

Section 7**Gas Transmission Pipeline Environmental Values and Management of Impacts****7.13 Cultural Heritage****7.13.1 Indigenous Cultural Heritage****7.13.1.1 Introduction**

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.

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.

7.13.1.2 Methodology

The methodology adopted for the CSG fields is applicable to the gas transmission pipeline as outlined in Section 6.13.1.2.

7.13.1.3 Regulatory Framework

The regulatory framework applicable for the assessment and management of Indigenous cultural heritage for the gas transmission pipeline component of the project is given in Section 6.13.1.3.

7.13.1.4 Existing Environmental Values***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 created. 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, currently underway, will define areas and sites of cultural significance that occur within the 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.

In accordance with the Cultural Heritage Management Plan (CHMP) agreements with the Aboriginal parties, the survey findings will remain confidential and will not be disclosed to the public. Rather, findings will be subject to the management and mitigation measures set out in the CHMPs.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Baseline Aboriginal Heritage Assessment

Desktop Review

Desktop searches of the following registers and databases were undertaken: The Department of Natural Resources and Water's (DNRW) register and database; the (former) Register of the National Estate; World Heritage List; National Heritage List and the Commonwealth Heritage List.

The Aboriginal parties and cultural heritage bodies within the project area are illustrated in Figure 7.13.1.

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 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 gas transmission pipeline area are presented below in Figures 7.13.2 and 7.13.3.

Previous Studies and Academic Research

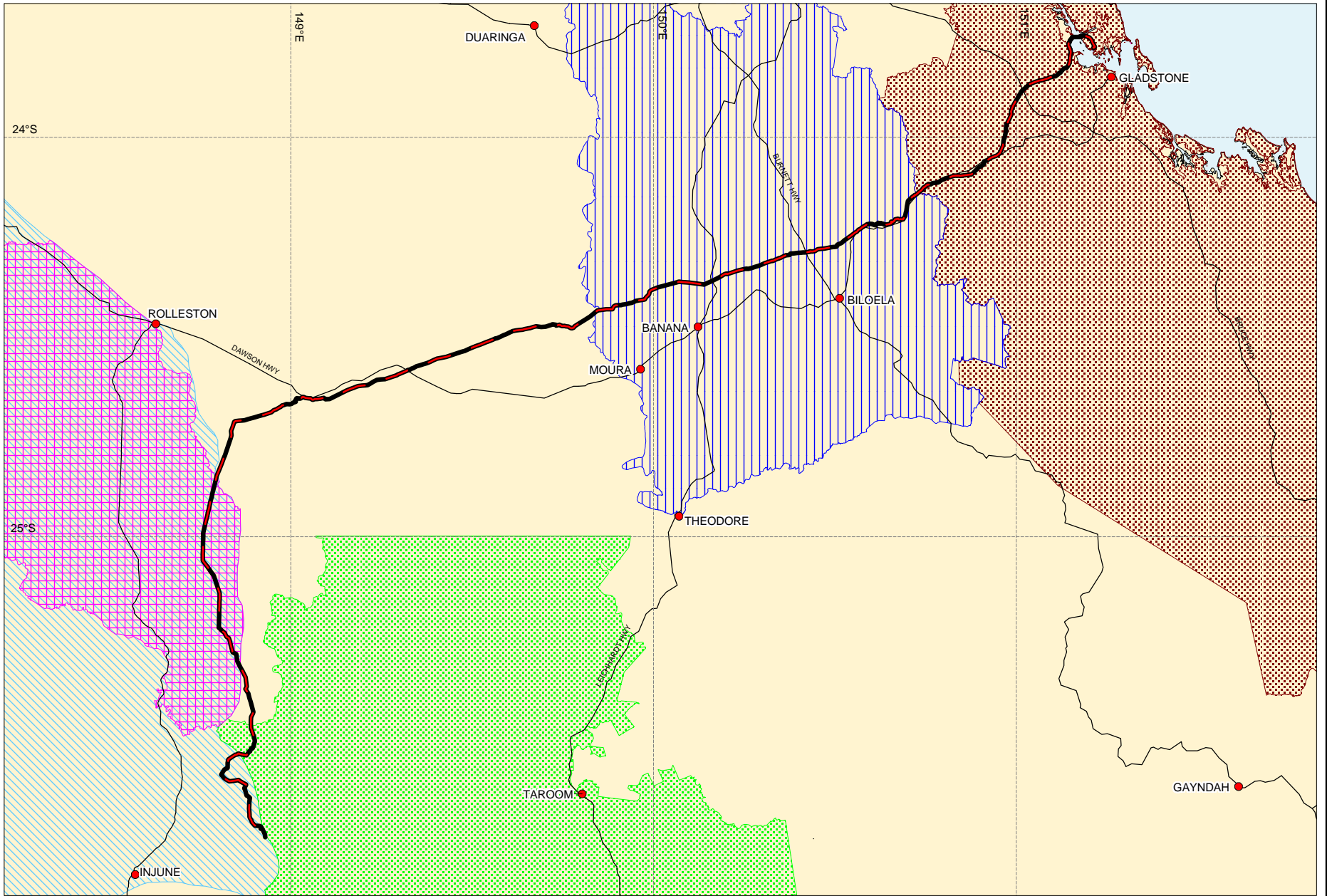
The gas transmission pipeline will link the CSG fields to the LNG facility on Curtis Island and will be approximately 435 km in overall length. Substantial amounts of archaeological research and consultancy work has been conducted across this broad area, several of which overlap with the CSG fields and the LNG facility areas. The most informative data across this region comes from the archaeological record of the Central Highlands and the Gladstone/Curtis Coast region. A selective summary of archaeological work and research undertaken in central Queensland and the Gladstone region is provided below.

Academic Research

In the Central Queensland Highlands, academic research has focused on occupational deposits and/or rock art within sandstone rock shelters, the most well known site being Kenniff Cave on Moffat Station, excavated by D.J. Mulvaney in 1961 (see Mulvaney and Joyce, 1965). Following were 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). Research into rock shelters in the region also intensified, particularly in the Carnarvon Ranges, with investigations undertaken at Cathedral Cave, Rainbow Cave and Wanderer's Cave by Beaton (1977, 1991a, 1991b).

A considerable amount of archaeological research has also been undertaken in the Gladstone region with a focus of coastal archaeology. Of note was the Gooreng Gooreng Cultural Heritage Project centred on the area of coastline between Baffle Creek and Hummock Hill Island along with an assessment of Ironbark Site Complex rhyolitic tuff quarry at Agnes Waters. Dates from excavated middens place activities in the area within the last 3,000 years BP. Within the Agnes Water - 1770 region, 52 cultural heritage places and two historical sites were located and documented during archaeological site surveys (Lilley, Williams and Ulm, 1997). Importantly, within this region the systematic site surveys investigated major environmental zones. The results revealed an extensive occupation of the region from the late Pleistocene through to the historical period and a consistent pattern of site location. *'Extensive midden deposits displaying evidence of multiple occupation and diverse activities are limited to tidal estuary margins in close proximity to their mouths'* (Lilley, Williams and Ulm, 1997).

