
- further loss of important cultural heritage sites valued by the Aboriginal community (cf see above);
- general impacts in relation to particular locations that the Aboriginal community may visit due for recreational, educational or aesthetic reasons;
- further loss of opportunity to maintain of community and family association with the Pilliga forests area; and
- impact on cultural values associated with water through contamination of aquifers.

In this context the following should be noted. Firstly, some of these impacts often already exist or have been in play for many years to some extent, and would not arise solely from this Project. Among other things, they stem in part from historic or current land use practices or from provisions of legislation that inhibits Aboriginal access to and use of land. Impact from the project may increase the overall impact but should not necessarily be seen as a new form of impact that has not previously occurred in this region. Secondly, Santos will not necessarily purchase the properties on which infrastructure will be established. As a consequence of this it will be unable to grant access to land which it does not own – thus the *status quo* pertaining to land access and use will remain. The continuation of this situation can, however, be addressed in some measure by application of an offsets program wherein certain cultural values are identified in the course of a broader natural environmental management program and provision is made for these cultural values in the design of this program. This opportunity is discussed in further detail in the management sections of this report below.

Before looking at proposed management programs that will offsets, we consider in more detail the specific impacts noted above and provide observations on long-term consequences.

#### **5.4.2 Commentary on Impacts**

##### *General Loss of Access to Land*

General loss of access could result from the following:

- installation of gas production facilities such well pads and compressor stations; and
- construction of Project-related infrastructure such as roads, flowlines, dams.

Of the 95,000ha constituting the Project Area, the total site disturbance will be up approximately 1% of that area. In terms of available land resources, the Pilliga Forest has a total area of approximately 500,000ha. The proposed 1,000ha disturbance area represents approximately 0.2% of the total forest area. All of the remaining forest areas will continue to be able to be accessed subject only to conditions that are imposed by regulatory agencies or landholders. Some of the project facilities and infrastructure will be situated on private land. In such cases where access was not available in any case there will be no additional loss of access. In this regard, freehold land constitutes approximately 39% of the Project Area. Access to such land always was and will remain at the discretion of the land owner and likely offered restricted access.

It also should be noted that the Project will be staged and certain production facilities and non-fixed infrastructure will come into use and then be retired at different stages of the project's life. For instance, use will be made of the partial rehabilitation technique. With regard to two major elements of project infrastructure, well pads and linear infrastructure such as flowlines this will be applied as follows. Well pads will be approximately 1ha in size and approximately 50% of this will be rehabilitated while the well remains operational. At the end of completion of the project all wells will be decommissioned and fully rehabilitated. Linear infrastructure will be on average 10m wide, with half of this width partially rehabilitated while the project remains operational. Topsoil will be applied following construction, native vegetation will be encouraged, but overstory trees (inconsistent with buried pipes) will be removed. The linear infrastructure will be fully decommissioned and rehabilitated at the conclusion of the project.

Thus, while the total impact of the Project will affect approximately 1,000ha over the life of the Project, at one particular stage of the Project the impact will be significantly less than this and rapidly rehabilitated. Questions of access to land are also addressed by the proposed offsets program – see below.

##### *Loss of Access to Traditional Resources including both Plants and Animals*

The Project could result in the loss of access to traditional resources in areas where specific project elements require the implementation of Work Place Safety plans that quarantine such areas from access. It could also occur as a result of clearing activities associated with the Project.

In relation to this the following points should be borne in mind. Over the 95,000 ha Project Area, the total site disturbance will be up to 1% or approximately 1,000ha. In terms of available resources, the Pilliga Forest has a total area of around 500,000ha. The proposed 1,000ha disturbance area represents around 0.2% of the total forest area. The following statistics should also be noted in this regard:

- 56% of the Project Area is currently State Forest and will remain so irrespective of this Project;
- 75% is currently native vegetation;
- 10% is derived native grassland;
- 14% is agriculture (cropping, improved pasture or areas of previous pasture improvement); and
- 1% other (including cleared, creek beds and dams).

All of the remaining forest areas will continue to be able to be accessed subject only to conditions that might be imposed by a regulatory agency. Once the life of the well or other non-fixed infrastructure has expired, the area will be rehabilitated to its original use and other work place conditions will no longer apply.

The Project will, for the life of the Project, result in some increase of partitioning of the landscape particularly through additional roads and access tracks. This may have some effect on viability of floral and faunal populations in those areas in the short to medium term. However increased impact arising from this will be greatly decreased by use being made wherever possible of existing roads and tracks.

There is considered to be a limited loss of access to traditional resources including plants and animals as a result of the Project. Use of an area will be suppressed in the short to medium term with the area rehabilitated at the end of the project. Plant communities once associated with that area will be re-established by rehabilitation and subject to suitable corridors existing wildlife will also return. Access would be reinstated to levels previously available. Questions of access to land and its use for traditional purposes are also addressed by the proposed offsets program – see below.

#### *Diminution of the Ability to Pass on Traditional Knowledge of Cultural Heritage Sites and Resources*

The general loss of access and, in particular, loss of access to traditional resources could result in a diminution of the ability to pass on traditional knowledge.

In the Project Area, for reasons described above, this will only be to a level where loss of access is greater than is currently the case. In circumstances where loss of access is greater than is currently the case this will only be for the life of the Project and access will be reinstated thereafter to levels previously available.

This issue also is addressed further in the assessment of impacts on cultural heritage sites. The proposed offsets program also directly addresses this issue.

#### *Further Loss of Important Cultural Heritage Sites Valued by the Aboriginal Community*

The Project could result in an impact of this kind through the destruction of Aboriginal cultural heritage sites in the course of establishing production facilities and infrastructure. Application of the Avoidance Principle as enunciated and implementation of a comprehensive management program as described above means that this will be restricted to some instances involving only

isolated stone artefacts, non-complex stone artefact scatters, non-complex shell middens where these cannot be avoided and for hearths or ovens identified during construction. These sites are of variable significance and management measures implemented will be first settled with the RAPs as provided for in the CHMP.

*General Impacts in Relation to Particular Locations that the Aboriginal Community may visit for Recreational, Educational or Aesthetic Reasons*

This impact could result from a loss of general access. For reasons noted above access to such locations will be only a short to medium term possibility, and alternative access arrangements may be available in any case.

There will be no direct impact on the locations themselves as these will be treated as Category 1 social values and subject to the Avoidance Principle applying to Recent Historic and Contact Sites (i.e. complete avoidance). Suitable curtilage to protect these values will also be agreed.

*Further Loss of Opportunity to Maintain Community and Family Association with the Pilliga Forest Area*

This impact may result as a consequence of all the above impacts operating either in isolation or in tandem. As noted, in some cases there will either be no or limited impacts. In other cases such as general land access, the impact will only be in the short to medium term and will be staggered in any case. Aboriginal communities will still have high levels of access to the Pilliga forest, similar to that which they currently enjoy. On conclusion of the Project the full suite of opportunities that currently exist will be again be available.

Santos is committed to promoting the Aboriginal communities' connection to the Pilliga forest area and has separately, through its social benefits programs, set in place additional measures to address this issue.

*Impact on Cultural Values Associated with Water through Contamination of Aquifers.*

This impact could include effects on water quality generally, noting its importance to the region as a whole, and on water in aquifers that has particular cultural values by its association with a creator being such as the rainbow serpent. CQCHM (2005) has considered these values in more detail in the context of the Great Artesian Basin. The impact would arise where there was contamination of the aquifer by the Project or the Project had an adverse effect on the availability or quality of water.

It expressly noted that the Project does not currently intend to use hydraulic fracture stimulation. Additionally, there are strict requirements to monitor water quality and water monitoring bores have been established for this purpose. The results of this monitoring program will be publically available. It is also noted that all wells will be constructed in compliance with the Well Integrity Code. All ponds are constructed to best practice with double liners and return systems. Together, these measures minimise the risk of contamination of aquifers.

## **5.5 Management of Aboriginal Cultural Values**

### **5.5.1 Introductory Comments**

There are a broad range of Aboriginal cultural values for the Project Area than those that can be characterised as Aboriginal cultural heritage sites. While it is important to effectively manage Aboriginal cultural heritage sites it is also accepted that this broader suite of Aboriginal cultural values also must be appropriately managed.

Various questions intrude in the management of these broader Aboriginal cultural values. These questions include:

- what do these values include?;
- to what extent do they have a distinct geographical referent?; and
- to what extent can they be captured within the parameters of a single management strategy aimed at minimising the impacts of a particular project?

The answers to these questions are critical to the design of a comprehensive Aboriginal cultural heritage management program.

The cultural values identified in this study can be allocated to one of three broad categories. Only some of them fall within the parameters of a comprehensive Aboriginal cultural heritage management strategy. The three social value categories are:

- Aboriginal Cultural Values Category 1 are those that have a direct cultural heritage value and to which a specific geographical referent can be allocated;
- Aboriginal Cultural Values Category 2 have a distinctly cultural value that can be managed for their cultural value but a specific geographical referent may not be available or is so broad as to be meaningless. These may be better managed within the sphere of general ecological values management that also make provision for specific Aboriginal involvement in the management program; and
- Aboriginal Cultural Values Category 3 are general in nature and lie firmly within the sphere of general social and community engagement while having a distinctly Aboriginal aspect.

#### 5.5.2 Management of Categories of Cultural Values

Aboriginal Cultural Values Category 1 include places, whether they be of anthropological, traditional, historical or contemporary value, to which a defined geographical referent can be ascribed. This could include places associated with creator beings or other spiritual entities, nodes on a dreaming where certain events took place (and these might be mentioned in traditional myths or song), **particular** places where important traditional practices occurred (e.g. initiation rites or births), **particular** places where important historical events occurred (camps, graves or specific work locations) – these, of course, are places, that by virtue of the broad definition of Aboriginal cultural heritage sites provided above would be protected as part of the Aboriginal heritage site program. But it also includes **particular** locations to which people went (or now go) to procure certain medicinal or useful resources or that are of **particular** aesthetic note or **particular** places that people visit for recreational or educational purposes. By virtue of the fact that all these **particular** locations can be explicitly defined and geospatial data delineated by suitably enculturated or knowledgeable individuals, they can be managed by application of the Avoidance Principle as part of a comprehensive Aboriginal cultural heritage management program. The preceding sections assessing site types and management commitments for them deal with this category of sites. For the avoidance of uncertainty, places that meet the criteria above will form part of the suite of sites to be investigated as part of the Additional Research Program.

Aboriginal Cultural Values Category 2 include a range of primary values and contingent interests linked in large measure to the Project Area's ethnobotanical and ethnofaunal cultural values. There are a range of plants and animals that are of primary value to Aboriginal people because they provide important resources in the form of food, medicine or because they were traditionally significant (e.g. as totemic emblems). However, in the context of this Project they are not necessarily easily managed as individual items or locations in the way that can be done for a **particular** cultural place. However, these values can be managed as part of a broader environmental management program. This can be done in two ways. First, **particular** locations where concentrations of ethnobotanical or ethnofaunal resources are known to occur can be

protected as an element of Aboriginal Cultural Values Category 1 discussed above. Second, it can be done through the use of offsets, where the long-term viability of these values can be guaranteed in perpetuity. This has the value of ensuring that the item of value is protected within its general environmental setting rather than as an isolated example or in circumstances where loss of that environmental setting would diminish the long term viability of the item of value. It also offers other opportunities. For instance, where done with due attention being given to contingent cultural values in the overall management regime it also offers opportunities to ensure the continued practice of those contingent values. For instance, it may not be possible because of tenure issues or for other reasons to allow hunting or collection of an important cultural resource, or the education of the younger generation about the methods by which those resources are harvested and used or of their traditional importance, in one setting. But these contingent values may be possible in an offset area which has been explicitly designed to protect the primary cultural values and make provision for the practice of the contingent cultural values.

Aboriginal Cultural Values Category 3 include those more general and possibly esoteric values that are neither easily addressed as part of a comprehensive Aboriginal cultural heritage management program nor able to be captured through application of an environmental management regime using offsets. For instance, while it may be possible to protect a **particular** location that is of aesthetic or recreational value (where of course such places have a geographical referent) as places of contemporary cultural value, it is not possible to so manage an attitude that the entire area has a general, ill-defined aesthetic value. Nor, while recognising that people may value their previous employment or residence in an area, and while specific places associated with this can be protected, programs to provide employment or residence within that area do not fall within the parameters of a cultural heritage management strategy as such. It is Santos' view that the management of these falls, for example, to programs associated with social and community engagement, where issues of employment and housing can be addressed. All cultural values identified will be managed in line with this model. Relevant sectors within Santos and those involved in preparation of the EIS will be suitably briefed to capture and respond Aboriginal Cultural Values Category 3 with appropriate management strategies.

### **5.5.3 Commentary on Offsets**

Having dealt with Aboriginal Cultural Values Category 1 as part of the cultural heritage sites management program and noting that Aboriginal Cultural Values will be managed under provisions of other programs some additional commentary concerning Aboriginal Cultural Values Category 2 is warranted.

Offsets seek to offset (rather than compensate) a particular impact. They offer opportunities to implement best practice management in other locations and providing tangible positive outcomes for future generations. This concept has gained some traction in relation to the management of cultural heritage in the context of development-related projects. Beck and Bartel (2011) provide a useful summary of examples and issues relating to the use of offsets in relation to cultural heritage management and offer the following as definition of offsets in this context:

Aboriginal Cultural Heritage offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse heritage impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of heritage offsets is to achieve no net loss and preferably a net gain of conserved cultural heritage on the ground with respect to conserved archaeological site composition and diversity, cultural landscape structure, and people's

use, history, and cultural (social, spiritual & (sic) aesthetic) values associated with heritage.’ (Beck and Bartel 2011: 79):

They further note (Beck and Bartel 2011: 82):

Aboriginal Cultural Heritage should not be offered any less protection than that currently offered to biodiversity.

It is noted that Aboriginal cultural heritage is infungible in nature. Consequently, the notion of ‘like for like’ as a core principle of an offset program may not be possible: is one cultural heritage site really exactly the same as another? This is less an issue in relation to offsets aimed at securing the existence of, and subsequent access to, and use of, areas that contain certain culturally-valued plant and animal resources. But it is an issue in relation to other types of cultural sites. Accordingly, it would be necessary to ensure that the offset was seen as a new conservation gain. This would need to be done on advice from the RAPs in line with provisions of CHMP.

A cultural values offsets program could be linked to an acquisition program for biodiversity offsets so these two interests (Aboriginal cultural heritage and biodiversity) could both be accommodated. But several complications intrude at this point.

Under existing bio-banking arrangements in NSW it is more likely that Santos would, in meeting biodiversity targets, make financial contribution to a fund managed by others rather than acquire land itself. In this circumstance it could make reasonable arguments to the agency responsible for management both of the fund and the areas in question that it should:

- include the Aboriginal cultural heritage values (including cultural heritage sites) within the suite of data that would be considered in assessing the relative merits of one area over another;
- ensure that Aboriginal parties were guaranteed involvement in the management of that area;
- guarantee that Aboriginal parties would have access to the area for the purposes of hunting, harvesting or collecting resources from that area, or otherwise using it for educational purposes and that ancillary cultural activities such as burning programs to ensure the continued viability of the area for these cultural purposes would be allowed; and
- guarantee that the management regime would not impair other Aboriginal cultural values of the area.

Further to these points the need for ‘local’ offsets also requires recognition. While the term ‘local’ is difficult to define, there needs to be reasonable geographical alignment between any area that may be impacted and the area where the offset is acquired. This is particularly so where the land is acquired as part of a bio-banking arrangement under the control of agency other than Santos.

But can Santos guarantee that such an outcome would be possible? The regulatory agency might insist that the sole purpose of a biodiversity offset program is just that. Even if conceded the issues of competing management interests, hierarchies and power imbalances that can arise from competing interests and interest groups must be factored in. For instance, the mediation of an interest to hunt and gather traditional foods set against a determination to maintain biodiversity by preventing activities of these kinds, or preventing an ancillary activity (e.g. burning) central to ensuring that there is a viable population because it threatens other biodiversity values brings these questions into stark relief. Similarly, where certain types of sites exist, the apparent opportunity for archaeological research in an offset area may well conflict

with the interest of the Aboriginal community to preserve sites in perpetuity as the ‘footprints of their old people’ in the landscape. As Beck and Bartel (2011: 45) observe in this regard:

There are additional complexities such as determining what might be meant by ‘the public good’. Who is ‘the public’? Is it mainstream Australia or Aboriginal Australia? This brings into play wider questions related to the meaning of heritage, such as who owns it, who is defining it for whom?, together with questions regarding rights and responsibilities, and the significance and role of heritage practices within a pluralistic social democracy (sic).

