Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

7.11 Land Use and Infrastructure

7.11.1 Introduction

This section describes the existing land use along the gas transmission pipeline corridor including land activities, features, resources and infrastructure. The local, regional and state planning frameworks for land use matters are also discussed. The land use context of the gas transmission pipeline corridor and the potential land use and planning impacts are assessed.

7.11.2 Methodology

The existing land use values within the gas transmission pipeline corridor, the impact of the gas transmission pipeline on these values and the proposed mitigation measures are provided below.

The gas transmission pipeline corridor has been examined in the context of relevant land use planning instruments including relevant federal government legislation, state planning policies, local government planning schemes and regional planning schemes. Further information is provided in Appendix V.

7.11.3 Regulatory Framework

7.11.3.1 Regional Planning Framework

There are a number of regional planning instruments that apply over the gas transmission pipeline corridor; details are discussed below and in Section 6.11.3.1 and Appendix C.

Central Queensland Regional Growth Management Strategy

The gas transmission pipeline corridor passes through sub-regions 1 - 3. Refer to Section 6.11.3.1 for details.

Central Queensland Strategy for Sustainability

Refer to Section 6.11.3.1 for further details.

Draft Maranoa and Districts Regional Plan

The gas transmission pipeline traverses a number of areas situated within the Maranoa and Districts Regional Plan area, such as Roma and Injune. For further details refer to Section 6.11.3.1.

7.11.3.2 State Planning Provisions

The following state planning policies (SPPs) and plans are a relevant consideration in respect of the gas transmission pipeline corridor component of this project.

SPP 1/92 - Development and Conservation of Agricultural Land

Refer to Section 6.11.3.2 for the policy principles of SPP 1/92 Development and Conservation of Agricultural Land. Section 7.3 of the EIS report provides further details of Good Quality Agricultural Land (GQAL) land classes.

Most shire planning schemes contain maps showing the locations of GQAL. The GQAL locations for the shires along the gas transmission pipeline corridor are provided in Appendix V. No GQAL data were

available for Curtis Island. Section 7.3 of the EIS provides further details of GQAL along the gas transmission pipeline corridor.

SPP 1/03 - Mitigating the Adverse Impacts of Flood, Bushfire and Landslide

SPP 1/03 aims to mitigate the adverse impacts of flood, bushfire and landslide for assessable development. The SPP applies generally throughout Queensland; however the bushfire and landslide outcomes apply only to local governments listed in Annex 2 of the SPP. Bushfire outcomes apply for all shires along the gas transmission pipeline. Landslide applies to Banana, Taroom, Miriam Vale, Calliope and Gladstone Shires. Flood assessment based on SPP 1/03 is not available for the shires.

SPP1/03 sets out outcomes for development subject to the policy. Refer to Section 6.11.3.2 mitigating the adverse impacts of flood, bushfire and landslide for further details.

SPP 2/02 - Planning and Managing Development Involving Acid Sulfate Soils

The purpose of SPP 2/02 is to ensure that development in low-lying coastal areas is planned and managed to avoid the generation of acid sulfate soils (ASS). The policy applies to land below 5 m Australian Height Datum (AHD) where the natural ground level is less than 20 m AHD and development on that land involves the following:

- Filling of land involving more than 500 m^3 or more of material; or
- Excavation of more than 100 m^3 or more of soil and sediment.

Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004

The *Marine Parks Act 2004* (Qld) (MPA) provides for the conservation of the marine environment through an integrated strategy including (among other things) the establishment of marine park zones, designated areas and highly protected areas within marine parks. The MPA also sets out various permitting and licensing requirements to carry out activities within declared marine park zones.

Relevant to the LNG facility, and in particular the bridge and gas transmission pipeline, is the Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004 (MPGBRC Zoning Plan). The bridge (or part thereof) and the gas transmission pipeline, are to be located within The Narrows which falls within the Habitat Protection Zone of the MPGBRC Zoning Plan. Under the MPA, the MPGBRC Zoning Plan applies the zoning plan for the Great Barrier Reef Marine Park; however the decision maker is the Environmental Protection Agency (EPA).

Permission is required to enter or use the Habitat Protection Zone for certain purposes. The main purposes for which permissions can be sought are those set out in the Commonwealth Great Barrier Reef Marine Park Zoning Plan 2003 (for the corresponding Commonwealth Habitat Protection Zone). Most relevant (by way of example) is the requirement for a permission to operate a facility (which includes, among other things, building structures) and to carry out works (which includes, among other things, dredging).

Curtis Coastal Regional Coastal Management Plan

The Curtis Coast Regional Coastal Management Plan (Curtis Coastal Plan) is a mechanism for implementing coastal zone management within the Curtis Coast Region. This occurs within the policy framework established by the State Coastal Management Plan - Queensland's Coastal Policy (State Coastal Plan) and the *Coastal Protection and Management Act 1995* (Coastal Act). The eastern end of the gas transmission pipeline study corridor is subject to the Curtis Coastal Plan, which is described in further detail in Section 8.11.

7.11.3.3 Local Government Planning Schemes and other Regulatory Provisions

The gas transmission pipeline corridor is located within four local government areas (LGAs). These LGAs were formed in March 2008 as part of the local government reform process initiated by the Queensland Government. Numerous shires were amalgamated into large LGAs, commonly referred to as regional councils. Table 7.11.1 lists the shires along the gas transmission pipeline corridor that form these regional councils.

Table 7.11.1 LGAs – Gas Transmission Pipeline

Regional Council	Former Shires
Roma Regional Council	Bendemere, Booringa, Bungil, Warroo and Roma
Central Highlands Regional Council	Bauhinia, Duaringa, Emerald and Peak Downs
Banana Shire Council	Banana and Taroom
Gladstone Regional Council	Calliope, Gladstone and Miriam Vale

Note: Bendemere, Booringa, Warroo, Roma (Roma Regional Council); Emerald, Peak Downs (Central Highlands Regional Council); and Gladstone, Miriam Vale (Gladstone Regional Council) form part of the Regional Council areas but do not include the proposed gas transmission pipeline.

Under the transitional arrangements for the amalgamated councils, the planning schemes for the former shires remain applicable in assessing development applications until the regional councils' planning schemes are prepared. Each of the shires listed in Table 7.11.1 has an existing or transitional planning scheme. Planning scheme maps for the relevant local authorities are provided in Appendix V.

However, development for an activity authorised under the *Petroleum and Gas (Production and Safety) Act 2004* (PG (PSA)) is exempt from assessment against a local government planning scheme by reason of Schedule 9 Table 5 Item 1(b) of the *Integrated Planning Act 1997.* Likewise, all aspects of development for a petroleum activity as defined in Section 77(1) of the Environmental Protection (EP) Act are exempt from assessment against a local government planning scheme. (The reference to Section 77(1) of the EP Act is now a reference to Section 309A of the EP Act).

Gladstone State Development Area

The Gladstone State Development Area (GSDA) is an area of approximately 28,000 ha. It comprises a number of precincts located both to the north-west of Gladstone (on the mainland) and on the southern section of Curtis Island. The GSDA has been designated by the Queensland government predominantly for industrial use and development. The location of the GSDA is shown in Figure 8.11.1. The gas transmission pipeline corridor passes through part of the GSDA.

The GSDA was established in 1993 as a 'State Development Area' for large-scale industrial development under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The aim of the GSDA is to provide land suitable for large-scale industrial development that conforms to acceptable engineering, environment and social criteria.

The GSDA is managed by the Department of Infrastructure and Planning and is subject to land use and planning controls set out in the GSDA development scheme and supporting policies.

The GSDA consists of ten land use precincts which establish designated land uses deemed to be suitable. Table 7.11.2 describes the intended land uses for Curtis Island Industry and surrounding precincts. The locations of these precincts are shown on Figure 8.11.1.

Table 7.11.2 GSDA Designated Land Uses

GSDA Precinct	Designated Land Use
Curtis Island Industry Precinct	Provides for the establishment of liquefied natural gas (LNG) facilities on the west coast of southern Curtis Island.
Restricted Development Precinct	Applies to Kangaroo Island and is intended to provide for the establishment of essential transportation infrastructure within the GSDA.
Environmental Management Precinct	Applies to the area east of the range on southern Curtis Island to recognise, protect and maintain areas of high ecological significance.
Aldoga Precinct	Industrial development of regional, state and national importance.
Yarwun Precinct	Industrial development of regional, state and national importance.
Corridor Buffer Area Precinct	A physical separation between the activities in the Materials Transportation and Services Corridor and areas where sensitive land uses may occur.
Targinie Precinct	Industrial uses that support other industrial activities.
Materials Transportation and Services Corridor Precinct	Materials transportation infrastructure and utility and service infrastructure.
Clinton Precinct	Port related activities and infrastructure.
Stuart Oil Shale Reserve Preservation Area	Mining within the Stuart Oil Shale Resource.

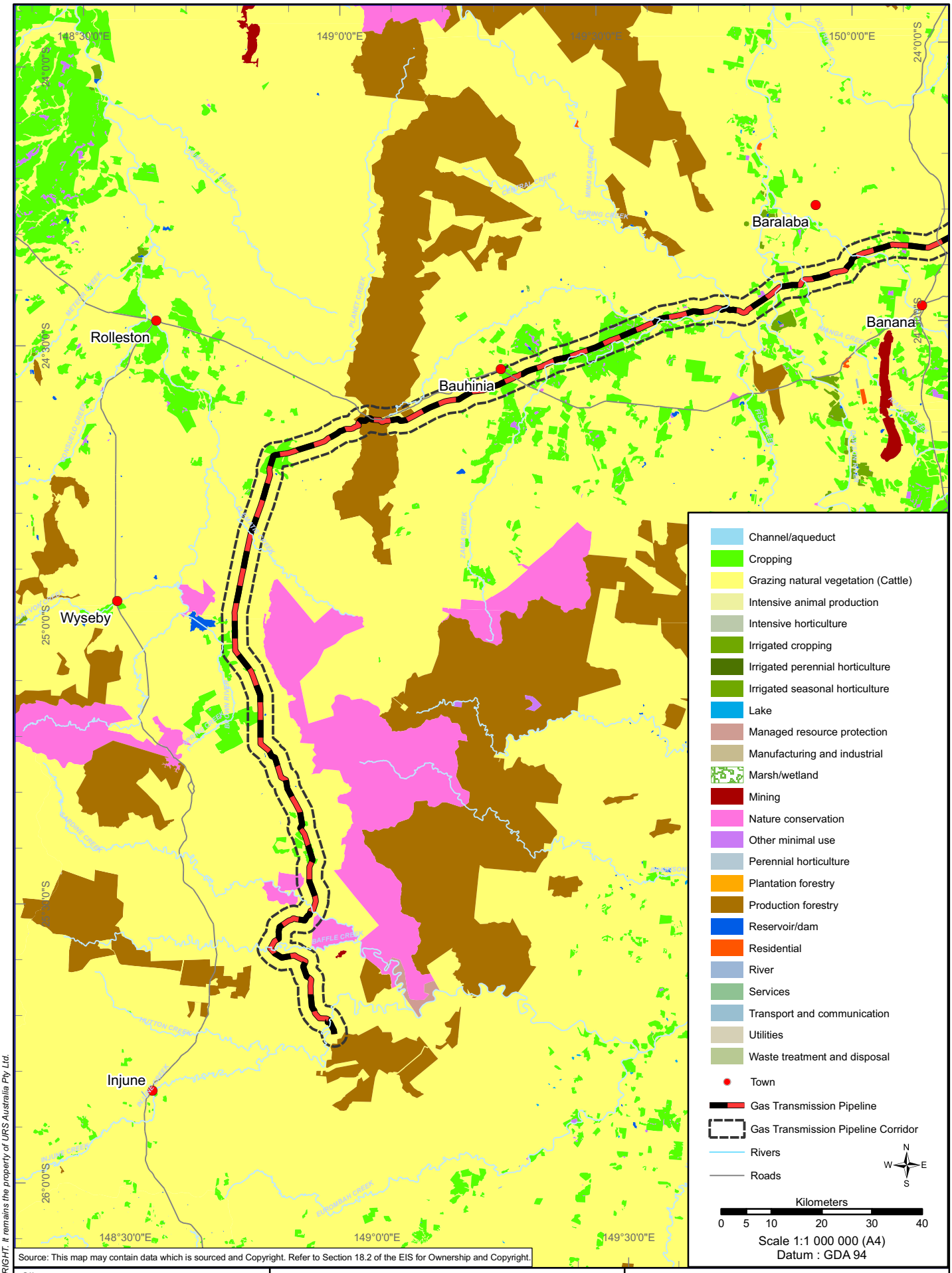
The GSDA development scheme outlines the land use planning approval process for all projects located within the GSDA. It sets out the objectives and guidelines for future land use in the area as well as establishing procedures for assessment of applications within acceptable timeframes and referrals to relevant agencies, including Gladstone Regional Council. The development scheme applies for development applications that will otherwise require a material change of use application (planning) including the proposed gas transmission pipeline.

7.11.4 Existing Environmental Values

The following section describes the existing environmental values along the gas transmission pipeline corridor in terms of current land use, land tenure, infrastructure and services, native title, regional planning framework, SPPs, and local government planning schemes.

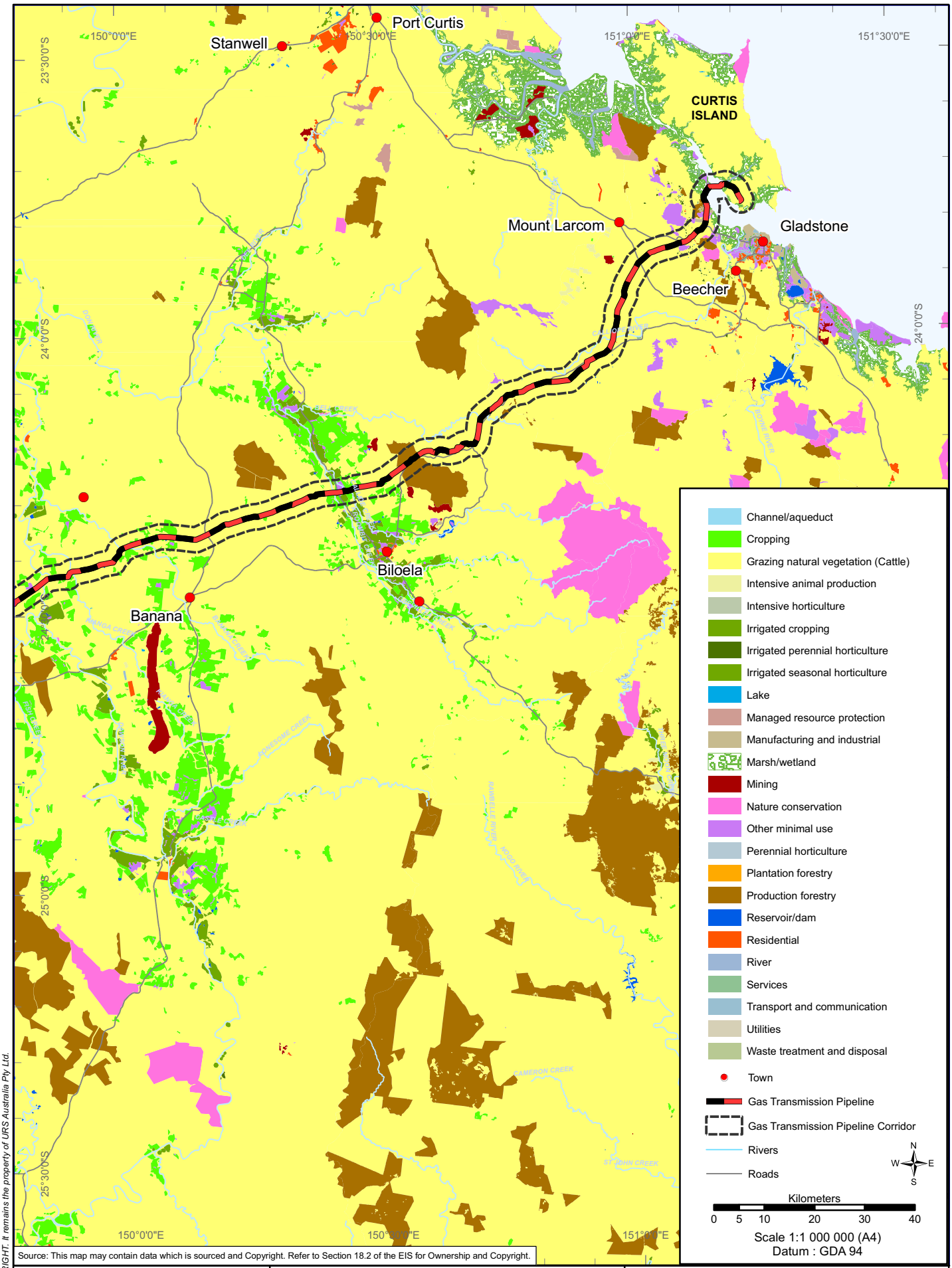
7.11.4.1 Current Land Use

The predominant land uses along the 5 km wide gas transmission pipeline corridor includes cattle grazing (83 %), cropping (10 %) and forestry (4 %). Other uses include industry, conservation and recreation, residential use (homesteads) and mining. Table 7.11.3 provides a detailed description of land uses along the gas transmission pipeline corridor. Figures 7.11.1a and 7.11.1b shows land use along the corridor route based on Queensland Land Use Mapping Program (QLUMP) data. A detailed breakdown of land use areas based on QLUMP data is provided in Appendix V.



