6.13 Cultural Heritage

6.13.1 Indigenous Cultural Heritage

6.13.1.1 Introduction

Santos' vision is to take a long term view on supporting the building of a sustainable future for the communities in which the company operates.

Santos has established an Aboriginal Engagement Policy (AEP) as one of the tools through which the company can build sustainable relationships and support Aboriginal people and communities. The AEP commits Santos to greater than minimal legal compliance in the company's relations with Aboriginal persons and enables the company to manage risk in engagement with Aboriginal peoples in terms of cost, delay and legal action. Importantly, the AEP provides a sustainable platform for the aspirations of Aboriginal people in their dealings with the company.

Santos has adopted an avoidance or harm minimisation approach to cultural heritage in the development of the GLNG Project. The approach has been developed in cooperation and consultation with some of the Aboriginal Parties.

6.13.1.2 Methodology

In accordance with Part 7, section 34 of the *Aboriginal Cultural Heritage Act (2003)* (ACHA), where category A and B Aboriginal Parties and areas covered by registered Aboriginal cultural heritage bodies exist, Santos has sent or will send formal notifications of its intention to develop cultural heritage management plans (CHMPs) with the Aboriginal Parties. Parties who respond to these notifications are endorsed by Santos as required by the ACHA. The philosophy behind the CHMPs is to avoid harm to cultural heritage in the first instance and if that cannot be achieved then a harm minimisation approach will be adopted. The status of this process is described in Section 6.13.1.4

Santos maintains a cultural heritage management system to ensure that all construction work is conducted according to the CHMPs and the ACHA.

As part of the Santos EHSMS, the Environmental Hazard Standard 11 (EHS11) Indigenous Cultural Heritage Management ensures that processes are developed, implemented, and assessed to prevent impact to Aboriginal cultural heritage from Santos operations within Australia and to ensure that all relevant statutory cultural heritage requirements are complied with. The EHS11 is supported by cultural heritage field personnel and a cultural heritage management system which ensures that construction work is undertaken according to the CHMPs and the ACHA.

Desktop Review

Potential cultural heritage sites were identified though desktop searches of commonwealth, state and local heritage registers and consultation with the local community and government agencies. Additional heritage sites were identified during consultation and targeted site surveys, as identified below.

Registers searched as part of the review included:

- World Heritage List (UNESCO);
- National Heritage List (Australian Heritage Commission);
- Commonwealth Heritage List (Australian Heritage Commission);
- Register of National Estate (Australian Heritage Commission);
- Queensland Heritage Register (Environment Protection Agency);
- Local council heritage registers; and

- Queensland Government registers and lists including the Queensland Department of Main Roads (DMR) Heritage Inventory and the Queensland Rail (QR) Heritage Register.

Consultation

Liaison with the EPA, the Roma Historical Society and potentially affected landowners was undertaken using both formal and informal discussions. The meetings aimed to identify any potential sites of historical heritage unknown to authorities. All meetings were recorded in consultation logs and are contained in full in Appendix X.

Sites identified during consultation were included in the field survey program outlined below.

Field Survey

The results of the desktop review were used to develop a targeted field survey aimed at ground-truthing the list of heritage and archaeological sites (HAS) developed from register searches, stakeholder consultation and analysis of historic maps. The survey aimed to locate potential HAS and establish their significance and potential for impact associated with the gas transmission pipeline corridor. Some of the sites identified are located proximate to both the CSG fields development and the gas transmission pipeline corridor (HAS-20) and have been considered in both Section 6.13 and in this section.

The field survey for the gas transmission pipeline corridor was undertaken in two parts:

- Part 1 - initial reconnaissance: conducted between 25 and 30 May 2008; and
- Part 2 - detailed assessment: conducted between 13 and 18 July 2008.

6.13.1.3 Regulatory Framework

The following section discusses both National and State Legislation relevant to indigenous cultural heritage and the best practice guideline, *The Burra Charter* (Marquis-Kyle and Walker 1999).

National Legislation

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* provides Aboriginal people with the right to request the Federal Minister for Aboriginal Affairs to intervene through an injunction in cases where they consider that their cultural heritage is at risk. The Act does not determine significance, or limit the type and place for which protection is being sought.

Australian Heritage Council Act 2003

The *Australian Heritage Council Act 2003,* provides for the establishment of the Australian Heritage Council, which is the principal advisory group to the Australian Government on heritage matters. This act also provides for the registration of places considered of National significant on the Register of the National Estate (RNE) or the Australian Heritage Places Inventory (AHPI). The RNE was frozen on the 19th February 2007, which means that no new places can be added to or removed from the RNE. Nonetheless, the RNE will continue as a Statutory Register until February 2012. This transition period allows States, Territories, local governments and the Australian Government to complete the task of transferring places to appropriate heritage registers where necessary and to amend legislation that refers to the RNE as a statutory list.

Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) is the key piece of legislation for the Commonwealth Government to manage the environment and heritage aspects of the country. The EPBC Act provides for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance. Among other things

the Act also promotes biodiversity conservation and heritage protection and recognises the role of Indigenous people in the conservation of Australia's biodiversity.

In relation to heritage, the EPBC Act provides for the Commonwealth Heritage List and the National Heritage List. The Commonwealth Heritage List includes Commonwealth areas that have values (whether natural, indigenous, historic or other) of significant value to Australia. The National Heritage List includes natural, historic and indigenous places of outstanding heritage value to the nation.

Native Title Act 1993

The Commonwealth *Native Title Act 1993* (Cth) (NT Act) (together with the *Native Title (Queensland) Act 1993* (Qld)) formalises the common law recognition of native title (i.e. rights and interests over land and water possessed by Indigenous people in Australia under their traditional laws and customs). The NT Act confirms that native title has been extinguished to areas subject to certain historical exclusive tenures (such as freehold), but has not been extinguished by non-exclusive tenures (such as pastoral leases). The NT Act also mandates procedural requirements for the grant of any rights that may impact on native title rights and interests that exist which must be followed in order to ensure the grant is valid.

State Legislation

Aboriginal Cultural Heritage Act 2003

The paramount legislation in Queensland with regard to Aboriginal cultural heritage is the ACHA. Under the ACHA Aboriginal cultural heritage includes items and areas where there is no physical manifestation of human use, but that are culturally significant to Aboriginal people. It also includes places of archaeological or historical significance. Aboriginal cultural heritage is defined as anything that is a significant Aboriginal area in Queensland, or a significant Aboriginal object or evidence or archaeological or historic significance pertaining to Aboriginal occupation of an area of Queensland.

The ACHA imposes a duty of care on all persons to ensure that Aboriginal cultural heritage in the project area is protected or appropriately managed. Although the ACHA provides for a number of methods to meet this duty of care, Part 7 (section 87) of the ACHA provides that if an EIS is required for a project, no lease, licence, permit, approval or other authority required for the project can be granted unless a CHMP for the project area has been developed with the relevant Aboriginal Parties and approved by the Chief Executive of DNRW or the authority is given subject to conditions to ensure that no excavation, construction or other activity takes places without an approved CHMP. As such, Santos is required to meet the duty of care only through the development of CHMPs with the relevant Aboriginal Parties within the GLNG Project area.

Queensland Heritage Act 1992

The *Queensland Heritage Act 1982* (Qld) (QH Act) provides for the conservation of Queensland's historical cultural heritage for the benefit of the community and future generations. Among other things it provides for the protection of cultural heritage (including archaeological artifacts and protected areas) and regulates development affecting the cultural heritage significance of registered places.

The Burra Charter

The Burra Charter guides cultural heritage management in Australia. First adopted in 1979 by Australia International Council on Monuments and Sites (ICOMOS), the Charter was initially designed for the conservation and management of historic heritage and has become an international best-practice guideline for historic and Indigenous heritage conservation.

The Charter defines conservation as *'the processes of looking after a place so as to retain its cultural significance'* (Article 1.4). A place is considered significant if it possesses aesthetic, historic, scientific or social value for past, present or future generations (Article 1.2).

Article 2.6 of the Guidelines notes that other categories of cultural significance may become apparent during the course of assessment of particular sites, places or precinct. A range of cultural significance values may apply. Article 5 of the Burra Charter states that:

> *"Conservation of a place should identify and take into consideration all aspects of its cultural significance without unwarranted emphasis on any one aspect at the expense of others (Marquis-Kyle and Walker 1999)."*

Every place has a history, aesthetic value or a social meaning to some member of a community. Most places therefore meet some of the criteria prescribed above. It is, however, neither possible nor desirable to conserve every place. Some measures must be applied to these broad criteria in order to determine the degree of significance. The degree to which a place is significant will determine the appropriate conservation management for that place.

6.13.1.4 Existing Environmental Values

Santos has taken, and continues to take, appropriate steps to identify the correct Aboriginal Parties who are given standing under the ACHA to speak for Aboriginal cultural heritage within the project area. The ACHA prescribes that the correct people to be considered as Aboriginal Parties include those who have a current registered Native Title Claim; those groups who had a previously registered Native Title Claim (in areas where there is no current registered claim) and interested parties for areas where no previous or current registered Native Title claim exists (identified through a public notification process or by reference to a registered Aboriginal cultural heritage body). Currently known Aboriginal Parties for the GLNG Project are set out below in Table 6.13.1. Figure 6.13.1 shows the Aboriginal Parties in the CSG fields.

Table 6.13.1 Aboriginal Parties within the GLNG Project Area

Category of Aboriginal Party	Name of Party	Section of Project
A. Current registered Native Title claims.	Iman People #2 (QC97/55).	CSG fields and gas transmission pipeline.
	Karingbal People (2 claim areas - (QC06/19) and (QC06/5).	CSG fields and gas transmission pipeline.
	Bidjara People (QC08/5).	CSG fields and gas transmission pipeline.
	Gangulu People (QC97/36).	Gas transmission pipeline.
	PCCC (QC01/29).	Gas transmission pipeline, LNG facility, marine facilities, bridge and road
	Kangoulu People (QC98/25).	CSG fields.
B. Previous registered Native Title claims.	Mandandanji People.	CSG fields.
	Barunggam (QC99/005).	CSG fields.
C. Areas where public notification/ reference to registered Aboriginal cultural heritage bodies is required to identify correct Aboriginal Party.	Gap Area A (Adjacent to Karingbal People's claim and claimed by Karingbal People only following public notification process).	CSG fields and gas transmission pipeline.
	Gap Area B (Between Karingbal Claims and Gangulu Claim and claimed by numerous parties following public notification process).	Gas transmission pipeline.

Category of Aboriginal Party	Name of Party	Section of Project
	Gap Area C (Santos operated tenements between Kangoulu (QC98/25) and Bidjara (QC08/5) claim areas – area is responsibility of Yumba Burin Heritage Association Inc, a registered Aboriginal cultural heritage body - engagement yet to occur).	CSG fields.
	Gap Area D (Santos operated tenement west of Mandandanji People).	CSG fields.