Ulm (2004), following on from the Gooreng Gooreng study, combined data from both regional archaeological surveys and the excavation of stratified coastal sites in order to reach conclusions regarding the late Holocene archaeological record of the southern Curtis Coast. Dates were obtained from a combination of excavated and eroding archaeological deposits culminating in a total of 66 radiocarbon dates from 12 archaeological sites that, according to Ulm, provided evidence that occupation of these areas spanned from around 4,000 years ago into the post-contact period.



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GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Drawn: CA

Approved: JB

Date: 05-03-2009

Job No.: 4262 6220

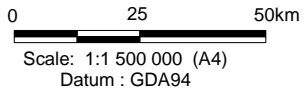
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ABORIGINAL PARTIES AND
CULTURAL HERITAGE BODIES
ALONG GAS TRANSMISSION PIPELINE

Figure: 7.13.1

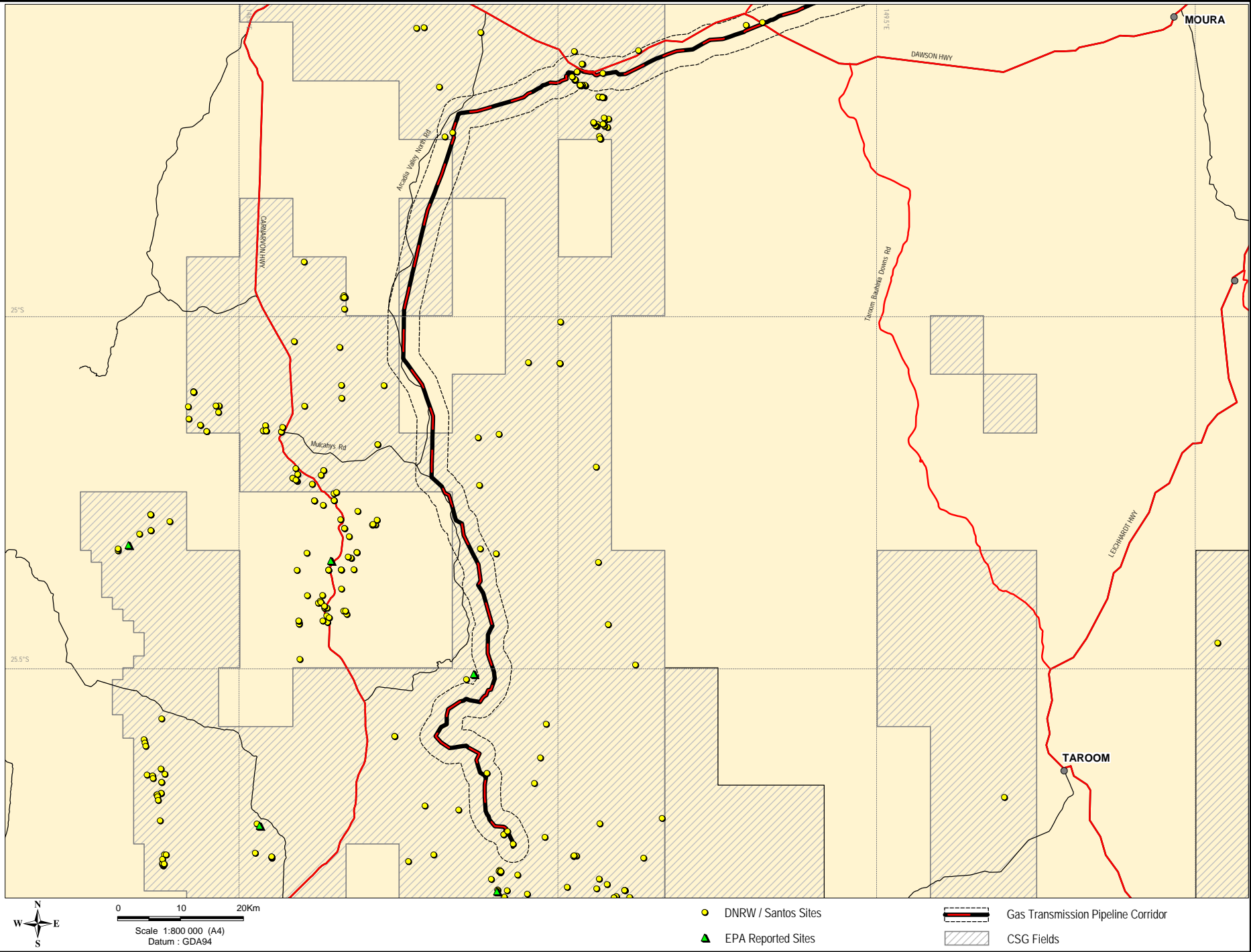
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- Gas Transmission Pipeline
- Port Curtis Coral Coast
- Iman People 2
- Gangulu People
- Karingbal 2
- Bidjara People

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Figure: 7.13.2		Title
Rev: A A4		GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT ASSESSMENT INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE PIPELINE WESTERN SECTION

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- DNRW / Santos Sites
- ▲ EPA Reported Sites
-  Gas Transmission Pipeline Corridor
-  CSG Fields

