

# 1. INTRODUCTION

Arrow CSG (Australia) Pty Ltd (Arrow Energy) proposes to develop a liquefied natural gas (LNG) plant on Curtis Island off the central Queensland coast, near Gladstone (Figure 1.1). The project, known as the Arrow LNG Plant, is a component of the larger Arrow LNG Project.

This environmental impact statement (EIS) has been prepared as the statutory basis for the environmental and social impact assessment of the project under Part 4 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and s. 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). This EIS will inform a decision on whether the project should proceed and, if so, under what conditions. Coffey Environments Australia Pty Ltd, a subsidiary of Coffey International Pty Ltd, was commissioned to assist Arrow Energy in the preparation of this EIS.

This chapter provides background information on Arrow Energy; an overview of the proposed project, the project objectives and detail; the relationship between the Arrow LNG Plant and other projects; information about the EIS objectives, structure and how to obtain a copy of the EIS; and the public consultation process.

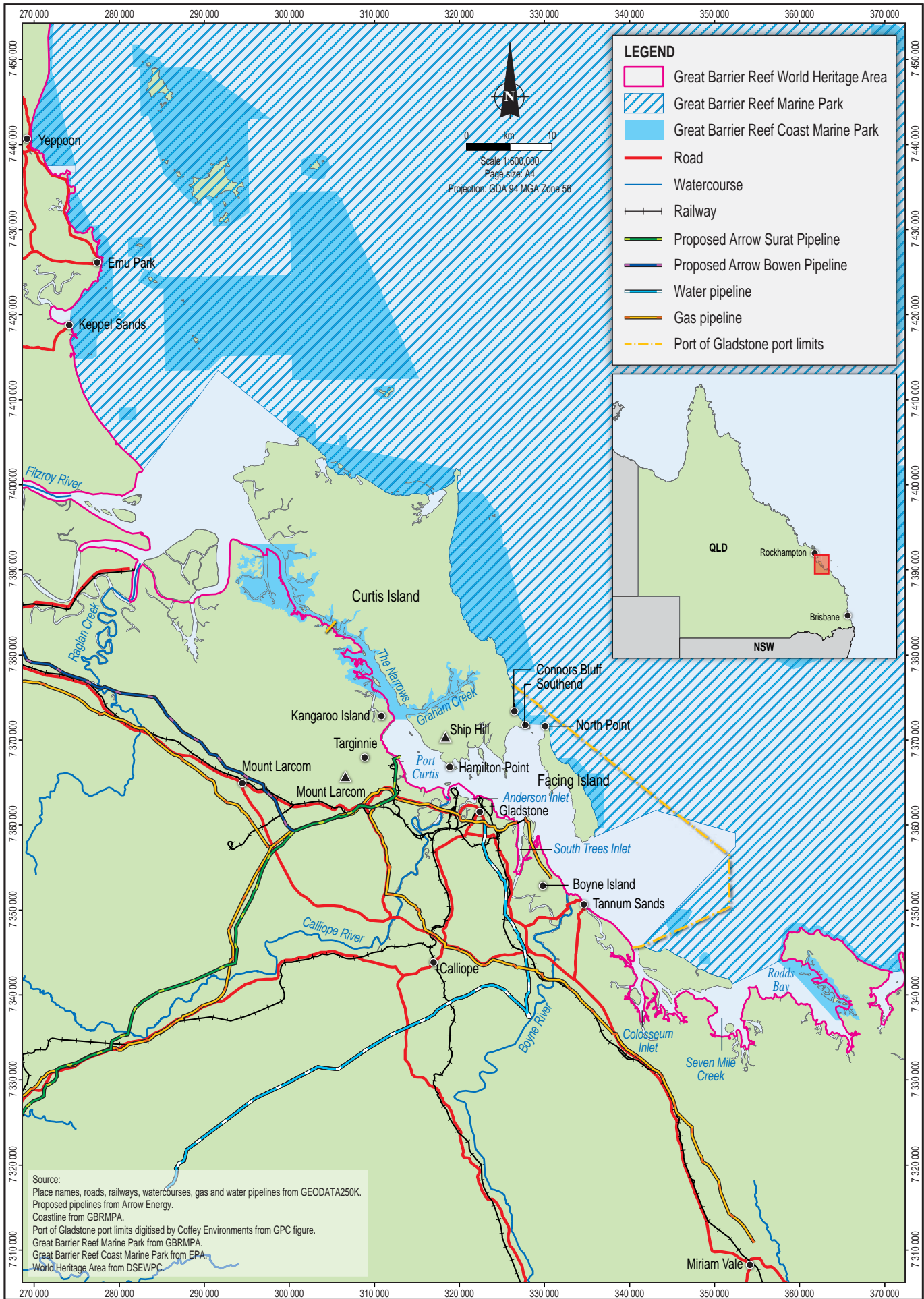
## 1.1 Project Proponent

Arrow Energy is the proponent for the Arrow LNG Plant. Arrow Energy is a Queensland-based company owned by Arrow Energy Holdings Pty Ltd (Arrow), a joint venture between subsidiaries of Royal Dutch Shell plc (Shell) and PetroChina Company Limited (Petrochina). The joint venture took ownership of Arrow Energy on 23 August 2010. Shell has had a presence in Australia since 1901. Current operations include refining, sale of petroleum products and retail businesses. Shell maintains equity in the exploration and development of large gas resources off the coasts of Western Australia and the Northern Territory. Shell is an internationally recognised leader in LNG production and has delivered some of the world's largest and most complex LNG projects in the past 40 years, including facilities in Qatar, Nigeria, Russia and southeast Asia. Through its subsidiary, Shell International Trading and Shipping Company Limited, Shell operates one of the largest LNG carrier fleets in the world.

PetroChina is a subsidiary of China's largest state-owned oil and gas producer and distributor, China National Petroleum Corporation, and is one of the world's largest oil companies. PetroChina was incorporated as a joint stock company in 1999, and brings extensive experience in exploration, refining and marketing of oil and natural gas in China and other countries.