As a consequence of circumstances where an offsets program designed primarily as part of biodiversity maintenance exercise might not adequately address the cultural interest of the Aboriginal parties:

- it may well be necessary to establish an offsets program for Aboriginal cultural heritage separate to biodiversity program established or funded by the Project; and
- in development of the offsets program, the relevant Aboriginal community, and the interests it holds, need to be privileged over that of other interest groups in relation to the management of Aboriginal cultural heritage sites and values.

Further, and returning to the issue of ‘like for like’. This may be possible in some measure but in other cases it is unachievable. If the cultural values offsets program was to include places or values other than those associated with culturally valued plants and animals there would be a need to develop this in consultation (and as appropriate through negotiation) with the relevant Aboriginal community, a broader offsets program that enhances conservation outcomes. Through use of funds provided for the management of the offsets program this might include such elements as resourcing for ongoing site management within the region, interpretive material, educational material, and acquisition of land where important cultural sites exist that are not attracting management support from regulatory agencies or so on.

Governance structures for land acquired expressly for its Aboriginal cultural values also should afford opportunity for the relevant Aboriginal community to assume direct authority for the management of that area, preferably through ownership. Offset areas so acquired would need to be subject to a covenant to preserve in perpetuity the values for which it has been acquired. Resources to develop and implement management plans under their authority also would need to be secured in some way.

#### **5.5.4 Management of Aboriginal Cultural Values Category 2 and Contingent Interests**

Details of the management process where the cultural values (and noting, for the removal of all doubt, that this includes culturally important plants) can be managed as part of the Aboriginal cultural sites management program have been provided. Where Aboriginal cultural values category 2 (with these principally but not exclusively consisting of ethnobotanical and ethnofaunal cultural values – see for instance, section 4.5.7 of this report) are to be managed as part of an offsets program Santos will implement the following program:

Cultural values will be linked to the land acquisition program for the Project biodiversity offsets so these two interests (Aboriginal cultural heritage and biodiversity) could both be accommodated.

Santos’ offset strategy will include the following commitments:

- the Aboriginal cultural heritage values (including cultural heritage sites) will be included within the suite of data that would be considered in assessing the relative merits of one are over another;

- it will ensure that Aboriginal parties are guaranteed involvement in the management of that area;
- it will guarantee that Aboriginal parties have access to the area for the purposes of hunting, harvesting or collecting resources from that area, or otherwise using it for educational purposes and that ancillary cultural activities such as burning programs to ensure the continued viability of the area for these cultural purposes would be allowed;
- it will guarantee that the management regime would not impair other Aboriginal cultural values of the area;
- it will prioritise this program in relation to Aboriginal owned land. The inclusion of Aboriginal owned land in the Project offsets would not only address the points above, it would also provide a budget for resource management to the owner of that land; and
- offset areas so acquired would need to be subject to a suitable covenant to preserve in perpetuity the values for which it has been identified.

If tension were to arise between management for biodiversity values and management for cultural values it would be resolved in the management plan for the area by giving effect to the above conditions.

Governance structures for land acquired expressly for its Aboriginal cultural values also will afford opportunity for the relevant Aboriginal community to assume direct authority for the management of that area, preferably through ownership. Resources to develop and implement management plans under their authority also will be negotiated.

## 5.6 Cultural Heritage Management Plan and Additional Management Tools

A Cultural Heritage Management Plan (CHMP) will be developed to guide the implementation of the mitigation measures. The CHMP has been developed in consultation with the RAPs. It will specify the procedures by which effect will be given to the management program in sections 5.1, 5.2, 5.3, 5.5.2 (Aboriginal Cultural Values Category 1) and 5.5.4 of this report.

The CHMP will provide for implementation of the following:

- all elements of the Aboriginal Cultural Heritage Management Program specified in section 5.2 of this report;

For the sake of clarity the CHMP will, as a minimum, provide for:

- implementation of the Avoidance Principle and commitment to apply the Precautionary Principle enunciated in this report;
- a definition of Aboriginal cultural heritage as enunciated in this report;
- pre-Clearance Surveys to be undertaken prior to all ground-disturbing activities in line with provisions of the CHMP;
- establishment of an Aboriginal Cultural Heritage Sites Register to be used for the purposes specified in this report;
- the sensitivity modelling included in this report to be included in the CHMP, and zoning scheme to be developed consistent with the purposes and issues noted in this report
- the sensitivity model is to be subject of review at least every five years and revised as necessary with that revised version to be included within the CHMP;
- continuation of the Site Verification Program;
- an Additional Research Program on places of traditional, anthropological, historical and contemporary significance in line with the provisions of this report;
- confidentiality provisions relating to all new Aboriginal cultural heritage information;
- management of field surveys using at least the enhanced survey procedures specified in this report;

- management of proposed work programs through use of a brief process outlined earlier with this providing for participation of RAPs in pre-clearance surveys in line with provisions of CHMP;
- the significance of impacts and appropriate management response to be determined by the Aboriginal community (being representatives of Gomeroi Native Title Applicant and the relevant LALC) to be determined in discussion with the proponent;
- commitment to meet all Regulatory Requirements;
- capacity to review and amend the CHMP, and for this to be possible in circumstances where legislative change or amendment warrants this;
- commitment to build the capacity of the Aboriginal parties to manage cultural heritage data using GIS and GPS systems and to participate in regional land management processes through this increased capacity;
- procedures to manage contingencies including chance finds of human skeletal remains and other Aboriginal cultural heritage;
- provisions to independently manage disputes between Santos and RAPs, including use of a graduated response to dispute and expert determination of technical matters pertaining to Aboriginal cultural heritage management; and
- a requirement to report on the implementation of the CHMP to OEH every year on the anniversary of the date of commencement of the CHMP.

All management commitments made in the CHMP for the management of Aboriginal cultural heritage are to be included in a comprehensive Field Development Protocol which will set out the detailed environmental criteria and locational principles that are being used during the project for selecting the specific location of infrastructure within the Project Area.

## **5.7 Management Measures: Project as a Benefit**

We note that over the last 25 years, approximately 25,000 hectares of land has been subject of major development activity, resulting in the heightened concerns of the Aboriginal community about the loss of cultural sites, culturally important resources and associated opportunities to access these places and to educate the younger generation. Through the implementation of the comprehensive management program for Aboriginal cultural heritage outlined above, the current project categorically guarantees the protection of many site types, adoption of the Avoidance and Precautionary Principles to minimise risk, provides opportunities for the protection of resources as well as access to them, provides for the direct participation of the Aboriginal community in the design and implementation of work programs by which cultural sites will be identified and managed and will result in greatly improved databases on cultural heritage sites and cultural values. Further, the program will take account of a range of sites and values that have previously not been central to programs ostensibly aimed at management of Aboriginal cultural heritage sites and cultural values. This in the context of a program that, as envisaged, will result in the clearance of approximately 1% of the Project Area (approximately 1,000 hectares) over a period of 25 years. This represents a significant opportunity to the community that previously has not been available to it. It is further noted that the possibility of developments in technology will further reduce this footprint – an advantage of the staged development of the project. In this sense, the proposed project represents a distinct opportunity that has otherwise not been afforded to the Aboriginal community of this region.

## **5.8 Management of Inter-generational Equity**

There is a widespread understanding that there is a need to provide for inter-generational equity. In relation to this project there are three distinct ways in which it will address this issue:

- the long term and staged approach to development of the project;
- settlement of native title agreement under s31 and development of other programs delivering a broad package of benefits that will extend over the life of the project and beyond; and
- the application of an offsets program.

### **5.8.1 Long Term, Staged Approach**

The project as currently conceived will be developed over a period of 25 years, and could run longer subject to reserves and commercial feasibility. Unlike a mine, where there is a particular reserve in a fixed location where disturbance must occur and where typically all (or the greater majority of) cultural heritage sites and values are identified and managed in advance of project development, the gas field offers far greater flexibility in design with this occurring over an extended period of time. Consequently, it is unnecessary for all management decisions, which can result in unalterable impacts on the cultural heritage landscape, to be made and implemented in advance of development. The staged nature of the project and the linkage of cultural heritage management processes to this will allow parties to take full opportunity of changed technologies with smaller impact footprints as they emerge. It also provides a situation in which the current generation is not required to make decisions that prevent subsequent generations from assessing issues and making decisions in light of these innovations.

### **5.8.2 Cultural Heritage Offsets**

Where avoidance is impossible, it will be necessary to consider management options. While mitigation/salvage is one option, it has limited capacity to deliver inter-generational equity. Other options that do address inter-generational equity include the use of offsets. Where an offset results in the delivery of what is called 'additionality' – that is they make a new contribution to conservation that otherwise would not result – and that additionality can be ensured in perpetuity then inter-generational equity can result. The Project has developed a program to ensure that such offsets are available to the Aboriginal parties.

We also note that additionality is also achieved in relation to land access. With the guarantee of access to biodiversity offset areas and reinstatement of existing land access the Project will, through the offsets program, provide for access to land additional to that which can currently be accessed.

## 6. Conclusion

The assessment has found:

- the project has the potential, to varying degrees, to impact on Aboriginal cultural heritage sites;
- a total of 90 sites are currently known in the Project Area. Using buffered extents, these cover approximately 0.010% of the Project Area. Even a doubling of this area would mean that only 0.02% of the Project Area contains cultural sites. Noting this and the fact that the project will only affect 1% of the Project Area, the likelihood of impacts is considered generally low;
- the assessment demonstrates that the project has the potential to impact on at least 16 categories of cultural heritage sites;
- the project could impact on areas that currently are zoned as being of very high, high and moderate cultural sensitivity;
- these cultural heritage sites are of significance for a range of reasons, with social and scientific significance both featuring;
- the assessment further demonstrates that there are likely to be more sites than those currently recorded within the Project Area;
- the assessment similarly shows that the data available on sites currently known is constrained in various ways (but the assessment also shows that these constraints can be rectified);
- all elements of the project (including but not limited to the gas field, central processing facility, project-associated infrastructure such as in-field compression and staff facilities, infrastructure corridor and other supporting infrastructure) could affect cultural heritage sites and
- impacts on cultural heritage sites would most likely to occur during the exploration and construction phases of the project when physical works occur in specified locations.

The assessment, including through the consultation program with RAPs, has also identified a range of Aboriginal Cultural Values that could, to varying degrees, be impacted. These include:

- general loss of access to land;
- loss of access to traditional resources including both plants and animals;
- a diminution of the ability to pass on traditional knowledge about cultural heritage sites and resources;
- further loss of important cultural heritage sites valued by the Aboriginal community (but see above);
- general impacts in relation to particular locations that the Aboriginal community may visit due for recreational, educational or aesthetic reasons;
- further loss of opportunity to maintain community and family association with the Pilliga forests area; and
- impact on cultural values associated with water through contamination of aquifers.

The assessment has concluded that by application of the Avoidance Principle there would be no impact on cultural heritage sites that have been assessed of high significance. It has determined that there would only be an impact on four categories of sites (these being isolated stone artefacts, non-complex stone artefact scatters, non-complex shell middens and hearths or ovens identified during construction) and only after attempts have been made to apply the Avoidance Principle. The assessment concluded that a management approach based on the

Avoidance Principle as enunciated in this report is feasible. It is feasible if a comprehensive and integrated management program as described in this report is implemented.

The assessment concluded that in relation to Aboriginal Cultural Values the impact of the Project would either be non-existent for some, minimal for others, and only operate in the short to medium term to the extent that there is an impact for others. Moreover, the short to medium term impacts on social values can be managed by use of an offsets program. This offsets program delivers new conservation opportunities and provides for direct Aboriginal involvement in management of offset areas. In certain circumstances it could provide for ownership of those areas.

Development and application of such a comprehensive and integrated management program presents an opportunity to implement a best practice regime.

Components of the program of engagement with the Aboriginal community of this area offer capacity to provide for inter-generational equity. This includes a cultural heritage program that is staged over the course of 25 years and provides flexibility to respond to changing technological developments, community expectations and values (in part expressed through legislative amendment or change).

Use of a Cultural Heritage Management Plan (CHMP) allows the above principles and commitments to be formally specified and audited. Inclusion of processes of audit and review allow transparency so that other parties can independently assess implementation of the management program. Measures to review, refine or amend the management program to ensure continued efficacy of the management program have been recommended and will be incorporated in the CHMP.

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# Appendix 1

## **RAP CONSULTATION MATERIALS**

Date	OEH Stage	Material	Location in Appendix	Consultation Summary
April 2014	Consultation stage 1 - Identification of RAPs	Copy of letter dated 8 April 2014 to Peak Bodies with copy of distribution list  Copy of newspaper notice calling for registration as RAPs	1a	Notification of project and seeking registration interest (seeking RAPs) – on 8 April 2014 newspaper advertisement and letters to organisations as required by the consultation policy
September 2014	Consultation stages 2 and 3	Copy of letter dated 13 August 2014 sent to all RAPs for meetings scheduled for 2-4 September 2014.  Copy of letter dated 5 September 2014 for follow up meetings – letter mentions site tours being conducted on 14 and 17 September	1b	<p>Presentation of information about the proposed project, and gathering information about cultural significance including presentation of proposed methodology for the cultural heritage assessment.</p> <p>Meetings with RAPs 2, 3 and 4 September 2014, in Wee Waa, Narrabri and Gunnedah respectively</p> <ul style="list-style-type: none"> <li>- The RAPs were provided with a copy of the Preliminary Environmental Assessment for the project and a copy of all the presentation material</li> <li>- Presentation included various technical experts – information about the project and Santos, the project and the Pilliga, drilling and gas wells, geology and groundwater</li> <li>- Presentation on the proposed cultural heritage assessment methodology</li> <li>- RAPs that did not attend were mailed all of the material provided at the meeting</li> <li>- A field tour of the project area and CSG infrastructure was also offered</li> </ul> <p>Following consultation with RAPs at September meetings, follow up meetings were organised to provide a forum to discuss issues or questions about the information provided and for RAPs to provide information on cultural values or sites – three such were organised on 15, 16 and 17 September in Gunnedah, Wee Waa and Narrabri respectively</p>

Date	OEH Stage	Material	Location in Appendix	Consultation Summary
November 2014	Consultation stage 4	<p>Copy of letter dated 10 November 2014 sent to all RAPs for meeting scheduled for 18 November 2014. (In response to request by RAPs for a single meeting the meeting scheduled for Narrabri).</p> <p>Copy of letter dated 28 November 2014 sent to all RAPs for meeting scheduled for 9-10 December 2014.</p>	1c	<p>Review of draft cultural heritage assessment report and draft cultural heritage management plan.</p> <p>Meeting with RAPs 18 November 2014 in Narrabri. At request of RAPs there was one meeting for all RAPs with buses provided from Gunnedah and Wee Waa.</p> <ul style="list-style-type: none"> <li>- The RAPs were provided with the draft Aboriginal Cultural Heritage Assessment Report and draft Cultural Heritage Management Plan for comment</li> <li>- Presentations on both draft documents, and the RAPs were provided with a copy of all the presentation material</li> <li>- RAPs that did not attend were mailed all of the material provided at the meeting</li> <li>- A field tour of the project area and CSG infrastructure was also offered</li> </ul> <p>Date for submission of written and oral responses provided in letter.</p> <p>Following consultation with RAPs additional meetings held on 9 December 2014 in Wee Waa and Narrabri, and 10 December 2014 in Gunnedah.</p>

Additional information concerning consultation and copies of material tabled at consultation meetings and provided to RAPs can be found at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=6456](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6456)

## Appendix 1a

Santos Ltd  
ABN 80 007 550 923  
125 Maitland Street  
Narrabri NSW 2390  
Telephone: 61 2 6792 9038



8 April 2014  
<<NAME>>  
<<ADDRESS>>

Dear <<NAME>>

Santos is proposing to develop natural gas from coal seams in the Gunnedah Basin in New South Wales (NSW). The Narrabri Gas Project (NGP) seeks to develop a gas field with production and appraisal wells, gas and water gathering systems and supporting infrastructure southwest of Narrabri, NSW. Please see attached map of the project area, and refer to the Preliminary Environmental Assessment on the Department of Planning and Infrastructure website ([http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=6456](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6456)).

As part of the NGP, Santos Ltd will be commissioning cultural heritage investigations within the project area.

Santos seeks to work in partnership with Aboriginal organisations and individuals and the Office of Environment and Heritage (NSW) consultation policy stipulates that the advice of your organisation in this matter should be sought. Accordingly, we are writing to you seeking the names of Aboriginal people who may have an interest in the area of the proposed project and who hold knowledge relevant to determining the cultural significance of any Aboriginal objects and/or places in the vicinity of the project.

We would appreciate your assistance in providing names and contact details for any nominated individuals. On receipt of your advice we will contact any Aboriginal person so nominated to determine whether they wish to register as an Aboriginal party for the purposes of assisting us in this matter.