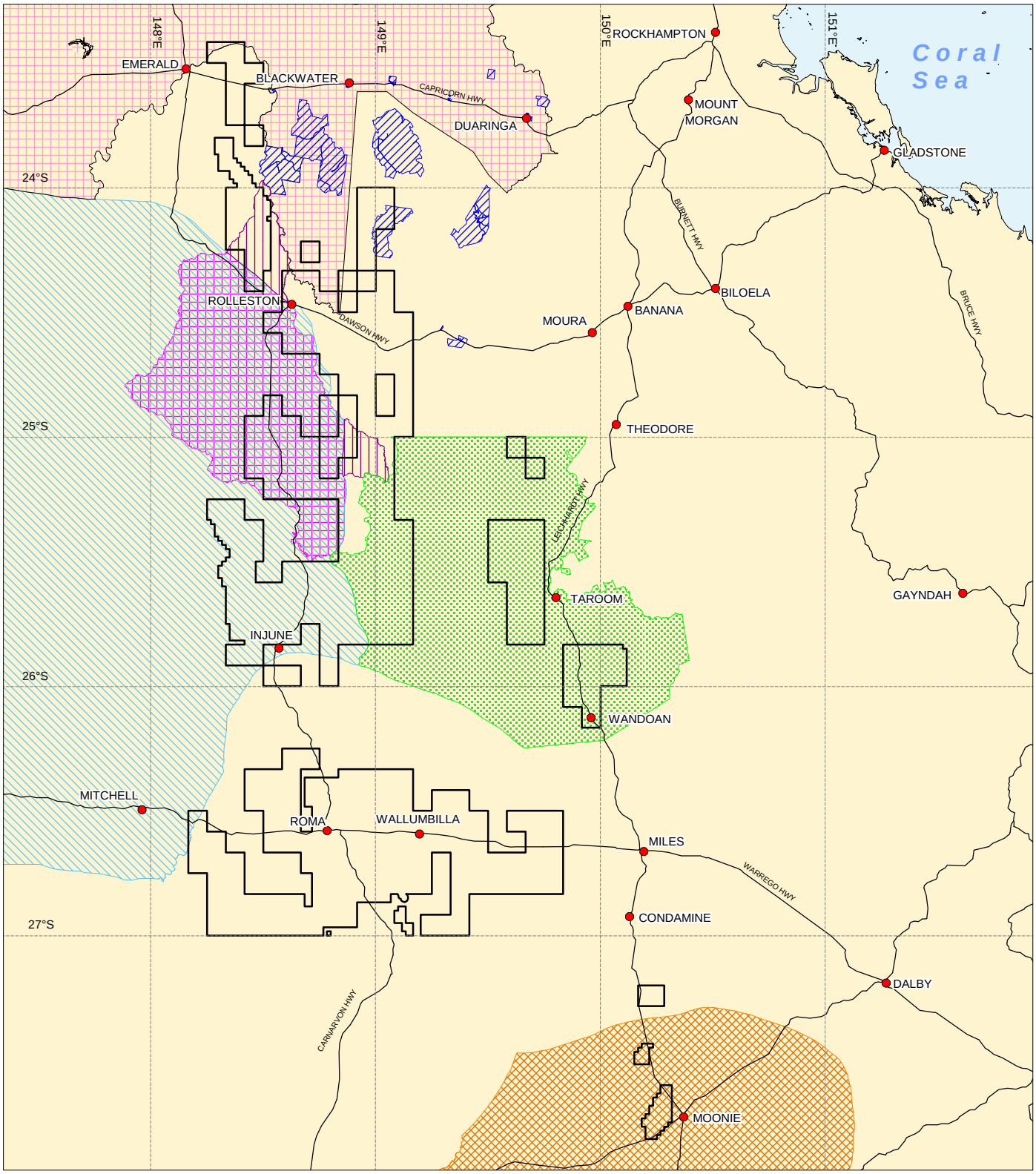
Santos is seeking to negotiate, or has already negotiated, CHMPs with the relevant Aboriginal parties for the entire area of the GLNG Project. Where category A or B Aboriginal Parties do not currently exist and there is no registered Aboriginal cultural heritage body for an area, public notifications are made pursuant to Part 7, Section 35 of the ACHA. Those people who respond in the prescribed time-frame are endorsed as Aboriginal Parties.

Meetings with the Aboriginal Parties to develop CHMPs commenced in April 2008. If Santos is unable to negotiate a CHMP with any of the Aboriginal Parties, then the matter can be brought before the Land Court for determination.

Table 6.13.2 indicates the status of CHMP negotiations as at February 2009.

Table 6.13.2 Status of CHMP Negotiations as at January 2009

Group	Negotiation Commenced	CHMP Agreed	CHMP to DNRW for Registration
Group A.			
PCCC.	Yes.	Yes.	March 2009.
Gangulu.	Yes.	No - agreement sought by March 2009.	Registration sought by April 2009.
Karingbal and Karingbal #2.	Yes.	Yes.	March 2009.
Bidjara.	Yes.	Yes.	March 2009.
Iman #2.	Yes.	Yes.	March 2009.
Kangoulu.	Yes.	No - agreement sought by April 2009.	Registration sought by April 2009.
Group B.			
Mandandanji.	Yes.	Yes.	March 2009.
Barunggum.	No – intend to commence in March 2009.	No.	Registration sought by May 2009.
Group C.			
Gap Area A.	Yes.	Yes.	March 2009.
Gap Area B.	Yes.	No - agreement sought by March 2009.	Registration sought by April 2009.
Gap Area C.	No – intend to commence in March 2009.	No.	Registration sought by May 2009.
Gap Area D.	No – intend to commence in March 2009.	No.	Registration sought by May 2009.



Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
ABORIGINAL PARTIES AND CULTURAL HERITAGE BODIES WITHIN CSG FIELDS

Drawn: CA	Approved: JB	Date: 04-03-2009	Figure: **6.13.1**	Rev:A
Job No: **4262 6220**	File No: 42626220-g-1020.wor			**A4**

Indigenous Cultural Heritage Values

The nature and distribution of many forms of Indigenous cultural heritage in a landscape is in part associated with environmental factors such as geology, climate and landforms which affect the availability of plants, animals and water, the location of suitable camping places and suitable surfaces upon which rock art could be performed. Such environmental factors also affect the degree to which cultural remains have survived natural and human-induced processes. In addition, European land-use practices often destroy or disturb artifacts from their original location and condition.

The extent of vegetation and the nature of erosion and deposition regimes also affect the visibility of cultural remains and hence the chances of their detection during ground surveys. Likewise, non indigenous land-use practices can disturb artifacts from their original context of deposition.

It is expected that cultural heritage surveys will define areas and sites of cultural significance that occur within the GLNG Project area. These may include sites containing physical evidence, such as artifact scatters and scarred trees. In addition, sites that contain no physical evidence of human occupation may also be defined. For example, these may include ceremonial and special sites, or may consist of varieties of native food plants.

As part of the CHMPs, the survey findings will remain confidential and will not be disclosed to the public. Rather, findings will be subject to the management measures set out in management plans that are contemplated in the CHMPs.

Baseline Aboriginal Heritage Assessment

Desktop Review

Desktop searches of the following registers and databases were undertaken:

- The Department of Natural Resources and Water (DNRW) register and database;
- The (former) Register of the National Estate (Australian Heritage Commission);
- World Heritage List (UNESCO);
- National Heritage List (Australian Heritage Commission); and
- The Commonwealth Heritage List (Australian Heritage Commission).

A combined total of 501 sites were identified on the DNRW register and database and by Santos across the three area components of the GLNG Project (see Appendix Y for details). Dominant site types across the GLNG Project area include art sites, isolated artifacts and artifact scatters, culturally marked trees, camp sites and shell middens. The registered and reported sites located within the Roma, Fairview and Arcadia Valley CSG fields are presented below in Figures 6.13.2 to 6.13.3.

Previous Studies and Academic Research

The CSG fields comprise parcels of land within the Bowen and Surat Basins roughly extending from Emerald in the north to Roma and surrounds in the south. A considerable amount of archaeological research has been conducted within the broader CSG fields area, with the most informative data coming from the archaeological record of the Central Queensland Highlands. A selective summary of archaeological work and research undertaken in the central and central southern Queensland area is provided below.

Academic Research

Considerable archaeological research has been undertaken in the Central Queensland Highlands. To date, the research has focused on occupational deposits and/or rock art within sandstone rock shelters in the region. Kenniff Cave on Moffat Station, excavated by D.J. Mulvaney in 1961, is perhaps the best known Aboriginal site in the area (see Mulvaney and Joyce, 1965). Mulvaney's findings at Kenniff Cave in 1961 provided the first firm evidence for a Pleistocene (>10,000 years) occupation of Australia

(Morwood, 1984). The Kenniff Cave stone assemblage was abundant and varied and it was with these tools that Mulvaney established the division of basic stone tool technological stages into non-hafted (once known as the 'Core Tool and Scraper Tradition') and hafted (the 'Australian Small Tool Tradition). Radio carbon dates confirmed the oldest artifacts, excavated from the base of a 3 m deposit, to approximately 18,800 BP (Morwood, 1984). Of the 23,000 artifacts that were excavated, 22,000 were flakes (flaking debris) and 800 were retouched flakes including tool types such as steep edge scrapers, backed blades, edge ground axes and adze slugs (Mulvaney and Joyce, 1965). These flaked artifacts were mostly prepared from quartzite and volcanic rock types.

Mulvaney's excavations were subsequently followed by a series of comprehensive archaeological and ethnographic research projects in the region (see L'Oste-Brown *et al.,* 1998, 2002; McNiven *et al.,* 1994; Morwood, 1978, 1979, 1981, 1984; Mulvaney and Joyce, 1965; Quinnell, 1976; Walsh, 1979, 1984). Following on from Mulvaney's work was a series of research into rock shelters in the region, particularly in the Carnarvon Ranges, with investigations undertaken at Cathedral Cave, Rainbow Cave and Wanderer's Cave by Beaton (1977,1991a,1991b). In the late 1970s, Morwood conducted excavations at Ken's Cave; a small rock shelter on the upper Belyando River, Turtle Rock; a large silcrete boulder on the southern flank of the Buckland River, and two Native Well sites located on the upper Warrego River near the head of Stockwhip Creek (Morwood, 1978, 1979, 1981). Quinnell conducted surveys and analyses of rock art at Carnarvon Gorge (see Quinnell, 1976) and Walsh (1979, 1984) undertook years of research on the various rock art assemblages in the Carnarvon Ranges.