Client	Project	Title
LNG / URS	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**LAND USE** **GAS TRANSMISSION PIPELINE** **(WESTERN SECTION)**

Drawn: MG	Approved: JB	Date: 18-05-2009	Figure: **7.11.1a**	Rev. A
Job No.: **4262 6220**	File No.: 42626220-g-826.mxd			A4



Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
LAND USE
GAS TRANSMISSION PIPELINE
(EASTERN SECTION)

Drawn: MG	Approved: JB	Date: 18-05-2009	Figure: **7.11.1b**	Rev. A
Job No.: **4262 6220**	File No.: 42626220-g-827.mxd			A4

Table 7.11.3 Location of Land Use

Area/Location	Land Use Description
Fairview to Carnarvon Range	Cattle grazing, some crop production
Carnarvon Range	Expedition National Park, low intensity cattle grazing
Arcadia Valley (eastern alignment)	Cattle grazing, some crop production
Expedition Range	Mount Nicholson State Forest, EPA defined essential habitat area
Between Expedition and Dawson Range	Cattle grazing in less fertile and undulating land. Intense crop production east of Bauhinia.
Between Dawson and Callide Range	Grazing land, limited cropping
Callide Range	Cattle grazing, Callide Timber Reserve (Conservation); EPA listed essential habitat areas; Underlying mineral development licence
Callide to Calliope Range	Grazing land, limited cropping
Calliope Range	Mount Stowe State Forest, Calliope Forest Reserve, Plantation forestry (private), grazing, aquaculture farm
Gladstone State Development Area (GSDA)	Rural, heavy industry
Coastal Area	Gladstone Port, GSDA, Targinie State Forest, Stuart Oil Shale Mining Lease
Curtis Island	Cattle grazing, conservation

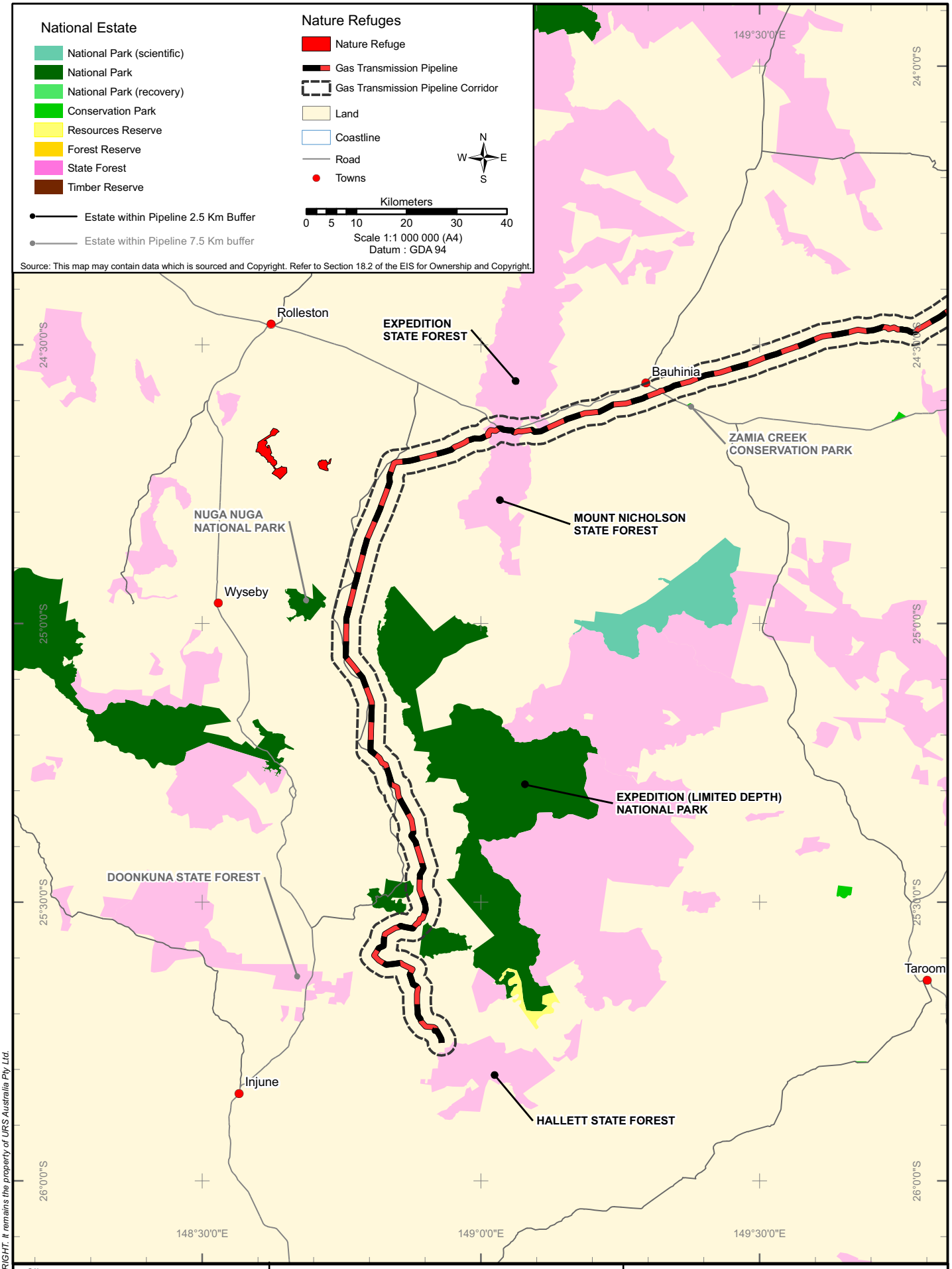
Agricultural Land

Cattle grazing is the predominant land use along the gas transmission pipeline corridor. Cropping areas are primarily situated on the flood plains between the Dawson, Callide and Expedition Ranges. Irrigated and dry land pasture crops include sorghum, wheat, lucerne and corn.

Numerous properties along the gas transmission pipeline corridor are accredited under produce certification programs including Cattlecare, and Flockcare. Certified organic farms are also located along the corridor. Santos is currently identifying farmers participating in these programs through the land holder liaison process.

Conservation Areas

Conservation areas in the vicinity of the gas transmission pipeline corridor are located along the ranges and foothills, including national parks, state forests, reserves and other conservation designations. Conservation areas within the pipeline buffer are and conservation areas within 5km of that buffer are listed in Table 7.11.4 and are shown on Figures 7.11.2a and 7.11.2b.

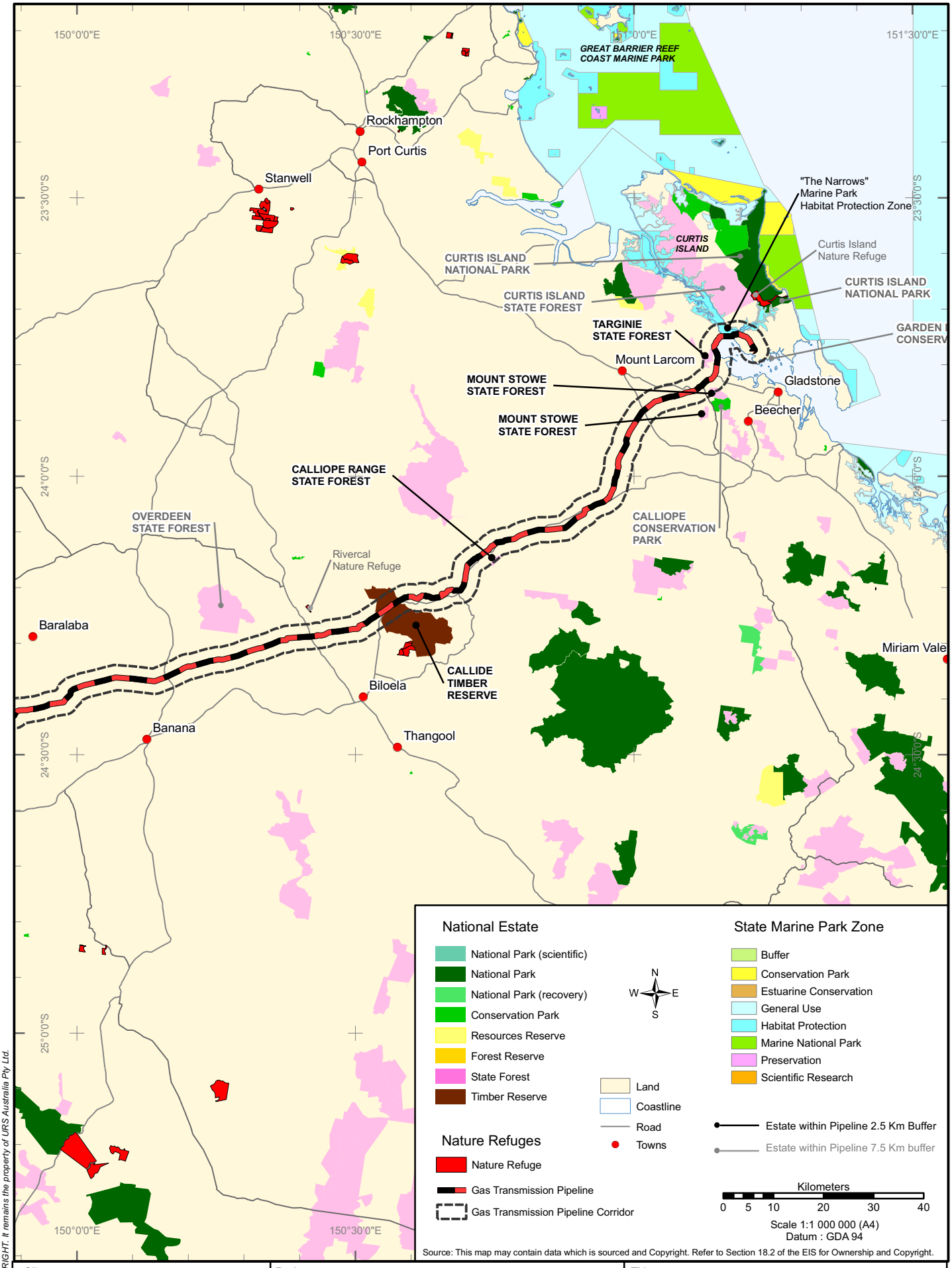


Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
CONSERVATION AREAS AND FORESTRY AREAS GAS TRANSMISSION PIPELINE (WESTERN SECTION)

Drawn: MG	Approved: LB	Date: 24-04-2009	Figure: **7.11.2a**	Rev. B
Job No.: **4262 6220**	File No.: 42626220-g-828.mxd			A4



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Client: LNG / URS	Project: GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	Title: **CONSERVATION AND FORESTRY AREAS GAS TRANSMISSION PIPELINE (EASTERN SECTION)**	
	Drawn: MG	Approved: LB	Date: 24-04-2009
	Job No.: 4262 6220	File No.: 42626220-g-829.mxd	Figure: **7.11.2b**
			Rev. B
			A4

Table 7.11.4 Conservation and Forestry Areas - Gas Transmission Pipeline Buffer and Within 5 km of the Buffer

Within Gas Transmission Pipeline Buffer[1]	Within 5km of Gas Transmission Pipeline Buffer[2]
National Parks	
Expedition N.P.	Curtis Island N.P.
GBR Coast Marine Park	Nuga Nuga N.P.
Other Reserves	
Callide Timber Reserve	Calliope Conservation Park
	Garden Island Conservation Park
	Zamia Creek Conservation Park
	Curtis Island Nature Refuge
	Rivercal Nature Refuge
State Forests/Plantations	
Calliope Range S.F.	Curtis Island S.F.
Hallett S.F.	Doonkuna S.F.
Expedition S.F.	Overdeen S.F.
Targinie S.F.	
Mount Stowe S.F.	
Mount Nicholson S.F	

As can be seen from Figures 7.11.2a and 7.11.2b, the gas transmission pipeline corridor is located in part of the following conservation areas:

- Expedition National Park;
- Expedition State Forest;
- Callide Timber Reserve;
- Mount Stowe State Forest;
- Targinie State Forest; and
- Great Barrier Reef Coast Marine Park.

An assessment of the potential impacts of the gas transmission pipeline on REs, including those in the above conservation areas, is given in Section 7.4.

Mining, Petroleum and Extractive Resource Areas

Figures 7.11.3a and 7.11.3b shows mining leases within and surrounding the gas transmission pipeline corridor. The corridor passes through mining lease ML5656 which forms part of Moura Mine operated by Anglo Coal Pty Ltd. Active mining operations are also located some distance to the south of the corridor. A number of mining leases are located north and south of the corridor around the Callide Range, north of

[1] Refers to estates within 2.5km either side of the pipeline alignment

[2] Refers to estates within 7.5km either side of the pipeline alignment

Biloela. The corridor also passes through ML3613, ML80081 and ML80003 which form the Stuart Oil Lease at the eastern end of the gas transmission pipeline.

Figures 7.11.4a and 7.11.4b shows the locations of mineral development leases along the corridor. Exploration permits for coal (EPC) are shown on Figures 7.11.5a and 7.11.5b and exploration permits for minerals (EPM) in proximity to the corridor are shown on Figures 7.11.6a and 7.11.6b.

Figures 7.11.7a and 7.11.7b show the petroleum leases along the gas transmission pipeline.

Homesteads / Residential Areas

Based on desktop review, there are 29 homesteads within the 5 km wide gas transmission pipeline corridor and an additional 13 homesteads within 5 - 10 km of the corridor. Appendix V lists the homesteads within these areas. A number of these homesteads are listed on heritage databases (refer Section 7.13 for more details).

Heritage / Historic Areas

Searches were made of statutory and non-statutory heritage registers and databases for items of known heritage significance within the study corridor. Heritage registers reviewed included:

- World Heritage List;
- National and Commonwealth Heritage Registers;
- Register of the National Estate;
- Queensland Heritage Register;
- National Trust of Australia (Qld) Register; and
- Local council heritage registers.

A number of natural and cultural heritage places in the study corridor are recorded in the Register of the National Estate, Queensland Heritage Register and National Trust of Australia Register. Further details are provided in Section 7.13.

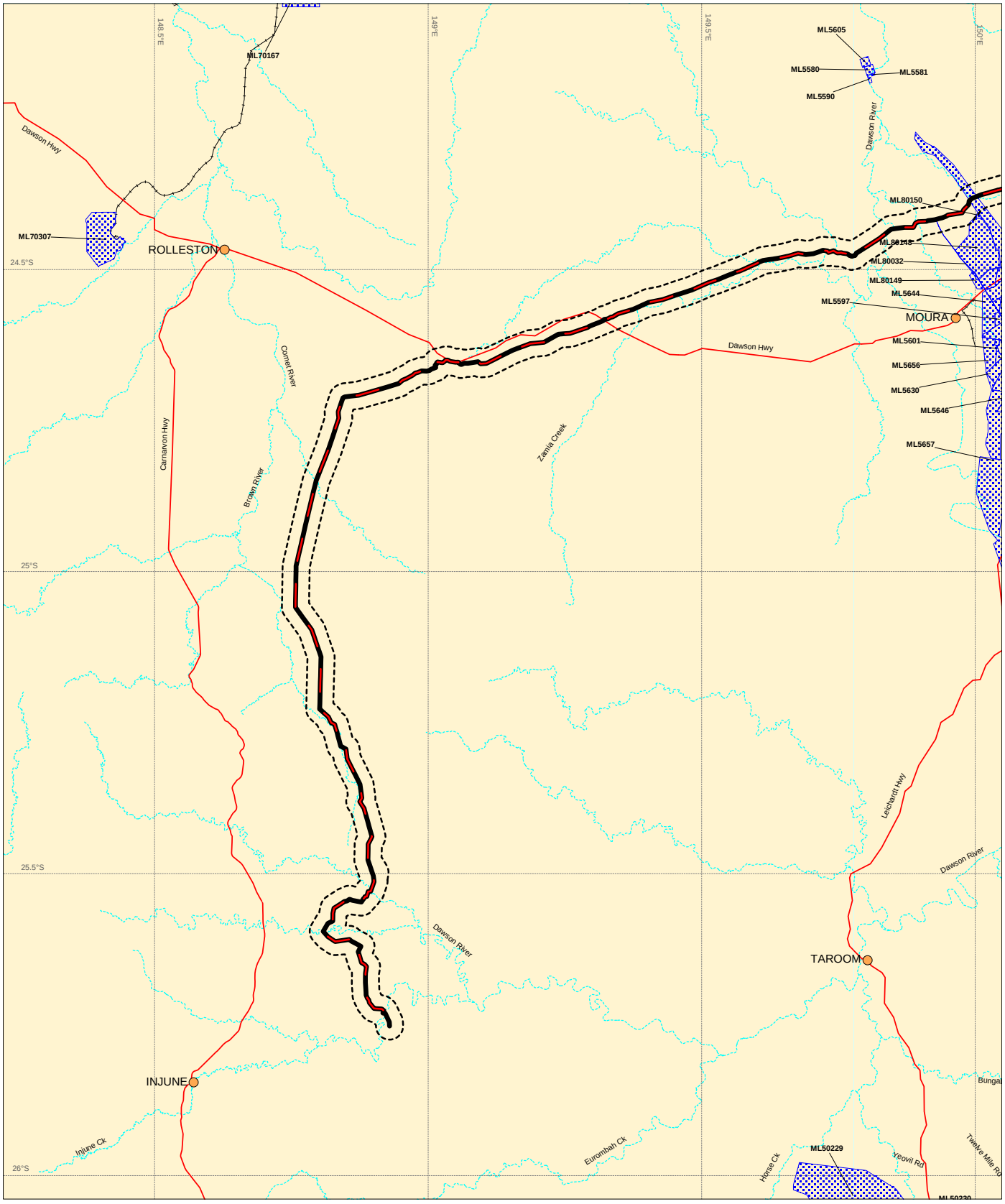
7.11.4.2 Land Tenure

Freehold land comprises 67 % of the gas transmission pipeline corridor, with the balance being leasehold. State forest comprises 2 %, state land 3 % and easements comprise 4.5 %. The distribution of land tenure in the region is shown on Figures 7.11.8a and 7.11.8b. Appendix V provides a detailed breakdown of land tenure along the corridor.

7.11.4.3 Infrastructure and Services

Table 7.11.5 details infrastructure and services located within the gas transmission pipeline corridor. These are summarised below and their locations are shown on Figures 7.11.9a and 7.11.9b:

- The corridor crosses a number of major and secondary roads including the Leichardt and Burnett Highways. The corridor runs parallel to the Dawson Highway for much of its length.
- The corridor crosses numerous rail lines. The Moura Short Line Railway and North Coast Line Railway are intersected at several points.
- The corridor runs parallel to the Queensland Gas Pipeline (QGP) for much of its length. The corridor also intersects with numerous Santos CSG fields gathering pipelines.
- The corridor passes underneath seven electricity transmission lines.
- Five landing grounds are located in close proximity to the gas transmission pipeline corridor.



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Datum : GDA94

Gas Transmission Pipeline
Gas Transmission Pipeline Corridor
Mining Lease

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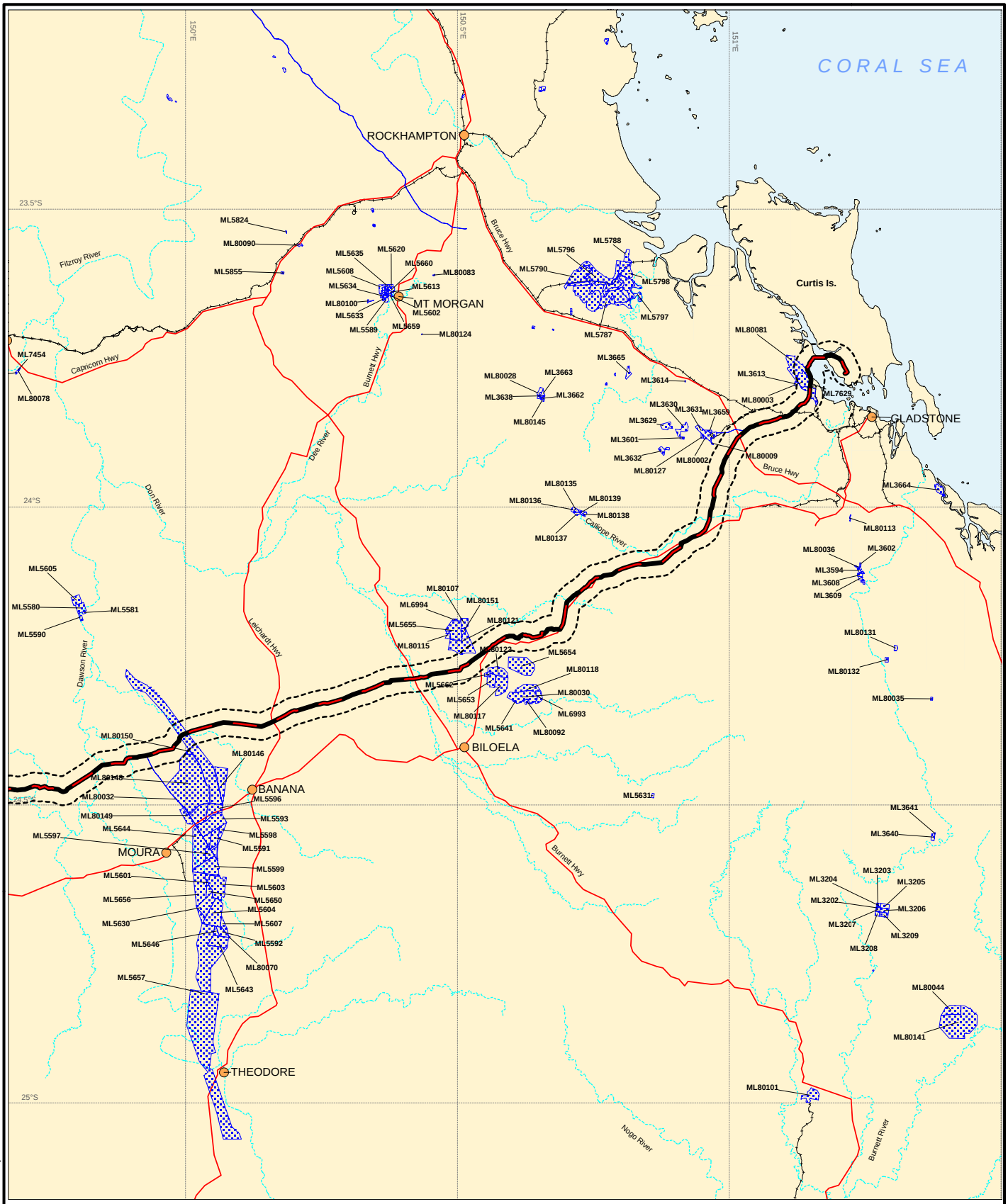
Client: LNG	Project: GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	Title: **MINING LEASE (ML) GAS TRANSMISSION PIPELINE (WESTERN SECTION)**	
URS	Drawn: CA / Approved: JB / Date: 11-02-2009 Job No: **4262 6220** / File No: 42626220-g-830.wor	Figure: **7.11.3a**	Rev:A **A4**