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Project

**GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT**

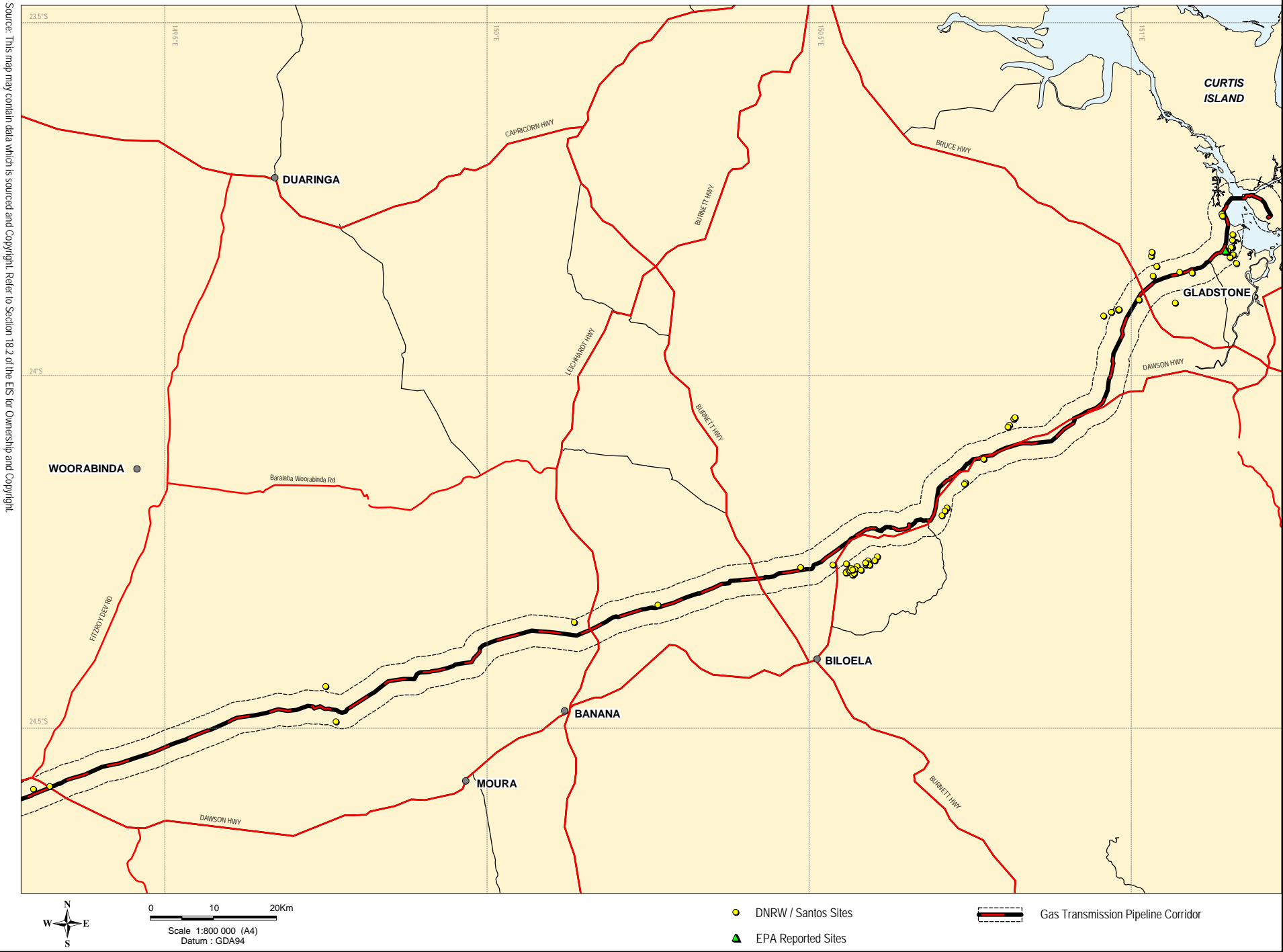
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**INDIGENOUS CULTURAL HERITAGE
SITES IN THE VICINITY OF THE
PIPELINE EASTERN SECTION**

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Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Previous Studies

Since 1995, Archaeo Cultural Heritage Services (Archaeo) [previously Ann Wallin and Associates (AWA)] have undertaken a large proportion of the archaeological surveys in the Gladstone region (1995, 1997, 1998, and 1999a, b, c, d, 2000, 2002, 2004a, b, c, 2005a, b, 2006a, b, 2007). Based on the results of this work it would appear that Aboriginal people living in the Gladstone area were not utilising the entire coastline for occupation, but rather were selective about where they were based and that these choices were likely related to the availability of particular suites of resources. In general, Archaeo has found that occupation sites were usually associated with places where higher ground and fresh permanent water, preferably from springs or creeks, were located in close association to a rich resource area.

The Boyne Valley has been a focus of investigation in relation to inland coastal sites with surveys and assessments undertaken since the 1980s (see Lilley, 1980; Hiscock, 1982; Archaeo, 2000; Gorman, 2002). Campsites, isolated artifacts and artifact scatters, varying in size and density, were located within this region primarily along creeks and rivers. Dreaming sites, 'good' and 'bad' places, rock shelters, stone arrangements, bora rings/ ceremonial sites, burials, massacre sites, water holes, food resources, scarred trees, quarries and ochre sources were also documented (Archaeo, 2000; Gorman, 2002). As a result of studies in this region, it is considered highly feasible that the long Boyne Valley was used as a means of traversing the steep Great Dividing Range and allowing movement between inland sites such as Cania Gorge and the coastal region, where river valleys such as the Calliope and Boyne Rivers and smaller creek valleys such as Police Creek were then used to transverse the hilly hinterland in order to access the coastline (Archaeo, 2000; Gorman, 2002).

Alfredson undertook survey work in the Gladstone region within the late 1980s and early 1990s. As part of surveys associated with the Stuart oil shale project, Alfredson (1989) located stone artifacts near natural drainage channels, fragmented oyster shells which were defined as possibly being disturbed midden material and a further site consisting of two small 'greenstone' flakes. A possible scarred tree was also located. This site was not located until ten years later and may have been burnt in subsequent bushfires (Archaeo, 2008).

Burke (1993) located some 93 Aboriginal sites along the Port Curtis coast, from Hummock Hill to Agnes Waters and the town of 1770. Extensive middens and artifact scatters were also noted on offshore islands, including Curtis, Facing, South Trees and Hummock Hill Islands together with a quarry at Monte Cristo Creek on Curtis Island. To the north of Gladstone further middens are located on the mainland in The Narrows between Curtis Island and the coast. These large middens demonstrate the importance of marine resources to local Aboriginal people.

A previous study directly relevant to the gas transmission pipeline area is Hall's (1988) archaeological assessment of the Wallumbilla-Gladstone State gas pipeline. The area surveyed for this assessment extended from Wallumbilla in the south to Boxvale, approximately 200 km north-west, then from Boxvale to Gladstone. 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).

Of relevance to the central pipeline area are Morwood and Godwin's (1987) surveys and excavations in the Gyration region along the Dawson River which included an investigation of the Coolibah land system, the Carborough-Nathan land system characteristic of Nathan Gorge and the fluvial plains upstream from this gorge. Nineteen sites were recorded during the survey, the majority being surface scatters of fresh water mussel shell and stone artifacts located within close proximity to the Dawson River channel on high ridges and terraces (Morwood and Godwin, 1987:98). Surface collections and excavations revealed a range of raw material for artifacts which included mudstone, silcrete, chert, quartz, sandstone and andesite. Hammer stones, flakes and flake pieces, cores and grind stones were identified as common tool types.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

7.13.1.5 Potential Impacts and Mitigation Measures

All potential impacts are assessed in regards 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 are 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 Aboriginal Cultural Heritage Act (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 applicable to each area. 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.