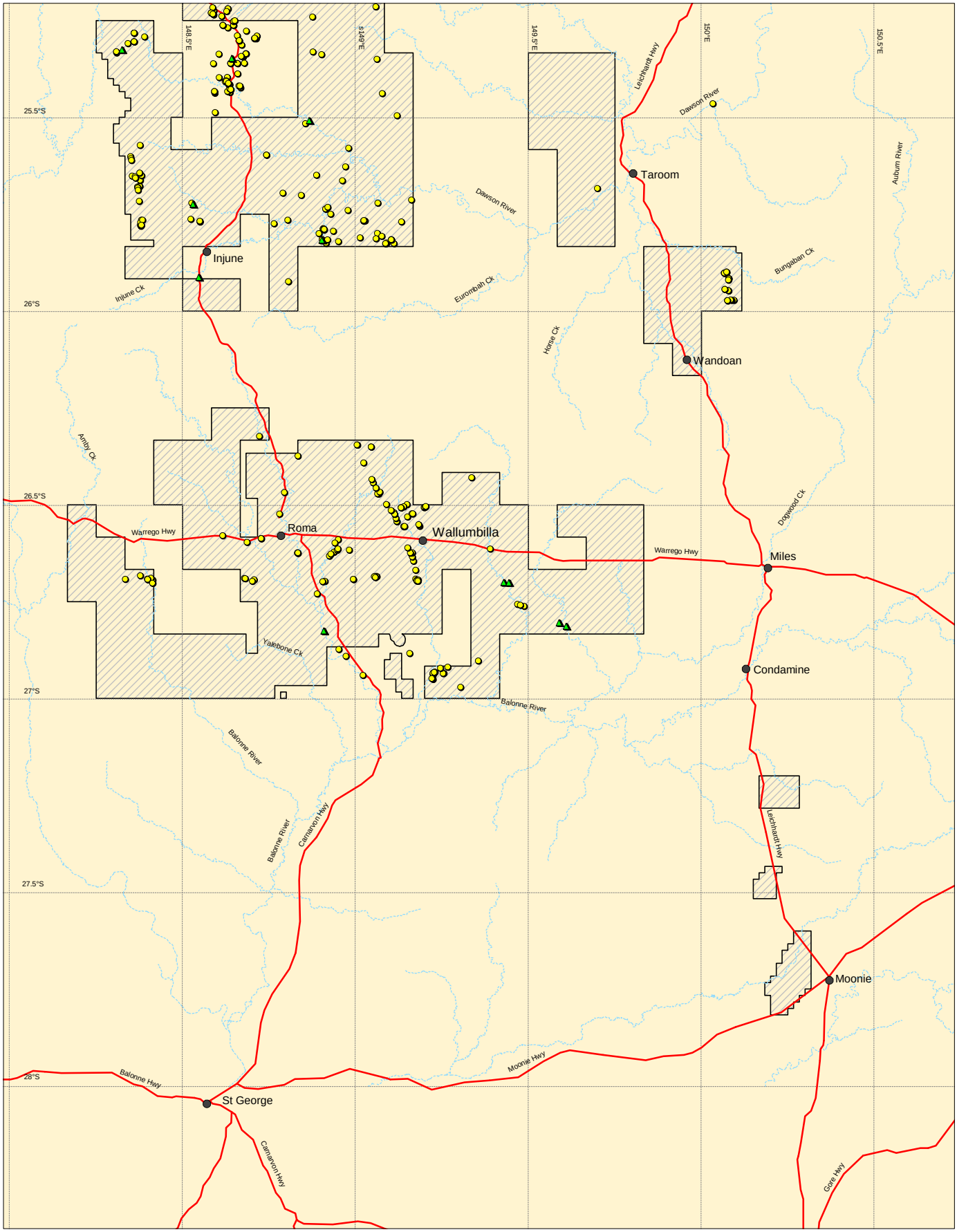
Beaton conducted a scientific investigation of Buckland Bower, an open site on a ridge overlooking Buckland Creek, a tributary of the Nogoa River. Beaton undertook a systematic surface collection of more than 7,000 stone artefacts at Buckland Bower as part of his PhD research program. Artifacts were exposed on the surface of a yellow, clayey soil of an area spanning 34,500 m². Stone tools and waste flakes were collected from 19 circular areas and two triangular areas constituting only 6.5 % of the total area of sites (Morwood 1984). The artifacts included large grindstones, edge ground axes, scrapers, backed blades, burren and tula adze slugs, and waste flakes (Beaton, 1977; Morwood, 1984).

Previous Studies

Archaeological studies in the Bowen and Surat Basins are largely borne from consultancy work resulting from mining, exploration, industrial and infrastructure development in the region.

In the Central Queensland Highland district, ARCHAEO (2007) undertook a Cultural Heritage Assessment of the Minerva Mine expansion area located between Emerald and Springsure. Over the course of 10 months of surveys and mitigation, more than 400 sites were identified. Site types included: large artifact scatters of variable density, artifact type and raw material; open camp sites with grinding plates, top stones, and edge ground axes; scarred trees, stone arrangements and hearths. Sources of raw material including ochre, silcrete and sandstone were also identified. Artifact types included retouched and backed flakes, multi-platform and single-platform cores, edge-ground axes, hammer stones, grinding stones, adzes and anvils. Silcrete was the dominant raw material utilised for stone tool manufacture in this area however other materials included chert, siltstone, mudstone, quartzite and chalcedony.

Hatte, of Northern Archaeology Consultancies Pty Ltd, undertook a Cultural Heritage Assessment of the original Minerva Mine site in November 1995. Three sites, all artifact scatters, were located along Sandhurst Creek. The sites contained a variety of identifiable stone tool types including grindstones, an edge ground axe and numerous flakes and cores of silcrete and chert. Also located was a possible scarred tree and a waterhole noted to be of high cultural, historical and spiritual significance to the local Aboriginal group (Hatte, 1996).



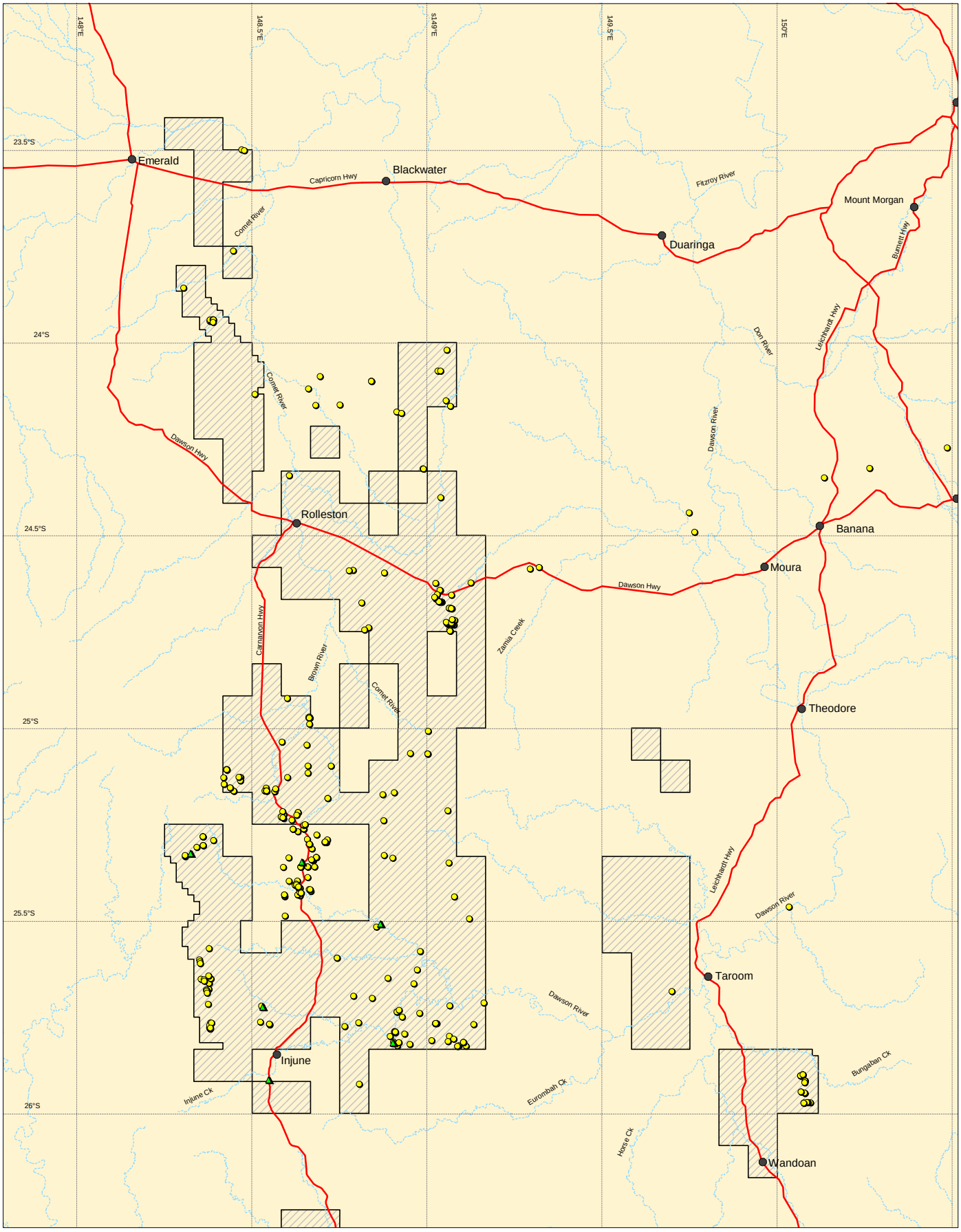
Source: This map may contain data which is sourced and Copyright. Refer to Section 18.2 of the EIS for Ownership and Copyright.

Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE SOUTHERN CSG FIELD

Drawn: CA	Approved: JB	Date: 05-03-2009	Figure: **6.13.2**	Rev:A
Job No: **4262 6220**	File No: 42626220-g-993.wor			**A4**



Source: This map may contain data which is sourced and Copyright. Refer to Section 18.2 of the EIS for Ownership and Copyright.

Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE NORTHERN CSG FIELD

Drawn: CA	Approved: JB	Date: 05-03-2009	Figure: **6.13.3**	Rev:A
Job No: **4262 6220**	File No: 42626220-g-993.wor			**A4**

Garingbal and Kara Kara Peoples together with Central Queensland Cultural Heritage Management (CQCHM) undertook another cultural heritage assessment of the Minerva mine site in 2004. During the course of this survey, 94 objects and places were identified and recorded. These included two artifact scatters, three resource locations, 1 possible scarred tree and numerous isolated artefacts. The majority of material was located near Sandhurst Creek and its tributaries on the mining lease. Identifiable artifact types included hammerstones, grindstones and plates, edge-ground axes and a number of flakes and cores. The raw material common to these artefacts was primarily silcrete, sandstone, chert and quartzite (CQCHM, 2004).

In 1995, Hatte also undertook a cultural heritage assessment of the proposed Telstra optic fibre cable route between Emerald and Springsure. Places were identified to potentially contain Aboriginal cultural material however no evidence of Aboriginal use of the corridor was established. Hatte notes that the greatest constraint to the survey was the extent of ground cover and the large amount of disturbance along the corridor. Sandhurst Creek and Crystal Creek were the main waterways through the survey area and it was in these areas where ground surface visibility was very low (Hatte, 1995).

In 1988, Hall undertook an archaeological assessment of the Wallumbilla-Gladstone State gas pipeline as part of the requirements of an EIS. The area surveyed for this assessment extended from Wallumbilla in the south to Boxvale, approximately 200 km to the north-west, then from Boxvale to Gladstone. Within the Wallumbilla to Boxvale section of the pipeline route, five archaeological sites were identified, all stone artifact scatters of varying types with silcrete as the dominant raw material. Between Boxvale and Gladstone, low density background scatters were identified in the vicinities of Prospect Creek, Moolayember Creek and Sandy Creek (just north of the Calliope River) (Hall, 1988).

Hatte undertook an archaeological and anthropological investigation in, 1992, of the proposed route of the Fibre Optic Link between Toowoomba and Roma however did not locate any archaeological or cultural material during the survey. Hatte considered this to be a result of extensive and continuous alteration of the landscape by Europeans (Hatte, 1992).

Field Surveys

The CHMPs allow for cultural heritage surveys to be carried out on an ‘as required’ basis throughout the project duration. In each case these will result in management planning that can be incorporated into the Santos EHSMS.