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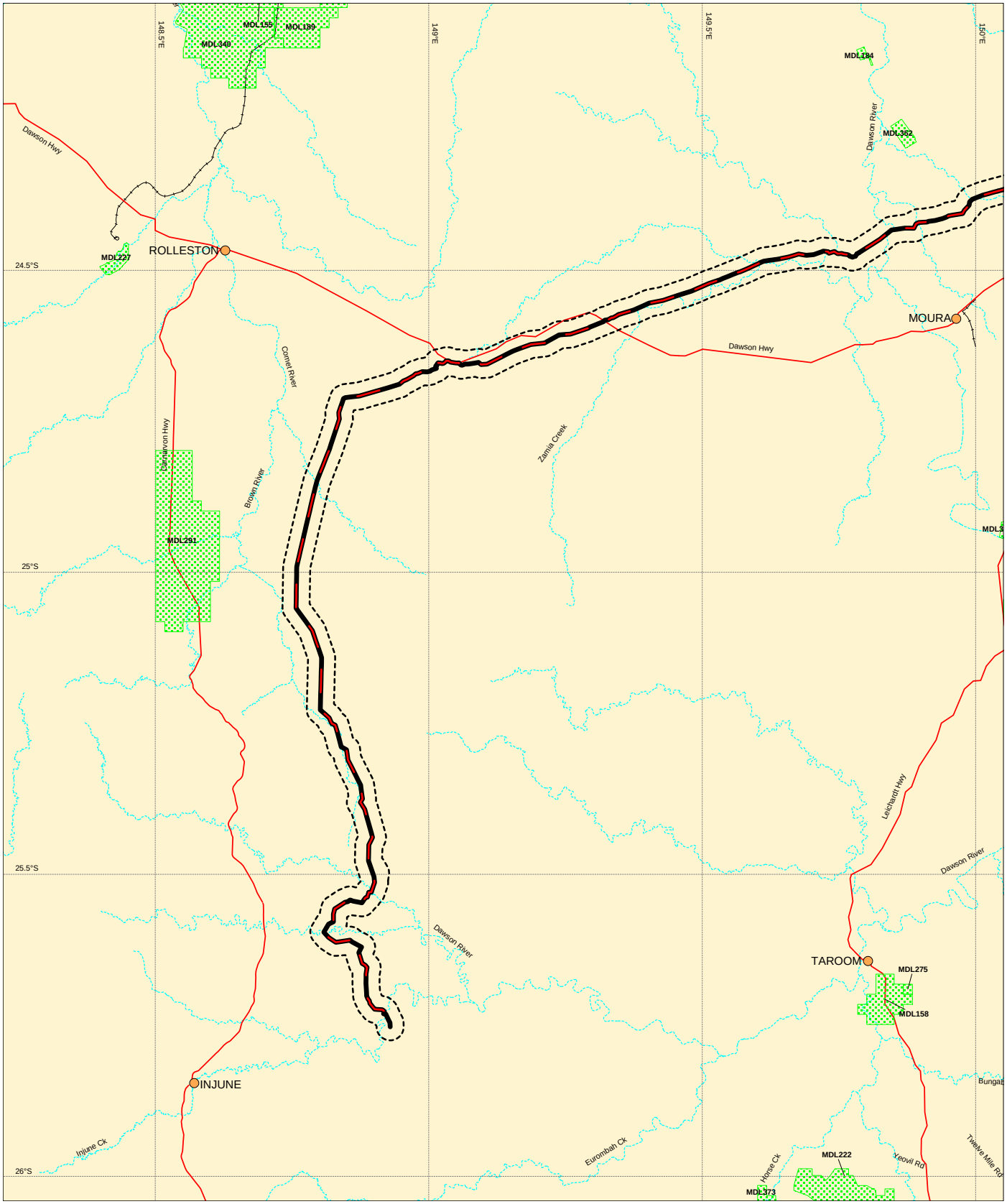
Client	Project	Title
LNG / URS	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**MINING LEASE (ML) GAS TRANSMISSION PIPELINE (EASTERN SECTION)**

Drawn: CA	Approved: JB	Date: 11-02-2009	Figure: **7.11.3b**	Rev:A
Job No: **4262 6220**	File No: 42626220-g-830.wor			**A4**



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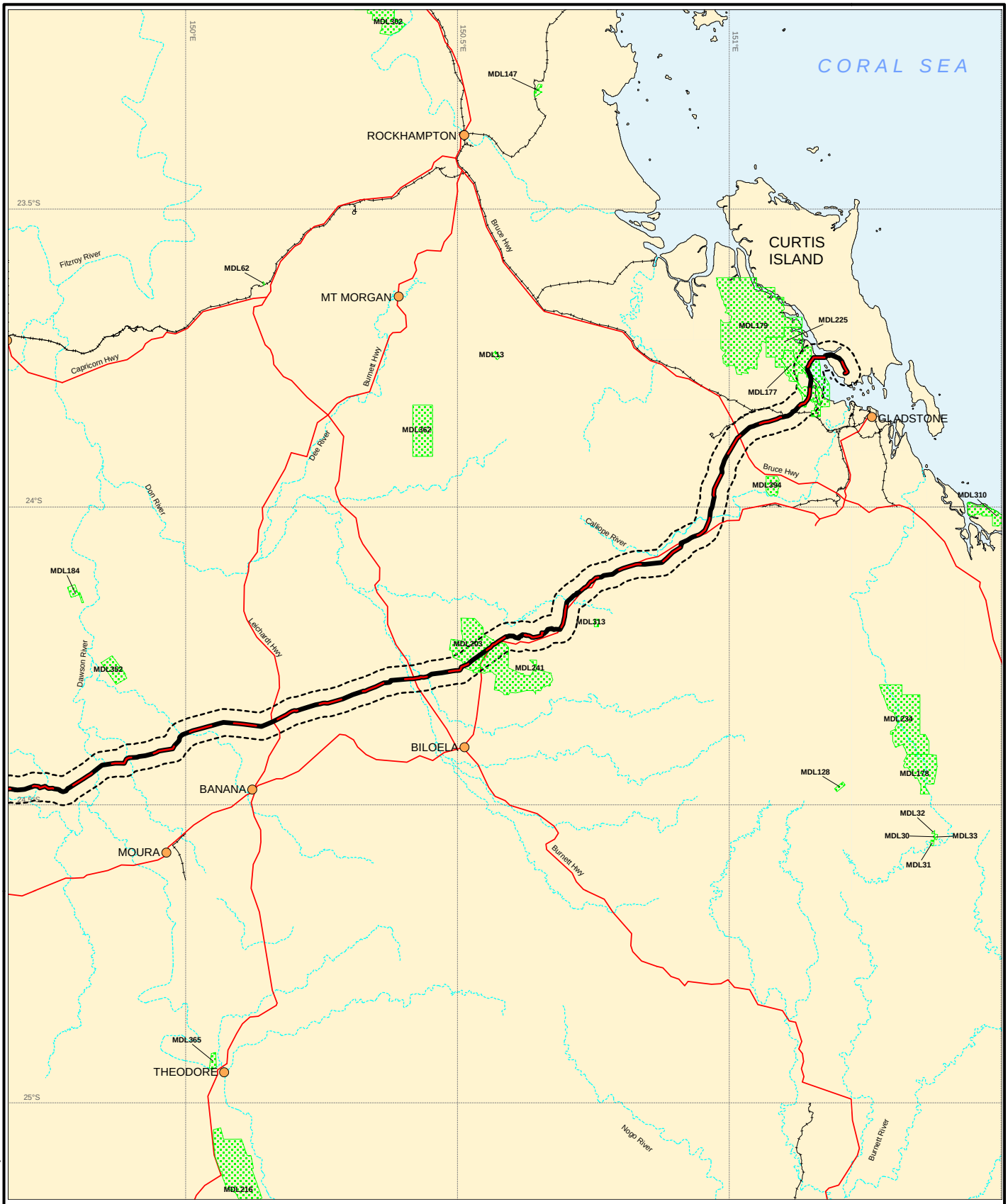
Client	Project	Title
	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**MINERAL DEVELOPMENT LEASES GAS TRANSMISSION PIPELINE (WESTERN SECTION)**
URS	Drawn: CA · Approved: JB · Date: 11-02-2009 Job No: **4262 6220** · File No: 42626220-g-831.wor	Figure: **7.11.4a** · Rev:A · **A4**



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Client	Project	Title	
	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**MINERAL DEVELOPMENT LEASES GAS TRANSMISSION PIPELINE (EASTERN SECTION)**	
	Drawn: CA / Approved: JB / Date: 11-02-2009	Figure: **7.11.4b**	Rev:A
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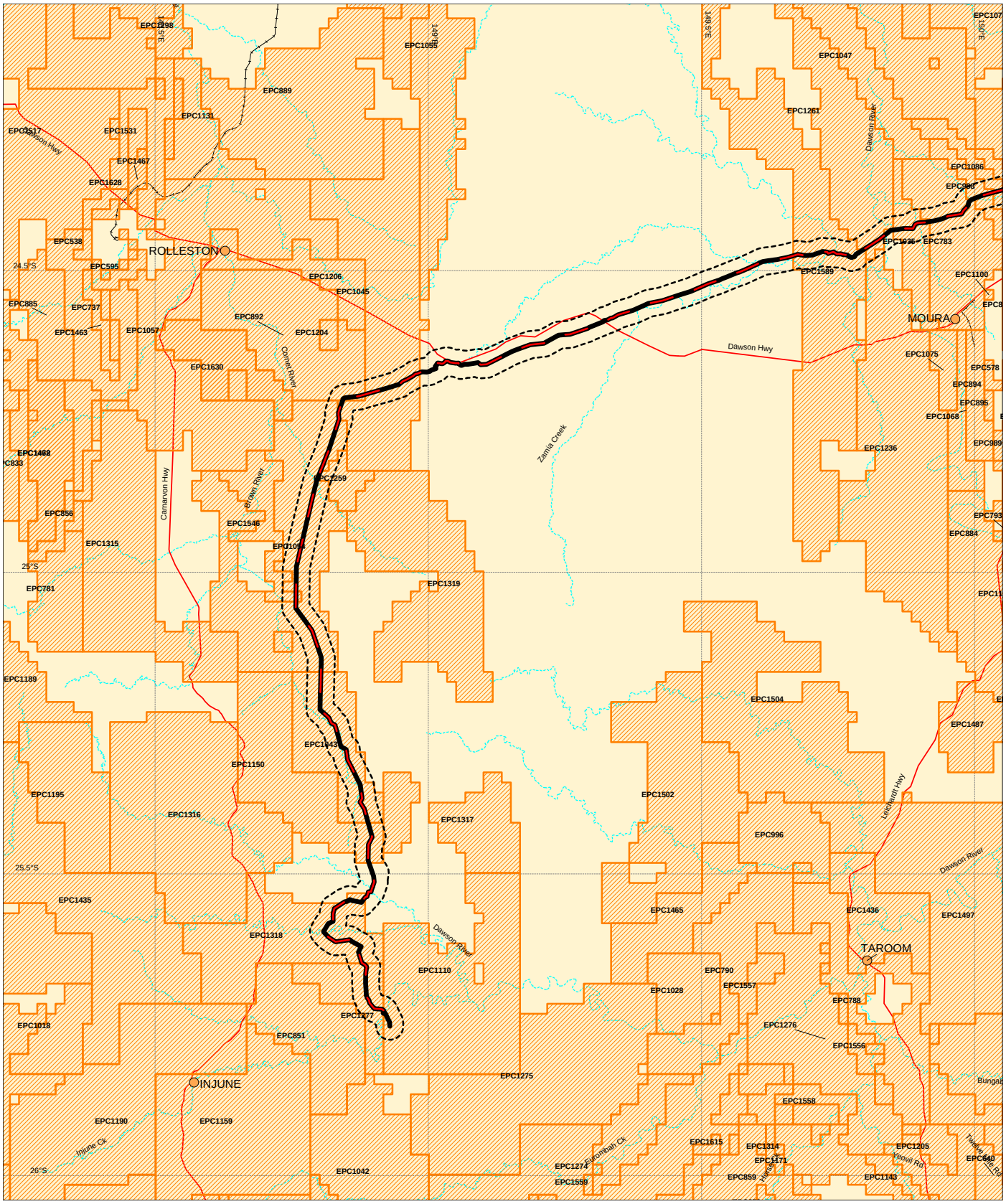

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Datum : GDA94

Gas Transmission Pipeline

Gas Transmission Pipeline Corridor

Exploration Permits (Coal)

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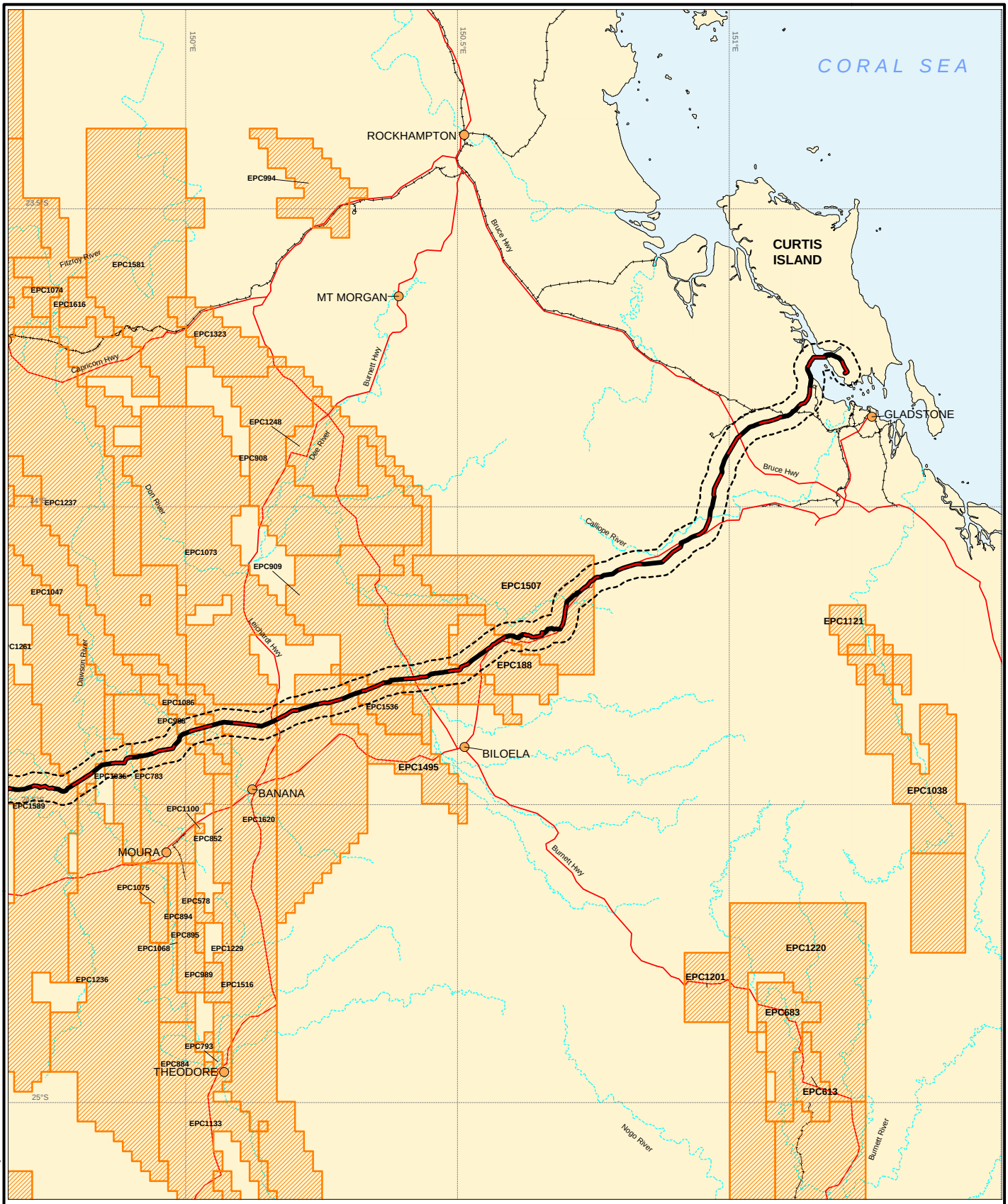
Client	Project	Title	
	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**EXPLORATION PERMITS (COAL) GAS TRANSMISSION PIPELINE (WESTERN SECTION)**	
Drawn: CA	Approved: JB	Date: 11-02-2009	Rev:A
Job No: **4262 6220**	File No: 42626220-g-832.wor	Figure: **7.11.5a**	**A4**



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Client: LNG / URS	Project: GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	Title: **EXPLORATION PERMITS (COAL) GAS TRANSMISSION PIPELINE (EASTERN SECTION)**	
	Drawn: CA	Approved: JB	Date: 11-02-2009
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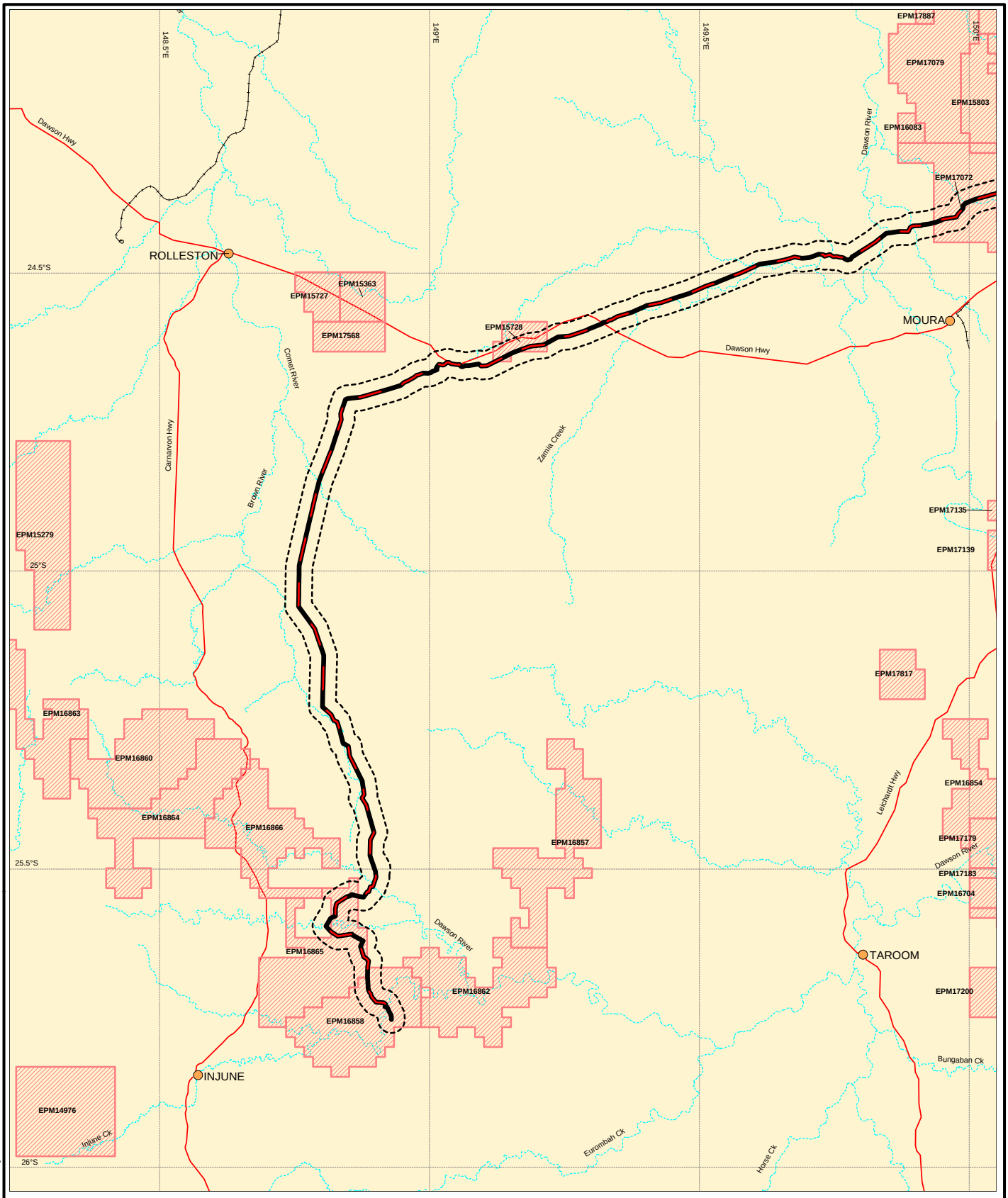
			Rev:A **A4**