7.13.1.6 Summary of Findings

Based on the selective summary of archaeological research and consultancy work undertaken in central and coastal Queensland, the following predictions can be made regarding the archaeological potential of these areas within which the gas transmission pipeline crosses. 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;
- Art sites, burials and rock shelters in sandstone outcrops in ranges; and
- Shell middens, stone artifacts and burials in coastal areas.

7.13.2 Non Indigenous Cultural Heritage

7.13.2.1 Introduction

A non indigenous cultural heritage assessment of the proposed gas transmission pipeline corridor was conducted on behalf of Santos by Archaeo Cultural Heritage Services Pty Ltd (refer to Appendix X).

7.13.2.2 Methodology

The methodology adopted for the CSG fields is applicable to the gas transmission pipeline as outlined in Section 6.13.2.2.

7.13.2.3 Regulatory Framework

The regulatory framework applicable for the assessment and management of non indigenous cultural heritage for the gas transmission pipeline component of the project are given in Section 6.13.2.3.

Section 7**Gas Transmission Pipeline Environmental Values and Management of Impacts****7.13.2.4 Existing Environmental Values**

The geographical area covered by the proposed gas transmission pipeline corridor includes a diverse landscape stretching from the coastal area of Gladstone, inland to the CSG fields near Roma. The history of the area encompasses maritime and inland exploration, pastoralism and 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. In the late twentieth century, the city of Gladstone was transformed from a small coastal community dependent on a butter factory and a seasonally operational meatworks to the site of Queensland's largest power station and one of the world's largest alumina plants. The presence of a deep-water port and the development of port facilities helped drive the economic development of Gladstone and the region as a whole. Many towns in the region have also experienced significant recent changes with the advent of large-scale coal mining, and gas exploration, mining, production and exportation.

Key themes in the historic background of the gas transmission pipeline corridor have been divided into the following periods:

Gladstone Region

- Maritime exploration (1802-1823).

Gladstone-Roma

- 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);
- Oil and gas development (>1900); and
- Development post 1900.

As the southern portion of the gas transmission pipeline overlaps the CSG fields study area some of the history of the gas transmission pipeline is covered in Section 6.13.2.4 with further details contained in Appendix X.

Maritime Exploration

The current Port Curtis or Gladstone Harbour was named in 1802 by Matthew Flinders (after sailing into the harbour) after Sir Rodger Curtis, the admiral commanding the British squadron in South Africa. Flinders spent four days mapping the harbour, naming Gatcombe Head and Facing Island. He also investigated the shore and named Mount Larcom, Hill View, South Trees Point and Sea Hill on Curtis Island. More significant exploration of Port Curtis occurred in 1823 as part of an investigation of potential sites for a penal settlement by Surveyor General John Oxley. The investigation was part of a wider exploration of Moreton Bay and Port Curtis. Moreton Bay was subsequently chosen over the harbour because of easier ship access.

Inland Exploration (1844 – 1848)

Refer to Section 6.13.2.4 for details.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Pastoral Development and Frontier Conflict (1840 – 1860)

Port Curtis Pastoral District (Gladstone, Curtis Island, Calliope)

Port Curtis was proclaimed a pastoral district on 10 January 1854 opening up central coastal Queensland to eager squatters seeking to lease vacant Crown Lands. Early leases in the area included Raglan, Carara and Calliope stations which were owned by James Landsborough. By the 1860s, the land's potential for grazing sheep and its convenient access to a deep-water port was realised.

Refer to Section 6.13.2.4 for information on:

- Maranoa Pastoral District (Roma);
- Leichhardt Pastoral District (Injune, Rolleston, Springsure, Emerald); and
- Northern Burnett Pastoral District (Banana).

Early Settlement (1850-1880)

Gladstone

The early settlement of Port Curtis commenced in 1853 as part of the surveying of town allotments and small farms by surveyor Francis McCabe. Earlier plans for Port Curtis to be established as a penal colony to receive reformed convicts from Tasmania was short lived and were abandoned some eight years earlier in 1845.

The development of town allotments and small farms was prompted by the need for a port from which inland squatters could ship their wool. Governor Fitzroy appointed Captain Maurice O'Connell as the Government Resident and he arrived there in March 1854, setting up a tent town at Barney Point. Fitzroy arrived on the HMS Calliope in April 1854 and officially installed O'Connell in his office. Gladstone, named after the former Colonial Secretary and future prime minister of Britain, was therefore officially created – unlike other towns which sprang up according to patterns of land settlement.

Colonial officials were also hopeful that Gladstone could support a major settlement because of the deep-water harbour there. Port Curtis had become a busy facility with a customs house built in 1860 and the first public wharf constructed in 1863. The population grew slowly, however the discovery of gold in 1861 on the Calliope fields helped bolster the fortunes of the town. Local government commenced in February 1863 and schools, churches and cultural institutions soon emerged. By 1870, several hundred people lived in Gladstone and the *Observer* newspaper had been established. A lighthouse was built at Cape Capricorn in 1874 and another at Gatcombe Head in 1876.

Curtis Island

The European presence on Curtis Island, the largest island off the Curtis Coast, commenced in 1858 when a pilot station for Fitzroy River shipping was established at Sea Hill on the northwest shore. A small township emerged; a primary school was opened and the first quarantine station was established at Sea Hill. The island was also a site for pastoral settlement. Monte Cristo Station, which took in the entire island, was registered in 1862 in the name of R.B.H.P. Ramsay. This station became the home of the famous Australian novelist, Rosa Campbell Praed. The island was eventually divided into two stations – Spadeleigh in the north and Monte Cristo in the south. Later, a holiday township grew up at South End located in the south-east corner of the island.

Refer to Section 6.13.2.4 for information on:

- Early Banana;
- Early Emerald; and
- Early Roma.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Railway Development (1865-1965)

Refer to Section 6.13.2.4 for further details.

Mining Development (1850-1900)

Gold Mining

The Gladstone region in 1861 had its own gold rush with a discovery made on the Calliope fields. The reefs were mined through various leases and workings. Gold had been discovered in the Targinie/Yarwun district as early as 1880, when a 36 kg gold nugget (worth \$1.2 million in modern terms) was discovered on the Golden fleece deposit in Sneaker's Gully, on the west of the Mt Larcom Range. Remnants of some of the local mining industry of the region have been located on private land near Yarwun.

The Langmorn goldfield covers a large area extending from Targinie west to the Dee Range and included the Raglan, Mount Larcom and Targinie fields. The Raglan field was discovered in 1867. The most important reef within these goldfields was the Duke of Brittany, situated approximately a quarter of a mile west of Raglan. Other important mines within the Langmorn goldfields included the Mount Bennett mine about 14 miles south of Raglan, the Mount Turrett Reef about a quarter of a mile from Mount Raglan, the Duke of York mine and numerous small mines near Targinie, which have been worked at times since the original discovery in 1900.