Field Survey Outcomes

At the conclusion of a cultural heritage field survey, a report must be provided to Santos with details of any Aboriginal cultural heritage identified during the survey and harm avoidance or minimisation recommendations. Avoidance is the preferred management approach, but where this is not possible, specific management and mitigation measures will be made. Once accepted by Santos the survey report becomes a binding agreement between the two parties and Santos may only undertake activities in accordance with the report’s recommendations. If the two parties fail to reach agreement on a survey report it may be referred to an independent expert who will decide on appropriate harm avoidance or minimisation measures.

The final survey reports are incorporated in Santos’ cultural heritage management system to ensure compliance with their requirements.

6.13.1.5 Potential Impacts and Mitigation Measures

All potential impacts are assessed in regard to the value or significance of the cultural heritage place. Cultural heritage significance relates to people’s perspective of place and sense of value, within the context of history, environment, aesthetics and social organisation.

A range of standards and criteria is available to assist with determining cultural heritage significance. The best practice guideline *The Australian ICOMOS Burra Charter* (Marquis-Kyle and Walker 1999) was

designed for the conservation of historic heritage. The addition of further guidelines that defined cultural significance and conservation policy extended the use of the Charter to Indigenous heritage.

The ACHA also sets out provisions for determining cultural significance. Archaeologists place a high priority on levels of existing site preservation as a means of determining scientific integrity and therefore, the value of the contextual data found within a site. Any loss of scientific integrity, however, does not reduce the cultural significance of a place and/or item. The presence of bush food species, trees of great age, or a particular bluff in a mountain range, for example, may provide indicators of cultural importance not borne out in the archaeological record.

The Indigenous assessment of significance and impacts will be carried out as part of the CHMP process. As yet, this has not been finalised. Protection, management and mitigation measures will be agreed after cultural heritage surveys are complete, and will then be incorporated in the Santos cultural heritage management system.

6.13.1.6 Summary of Findings

Based on the summary of archaeological research and consultancy work undertaken in central and south central Queensland, the following predictions can be made regarding the archaeological potential of these areas within which the CSG fields are situated. The likely most common site types expected to be encountered are:

- Stone artifacts, as isolates and in scatters, particularly in association with creeks and rivers;
- Open camp sites, also in association with creeks or rivers;
- Scarred trees in areas of remnant vegetation; and
- Art sites, burials and rock shelters that may exist in sandstone outcrops in ranges.

The CHMP process allows for cultural heritage surveys to be carried out on an “as required” basis, throughout the duration of the project. Protection, management and mitigation measures will be agreed once the cultural heritage surveys are finalised and incorporated into Santos cultural heritage management system.

6.13.2 Non Indigenous Cultural Heritage

6.13.2.1 Introduction

A non indigenous cultural heritage assessment for the proposed CSG fields was conducted on behalf of Santos by Archaeo Cultural Heritage Services Pty Ltd (refer Appendix X).

6.13.2.2 Methodology

The non indigenous cultural heritage assessment of the CSG fields included:

- A desktop review of the CSG fields study area including register searches to determine presence of registered heritage sites;
- A general reconnaissance and targeted field investigation of sites identified as part of the desktop review as being of potential heritage significance;
- An assessment of potential impacts to identified heritage sites; and
- An overview of possible mitigation measures which could be incorporated into the CSG fields to minimise potential impacts.

Desktop Review

Potential non indigenous cultural heritage sites were identified though desktop searches of Commonwealth, State and local heritage registers and consultation with the local community and

government agencies. Additional heritage sites were identified during consultation and targeted site surveys as described below.

Registers searched as part of the review included:

- World Heritage List (UNESCO);
- National Heritage List (Australian Heritage Commission);
- Commonwealth Heritage List (Australian Heritage Commission);
- Register of National Estate (Australian Heritage Commission);
- Queensland Heritage Register (Environment Protection Agency);
- Local council heritage registers; and
- Queensland Government Lists and Registers including Queensland Department of Main Roads (DMR) Heritage Inventory and Queensland Rail (QR) Heritage Register.

Consultation

Liaison with the Environmental Protection Agency (EPA), the Roma Historical Society and potentially affected landholders was undertaken using both formal and informal discussions. The meetings aimed to identify any potential sites of historical heritage that may be unknown to authorities. All meetings were recorded in consultation logs and are contained in full in Appendix X.

Sites identified during consultation were included in the field survey program outlined below in the field survey section. Santos adopted a targeted field survey of ground-truthing highlighted sites from the desktop review focusing on the reasonable foreseeable development (RFD) area. However many of these potential sites could not be reviewed as part of this Phase 1 assessment due to site access.

Selected sites were included in the field survey program outlined in the field survey section below.

Field Survey

The results of the desktop review were used to develop a targeted field survey aimed at ground-truthing the list of heritage and archaeological sites (HAS) developed from register searches, stakeholder consultation and analysis of historic maps. The survey aimed to locate potential HAS and establish their significance and potential for impact associated with the CSG development. The field survey was undertaken in two parts:

- Part 1 - initial reconnaissance: conducted between 25 and 30 May 2008; and
- Part 2 - detailed assessment: conducted between 13 and 18 July 2008.

Part 1 was undertaken to confirm the existence of sites as well as define areas which had the potential to contain further sites and places of cultural heritage significance. The initial reconnaissance involved a targeted survey of the field areas over five days and involved both vehicle and pedestrian survey techniques.

Part 2 involved a detailed survey of areas and sites, including those identified during Part 1 which required further research and/or access to sites to confirm potential significance. The assessment included further research on certain sites to confirm their potential significance and requirement for further survey.

The field survey aimed to identify three types of places:

- **Items of potential heritage significance** - Comprising items and places of potential historic cultural heritage significance, to the level which may warrant listing on a local or State heritage register.
- **Heritage Precincts** - Includes urban areas which contain a high density of heritage sites and places. Heritage precincts were established for these areas to capture the values that they contain.

- **Places of Historical Interest** - Places of historical interest include items and places which do not provide a suitable level of cultural heritage significance in their own right to justify further assessment. They are however, included as they contribute (or potentially contribute) to the broader discussion of historical context.

Further detail on survey methodology is provided in Appendix X.

6.13.2.3 Regulatory Framework

The following section discusses both National and State legislation relevant to non indigenous cultural heritage.

National Legislation

Environmental Protection and Biodiversity Conservation Act 1999

As discussed in Section 6.13.1.3 The EPBC Act provides for the Commonwealth Heritage List and the National Heritage List, and applies to places of National heritage value and to those owned or managed by the Commonwealth.

There are no known places of Commonwealth or National heritage significance located within the GLNG Project area.

The Australian Heritage Council Act 2003

The sites within the GLNG Project area which are listed on the RNE are protected under this act until 2012, by which time it is likely they would have been transferred to another heritage register.

State Legislation

Queensland Heritage Act 1992

As discussed in Section 6.13.1.3.

6.13.2.4 Existing Environmental Values

The history of the CSG fields study area encompasses exploration, pastoralism, conflict with Indigenous occupants, a long period of gradual 'opening up' of the land and the development of towns and infrastructure. Key industries such as cattle and mining have had a profound impact on the history of the region. More recent history has seen the advent of large-scale gas exploration, extraction and production. The land comprising the CSG fields, despite the wide geographic area, has some similar historic themes key to its development and has been described by the following general periods:

- Inland exploration (1844-1848);
- Pastoral development and frontier conflict (1840-1860);
- Early settlement (1850-1880);
- Railway development (1865-1965);
- Mining development (1850-1900);
- Closer settlement (1880-1900); and
- Oil and gas development (post 1900).

Following is a summary of the non indigenous history of the study area. A detailed history and referenced information sources are provided in full in Appendix X.

Inland Exploration (1844 – 1848)

Ludwig Leichhardt is generally considered to be the first European to have traversed the region, having set out from Jimbour in 1844 to determine an overland route to Port Essington (now Darwin). Leichhardt crossed the Dawson River near Taroom on 6 November 1844. The party tracked eastwards past Wandoan then on to Taroom. Leichhardt skirted the eastern part of the present Bauhinia Shire and travelled past Rolleston through the Springsure district, naming the Expedition Range, Christmas Range, and Albinia Downs. On 28 December 1844, he named the Comet River after seeing a comet that night. Leichhardt planned to travel overland from the Darling Downs to the Swan River in Western Australia and passed through the Roma area in 1847. His party encountered difficulties and after returning to the Darling Downs in 1848, he came to the Maranoa district, travelled to Mt Abundance and called at an outstation near present day Muckadilla. From there, Leichhardt wrote his last letters before setting off around 5 April 1848, never to be heard of again.

Pastoral Development and Frontier Conflict (1840 – 1860)

Apart from the penal settlement established at Moreton Bay in 1823, European settlement of Queensland commenced with the arrival of squatters from the New England and Hunter districts of New South Wales, who entered the Southern Darling Downs and Maranoa district in the 1840s in search of land to pasture their stock. The spread of pastoralism was largely responsible for the opening up of new territory.

Early colonial settlement in the region began in the south with the take up of land around the Maranoa/southern Leichhardt district (around present day Roma), moving north into the central Leichhardt district (Injune, Rolleston, Springsure and Emerald), and then east to the northern Burnett region (Banana and Biloela) and ended on the coast at the district of Port Curtis (Gladstone and Curtis Island).

Maranoa Pastoral District (Roma)

Following Leichhardt, a large number of squatters entered the eastern Maranoa district in search of fresh pastures. In 1847, Frederick Isaac, who had been with Leichhardt, successfully claimed the area now known as Dulacca on the lower Condamine River. Charles Coxen led another group across the Maranoa district establishing themselves in the eastern region after the Native Mounted Police 'pacified' the district.

Armed with maps and advice supplied by Thomas Mitchell, in October 1847 Gwydir River squatter Allan McPherson set off from his property, Keera, with more than 20 men, thousands of sheep and hundreds of cattle to occupy the land of the Mandandanji at Mt Abundance in the eastern Maranoa district. Centred on Mt Abundance, near present day Roma, McPherson's run took in considerable stretches of the Muckadilla, Yalebone and Bungeworgorai creeks.

Leichhardt Pastoral District (Injune, Rolleston, Springsure, Emerald)

The onset of European settlement in the pastoral district of Leichhardt north of the Maranoa, in the area later known as the Bauhinia Shire, remains somewhat unclear. In the latter part of the 1850s, a number of 'informal' runs were taken up. In 1857, Mackenzie, Serecold, Walker and Wiggins took leases on Carnarvon, Clematis, Consuelo, Planet, Meteor and Orion Creeks. Lieutenant Serocold also took up a run in the Comet area and William Landsborough followed in 1858. He explored the Comet River to its watershed and was probably the first white person to explore the Rolleston/Springsure area. They were followed by Peter MacDonald who took up land on the Nogoa, and named the area known as Cullin-la-Ringo, Spanish for 'sought and found'.

Northern Burnett Pastoral District (Banana)

Settlement in the Burnett district commenced in the 1840s, but the central and northern regions of Burnett were not extensively occupied until 1848. Early landholders included Reid on Iderway Station and Humphries and Herbert who jointly held Wetherton and Ban Ban. By the end of 1848, most of the Burnett Basin had been occupied.