Client

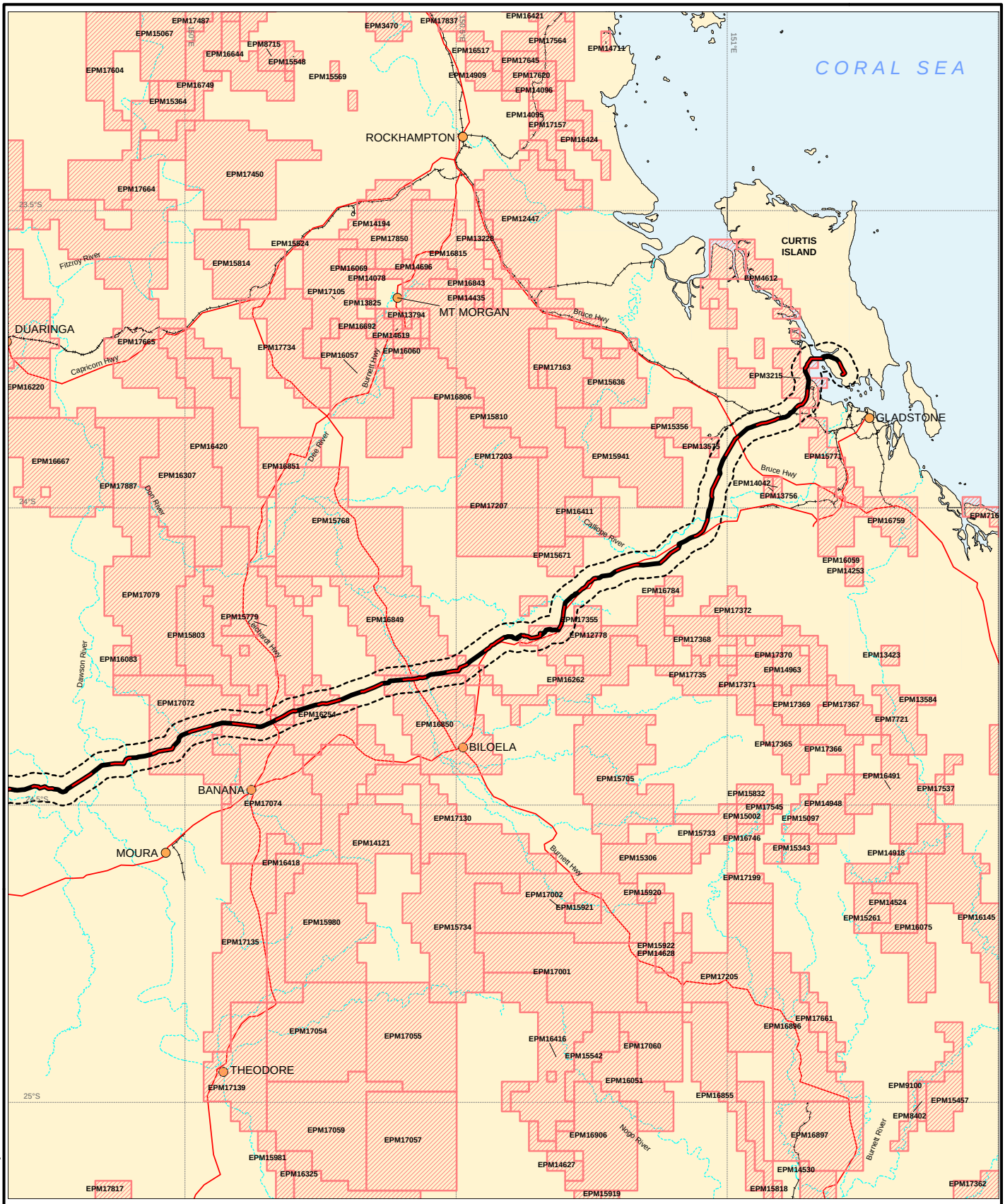
Project

GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title

EXPLORATION PERMITS MINERALS
GAS TRANSMISSION PIPELINE
(WESTERN SECTION)

Drawn: CA	Approved: JB	Date: 11-02-2009	Figure: **7.11.6a**	Rev:A
Job No: **4262 6220**	File No: 42626220-g-833.wor			**A4**



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Datum : GDA94

Gas Transmission Pipeline

Gas Transmission Pipeline Corridor

Exploration Permits Minerals

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Client

LNG

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Project

GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title

EXPLORATION PERMITS MINERALS
GAS TRANSMISSION PIPELINE
(EASTERN SECTION)

Drawn: CA	Approved: JB	Date: 11-02-2009
Job No: **4262 6220**	File No: 42626220-g-833.wor	

Figure: **7.11.6b**

Rev:A

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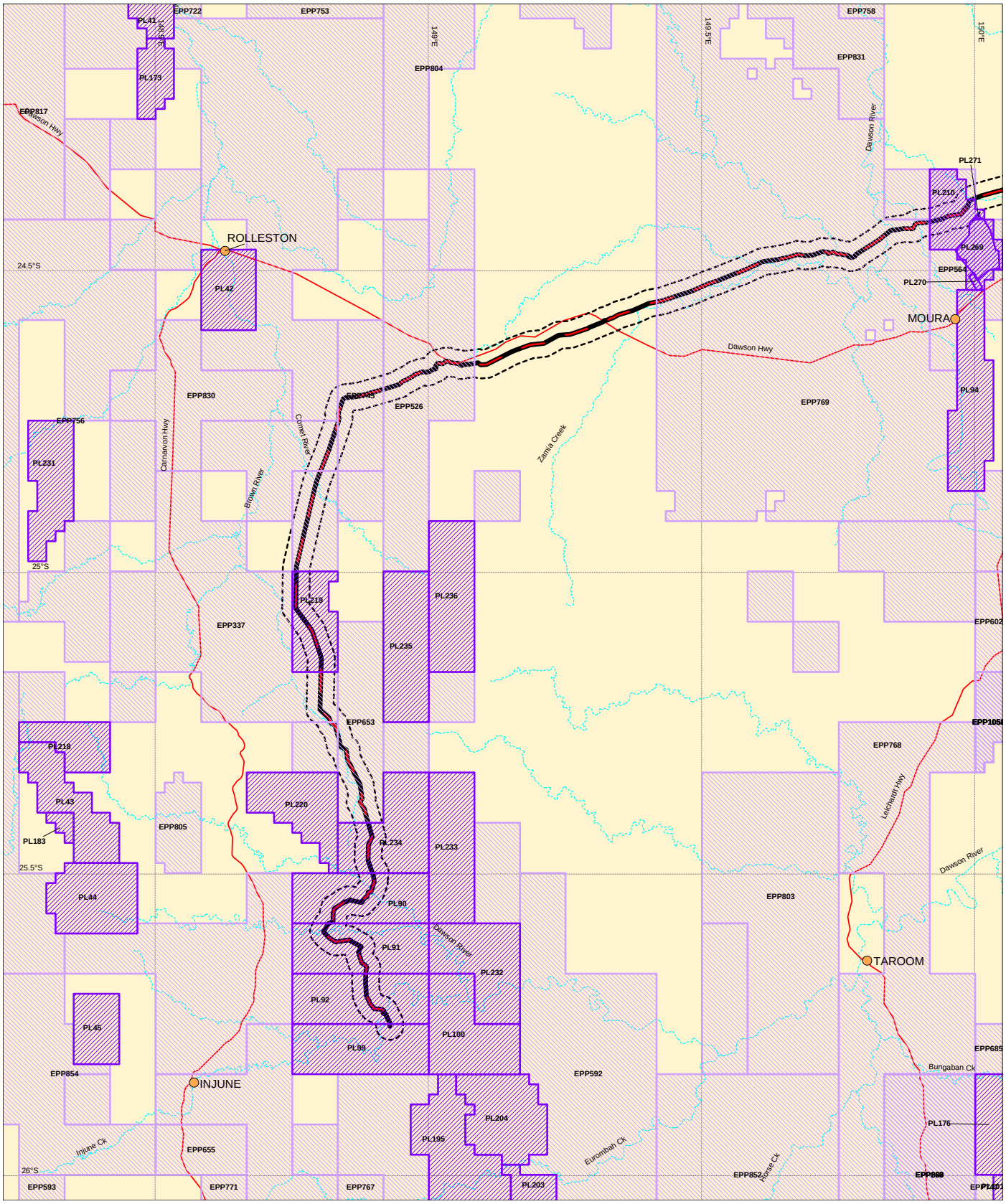

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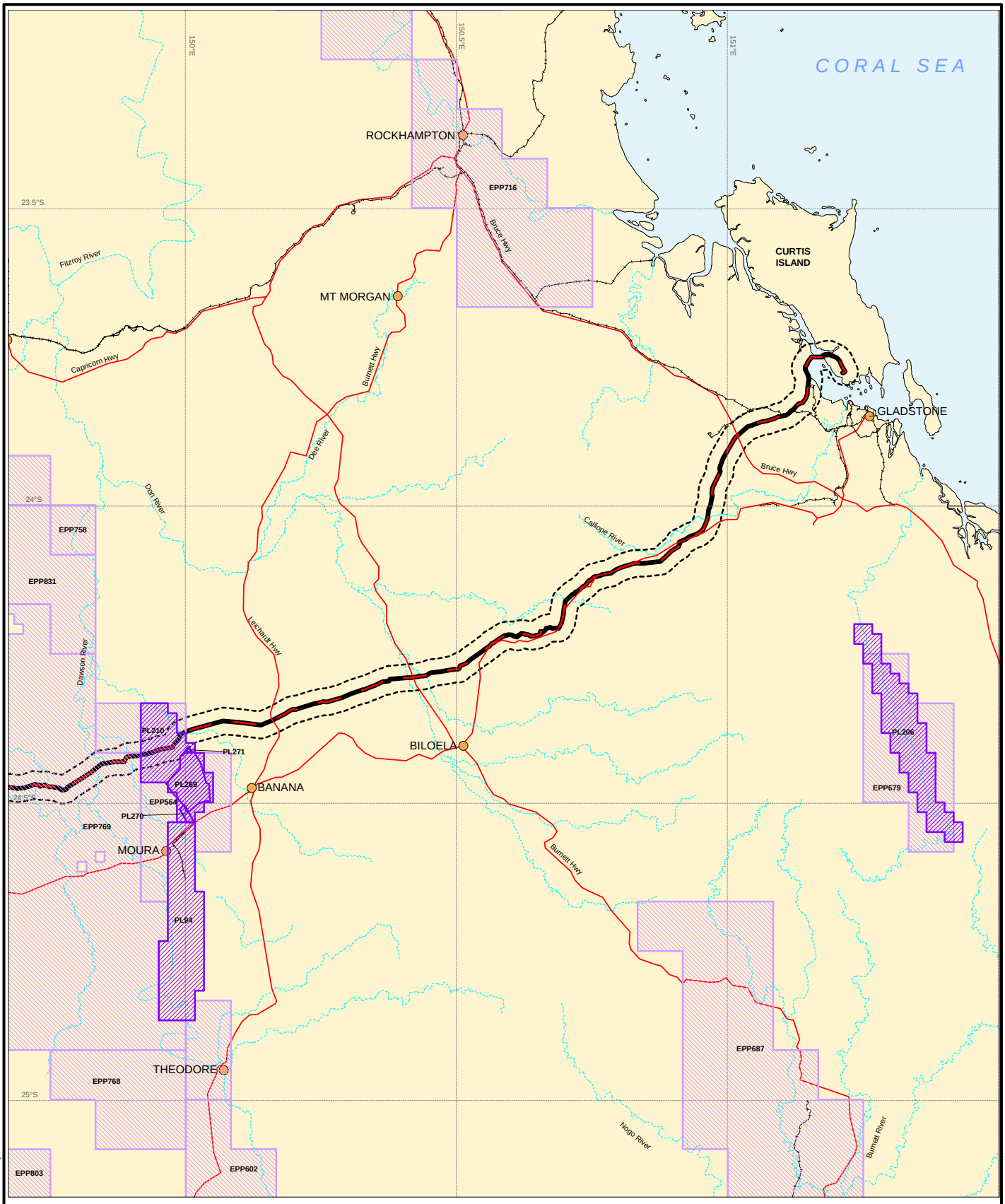
Client	Project	Title
	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**PETROLEUM TENURES GAS TRANSMISSION PIPELINE (WESTERN SECTION)**
	Drawn: CA / Approved: JB / Date: 11-02-2009	Figure: **7.11.7a**
	Job No: **4262 6220** / File No: 42626220-g-834.wor	Rev:A / **A4**



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Client: LNG / URS	Project: GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	Title: **PETROLEUM TENURES GAS TRANSMISSION PIPELINE (EASTERN SECTION)**
	Drawn: CA | Approved: JB | Date: 11-02-2009 Job No: **4262 6220** | File No: 42626220-g-834.wor	Figure: **7.11.7b** Rev:A **A4**

Table 7.11.5 Location of Infrastructure and Services

Feature	Intersecting point along Gas Transmission Pipeline (Km)	Longitude (decimal degrees)	Latitude (decimal degrees)
Major and Secondary Roads			
Dawson Highway	188	149.320904	-24.583659
Leichhardt Highway	280	150.160716	-24.360334
Burnett Highway	307	150.418494	-24.288369
Dawson Highway	339	150.688112	-24.205593
Dawson Highway	339	150.690804	-24.202068
Dawson Highway	340	150.692909	-24.198596
Dawson Highway	340	150.694428	-24.195195
Dawson Highway	341	150.695745	-24.189798
Dawson Highway	342	150.697734	-24.179013
Dawson Highway	352	150.756970	-24.118729
Dawson Highway	353	150.766743	-24.116414
Dawson Highway	353	150.771760	-24.114672
Dawson Highway	369	150.911722	-24.061763
Bruce Highway	393	151.017494	-23.882424
Gladstone - Mount Larcom Road	405	151.120121	-23.838560
Railway Lines			
Moura Short Line Railway	298	150.32881213400	-24.30911351620
Callide Valley Branch Railway	311	150.45314513300	-24.28046787220
Moura Short Line Railway	369	150.91136943100	-24.06500375330
North Coast Line Railway (electrified)	403	151.10429126600	-23.84757955000
North Coast Line Railway (electrified)	403	151.10526305500	-23.84762059560
North Coast Line Railway (electrified)	404	151.11475623100	-23.84290932580
Gas Pipelines			
Comet Ridge To Wallumbilla Gas Trunkline	0.23	148.9294	-25.7502
Fairview 67 Gas Flowline	3	148.9187	-25.7310
Comet Ridge To Wallumbilla Gas Trunkline	4	148.9111	-25.7239
Compressor Station 2 To Fairview Field Gas Trunkline	4	148.9106	-25.7238
Compressor Station 2 To Fairview Field Gas Trunkline	4	148.9095	-25.7237
Comet Ridge To Wallumbilla Gas Trunkline	4	148.9077	-25.7236
Fairview 48 Gas Flowline	5	148.9004	-25.7225
Fairview 47 Gas Flowline	5	148.9001	-25.7222
Fairview 47 Gas Flowline	5	148.9000	-25.7221
Fairview Field Gas Flowline	7	148.8920	-25.7115

Feature	Intersecting point along Gas Transmission Pipeline (Km)	Longitude (decimal degrees)	Latitude (decimal degrees)
Fairview Field Gas Flowline	7	148.8920	-25.7115
Fairview 41 Gas Flowline	10	148.8857	-25.6860
Fairview 40 Gas Flowline	12	148.8854	-25.6658
Fairview 39 Gas Flowline	13	148.8861	-25.6611
Fairview 38 Gas Flowline	14	148.8782	-25.6471
Fairview Lateral Gas Trunkline	20	148.8570	-25.6096
Dawson's Valley Lateral	254	149.9267	-24.4174
Central Queensland Gas Pipeline	393	151.0143	-23.8852
Powerlines			
Powerline	260	149.980281	-24.399804
Powerline	303	150.376463	-24.293240
Powerline	321	150.537528	-24.250899
Powerline	321	150.539363	-24.249727
Powerline	354	150.775609	-24.114167
Powerline	387	150.987908	-23.930280
Powerline	406	151.126527	-23.832407
Airstrips			
Landing Ground	84		
Landing Ground	100		
Landing Ground	184		
Landing Ground	234		
Landing Ground	384		

7.11.4.4 Native Title and Aboriginal Cultural Heritage

There are five currently registered native title claim areas along the gas transmission pipeline route being Port Curtis Coral Coast (QC01/029), Gangulu (QC97/036), Karingbal #2 (QC06/005), Bidjara (QC08/005), and Iman #2 (QC97/55) claim areas.

There are also a number of Aboriginal Parties, including the above claim groups, which are afforded rights under the ACHA to enter into agreements with respect to Aboriginal Cultural Heritage. These groups, and their relevant areas, are identified in Table 6.13.1 and are shown in Figures 7.11.10a and 7.11.10b.

7.11.5 Potential Impacts and Mitigation Measures

7.11.5.1 Impacts on Existing Land Use

Agriculture

The main potential impact of the gas transmission pipeline on agricultural land uses will occur during construction when agricultural and grazing activities will be temporarily restricted over the construction corridor. Land use can generally recommence following construction, with landholders retaining full access and use of the surface area above the gas transmission pipeline, subject to some restriction to

preclude activities that will threaten gas transmission pipeline integrity, security or significantly impede future access to the gas transmission pipeline (e.g. construction above the pipeline, planting of trees or certain crops in close proximity to the gas transmission pipeline or installation of subsurface infrastructure).

The area affected will generally be limited to within the 30 m wide proposed ROW during construction. However, as gas transmission pipeline construction will advance at an average rate of approximately 1 km per day, the period that any one location is affected by the peak of construction activities is expected to be limited to several weeks. Santos and/or the construction contractor will consult with all landholders prior to construction commencing to minimise fragmentation or reduced property access.

Care will be taken to avoid disturbance to any pre-existing soil conservation measures (e.g. levee/contour banks) as far as possible. Where disturbance is required, the banks/levees will be reinstated as soon as practicable, in consultation with the relevant landholder.