If you wish to nominate any individuals we would appreciate receiving such advice by COB 5 May 2014. You can do this by sending a written reply to this letter, sending an email to [Cultural.Heritage.Coordinator.NSW@santos.com](mailto:Cultural.Heritage.Coordinator.NSW@santos.com) or calling Krystle Sutherland or Angela Smith at our Narrabri Office on 6792 9038.

Yours faithfully,

A handwritten signature in black ink, consisting of a stylized 'J' and 'B' followed by a horizontal line.

Jon Bok  
Principal Adviser, Stakeholder Engagement

**Distribution list for letter**

CEO, Narrabri Aboriginal Lands Council  
NARRABRI NSW 2390

CEO, Wee Waa Local Aboriginal Lands Council  
WEE WAA NSW 2388

CEO, Red Chief Local Aboriginal Lands Council  
GUNNEDAH NSW 2380

CEO, Baradine Local Aboriginal Lands Council  
BARADINE NSW 2396

CEO, Pilliga Local Aboriginal Lands Council  
PILLIGA NSW 2388

CEO, Coonabarabran Local Aboriginal Lands Council  
COONABARABRAN NSW 2357

CEO, Narrabri Shire Council  
Narrabri NSW 2390

National Native Title Tribunal  
Sydney NSW 2001

NTS Corp  
Strawberry Hills NSW 2012

Local Land Services - North West  
TAMWORTH NSW 2340

CEO, Coonabarabran Local Aboriginal Lands Council  
86-90 John Street  
COONABARABRAN NSW 2357

Office of Environment and Heritage - Dubbo  
Dubbo NSW 2830

The Registrar  
Aboriginal Land Rights Act  
Glebe NSW 2037

# Narrabri Gas Project Cultural Heritage Management Plan

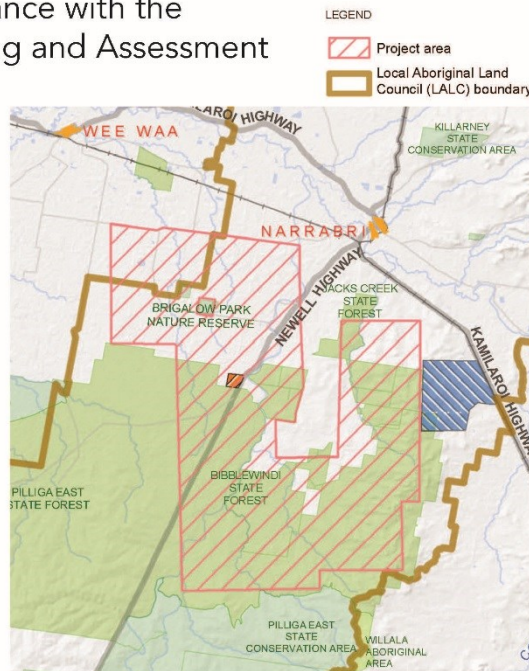
**As a part of Santos' proposed Narrabri Gas Project, cultural heritage assessments will be undertaken throughout the life of the project as the gas field and associated infrastructure develops.**

Santos proposes to develop a cultural heritage assessment framework for the areas to be affected by this project, as part of a Part 4 State Significant Development assessment in accordance with the Environmental Planning and Assessment Act 1979.

The assessment framework will be detailed in an Aboriginal Cultural Heritage Management Plan that will outline how relevant impacts will be managed.

Any Aboriginal person who has an interest in the proposed project area and who holds knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the vicinity of the project may register to assist Santos with this assessment.

To register interest please email  
Cultural.Heritage.Coordinator.NSW@santos.com  
or call Krystle Sutherland or Angela Smith  
at Santos' Narrabri office  
on 6792 9035  
by Monday May 5, 2014.



**Santos**  
We have the energy.

## Appendix 1b

Santos NSW (Eastern)  
A.B.N. 11 009 321 662  
125 Maitland Street  
Narrabri NSW 2390  
PO Box 859  
Narrabri NSW 2390

Phone: 02 6792 9041



13 August 2014

«First\_name» «Last\_name\_»  
«RAP\_Group\_Business\_Name\_Affiliation»  
«Organisation\_Representing\_RAP»  
«Mailing\_Address\_1»  
«Mailing\_Address\_2»  
«Mailing\_Address\_3»

Dear «First\_name»

Thank you for registering as a "Registered Aboriginal Party" (RAP) in relation to the proposed Narrabri Gas Project being undertaken by Santos Ltd.

The period for registrations has now closed and Santos has provided details of those who have registered to the Office of Environment and Heritage and the relevant Local Aboriginal Lands Councils (unless otherwise specified) as we are required to do.

Further to our earlier letter to you, we have reviewed the number and geographic location of those who have registered and considered the best way further consultation can occur. Arrangements have now been made for the presentation of more detailed information about the project and our approach to Aboriginal cultural heritage assessment and management and to seek your feedback.

As the vast majority of RAP's are located in the Wee Waa, Narrabri and Gunnedah regions, I wish to advise that the first round of consultation meetings will take place at the following locations, times and dates.

Location: Wee Waa & District Bowls Club  
Address: 69 Alma Street, Wee Waa NSW 2388  
Time: 4.30 – 7.30pm  
Date: Tuesday 2<sup>nd</sup> September 2014

Location: Crossing Theatre Auditorium  
Address: 117 Tibbereena Street, Narrabri NSW 2390  
Time: 4.30 – 7.30pm  
Date: Wednesday 3<sup>rd</sup> September 2014

Location: Town Hall Gunnedah  
Address: corner Conadilly and Chandos Streets, Gunnedah NSW 2380  
Time: 4.30 – 7.30pm  
Date: Thursday 4<sup>th</sup> September 2014

I hope you will be able to attend as these meetings are important to allow us to present accurate information to you about the project and receive further feedback from you on our approach to Aboriginal Cultural Heritage. Santos wants to work closely with members of the Aboriginal community to develop and implement the best possible Aboriginal Cultural Heritage management program based on the most accurate information possible. Your attendance and participation in these meeting will assist us greatly.

It is also a requirement of NSW legislation, under the "Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010" that the company ensure appropriate consultation occurs with Registered Aboriginal Parties in respect of Aboriginal cultural heritage management.

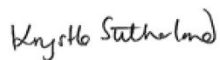
Details of the consultation requirements can be obtained from the NSW Office of Environment and Heritage or downloaded from the following link:  
<http://www.environment.nsw.gov.au/licences/consultation.htm>

Detailed information can also be accessed from the NSW Department of Planning and Environment website via the following link: [http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=6456](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6456)

Thank you for your continued interest in the project. We look forward to talking with you and receiving your input and feedback.

Should you have any questions, please contact Ms Krystle-Lee Sutherland on 02 67929041 or email - [Krystle-Lee.Sutherland@santos.com](mailto:Krystle-Lee.Sutherland@santos.com)

Yours sincerely



**Ms Krystle-Lee Sutherland**

Aboriginal Engagement and Cultural Heritage Coordinator, Energy NSW

Santos NSW (Eastern)  
A.B.N. 11 009 321 662  
125 Maitland Street  
Narrabri NSW 2390  
PO Box 859  
Narrabri NSW 2390

Phone: 02 6792 9041



05 September 2014

Dear Sir/Madam

Thank you for registering as a "Registered Aboriginal Party" (RAP) in relation to the proposed Narrabri Gas Project being undertaken by Santos Ltd.

We have held consultation meetings in Wee Waa, Narrabri and Gunnedah and presented more detailed information about the project. We also presented the proposed methodology for the cultural heritage assessment for comment.

We are now holding follow up meetings in those centres to:

- Give you another opportunity to meet with Santos and our consultants if you could not make it to the first round of RAP meetings;
- Provide a forum if you have issues or questions following the first round of RAP meetings, or questions about the information provided by Santos;
- Give you an opportunity to provide us with information on cultural values or sites relevant to the development of the proposed Narrabri Gas Project;
- Provide you with an opportunity to provide any initial comments on our proposed methodology for the cultural heritage assessment; and
- Assist you in having enough information for you to make submissions on the proposed Narrabri Gas Project Aboriginal Cultural Heritage assessment methodology.

**Submissions are due Monday 6 October 2014.**

You are welcome to attend any time between 3.30pm-7.30pm. Light refreshments will be provided at 4.30pm and 6.30pm.

The details of these meetings are:

**Gunnedah Monday 15th September 2014**

Location: Town Hall Gunnedah

Address: corner Conadilly and Chandos Streets, Gunnedah NSW 2380

Time: 3.30 – 7.30pm

**Wee Waa - Tuesday 16th September 2014**

Location: Wee Waa & District Bowls Club  
Address: 69 Alma Street, Wee Waa NSW 2388  
Time: 3.30 – 7.30pm

**Narrabri - Wednesday 17<sup>th</sup> September 2014**

Location: The Crossing Theatre Auditorium  
Address: 117 Tibbereena Street, Narrabri NSW 2390  
Time: 3.30 – 7.30pm

The proposed format of the meetings will be:

- All the relevant material and staff/consultants will be available for the full four hours; and
- Two break out areas will be set up where culturally sensitive conversations can be undertaken, and relevant cultural information provided.

In addition, we are conducting tours of the project site for RAP's departing Narrabri on Sunday 14<sup>th</sup> September and Wednesday 17<sup>th</sup> September. If you would like to come on one of the tours, please contact me on 02 6792 9041 or email - [Krystle-Lee.Sutherland@santos.com](mailto:Krystle-Lee.Sutherland@santos.com).

Clothing requirements for site tours include:

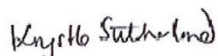
- **Long sleeved cotton shirt** (with sleeves rolled down to the wrist)
- **Long pants/trousers** (whole leg covered to the ankles)
- **Closed-in shoes** (please note that sandals and thongs are not allowed)

Santos will provide personal protective equipment, sunscreen, drinking water and morning tea.

Thank you for your continued interest in the project. We look forward to talking with you and receiving your input and feedback.

Should you have any questions, please contact me on the above phone number or by email.

Yours sincerely



**Ms Krystle-Lee Sutherland**

Aboriginal Engagement and Cultural Heritage Coordinator, Energy NSW

## Appendix 1c

Santos NSW (Eastern)  
A.B.N. 11 009 321 662  
125 Maitland Street  
Narrabri NSW 2390  
PO Box 859  
Narrabri NSW 2390

Phone: 02 6792 9041



10 November 2014

«First\_name» «Last\_name\_»  
«RAP\_Group\_Business\_Name\_Affiliation»  
«Organisation\_Representing\_RAP»  
«Address\_1»  
«Address\_2»  
«Address\_3»

Dear «First\_name»

I am writing to you again as a "Registered Aboriginal Party" (RAP) in relation to the proposed Narrabri Gas Project being undertaken by Santos Ltd.

You will probably be aware that a meeting was scheduled for 11 November and was cancelled due to another similar Aboriginal community consultation meeting scheduled in the region the same day. We can now confirm the new date for this meeting - **Tuesday 18 November 2014 at The Crossing Theatre Narrabri from 4.00pm to 8.00pm.**

To date, we have had two rounds of consultation meetings as part of the NSW Government consultation requirements for proponents. This meeting is scheduled for RAP's to respond to the feedback and submissions given on the assessment methodology, respond to issues raised at the last series of meetings and to present the draft cultural heritage assessment report and draft Cultural Heritage Management Plan for the proposed Narrabri Gas Project so that you can give us your views on it. **You will have 28 days after the meeting to provide that feedback.**

This meeting is being held in Narrabri as requested by the RAPs. Buses will run from Gunnedah and Wee Waa to allow attendance. A bus will depart Gunnedah from Wolsley Park, Conadilly Street on 18 November at 2.30pm and will return after the meeting. Another bus will depart Wee Waa on 18 November from the Wee Waa Local Aboriginal Land Council, 63 Rose Street at 3.00pm and return after the meeting. If possible please advise me by Monday 17 November if you wish to use the bus service.

Light refreshments and food will of course be provided.

We will be sending out all of the information presented at the meeting to everyone who is registered, but unable to attend.

Thank you for your continued interest in the project and we look forward to seeing you at this meeting. Should you have any questions, please contact me on telephone 02 6792 9041 or email [Krystle-lee.sutherland@santos.com](mailto:Krystle-lee.sutherland@santos.com)

Yours sincerely

A handwritten signature in black ink that reads "Krystle Sutherland".

**Aboriginal Engagement & Cultural Heritage Coordinator**

Santos NSW (Eastern)  
A.B.N. 11 009 321 662  
125 Maitland Street  
Narrabri NSW 2390  
PO Box 859  
Narrabri NSW 2390

Phone: 02 6792 9041

28 November 2014

«First\_name» «Last\_name\_»  
«RAP\_Group\_Business\_Name\_Affiliation»  
«Organisation\_Representing\_RAP»  
«Address\_1»  
«Address\_2»  
«Address\_3»

Dear «First\_name»

I am writing to you again as a "Registered Aboriginal Party" (RAP) in relation to the proposed Narrabri Gas Project being undertaken by Santos Ltd.

As you would be aware, there was a consultation meeting as part of the NSW Government consultation requirements for proponents held in Narrabri on 18 November.

The purpose of that meeting was to:

- Present the draft Aboriginal cultural heritage assessment report that was prepared following input from RAP's
- Present the draft Cultural Heritage Management Plan
- Seek submissions from RAP's on the content of these documents

**You have 28 days from 18 November (until close of business 17 December) to make your submission. This can be by mail to the above address, email to [Cultural.Heritage.Coordinator.NSW@santos.com](mailto:Cultural.Heritage.Coordinator.NSW@santos.com) or, if you'd prefer, you can make a verbal submission that will be recorded – to arrange this, please contact Krystle Sutherland on 02 67929041.**

All RAP's who did not attend the meeting were mailed the same information provided at the meeting and also have the same opportunity to make submissions. If for some reason you have not received this please advise us and we will re-send.

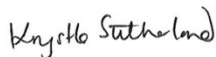
To assist you in making your submission within the consultation period, we are also holding a further meeting to give you a chance to ask questions or seek more information after you have had a chance to think about the material provided so far.

**This will be held at The Crossing Theatre in Narrabri Tuesday 09 December between 4pm and 7pm. Light refreshments and food will be provided. Buses will also be provided from Gunnedah (departing Wolsely Park, Conadilly Street at 2.30pm) and Wee Waa (departing Wee Waa Local Aboriginal Land Council, Rose Street at 3.00pm).**

**In addition, meetings will be held Tuesday 09 December in Wee Waa from 10am to 1pm at Wee Waa Motel and Wednesday 10 December in Gunnedah from 10am to 1pm at the Gunnedah Town Hall. Light refreshments and food will be provided.**

Thank you for your continued interest in the project and we look forward to further contact with you as the process unfolds. Should you have any questions, please contact me on telephone 02 67929041 or email [Krystle-lee.sutherland@santos.com](mailto:Krystle-lee.sutherland@santos.com)