The Upper Dawson region was occupied and settlement advanced northwards from the Burnett District. Rannes Station was founded by the Leith-Hay brothers, James and Norman, in 1852. They set up their station on the confluence of the Don and Dee Rivers and named it Rannes, which was the most remote station in the region. The land proved to be unsuitable for the 28,000 sheep with which they stocked it. Bullock drays had to cart the wool as far south as Maryborough, travelling via the Gayndah track, however by 1856, they were able to ship the wool through Gladstone and later Rockhampton.

Frontier Conflict

With the expansion of European settlement came conflict with Aboriginal populations for ownership and use of the land. The squatters appropriated valuable water holes, frightened away game and disturbed sacred sites. The only gain to the region's Aboriginal people from the arrival of pastoralists and other settlers was that the stock provided good food to replace their traditional sources. However, squatters had arrived to use the land for the profit it could yield, and not to have their stock killed by people they considered 'uncivilized savages'. A state of constant conflict, frequently breaking into violence, raids and vigilante-style punitive reprisals soon developed between European and Aboriginal communities throughout Central Queensland.

Early Settlement (1850-1880)

Early Banana

Banana was surveyed in September 1860 by Clarendon Stuart. Anecdotal sources suggest the town got its name from a bullock owned by a Chinese carrier who may have been one of the first settlers in the district. Banana was approved as a township on 5 June 1861 and the first town allotments went on sale in Rockhampton on 16 July 1861.

By the mid-1860s, settlers were flowing in. In 1863, two hotel licences were granted in Banana – to Patrick Bolger's 'Commercial Hotel' and John McKeon's 'The Banana Hotel'. Two years later the first bank was established. The 1868 Post Office Directory included property owners from a wide area under the heading 'Banana'. Outlying properties included Kooingal, Rawbelle, Prairie, Mimosa Creek and Moura. Banana was the only town in the area and the people who lived there fulfilled a variety of roles, including two storekeepers, two builders and two shoemakers.

Early Emerald

The town of Emerald owes its origin to the westward advance of the railway line from Rockhampton. There was a rapid influx of population in the late 1870s when Emerald was made the junction for the Central Railway line. Emerald was chosen because it was a likely site for the establishment of a township. The mountainous country to the west and open downs country to the north and south, combined with its proximity to the Nogoa River, made the Emerald district conducive for the future development and prosperity of a township. Reflecting the significance of rail, the township of Emerald was named in 1879, the same year it became the terminus for the advancing Central Railway line, and by that time was a community of 500 people.

Early Roma

The Town Reserve of Roma was proclaimed in September 1862. The new township was named 'Roma' at the end of that same year, in honour of the wife of Sir George Ferguson Bowen, the first governor of Queensland. By the early 1860s, Roma was a collection of bark huts, with a population of 82 recorded in 1865, residing on a creek crossing, half-a-day's travel east of Mt Abundance. Beginning as a settlement of squatters, the dominant industry was based on sheep and cattle.

In 1866, the first Roma court house was built, slightly to the west of the present site. It was initially hoped that the court house would form the centre of the town; however that role was soon taken over by the Post Office, which greatly influenced the development of the town centre. Roma became a municipality in 1867, the same year the Roma branch of the Bank of New South Wales was opened. Permanent Council Chambers were built in 1871. In 1872, the present golf links site was declared a public reserve and the

show ground site was selected. The township grew from small pastoral beginnings into a significant rural service town when it was connected to Toowoomba via Dalby after the extension of the Western Railway line in 1880.

Railway Development (1865-1965)

The construction of the railway branches was integral to the expansion of Queensland's mining industry. Railways were extended into Central and Western Queensland after 1865. Much of the area under study underwent significant transformation with the advent of the rail, as the rail traffic inevitably encouraged closer settlement, economic development and, above all, the opportunity to explore mining ventures that had been confined to the south-east corner of Queensland.

Construction of the Great Northern Railway (renamed the Central Railway in 1878) began in 1867. Construction of the line connected Westwood to Comet in 1878 and Comet to Emerald in 1879. Branch lines extended from Westwood to Springsure (1886). From Roma, a branch line 47km north to Orallo commenced construction in September 1914 and opened in 1916. The line was further extended to Injune and opened in 1920 with a thrice-weekly, five-and-a-half hour service from Roma. Livestock trains were frequent on this branch until the Roma meatworks opened and road haulage replaced the railway. Coal traffic from the Maranoa Colliery near Injune began in 1932 and ended with the dieselisation of the railways west of Roma in 1963. The line from Roma to Injune closed at the end of 1966.

Mining Development (1850-1900)

As part of the expansion of railways after 1865 the rail network not only increased the demand for coal as fuel but also increased accessibility to coal resources in central and northern Queensland, enabling the haulage of coal for use in coastal steamers and as an export commodity.

Coal had been mined from the 1860s in Blair Athol and Capella, both north of Emerald, and from 1878 in Comet to the east. Coal mining commenced in the area surrounding Emerald in the 1970s.

Closer Settlement (1880-1900)

Emerald, Springsure, Injune and Roma benefited from the advent of the railways and closer settlement that was encouraged by transport developments. Pastoral activities persisted, however, with a shift from sheep and wool production to beef and dairy cattle. The cattle industry became a key economic driver of the region, which also stimulated town development.

Roma

The built environment of present day Roma commenced in the 1880s as the result of the closer settlement which was encouraged by the coming of the railway. In mid-1881, a number of cottages were built in various parts of the town, mainly around the court house, in the vicinity of the Euthulla Road, and in Arthur Street towards the railway line. Additionally, in 1882, Green and Bellgrove's new sawmill was constructed and directly opposite the end of Station Street, Cottell and Co's new blacksmith shop was built. The Queensland hotel at the south-west corner of the Bowen and Wyndham Streets intersection was also constructed in 1881.

Oil and Gas Development (post-1900)

In the early twentieth century, Roma became the birthplace of Australia's oil and gas industry. The oil industry steadily declined as the twentieth century progressed, but other industries continued to support the existence of Roma. Around Roma, the Maranoa district's agricultural industry is worth $620 million annually, 64.3 % of this being generated from crops. The Maranoa business sector is 58.7% agriculture, forestry and fishing employing 32.7 % of the region's workforce. Roma is the site of Australia's largest cattle sale yards.

Gas continues to be an important economic driver of the town and the surrounding region. Origin Energy's Spring Gully Coal Seam gas development is located about 80 km north of Roma and its projects

Client

Project

GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title

NON INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE ROMA CSG FIELD

Drawn: LL/CA | Approved: BG | Date: 25-05-2009

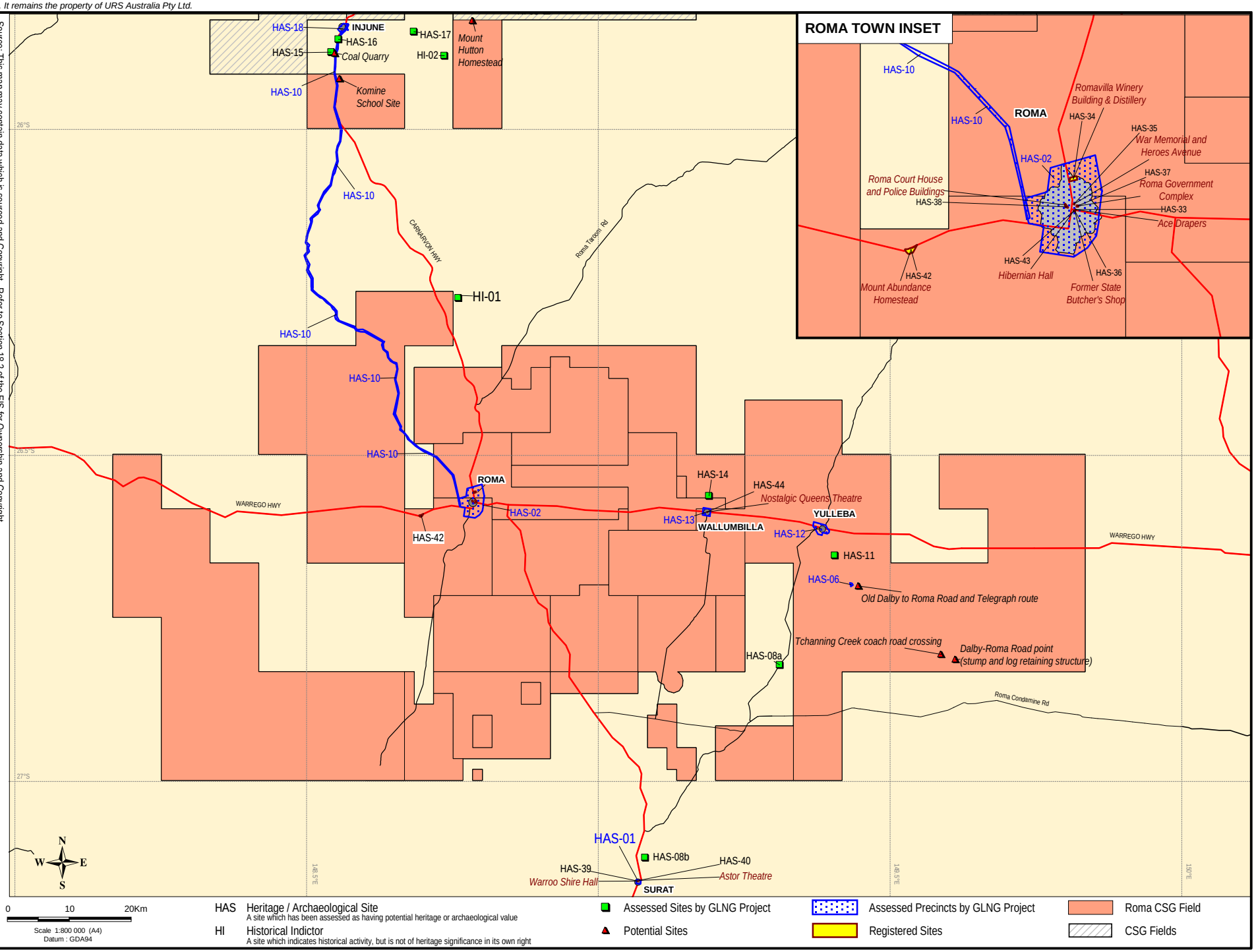
Job No: **4262 6220** | File No: 42626220-g-902b.wor

Figure: **6.13.4**

Rev:B

A4

Source: This map may contain data which is sourced and Copyright. Refer to Section 18.2 of the EIS for Ownership and Copyright