Coal

As part of the expansion of railways after 1865, the rail network not only increased the demand for coal as a 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.

Gladstone and Curtis Island

Closer settlement at Port Curtis was encouraged by the opening of blocks for agriculturists and small farmers. Gladstone's importance as a portside town also increased in this period. Until 1924 (when Mackay was linked by a railway), mail bound for North Queensland areas had to be sent from Gladstone via its unique steamers, with thousands of passengers forced to pass through The Narrows between Gladstone and Curtis Island which helped to establish Gladstone as an important transit junction in the later nineteenth century.

The introduction of meat and dairy processing works also helped to establish closer settlement of the Port Curtis district, with the Gladstone Meatworks of Queensland commencing operation at Parsons Point in 1896. The meatworks and the utilisation of refrigeration technology helped to establish Gladstone as a relatively busy industrialised town by the close of the nineteenth century. A butter factory also opened in Gladstone in 1906.

Roma

Refer to Section 6.13.2.4 for details.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Oil and Gas Development (>1990)

Refer to Section 6.13.2.4 for details.

Agricultural Development (>1900)

The provision of rail infrastructure to Gladstone in 1903 proved a key economic boost to the town and the surrounding region. Pastoralists and farmers now had easier access to markets with agricultural activity intensifying with the clearing of softwood scrubs around Mt Larcom, Ambrose, Yarwun and Targinie. Elsewhere, various agricultural enterprises met with mixed fortunes. A 'sugar rush' occurred in 1912 as cane was grown and railed to Bundaberg. Immigrant Germans established settlements at Ambrose and Raglan in 1910. Dryland cotton farming held out promise and a ginnery was built in Gladstone in 1923, but lasted only two years. Fruit growing started up at Yarwun in 1913 and was to prove far more enduring. In 1924, the Yarwun-Targinie Fruit growers association was formed to export papaws to domestic markets in the south. Large scale development occurred at the meatworks following a change of ownership in 1934 and gold also continued to be mined in the area. After 1900, discoveries of gold were made on the eastern side of the Mount Larcom Range. The Archers reefs were mined between the turn of the century and World War II, with other local mines situated in the vicinity.

Baseline Non Indigenous Cultural Heritage Assessment

No non indigenous heritage sites were identified on the World, National and Commonwealth Heritage lists or local government (QR/ DMR) lists or registers. Heritage sites identified within 5 km of the gas transmission pipeline corridor contained in one or more of the heritage registers are summarised in Table 7.13.1 and depicted in Figures 7.13.4 and 7.13.5.

Table 7.13.1 Results of Register Searches

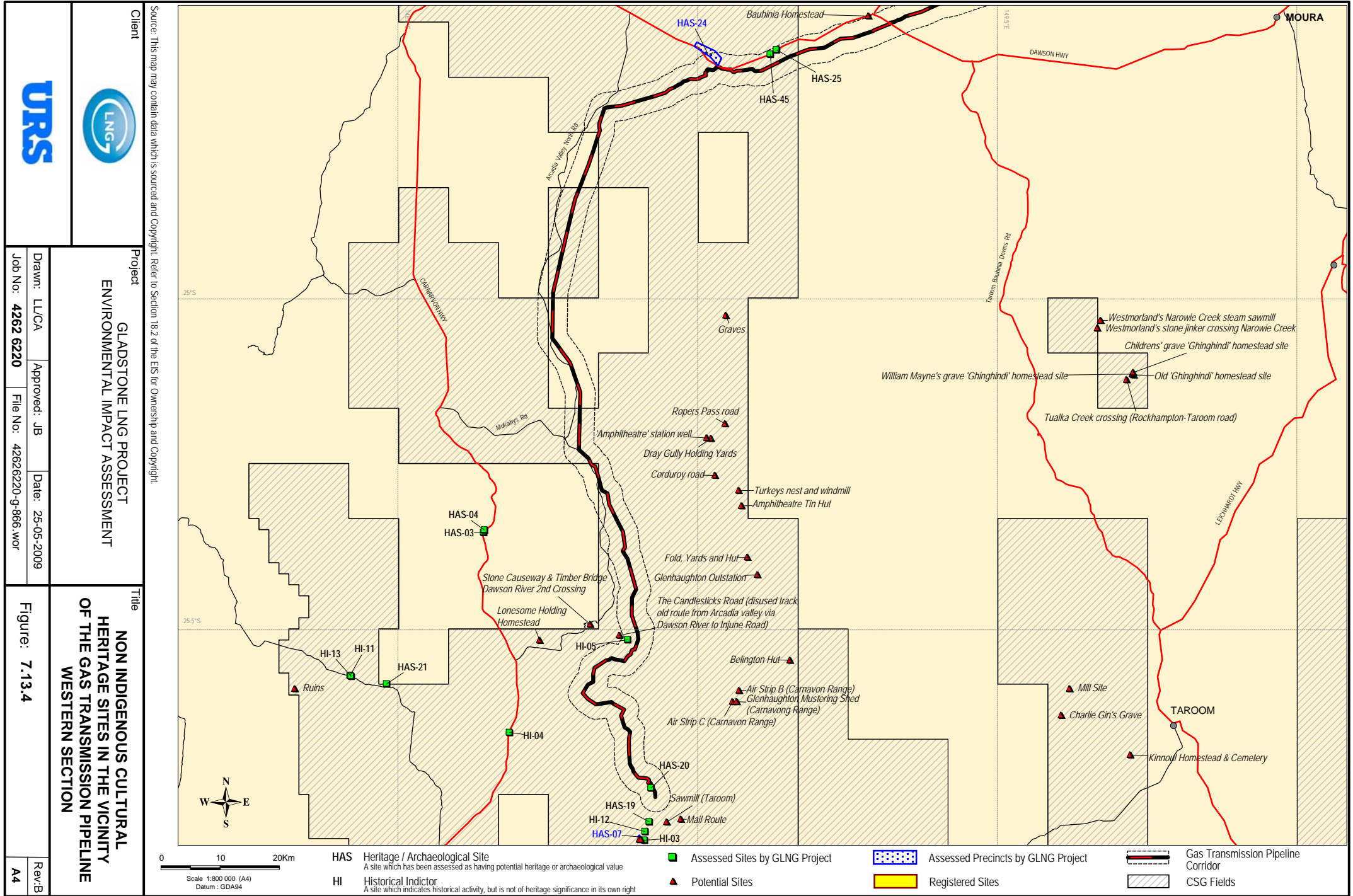
HAS No.	Site / Address	LGA	Register of National Estate	Queensland Heritage Register	Local Heritage Register	National Trust Register
41	Kilbirnie Homestead – Kilbirnie Road	BANANA		✓	✓	✓

Heritage and Archaeological Sites (HAS)

A total of 8 individual sites were identified during the field survey within the gas transmission pipeline corridor. Of these sites, four were considered to be of State significance, including one site already listed on heritage registers. A summary of the findings and the significance of the sites are provided below in Table 7.13.2.