Yours sincerely



Aboriginal Engagement & Cultural Heritage Coordinator



## Appendix 2

### **ANALYSIS OF REGISTERED ABORIGINAL PARTIES**

## **Santos ENSW – Narrabri Gas Project RAP Analysis**

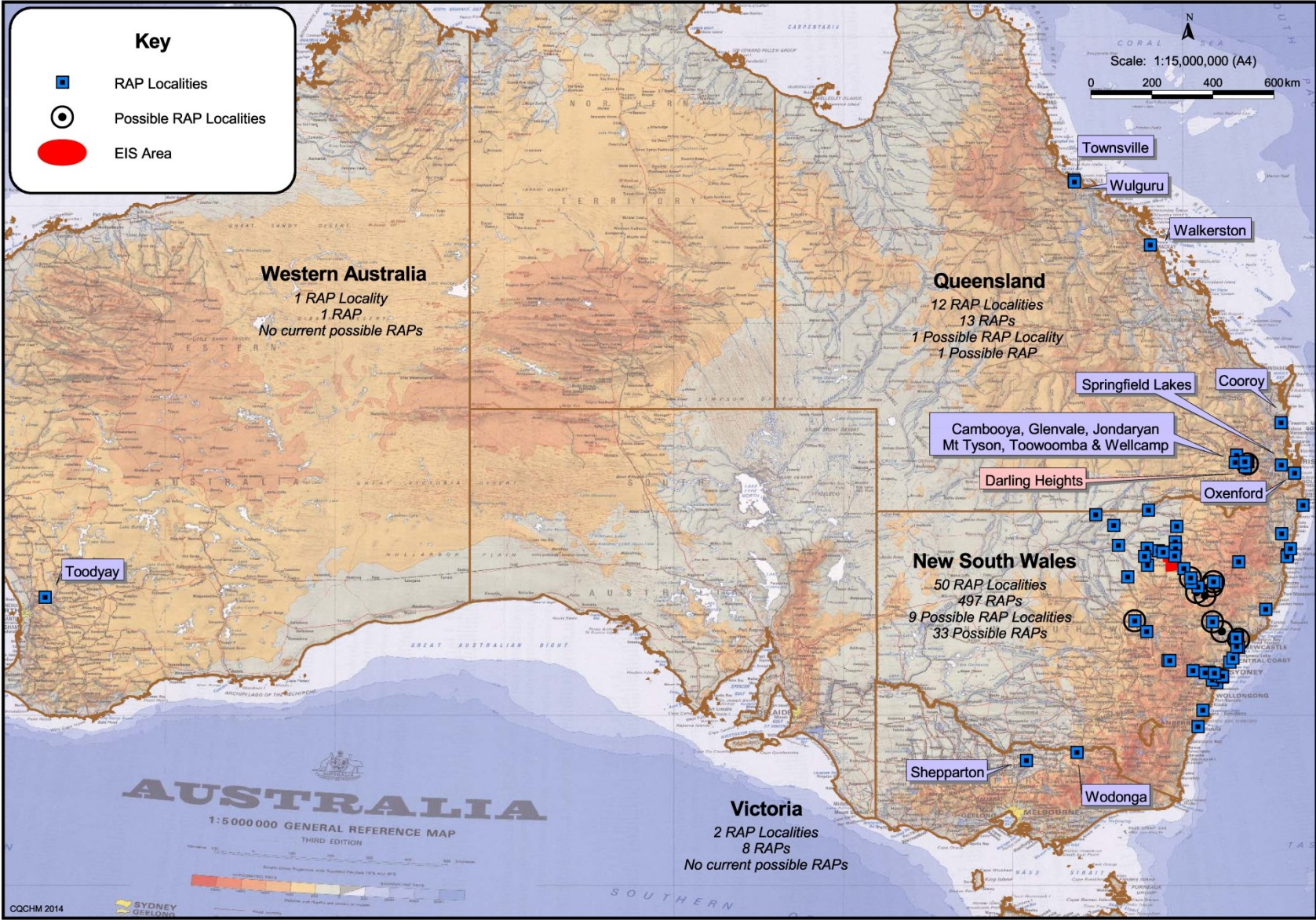
### **12 August 2014**

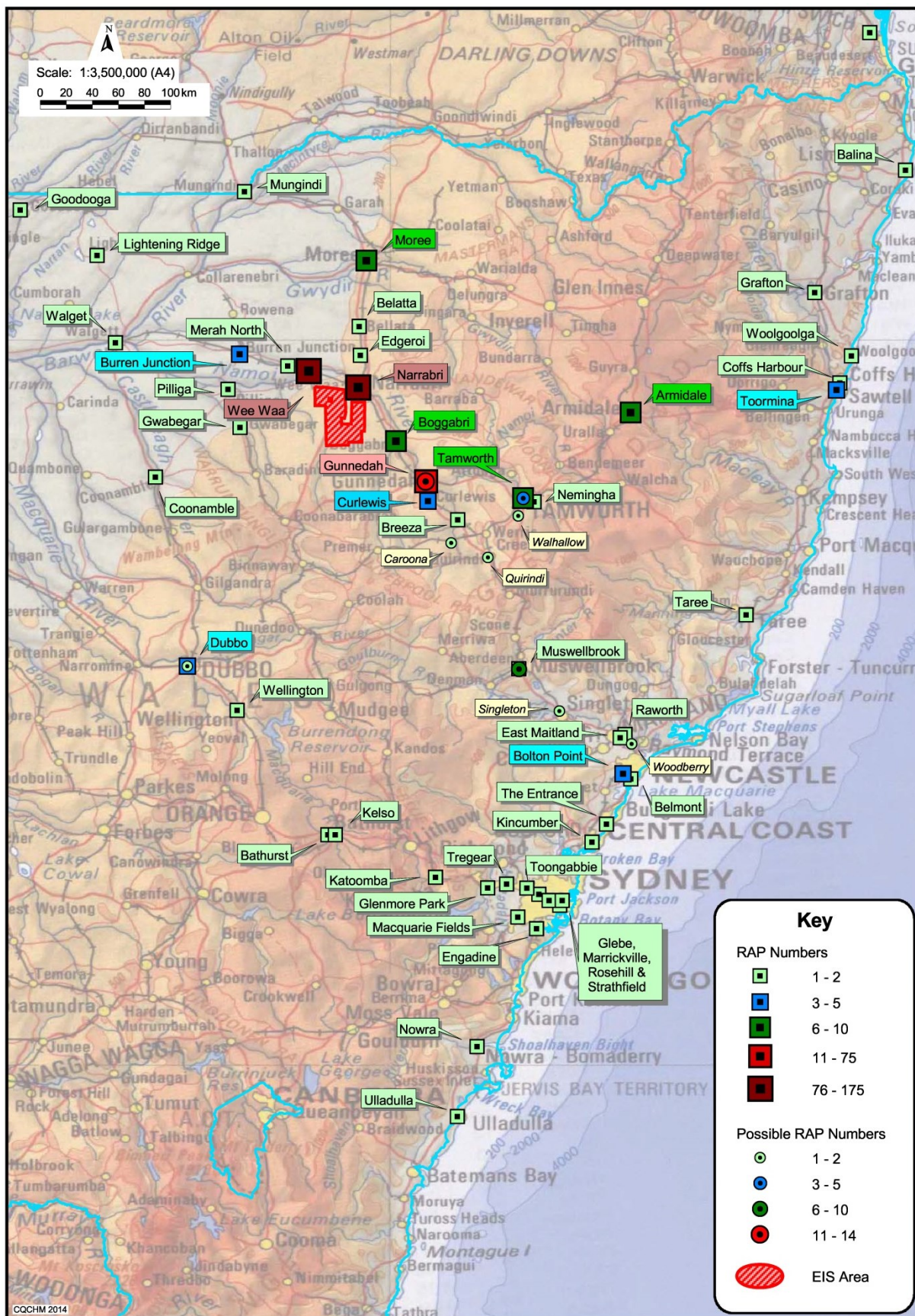
- The Santos ENSW RAP spreadsheet contains a total of 586 records relating to RAPs.
- Once combined and consolidated to standardise, remove duplicate records and separate out one instance of multiple individuals referenced within a single record there are 556 RAP records.
- Of these 521 appear to be RAPs for the purposes of the Project while the remaining 35 records remain as representing potential RAPs who may register.
- The 521 RAPs hail from 65 localities. Of these 50 (~77%) are within NSW, 12 (~18%) from Queensland, 2 (~3%) from Victoria, and one from Western Australia. There remain the two RAPs who do not have contact addresses noted for them.
- Of the 519 RAPs with addresses, 497 (~96%) come from NSW, 13 (~2.5%) from Queensland, 8 (~1.5%) from Victoria, and 1 from Western Australia.
- Almost 77% of RAPs come from the three local centres of Narrabri (36%), Wee Waa (30%) and Gunnedah (10%).
- The spreadsheet shows that four of the previous potential RAPs have subsequently confirmed and were included in the RAP analysis above.
- The remaining 35 potential RAPs come from 10 localities – 9 in NSW and 1 from Queensland. One of these potential RAPs remains without a presently known contact address.
- Of the 34 potential RAPs with known addresses, only 1 hails from areas outside NSW.
- Although some 38% of potential RAPs come from Narrabri (one of the three major RAP centres) if all remaining potential RAPs register a considerable number of additional RAPs (n=10) will hail from the Upper Hunter Valley centres of Muswellbrook and Singleton. This is some 29% of the total number of potential RAPs.
- Additional details are provided in the table below and depicted on the maps following.

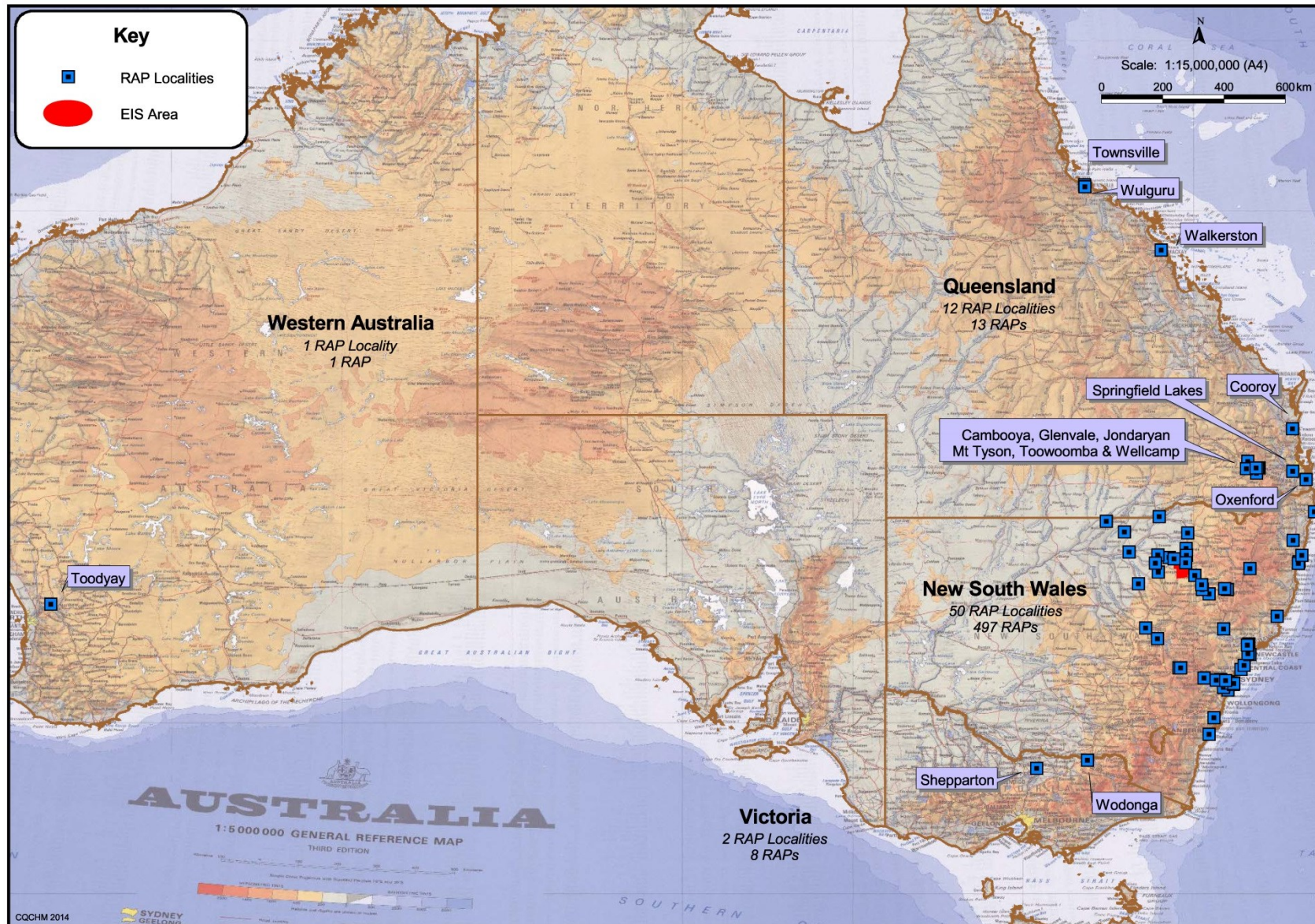
Town	State	Registered RAPs		May Register	
		No	%	No	%
<b>Armidale</b>	<b>NSW</b>	<b>7</b>	<b>1.3</b>	-	-
Ballina	NSW	1	0.2	-	-
Bathurst	NSW	1	0.2	-	-
Bellata	NSW	1	0.2	-	-
Belmont	NSW	2	0.4	-	-
<b>Boggabri</b>	<b>NSW</b>	<b>8</b>	<b>1.5</b>	-	-
Bolton Point	NSW	3	0.6	-	-
Breeza	NSW	2	0.4	-	-
Burren Junction	NSW	4	0.8	-	-
Cambooya	QLD	1	0.2	-	-
Caroona	NSW	-	-	2	5.9
Coffs Harbour	NSW	1	0.2	-	-
Coonamble	NSW	2	0.4	-	-
Cooroy	QLD	1	0.2	-	-
Curlewis	NSW	4	0.8	-	-
Darling Heights	QLD	-	-	1	2.9
Dubbo	NSW	3	0.6	2	5.9
East Maitland	NSW	1	0.2	-	-
Edgeroi	NSW	1	0.2	-	-
Engadine	NSW	1	0.2	-	-
Glebe	NSW	1	0.2	-	-
Glenmore Park	NSW	2	0.4	-	-
Glenvale	QLD	1	0.2	-	-
Goodooga	NSW	1	0.2	-	-
Grafton	NSW	2	0.4	-	-
<b>Gunnedah</b>	<b>NSW</b>	<b>54</b>	<b>10.4</b>	<b>13</b>	<b>38.2</b>
Gwabegar	NSW	1	0.2	-	-
Jondaryan	QLD	1	0.2	-	-
Katoomba	NSW	2	0.4	-	-
Kelso	NSW	1	0.2	-	-
Kincumber	NSW	1	0.2	-	-
Lightening Ridge	NSW	1	0.2	-	-
Macquarie Fields	NSW	1	0.2	-	-
Marrickville	NSW	1	0.2	-	-
Merah North	NSW	2	0.4	-	-
<b>Moree</b>	<b>NSW</b>	<b>6</b>	<b>1.2</b>	-	-
Mt Tyson	QLD	1	0.2	-	-
Mungindi	NSW	1	0.2	-	-
Muswellbrook	NSW	1	0.2	8	23.5
<b>Narrabri</b>	<b>NSW</b>	<b>187</b>	<b>36.0</b>	-	-
Nemingha	NSW	1	0.2	-	-
Nowra	NSW	2	0.4	-	-
Oxenford	QLD	1	0.2	-	-
Pilliga	NSW	2	0.4	-	-
Quirindi	NSW	-	-	1	2.9
Raworth	NSW	1	0.2	-	-

Town	State	Registered RAPs		May Register	
		No	%	No	%
Rosehill	NSW	1	0.2	-	-
<b>Shepparton</b>	<b>VIC</b>	<b>6</b>	1.2	-	-
Singleton	NSW	-	-	2	5.9
Springfield Lakes	QLD	1	0.2	-	-
Strathfield	NSW	2	0.4	-	-
<b>Tamworth</b>	<b>NSW</b>	<b>8</b>	<b>1.5</b>	3	8.8
Taree	NSW	1	0.2	-	-
The Entrance	NSW	1	0.2	-	-
Toodyay	WA	1	0.2	-	-
Toongabbie	NSW	2	0.4	-	-
<b>Toormina</b>	<b>NSW</b>	<b>5</b>	<b>1.0</b>	-	-
Toowoomba	QLD	1	0.2	-	-
Townsville	QLD	1	0.2	-	-
Tregear	NSW	1	0.2	-	-
Ulladulla	NSW	1	0.2	-	-
Walgett	NSW	1	0.2	-	-
Walhallow	NSW	-	-	1	2.9
Walkerston	QLD	1	0.2	-	-
<b>Wee Waa</b>	<b>NSW</b>	<b>158</b>	<b>30.4</b>	-	-
Wellcamp	QLD	2	0.4	-	-
Wellington	NSW	1	0.2	-	-
Wodonga	VIC	2	0.4	-	-
Woodberry	NSW	-	-	1	2.9
Woolgoolga	NSW	2	0.4	-	-
Wulguru	QLD	1	0.2	-	-
<i>No address provided</i>		<b>2</b>	0.4	1	-
		<b>521</b>		<b>35</b>	

**Note:** Highlighted (yellow) cells indicate localities not represented in the currently confirmed RAPs; text presented in red represents sizeable RAP or potential RAP population centres; cells highlighted in puce are additional RAP localities following the incorporation of the Wee Waa LALC information.