Client

Project

GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

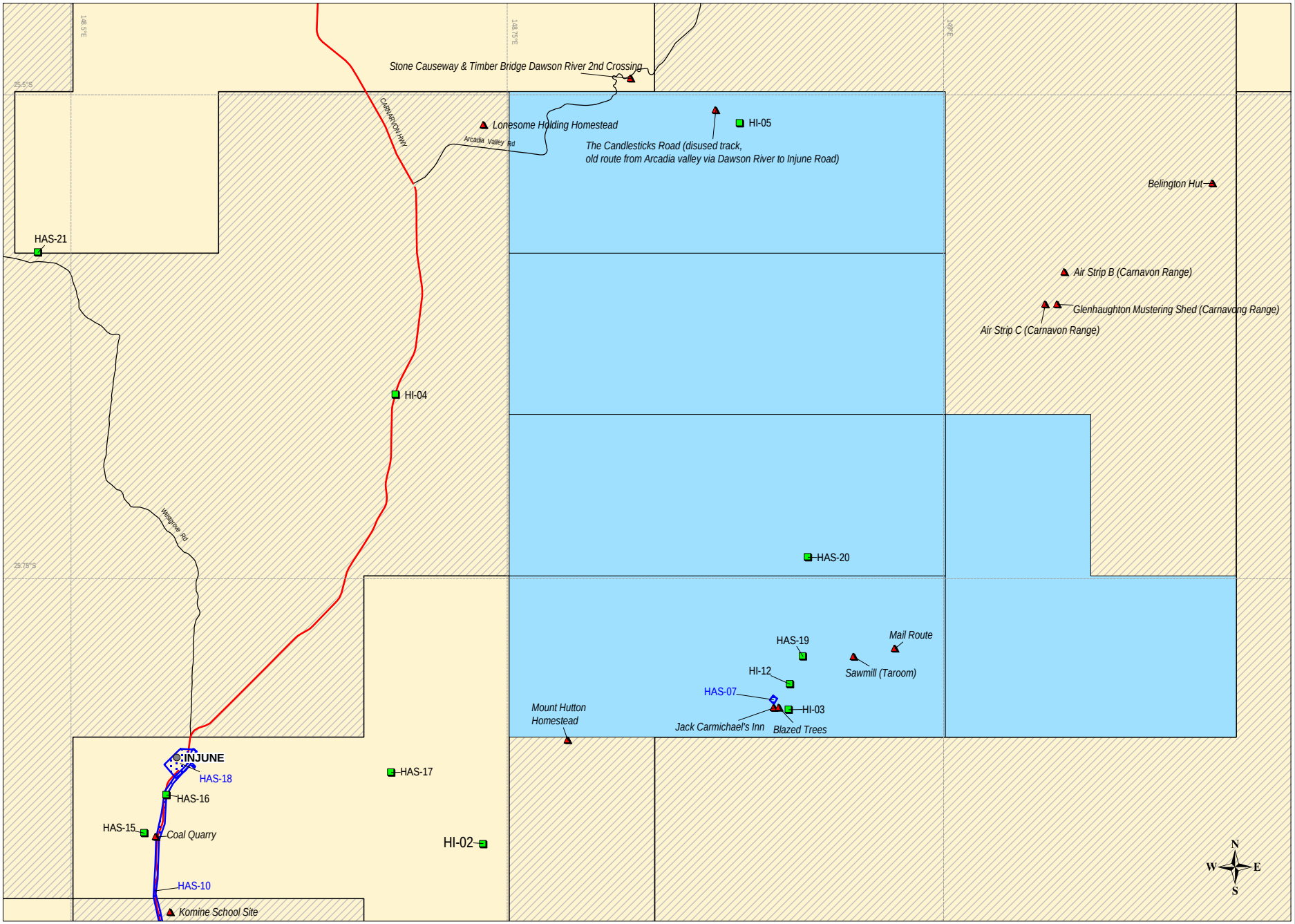
Title

NON INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE FAIRVIEW CSG FIELD

Job No: **4262 6220**
Drawn: LL/CA
Approved: BG
Date: 25-05-2009
File No: 42626220-g-903c.wor

Figure: **6.13.5**

Rev:C
A4



0 5 10Km

Scale 1:300 000 (A4)
Datum : GDA94

HAS Heritage / Archaeological Site
A site which has been assessed as having potential heritage or archaeological value

HI Historical Indictor
A site which indicates historical activity, but is not of heritage significance in its own right

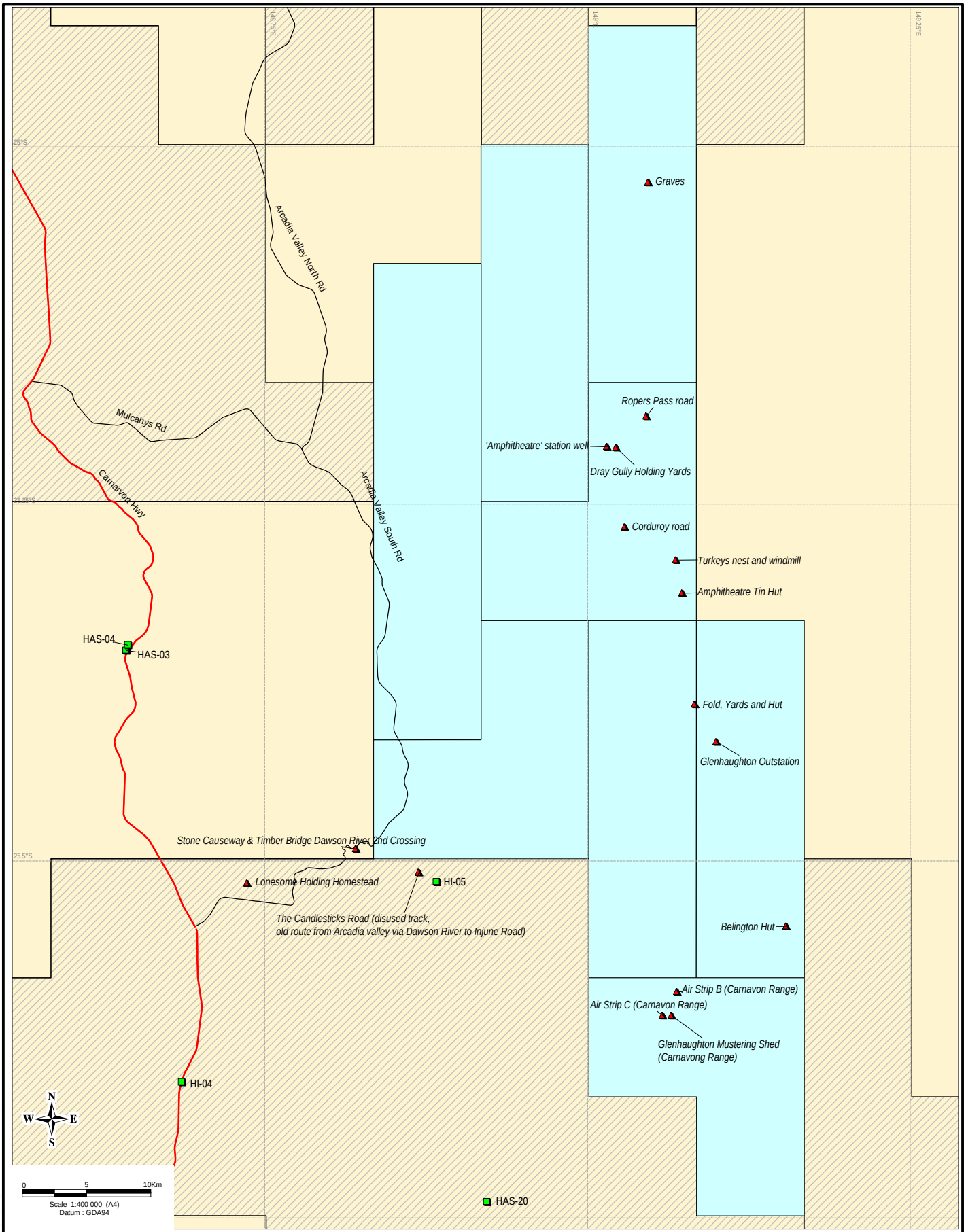
Assessed Sites by GLNG Project

Potential Sites

Assessed Precincts by GLNG Project

Fairview CSG Field

CSG Fields



HAS Heritage / Archaeological Site
A site which has been assessed as having potential heritage or archaeological value

HI Historical Indictor
A site which indicates historical activity, but is not of heritage significance in its own right

Assessed Sites by GLNG Project

Potential Sites

Arcadia Valley CSG Field

CSG Fields

Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
NON INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE ARCADIA VALLEY CSG FIELD

Drawn: LL/CA	Approved: BG	Date: 25-05-2009	Figure: **6.13.6**	Rev:B
Job No: **4262 6220**	File No: 42626220-g-904b.wor			**A4**

include an 87 km gas pipeline to Wallumbilla, to connect with the 434 km Roma to Brisbane gas pipeline hub. The proposed Spring Gully power station is an $870 million, 1,000 MW power station that will provide electricity to south-east Queensland. The power station will have the benefit of being close to the source of gas and will also be able to use the associated waste water produced from other CGS operations.

Baseline Cultural Heritage Assessment

No non indigenous heritage sites were identified on the World, National and Commonwealth Heritage lists or local government (QR/ DMR) lists and registers. Heritage sites identified within five kilometres of the CSG fields study area, contained in one or more of the heritage registers, are summarised in Table 6.13.3 and depicted in Figure 6.13.4 for the Roma CSG fields.

Table 6.13.3 Results of Register Searches

HAS No.	Site / Address	LGA	Register of National Estate	Queensland Heritage Register	Local Heritage Register	National Trust Register
08	Corduroy Road	Roma.			✓	
33	Ace Drapers- 86 McDowell St	Roma.	✓			✓
34	Romavilla Winery- Northern Road	Roma.	✓	✓		✓
35	Roma War Memorial and Heroes Ave	Roma.	✓	✓		✓
36	Ladbrooks Butchery (State Butchers Shop)	Roma.	✓	✓		✓
37	Roma Government Complex (Roma State School)	Roma.		✓		✓
38	Roma Court House and Police Buildings	Roma.		✓		✓
39	Warroo Shire Hall	Surat.		✓		
40	Astor Theatre	Surat.		✓	✓	
42	Mt Abundance Homestead- Warrego Hwy	Roma.	✓	✓		✓
43	Hibernian Hall- Hawthorne St	Roma.	✓	✓		✓
44	Nostalgic Queen's Theatre	Wallumbilla.		✓		

Heritage and Archaeological Sites

A total of 23 individual sites and five precincts were identified during the field survey. Of the 23 sites, 14 were considered to be of State significance, with 12 sites already included in heritage registers. A summary of the findings and the significance of the sites are provided below in Table 6.13.4. Archaeological sites have been assessed against Section 60 of the Queensland Heritage Act for their potential to contain archaeological artifacts of importance to Queensland history. Heritage sites have been assessed against Section 35(1) - Criterion a-h.

A detailed description of each HAS and justification for listing on State registers is provided in Appendix X.

Five heritage precincts were identified during the site investigation, with the Surat and Roma precincts assessed as being of State significance (refer Table 6.13.4).

Places of Historical Interest

A total of eight Places of Historical Interest (or historical indicator- HI) were identified and while they do not provide a suitable level of heritage significance to justify further assessment, they contribute (or potentially contribute) to the broader discussion of historical archaeological places within the study area and generally add to the character of the area. The HI identified form part of heritage precincts listed in Table 6.13.5 and their location is indicated in Figures 6.13.4, 6.13.5 and 6.13.6 for the Roma, Fairview and Arcadia Valley CSG fields respectively.