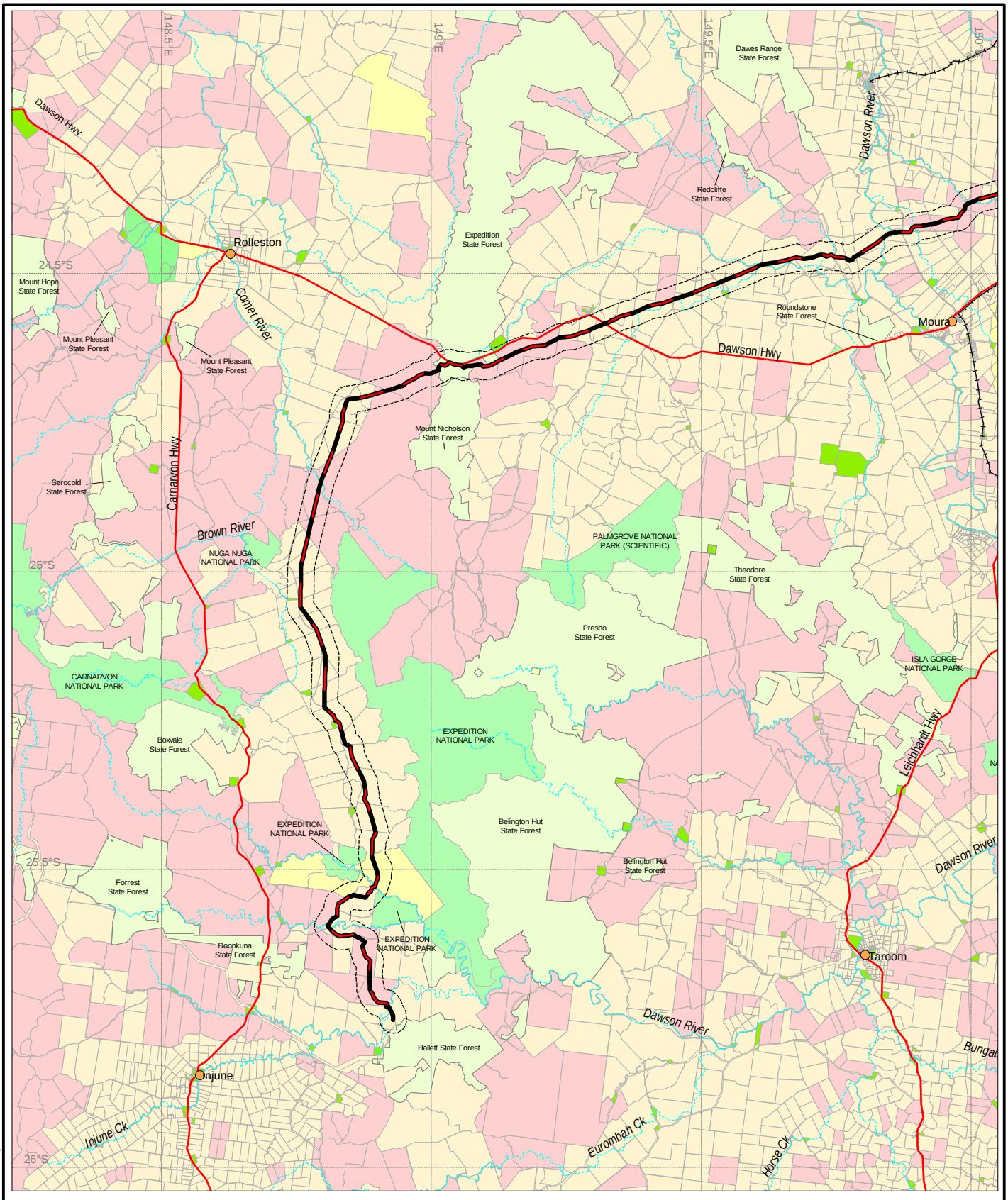
The gas transmission pipeline trench will be left open for a minimum amount of time and should not pose a long-term hazard or barrier to stock. Temporary provisions such as fencing, access to water and other mitigation measures will be discussed with the landholder and any fences that are crossed will be repaired to at least the original condition. While the trench is open, ramps will be placed at strategic locations to ensure that any stock or native animals trapped in the trench can escape.

Additional tracks may be required in some areas to provide access to the proposed ROW during construction and for long term maintenance access. The location and rehabilitation (where applicable) of the access tracks will be conducted in consultation with the landholder.

Measures to minimise farming impacts during gas transmission pipeline construction may include:

- Avoiding land of high value/potential such as good quality agricultural land (class A and B) where practicable;
- Minimising the disturbance to any valuable agricultural land that cannot be avoided and remediating it thereafter;
- Avoiding fragmentation within individual land parcels and across areas of agricultural value;
- Restricting development on small properties which would become unviable for farming due to the project effects;
- Placing the pipeline and required infrastructure along the boundary of properties where practicable or outside of cropping fields;
- Maximising the opportunity to locate the gas transmission pipeline adjacent to the existing QGP thus using land previously disturbed by another pipeline; and
- Burying the gas transmission pipeline to a depth suitable for ongoing farming operations (generally between 750 mm – 1,200 mm).

As soon as practical after pipe laying and backfill, the proposed ROW will be re-contoured to match surrounding landform and erosion controls constructed where necessary. The separately stockpiled topsoil will then be respread evenly across the proposed ROW and, in consultation with the landholder, any cleared vegetation placed across it to assist in soil retention and provision of seed stock. Reseeding or revegetation of the proposed ROW, using appropriate species (i.e. crops/pasture or Indigenous native species) may be undertaken to restore vegetation cover in consultation with the landholder. Further details on gas transmission pipeline rehabilitation are given in Section 7.16.



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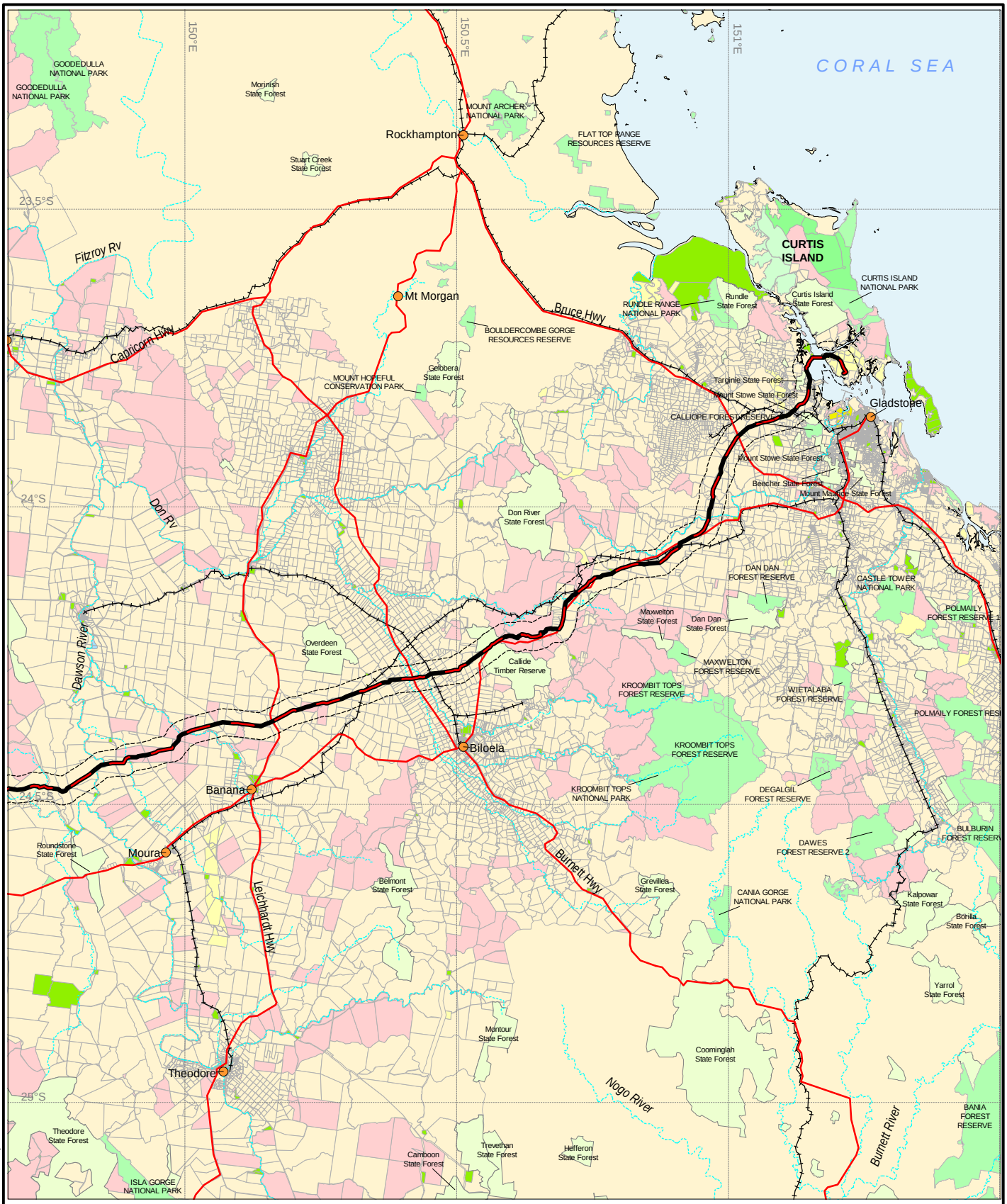
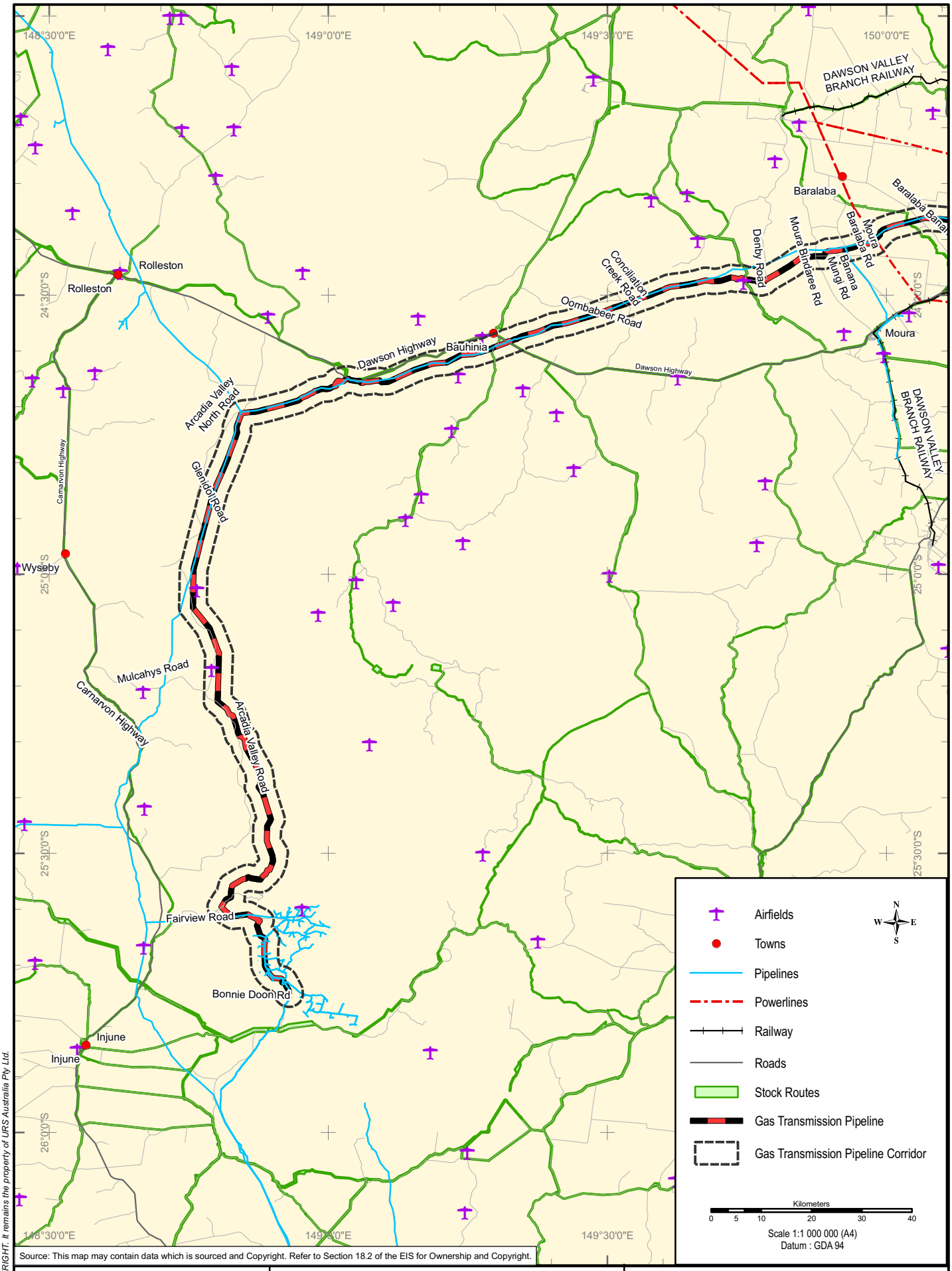
Client	Project	Title
LNG / URS	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**LAND TENURE** **GAS TRANSMISSION PIPELINE** **(WESTERN SECTION)**

Drawn: CA	Approved: JB	Date: 11-02-2009	Figure: **7.11.8a**	Rev:B
Job No: **4262 6220**	File No: 42626220-g-835.wor			**A4**



Client	Project	Title
LNG / URS	GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	**LAND TENURE** **GAS TRANSMISSION PIPELINE** **(EASTERN SECTION)**

Drawn: CA	Approved: JB	Date: 11-02-2009	Figure: **7.11.8b**	Rev:B
Job No: **4262 6220**	File No: 42626220-g-835.wor			**A4**



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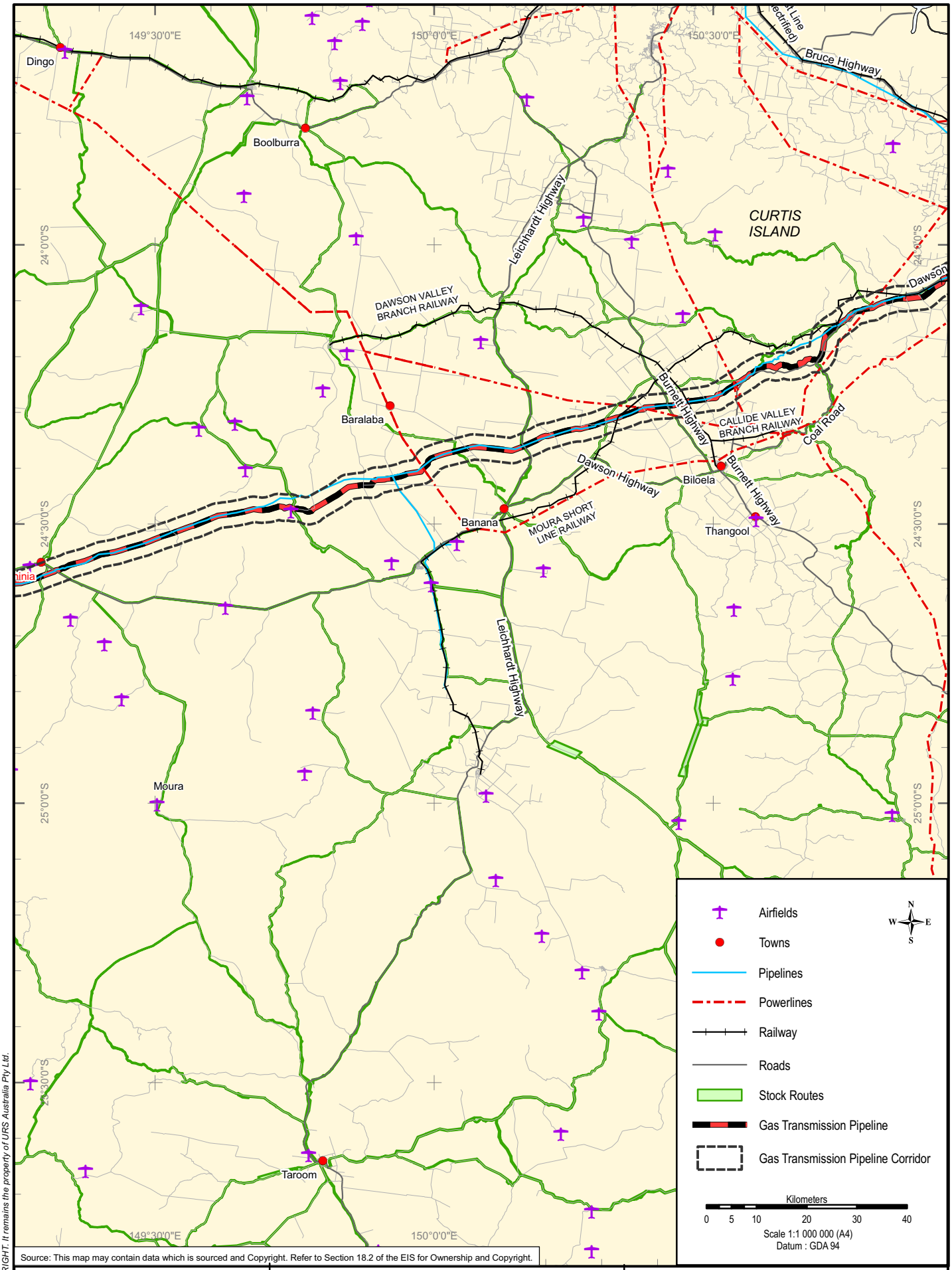
Client: LNG / URS	Project: GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT	Title: **INFRASTRUCTURE AND SERVICES GAS TRANSMISSION PIPELINE (WESTERN SECTION)**	
	Drawn: MG	Approved: JB	Date: 10-02-2009
	Job No.: **4262 6220**	File No.: 42626220-g-836mxd	Figure: **7.11.9a**
			Rev. A
			A4

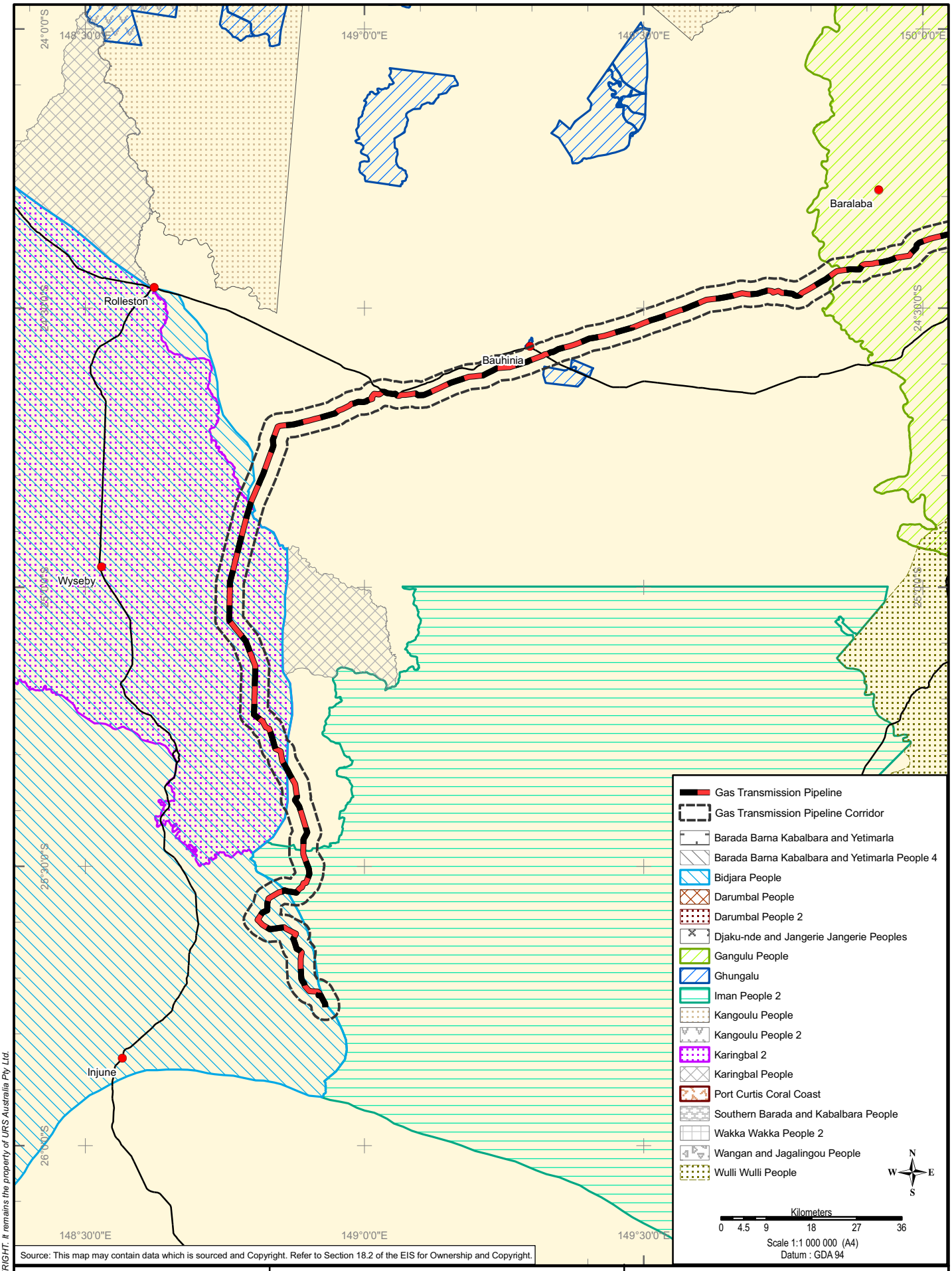


Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
INFRASTRUCTURE AND SERVICES
GAS TRANSMISSION PIPELINE
(EASTERN SECTION)