Arrow is an integrated energy company with interests in coal seam gas field developments, pipeline infrastructure, electricity generation and the proposed Arrow LNG Plant. Arrow has interests in more than 65,000 km<sup>2</sup> of petroleum tenures, mostly within Queensland's Surat and Bowen basins. Elsewhere in Queensland, the company has interests in the Clarence-Moreton, Coastal Tertiary, Ipswich, Styx and Nagoorin Graben basins. Arrow also holds a petroleum exploration licence in the Clarence-Moreton Basin in NSW.

Arrow's Queensland petroleum tenures are located close to the state's three key energy markets; Townsville, Gladstone and Brisbane. The Moranbah Gas Project in the Bowen Basin and the Tipton West, Daandine, Kogan North and Stratheden projects in the Surat Basin near Dalby comprise Arrow's existing coal seam gas production operations. These existing operations currently account for approximately 20% of Queensland's overall gas production.



**LEGEND**

- Great Barrier Reef World Heritage Area
- Great Barrier Reef Marine Park
- Great Barrier Reef Coast Marine Park
- Road
- Watercourse
- Railway
- Proposed Arrow Surat Pipeline
- Proposed Arrow Bowen Pipeline
- Water pipeline
- Gas pipeline
- Port of Gladstone port limits



Source:  
 Place names, roads, railways, watercourses, gas and water pipelines from GEODATA250K.  
 Proposed pipelines from Arrow Energy.  
 Coastline from GBRMPA.  
 Port of Gladstone port limits digitised by Coffey Environments from GPC figure.  
 Great Barrier Reef Marine Park from GBRMPA.  
 Great Barrier Reef Coast Marine Park from EPA.  
 World Heritage Area from DSEWPC.

Arrow supplies gas to the Daandine, Braemar 1 and 2, Townsville and Swanbank E power stations, which participate in the National Electricity Market. With Arrow's ownership of Braemar 2, and the commercial arrangements in place for Daandine and Townsville power stations, Arrow has access to up to 600 MW of power generation capacity.

Arrow and its equity partner, AGL Energy, have access rights to the North Queensland Pipeline, which supplies gas to Townsville from the Moranbah Gas Project. They also hold the pipeline licence for the proposed Central Queensland Gas Pipeline between Moranbah and Gladstone.

### **1.1.1 Corporate Environmental Policy and Environmental Performance**

Arrow is committed to the sound management of health, safety and the environment throughout all its business activities. The company maintains a comprehensive and integrated health, safety and environmental management system (HSEMS) based on the principles of the international standard for environmental management systems (AS/NZS ISO 14001).

A copy of Arrow's environmental policy is included in Attachment 5, Arrow Policies. This policy governs the development and implementation of Arrow's HSEMS. Together, these documents are the key tools used by Arrow to engage in activities and to supply services in an environmentally sustainable manner.

Arrow reports its environmental performance in compliance reports as required under the *Environmental Protection Act 1994* (Qld), the National Pollutant Inventory National Environmental Protection Measure, and the *National Greenhouse and Energy Reporting Act 2007* (Cwlth).

Arrow Energy Holdings Pty Ltd (Arrow) and/or its subsidiaries have received two penalty infringement notices relating to non-compliances with Environmental Authority conditions issued under the Queensland *Environment Protection Act 1997*. The penalty infringement notices related to:

- Unauthorised clearing of a Category B Environmentally Sensitive Area.
- Unauthorised release of coal seam gas water to land.

Arrow is not aware of any other fines or prosecutions for breaches of environmental legislative requirements in the past five years.

Arrow is ultimately responsible for the ongoing environmental management of project activities. However, all Arrow employees and contractors are responsible for the environmental performance of their activities and must demonstrate compliance with Arrow procedures and policies and with any commitments made as part of the HSEMS.

### **1.1.2 Contact Details**

Arrow Energy's registered office address in Australia is:

'AM-60' Level 19  
42 Albert Street  
Brisbane QLD 4000  
AUSTRALIA

All project enquiries should be sent to:

Arrow LNG Plant  
Reply Paid 81  
Hamilton QLD 4007  
AUSTRALIA  
Ph: 1800 038 856

## 1.2 Project Description

This section provides a high level overview of the project, including its location, scope and staging.

### 1.2.1 Project Location

Arrow Energy (which was known as Shell CSG (Australia) Pty Ltd at the time of grant) has been granted an exclusive right by the Queensland Government to investigate a site on Curtis Island for the purpose of an LNG project. The site forms part of the 1,500 ha Curtis Island Industry Precinct of the Gladstone State Development Area in the southwestern part of Curtis Island, gazetted for industrial development by the Queensland Government in July 2008 (Figure 1.2). The Curtis Island Industry Precinct is bordered by a 4,500 ha Environmental Management Precinct established by the Queensland Government in July 2008 for conservation purposes. The Environmental Management Precinct abuts the Arrow LNG Plant site. Other proponents have also investigated LNG developments within the Curtis Island Industry Precinct, and two of these projects are presently under construction.

The Curtis Island Industry Precinct is located outside the Great Barrier Reef Marine Park and Great Barrier Reef Coast Marine Park, but inside the Great Barrier Reef World Heritage Area (see Figure 1.1). The World Heritage area extends to the mainland low water mark of the Queensland coast.

### 1.2.2 Project Scope

Key elements of the project include the LNG plant, a feed gas pipeline, dredging and disposal works, and ancillary facilities. An overview of each project component is provided below and described in detail in Chapter 6, Project Description: LNG Plant, Chapter 7, Project Description: Feed Gas Pipeline, and Chapter 8, Project Description: Dredging.

#### LNG Plant and Ancillary Facilities

The LNG plant will have a base case capacity of 16 Mtpa, with a total plant capacity of up to 18 Mtpa. The plant will consist of four LNG trains, each with a nominal capacity of 4 to 4.5 Mtpa. Major infrastructure and components required to develop the project will include LNG trains, LNG storage tanks, LNG loading lines, a seawater inlet for desalination and stormwater outlet pipelines, water and wastewater treatment facilities, a 110 m high flare stack, power generators, administrative buildings and workshops.