Places of Historical Interest

Two 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. A list of the HI is provided in Table 7.13.3 and their locations are indicated in Figures 7.13.4 and 7.13.5.



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GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT

Drawn: LL/CA Approved: JB Date: 25-05-2009
Job No: 4262 6220 File No: 42626220-g-866_wor

Title



NON INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE GAS TRANSMISSION PIPELINE WESTERN SECTION

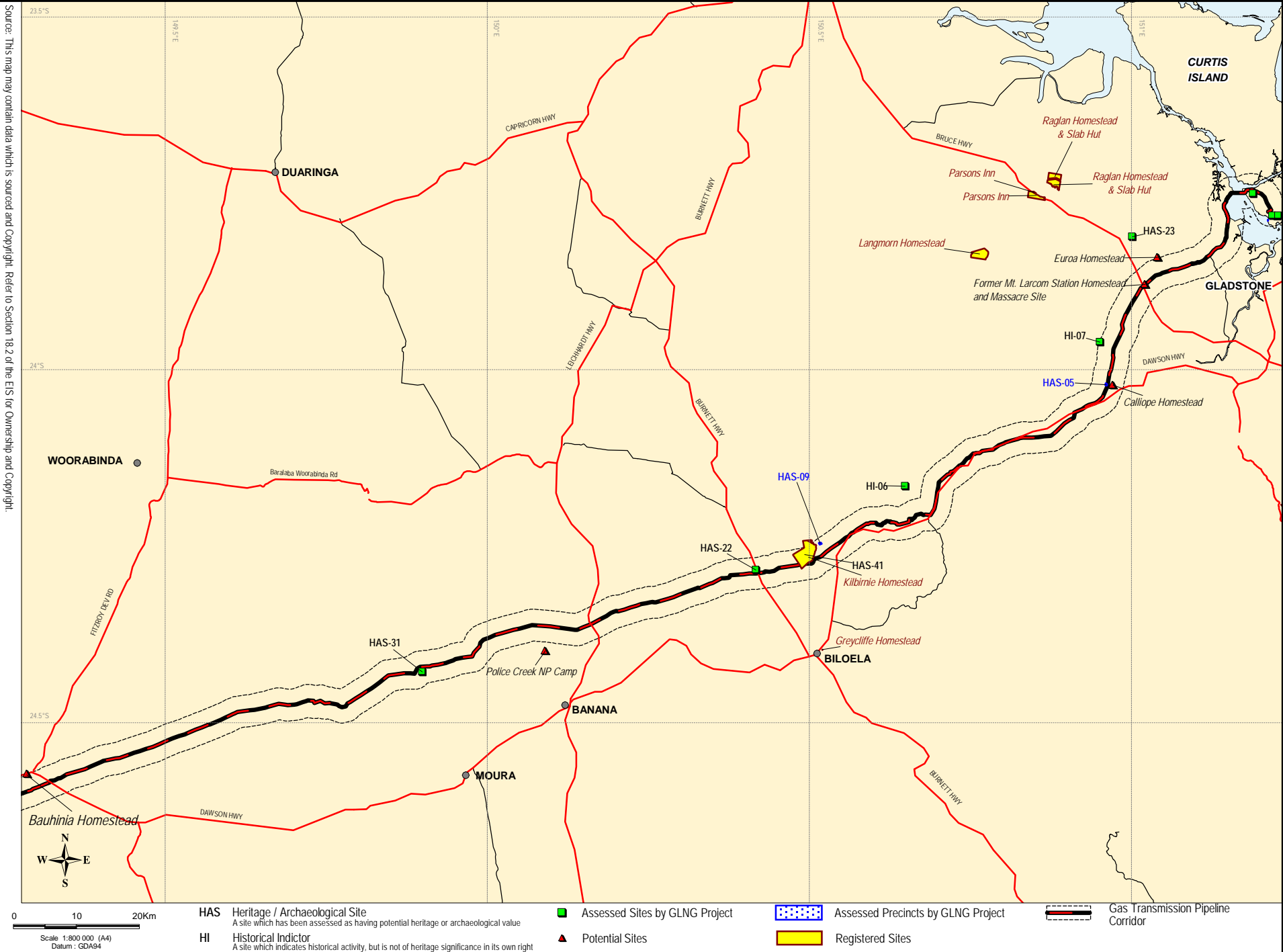
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- HAS** Heritage / Archaeological Site
A site which has been assessed as having potential heritage or archaeological value
- HI** Historical Indicator
A site which indicates historical activity, but is not of heritage significance in its own right
- Assessed Sites by GLNG Project
- Potential Sites
- Assessed Precincts by GLNG Project
- Registered Sites
- Gas Transmission Pipeline Corridor
- CSG Fields

 	
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NON INDIGENOUS CULTURAL HERITAGE SITES IN THE VICINITY OF THE GAS TRANSMISSION PIPELINE EASTERN SECTION	
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|--|--|--|--|
| HAS Heritage / Archaeological Site
A site which has been assessed as having potential heritage or archaeological value |  Assessed Sites by GLNG Project |  Assessed Precincts by GLNG Project |  Gas Transmission Pipeline Corridor |
| HI Historical Indicator
A site which indicates historical activity, but is not of heritage significance in its own right |  Potential Sites |  Registered Sites | |

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Table 7.13.2 Site Investigation Results and Assessment Summary