## Appendix 3

### **RAP CONSULTATION AND SUBMISSION ISSUES AND RESPONSES**

Issue Grouping and Where/When Raised	Issue	Santos Response
<b>Community Confidence</b> Narrabri 18/11/14 4.00pm-8.00pm 26 RAP's	Court orders re documents has eroded RAP's confidence in Santos. (Santos will present at next meeting: what was asked for and what was provided)	As part of the Court process Santos has produced to the Court 214 documents that Santos and the Court agreed were relevant to the complaint made. The Court agreed that there was an unreasonable approach made by the Environmental Defender's Office in initially requesting a broad range of documents, many of which were unrelated to the allegation. It should be noted that most of the documents supplied to the Court relate to facilities which have been decommissioned and removed as part of Santos' rehabilitation program following Santos' acquisition of Eastern Star Gas.
<b>Consultation Process</b> Narrabri 18/11	Should have 1 RAP meeting.	A central meeting in Narrabri with buses from Wee Waa and Gunnedah was arranged. Additional meetings held during the day to accommodate Elders that may have difficulty travelling. Additional meetings were held in Wee Waa and Gunnedah.
<b>Consultation Process</b> Narrabri 18/11	Bring senior person to RAP meeting.	Appropriate Santos staff with responsibility for the areas being considered have attended, and will continue to attend, RAP meetings.
<b>Community Confidence</b> Narrabri 18/11	Santos doesn't have a social license to operate so shouldn't undertake activities.	Santos is working closely with the community and stakeholders to explain issues and address concerns and believes there is broad support for the project.
<b>Native Title</b> Narrabri 18/11	Does Santos have a spearhead committee with applicants and how many meetings have they had?	Santos is bound by law to negotiate in good faith with the registered Native Title applicant in respect of the issue of a Petroleum Production Licence. The Gomeroi nation has elected 19 individuals to act as the applicant- group and they have legal standing in the claim and thus negotiations. Three formal meetings with the Gomeroi applicant group under the Right to Negotiate provisions of the Native Title Act have been held up to the end of 2014.
<b>Native Title</b> Narrabri 18/11	RAP's don't like payments/gifts to applicants.	In order for the Native Title claimants to reach an informed decision, it is reasonable for Santos to fund the costs associated with the applicants meeting to negotiate a Native Title agreement and to receive sitting fees for attendance at these meetings. Such payments are not gifts.
Comment on draft reporting (including CHMP)	What happens if the RAP's don't endorse the CHMP?	All RAP's have been provided the Draft Impact Assessment and the Draft CHMP. Santos will consider and respond to all issues raised in submissions and meetings. The full EIS will then be placed on public exhibition providing another opportunity for RAP review and comment.

Narrabri 18/11		
Provision of Project Information Narrabri 18/11	Copies of maps/layout including live GIS to be presented at the next RAP meeting.	This was completed at the meetings on the 9 <sup>th</sup> and 10 <sup>th</sup> of December.
Provision of Project Information Narrabri 18/11	Concern re Santos undertaking activities outside existing project area.	The Narrabri Gas Project will be undertaken within the project boundary that has been provided to RAPs in the draft reports and in the Preliminary Environmental Assessment.
Consideration of Management Options Narrabri 18/11	All cultural heritage sites are very significant and should be avoided.	Santos acknowledges the importance of cultural heritage sites to Aboriginal people which is why the project proposes avoidance of the most sensitive sites, and maximising the avoidance of other sites. Santos has also adopted a broad definition of ACH to allow recognition and management of a wide range of sites types and values. In addition to the Avoidance Principle being implemented, Aboriginal people will be involved in the site survey and decisions on their heritage.
Knowledge of Cultural Information Narrabri 18/11	Day sky/night sky play a major role for Gomeri – need to recognise.	Santos has noted this information and thanks the RAPs who described this issue to the RAP meeting. Santos will add this information to the ACH data audit records if the relevant RAP agrees.
Consideration of Management Options Narrabri 18/11	Need to lock offset obligations in perpetuity.	Provided for in commitments – see technical report.
Comment on draft reporting (including CHMP) Narrabri 18/11	Santos should report on CHMP 6 monthly not yearly.	Santos believes that an annual compliance review is adequate noting the processes of the CHMP continuously record all implementation and decision making. Santos also notes OEHL considers annual reporting appropriate.
Consultation Process Narrabri 18/11	RAP meetings too late for Elders.	In accordance with a request from the RAPs, central meetings in Narrabri were held with buses from Wee Waa and Gunnedah. In December Santos also scheduled additional meetings during the day in Wee Waa and Gunnedah to accommodate Elders that may have difficulty travelling. Santos must balance meeting times and arrangements that allow attendance by RAPs that work during the day, parents with childcare and school commitments as well as arrangements that maximise attendance by Elders.

		Santos will continue to accommodate consultation and discussion with Elders, whether through the scheduled RAP meetings, additional meetings targeting Elders or other discussions as arranged.
Consultation Process Narrabri 18/11	Time required in meeting to address issues raised already at previous meetings.	Issues raised at previous meetings have been provided to all RAPs, along with Santos responses. Time was and is allocated to discussion.
Comment on draft reporting (including CHMP) Narrabri 18/11	Disagreement with proposed composition of cultural heritage reference group – too many applicants and none are from the project area.	Santos notes that the reference group includes representatives from the Narrabri and Wee Waa LALCs, both of which intersect with the project area. Who the Applicant nominates for the reference group will be a matter for the Applicant group to determine.
Comment on draft reporting (including CHMP) Narrabri 18/11	Roster for cultural clearance work must be fair.	The draft CHMP proposes that the Reference Group (i.e. the Aboriginal community) nominates participants for pre-clearance surveys.
Consideration of Management Options  Wee Waa 09/12 10.00am – 1.00pm	Will cultural heritage sites be fenced?	A range of management options are available in implementing the CHMP. Fencing can be undertaken if and where appropriate e.g. in close proximity to construction activities. This management option will be decided on a case by case basis over the course of the project.
Consideration of Management Options  Wee Waa 09/12	How big are buffer zones for existing known sites?	Detailed information on buffer zones is provided in technical appendix. They vary according to the accuracy of site information, site type and the size of the site. Ground disturbance activities will only be carried out after a pre clearance survey has been done using a differential (very accurate) GPS. Buffers provide an extra level of protection.
Consideration of Management Options  Wee Waa 09/12	How accurate is the existing cultural heritage information for the project area?	It varies, which is why the information has been audited and ground-truthed. All known sites at the time of EIS submission within the project area will be verified and all ground disturbance activities will only be carried out after a pre-clearance survey has been done using a differential (very accurate) GPS.  All known sites at the time of EIS submission within the project area will be avoided by the project.

Consideration of Management Options Wee Waa 09/12	If cultural heritage information is not accurate or is incomplete, how does Santos ensure cultural heritage sites are avoided?	All known sites at the time of EIS submission within the project area (see the assessment report for all known sites) will be verified and avoided by the project. Ground disturbance activities will only be carried out after a pre-clearance survey has been completed, in accordance with the terms of the CHMP, using a differential (very accurate) GPS. The Avoidance Principle and commitments to avoidance by site type will also be implemented in accordance with the commitments in the assessment report and the CHMP.
Consideration of Management Options Wee Waa 09/12	Have all cultural heritage sites been checked or validated?	Over 40 sites have been validated so far. These sites were chosen to test known information. All known sites at the time of EIS submission within the project area will be verified (ground-truthed) within twelve months of approval.
Identify Data Sensitivity Wee Waa 09/12	Ownership and confidentiality of cultural information is important.	Santos agrees and has committed to confidentiality arrangements being finalised with the Aboriginal community – see CHMP. Santos is committed to Aboriginal ownership and management of cultural information.
Knowledge of Cultural Information Wee Waa 09/12	Elders from the 17 LALC's who were involved in the Brigalow studies in NSW NW region should be involved in the project and provide information and validation of cultural heritage sites.	Brigalow studies data relevant to the project area and for the Narrabri LALC area has been used in the project assessment. This data was obtained from the Narrabri LALC after agreement was reached with the LALC Board. The RAP process has been carried out to ensure all Aboriginal people with cultural knowledge have had the chance to be consulted and provide input.
Consideration of Management Options Wee Waa 09/12	Will all creeks be avoided?	The nature of the CSG project allows a high degree of flexibility in the siting of infrastructure. No wells will be sited within creeks and buffers along creeks. Tracks and buried gas lines will cross creeks only after the areas have been examined by pre-clearance surveys in accordance with the CHMP.
Comment on draft reporting (including CHMP) and Consultation Process Wee Waa 09/12	How will Aboriginal parties be identified and verified both pre and post EIS determination?	'Aboriginal parties' is a term used in the draft CHMP. Santos will continue to work with all RAPs until project determination, and following determination until the CHMP is finalised.

Aboriginal participation in ancillary programs Wee Waa 09/12	Indigenous businesses should be given priority for work relating to cultural heritage – such as fencing cultural heritage sites.	Santos is developing a comprehensive Aboriginal participation plan that will include business, training and employment opportunities. This suggestion will be given further consideration in the context of developing this plan.
Aboriginal participation in ancillary programs Wee Waa 09/12	Santos needs to skill up indigenous businesses and people well in advance of requiring services.	Santos is developing a comprehensive Aboriginal participation plan that will include business, training and employment opportunities. This suggestion will be given further consideration in the context of developing this plan.
Consultation Process Wee Waa 09/12	Some RAP's not happy with the amount of mail and large documents being sent to them by Santos. As a result, many RAP's have disengaged from the RAP process.	Santos provided all RAPs with copies of the draft assessment report and draft CHMP. Santos acknowledges this was a lot of written material, but it ensured all RAPs were equally able to review and provide comment.
Consultation Process Wee Waa 09/12	Santos should attend and present at LALC meetings which would attract more people as well as present to LALC boards.	Santos will attend LALC meetings and LALC board meetings upon request. Santos has also committed to provide hard copies of the full EIS to the Narrabri, Wee Waa and Gunnedah LALCs once the EIS is on public exhibition, Santos has also committed to briefing the boards of these three LALCs during 2015 when the Narrabri Gas Project EIS is on public exhibition.
Comment on draft reporting (including CHMP) Wee Waa 09/12	How are people appointed to the cultural heritage reference group by two LALC's and Gomeroi?	Nominations will be sought from the relevant LALC's and the Gomeroi native title applicant.
Comment on draft reporting (including CHMP) Wee Waa 09/12/14	What happens to the cultural heritage group membership if a LALC is dissolved or the Gomeroi applicants change?	Santos will make provision for this contingency in the CHMP.

<p>Comment on draft reporting (including CHMP)</p> <p>Narrabri</p> <p>09/12/14 4.00pm – 7.00pm</p>	<p>Why should the Gomerioi applicant group get 4 positions on the cultural heritage reference group when Narrabri LALC only get 3? Narrabri LALC has a lot more involvement in Pilliga cultural heritage.</p>	<p>The proposed composition of the Cultural Heritage Working Group balances the roles of LALC's and the Gomerioi native title applicant. The project area is entirely within the Gomerioi Native Title Claim area and is predominantly within the Narrabri LALC boundary with a small section within the Wee Waa LALC boundary. The proposed composition of the Group reflects this.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Narrabri</p> <p>09/12/14</p>	<p>If Wee Waa LALC dissolves, their representative should be replaced by another GNAC/Narrabri LALC representative to ensure an equal balance between local LALC and Gomerioi applicant group is maintained.</p>	<p>In the event a LALC is dissolved, Santos will make provision for a contingency in the CHMP.</p>
<p>Comment on draft reporting (including CHMP) and Consideration of Management Options</p> <p>Narrabri</p> <p>09/12/14</p>	<p>How far in advance of clearance activities will work programmes for clearance walks be given? At least 6 weeks preferable.</p>	<p>The notice period will be maximised to allow adequate time for selection of personnel and for the work to be done. The CHMP specifies this period.</p>
<p>Other</p> <p>Narrabri</p> <p>09/12/14</p>	<p>People who act against Santos in public protests should not be undertaking cultural heritage coordinator or officer roles.</p>	<p>Under the terms of the CHMP the Aboriginal Cultural Heritage Working Group will determine who will undertake these roles, and the basis on which decisions are made.</p>
<p>Identify Data Sensitivity</p> <p>Narrabri</p> <p>09/12/14</p>	<p>Confidentiality of the Narrabri LALC held cultural heritage information should be maintained, including non-publication as part of the EIS process and public presentations.</p>	<p>Santos will not publish maps of any Aboriginal sites when the full EIS is publicly exhibited. Long term data management and confidentiality arrangements for Narrabri LALC held data will be determined under agreement with the Narrabri LALC.</p>

<p>Comment on draft reporting (including CHMP)</p> <p>Gunnedah</p> <p>10/12/14</p> <p>10.00am – 1.00pm</p> <p>4 RAP's</p>	<p>Detail in the draft assessment report was good.</p>	<p>Noted.</p>
<p>Comment on draft reporting (including CHMP) and Consideration of Management Options</p> <p>Gunnedah</p> <p>10/12/14</p>	<p>Concern regarding the impacts on plants and animals and the need to avoid these impacts.</p>	<p>Ecological values have been comprehensively assessed in the project area. In order, the priorities are to avoid, mitigate and then offset any impacts.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Gunnedah 10/12/14</p>	<p>There is a need to standardise cultural heritage data.</p>	<p>An important outcome from the project (specifically the data audit and site validation), has been the compilation of all relevant cultural heritage data into a single location and to correct/revise this data. This helps with standardisation of existing data management into the future. Enhanced survey methods using the latest technology are designed to ensure consistent, quality data collected from now on.</p>
<p>Consideration of Management Options</p> <p>Gunnedah</p> <p>10/12/14</p>	<p>Are offsets one to one and how close to impacted location is it?</p>	<p>Offsets will only apply after avoidance and mitigation of impacts. The area required as offsets will be determined by the Government's offset policies and assessment tools. Typically offsets are greater than one to one – but this is an issue for Government.</p>
<p>Consideration of Management Options</p> <p>Gunnedah</p>	<p>Will offset areas be protected in perpetuity?</p>	<p>Yes.</p>

10/12/14		
Other  Gunnedah 10/12/14	Concerns about birds drinking in Leewood dams and negative impacts on them.	The Leewood ponds contain saline water which is about half the salinity of sea water. They have been fenced to prevent wildlife such as kangaroos falling in the ponds. Birds can access all ponds and dams in the region, including those on nearby farms.
Comment on draft reporting CHMP (including CHMP) Gunnedah 10/12/14	How will cultural heritage officers be chosen and what scrutiny will Santos put on potential cultural heritage officers?	The Aboriginal Cultural Heritage Working Group will advise Santos on suitable potential cultural heritage officers. Normal occupation requirements (medical, drug and alcohol, site inductions and security clearance) that apply to all staff and contractors entering the project area will be applied.
Comment on draft reporting CHMP (including CHMP) Gunnedah 10/12/14	How will cultural knowledge of the Pilliga for potential cultural heritage officers be identified and verified? Need to ensure cultural connection to land and knowledge as well as proof of local Aboriginal identity for all cultural heritage officers.	The Aboriginal Cultural Heritage Working Group will advise Santos on suitable potential cultural heritage officers. The relevant LALC's and the Gomeroi native title applicants make up the membership of the reference group.
Comment on draft reporting CHMP (including CHMP) Gunnedah 10/12/14	Do not like LALC and Gomeroi applicants being the only people on the cultural heritage reference group. They do not represent all local Aboriginal people.	Santos notes that the reference group includes representatives from the Narrabri and Wee Waa LALCs, both of which intersect with the project area and that the vast majority of the project area is within the Narrabri LALC. Who the applicant or LALCs nominate for the reference group will be a matter for them to determine. In summary the arrangements are for the Aboriginal community to determine who sits on the reference group. OEH recommendations in this respect should be also noted.
Comment on draft reporting CHMP (including CHMP) Gunnedah 10/12/14	Santos needs to have the right people involved (including on the cultural heritage reference group, cultural heritage officers) to ensure no cultural sites are destroyed. Should use anthropologists.	Santos believes that the Aboriginal community should make decisions about the right people to participate in cultural heritage management processes and decision making about their heritage. This is an issue for members of the Aboriginal Cultural Heritage Working Group to decide. The processes of the CHMP ensure that pre-clearance surveys are undertaken.