Power for the LNG plant and associated site utilities may be supplied from the electricity grid (mains power), gas turbine generators, or a combination of both. Four power supply options have been assessed during the EIS process.

Marine facilities will include a LNG jetty, materials offloading facility (MOF), personnel jetty and mainland launch site. The EIS has considered:

- A co-located MOF and personnel jetty, with three locations currently being considered. Boatshed Point and Hamilton Point South are new sites. The third option is the Santos Gladstone LNG (GLNG) Project's Hamilton Point MOF, over which Arrow is investigating a sharing arrangement with GLNG. Arrow Energy's current preference is for a standalone facility on Boatshed Point.
- Two mainland launch sites are the Western Basin Reclamation Area and a site at the mouth of the Calliope River.

Temporary workers accommodation facilities (TWAFFs) for up to 3,500 people will be constructed. The main accommodation facility will be located on Curtis Island. Two TWAFF locations are being considered on the mainland including a pastoral property near the township of Targinnie (TWAFF 8) and the former Gladstone Power Station ash pond (TWAFF 7). These sites are shown in Figure 1.2.

### **Feed Gas Pipeline**

An approximately 9 km long feed gas pipeline will supply gas to the LNG plant from its connection to the Arrow Surat Pipeline on the mainland, adjacent to Rio Tinto's Yarwun alumina refinery. The feed gas pipeline will be constructed in three sections:

- A short length of feed gas pipeline will run from the proposed Arrow Surat Pipeline to the tunnel launch shaft, which will be located on a mudflat south of Fishermans Landing, just south of Boat Creek. This section of pipeline will be constructed using conventional trenching methods within an approximately 40 m wide construction right of way.
- The next section of the feed gas pipeline will traverse Port Curtis harbour in a tunnel to be bored under the harbour from the launch shaft to a reception shaft on Hamilton Point. The tunnel under Port Curtis will have an excavated diameter of up to approximately 6 m, and will be constructed by a tunnel boring machine that will begin work at the mainland launch shaft. Tunnel spoil material will be processed through a de-sanding plant to remove the bentonite and water. The spoil will comprise mainly a finely graded fill material, which will be deposited in a spoil placement area established adjacent to the launch shaft.
- From the tunnel reception shaft on Hamilton Point, the remaining section of the feed gas pipeline will run underground to the LNG plant, parallel to LNG loading lines. This section will be constructed using conventional trenching methods within an approximately 40 m wide construction right of way.

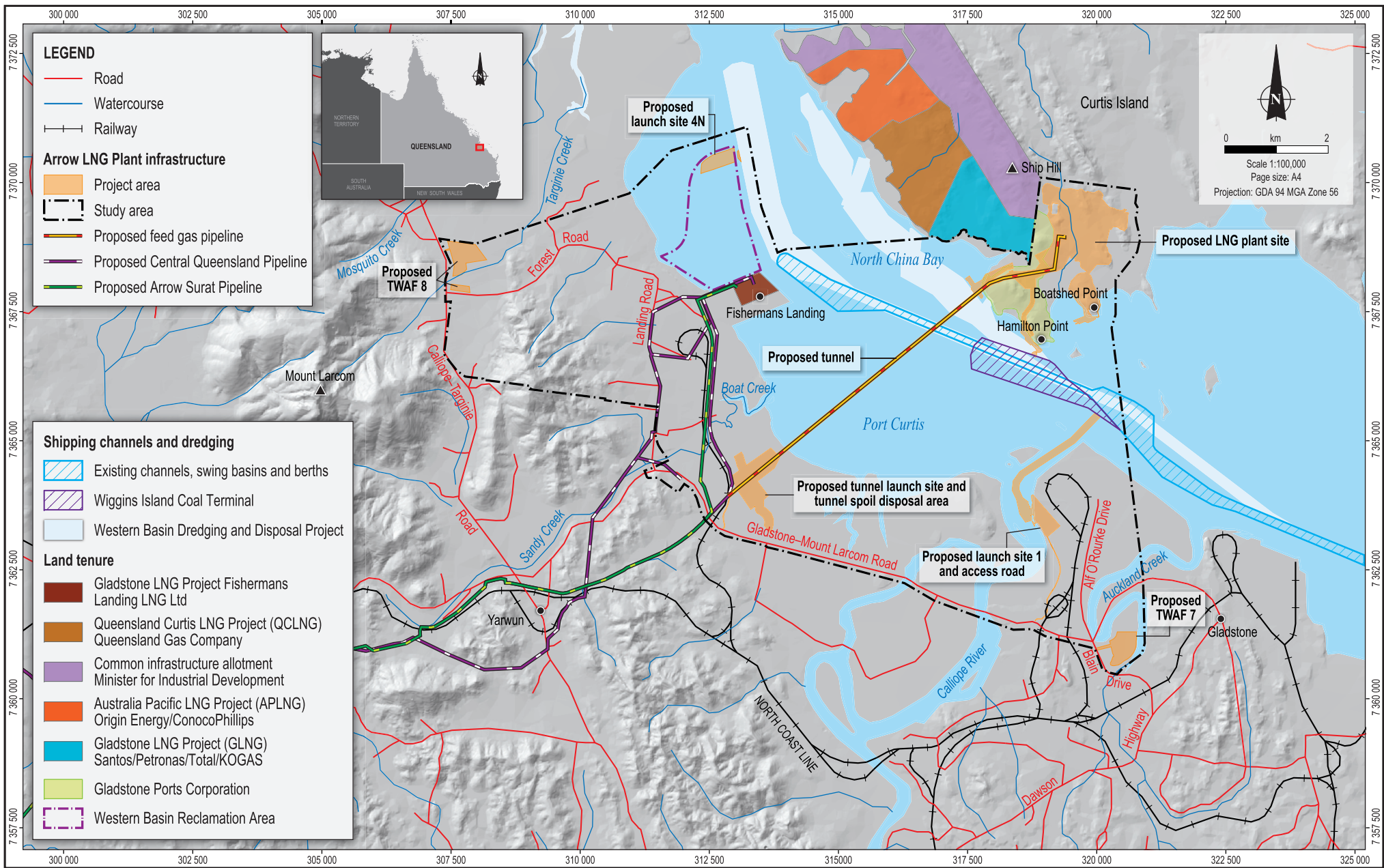
If an electrical power import option is chosen, a power connection provided by a third party may be installed within the tunnel. Other infrastructure, such as communication cables, water and wastewater pipelines, may also be accommodated within the tunnel.