Drawn: MG	Approved: LB	Date: 10-02-2009	Figure: **7.11.9b**	Rev. A
Job No.: **4262 6220**	File No.: 42626220-g-837.mxd			A4

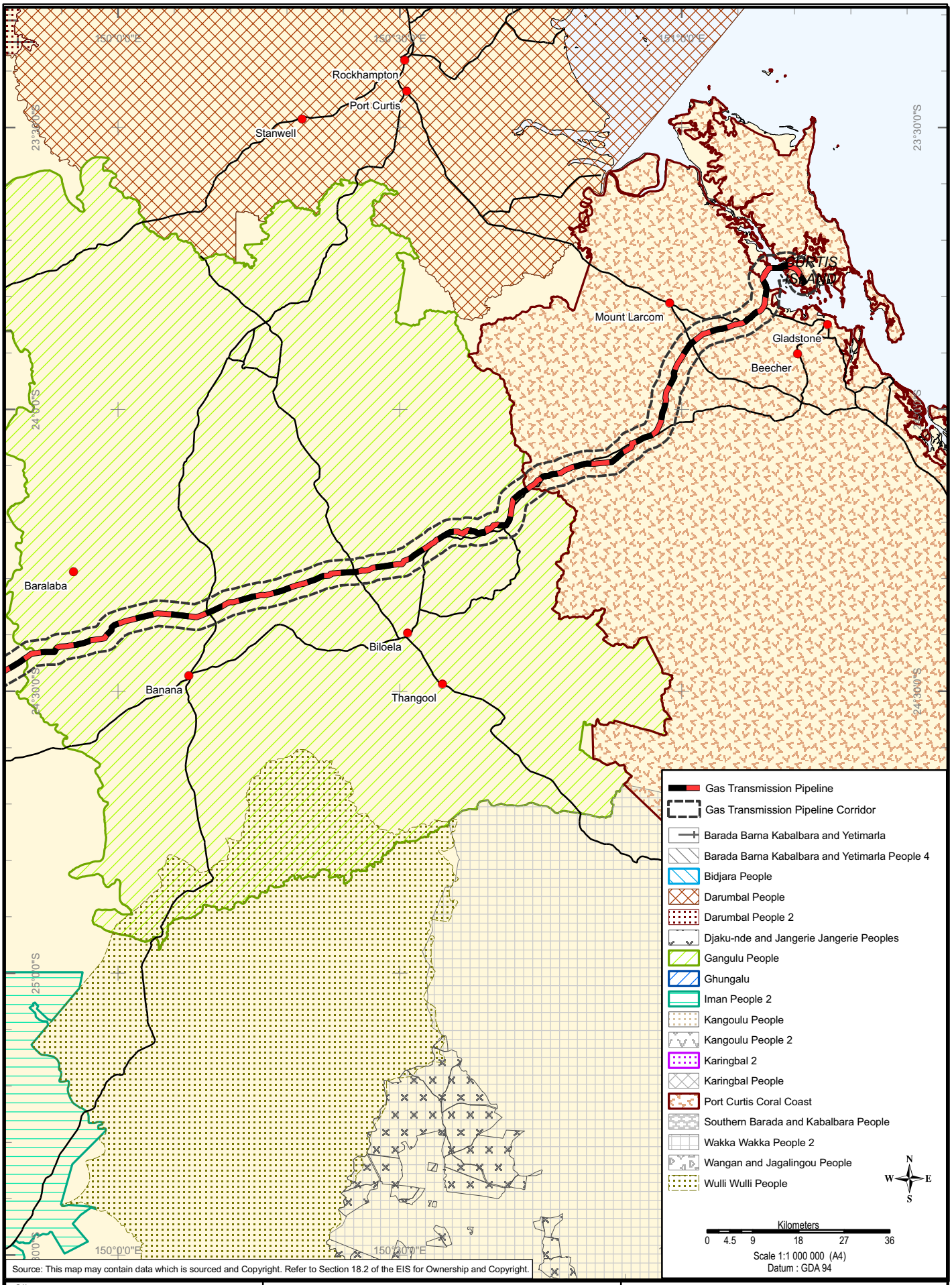


Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
NATIVE TITLE CLAIM AREAS
GAS TRANSMISSION PIPELINE
(WESTERN SECTION)

Drawn: MG	Approved: JB	Date: 18-05-2009	Figure: **7.11.10a**
Job No.: **4262 6220**	File No.: 42626220-g-838.mxd		Rev. A A4



Client

Project
GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title
NATIVE TITLE CLAIM AREAS
GAS TRANSMISSION PIPELINE
(EASTERN SECTION)

Drawn: MG	Approved: JB	Date: 18-05-2009
Job No.: 4262 6220	File No.: 42626220-g-847.mxd	

Figure: **7.11.10b**

Rev. A
A4

Fire Management

Fire can pose a significant risk to farming activities. The hazard and risk assessment undertaken for the project (refer Section 10) identified a number of fire risks from the gas transmission pipeline. These include gas leaks from infrastructure, fire at accommodation facilities, and fire from mobile fuel tankers. The management and mitigation measures proposed to be implemented to minimise the risk of fire from each of the potential risk sources are discussed in Table 7.11.6.

Table 7.11.6 Gas Transmission Pipeline Hazards

Risk	Cause	Safety Management
Gas leak from gas transmission pipeline infrastructure	• Faulty valve • Faulty flange/seal • Earthquake	• Design standards for potential earthquake loads • Gas leak detection • Quality assurance of installed equipment • Inspection and condition monitoring program • Secured area around aboveground gas transmission pipeline infrastructure • Emergency response procedures
Workers accommodation area fire involving combustible construction, LPG or diesel.	• Electrical fault • Naked flame • Hot oil or surfaces in kitchen	• Smoke detection in workforce accommodation facility buildings • Manual fire fighting equipment • Separation of diesel storage • Emergency response procedures
Diesel fire involving mobile fuel tanker.	• Vehicle engine fire as an ignition source to the fuel tank • Naked flame • Vehicle collision/ roll over	• Suitably qualified fuel transport operator (giving consideration to vehicle maintenance, driver training and procedure).

Further measures that may be implemented to minimise risk of initiating or spreading bushfire include:

- Application of appropriate design standards to minimise the risk of fire;
- Prohibit all burning activities or the use of naked flames during construction;
- Clear all work areas from any combustible materials;
- Implement a regular inspection and monitoring program;
- Implement clear markers and signage to reduce the risk of accidental gas transmission pipeline damage;
- Remote monitoring of pressure and flow; and
- Emergency response procedures.

Millable Timber

Vegetation to be cleared along the gas transmission pipeline corridor may include some timber suitable for milling. Santos will advise the Department of Primary Industries and Fisheries (DPIF) about any areas of state owned land likely to be affected by the gas transmission pipeline construction. The DPIF will be able to survey for millable timber in these areas and arrange for their prior removal if required. Similarly, should there be any millable timber on private land that is likely to be affected by the project; Santos will

liaise with the landholder to provide the opportunity for the removal of such timber prior to construction occurring.

Mineral Resources and Extractive Industries

The gas transmission pipeline corridor intersects ML5656, operated by Anglo Coal. There is already existing infrastructure running through this lease, including the QGP and the Dawson Highway. As the Santos gas transmission pipeline will be adjacent to the QGP, it is not expected to have any additional impact on the mine's existing or planned operations. Santos has been in consultation with Anglo Coal to identify a suitable alignment across the lease.

At its eastern end, the gas transmission pipeline corridor passes through the Stuart Oil Shale mining lease (ML80003). It generally follows the alignment of Landing Road, which also passes through ML80003. In this way the gas transmission pipeline poses a similar constraint to that posed by Landing Road. Santos is committed to working with Queensland Energy Resources Ltd (the holder of ML80003), and the Queensland Government to minimise any impacts on the future mining potential of the lease.

The gas transmission pipeline is likely to pass through other petroleum tenements along the 435 km length. A pipeline licence authorises the construction of a pipeline through the area of other petroleum authorities. Santos will consult with relevant petroleum authorities to ensure disruption to activities is minimised to the extent practicable.

No existing quarries will be impacted by the gas transmission pipeline route.

Residential

There are 29 homesteads within the 5 km wide gas transmission pipeline corridor (there are none within the 30 m wide proposed ROW). In selecting the final gas transmission pipeline route, consideration will be given to maximising the distance of the gas transmission pipeline to the existing homesteads.

Potential short term impacts that may occur as the gas transmission pipeline construction passes within the vicinity of the homesteads include increased noise, vibration and dust from machinery operation and traffic as well as increased traffic within properties and along the local road network. Given the short term and low intensity nature of the gas transmission pipeline construction activities, the level of impact at any individual homestead is not expected to be significant. Further details on these impacts and the proposed mitigation measures are given in Section 4, 7.8, and 7.10 of this EIS.

Santos and/or the pipeline contractor will liaise with all residents along the gas transmission pipeline corridor prior to any construction activities taking place to ensure that residents are fully informed of the proposed nature, timing and location of the construction works and any site specific mitigation measures are implemented.

Heritage Areas

Section 7.13 provides details on cultural heritage sites (Indigenous and non-indigenous) identified within the gas transmission pipeline corridor. These sites have been assessed for significance and gas transmission pipeline development activities will be undertaken in such a way as to minimise any impacts on identified sites.

Conservation Areas

As discussed the gas transmission pipeline study corridor passes through a number of conservation areas. While some of these areas cover the full width of the corridor, others such as Expedition National Park, Mount Stowe State Forest and Targinie State Forest occupy only a portion of the study corridor width (refer Figure 7.11.2a and 7.11.2b) and may be able to be avoided. Following construction, the proposed ROW will be rehabilitated and revegetated to stabilise it against erosion. Further details of the

impacts on REs including conservation areas and the proposed mitigation measures are provided in Section 7.4.

Weed Management

Santos is committed to reducing the risk of spreading weeds along the gas transmission pipeline during its installation and operation. As part of this commitment, Santos will work with the local community and landholders to provide an integrated weed management approach.

During field investigations a weed survey will be undertaken to identify all declared and environmental weeds along the gas transmission pipeline corridor so that management strategies can be developed. Also, wash-down facilities (both permanent and temporary) will be installed to assist in weed control measures.

Further details of the proposed weed management strategy are given in Section 7.4.

7.11.5.2 Impacts on Land Tenure

The land on which the gas transmission pipeline will be constructed is held under various land tenures including freehold, State leasehold, reserves, unallocated State land, roads, and State forest.

Santos is currently negotiating with private landholders agreements for the grant of an easement over the pipeline land. Because of the significant cost involved in construction of the gas transmission pipeline, Santos is seeking where practicable easements over land the subject of the gas transmission pipeline for greater security and certainty. The agreements will provide for the payment of compensation to the landholder in return for grant of the easement and the effects of the gas transmission pipeline construction on the landholders' use of the land.

For land tenures over which easements cannot be registered (such as roads), Santos will endeavour to reach agreement with the landholder (which for roads is either the local authority or the Department of Main Roads (DMR)) as to the terms on which the gas transmission pipeline may be constructed and operated on the land. In those cases, there might not be a recorded tenure interest for the gas transmission pipeline.

If Santos cannot negotiate an appropriate arrangement with a landholder, Santos may seek a permission to construct and operate the gas transmission pipeline from the Minister of Mines and Energy under Chapter 4, Part 5 of the PG (PSA) Act. It may also request the Land Court to determine appropriate arrangements for access to the gas transmission pipeline land where necessary and to determine appropriate compensation to be paid to the landholder.

If Santos constructs the gas transmission pipeline pursuant to a Ministerial permission and is still unable to negotiate an appropriate easement (where available) or other arrangement with the landholder, Santos may then seek the taking of an easement or other right of way by either the Minister for Mines and Energy under the PG(PSA) Act or by the Coordinator-General (CG) under the *State Development and Public Works Organisation Act* 1971 (Qld). The processes in the Acquisition of *Land Act* 1967 (Qld) will apply to the acquisition and the assessment of any additional compensation. Santos will not seek the acquisition of a whole parcel of land because an easement is sufficient for the gas transmission pipeline.

7.11.5.3 Impacts on Infrastructure and Services

Roads

Minor disruptions to local roads may occur during the construction of the gas transmission pipeline. Santos will contact the relevant local authorities with respect to local road usage and the scheduling of activities to minimise disruption. Further details on impacts to roads from the construction of the gas transmission pipeline are given in Section 4.

Crossing of the major roads will be carried out in consultation with the DMR and/or the relevant councils in such a way as to minimise disturbance to traffic. The design of the crossings will be finalised during the detailed design phase of the project. During this phase, Santos will liaise with the relevant regulators regarding the design of the crossing and obtain the necessary consents/approvals. Road crossing arrangements will be documented in a traffic management plan to be prepared by the pipeline contractor and agreed with the DMR and councils prior to construction commencing.

Opportunities for utilising or upgrading existing tracks or roads for access (to reduce the extent of disturbance to new ground) will be investigated, taking into account any operational and/or design constraints.

Railways

As shown in Table 7.11.5, the gas transmission pipeline will cross under or be located in the vicinity of a number of railway lines. Construction of the gas transmission pipeline will not directly impact on the operation of any rail lines. Where the gas transmission pipeline crosses a rail line, the crossing will be either bored or directionally drilled. Minor service disturbance may occur while the crossing is being constructed as a result of recommended safety protocols (e.g. trains reducing speed near the construction zone). Where the gas transmission pipeline does not cross under the rail line it will be set back an appropriate distance (as stipulated in AS2885) so as not to interfere with railway infrastructure or to induce electric currents in the pipe.

Gas transmission pipeline development activities may require construction of access tracks in the vicinity of existing railway lines. Where this is required, opportunities for locating new access tracks alongside or parallel to existing railway lines (to reduce the extent of disturbance to new ground) will be investigated, taking into account any operational, safety and/or design constraints such as required set-back distances as stipulated in AS 2885.

Pipelines and Powerlines

The gas transmission pipeline will be co-located alongside the QGP for much of its route. This will limit the extent of undisturbed land required for the gas transmission pipeline construction.

The gas transmission pipeline will terminate in the GSDA. The currently preferred route runs generally in the vicinity of the Gladstone-Mt Larcom Road and passes to the north of Yarwun in an area referred to as the “Yarwun Neck”. This area includes a number of existing pipelines and the space available for new pipelines is limited. 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 GSDA, including the Port Curtis Crossing and Curtis Island pipeline sections. Santos continues to liaise with the Queensland Government in this regard.

The construction of the gas transmission pipeline will not have a direct impact on overhead powerlines or electricity supply. When the gas transmission pipeline needs to cross a powerline it will be located so as to not interfere with any pylons or other associated infrastructure. Santos and/or the construction contractor will consult with the relevant power authority prior to any construction near powerlines.

Landing Grounds

Several landing (airfields) grounds are situated within the gas transmission pipeline corridor, the majority of which serve individual properties. The gas transmission pipeline corridor will be selected to avoid these where practicable and suitable arrangements agreed with the relevant landholders.

Other Infrastructure

A review of existing utilities and other infrastructure was undertaken at the gas transmission pipeline road crossing locations to identify potential construction impacts. This was done in the form of a ‘dial before

you dig' request. This investigation identified the following services which may be impacted in some way along the length of the gas transmission pipeline at the rail and road crossing locations:

- QGP;
- Jemena gas pipeline;
- Ergon services;
- Gladstone Regional Council water facilities;
- Envestra gas pipeline;
- Gladstone Area Water Board water pipeline;
- Telstra services; and
- Vision Stream fibre optic cable.

A further detailed analysis of impacts to these services will be undertaken at the design stage of the gas transmission pipeline and again prior to construction when the exact gas transmission pipeline crossing location is known.

Common User Facilities

Santos agrees that the costs of infrastructure development should be borne by those who benefit. However, Santos also recognises that there has been a long history in Queensland of government support for coal, alumina, gas and other resource projects. The Queensland (and Federal) Governments have played leading roles in the development of some of these industries and associated common user infrastructure. Examples of common user infrastructure facilities that may be relevant for the gas transmission pipeline include the following:

- Designated areas for construction camps and pipe marshalling along pipeline route including access to raw or treated water; and
- The opportunity for telecommunications providers to lay a fibre-optic cable in the pipeline trench during construction to extend the telecommunications network and overcome known network blind spots along the pipeline route.

7.11.5.4 Impacts on Cultural Heritage and Native Title

Santos will seek to gain relevant native title permissions for the GLNG Project via the negotiation and registration of Indigenous Land Use Agreements (ILUAs) or the grant of Ministerial permissions under the PG (PSA) where ILUAs are not achievable. Native title permissions will be required for the gas transmission pipeline (and related elements) and some areas of the plant site and related construction. ILUAs are being negotiated with the registered native title claim groups covering the gas transmission pipeline corridor: PCCC, Gangulu, Karingbal, Iman and Bidjara.

7.11.5.5 Impacts on Regional Planning Framework

This section considers the impacts of the gas transmission pipeline and where relevant other components of the GLNG Project on the regional planning framework.

Central Queensland Regional Growth Management Strategy

The Central Queensland – A New Millennium report which initiated the CQRGMS sets out the objectives and outcomes to achieve these "Outcomes". Of particular relevance to the gas transmission pipeline are the resource, conservation and management objectives and the economic development objectives. Details of the objectives and outcomes in relation to the gas transmission pipeline corridor are outlined in Table 7.11.7.

Table 7.11.7 Gas Transmission Pipeline Corridor Compatibility with CQRGMS

Outcome	Objectives	Compatibility of Gas transmission pipeline
Resource use, conservation and management		
Land use planning and management	The promotion of, and adherence to, best practice land management for sustainable and profitable land use.	The gas transmission pipeline will be designed to enable best practice land management for sustainable use.
Pests and diseases	The economic prosperity, competitive advantage and biodiversity of the region are protected from introduced and endemic pests and diseases.	Pest and weed control strategy to address threat of pests and diseases.
Water use planning and management	The promotion of, and adherence to, sustainable use of water resources while maintaining and enhancing environmental values.	The gas transmission pipeline component of the GLNG Project will have minimal long term impact on water resource management and planning.
Air quality	Air quality is maintained at levels which ensure sustainable regional communities, protection of the natural environment and opportunities for continuing economic growth.	Air quality will not be significantly affected by the gas transmission pipeline.
Climate change and greenhouse gas (GHG) emissions	Development takes place with a focus on efficiency to achieve economic progress with minimisation of GHG emissions and with an understanding of the potential impact of climatic conditions.	CSG is an energy source with significantly lower GHG emissions than other hydrocarbon energy sources.
Biodiversity conservation	Biodiversity in terrestrial, freshwater, marine and estuarine ecosystems is maintained, with native species and communities conserved and linked by viable networks of wildlife habitat across the landscape.	The gas transmission pipeline alignment has been selected to minimise impacts on biodiversity by, where practicable, avoiding sensitive ecosystems and limiting habitat fragmentation.
Coastal planning and management	The region's coastal resources and values have been identified and promoted to ensure they are used in a sustainable manner.	The gas transmission pipeline will be laid across Port Curtis so as to minimise impacts on coastal resources and in accordance with the requirements of the Coastal Act, Curtis Coastal Plan.
Economic development		
Existing and emerging industries	The region supports existing and emerging industries and encourages diversification ensuring growth and a viable and ecologically sustainable economy in the region.	The gas transmission pipeline will support long term economic growth in the region.
Investment and capital markets outcome	There is a measurable increase in the understanding and the flow of capital within the local and regional economies and how this applies to the state, national and international economies.	The gas transmission pipeline is a key component of the GLNG Project which will provide a considerable input of investment capital into the region.