Other Gunnedah 10/12/14	Opportunity for local Aboriginal people to salvage natural resources that would be otherwise seen as waste prior to clearing.	Santos will consider how this may be able to be accommodated in the protocols and plans that will direct development of the gas field if the project is approved.
Consultation process  Gunnedah 10/12/14	People who are legitimately from this country are not being consulted due to historic dispossession and dispersal – particularly in the early 20 <sup>th</sup> century.	The OEH requirements for consultation have been followed, including advertising seeking Aboriginal people to register interest. Additional Aboriginal people who have come forward during the consultation process have also been registered as RAPs. The Gomeroi Native Title Applicant group and their legal representative have registered as a RAP as have many Gomeroi and Aboriginal people from the region and numerous other locations around Australia. The ancestry of the Gomeroi applicant, including ongoing cultural connection to the Claim area, has been examined by the Native Title process and the Claim has been registered having met the necessary criteria. Information in the various oral histories also examines this issue. All RAPs have been afforded opportunity to participate in all consultation, provided with copies of all materials and encouraged to make submissions, share knowledge and participate.
Consultation process  Letter from Dominic Steele (on behalf of Ricky Fields)	The consultation process has failed to identify many key stakeholders as the consultation process has been deeply flawed. Key stakeholders have not been identified nor included in discussion. It has been suggested that this process be re-established with due consideration given to the relative recent history of the locality so that appropriate stakeholders are identified and included in the process.	The OEH requirements for consultation have been followed, including advertising seeking Aboriginal people to register interest. Additional Aboriginal people who have come forward during the consultation process have also been registered as RAPs. The Gomeroi Native Title applicant group and their legal representative have registered as a RAP as have many Gomeroi and Aboriginal people from the region and from numerous other locations around Australia. The ancestry of the Gomeroi Applicant, including ongoing cultural connection to the Claim area, has been examined under the legally-sanctioned Native Title process and the claim has been registered as having met the necessary criteria. Information in the various oral histories also examines this issue. All RAPs have been afforded opportunity to participate in all consultation, provided with copies of all materials and encouraged to make submissions, share knowledge and participate.
Comment on draft reporting (including CHMP)	Lack of appropriate consultative process underpinning establishment of the steering group. Identification of the key stakeholders is paramount to the appropriate functioning and	The OEH requirements for consultation have been followed, including advertising seeking Aboriginal people to register interest. Additional Aboriginal people who have come forward during the consultation process have also been registered as RAPs. The Gomeroi Native Title applicant group and their legal representative have registered as a RAP as have many Gomeroi and Aboriginal people from the region and numerous other locations around Australia. The ancestry of the Gomeroi applicant, including ongoing cultural connection to the Claim area, has been examined by the Native Title process and the Claim has been registered having met the necessary criteria. Information in the

Letter from Dominic Steele (on behalf of Ricky Fields)	the ongoing monitoring and reporting of the avoidance methodology. This has not yet been achieved to the OEH consultation guidelines. Establishment of an Aboriginal steering group that does not include or identified (sic) key stakeholders does not meet the requirements of the OEH guidelines.	various oral histories also examines this issue. All RAPs have been afforded opportunity to participate in all consultation, provided with copies of all materials and encouraged to make submissions, share knowledge and participate. OEH specifically nominated the relevant LALC's and the Gomeroi Native Title applicant as key stakeholders to be consulted and to be involved in ongoing management of Aboriginal cultural heritage. The proposed make-up of the Aboriginal Cultural Heritage Working Group as set out in the draft Aboriginal Cultural Heritage Management Plan includes these key stakeholders. Santos' proposed framework is that Aboriginal people survey and make decisions about their own heritage.
Comment on draft reporting (including CHMP)  Letter from Dominic Steele (on behalf of Ricky Fields)	Avoidance Methodology: unforeseen possible cumulative effects. The EIS does not propose a known path and is consequently not an approach that stakeholders are familiar with. Stakeholders are unsure how unforeseen challenges/changes will be addressed in the absence of this control. Ways of guaranteeing that the scope of the project will not grow in scale must be provided to stakeholders in advancement of on ground works.	The nature of the proposed CSG project provides far more scope for minimising impacts on Aboriginal cultural heritage than other projects because of the inherent flexibility that can be applied to the design and placement of most of the infrastructure. Therefore, the Avoidance Principle is a practical and effective approach to the design of the project. The siting of infrastructure will be informed by the comprehensive analysis of all known data in respect of Aboriginal cultural heritage sites that has been carried out. Further, ground disturbance activities will only be carried out following pre clearance surveys by Aboriginal people. This approach has been trialled and is proven to be effective, ensuring that commitments to the complete avoidance of all currently known sites and most categories sites likely to be found in the project area can be delivered. This will also prevent cumulative impacts of any significance particularly given that the most sensitive sites will be avoided. Commitments have also been made in respect of offsets. Unlike other resource extraction projects in the region, that stakeholders are familiar with, the proposed CSG extraction is flexible and staged within a fixed period of time, all of which will allow implementation of the Avoidance Principle. Further, any future proposed activity outside the footprint of the project area nominated in the EIS will require separate assessment, consultation and approvals.
Comment on draft reporting (including CHMP) and Consultation Process  NTSCORP letter 1	Due to the inadequate amount of time to review and provide instructions to NTSCORP, the Gomeroi Applicants cannot give its consent or approval to the draft CHMP.	All RAPs were advised of consultation meetings in advance, two rounds of consultation meetings were undertaken, and all RAPs were provided the draft reports. The Legislative requirements of the NSW Government as expressed in the OEH Guidelines for Aboriginal cultural heritage consultation have been followed in full, including all timelines allowed for provision of information and seeking submissions from RAP's. The Legislative requirements of the NSW Government do not extend to requiring consent or approval of the draft CHMP, but for proponents to provide the draft, carry out consultation and seek submissions from RAP's.
Consultation process NTSCORP letter 1	NTSCORP and the Gomeroi Applicant strongly believe and have previously asserted that	Santos notes the position of the Gomeroi applicant in this respect. Nevertheless, Santos is required to work within the legislative and policy framework as directed by the NSW Government.

	the NSW Office of Environment and Heritage's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 does not adequately assess and protect Aboriginal culture and heritage in NSW.	
Other NTSCORP letter 1	<p>The Gomeroi Traditional Owners have developed a set of rules for agreement making. Although these rules are not exhaustive, they form a set of guiding principles that should be abided by in order to reach agreement between Santos and the Gomeroi people for a coal seam gas project on Gomeroi country.</p> <p>We do not believe the draft CHMP, as it stands, adequately incorporated our prior submissions. The consultation required of Santos with the Gomeroi Applicant is lacking throughout the process of developing the draft CHMP. In addition to this, the Applicant has been given an insufficient amount of time to review and consider the contents of the draft CHMP in line with the Gomeroi Applicant's guidelines for culture and heritage. The draft CHMP was received after the consultation meeting and as such the Gomeroi Applicant has not been able to provide</p>	<p>EIS processes and policies are determined by the NSW Government. Santos has been consistent and equitable when undertaking consultation with all RAPs.</p> <p>NTSCORP made a written submission on behalf of the Gomeroi Native Title claimant as part of Stage 3 of the RAP consultation process. This followed presentation of and provision to all RAP's of the proposed methodology for the cultural heritage assessment of the proposed project. This is provided as Attachment 1. Attachment 2 is a table that sets out the issues raised in that submission and the response by Santos including the relevant sections of the Assessment or Aboriginal Cultural Heritage Plan where the issue was addressed.</p> <p>All RAPs were advised of consultation meetings in advance, two rounds of consultation meetings were undertaken, and all RAPs were provided the draft reports. The Legislative requirements of the NSW Government as expressed in the OEH Guidelines for Aboriginal cultural heritage consultation have been followed in full, including all timelines allowed for provision of information and seeking submissions from RAP's. The Legislative requirements of the NSW Government do not extend to requiring consent or approval of the draft CHMP, but for proponents to provide the draft, carry out consultation and seek submissions from RAP's.</p>

	NTSCORP with further instructions from the Applicant.	
<p>Comment on draft reporting (including CHMP)</p> <p>NTSCORP letter 1</p>	<p>The Gomeroi people are the custodians for the country on which the project is taking place. Santos must agree that it is the Gomeroi people who are to make decisions about how heritage clearances and surveys happen and ensure that cross cultural training is conducted for all people (including contractors) working on the site. The draft CHMP presented to the Gomeroi applicant fails to address these rules of decision making adequately.</p>	<p>Santos notes the position of the Gomeroi applicants in this respect. Nevertheless, Santos is required to work within the legislative and policy framework as directed by the NSW Government.</p> <p>The draft CHMP is designed to ensure that the Gomeroi Native Title applicants are involved in decision making in respect of Aboriginal cultural heritage for the life of the project.</p> <p>Aboriginal cultural heritage training provisions for all staff and contractors are included in the Draft CHMP.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Tony Munro - (Verbal submission 19/12/14)</p>	<p>The proposed Cultural Heritage Management Plan proposed to be implemented is very good – particularly compared to others he has seen in the coal industry.</p>	<p>Santos believes that the Aboriginal community should make decisions about the right people to participate in cultural heritage management processes and decision making about their heritage.</p> <p>Santos has significant experience in developing and implementing CHMP's across Australia and has benefitted from continuous review of its operations in this respect. The nature of a CSG project is also such that significantly more flexibility exists compared to other resource projects in the siting of infrastructure. This allows a far more flexible approach to avoidance of harm to Aboriginal cultural heritage.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Tony Munro - (Verbal submission 19/12/14)</p>	<p>The Aboriginal Cultural Heritage Working Group membership needs to be very well thought out and it needs to get all the support it can. The Group should consist of Gomeroi applicant members and Aboriginal community members.</p>	<p>Considerable thought has gone into the proposed membership of the ACHWG and the views of Aboriginal people have been taken into account. Santos wishes to have a long term relationship with Aboriginal people and wants to work with the whole community. The Gomeroi Native Title applicant and the relevant LALC's are key components of the ACHWG.</p>

<p>Comment on draft reporting (including CHMP)</p> <p>Tony Munro - (Verbal submission 19/12/14)</p>	<p>The Terms of Reference Group must have some elders as members because they will have the respect of all committee members. By electing to use a Terms of Reference Group, it will ensure issues that arise can be solved very quickly.</p>	<p>Santos believes that the Aboriginal community should make decisions about the right people to participate in cultural heritage management processes and decision making about their heritage.</p> <p>The Aboriginal community will determine who their representatives are including Elders.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Greg Griffiths – (Verbal submission 19/12/14)</p>	<p>The Cultural Heritage Management Plan proposed by Santos is a good plan and is supported overall.</p>	<p>Santos believes that the Aboriginal community should make decisions about the right people to participate in cultural heritage management processes and decision making about their heritage.</p> <p>Santos has significant experience in developing and implementing CHMP's across Australia and has benefitted from continuous review of its operations in this respect. The nature of a CSG project is also such that significantly more flexibility exists compared to other resource projects in the siting of infrastructure. This allows a far more flexible approach to avoidance of harm to Aboriginal cultural heritage.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Greg Griffiths – (Verbal submission 19/12/14)</p>	<p>There are 268 sites which are registered on AHIMS and only 50 have been ground-truthed. Santos must ground truth all of the sites so that the work is completed.</p>	<p>The pilot ground-truthing exercise carried out following the data audit of Aboriginal cultural heritage site information was designed to verify accuracy of information for a sample of sites in the project area. This was needed to ensure that the assumptions underpinning the methodology for further work and the avoidance strategy were sound and that suitable buffers and protocols were established to mitigate against any inaccuracies. Santos is committed to verifying the balance of the AHIMS sites within the project area for the same reasons. In addition, Santos is committed to avoiding all currently known sites within the project area and pre clearance surveys will be carried out.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Greg Griffiths – (Verbal submission 19/12/14)</p>	<p>Supports the concept of an Aboriginal Cultural Heritage Working Group working within a Terms of Reference.</p>	<p>Considerable thought has gone into the proposed membership of the ACHWG and the views of Aboriginal people have been taken into account. Santos wishes to have a long term relationship with Aboriginal people in the region of the project and wants to work with the whole community. The Gomeroi Native Title claimant and the relevant LALC's are key components of the ACHWG.</p>
<p>Comment on draft reporting (including CHMP)</p>	<p>The Chair of the Terms of Reference Group should be appointed by the Gomeroi applicants.</p>	<p>Santos has considered this issue and will consult with the Gomeroi native title applicant and relevant LALC's prior to the appointment of the Chair of this group.</p>

Greg Griffiths – (Verbal submission 19/12/14)		
<p>Comment on draft reporting (including CHMP)</p> <p>Greg Griffiths – (Verbal submission 19/12/14)</p>	Some Elders should form part of the Terms of Reference Group	<p>Santos believes that the Aboriginal community should make decisions about the right people to participate in cultural heritage management processes and decision making about their heritage.</p> <p>The Aboriginal community will determine who their representatives are including Elders.</p>
<p>Comment on draft reporting (including CHMP) and Consultation Process</p> <p>Letter from Dolly Talbot</p>	<p>Timing of the review/both Assessment and Draft CHMP simultaneously – inability to provide informed feedback. Number of projects requiring submission on too much for the community and lack of coordination of consultation meetings.</p>	<p>This submission was received after the closing date for comment but has been accepted and considered by Santos.</p> <p>Hard copies of the draft reports were provided to all RAPs and Santos held multiple meetings during the comment period. All RAP's received the same material promptly even if they were unable to attend meetings. In excess of the 28 day minimum consultation period was allowed.</p>
<p>Consultation process</p> <p>Letter from Dolly Talbot</p>	Registration of the Gomeroi Traditional Custodians (GTC) group as a RAP.	<p>The OEH requirements for consultation have been followed, including advertising seeking Aboriginal people to register interest. Additional Aboriginal people or organisations that have come forward during the consultation period have also been registered as RAPs.</p> <p>Santos was directed to send all correspondence to the Gomeroi Traditional Custodians through Dolly Talbot, and to organise any meetings or site tours including the GTC through Dolly Talbot. Santos has implemented this request. All RAP material has been provided to Dolly Talbot.</p> <p>Santos notes that over 20 of the signatories to the GTC submission are registered as RAPs individually and therefore would have received all RAP information including the draft reports and RAP meeting invitations.</p>
<p>Consultation process</p> <p>Letter from Dolly Talbot</p>	Site visit for GTC group	<p>Numerous offers of site visits have been extended to all RAP's, including members of the GTC. This has included the provision of buses to provide transport from Wee Waa and Gunnedah to Narrabri.</p> <p>Santos is happy to continuing to offer site visits for all Elders and the GTC.</p>

<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>Assessment not detailed according to the Director General's requirements.</p>	<p>Santos holds the view that it has complied with the OEH guidelines and the Secretary's Requirements, and has summarised how it has done this in the technical appendix.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>Draft ACHMP pre-emptive of full EIS Assessment process.</p>	<p>The OEH Requirements included in the Secretary's Requirements required the draft CHMP as an element of the assessment and RAP consultation process.</p> <p>RAPs will have another opportunity to review and comment on the draft CHMP when the full EIS is exhibited later in 2015.</p> <p>Santos is committed to finalisation of the CHMP in consultation with RAPs if the project is approved.</p>
<p>Consultation Process and Provision of Project Information</p> <p>Letter from Dolly Talbot</p>	<p>Information previously requested not provided i.e. mapping of aquifer's soil profiles and detailed mapping which includes properties, numbers of hectares to be impacted including the extent of the waterways and water basin effects and ethnobotanical details etc</p>	<p>Information requested at consultation meetings has been provided including a description of the project area and its underlying geology. The relationship of the project to waterways/creeks has also been described, i.e. only linear infrastructure (e.g. the gathering systems, tracks) will intersect with creeks.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>Cumulative impacts are not addressed and the rationale for conservation and protection and avoidance is poorly described and deemed inadequate.</p>	<p>Cumulative impacts have been addressed in the assessment report. The Avoidance Principle is also described in detail and is best practice. The avoidance of all currently known sites, and avoidance commitments by site type including complete avoidance of the most sensitive sites has also been detailed.</p> <p>The processes of the CHMP to deliver these commitments have also been described in detail, this includes pre-clearance surveys.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>The ACHA describes a 'social and cultural study' as being undertaken in conjunction with Aboriginal registrants, and presents a dominant non Aboriginal view of the cultural social and aesthetic qualities of both objects and their</p>	<p>The technical report includes statements of Aboriginal persons on the cultural values of the project area: a broad definition of Aboriginal cultural heritage has and will continue to be adopted, oral history has been covered, ethnobotanical data has been amassed and is being included in design of the project and selection of offsets, RAPs have been asked for information on cultural places and the management strategy, the social significance of sites has been included and assessed as generally high, an integrated approach has been adopted – see discussion of cultural values and management of same.</p>

	interrelationship to each other and fails to demonstrate an assessment of landscape values understanding	
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>A complete absence of consideration of the importance of night sky, mapping water resources and ethnobotanical values and relationship of the project area to well-known traditional owners with connections to the area and the special values relating to the project area which gives the area its cultural and spiritual significance and landscape and material cultural values. These assessment considerations should have been included.</p>	<p>A broad definition of Aboriginal cultural heritage has been and will continue to be adopted. No information on the issue of mapping of the night sky and its relationship to cultural places and values in the project area has been provided although information was requested on this and other issues of this sort. Ethnobotanical data and other cultural information has been reviewed and included – that information derives from parties who are RAPs for the project. Santos recognises that there may be further information to be elicited which is why the Additional Research Program has been designed to undertake additional research targeted at identifying and recording places and values of <b>particular</b> traditional, anthropological, historical and contemporary significance to Aboriginal people and any places and values of <b>particular</b> traditional, anthropological, historical and contemporary significance to Aboriginal people will be subject to the Avoidance Principle.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>There is poor reference to the findings of historic AHIMS records and any due diligence reporting and the cumulative impacts arising from the proposed project.</p>	<p>A comprehensive audit of all cultural heritage data held, including but not limited to the AHIMS records was carried out and a suitable proportion subsequently ground-truthed as part of the assessment process. Cumulative impacts have been addressed in assessing the total likely footprint of the Project and we note the commitment to the Avoidance Principle which will result in minimal development impacts. The additional conservation outcomes arising from the offsets program should also be noted.</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>Given that an assessment report provides the basis for managing cultural heritage for the life of a Project, we formally request that the ACHA be revised Elders taken out on site and consulted and the assessment completed to the standard required by OEHS guidelines and then re-issued to Aboriginal registrants, as there is insufficient information</p>	<p>Santos rejects these non-specific and unsupported assertions. The report addresses the issues required by the Secretary and OEHS. A number of opportunities were provided to RAPs to provide cultural information. Santos also notes that in excess of 550 RAPs have been registered for the project, all of whom have been provided hard copies of draft documents, advice about meeting dates, site visits, Santos contact details (phone, email and office address) etc..</p> <p>Adoption of the Avoidance Principle, and the detailed and specific commitments made by Santos to avoidance of all currently known sites and the most sensitive site types, will ensure that the project has minimal if any impact on cultural heritage. The technical report describes measures that have been tested and procedures and found that they will be effective in this regard.</p>