### **Dredging**

Dredging required for LNG shipping access to Port Curtis has been assessed under the approved Gladstone Ports Corporation Western Basin Dredging and Disposal (WBDD) Project EIS. Additional dredging within the marine environment of Port Curtis may be required to accommodate the construction and operation of the marine facilities specific to the Arrow LNG Plant. This EIS assesses the additional dredging required for the construction and operation of the project that is not considered under the WBDD Project. Dredging to facilitate construction and operations will be required for the launch site on the mainland, in the Calliope River to allow access to launch site 1, at the MOF and passenger jetty on Curtis Island, and at the LNG jetty.

Maintenance dredging may be required in the Calliope River and, to a lesser extent, at the MOF and passenger jetty on Curtis Island. Dredge locations are shown on Figure 1.2.

The preferred option is to place dredged material in the Western Basin Reclamation Area. The impacts of the placement of material into the reclamation area and the ongoing management of the site are covered in the WBDD Project EIS (GHD, 2009a; 2010a).



Source:  
 Place names, roads, watercourses and railways from DME.  
 Proposed pipelines from Arrow Energy.  
 Proposed feed gas pipeline, project area, land tenure proponents and digital elevation model from Coffey Environments.  
 Western Basin Dredging Master Plan and Disposal Project from Gladstone Ports Corporation.

**coffey**  
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 17.11.2011

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 7033\_07\_F01.02\_GIS\_GL

**Arrow Energy**

**Arrow LNG Plant**

**arrowenergy**  
 go further

**Site locality**

Figure No:  
**1.2**

### **1.2.3 Project Staging**

The plant will be constructed in two stages as depicted in Figure 1.3. Stage 1 will involve the construction of LNG trains 1 and 2, two LNG storage tanks (each with a capacity of between 120,000 m<sup>3</sup> and 180,000 m<sup>3</sup>), Curtis Island construction camp and, if additional capacity is required, a mainland workforce accommodation camp. Associated marine infrastructure will also be required as part of stage 1. Stage 2 will involve the construction of LNG trains 3 and 4 and, potentially, a third LNG storage tank. Construction of stage 1 is scheduled to commence in 2014 with train 1 producing the first LNG cargo in 2017. Construction of stage 2 is anticipated to commence approximately five years after the completion of stage 1 but will be guided by market conditions and a final investment decision at that time.

### **1.2.4 Actions Already Undertaken Within the Project Area**

Arrow Energy has not commenced any direct physical works in relation to the construction and operation of the Arrow LNG Plant. Activities that Arrow Energy has been undertaking within and adjacent to the project area include:

- Investigatory works, such as flora and fauna surveys, geotechnical and environmental sampling, to support the development of this EIS, and the front end engineering design phase for the Arrow LNG Plant.
- Development of commercial agreements to facilitate the construction and operation of the Arrow LNG Plant.
- Securing tenure required, including land purchase, for the development of the Arrow LNG Plant.
- Lease of a commercial property to provide a shop front for Arrow Energy in Gladstone.