Table 6.13.4 Site Investigation Results and Assessment Summary

Site Type & HAS No.	Site Name	Registered	Site Significance	Justification (of significance assessment)
Archaeological Site				
HAS-08	Corduroy Road	✓	State	Roads of this type are extremely rare in Australia and these two sections are unique and provide an excellent opportunity to study the construction and use of 19th & 20th century transport and communications infrastructure.
HAS-10	Injune to Roma Rail Line	-	State	Route mostly untouched since dismantling important local archaeological resource. Potential for large finding at several of the old soldier settlements along the length of the line. Excellent example of disused rail corridor central to settlement and servicing of post World War 1 soldier settlements.
HAS-20	Bonnie Doon Homestead	-	State	Potential to reveal development of isolated homesteads over extended periods of time within the region.
Heritage Site				
HAS-11	Dalby-Roma Telegraph Line	-	Local	Remnants have potential for investigations into the technology at the time for local/regional recording and comparison of typologies of this finite resource.
HAS-14	Wooden Homestead	-	Local	Criterion (a) - Provides some of the few links remaining to the early settlement of the land surrounding Wallumbilla. Criterion (e) - Distinctive character of buildings in original setting provides insight into the spacing of rural settlements at this time.
HAS-15	Gallipoli Hill Sand Mine	-	Local	Criterion (a) - historic ties to Injune area as major source of sand in area's early history. Indicator of the once large ex-soldier population in the area.
HAS-16	Vertical Board Homestead	-	Local	Criterion (a) - provide picture of the development of rural technology, building styles and materials in the area.
HAS-17	Autumn Vale Homestead	-	Local	As per HAS-16
HAS-19	Moonah Telegraph Line	-	Local	Criterion (a) - associated with introduction of telecommunications to remote properties in central Queensland and provides potential to investigate technology at the time for local/regional recording and typology comparison.

Site Type & HAS No.	Site Name	Registered	Site Significance	Justification (of significance assessment)
HAS-21	Westgrove Homestead	-	Local	Criterion (a) - one of original settlements in region Criterion (d) - representative example of the existing homestead design in the New England region of NSW used by settlers moving north. Structures largely intact and illustrate clear picture of functions of homestead complex. Criterion (f) - technical significance illustrating transferrable of homestead design and construction from well settled areas to an area of recent occupation.
HAS-27	Telegraph Line	-	Local	Criterion (a) - the former telegraph alignment is associated with the introduction of telecommunications to remote areas. It provides the potential for investigations into technology at the time, and for local and regional recording and comparison of typologies of this finite resource.
HAS-28	Telegraph Line	-	Local	As per HAS-27
HAS-33	Ace Drapers – 86 McDowell Street	✓	State	- refer QLD/National Register (Appendix X)
HAS-34	Romavilla Winery – Northern Road	✓	State	- refer QLD/National Register (Appendix X)
HAS-35	Roma War Memorial and Heroes Avenue	✓	State	- refer QLD/National Register (Appendix X)
HAS-36	Ladbrook's Butchery (State Butchers shop)	✓	State	- refer QLD/National Register (Appendix X)
HAS-37	Roma Government Complex (Roma State School)	✓	State	- refer QLD/National Register (Appendix X)
HAS-38	Roma Court House and Police Buildings	✓	State	- refer QLD/National Register (Appendix X)
HAS-39	Warroo Shire Hall	✓	State	- refer QLD/National Register (Appendix X)
HAS-40	Astor Theatre	✓	State	- refer QLD/National Register (Appendix X)
HAS-42	Mount Abundance Homestead – Warrego Hwy	✓	State	- refer QLD/National Register (Appendix X)
HAS-43	Hibernian Hall – Hawthorne Street	✓	State	- refer QLD/National Register (Appendix X)
HAS-44	Nostalgic Queen's Theatre	✓	State	- refer QLD/National Register (Appendix X)
Precinct				
HAS-01	Surat Precinct	-	State	Criterion (a) - a major way station on the Cobb & Co routes and includes remaining infrastructure and associated elements. Criterion (b) - Cobb & Co infrastructure, government buildings, corduroy roads make Surat a rare example of a rural communication hub. Criterion (d) - representative examples of rural communication and administrative hub.

Site Type & HAS No.	Site Name	Registered	Site Significance	Justification (of significance assessment)
				Criterion (e) - distinctive town character with wide tree lined streets with historic buildings and aesthetic value located near Condamine River. Criterion (g) - significant centre of trade and communications to local residents and neighbouring towns.
HAS-02	Roma Precinct	-	State	Criterion (a) - Roma was one of the first major settlements in QLD and is the centre of rural communications, trade and government in the area. Criterion (b) - rare example of a large Queensland town with intact main streetscape and distinctive suburban character precincts. Criterion (d) - excellent example of large rural urban centre with a large number of surviving landscape and streetscape elements indicative of the towns past Criterion (e) - unique aesthetics due to surviving historic structures and tree plantings. The suburban character precincts lends Roma an enhanced distinctive character
HAS-13	Wallumbilla Precinct	-	Local	Criterion (a) - significant association with rail line history and grain shed (local museum) intertwined with larger history of Wallumbilla. Criterion (e) - distinctive aesthetic from town grid pattern and non-centralised business areas and contrast to imposing size of grain shed and large hotel. Criterion (g) - significant centre of trade and communications to local residents and neighbouring towns.
HAS-18	Injune Precinct	-	Local	Criterion (a) - gateway to the region including terminus of the rail line. Strong link to early explorer missions including Major Mitchell and Ludwig Leichhardt. Criterion (e) - distinctive town aesthetic revolving around former and current main street displaying the boom and bust history of the town.
HAS-26	Rolleston Heritage Precinct	-	Local	Criterion (a) - precinct demonstrates the early formation of the town Criterion (e) - buildings have aesthetically pleasing visual character, with large open landscape with a sense of community. Criterion (g) - sense of community exemplified by relocated hut and sawmill, All Saints church and cemetery and stockmen's memorial.

Table 6.13.5 Historical Indicators Identified in the CSG fields

Site	Comment
HI-01	Fire Service Barracks Ruined
HI-02	Wool Washpool
HI-03	Possible Stone Causeway
HI-04	Roadside Shelter
HI-05	Red Dam Complex
HI-11	Bottle Dump (not shown on Figure 6.13.5 however is approximately 6.25 km west of HAS-21).
HI-12	Rubbish Dump
HI-13	Injune Cypress Mill (not shown on Figure 6.13.5 however site is approximately 6.5 km west along Westgrove Road from site HAS-21).

A detailed description of each HI is provided in Appendix X.

6.13.2.5 Potential Impacts and Mitigation Measures

The potential for direct and indirect impacts as a result of CSG fields development were assessed for each HAS.

There are potential impacts associated with the CSG fields depending on the location of CSG wells and drilling works; and depending on traffic flow and potential cumulative impacts within the area. Potential impacts will be mitigated and minimised where practicable via a tiered approach of avoidance, and adoption of mitigation measures where necessary including maintaining offset distances to minimise potential vibration impacts.

Avoid Known Cultural Heritage Sites

Potential Impacts

Location of CSG wells and associated infrastructure located proximate to or within heritage site perimeters.

Mitigation Measures

Infrastructure will be located to avoid known HAS. All heritage sites will be demarcated and access restricted where construction works are close to the heritage site.

The Phase 1 non indigenous cultural heritage assessment comprised the first stage of assessment and identified potential to identify further sites and places of cultural heritage significance that exist. All project areas outside of those reviewed in Appendix X will be managed via:

- Conducting additional detailed surveys of the CSG fields areas as part of the Phase 2 (post EIS) assessment proximate to known heritage sites;
- Conducting cultural heritage surveys prior to any construction activities, commencing in the vicinity of any identified or potential cultural heritage sites;
- Developing further site specific management measures for significant sites and places as required; and
- The development of Environmental Management Plans (EMPs).

Santos will seek to educate its staff and contractors on the location and significance of the sites to avoid disturbance. Training of field workers will be undertaken as part of broader environmental awareness training and/or Workplace Health and Safety meetings. Training materials will inform the workers what archaeological material and cultural heritage sites may look like and provide clear instructions on what to do if they find anything.

Unexpected Finds and Archaeologist 'On-Call'

Potential Impacts

Construction activities have the potential to uncover further cultural heritage material, particularly in the vicinity of the archaeological sites and CSG fields development areas that have not been investigated by consultation or survey.

Mitigation Measures

Training of field workers will be undertaken as part of broader environmental awareness training and/or Workplace Health and Safety meetings. Training materials will inform the workers what archaeological material and cultural heritage sites may look like and provide clear instructions on what to do if they find anything.

EMPs will include procedures for managing unexpected cultural heritage material or sites that may be encountered. The procedure provides that:

- Work will cease at the location of the potential material or site and reasonable efforts to secure the site will be made such as a buffer zone of 20 m with no removal or further disturbance of site;
- The Site Manager will be notify the Historical Archaeologist appointed to the project; and
- Historical Archaeologist will provide management measures to the Site Manager and will liaise with the EPA to ensure that the archaeological provisions of the *Queensland Heritage Act 1992* are met.

State Significant Sites

A number of potential sites within the CSG fields were identified (refer Figures 6.13.4 to 6.13.6).

Potential Impacts

Construction activities have the potential to disturb state significant sites.

Mitigation Measures

State significant sites are protected by the QH Act and will be avoided in all cases. All heritage sites will be demarcated and access restricted where construction works are close to the heritage site.

Santos staff and contractors will be educated as to the location of state significant sites to ensure avoidance. Training of field workers will be undertaken as part of broader environmental awareness training and/or Workplace Health and Safety meetings. Training materials will inform the workers what archaeological material and cultural heritage sites may look like and provide clear instructions on what to do if they find anything. Should any works need to be conducted in these areas they will be governed by Part 6 of the Queensland Heritage Act and a qualified heritage consultant will be engaged to advise on mitigation measures.

Any works which may potentially disturb these sites will require a heritage survey to be completed prior to commencement of works to establish location, level of significance and necessary management measures.

A project specific conservation management plan will consider available options for the project to mitigate impacts on cultural heritage significance during all phases of the project and includes approval from the EPA through Queensland's Integrated Development Assessment System (IDAS).

Santos will seek to actively involve the community where matters of historic cultural heritage are involved.

Archaeological Sites

State significant archaeological sites require special consideration under the provisions of the *QH Act,* as they represent a heritage asset that *has potential to contain an archaeological artefact that is an important source of information about Queensland's history*.[1] Avoidance of these sites will be practised and all staff made aware of their location.

Potential Impacts

Construction activities have the potential to disturb state significant archaeological sites.

Mitigation Measures

Under the provisions of the QH Act, liaison with the EPA is required so that these sites can be appropriately managed. Where the site/place is registered on the Queensland heritage register, development at that place will fall under IDAS. As a result, the EPA may require an archaeological investigation to be conducted as part of the consent conditions, particularly if the proposed development may damage or impact the significance of the site.

Santos will seek to actively involve the community where matters of historic cultural heritage are involved.

Locally Significant Sites / Heritage Precincts / Places of Historic Interest

Potential Impacts

Construction activities have the potential to disturb locally significant sites, heritage precincts and places of historic interest.

Mitigation Measures

All sites will be avoided, unless there is no other feasible alternative, and then only when following the best practice guidelines of the Burra Charter (Marquis-Kyle and Walker 1999). The relevant local government department will be liaised with prior to any disturbance.

Santos will seek to educate its staff and contractors on the location and significance of the sites to avoid disturbance. Training of field workers will be undertaken as part of broader environmental awareness training and/or Workplace Health and Safety meetings. Training materials will inform the workers what archaeological material and cultural heritage sites may look like and provide clear instructions on what to do if they find anything.

If there is to be any work within a heritage precinct, a full urban heritage study by a qualified heritage consultant will be required.

Santos will seek to actively involve the community where matters of historic cultural heritage are involved.