	to even make comments on some parts of the assessment.	
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>Given that an Aboriginal Cultural Heritage Management Plan must reflect the findings of the integrated EIS considerations relating to cultural heritage archaeological and social values including ethno botanical = biodiversity water flora fauna and other environmental/cultural considerations, we formally request that the ACHMP is rejected and deemed inadequate and pre-emptive of the EIS assessment process, and that the ACHMP draft be developed only after an EIS assessment process public comment period and project consent process determined.</p>	<p>The OEH Requirements included in the Secretary's Requirements required the draft CHMP as an element of the assessment and RAP consultation process.</p> <p>RAPs will have another opportunity to review and comment on the draft CHMP when the full EIS is exhibited later in 2015.</p> <p>Santos is committed to consultation with RAPs on the finalisation of the CHMP if the project is approved.</p>
<p>Consultation process</p> <p>Letter from Dolly Talbot</p>	<p>Lack of Aboriginal involvement in all stages of the assessment, consultation and management processes; lack of consultation to actively involve all Aboriginal people who registered.</p>	<p>The OEH requirements for consultation have been followed explicitly, including advertising seeking Aboriginal people to register interest. Additional Aboriginal people or organisations who have come forward during the consultation period have also been registered and provided the complete package of information given to RAP's.</p> <p>Santos also notes that in excess of 550 RAPs have been registered for the project, all of whom have been provided hard copies of draft documents, written advice about meeting dates, the offer of site visits, Santos contact details (phone, email and office address) etc..</p>
<p>Comment on draft reporting (including CHMP)</p> <p>Letter from Dolly Talbot</p>	<p>The assessment does not reflect Aboriginal registrant input on the significance of the archaeological sites; does not integrate social and cultural contexts and landscape influences; provides a limited discussion of the meaning of</p>	<p>The assessment report is clear on exactly what it covered, the comprehensive and broad definition of Aboriginal cultural heritage has been adopted by the project.</p> <p>All currently known sites and the most sensitive site types will not be impacted by the project.</p>

	the archaeology of the Project site; does not provide an assessment of the historic significance of the sites;	
Comment on draft reporting (including CHMP)  Letter from Dolly Talbot	The assessment of aesthetic significance makes no real or meaningful comment on the importance of sites and places to Aboriginal people.	The technical report addresses these issues explicitly. It notes that places of aesthetic significance can be of cultural significance and will be afforded the highest level of protection by application of the Avoidance Principle.
Comment on draft reporting (including CHMP) and Consultation Process  Letter from Dolly Talbot	Management strategies have not been developed in consultation with all Aboriginal registrants; Santos have failed to provide even draft information in stage 3 of the consultation process, therefore the assessment has been undertaken in the absence of registered parties management and mitigation recommendations in contravention to the assessment requirements detailed by OEH.	Stage 3 of the OEH consultation requirements has been fully complied with by – holding a series of RAP meetings, providing hard copy information to all RAPs including those that could not attend meetings, the process of the data audit, analysis of that data including validation, and discussion and review of the results with the Aboriginal community including RAPs, facilitating a process for RAP's to contribute culturally appropriate information, information gathering and research methodology; providing information that enabled the cultural significance of Aboriginal objects and/or places on the proposed project area to be determined; provided draft cultural heritage management options to allow input into their further development; presented and provided the proposed methodology for cultural heritage assessment to all RAP's and giving the opportunity to review and provide comments of at least 28 days. All RAP's were also invited to supply information (with appropriate confidentiality protocols) regarding places or objects of significance in the Project area. All RAP's were given the opportunity to comment on potential management options. All feedback has been recorded and considered.
Comment on draft reporting (including CHMP)  Letter from Dolly Talbot	DG requirements for a Part 4 project to include detailed ESD consideration management and mitigation has not been adequately addressed.	The concept of ESD has been a key consideration for the overall project where the Avoidance Principle is the key driver. The project will directly impact about 1% of the project area, the ecological functioning of the area will continue throughout construction, operation and decommissioning. For ACH the Avoidance Principle has led to commitments for complete avoidance of currently known sites and complete avoidance of the most sensitive or significant site types, and overall a very low impact on Aboriginal cultural heritage.
Comment on draft reporting (including CHMP)	The ACHA does not contain a technical archaeological appendix; has omitted to record Aboriginal cultural features identified as important to RAP's	The technical report is clear on all these matters.

Letter from Dolly Talbot	and ethno botanical considerations are also omitted.	
NTSCORP letter 2	The Gomeri Applicant thanks Santos for considering comments submitted on 8 October 2014 in relation to the proposed methodology of the Aboriginal Cultural Heritage Assessment by NTSCORP Limited (NTSCORP) on behalf of the Gomeri Applicant. We recognise that some of those comments have been incorporated in the latest Santos ACHMP consultation draft	Santos welcomes this feedback. The CHMP reflects important principles arising from the consultation process including primacy of decision-making with the Aboriginal community in accordance with OEH requirements as specified in the Secretary's requirements, a comprehensive approach to identifying cultural heritage sites in advance of construction activity, and extensive and binding commitments to site avoidance
NTSCORP letter 2	We refer specifically to schedule 6 of the CHMP Consultation Draft. The Gomeri Applicant recognises the suggested Aboriginal Cultural Heritage Working Group and supports the principle of the creation of a working group; however note that Gomeri People must have primacy in the process, and would like to see that principle incorporated at Schedule 6. Decisions about Gomeri Country must be made by Gomeri People.	The composition of the Aboriginal Cultural Heritage Working group includes four representatives nominated by the Gomeri Applicants. This accounts for half of the total membership and ensures decisions about Gomeri country are made by Gomeri people.
NTSCORP letter 2	The Santos Narrabri Gas Project will have a range of impacts on Gomeri Country and cultural heritage, often	Santos acknowledges the importance of cultural heritage sites to Aboriginal people which is why the project proposes to adopt the Avoidance Principle. Santos has also adopted a broad definition of ACH to allow recognition and management of a wide range of sites types and values by avoidance.

	<p>irreversibly so. The Project will not only directly affect Aboriginal culture and heritage by the destruction of objects and places, but also indirectly by restricting access to places to carry out cultural practices.</p>	<p>In addition to the Avoidance Principle being implemented, Aboriginal people will be involved in the pre clearance surveys and decisions on their heritage.</p> <p>All known sites at the time of EIS submission within the project area will be subject of a verification program and avoided by the project. There is a commitment to undertake an Additional Research Program that would be aimed at identifying and recording places and values of <b>particular</b> traditional, anthropological, historical and contemporary significance to Aboriginal people. The program will not be expressly linked to any proposed program of works. It will be completed within a period of 12 months of commencement. The aim will be to collate a body of data on places and values that can be integrated into general project planning such that the locations where these places and values are identified can be managed by the Avoidance Principle described above. The methodology will be developed in collaboration with the RAPs through mechanisms given effect in the CHMP. This will be captured in a brief specifically developed for this program. Implementation of the program can then be audited against the provisions of the brief. The brief and research program will give effect to the confidentiality provisions of the CHMP pertaining to this program. Ground disturbance activities will only be carried out after a pre-clearance survey has been completed, in accordance with the terms of the CHMP, using a differential (very accurate) GPS. The Avoidance Principle and commitments to avoidance of the most sensitive site types will also be implemented in accordance with the commitments in the assessment report and the CHMP.</p> <p>Approximately 1,000 hectares of the 95,000 hectare project area would be subject to disturbance from the project. In terms of available resources in the region, the Pilliga Forest has a total area of around 500,000 hectares. The project would impact on one per cent of the project area and about 0.2 per cent of the total forest area. All of the remaining forest areas can still be accessed subject only to conditions that are imposed by regulatory agencies or land holders. Some of the project facilities and infrastructure would be situated on private land. In cases where access is not currently available there would be no additional loss of access.</p> <p>The proposed offsets program would also address access to land. This will guarantee access to land for cultural purposes that may currently not be accessible. Overall, there is considered to be a limited loss of access to land, associated sites and to traditional resources including plants and animals as a result of the project.</p>
NTSCORP letter 2	<p>Impacts on places of cultural importance which fall short of physical destruction but nonetheless destroy or impair the cultural integrity of a place of importance. The effects of</p>	<p>A broad definition of Aboriginal cultural heritage has been and will continue to be adopted. Ethnobotanical data and other cultural information has been reviewed and included – some of that information derives from parties who are RAPs for the project and all RAPs were asked to provide such information. Beyond this, Santos recognises that there may be further information to be elicited. Accordingly it has committed to a program of additional research as outlined in the assessment report. Places identified and verified through this process will be subject to the Avoidance Principle.</p>

	these impacts are wide-ranging on the spiritual, physical, societal and mental well-being of Gomeroi People, at both an individual and at a community level.	The curtilage of such locations will be identified and respected as part of the Additional Research Program.
NTSCORP letter 2	At this stage the CHMP consultation draft does not expressly mention the Gomeroi People as key stakeholders in the development and approval process, or their obligation to access, protect and care for their land. The Gomeroi Applicant would like to see these principles incorporated into the Santos CHMP.	Santos will consider amendments to the CHMP to reflect this principle, should the native title claim proceed to determination while noting the Gomeroi Applicant's membership of the ACHWG reflects their status as a key stakeholder.
NTSCORP letter 2	The site verification program as outlined at section 4.10 of the Aboriginal Cultural Heritage Assessment report ( <b>ACHA</b> ) and section 4.5 of the CHMP would provide for the generation of more accurate and detailed information about cultural heritage sites than Aboriginal Heritage Information Management Systems currently provide in general. In the continuation of this program as outlined at section 4.5 of the CHMP, Santos must ensure that Aboriginal field officers participating in the program are appropriate Gomeroi People.	In the assessment report Santos commits to completion of the site verification program using the same methodology as the initial site verification program already completed. The surveys will be undertaken with Aboriginal people including representatives nominated by the Gomeroi.

NTSCORP letter 2	<p>The site verification program appears only to be related to known sites. While we acknowledge that Santos has provided some measures in the event of a finding a new cultural heritage site in the project area, it is unclear how new sites will be located so as to be avoided before construction begins.</p>	<p>All known sites at the time of EIS submission within the project area (see the assessment report for all known sites) will be verified and avoided by the project.</p> <p>There is a commitment to undertake an Additional Research Program that would focus on ethnographic sites and all sites identified will be avoided. Ground disturbance activities (construction) will only be carried out after a pre-clearance survey has been completed with the Aboriginal community, in accordance with the terms of the CHMP, using a differential (very accurate) GPS. The Avoidance Principle and commitments to avoidance of the most sensitive site types using highly accurate data will also be implemented in accordance with the commitments in the assessment report and the CHMP.</p>
NTSCORP letter 2	<p>The Gomeri Applicant supports an Avoidance Principle being implemented with regard to cultural heritage sites. In relation to the table at section 5.3.2 of the ACHA and Schedules 3 and 4 of the CHMP, the Avoidance Principle should be applied to all site types and project infrastructure should not be located at any cultural heritage site.</p>	<p>All known sites at the time of EIS submission within the project area (see the assessment report for all known sites) will be verified and avoided by the project.</p> <p>Ground disturbance activities (construction) will only be carried out after a pre-clearance survey has been completed with the Aboriginal community, in accordance with the terms of the CHMP, using a differential (very accurate) GPS. The Avoidance Principle and commitments to avoidance of the most sensitive site types will also be implemented in accordance with the commitments in the assessment report and the CHMP.</p> <p>Low-sensitivity sites will only be impacted under strict conditions after meaningful attempts to give effect to the Avoidance Principle in the first instance with formally quantified criteria to be applied in all cases and in consultation with the Aboriginal community through the processes set out in the CHMP.</p>
NTSCORP letter 2	<p>We note Santos comments that the meetings held on 2 – 4 September 2014, outlined at section 3.2 of the ACHA, were the first round of the consultation process, rather than an information session. We note that, in accordance with the description of these meetings as at section 3.2 of the ACHA, the format and content of the meetings was consistent with that of an information session, and should be regarded as such.</p>	<p>The OEH requirements for consultation have been followed explicitly, including advertising seeking Aboriginal people to register interest and the provision of detailed information about the project. Additional Aboriginal people or organisations who have come forward during the consultation period have also been registered and provided the complete package of information given to RAP's.</p> <p>Santos also notes that in excess of 550 RAPs have been registered for the project, all of whom have been provided hard copies of draft documents, written advice about meeting dates, the offer of site visits, invitations to make submissions and Santos contact details (phone, email and office address) etc.</p> <p>The OEH consultation requirements include the provision of all information about the project, and the proposed assessment methodology. Follow up consultation meetings were held in Gunnedah, Wee Waa and Narrabri following the meetings of 2-4 September.</p>

NTSCORP letter 2	<p>With regard to the Right to Negotiate process, the Gomeri Applicant have raised the concern that Santos is pledging financial benefits to other organisations in the Narrabri region, under a community benefit fund, as mentioned under section 4.1 of Santos' tabled responses to issues raised at the Narrabri meeting 18 November 2014. We note that the Right to Negotiate process has not concluded in relation to this matter and that the aim of the process is to provide appropriate benefits to Gomeri People.</p>	<p>The proposed Regional Community Benefit fund is separate to the Right to Negotiate process.</p>
NTSCORP letter 2	<p>As previously stated the Gomeri Applicant support- the creation of the Aboriginal Cultural Heritage Working Group. However, the Gomeri Applicant wish to note that the system proposed does not necessarily ensure that an appropriate Gomeri person who can speak for country will be nominated as cultural heritage officer or that appropriate Gomeri people will be nominated for cultural heritage officer roles in pre-clearance survey teams. Provisions must be made in the CHMP ensuring the</p>	<p>Santos has established the Aboriginal Cultural Heritage Working Group as the most effective mechanism to determine appropriate people to be nominated as Cultural Heritage Officers. The composition of the ACHWG reflects the key local and regional stakeholders for cultural heritage management and responds to the Gomeri People's position of 8 October 2014 that cooperation between Gomeri Applicants and Local Aboriginal Land Councils represents best practice. It also aligns with the OEH Requirements regarding this specified in the Secretary's requirements. Ultimately the Aboriginal community, including the Gomeri, will determine who is involved in pre-clearance surveys.</p>

	appropriate people are nominated for these roles.	
NTSCORP letter 2	<p>Section 4.10 of the CHMP consultation draft states that Santos will provide site induction training to employees and contractors working in the project area and ensure the training includes information about Aboriginal cultural heritage and the provisions of the CHMP. Santos should ensure that the information provided about Aboriginal cultural heritage is specific and is provided as early as possible in the cultural heritage assessment process. Section 4.10 should detail the nature of the training and information to be provided to employees and contractors. Santos must ensure that only employees and contractors who have undertaken this training be involved in the cultural heritage assessment process.</p>	<p>Santos will consult with the ACHWG in finalisation of the cultural heritage induction for the project. The induction will be compulsory and focuses on cultural heritage information and processes and must be successfully completed before employees and contractors enter the field.</p>
NTSCORP letter 2	<p>We note that the site verification process outlined at section 4.5 of the CHMP consultation draft is necessary to ensure more accurate data is collected about cultural heritage sites within the project area. However, as mentioned above, Santos must ensure that appropriate Gomeroi People form part of the field</p>	<p>In the assessment report Santos commits to completion of the site verification program using the same methodology as the initial or pilot site verification program completed. The surveys will be undertaken with Aboriginal people including representatives nominated by the Gomeroi.</p>

	survey teams for the purposes of the program. Santos must also ensure that Gomeroi People are consulted as part of the additional research program outlined at section 4.6 of the CHMP.	
NTSCORP letter 2	We note that while there are 90 known specific sites of cultural significance within the project area, the entire Pilliga area is of high cultural value to the Gomeroi People. Gomeroi People believe that to date there has been no assessment of the project's impact on totemic species or cultural water flows in the area. For this reason, an ethnographic report should be undertaken to qualify and evaluate the information gained from the specific site inspections.	<p>Information on broader cultural values was expressly sought from the Aboriginal community, including through the consultation meetings.</p> <p>A broad definition of Aboriginal cultural heritage has been and will continue to be adopted. Ethnobotanical data and other cultural information has been reviewed and included – that information derives from parties who are RAPs for the project. Santos recognises that there may be further information to be elicited which has prompted provision for the Additional Research Program and subsequent management in accordance with commitments and processes in the CHMP. The Additional Research Program is intended to collate data for management on precisely the issues that have been raised in the submission.</p> <p>The impact of the project on surface water, surface water flows and shallow groundwater is predicted to be negligible.</p>
NTSCORP letter 2	We note that the sensitivity zones should extend outside the project area to ensure that access tracks to the project area and other areas that may be accessed by Santos and its contractors can be adequately protected.	The Sensitivity Zones do include areas beyond the boundary of the Project Area. In actual fact they cover an area more than twice the size of the Project Area.
NTSCORP letter 2	The Gomeroi Applicant acknowledges the reference to the role of the Burra Charter (The Australia ICOMOS Charter for Places of Cultural Significance, 2013) in that	Santos welcomes this acknowledgement of its commitment to following best practice in the management of Aboriginal cultural heritage.