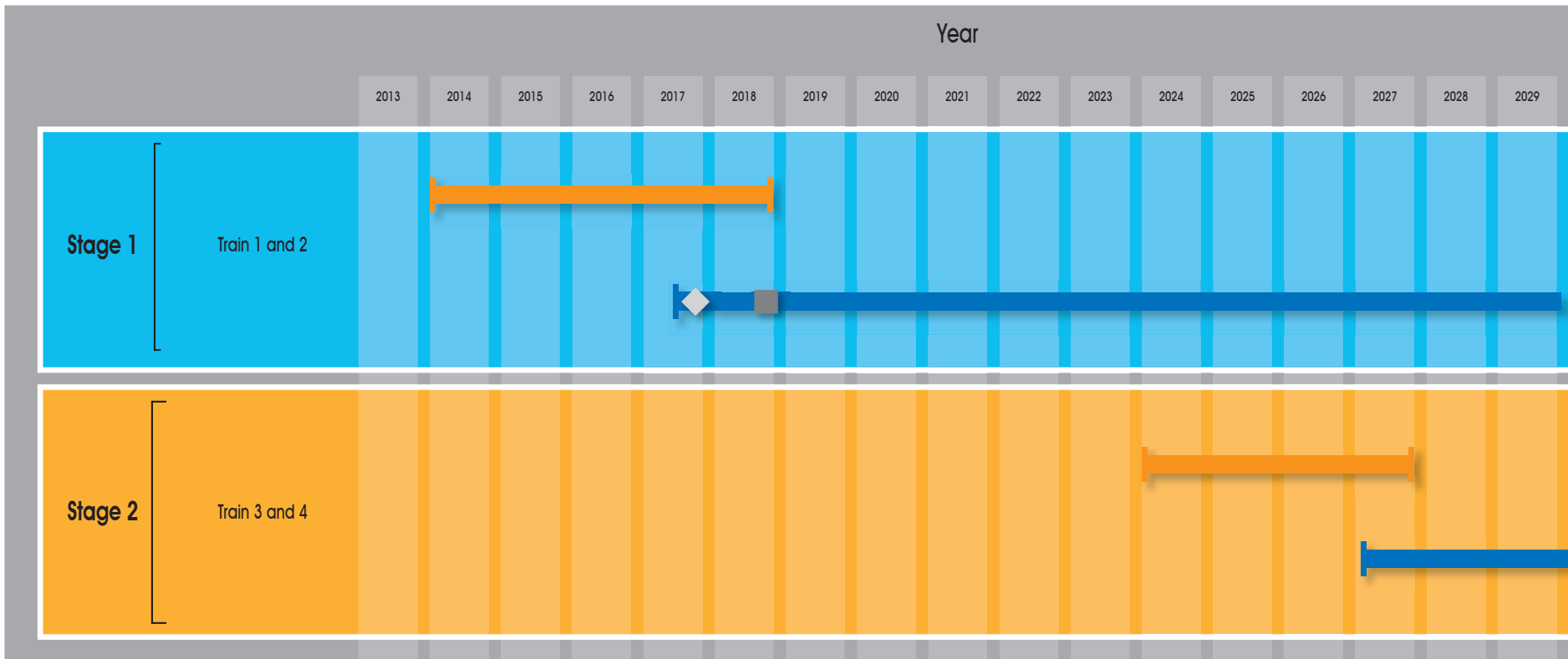
## **1.3 Project Rationale**





Development of the proposed Arrow LNG Plant forms part of Arrow's vision to increase value to its operations and the Queensland economy by commercialising coal seam gas reserves held in the company's petroleum tenures. The LNG market offers opportunities to capitalise these resources that do not presently exist within the Australian domestic market. The development of these resources will continue to safeguard Australia's domestic gas supply for many years. The project will use gas from Arrow's Surat and Bowen basin coal seam gas reserves to cater for LNG market demand (which is forecast to increase for the period 2011 to 2030).

Australian and Queensland government policies support the continued development of Australia's LNG industry and the country's potential as a global energy producer of less carbon intensive energy resources. Chapter 3, Project Rationale, provides a detailed review of the rationale for the project.

In carrying out the project, key objectives of focus for Arrow Energy include:

- Safety. Causing no harm or injury to people.
- Environment. Adhering to Arrow's Corporate Environment Policy and Health, Safety and Environmental Management System.
- Operational excellence. Implementing measures to reduce waste in work processes and improve business efficiency.



-  Construction
-  Operation
-  Train 1 - First LNG export cargo 2017
-  Train 2 - Starts production 2018



- Governance and reputation. Adhering to industry regulations with a desire to become the operator of choice.
- Key stakeholder management. Engaging landowners and local communities appropriately to earn and maintain their respect throughout project life.
- Maximising net present value. Maximising revenue and minimising development costs.

### **1.3.1 Social and Economic Benefits and Costs of the Project**

The construction and operation of the Arrow LNG Plant is expected to provide benefits at the regional, state and national levels including:

- Diversifying the regional, state and national economies and advancing Queensland and Australia as a global energy producer through substantial and sustained investment in the Gladstone and Queensland economies over the next 35 years or more. This will lead to increases in gross state product and gross domestic product.
- Generating employment opportunities directly through job creation at the facility, and indirectly through the provision of goods and services. The project will create approximately 3,500 jobs during stage 1 of project construction, a further 2,300 jobs during stage 2 of construction, and up to 600 long-term jobs during the project's operational phase.
- Developing Queensland's vast gas reserves for a growing export market, leading to the provision of increased revenue from taxation and royalty payments to state and Commonwealth governments.
- Diversifying Gladstone's industry base with the introduction of new and supporting technologically advanced businesses in the region.
- Contributing to the growth in Gladstone's economy through increased employment opportunities, provision of goods and services, and stimulation of other industry development. This will support the viability of some local small businesses.
- Providing training and employment opportunities for a long-term workforce with high levels of technical expertise.
- Potentially encouraging government and private investment in community services and infrastructure. The expansion of services will be of social benefit to local and regional communities. No additional infrastructure is required to support the project.

Negative social and economic impacts may occur that are associated with the project and the cumulative impact of multiple new projects in the region. These impacts could include:

- A marginal increase may occur in the wholesale gas price, together with a small reduction in domestic gas availability in the Queensland wholesale market.
- Increases in housing costs (due to demand generated by previous projects) could be sustained during the initial operation period, with housing less available and less affordable for local residents.
- Potential higher wages within the LNG industry may result in competition for, and a drain on, local workers. Businesses competing for skilled and unskilled workers and supplies could face a rise in wage and operating costs. There may be a high staff turnover at some local businesses during project construction.

- Increased demand on local and regional infrastructure and services may occur, including the airport, childcare and educational facilities, health care facilities, waste facilities, policing and emergency services, and water and electricity utilities.
- Reduced availability of temporary accommodation (hotels and motels) may occur, particularly during the initial construction phase (if temporary construction camps are not available). This may impact on the tourism industry as well as other users of temporary accommodation.

Detailed social and economic assessments have been completed for the project and are provided in Chapter 26, Social, and Chapter 27, Economics.

## **1.4 Relationship to Other Projects**

The relationship of the Arrow LNG Plant to the Arrow LNG Project and Gladstone Ports Corporation projects is discussed below.

### **1.4.1 Arrow LNG Project**

Shell CSG (Australia) Pty Ltd (Shell Australia) was the original proponent of the Arrow LNG Plant project, first known as the Shell Australia LNG Project. Following the successful acquisition of Arrow Energy Pty Ltd (Arrow) by a joint venture between subsidiaries of Royal Dutch Shell and PetroChina on 23 August 2010, the former Shell Australia LNG Project was included as part of the Arrow suite of projects. It is now known as the Arrow LNG Plant and a part of the Arrow LNG Project.

Further to this, on 18 August 2010, Shell CSG (Australia) Pty Ltd changed its name to Arrow CSG (Australia) Pty Ltd.

Prior to acquisition, Arrow was undertaking separate approvals processes to develop its Surat Basin gas resources and to construct a pipeline to supply gas to the proposed Liquefied Natural Gas Limited's Gladstone LNG Project at Fishermans Landing and the then named Shell Australia LNG Project on Curtis Island (now the Arrow LNG Plant). Arrow was also investigating the development of its Bowen Basin gas resources and pipeline options for delivering gas from the Bowen Basin to Gladstone.