Outcome	Objectives	Compatibility of Gas transmission pipeline
Labour market	The provision of a flexible and skilled workforce meeting industry requirements which is capable of responding to both industry and personal changes.	The gas transmission pipeline will encourage a skilled workforce into the region plus up-skilling of the existing workforce.
Export development	It is recognised there is an increased capacity of the region to engage directly with international markets which increases our global perspective and enhances the viability of organisations based in the region.	The gas transmission pipeline will enable a major regional resource to be exported to global markets.
Energy	A region which promotes its capacity to meet high energy demand in an efficient and competitive manner to support economic growth and improvement in lifestyle.	The gas transmission pipeline is a key component of the GLNG Project which will develop a significant resource to meet the growing demand for lower carbon energy.

The gas transmission pipeline will support the outcomes of the CQRGMS and implement management strategies that reflect those contained within the CQRGMS.

Central Queensland Strategy for Sustainability

Table 7.11.8 outlines the key issues relevant to the gas transmission pipeline, objectives to address the issues, and how the project influences these issues and objectives.

Table 7.11.8 CQSS - Gas Transmission Pipeline Compatibility

Regional Issues	Sustainability Objectives	Compatibility of Gas transmission pipeline
Water resources management The equitable allocation of water resources. Ecological needs of the river, estuary and marine environments. Water infrastructure developments harvesting and storing of water.	Regional water resources managed in an ecologically, economically and socially sustainable way. Water use efficiency and water conservation practices adopted by water users. Whole-community participation in water resources decisions.	The gas transmission pipeline component of the GLNG Project will have minimal long term impact on water resource management and planning.
Weeds Spread of weeds. Impacts on rural productivity as well as on natural ecosystems; Awareness.	Limit the introduction of new weeds to the region, restrict the spread of existing weeds and eradicate where practicable. Integrate weed management with other natural resource management activities	Weed identification surveys have been carried out as part of the EIS. A weed management strategy has been outlined in Section 7.4.
Salinity The potential for salinity to contribute to land degradation in the region.	Minimise the potential for soil and water salinity in the region. Contain or reverse salinity in existing problem areas.	Construction and operation of the gas transmission pipeline will not significantly influence soil salinity.

Regional Issues	Sustainability Objectives	Compatibility of Gas transmission pipeline
Degradation of the soil resource Soil erosion. Soil fertility and structural decline. Development of areas of salinity associated with tree-clearing and irrigation.	Management of the region's land resources (soils and vegetation) in an ecologically, socially, and economically sustainable manner. Address institutional and structural factors which constrain the achievement of integrated sustainable resource management.	The gas transmission pipeline ROW will be rehabilitated following construction to ensure the risk of soil erosion is minimised. Regular monitoring of the route for erosion will be undertaken and any erosion identified will be remediated.
Vegetation management Native plants becoming woody weeds. Pasture management. State of natural riparian and remnant vegetation. The rights of owners of freehold land. Economic benefits to landholders through the productive use of cleared timber.	Not stated.	The gas transmission pipeline will avoid significant vegetation where practicable. Opportunities for milling timber will be investigated. All landholders to be consulted.
Land use planning Loss of good quality agricultural land (GQAL) to other land uses.	Management of the region's land resources (soils and vegetation) in an ecologically, socially, and economically sustainable manner. Address institutional and structural factors which constrain the achievement of integrated sustainable resource management.	The gas transmission pipeline is planned to avoid loss of GQAL where practicable. The gas transmission pipeline will be located adjacent to the existing QGP for much of its length to avoid additional land disturbance.
Ecosystem health and biodiversity Fragmentation of habitat. Introduction of potential weed species. Maintaining biodiversity.	Healthy regional ecosystems where biodiversity is maintained. Regional activities managed for healthy ecosystems reflecting stakeholders' understanding of the region's natural environment. Biodiversity and ecosystem health integrated with natural resource management decision making.	The gas transmission pipeline will be planned to avoid where practicable fragmenting habitat, or loss of biodiversity. Environmental Management Plans (EMP) will be implemented to minimise and manage the introduction of weeds.
Economic viability of industries Decline of primary industry viability; Development of regional industries; Farm income diversification.	A robust and well-balanced regional economy which is economically, socially and ecologically sustainable in the long-term, and able to withstand external pressures.	The gas transmission pipeline is a key component of the GLNG Project which will provide an opportunity for diversification of the economies at the CSG fields and at Gladstone.

7.11.5.6 Impacts on State Planning Provisions

SPP 1/92 - Development and Conservation of Agricultural Land

Refer to Section 6.11.5.5 for measures to be implemented to minimise impacts of the gas transmission pipeline development on GQAL. Further details of management measures are discussed in Section 7.3.

SPP 1/03 - Mitigating the Adverse Impacts of Flood, Bushfire and Landslide

Bushfire Management

Based on council mapping, high bushfire risk areas are generally situated around more vegetated areas (refer Appendix V for further details). High risk bushfire areas within the gas transmission pipeline corridor are listed in Table 7.11.9 (sourced from the relevant local authority planning scheme).

Table 7.11.9 High Bushfire Risk Areas – Gas transmission pipeline Corridor

Marker Point (Km from Western End of Pipeline)	Areas of High Bushfire Risk
5 – 12	1 to 2 km west of the gas transmission pipeline
16	1.5 km west of the gas transmission pipeline
28 – 32	1.5 to 2 km east of the gas transmission pipeline
32 – 37	Directly adjacent to parts of the gas transmission pipeline
39 – 42	2 km east and 1.5 km west of the gas transmission pipeline
59 – 61	2.5 km east of the gas transmission pipeline
108 – 111	2.5 km west of the gas transmission pipeline
152 – 153	300 to 500 m south of the gas transmission pipeline
157 – 159	1 to 1.5 km north of the gas transmission pipeline
159	1 km south of the gas transmission pipeline
155 – 166	Directly adjacent to the gas transmission pipeline
401 – 402	1.8 km south of the gas transmission pipeline
404 – 405	2.4 km north of the gas transmission pipeline

Landslide

The SPP states that landslide hazard areas "*include land of 15 % and greater slope and other land known of or suspected by the local government as being geologically unstable"* (SPP 1/03). Landslide hazard areas identified by the SPP are summarised in Appendix V.

No landslide hazard data are available for Calliope, Banana, Duaringa, Taroom, Bauhinia and Bungil Shires. The town planning schemes for these shires state that the landslide hazard is not mapped but is deemed to involve all land having slope of 15 % or greater.

In determining the gas transmission pipeline corridor, Santos has generally avoided landslide prone areas. Should there be any potential landslide hazard areas that cannot be avoided, Santos will employ a range of procedures to minimise risk of landslide including:

- Investigate alternative sites away from landslide risk areas;
- Utilise appropriate construction materials, equipment and techniques;
- Cease work during periods of potential landslide activity (e.g. high rainfall events);
- Minimise vegetation clearing, stabilise slopes;
- Regular inspection and monitoring; and
- Emergency response procedures.

SPP 2/02 Planning and Managing Development Involving Acid Sulfate Soils

The gas transmission pipeline will traverse low lying coastal areas that have been identified by the Calliope Shire planning scheme and the Gladstone City planning scheme as land containing acid sulfate soils (ASS). ASS studies have been carried out along the gas transmission pipeline corridor (refer Section 7.3 which outlines the procedures to be adopted to manage and control ASS impacts.

7.11.5.7 Impacts on Great Barrier Reef Coast Marine Park Zoning Plan

The Narrows north of a line between Friend Point and Laird Point is located in the Great Barrier Reef Coast Marine Park (Queensland) (GBR Coast MP) which extends approximately three nautical miles seaward from highest astronomical tide within the Great Barrier Reef World Heritage Area. The Great Barrier Reef Marine Park (Commonwealth) (GBRMP) extends seaward from the GBR Coast MP. The GBR Coast MP complements the GBRMP by adopting similar zone objectives and use provisions.

In the zoning plans for both marine parks, The Narrows is located in the habitat protection zone. The objectives of the habitat protection zone are:

- To provide for the conservation of areas of the Marine Park through the protection and management of sensitive habitats, generally free from potentially damaging activities; and
- Subject to the objective mentioned above, to provide opportunities for reasonable use.

The zoning plan allows for a number of uses within the habitat protection zone both with and without permission. Included in the list of permitted uses is:

- Carrying out works for a purpose that is consistent with the objectives mentioned above including:
  - Dredging;
  - Placement of dredged material;
  - Reclamation;
  - Beach protection works;
  - Harbour works; or
  - Any other purpose that is consistent with the above objectives and not already listed in the plan.

Based on the zoning plan's objectives and permitted uses, it is evident that "reasonable use" (including dredging, dredged material placement, reclamation, beach protection works or harbour works) may be permitted provided that conservation areas and sensitive habitats are protected and managed and free from potentially damaging activities.

As discussed in Section 3.7.3.20, the gas transmission pipeline will cross Port Curtis between Friend Point and Laird Point to the north of the proposed location of the potential bridge. This will place the gas transmission pipeline within the marine park. The bridge will also be partially within (eastern end) the marine park. This location is at the southern extremity of the habitat protection zone.

While much of The Narrows contains significant marine habitats including extensive areas of seagrass and mangroves, the habitats in the vicinity of the proposed bridge and gas transmission pipeline (between Friend Point and Laird Point) are less significant. The habitats in this area are described in Section 8.4 as follows:

- **Benthic Habitat**. The benthic habitat near Friend Point is primarily silt with numerous small and large burrows. Strong currents occur around Friend Point creating a scouring effect on the benthic substrate. In the centre of the channel the benthic substrate is coarse sand with a high proportion of shell grit. The proportion of silt increases towards Laird Point with lesser amounts of sand and shell grit.

- **Seagrass**. Surveys in the area north of Fisherman's Landing found a varying extent of seagrass between 2002 and 2006. This seagrass variability has been attributed to their patchy extent in this area with low overall biomass and lower resilience and no substantial seed bank to support rapid regeneration of seagrass species. Additional surveys undertaken for this EIS in 2008 found minimal seagrass at the subtidal sites and highly patchy seagrass north of Fisherman's Landing in the intertidal zone (however, these surveys were undertaken in autumn when biomass and area would be expected to be reduced).
- **Mangroves**. In the extensive tidal flat areas south-west of Friend Point there are several isolated stands of dead and fallen mangroves, possibly resulting from storm events and/or shoreline erosion. The sediment has been undermined from the mangrove fringes in this area as a result of tidal surges receding rapidly through the mangrove forest during spring tides. Localised areas of mangrove mortality are also present resulting from root smothering in areas where mobile sand ridges (cheniers) have moved into the mangrove forest covering the aerial breathing root systems.

To satisfy the objectives of the GBR Coast MP, a permitted use must not interfere with the protection and management of sensitive habitats and must be for a reasonable use. Based on the above habitat descriptions, it can be seen that the habitats to be disturbed by the proposed gas transmission pipeline and bridge are not specially significant particularly when compared with the more extensive seagrass and mangrove areas further north in The Narrows. Furthermore it is considered that the provision of vital infrastructure to a major LNG precinct on Curtis Island that is consistent with the strategic planning intent of the Queensland Government (as expressed in the GSDA development plan) is a reasonable use. On this basis it can be concluded that the proposed gas transmission pipeline and bridge will be consistent with the objectives of the GBR Coast MP.

Curtis Coast Regional Coastal Management Plan

Tables 7.11.10 to 7.11.13 summarise the desired coastal outcomes for these coastal sites and the extent to which the gas transmission pipeline will be consistent with them.

Table 7.11.10 Curtis Island Coastal Site - Desired Coastal Outcomes

Aspect	GLNG Project Compliance
Desired Coastal Outcomes	
Maintenance of Curtis Island in a generally natural or non-urban state outside existing residential and tourist areas at South End, Black Head, Sea Hill and Station Point while providing opportunities for future development in appropriate locations.	While the plan recognises the need to maintain the island's natural state, it does envisage that the future development of the project site will be "associated with port end industrial expansion". The proposed project is consistent with that objective. Measures will be implemented to minimise disturbance outside of the development footprint.
Maintenance of the integrity and ecological functioning of areas of high conservation significance.	The Curtis Coastal Plan has mapped the mangrove fringe at Laird Point as areas of high conservation significance. The gas transmission pipeline will intersect the mangrove area at this point and there will be some disturbance caused by the construction of the gas transmission pipeline. The project will minimise the area of disturbance and will implement appropriate mitigation measures where practicable (refer Section 8.4.)

Aspect	GLNG Project Compliance
Development is sited and designed to protect the island's significant coastal resources and their values including protection of the island's scenic coastal landscapes.	The Curtis Coastal Plan has mapped the mangrove fringe at Laird Point as areas of high scenic value. There will be some disturbance caused by the construction of the gas transmission pipeline. The project will minimise the area of disturbance and will implement appropriate mitigation measures where practicable (refer Section 8.12.)
Enhancement of low-key recreation and tourism opportunities in appropriate locations.	Recreation and tourism will be affected in the short term whilst the gas transmission pipeline is in construction. Following construction recreation and tourism in the area of the gas transmission pipeline can continue.
Coordination of management and decision-making among land and marine resource managers in managing adverse impacts on biodiversity from fire, pest species, development and public access.	Management plans will be implemented to control fire and pest species. Public access will not be permitted across the potential bridge to the island.
Management of forestry operations ensure minimal impact on water quality of The Narrows and the waterways flowing to The Narrows.	There are no current forestry operations on the gas transmission pipeline route. The corridor will be cleared in a manner that will minimise erosion potential and downstream water quality impacts.
Decision-making in relation to Curtis Island is based on a sound understanding of the island's coastal resources and their values and potential adverse impacts on these resources and values.	The proposed development is consistent with the intended use for the area as stated in the GSDA Development Scheme. This EIS has assessed the project's impacts on the islands coastal resources and has development appropriate management strategies.
Coastal Management Issues	
Although this coastal locality is undeveloped there is significant potential for future development associated with port and industrial expansion. Gladstone Ports Corporation's Strategic Plan identifies part of this coastal locality for future port development by 2025.	The project is consistent with the intent of "future development associated with port and industrial expansion".
Development of part of this coastal locality for industry and port development has the potential to be a catalyst for further major development on Curtis Island that could have significant adverse impacts on coastal resources and their values. Any future development of this coastal locality needs to be carefully planned and managed in an ecologically sustainable manner to avoid significant impact on the area's biodiversity and coastal landscape values.	The GSDA Development Plan limits that area of Curtis Island on which industrial development will be permitted and preserves a much larger area as an environmental management area to prevent further major development of the island. The assessment undertaken in the preparation of this EIS has shown that the project will not have a significant impact on the area's biodiversity or coastal landscape values. Mitigation measures will be implemented to minimise the impacts that have been identified.

Table 7.11.11 Gladstone Harbour Coastal Site - Desired Coastal Outcomes

Aspect	GLNG Project Compliance
Desired Coastal Outcomes	
Management of the harbour providing for a range of uses, while ensuring conflicts between these uses are managed and adverse impacts on coastal resources and their values are minimised.	The gas transmission pipeline crossing of the harbour will be designed to facilitate the passage of recreational boating.

Aspect	GLNG Project Compliance
Continued development of the Port of Gladstone in an ecologically sustainable manner avoiding the location of port infrastructure in areas of high conservation significance, where practicable.	The Curtis Coastal Plan has mapped the mangrove fringe at Laird Point as areas of high scenic value. There will be some disturbance caused by the construction of the gas transmission pipeline. The project will minimise the area of disturbance and will implement appropriate mitigation measures where practicable (refer Section 8.4.)
Recognition of the importance of the undeveloped inner-harbour islands in providing public access, recreation, biodiversity and scenic amenity to the regional community and avoidance of development with the potential to compromise these values.	The GLNG Project will not involve any development of the inner harbour islands.
Coordination of management approaches among land and marine resource managers in relation to monitoring the health of the harbour in regards to water quality, managing increasing vessel use and minimising impacts to shorebirds, turtles and dugong.	Santos will participate in the Port Curtis Integrated Monitoring Program and other relevant regional monitoring programs.
Future use of the following State land on the coast protects coastal resources and values through the implementation of an appropriate management regime: 5DS219, 10SUSL39395, 8USL39395, 9USL39395, 7USL39395, 6USL39395, 11USL39395, 1USL36585.	The project will not involve the development of any of these allotments.
Coastal Management Issues	
A critical issue for Gladstone Harbour is providing for future port and industrial expansion while ensuring significant adverse impacts to coastal resources and their values are minimised.	The GLNG Project will contribute significantly to the expansion of Gladstone Harbour. The assessment undertaken in the preparation of this EIS has shown that the project will not have a significant impact on the area's coastal resources. Mitigation measures will be implemented to minimise the impacts that have been identified.
Dredging of the harbour and sea-placing of marine dredged material has the potential to cause benthic disturbances and increased turbidity in the water column. This can adversely affect marine biodiversity and in particular seagrass beds.	The GLNG Project has undertaken an initial environmental assessment for dredging which is outlined in Section 8.17 of this EIS.

Table 7.11.12 The Narrows Coastal Site - Desired Coastal Outcomes

Aspect	GLNG Project Compliance
Desired Coastal Outcomes	
This key coastal site is given the highest level of protection in recognition of its near pristine state and significant coastal resources and their values.	The potential bridge and gas transmission pipeline crossing of Port Curtis will be located at the southern extremity of The Narrows Coastal Site and have been designed and constructed to minimise impacts on the coastal marine environment. EMPs will be implemented to facilitate this.
Protection of the area's integrity and ecological functioning from incompatible development, land uses and activities.	The potential bridge and gas transmission pipeline crossing of Port Curtis will be located at the southern extremity of The Narrows Coastal Site and have been designed and constructed to minimise impacts on the coastal marine environment. EMPs will be implemented to facilitate this.

Aspect	GLNG Project Compliance
Maintenance of the mangrove fringe bordering The Narrows and associated waterways to protect scenic amenity and water quality.	The potential bridge and gas transmission pipeline have been located to minimise the need to clear mangroves. Approximately 4 ha will need to be cleared on the mainland side but none will need to be cleared on Curtis Island. The bridge EMP will set out mitigation measures to be implemented to protect mangroves and water quality.
Maintenance of World Heritage values associated with the area's outstanding coastal landscape values including its scientific value as an indicator of past geomorphological processes and its scenic amenity values.	The project's impacts on World Heritage values and proposed mitigation measures are provided in Section 8.4.
Monitoring of water quality to detect any adverse impacts on marine and estuarine biodiversity from contaminants including suspended solids.	The GLNG Project will implement an ongoing water quality monitoring program to ensure the marine and estuarine environments are protected.
Future use of the following State land on the coast protects coastal resources and values through the implementation of an appropriate management regime: 29DS546, 1USL36622, 3USL39057 and 2AP8707.	Any development associated with State land will be protected through appropriate environmental management regimes.

The Curtis Coastal Plan contains regional policies and sub-policies to assist in implementing the coastal management outcomes, principles and policies of the State Coastal Plan. These policies and sub-policies have been considered in the project design where relevant. Regional policies and sub-policies relevant to the project are outlined in Table 7.11.13 below.

Table 7.11.13 Curtis Coastal Plan - Relevant Regional Policies

Regional Policy	Relevant Sub-policy
Coastal use and development	Areas of state significance (such as GSDA areas) Settlement pattern and design Coastal-dependent land uses Maritime Infrastructure Mining and petroleum activities Dredging Reclamation Ports of Gladstone Infrastructure development
Physical coastal processes	Adaption to climate change Erosion prone areas Coastal hazards
Public access to the coast	Future need for access.
Cultural heritage	Areas of state significance (cultural heritage) Cultural heritage
Coastal landscapes	Areas of state significance (scenic coastal landscapes)
Conserving nature	Areas of state significance (natural resources)

7.11.5.8 Impacts on Local Government Planning Schemes

Planning schemes indicate the desired pattern of development for each local government area (LGA) area. The majority of the gas transmission pipeline corridor is zoned "Rural" within the various planning

schemes. Following construction of the gas transmission pipeline, the predominant rural land uses in the region will be able to continue. Other more intensive town planning zones such as "Urban" or "Town" exist in the town plans for the region, but the gas transmission pipeline will be located to avoid these residential and built-up areas.