Site Type & HAS No.	Site Name	Registered	Site Significance	Justification (of significance assessment)
<i>Archaeological Site</i>				
HAS-09	Former Dudarcho Homestead	-	State	Remnant features illustrate period of sheep holdings attempted and later abandoned (failed) in QLD's history- potential contribution to understanding the evolution of land use across Queensland.
HAS-20	Bonnie Doon Homestead	-	State	Potential to reveal development of isolated homesteads over extended periods of time within the region.
<i>Heritage Site</i>				
HAS-05	Hazel Dean Homestead	-	State	Criterion (a) - gateway to the region including terminus of the evidence of multiple development phase indicating evolution from dairying to pastoral concern. Illustrates pattern of early European settlement where development of pastoral properties preceded agriculture and town establishment. Criterion (d) - demonstrates principle characteristics of a 1890s homestead. Criterion (g) - association with the life and work of six generations of the Farmer family and early dairying in the area. Important role in the social network of the local area hosting community dances 1898-1950s.
HAS-22	Survey Tree	-	Local	Criterion (a) - Provides evidence of surveying associated with the Burnett Highway construction. Criterion (d) - representative of the method of marking routes, locations and settlement sites.
HAS-24	Old Dawson Highway Alignment	-	Local	Criterion (a) - Provides contrast of modern infrastructure and evidence of early road transport conditions and networks in the Bauhinia shire. Criterion (c) - record of early road infrastructure and includes elements informing of the surveying, construction and associated telecommunications.
HAS-25	Camping Reserve	-	Local	Criterion (a) - camping venue for travellers in transport corridor from Bauhinia to Rolleston. Criterion (c) - potential records associated with transient occupation during 20 th century.
HAS-31	Wooden Road Bridge	-	Local	Criterion (a) - illustrates development of transportation around Moura and contrasts modern infrastructure. Criterion (b) - one of few remaining wooden road bridges.
HAS-41	Kilbirnie Homestead	✓	State	-Refer QLD/National Register (Appendix X)
<i>Precinct – N/A</i>				

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Table 7.13.3 Historical Indicators Identified in the Gas Transmission Pipeline Corridor

Site	Comment
HI-05	Red Dam Complex
HI-07	Kaluda Park Boiler and Yards

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

7.13.2.5 Potential Impacts and Mitigation Measures

The potential for direct and indirect impacts as part of the gas transmission pipeline development were assessed for each HAS.

The EMP will include a procedure to manage any new HAS encountered during gas transmission pipeline construction. Potential impacts will be mitigated and minimised where practicable via a tiered approach of avoidance, and adoption of mitigation measures where necessary including maintaining off-set distances to minimise potential vibration impacts.

Avoid Known Cultural Heritage Sites

Potential Impacts

The gas transmission pipeline located proximate to or within heritage site perimeters.

Mitigation Measures

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

Further assessment of the gas transmission pipeline route will be undertaken in the event of realignment or the identification of additional sites during construction activities or as part of Environment Management Plan (EMP) obligations. Any new heritage items identified will be assessed as part of the EMP and Santos where necessary will:

- Conduct cultural heritage surveys prior to any construction activities, commencing in the vicinity of any identified or potential cultural heritage sites; and
- Develop further site specific management recommendations for significant sites and places as required.

Utilising a similar route to the QGP has been assessed as the preferred option for avoiding HAS for the majority of the gas transmission pipeline route. There are several areas, however where the route encounters or comes close to sites of cultural heritage significance: e.g. the proposed gas transmission pipeline corridor includes HAS-05, HAS-09, HAS-20, HAS-22, HAS-24, HAS-25, HAS-31 and HAS-42 and HI-05 and HI07.

HAS-41 is the Kilbirnie Homestead site which is listed on the Queensland Heritage Register. Given the significance of this site, if the final alignment does traverse in close proximity to the site then specific mitigation measures will be developed and incorporated into the gas transmission pipeline EMP. Such measures will be developed in consultation with relevant stakeholders including the EPA, and will consider all practical options available to reduce the gas transmission pipeline development's impact to an acceptable level.

The preferred route for the gas transmission pipeline is the best option amongst the routes considered by Santos for the preservation of historic cultural heritage.

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

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

training and/or Workplace Health and Safety meetings. Training materials will inform the workers as to what archaeological material and cultural heritage sites may look like and provide clear instructions on what to do if they find anything. This mitigation measure will be applicable to all of the impacts identified in this section.

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 gas transmission pipeline 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 notify the historical archaeologist appointed to the project; and
- The historical archaeologist will provide management recommendations to the site manager and will liaise with the Environmental Protection Agency (EPA) to ensure that the archaeological provisions of the *Queensland Heritage Act 1992* (Heritage Act) are met.

State Significant Sites

A number of potential sites within the gas transmission pipeline corridor were identified (refer Figures 7.13.4 and 7.13.5).

Potential Impacts

Construction activities have the potential to disturb state significant sites.

Mitigation Measures

State significant sites are protected by the Heritage 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.

Should any works need to be conducted in these areas they will be governed by Part 6 of the 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.

Archaeological Sites

State significant archaeological sites require special consideration under the provisions of the Heritage Act, as they represent a heritage asset that *has potential to contain an archaeological artefact that is an*

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

*important source of information about Queensland's history.*¹ Avoidance of these sites will be practised and all staff made aware of their location.

State significant archaeological places located in the gas transmission pipeline corridor include:

- HAS-05;
- HAS-09
- HAS-20; and
- HAS-42.

Potential Impacts

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

Mitigation Measures

Under the provisions of the Heritage Act, liaison with the EPA is required so that these sites can be appropriately managed. 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.

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.

Potential Sites

Potential Impacts

A number of potential sites within the gas transmission pipeline corridor study area were identified (refer to Figure 7.13.5).

Mitigation Measures

All potential impacts are assessed regarding 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.

¹ Queensland Heritage Act 1996, Section 60 (b)

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

A range of standards and criteria are 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 Aboriginal Cultural Heritage Act 2003 (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 applicable to the LNG facility. 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.

Protection of Heritage in Santos Ownership

Potential Impacts

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

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.

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.

Cumulative Impacts

Section 1 identifies other proposed gas transmission pipelines associated with other potential CSG projects. There is limited information available as to the planned development or timing of these projects, however a qualitative assessment can be made of the possible cumulative impacts.

Some sections of the proposed gas transmission pipeline corridor may be located within an area where these other pipelines are proposed to be located in the future. Within these areas there would be an increased disturbed area and possible impacts on cultural heritage values. The anticipated impacts of the pipeline installation are considered to be the same for the other envisaged pipelines.

It may be considered that where pipeline alignments coincide then consideration should be made, where appropriate, for multi-use corridors or parallel ROW.

In the event that the "Yarwun Neck" in the GSDA contains multiple pipelines, cooperation between the relevant pipeline development proponents and regulatory agencies will be required to minimise potential impacts to cultural heritage values.

The Queensland Government has advised that its preference is for the gas transmission pipelines for all LNG facilities proposed for Curtis Island to be located in a common pipeline corridor across the Gladstone

Section 7**Gas Transmission Pipeline Environmental Values and Management of Impacts**

State Development Area, including the Port Curtis Crossing and Curtis Island gas transmission pipeline sections to minimise potential impacts in this area.

It is expected that the other gas transmission pipeline development projects would include some or all of the proposed mitigation measures in relation to cultural heritage described in this section. By utilising the mitigation methods proposed the expectation is the minimisation of the cumulative impacts on the receiving environment.