Following the acquisition, Arrow and Shell Australia projects were brought together as components of the larger Arrow LNG Project. Separate approval is being sought for each component as described below:

- Surat Gas Project. The proposed upstream field development is located approximately 160 km west of Brisbane in Queensland's Surat Basin. The 8,600 km<sup>2</sup> project development area extends from the township of Wandoan in the north towards Goondiwindi in the south, in an arc through Dalby. The project is presently undergoing an EIS process in accordance with the Environmental Protection Act. The project is a controlled action under the EPBC Act.
- Arrow Surat Pipeline (formerly the Surat to Gladstone Pipeline Project). The proposed 470 km long, high pressure gas transmission pipeline will extend from the Kogan area of the Surat Basin to Fishermans Landing at Gladstone. An EIS process for the project was completed on 15 January 2010 under the Environmental Protection Act, and a petroleum pipeline licence (PPL 144) was granted in February 2010.
- Surat Header Pipeline. The proposed 110 km long, high-pressure gas transmission pipeline will connect the Arrow Surat Pipeline to the gas production facilities that will be located in the

southern region of the Surat Gas Project development area. The project is intended to be assessed as a Level 2 Environmental Authority under the Environmental Protection Act.

- Bowen Gas Project. The proposed upstream gas field development in the Bowen Basin is located between Collinsville in the north and to the south of Middlemount, approximately 475 km north of Brisbane and 75 km from Mackay. The proposed project includes the existing Moranbah Gas Project. The EIS process for the project has not yet commenced.
- Arrow Bowen Pipeline. The proposed 600 km long, high-pressure gas transmission pipeline consists of a main pipeline and several lateral pipelines to convey coal seam gas from Arrow Energy's gas fields in the Bowen Basin to Gladstone for eventual export as LNG. The project is undergoing an EIS process in accordance with Chapter 3 of the Environmental Protection Act.

Figure 1.4 shows the relationship between these different components of the Arrow LNG Project.

### **1.4.2 Gladstone Ports Corporation Works**

The Gladstone Ports Corporation is undertaking marine works to facilitate the development of LNG export facilities on Curtis Island. Of relevance to the Arrow LNG Plant are:

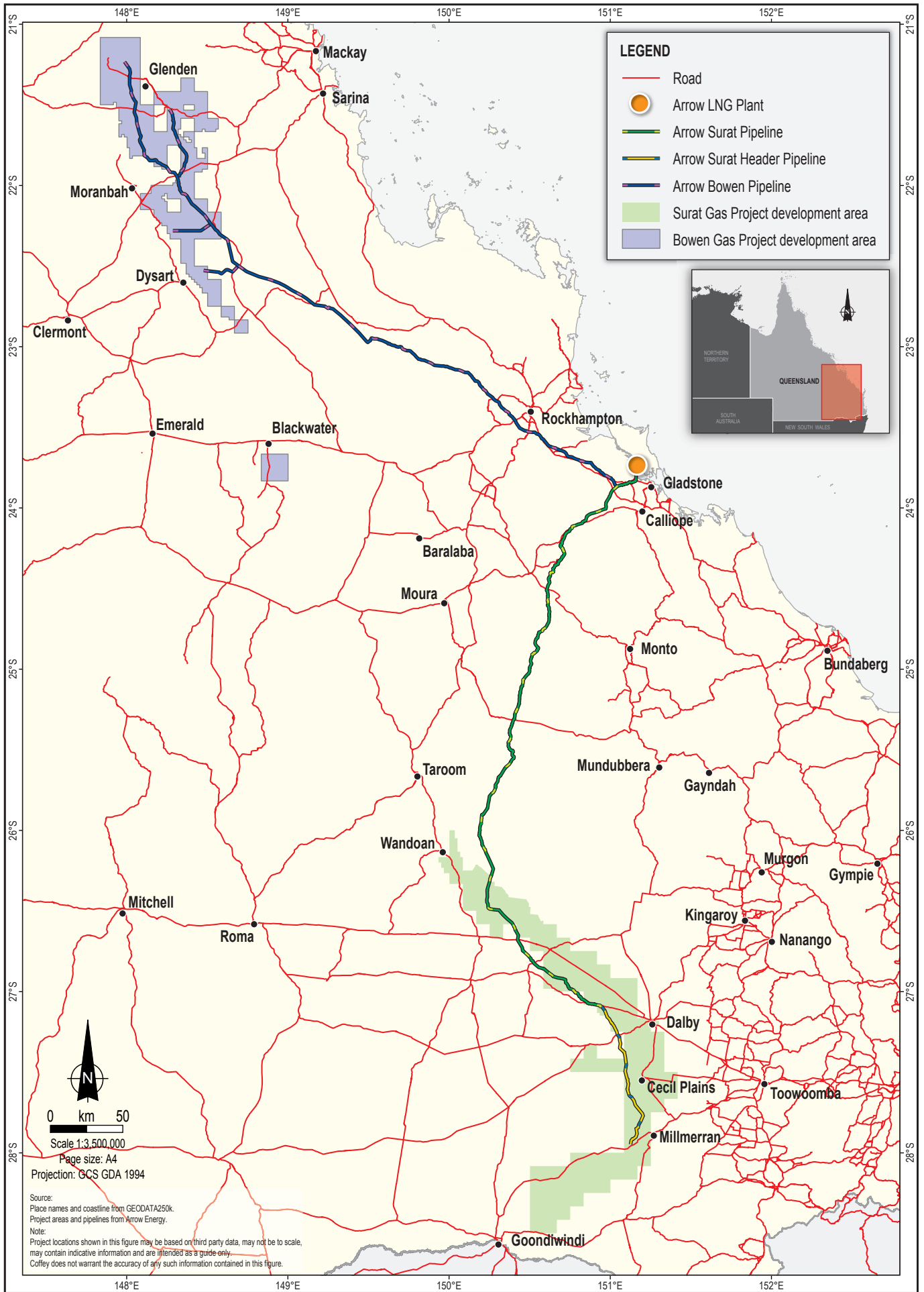
- Western Basin Reclamation Area: The approved project expands the Fishermans Landing port facility through the reclamation of about 150 ha of land adjacent to the existing facility. This will provide land for construction of six new wharves and an area for the development of transport, storage, loading and unloading facilities. A site at the northern end of the Western Basin Reclamation Area is one of Arrow Energy's options for a mainland launch site, assuming the reclamation area is constructed prior to Arrow LNG Plant early works.
- WBDD Project. This is an approved project to undertake dredging associated with the deepening and widening of existing channels and swing basins, and the creation of new channels, swing basins and berth pockets in the Western Basin. The works will provide access to Curtis Island for LNG carriers (GPC, 2011a). Proposed areas for dredging include the Clinton Bypass Channel/Port Targinie Channel, the Passage Island Channel, and MOF locations and berth pockets for other project proponents (GPC, 2011b). Construction dredging for the Arrow LNG Plant MOF, LNG jetty and mainland launch site was not included in the WBDD Project, and is included in the Arrow LNG Plant EIS.