IPA provides that development for an activity authorised under the PG (PSA) Act is exempt from assessment against the local government planning scheme.

7.11.5.9 Impacts on Gladstone State Development Area

The gas transmission pipeline corridor will pass through the following GSDA precincts:

- Aldoga;
- Materials transportation and services corridor;
- Corridor buffer area;
- Targinie;
- Yarwun; and
- Curtis Island industry.

In each of these precincts the proposed gas transmission pipeline is considered by the development scheme to be a use that is "considered highly likely to meet the purpose of the land use designation" or, specifically relating to the corridor buffer area, a use that "may meet the purpose of the land use designation".

This includes the Curtis Island Industry Precinct where the development scheme states that high impact industry limited to natural gas (liquefaction and storage) is a use of land that is highly likely to meet the purpose of the land use designation.

Four policies dealing with specific development issues have been prepared to support the GSDA development scheme. These policies are intended to assist proponents in the management and development of projects in the GSDA. The relevance of these policies is discussed below.

- Policy 1 - Information Collection for the Gladstone State Development Area

  This policy is to support the development scheme and to assist in the distribution of information prepared regarding the GSDA. The CG will collect, retain and make available studies and other relevant information about the GSDA. This information may then be used in the preparation of planning reports, environmental impact assessments and other related studies.

- Policy 2 - Environmental management in the Gladstone State Development Area

  The aim of this policy is to promote best practice environmental management and to encourage ecologically sustainable development. Thus the main objective is to ensure that the negative environmental effects created by developments within the GSDA are minimised and that environmental harm is avoided. Environmental impacts can be kept within the accepted state and national environmental parameters and guidelines through the implementation of best practice environmental management.

  Santos will adopt the goals, standards and guidelines for environmental management under the GSDA development scheme. The environmental management strategies to be implemented for the gas transmission pipeline construction are outlined in Section 12.

- Policy 3 - Public Notification

  This policy outlines the requirements of public notification under the scheme. The CG is to consider whether further notification is required for the gas transmission pipeline given the prior public

advertising and consultation that will have been undertaken in respect of the EIS and gas transmission pipeline licence.

It is expected that the public notification provided for the EIS process for the project and gas transmission pipeline licence will be sufficient and that no further public notification will be required.

- Policy 4 - Ecologically Valuable Land

  This policy requires a detailed assessment of all land in the GSDA to determine its ecological value and to identify ecologically valuable land within the GSDA that is to be subject to the requirements of this policy. The ecological assessment undertaken as part of this EIS has been prepared with reference to this planning policy.

  The gas transmission pipeline corridor has been selected to avoid areas of high ecological value.

7.11.6 Cumulative Impacts

Section 1 identifies other proposed gas transmission pipelines associated with other CSG projects. There is limited information available as to the planned development and 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 cumulative impacts on land use. The anticipated impacts of the gas transmission pipeline are considered to be the same for the other envisaged pipelines:

- Loss of productive land;
- Disruption to land use activities;
- Impacts to conservation areas;
- Potential impact on infrastructure and services;
- Impact to native titles; and
- Impacts to regional, state, and local planning.

During the consultation undertaken as part of the EIS preparation, some landholders expressed concern about having multiple easements within their property and suggested that this may have implications on their ability to subdivide their property into smaller lots. Having adjoining easements will reduce constraints to subdividing land. For some areas, Santos may be able to negotiate the shared use of land with the owner of the QGP.

The land where Santos has permission from either the landholder or the Minister for Mines and Energy to construct the gas transmission pipeline will in most places be 30 m wide and will be in close proximity to the QGP easement area for much of the gas transmission pipeline corridor. Without the consent of the QGP easement holder, the two easement areas cannot overlap and this consent has not been obtained.

In the event that the “Yarwun Neck” in the GSDA contains multiple pipelines, cooperation between the relevant gas transmission pipeline development proponents and regulatory agencies will be required to minimise impacts to land use.

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 GSDA, 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 land use described in this section. By utilising the

mitigation methods the expectation is the minimisation of the cumulative impacts on the receiving environment.

Table 7.11.14 provides a summary of potential land use impacts and mitigation measures for the gas transmission pipeline.

Table 7.11.14 Potential Land Use Impacts and Mitigation Measures

Aspect	Potential Impact	Mitigation Measures	Objective
Construction			
Impact on Land Use	Restriction of access to agricultural land	• Avoiding (where practicable) good agricultural land; • Minimising the disturbance to any valuable agricultural land that cannot be avoided and remediating it thereafter; • Avoiding fragmentation within individual land parcels and across areas of agricultural value; • Restricting development on small properties which could become unviable for farming due to the project effects; • Placing the gas transmission pipeline and required infrastructure along the boundary of properties where practicable or outside of cropping fields; • Burying the gas transmission pipeline to a depth suitable for ongoing farming operations (generally between 750 mm – 1,200 mm); • Avoiding pre-existing soil conservation measures where practicable; • Liaising with each relevant landholder regarding their site-specific land use practices and ways to minimise interference from project activities; • Rehabilitating the gas transmission pipeline ROW as quickly as possible; • Speed limits established for all access roads; • Vehicles to give way to all non-project traffic including farming equipment; • Vehicle wash down facilities to be provided and wash down procedures enforced; • Consultation with landholders to identify mutually suitable locations for infrastructure; and • Fences and cattle grids to be maintained and gates to be kept closed/open as requested by landholder.	Reduce the impact on existing land uses.

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
	Removal of vegetation and habitat from conservation and forestry areas	• Avoid high conservation value areas where practicable. • Revegetate and stabilise disturbed areas as soon as practical after the gas transmission pipeline installation.	Minimise impact on vegetation and habitat.
	Removal of millable timber reserves	• The DPIF will be notified about any areas of state owned land likely to be affected by the gas transmission pipeline construction. The DPIF will be able to survey for millable timber in these areas and arrange for their prior removal if required. • Liaise with landholders regarding millable timber on affected private landholdings.	Practicable uses for millable timber.
Residential and Commercial Use	Increased noise levels	• Field development activities will be remote from township areas. • All rural residences will be identified during the scouting phase of gas transmission pipeline planning. • Gas transmission pipeline construction activities will comply with relevant construction noise regulations. • Noise reduction devices will be fitted to machinery used in the vicinity of residential areas and noise sensitive locations. • Vehicle speeds will be limited on all lease access roads.	Reduce impacts to stakeholders.
	Increased dust	• Dust suppression measures such as watering access roads will be implemented during construction when required.	Reduce impacts to stakeholders.
	Increased traffic and road safety concerns.	• By agreement with the landholder ROW access roads will be separated from property access roads, as appropriate and will not be located in the vicinity of residences unless there is no alternative. • All project vehicles will be required to give way to non-project vehicles to ensure safety.	Road Safety.
Weed Management	Weed seed spread along the gas transmission pipeline	• Implement pest and weed management strategy as provided in the EMP. • As part of this commitment, Santos will work with the local community and landholders to provide an integrated weed management approach.	Reduce the spread of weeds through out the project.

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
Mineral Resources and Extractive Industries	Restricted or reduced activities within mineral resources and extractive industry areas.	• Liaise with holders of these leases with regard to access and gas transmission pipeline construction requirements.	Minimise effect on mineral resources and extractive industry areas.
Fire	Bush fire started by malfunctioning machinery or spark from welding.	• Implement emergency response plan as necessary. • Maintain machinery and consider heat shields for hot moving parts. • Use effective welding techniques or controls to minimise sparks.	Reduce the risk of fires.
	Fire at accommodation facilities.	• Smoke detection in workforce accommodation facility buildings. • Manual fire fighting equipment. • Separation of diesel storage. • Emergency response procedures.	Reduce the risk of fires.
	Diesel fire involving mobile fuel tanker.	• Compliance with requirements of relevant codes for the transport of hazardous and flammable materials.	Reduce the risk of fires.
Infrastructure and Services	Impact of gas transmission pipeline construction on existing infrastructure corridors.	• Work with the DIP to identify the preferred gas transmission pipeline alignment through the GSDA.	Reduce the impact on infrastructure and services.
	Impact of gas transmission pipeline construction on the railway.	• Where the gas transmission pipeline crosses a rail line, the crossing will be either bored or directionally drilled. Implement safety protocols (e.g. trains reducing speed near the construction zone). • Where the gas transmission pipeline does not cross the rail line it will be set back an appropriate distance so as not to interfere with railway infrastructure or to induce electric currents in the pipe.	Reduce the impact on infrastructure and services.

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
	Impact of the gas transmission pipeline construction on intersecting roads.	• Santos will contact the relevant local authorities with respect to local road usage and the scheduling of activities to minimise disruption. • Crossing of the major roads will be carried out in consultation with the DMR and/or the relevant councils in such a way as to minimise disturbance to traffic. • The design of the crossings will be finalised during the detailed design phase of the project. • Liaise with the relevant regulators regarding the design of the crossing and obtain the necessary consents/approvals. • Road crossing arrangements will be documented in a road crossing management plan to be prepared by the pipeline contractor and agreed with the DMR and councils prior to construction commencing.	Reduce the impact on infrastructure and services.
	The impact of the gas transmission pipeline construction on intersecting powerlines.	• Where the gas transmission pipeline needs to cross a powerline it will be located so as to not interfere with any pylons or other associated infrastructure. • Consult with the relevant power authority prior to any construction within power easements.	Reduce the impact on infrastructure and services.
	The construction of the gas transmission pipeline has a potential impact on private landing grounds.	• The gas transmission pipeline corridor will be selected to avoid these where practicable and suitable arrangements agreed with the relevant landholders.	Reduce the impact on infrastructure and services.
	Impact on other infrastructure along the gas transmission pipeline corridor.	• A further detailed analysis of impacts to other infrastructure services will be undertaken at the design stage of the gas transmission pipeline and again prior to construction when the exact gas transmission pipeline crossing locations are known.	Reduce the impact on other infrastructure and services along the gas transmission pipeline corridor.
Native Title	The 435 km long gas transmission pipeline will intersect with Aboriginal lands.	• Seek to gain relevant native title permissions for the GLNG Project via the negotiation and registration of Indigenous Land Use Agreements (ILUAs).	Native title approval

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
Curtis Coast Regional Coastal Management Plan- Desired Coastal Outcomes	The construction of the gas transmission pipeline will travel along the coast of the mainland to Friend Point and cross The Narrows at Friend Point where the gas transmission pipeline moves inland from the coast on Curtis Island.	• While the plan recognises the need to maintain the island's natural state, it does envisage that the future development of the project site will be "associated with port end industrial expansion". The proposed project is consistent with that objective. • Measures will be implemented to minimise disturbance outside of the development footprint.	Compliance with Curtis Coast Regional Management Plan.
	Potential for gas transmission pipeline to impact coastal environments.	• The Curtis Coastal Plan has mapped the mangrove at Laird Point as an area of high conservation significance. The gas transmission pipeline will avoid the mangrove areas and mitigation measures will be implemented to reduce disturbance to coastal environments.	Compliance with Curtis Coast Regional Management Plan.
Recreation	Potential impacts to recreational users of the areas the gas transmission pipeline crosses.	• Following construction recreation and tourism will not be impacted.	Minimise the short term impacts to tourism and recreation.
Land Use	Potential impact on forestry activities.	• There are no current forestry operations on the gas transmission pipeline corridor. The gas transmission pipeline corridor will be cleared in manner that will minimise erosion potential and downstream water quality impacts.	Clear vegetation in a responsible manner to prevent erosion.
GSDA	Gas transmission pipeline construction and development impact on GSDA planning.	• The proposed development is consistent with the intended use for the area as stated in the GSDA Development Scheme. This EIS has assessed the project impacts on the islands coastal resources and has development appropriate management strategies.	Compliance with GSDA.

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
Central Queensland Regional Growth Management Strategy	Gas transmission pipeline implications on Resource Use, Conservation and Management.	• The gas transmission pipeline will be designed to enable best practice land management for sustainable use.	The gas transmission pipeline will be designed to enable best practice land management for sustainable use.
Weed and Pests	Gas transmission pipeline construction has the potential to spread weeds long distances via vehicle and equipment movements.	• Implement pest and weed management strategy as provided in the EMP.	Reduce the risk of the spread of weeds and pests.
Water resources	Impact of gas transmission pipeline hydrotest on water resources.	• Minimal long term impact on water resource management and planning. • Potential for CSG associated water to be used. • Re-use of hydrotest water between gas transmission pipeline sections and for the facility tank hydrotest. • Treatment and re-use of hydrotest waters.	Minimise the use of water resources. Recycle and re-use where applicable.
Flora and Fauna	Potential impact of the gas transmission pipeline construction on biodiversity.	• The gas transmission pipeline alignment has been selected to minimise impacts on biodiversity by, where practicable, avoiding sensitive ecosystems and limiting habitat fragmentation.	Protect biodiversity and habitat fragmentation.
Coastal Resources	Potential impact of the gas transmission pipeline construction on coastal resources.	• The gas transmission pipeline will be laid across Port Curtis so as to minimise impacts on coastal resources and in accordance with the requirements of the Coastal Act, Curtis Coastal Plan.	Compliance with Coastal Act and Curtis Coastal Plan.
Soils	Potential Soil impacts to the gas transmission pipeline ROW from	• Soils will be handled according to the EMP and CMP to ensure proper excavation and backfilling of soils. • The gas transmission pipeline ROW will be rehabilitated following construction to	Construction and operation of the gas transmission pipeline will not significantly

Aspect	Potential Impact	Mitigation Measures	Objective
	construction.	ensure the risk of soil erosion is minimised. Regular monitoring of the route for erosion will be undertaken and any erosion identified will be remediated.	influence soils.
Flora and Fauna	Potential impacts on vegetation from the gas transmission pipeline.	• The project will avoid significant vegetation where practicable. • Opportunities for milling timber will be investigated. All landholders to be consulted.	Where practicable avoid significant stands of trees to protect biodiversity and reduce habitat fragmentation.
State Planning Policies	SPP 1/92 - Development and conservation of agricultural land	• Measures that may be implemented by the GLNG Project to minimise impacts of the gas transmission pipeline development on GQAL include: – Where practicable, focussing development on land with lower agricultural potential (e.g. class C and D land) and avoiding land of higher value/potential such as cropping land (class A and B land); – Avoiding fragmentation within individual land parcels and across areas of high agricultural value; – Restricting impact on properties which will become non-viable for farming due to the project infrastructure (e.g. development on small land parcels); and – Placing gas transmission pipeline project infrastructure on the boundaries of properties or outside of active farming areas (e.g. outside of fields).	Compliance with SPPs.
	SPP 1/03 Mitigating the adverse impacts of flood, bushfire and landslide.	• Utilise appropriate construction materials, equipment and techniques. • Cease work during periods of potential landslide activity (e.g. high rainfall events). • Minimise vegetation clearing, stabilise slopes. • Regular inspection and monitoring. • Emergency response procedures.	Compliance with SPPs.
	SPP 2/02 Planning and managing development involving acid sulfate soils.	• Detailed ASS studies have been carried out along the gas transmission pipeline study corridor. Section 7.3 also outlines the procedures to be adopted to manage and control ASS impacts.	Compliance with SPPs.

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

Aspect	Potential Impact	Mitigation Measures	Objective
GSDA	Potential that the gas transmission pipeline will not comply with the GSDA.	• Santos will comply with the following GSDA policies: – Policy 1 - Information Collection for the Gladstone State Development Area; – Policy 2 - Environmental Management in the Gladstone State Development Area; – Policy 3 - Public Notification; and – Policy 4 - Ecologically Valuable Land.	GSDA Compliance
Operation			
Fire Management	Gas leak from gas transmission pipeline infrastructure.	• Design standards for potential earthquake loads. • Gas leak detection. • Quality assurance of installed equipment. • Inspection and condition monitoring program. • Secured area around aboveground gas transmission pipeline infrastructure. • Emergency response procedures.	Reduce the risk of gas leaks and potential for fires.
Weed Management	Weed seed spread along the gas transmission pipeline.	• Implement pest and weed management strategy as provided in the EMP. • During field investigations a weed survey will be undertaken to identify all declared and environmental weeds along the gas transmission pipeline route so that management strategies can be developed. • Wash-down facilities (both permanent and temporary) will be installed to assist in weed control measures	Reduce the risk of movement of weeds and pests.
Recreation	Potential impacts to recreational users of the areas the gas transmission pipeline crosses.	• Recreation and tourism will be impacted in the short term whilst the construction takes place. Following construction recreation and tourism will have no impacts.	Minimal disturbance to recreation and tourism.
Decommissioning and Rehabilitation			
Decommissioning	Impact of decommissioning the pipeline.	• An environmental management plan will be developed to ensure that there is low disturbance to existing land uses.	Low disturbance to existing land uses.

7.11.7 Summary of Findings

The predominant land uses along the gas transmission pipeline corridor includes cattle grazing, cropping and forestry. Other land uses include industry, conservation and recreation, residential use (homesteads) and mining.

The main potential impact of the gas transmission pipeline on agricultural land uses will occur during construction when agricultural and grazing activities will be temporarily restricted over the construction ROW. Land use can generally recommence following construction, with landholders retaining full access and use of the surface area above the gas transmission pipeline, with minor restrictions to preclude activities that will threaten gas transmission pipeline security or significantly impede access to the pipe (e.g. construction above the gas transmission pipeline or installation of subsurface infrastructure).

The area affected will generally be limited to within the 30 m wide ROW during construction. However, as gas transmission pipeline construction will advance at an average rate of approximately 1 km per day, the period that any one location is affected by the peak of construction activities will be limited to several weeks. Santos and/or the construction contractor will consult with all landholders prior to construction commencing to minimise any land use interferences.

No homesteads will be within the proposed ROW. In selecting the final gas transmission pipeline corridor, consideration will be given to maximising the distance of the gas transmission pipeline to the existing homesteads. Potential short term impacts that may occur as gas transmission pipeline construction passes within the vicinity of any homestead include increased noise, vibration and dust from machinery operation, and traffic within properties and along the local road network. Given the short term and low intensity nature of the gas transmission pipeline construction activities, the level of impact at any individual homestead is not expected to be significant.

Care will be taken to avoid disturbance to any pre-existing soil conservation measures (e.g. levee/contour banks) as far as possible. Where disturbance is required, the banks/levees will be reinstated as soon as practicable, in consultation with the relevant landholder.

The gas transmission pipeline trench will be left open for a minimum amount of time and should not pose a long-term hazard or barrier to stock. Temporary provisions such as fencing or access to water will be discussed with the landholder and any fences that are crossed will be repaired to at least the original condition. While the trench is open, ramps will be placed at strategic locations to ensure that any stock or native animals trapped in the trench can escape.

Additional tracks may be required in some areas to provide access to the construction ROW. The location and rehabilitation of the access tracks will be conducted in consultation with the landholder.

The gas transmission pipeline corridor passes through a number of conservation and forestry areas. While some of these areas cover the full width of the corridor, other areas may be able to be avoided. Following construction, the proposed ROW will be rehabilitated and revegetated to stabilise it against erosion.

The gas transmission pipeline is likely to pass through other petroleum tenements. A gas transmission pipeline license authorises the construction of a gas transmission pipeline through the area of other petroleum authorities. Santos will consult with relevant petroleum authorities to ensure disruption to activities is minimised to the extent practicable.

The land on which the gas transmission pipeline will be constructed is held under various land tenures including freehold, State leasehold, reserves, unallocated State land, roads, and State forest. Santos is currently negotiating agreements with private landholders for the grant of an easement over the gas transmission pipeline land. For land tenures over which easements cannot be registered (such as roads) Santos will endeavor to reach agreement with the landholder as to the terms on which the gas transmission pipeline may be constructed and operated on the land.

Section 7 Gas Transmission Pipeline Environmental Values and Management of Impacts

The gas transmission pipeline will cross or be located in the vicinity of a range of infrastructure. Minor disruption to road traffic and rail services may occur during construction where the pipe crosses infrastructure. Crossing of the major roads and railway lines will be carried out in consultation with the DMR, Queensland Rail (QR) and the relevant councils in such a way as to minimise disturbance to traffic and rail services.