Protection of Heritage in Santos Ownership

Potential Impacts

Construction activities have the potential to disturb heritage sites and places in areas owned by Santos.

[1] *Queensland Heritage Act 1996, Section 60 (b)*

Mitigation Measures

All heritage sites and places will be protected and managed by Santos as part of best practice heritage management as per the Burra Charter.

Santos will seek to educate its staff and contractors on the location and significance of the sites to avoid disturbance. Training of field workers will be undertaken as part of broader environmental awareness training and/or Workplace Health and Safety meetings. Training materials will inform the workers what archaeological material and cultural heritage sites may look like and provide clear instructions on what to do if they find anything.

All sites will be managed under the guidance of a qualified heritage consultant. Additionally, staff will be encouraged to report any new items of historic heritage significance to Santos so that a qualified heritage consultant can advise on the level of significance and the management of the item or site.

Santos will seek to actively involve the community where matters of historic cultural heritage are involved.

Santos will regularly undertake a survey of all heritage items identified on Santos owned or leased land, or on land directly affected by current operations, to ensure that the general mitigation measures outlined above and those for individual heritage items are being followed and are effective. Any damage to items will be catalogued and actions taken to protect heritage items. A heritage item database should be developed to monitor the condition, management and protection of the heritage sites.

Active Protection of Heritage within the Community

HAS sites where the heritage value could be enhanced in consultation with the community include:

- HAS-20 - Bonnie Doon Homestead site.

HAS-20 (Bonnie Doon Homestead site) heritage value could be enhanced in consultation with the community, as this site is particularly well suited to archaeological excavation, which could provide extensive information about Queensland early settlement.

Cumulative Impacts

Section 1 identifies other CSG development projects planned for the surrounding region. Some of these projects are up to 100 km from the GLNG Project CSG field areas and some may be within the GLNG Project future development (FD) area. There is limited information available as to the planned development of those projects or the quantity and timing of the development of the wells or associated infrastructure; however, a qualitative assessment can be made of the possible cumulative impacts.

Santos will develop the CSG fields in accordance with the EIS. There will be no other development by other petroleum producers in the tenements described in the CSG fields. Infrastructure impacts will not exceed those stated in the project description.

It is however, possible that other companies may develop CSG facilities within the CSG fields FD area as part of their planned CSG development projects in addition to the existing CSG domestic supply facilities. This will mean that there will be more CSG development in the FD area than the Santos project. As an area is developed, the number of wells will increase, but the spacing of wells will not intensify.

Cumulative impacts associated with the CSG fields development and other developments in the surrounding region were also considered, especially where these sites crossed large geographic areas such as the railway and telegraph lines. The following sites were considered to be at risk of cumulative impact:

- HAS-10 (Injune to Roma Rail line)

  The integrity of this site could be rapidly eroded by the cumulative impact of developments removing select elements or features of the line. As the significance of this railway line is vested in its integrity

as a group of features and its ability to demonstrate such a large range of features associated with a railway, its value could be compromised by cumulative impact.

- HAS-11; HAS-19; HAS 27 and HAS 28 (Telegraph lines)

  Like the railway line, these telegraph lines are very susceptible to cumulative impact of multiple projects which may remove select elements, thus compromising the integrity and value of the line.

Table 6.13.6 provides a summary of non-Indigenous cultural heritage impacts and mitigation measures for the CSG fields.

Table 6.13.6 Potential Non Indigenous Cultural Heritage Impacts and Mitigation Measures

Aspect	Potential Impact	Mitigation Measures	Objective
Construction			
Cultural Heritage disturbance in the CSG field area	Preferred well location proximate to or within (unlikely) heritage site perimeter	• Wells and associated infrastructure shall be positioned to avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated. • Where potential impacts have been identified for state significant heritage sites, an EMP shall be prepared and the EPA consulted. • Relevant mitigation measures shall be identified which may include- maintenance of offset distances (e.g. building vibration) for infrastructure positioning. • Vibration associated with transport was assessed to be insignificant (refer Section 6.10), however haulage proximate to heritage sites shall be avoided and utilise existing tracks only. • Heritage sites shall be demarcated and access restricted including for items of local heritage significance as per existing Santos policy. • Training shall also be conducted for contractors/staff in operational areas on the location of sites and their protection requirements. • Items of local heritage significance where impact is likely shall be managed by a heritage professional to enable recording and any approvals.	Conserve and protect both known and undiscovered items of historic cultural heritage.
	Sites located townships and precincts are unlikely to be impacted due to distant location from CSG fields.	• Townships and precincts to be avoided and any new potential impacts to be assessed as part of an EMP.	Conserve and protect both known and undiscovered items of historic cultural heritage.
Construction simultaneous with	Site located proximate to existing gas production operations and	• Wells and associated infrastructure shall be positioned to avoid sites of state significance, and where practical, sites of	Maintain integrity of significant sites

Aspect	Potential Impact	Mitigation Measures	Objective
operations	potentially further infrastructure associated with the CSG fields. Potential for cumulative vibration impacts, unauthorised access due to opening up access tracks and associated potential for vandalism.	local significance, where potential direct or indirect impacts are anticipated. • Where potential impacts have been identified for state significant heritage sites, an EMP shall be prepared and the EPA consulted. • Relevant mitigation measures shall be identified which may include maintenance of offset distances (e.g. building vibration) for infrastructure positioning. • Relevant mitigation measures shall be identified which may include- maintenance of offset distance of at least 250m (e.g. building vibration) for field construction activities. • Vibration associated with transport was assessed to be insignificant (refer Section 6.10). • Where buffer cannot be maintained, monitoring and/or full archaeological survey if within 100 m will be required. • The site shall be demarcated and access restricted as per existing Santos policy. • Training shall also be conducted for contractors/staff in operational areas on the location of sites and their protection requirements.	
	Preferred well location proximate to site (unlikely).	• As per above with addition of- – Items of local heritage significance where impact is likely shall be managed by a heritage professional to enable recording and any approvals.	Conserve and protect both known and undiscovered items of historic cultural heritage.
	Sites located within Roma township are unlikely to be impacted due to distant location from CSG fields.	• Heritage precincts are outside the CSG field development boundaries. • Any indirect impacts are anticipated to be minimal based on distance from proposed CSG construction and operational activities. • Material transport shall avoid haulage though township, however truck vibration is expected to be minimal associated with construction related transport (refer Section 6.10).	To avoid heritage precincts as part of CSG construction and transportation activities.

Aspect	Potential Impact	Mitigation Measures	Objective
		• Any new potential impacts to be assessed as part of an EMP.	
Drilling Activities	Direct or indirect impact due to siting within a HAS site or indirect impact associated with drilling.	• Drilling works shall avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated. • Where potential impacts have been identified for state significant heritage sites, an EMP shall be prepared and the EPA consulted. • Relevant mitigation measures shall be identified which may include maintenance of offset distances (e.g. building vibration) for drilling operations to minimise potential for vibration impacts. • All heritage sites shall be demarcated and access restricted including items of local heritage significance as per existing Santos policy. • Training of contractors/staff in operational areas on the location of sites and their protection requirements shall also be undertaken. • Items of local heritage significance where impact is likely shall be managed by a heritage professional to enable recording and any approvals.	Conserve and protect both known and undiscovered items of historic cultural heritage.
Subsidence-Drilling Activities	Direct or indirect impact due to subsidence within or proximate to a HAS site.	• Wells and associated infrastructure shall be positioned to avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated. • Where potential impacts have been identified for state significant heritage sites, an EMP shall be prepared and the EPA consulted. • Relevant mitigation measures shall be identified which may include maintenance of offset distances (e.g. building vibration) for drilling operations to minimise potential for subsidence impacts. • Subsidence impacts were assessed to be insignificant (refer	Conserve and protect both known and undiscovered items of historic cultural heritage.

Aspect	Potential Impact	Mitigation Measures	Objective
		Section 6.10). • All heritage sites shall be demarcated and access restricted including items of local heritage significance as per existing Santos policy. • Training of contractors/staff in operational areas on the location of sites and their protection requirements shall also be undertaken. • Items of local heritage significance where impact is likely shall be managed by a heritage professional to enable recording and any approvals.	
Infield gas transmission pipeline explosion	Direct or indirect impact due to explosion proximate to a HAS site.	• Infrastructure should be positioned to avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated from normal or abnormal operations. • Relevant mitigation measures shall be identified which may include- maintenance of offset distances for infrastructure siting to avoid adverse impacts from an emergency situation. • Items of local heritage significance where impact is likely shall be managed by a heritage professional to enable recording and any approvals.	Conserve and protect both known and undiscovered items of historic cultural heritage.
Explosion during transportation.	Refer to the construction section above.		
Operation			
Construction simultaneous with operations	Sites are proximate to existing gas production operations and potentially further infrastructure associated with the CSG fields. Potential for cumulative vibration impacts, unauthorised access due to opening up access tracks and associated potential for vandalism.	• Construction activities should avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated. • Where potential impacts have been identified for state significant heritage sites, an EMP shall be prepared and the EPA consulted. • Relevant mitigation measures shall be identified which may include maintenance of offset distances (e.g. building	Maintain integrity of significant sites.

Aspect	Potential Impact	Mitigation Measures	Objective
		vibration) for construction works to minimise potential for cumulative vibration impacts with existing operation. • All heritage sites shall be demarcated and access restricted including items of local heritage significance as per existing Santos policy. • Training of contractors/staff in operational areas on the location of sites and their protection requirements shall also be undertaken.	
Gas Explosion	Direct or indirect impact due to explosion proximate to a HAS site.	• Infrastructure should be positioned to avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated from normal or abnormal operations. • Relevant mitigation measures including the maintenance of appropriate offset distances for infrastructure siting including a minimum of 100 m from HAS-08 to avoid adverse impacts from an emergency situation.	Conserve and protect both known and undiscovered items of historic cultural heritage.
	Sites located within Roma township are unlikely to be impacted due to distant location from CSG fields.	• Heritage Precincts are outside the CSG field development boundaries. • Any direct or indirect impacts are anticipated to be minimal based on distance from proposed CSG construction and operational activities.	To avoid heritage precincts as part of CSG construction.
Infield gas transmission pipeline explosion	Refer to the construction section above.		
Explosion during transportation.	Refer to the construction section above.		
Decommissioning			
Gas Explosion	Potential for direct and indirect impact due to proximity to explosion.	• Gas wells to be decommissioned and residual gas to be removed. • Normal operating practices to be followed to minimise potential for explosion.	To eliminate gas explosion potential.

6.13.2.6 Summary of Findings

The non indigenous cultural heritage assessment identified 23 sites of historic cultural heritage significance as well as 5 precincts and 8 sites of historical interest within the RFD area. The study identified a high potential for items of cultural heritage, with potential for further historic items/places to exist within the RFD field study area. Sites located as part of this assessment relate to pastoral and settlement activities, such as roads, telegraph and railway lines and homesteads.

Of the sites identified in the desktop review, 14 were considered to be of State significance based on the criteria of the Queensland Heritage Act, with 12 already listed on state registers.

General mitigation measures include avoiding items of State and local significance and the adoption of appropriate offset distances to avoid vibration and subsidence impact to items of heritage significance. Specific site assessments and further management measures will be made as part of the Phase 2 assessments once infrastructure locations are confirmed.