### **1.4.3 Other LNG Projects**

The Arrow LNG Plant is one of four LNG facilities proposed for the Curtis Island Industry Precinct. Three other LNG projects have been approved and are under construction on the island. Details of the projects are provided below and their locations are shown in Figure 1.2.

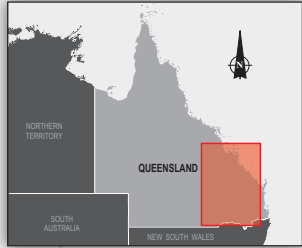
Origin Energy and ConocoPhillips have commenced construction of the first stage of an 18 Mtpa LNG plant on the northern allotment of the Curtis Island Industry Precinct, as part of its Australia Pacific LNG (APLNG) Project. The first stage involves construction of two LNG trains with a combined capacity of 9 Mtpa.


Queensland Gas Company (QGC), a BG Group business, has commenced construction of an 8.5 Mtpa LNG plant on Curtis Island, as part of its Queensland Curtis LNG (QCLNG) Project. The two train initial stage is being constructed on the allotment adjacent to the APLNG Project site.



**LEGEND**

- Road
- Arrow LNG Plant
- Arrow Surat Pipeline
- Arrow Surat Header Pipeline
- Arrow Bowen Pipeline
- Surat Gas Project development area
- Bowen Gas Project development area



  
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 Scale 1:3,500,000  
 Page size: A4  
 Projection: GCS GDA 1994

Source:  
 Place names and coastline from GEODATA250k.  
 Project areas and pipelines from Arrow Energy.  
 Note:  
 Project locations shown in this figure may be based on third party data, may not be to scale,  
 may contain indicative information and are intended as a guide only.  
 Coffey does not warrant the accuracy of any such information contained in this figure.

Santos and its partners Petronas, Total and KOGAS have commenced construction of the LNG plant component of the Gladstone LNG (GLNG) Project on the allotment located between the QCLNG Project and the Arrow LNG Plant. The two initial LNG trains of the proposed 10 Mtpa development will have a capacity of 7.8 Mtpa.

## **1.5 Environmental Impact Statement**

The SDPWO Act requires that proponents of 'significant projects' prepare an EIS. Proponents apply for a 'significant project' declaration by submitting an application to the Coordinator-General of the State of Queensland (Coordinator-General). Arrow CSG (Australia) Pty Ltd, the original proponent, lodged the application for the project on 11 May 2009 (at that time known as Shell CSG (Australia) Pty Ltd). The project was gazetted as a 'significant project' on 12 June 2009. The Draft Terms of Reference for the EIS were advertised for public comment from 3 October 2009 to 2 November 2009. The Coordinator-General issued the Final Terms of Reference on 22 January 2010. Arrow Energy has prepared the EIS to address the Final Terms of Reference (Attachment 2, Terms of Reference) in accordance with the SDPWO Act EIS process.

Arrow CSG (Australia) Pty Ltd (previously known as Shell CSG (Australia) Pty Ltd) has submitted two EPBC Act referrals to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (former Department of Environment, Water, Heritage and the Arts).

The project was declared a 'controlled action' due to its potential to impact on matters of national environmental significance (Attachment 4, Matters of National Environmental Significance).

The proposed LNG plant will require a Major Hazard Facility and petroleum facility licence under the *Petroleum and Gas (Production and Safety) Act 2004* (Qld). A pipeline licence will also be required under the act for the gas pipeline from the Arrow Surat Pipeline to the LNG plant site. Environmental authorities issued under the Environmental Protection Act will attach to these licences.

Approvals required for the project are detailed in Chapter 2, Project Approvals. The process followed for this EIS is discussed below.

### **1.5.1 Submission of the EIS**

The EIS, once prepared, is submitted to the Coordinator-General and published for public comment. Following the receipt of submissions, the proponent must summarise and address the comments presented in each submission, and provide an EIS supplementary report to the Coordinator-General. The Coordinator-General prepares an EIS evaluation report, which evaluates the environmental effects and states any conditions that should be attached to licences, environmental authorities or other approvals required for the project to proceed.

### **1.5.2 Objective of the EIS**

The objective of the EIS is to ensure that Arrow Energy has fully examined and addressed all environmental, social and economic impacts of the project, both direct and indirect. The EIS is a self-contained document that provides:

- For interested persons and organisations; a basis of understanding of the proposal, environmental and social values, impacts that may occur, and measures to be taken to mitigate all adverse impacts.
- For government agencies and decision makers; a framework for assessing the impacts of the project and associated development in view of legislative and policy provisions.

- For Arrow Energy; a mechanism to establish environmental protection objectives, control measures and strategies to be undertaken throughout construction, operation and decommissioning of the project (see Attachment 6, Environmental Management Plan).

### **1.5.3 EIS Method**

The EIS addresses all environmental, social and economic aspects of the project.

The EIS presents the conceptual project design and timeframes for the Arrow LNG Plant development, and provides a detailed description of how project activities will be undertaken during construction, operation and decommissioning phases.

The technical studies, which inform this EIS, have used desktop studies, consultation activities, field investigations and modelling to:

- Identify relevant policies, legislation and standards applicable to the project.
- Identify the environmental and social values important to the project area, including their significance, potential exposure to threatening processes and capacity to adjust to change.
- Review the type, timing, extent and duration of project activities to determine potential project impacts on environmental and social values.
- Recommend avoidance, mitigation and management measures to minimise potential impacts or capitalise on benefits that may arise from the project.
- Identify residual impacts and, where applicable, potential cumulative effects.