Table 7.13.4 provides a summary of potential non-indigenous cultural heritage impacts and mitigation measures for the gas transmission pipeline.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Table 7.13.4 Potential Non-Indigenous Cultural Heritage Impacts and Mitigation Measures

Aspect	Potential Impact	Mitigation Measures	Objective
Disturbance of Cultural heritage sites	Construction activities and transport associated with the gas transmission pipeline poses a risk of direct and indirect disturbance (e.g. vibration/ blasting).	<ul style="list-style-type: none"> Where potential impacts have been identified for state significant heritage sites, specific mitigation measures will be prepared in consultation with the EPA. All HAS shall be demarcated and access restricted where construction works are close to the HAS (~100 m). This will be undertaken for all sites including those of local heritage significance. Training of contractors/staff in operational areas on the location of sites and their protection requirements shall also be undertaken. 	Conserve and protect both known and undiscovered items of historic cultural heritage.
Horizontal directional drilling of the gas transmission pipeline.	Direct or indirect impacts due to drilling proximate to a HAS site.	<ul style="list-style-type: none"> Avoid drilling activities at 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, specific mitigation measures will be prepared in consultation with the EPA. Identify appropriate mitigation measures which may include- maintenance of offset distances (e.g. building vibration) for infrastructure positioning. Ensure items of local heritage significance are managed by a heritage professional. Demarcate and restrict access to all state and local heritage sites where works within 100 m. Train contractors/staff in operational areas on the location of sites and their protection requirements. 	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 gas transmission pipeline.	<ul style="list-style-type: none"> Heritage Precincts are outside the proposed gas transmission pipeline corridor. Any indirect impacts are anticipated to be minimal based on distance from proposed gas transmission pipeline construction and operational activities. Material transport for drilling operations shall avoid haulage through township, however truck vibration is expected to be minimal associated with construction related transport (refer Section 7.10). 	To avoid heritage precincts as part of gas transmission pipeline construction and transportation activities.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
Subsidence of gas transmission pipeline.	Potential vibration associated with subsidence of gas transmission pipeline.	<ul style="list-style-type: none"> Position gas transmission pipeline to avoid sites of state significance, and where practical, sites of local significance, where potential direct or indirect impacts are anticipated. 	Ensure gas transmission pipeline integrity to secure supply gas and prevent adverse impacts to surrounding environment.
Gas explosion in the gas transmission pipeline.	Direct or indirect impact due to explosion proximate to a HAS site.	<ul style="list-style-type: none"> Position gas transmission pipeline 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, specific mitigation measures will be prepared in consultation with the EPA. Prepare Emergency Management Plan and implement risk reduction measures to prevent impacts to surrounding environment including heritage sites. 	Conserve and protect both known and undiscovered items of historic cultural heritage.
Bushfires along the gas transmission pipeline.	Direct or indirect impact due to explosion proximate to a HAS site.	<ul style="list-style-type: none"> Refer to mitigation measures for a gas explosion above. 	Conserve and protect both known and undiscovered items of historic cultural heritage.
Blasting along the gas transmission pipeline.	Blasting activities for gas transmission pipeline trenching has the potential to generate vibration which may impact on buildings associated with heritage sites.	<ul style="list-style-type: none"> Adoption of recommended offset distances as per Section 7.10 for blasting activities. Monitor vibration at nearby heritage sites with the potential for blast impacts and modification of blast parameters where required. 	Conserve and protect both known and undiscovered items of historic cultural heritage.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
Unauthorised access, vandalism and accidental damage of the gas transmission pipeline.	Unauthorised access to transmission pipeline and nearby cultural heritage sites- potential vandalism or accidental damage of sites associated with landholder or other third party activities.	<ul style="list-style-type: none"> • Demarcate and restrict access to all state and local heritage sites where works within 100 m. • Train contractors/staff in operational areas on the location of sites and their protection requirements. • Monitor heritage sites at least biannually for integrity. • Restrict access to gas transmission pipeline ROW. 	Conserve and protect known items of historic cultural heritage.
Construction			
Gas explosion in the gas transmission pipeline.	Direct or indirect impact due to explosion proximate to a HAS site.	<ul style="list-style-type: none"> • Refer to the construction section above. 	Conserve and protect both known and undiscovered items of historic cultural heritage.
Bushfires along the gas transmission pipeline.	Direct or indirect impact due to explosion proximate to a HAS site.	<ul style="list-style-type: none"> • Tiered approach of avoidance and minimisation of impacts. The gas transmission pipeline 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, specific mitigation measures will be prepared in consultation with the EPA. Relevant mitigation measures shall be identified which may include- maintenance of offset distances (e.g. building vibration) for infrastructure positioning, maintenance of hazard buffers. • Emergency Management Plan will be prepared and risk reduction measures implemented to prevent impacts to surrounding environment including heritage sites. 	<p>To conserve and protect both known and undiscovered items of historic cultural heritage.</p> <p>To ensure operations do not place any items of heritage at risk from emergency situations.</p>
Unauthorised access, vandalism and accidental damage of the gas transmission pipeline.	Unauthorised access to the gas transmission pipeline and nearby cultural heritage sites- potential vandalism or accidental damage of sites associated with landholder or other third party activities.	<ul style="list-style-type: none"> • Refer to the construction section above. 	Conserve and protect known items of historic cultural heritage.

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
Rehabilitation and Decommissioning.			
Disturbance of cultural heritage sites along the gas transmission pipeline.	Construction activities and transport associated with the gas transmission pipeline poses a risk of direct and indirect disturbance (e.g. vibration).	<ul style="list-style-type: none"> • Avoid haulage proximate to heritage sites and utilise existing tracks only. • Demarcate and restrict access to all state and local heritage sites where works within 100 m. • Train contractors/staff in operational areas on the location of sites and their protection requirements. 	Conserve and protect both known and undiscovered items of historic cultural heritage.

Section 7**Gas Transmission Pipeline Environmental Values and Management of Impacts****7.13.2.6 Summary of Findings**

The non-indigenous cultural heritage assessment identified eight sites of historic cultural heritage significance as well as two sites of historical interest within the gas transmission pipeline corridor. The study identified a high potential for additional items of cultural heritage to exist within the project area (in addition to those identified in the study), and the potential for further historic item/places to be identified within the project area as works proceed. Sites located as part of this assessment relate to pastoral and settlement activities, such as roads, survey trees and homesteads.

Of the eight sites, four were assessed to be of state significance based on the criteria of the Heritage Act, including Kilbirnie Homestead site which is listed on the Queensland Heritage Register.

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. Where additional heritage sites are identified during construction, assessments shall be undertaken as part of EMP requirements.