	process and its use in the assessment of significance.	
NTSCORP letter 2	The CHMP consultation draft does not expressly acknowledge cultural information received as a result of the CHMP to be Gomeroi intellectual property. The CHMP should expressly address the issue that information gathered which pertains to Gomeroi culture and heritage is the intellectual property of Gomeroi People.	<p>The ownership, security and ongoing management of cultural heritage data has been discussed extensively in the various consultation meetings. The management of this information is currently determined by the NSW Government under legislation and policy.</p> <p>Santos acknowledges and agrees with the philosophy that Aboriginal people should hold and manage information about their heritage. Ongoing management of cultural heritage information will need to be negotiated with the Aboriginal community and NSW Government.</p>
NTSCORP letter 2	Santos should specifically state in the CHMP how Registered Aboriginal Parties ( <b>RAPs</b> ) can be involved in cultural heritage management, aside from involvement in the Aboriginal Cultural Heritage Working Group.	The CHMP includes all relevant references to the role of RAPs in the implementation of the Plan.
NTSCORP letter 2	As stated above, the systems in place to achieve Aboriginal involvement in the assessment process are inadequate in terms of ensuring that appropriate Gomeroi People who can speak for country are part of the field survey teams. The CHMP must include provision that appropriate Gomeroi People are included in the cultural heritage assessment process to ensure the proper representation of Gomeroi knowledge in the	Santos has established the Aboriginal Cultural Heritage Working Group as the most effective mechanism to determine appropriate people to be nominated as Cultural Heritage Officers. The composition of the ACHWG reflects the key local and regional stakeholders for cultural heritage management and responds to the Gomeroi People's position of 8 October 2014 that cooperation between Gomeroi Applicant and Local Aboriginal Land Councils represents best practice. They are also informed by and align with the OEH requirements included in the Secretary's requirements. Ultimately the Aboriginal community, including the Gomeroi, will determine who is involved in pre-clearance surveys.

	information gathered as part of that process.	
NTSCORP letter 2	<p>We note that Santos has stated in the document attached to its email of 19 December 2014 that it has programs in place to ensure that contamination of underground water does not occur. More detail on the extent and nature of these programs should be provided in the CHMP. We note the importance of communicating the progress of any ongoing water monitoring or management programs that Santos has in place in the area to the Gomeroi People. The CHMP should make provisions for the continual reporting of information on the monitoring and management of water to the Gomeroi People.</p>	<p>Information regarding the project, including drilling techniques, standards and codes as well as the water monitoring program and water portal was presented to and discussed with RAPs. Santos will comply with the <i>Code of Practice for Coal Seam Gas: Well Integrity</i> (NSW Government 2012). The code defines standard practice for well design and construction to prevent environmental harm, particularly to groundwater resources. Full detail will be in the EIS when it is exhibited.</p> <p>All RAP's including the Gomeroi Native Title applicant can review the full EIS when it is publicly exhibited.</p>
NTSCORP letter 2	<p>We note that the proposed 5 year review period outlined at section 5.3 of the CHMP consultation draft allows for a period of time to elapse in which extensive damage to Gomeroi cultural heritage may occur. The CHMP should provide for more regular reviews over the life of the project to ensure that the CHMP is operating effectively to protect Gomeroi culture and heritage.</p>	<p>All known sites at the time of EIS submission within the project area (see the assessment report for all known sites) will be verified and avoided by the project.</p> <p>There is a commitment to undertake an Additional Research Program that would focus on places and values of <b>particular</b> traditional, anthropological, historical and contemporary significance to Aboriginal people and all places and values of <b>particular</b> traditional, anthropological, historical and contemporary significance to Aboriginal people identified will be avoided. Ground disturbance activities (construction) will only be carried out after a pre-clearance survey has been completed with the Aboriginal community, in accordance with the terms of the CHMP, using a differential (very accurate) GPS. The Avoidance Principle and commitments to avoidance of the most sensitive site types will also be implemented in accordance with the commitments in the assessment report and the CHMP.</p> <p>Low-sensitivity sites will only be impacted under strict conditions and in consultation with the Aboriginal community through the processes set out in the CHMP.</p>

	<p>Santos should ensure that the annual report outlined at section 5.1 of the CHMP consultation draft is accessible to Gomeri People. We note the importance of regularly communicating on the effectiveness of the CHMPs implementation with Gomeri People.</p>	<p>Accordingly, Santos does not agree that there will be an extended period of time in which extensive damage will occur.</p> <p>The implementation of the project, including the various commitments in the assessment report and provisions of the CHMP are proposed to be subject to annual reviews and third party audits every three years. These details will be in the full EIS when exhibited.</p> <p>Santos has considered the timing of the CHMP review and is of the view that given the compliance review and third party audits for the project, as well as the CHMP annual reporting to OEHL, the timing is appropriate.</p> <p>Santos will make the OEHL Annual Report available to the ACHWG.</p>
NTSCORP letter 2	<p>The Gomeri Applicant look forward to further discussing the process on how to greater integrate Gomeri People in the evaluation of impact of development, particularly on their culture and heritage. While we note, that no one proponent operating in NSW can influence the regulatory scheme in NSW, both Santos and the Gomeri Applicant agree that items, sites and areas must be properly identified and impact must be mitigated.</p>	<p>Santos welcomes this sentiment and is committed to working with the Gomeri Applicant on cultural heritage management arrangements.</p>
NTSCORP letter 2	<p>The Right to Negotiate process under the NTA afforded to the Gomeri People in relation to the Narrabri Gas Project is an opportunity to negotiate and implement measures ensuring best practice cultural heritage management systems are implemented, those over and above those contemplated by</p>	<p>Santos recognises the Gomeri People's unique native title rights and interests as a registered native title claim and that discussions and negotiations regarding cultural heritage management will be ongoing. Santos notes that the measures it proposes to adopt do go beyond the current cultural heritage framework.</p>

	the NSW current cultural heritage framework.	
Narrabri LALC letter	Narrabri Local Aboriginal Land Council would like firstly to state this project operates within our land and boundary as Gazetted under the NSW Aboriginal Land Rights Act 1983 (sic) for the past 32 years we have been working to make our community for the betterment of all Aboriginal people and work closely with the wider community and organisations. As we have 95% of land within this project the impact on Culture and Heritage protection within this boundary is of the utmost importance.	Santos acknowledges that the proposed project is located primarily within the Narrabri LALC boundary and has been working closely with Narrabri LALC as a key stakeholder. Santos also acknowledges the importance of culture to Aboriginal people which is why it has consulted widely with Aboriginal people on the management of Aboriginal Cultural heritage in order to develop the best possible avoidance and management regime.
Narrabri LALC letter	There are rules on Culture and Heritage Management within our organisation, firstly for the protection. Many of our 228 members are knowledge holders, accredited Sites Workers and also local Gomeroi Traditional Owners and members who have close connection to this country. This land is in safe keeping for all to share. Our members are the people who make decisions for Narrabri Local Aboriginal Land Council.	<p>Santos acknowledges the commitment of Narrabri LALC to heritage protection and notes the large number of RAPs who registered and participated in consultation who are Narrabri LALC members. The depth of cultural knowledge held by Narrabri LALC members and the footprint of the proposed project location in respect of the LALC boundary are key reasons for Narrabri LALC representation on the proposed ACHWG. It is Santos' intention that the composition of the ACHWG reflects the key local and regional stakeholders for cultural heritage management.</p> <p>The ownership, security and ongoing management of cultural heritage data has been discussed extensively in the various consultation meetings. The management of this information is currently determined by the NSW Government under legislation and policy.</p> <p>Santos acknowledges and agrees with the philosophy that Aboriginal people should be the holders and managers information about their heritage. Ongoing management of cultural heritage information will need to be negotiated with the Aboriginal community and NSW Government.</p>
Narrabri LALC letter	We have been involved with Cultural and Heritage Protection with Eastern Star	Noted. Santos acknowledges the role that Narrabri LALC played in the Southern Brigalow Bioregion assessment and the importance of that information to our understanding of the region's cultural heritage values. We note the substantial period of time over which Narrabri LALC has taken an

	<p>Gas prior to the Brigalow Belt South Bioregion Assessments 2002. Through this process we had the opportunity of ensuring Culture and Heritage was a priority and protected, before all works would commence. When Santos Pty Ltd had taken over from Eastern Star Gas initial meetings were held and since with the development of new Culture and Heritage Protection.</p>	<p>active role in cultural heritage management in the region. Consistent with previous practice, Santos is committed to field survey prior to ground disturbance activities as set out in the Draft ACHMP and the operation of the proposed ACHWG will ensure Narrabri LALC participation in this.</p>
Narrabri LALC letter	<p>Narrabri Local Aboriginal Land Council registered all 228 members as interested parties, to give an opportunity of speaking in relation to the project and the development of the CHMP. Community Forums were held as information sessions, other RAP's also attended to gather and give views on the project. The appropriateness and thoroughness of the community consultations whether they were informal or organised sessions, were a must and at these meetings there was an opportunity for verbal submissions. The main focus was for culturally appropriate recognition of the importance of protection of sites and the significance of each one individually. And given the nature of the project – be ongoing, incremental footprint</p>	<p>Santos welcomes this sentiment and is committed to working with the Narrabri LALC and others on cultural heritage management arrangements.</p>

	has already been put into place. The impact assessment was robust and management measures practical.	
Narrabri LALC letter	<p>Narrabri Local Aboriginal Land Council appreciates the role Santos played in pulling together all the cultural heritage information from the various studies into one place, providing it to the Narrabri Local Aboriginal Land Council (with resources to manage it) and thus empowering us to have a role in decision making, continuing to walk country, assessing our heritage and having control over the information relating to it. We fully support the approach because of this has it given us the opportunity and a focus to be able to be negotiating better outcomes for protection of our Culture and Heritage.</p>	<p>Santos welcomes this sentiment. The ownership, security and ongoing management of cultural heritage data has been discussed extensively in the various consultation meetings. The management of this information is currently determined by the NSW Government under legislation and policy.</p> <p>Santos acknowledges and agrees with the philosophy that Aboriginal people should be the holders and managers information about their heritage. Ongoing management of cultural heritage information will need to be negotiated with the Aboriginal community and NSW Government.</p> <p>Santos is committed to working with the Narrabri LALC on cultural heritage management arrangements.</p>
Narrabri LALC letter	<p>The consultation draft (18/11/2014) for Cultural Heritage Management Plan Narrabri Gas Project is information that has been put forward from Community Forums meetings with other interested parties.</p> <p>There is a general consensus on certain ideas from all Community Forums as this information was shared.</p>	<p>Santos incorporated many of the comments received during the first round of consultation into the Draft ACHMP presented for comment at the RAP meeting of 18/11/14.</p>

<p>Narrabri LALC letter</p>	<p>Narrabri Local Aboriginal Land Council is in support of the CHMP and the implementation, however in relation to Aboriginal Cultural Heritage Working Group (ACHWG).</p> <p><b>Please note the following:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Narrabri Local Aboriginal Land Council should be engaged as the organisation to manage this project as well as be Cultural Heritage Coordinator</li> <li><input type="checkbox"/> Utilising the current system GIS mapping all information is in our control</li> </ul>	<p>Santos appreciates this sentiment.</p> <p>Santos will engage with the Aboriginal community in the finalisation of the CHMP. Santos expects that arrangements regarding the ACHWG and Cultural Heritage Coordinator will continue to be debated and discussed until the CHMP is final.</p> <p>Santos is committed to supporting the Narrabri LALC capacity to gather and manage cultural heritage information and has demonstrated this commitment to date by providing data and resources to manage the information. This will continue.</p>
<p>Narrabri LALC letter</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Membership Governance</li> <li><input type="checkbox"/> Santos or an Independent Chair</li> <li><input type="checkbox"/> N.L.A.L.C (3 reps)</li> <li><input type="checkbox"/> Gomerioi NT (4 reps)</li> <li><input type="checkbox"/> Wee Waa LALC (1 rep), however if WWLALC is not operating as per RAS (NSWALC regulations fully funded) Local GOMEROI Narrabri Aboriginal Corporation representative</li> </ul>	<p>Santos has established the Aboriginal Cultural Heritage Working Group as the most effective mechanism to determine appropriate people to be nominated as Cultural Heritage Officers. The necessary skills for the coordinator will be clarified by Santos in the CHMP. The composition of the ACHWG reflects the key local and regional stakeholders for cultural heritage management and responds to the Gomerioi People's position of 8 October 2014 that cooperation between Gomerioi Applicant and Local Aboriginal Land Councils represents best practice. It also aligns with the OEH Requirements regarding this specified in the Secretary's requirements. Ultimately the Aboriginal community, including the Gomerioi, will determine who is involved in pre-clearance surveys.</p>
<p>Narrabri LALC letter</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Rules on Culture and Heritage for Aboriginal People</li> <li><input type="checkbox"/> Sites workers will consist of people from throughout the Nation</li> </ul>	<p>Santos has established the Aboriginal Cultural Heritage Working Group as the most effective mechanism to determine appropriate people to be nominated as Cultural Heritage Officers. The necessary skills for the coordinator will be clarified by Santos in the CHMP. The composition of the ACHWG reflects the key local and regional stakeholders for cultural heritage management and responds to the Gomerioi People's position of 8 October 2014 that cooperation between Gomerioi Applicant and Local Aboriginal Land Councils represents best practice. It also aligns with the OEH</p>

	<ul style="list-style-type: none"> <li>o A register of sites workers will be developed from all RAP's</li> <li>o Identified protestors against the project not be engaged for works</li> </ul>	<p>Requirements regarding this specified in the Secretary's requirements. Ultimately the Aboriginal community, including the Gomeroi, will determine who is involved in pre-clearance surveys.</p>
Narrabri LALC letter	<ul style="list-style-type: none"> <li><input type="checkbox"/> The "roles" for Santos for the activity.</li> <li>o Avoidance</li> <li>o Commitment</li> <li>o Avoidance/Principle</li> <li>o Disturbance – gets surveyed</li> <li>o Work program</li> <li>o What, where, when, how</li> <li>o Pre meeting</li> <li>o Agree arrangement</li> <li>o Pre-clearance survey</li> <li>o Assessment, findings recommendation (CHWG)</li> <li>o Santos updating Narrabri Local Aboriginal with any new information of any new sites recorded.</li> </ul>	<p>There is a comprehensive approach to identifying cultural heritage sites in advance of construction activity, and extensive and binding commitments to site avoidance.</p> <p>Santos is committed to supporting the Narrabri LALC capacity to gather and manage cultural heritage information and has demonstrated this commitment to date by providing data and resources to manage the information. This will continue.</p>
Narrabri LALC letter	<p>Our main focus with working closely with Gomeroi NT Applicants is specifically for Culture and Heritage Management. Narrabri Local Aboriginal Land Council fully supports the opportunity of Gomeroi NT Applicants negotiating with Santos for better outcomes financially for their group; however we feel</p>	<p>Santos has established the Aboriginal Cultural Heritage Working Group as the most effective mechanism to determine appropriate people to be nominated as Cultural Heritage Officers. The necessary skills for the coordinator will be clarified by Santos in the CHMP. The composition of the ACHWG reflects the key local and regional stakeholders for cultural heritage management and responds to the Gomeroi People's position of 8 October 2014 that cooperation between Gomeroi Applicant and Local Aboriginal Land Councils represents best practice. It also aligns with the OEH Requirements regarding this specified in the Secretary's requirements. Ultimately the Aboriginal community, including the Gomeroi, will determine who is involved in pre-clearance surveys.</p> <p>Santos will continue to discuss with the Narrabri LALC how the organisation can be engaged on an ongoing basis, including commercial opportunities.</p>

	that we as the Narrabri Local Aboriginal Land Council will become a commercial business within this project this will give us the opportunity of assisting the local Gomeroi Narrabri Aboriginal Corporation.	
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