Detailed knowledge of the environmental and social values, and the processes that threaten those values, will inform decisions about whether project activities are likely to have a significant adverse impact.

The methodology set out above focuses the EIS process on the most significant and important environmental and social values and potential impacts relevant to the project area. The method adopted for this EIS is elaborated on in Chapter 9, Impact Assessment Method.

### **1.5.4 Structure of the EIS**

The EIS is contained in nine volumes. These volumes (and appendices) include:

- The main report (this report), intended to be understood without reference to the technical study reports on which it is based.
- The Environmental Management Plan (EMP) which provides operational detail of how environmental management measures identified in the EIS will be implemented.
- The Social Impact Management Plan (SIMP) which details how social impact management recommendations will be implemented.
- A series of technical studies in volumes four to nine. The main findings of each of these studies are presented in the main report.

The content of each volume is set out in Table 1.1.

Arrow Energy has also prepared an EIS Executive Summary, which provides a succinct overview of the project, its impacts, and the proposed environmental and social management measures to address these impacts.

The EIS does not disclose information that is confidential for cultural or commercial reasons. Arrow Energy may provide such information in confidence to relevant government agencies, if required.

**Table 1.1 Arrow LNG Plant EIS documentation**

<b>EIS Section</b>	<b>Title</b>	<b>Author</b>
<b>Executive Summary</b>		
Stand alone	Arrow LNG Plant EIS Executive Summary	Coffey Environments Australia Pty Ltd (Coffey Environments) and Arrow Energy
<b>Volume One (Main Report)</b>		
Chapter 1 to 19	Arrow LNG Plant EIS Main Report	Coffey Environments
<b>Volume Two (Main Report)</b>		
Chapter 19 to 37	Arrow LNG Plant EIS Main Report	Coffey Environments
<b>Volume Three (Attachments)</b>		
Attachment 1	Relevant Legislation, Policies and Approvals	Coffey Environments
Attachment 2	Terms of Reference	Coordinator-General
Attachment 3	Terms of Reference Cross Reference	Coffey Environments
Attachment 4	Matters of National Environmental Significance	Coffey Environments
Attachment 5	Arrow Policies	Arrow Energy
Attachment 6	Environmental Management Plan	Coffey Environments
Attachment 7	Social Impact Management Plan	Sinclair Knight Merz Pty Ltd
Attachment 8	Commitments	Coffey Environments
<b>Volume Four (Appendices)</b>		
Appendix 1	Climate and Climate Change Adaptation	PAE Holmes
Appendix 2	Geology, Landform and Soils Impact Assessment	Coffey Geotechnics Pty Ltd
Appendix 3	Stage 1 Preliminary Site Investigation (Contaminated Land)	Coffey Environments Pty Ltd
Appendix 4	Acid Sulfate Soil Impact Assessment	Coffey Geotechnics Pty Ltd
Appendix 5	Surface Water Impact Assessment	Alluvium Consulting Pty Ltd
Appendix 6	Stormwater Quality Impact Assessment	Alluvium Consulting Pty Ltd
<b>Volume Five (Appendices)</b>		
Appendix 7	Groundwater Impact Assessment	Coffey Geotechnics Pty Ltd
Appendix 8	Coastal Processes, Marine Water Quality, Hydrodynamics and Legislation Assessment	BMT WMB Pty Ltd
Appendix 9	Terrestrial Ecology Impact Assessment	Ecosure Pty Ltd
Appendix 10	Pest Management Plan	Ecosure Pty Ltd

**Table 1.1 Arrow LNG Plant EIS documentation (cont'd)**

<b>EIS Section</b>	<b>Title</b>	<b>Author</b>
<b>Volume Six (Appendices)</b>		
Appendix 11	Freshwater Ecology and Water Quality Impact Assessment	Aquateco Consulting Pty Ltd
Appendix 12	Marine and Estuarine Ecology Impact Assessment	Coffey Environments
Appendix 13	Greenhouse Gas Impact Assessment	PAEHolmes
Appendix 14	Air Quality Impact Assessment	Katestone Environmental Pty Ltd
Appendix 15	Plume Rise Assessment	Katestone Environmental Pty Ltd
<b>Volume Seven (Appendices)</b>		
Appendix 16	Noise and Vibration Impact Assessment	Sonus Pty Ltd
Appendix 17	Landscape and Visual Impact Assessment	AECOM Australia Pty Ltd
Appendix 18	Indigenous Cultural Heritage Impact Assessment	Central Queensland Cultural Heritage Management Pty Ltd
Appendix 19	Non-Indigenous Cultural Heritage Impact Assessment	Heritage Consulting Australia Pty Ltd
Appendix 20	Social Impact Assessment	Sinclair Knight Merz Pty Ltd
<b>Volume Eight (Appendices)</b>		
Appendix 21	Economic Impact Assessment	AEC Group Limited
Appendix 22	Implications for the Domestic Gas Market	ACIL Tasman Pty Ltd
Appendix 23	Traffic and Transport Impact Assessment	GTA Consultants
Appendix 24	Confidential Information	
Appendix 25	Preliminary Safety Management Study	Planager Pty Ltd
Appendix 26	Bushfire Impact Assessment	Eco Logical Australia Pty Ltd
<b>Volume Nine (Appendices)</b>		
Appendix 27	Health Impact Assessment	Arup Pty Ltd
Appendix 28	Land Use and Planning Impact Assessment	Coffey Environments
Appendix 29	Waste Impact Assessment	Coffey Environments
Appendix 30	Consultation Report	JTA Australia Pty Ltd

### 1.5.5 Viewing the EIS

The EIS can be viewed online at the Arrow Energy website, [www.arrowenergy.com.au](http://www.arrowenergy.com.au). Hard copies of the EIS will be available for viewing at:

- Gladstone Regional Library: 39 Goonoon Street, Gladstone, QLD 4680.
- Calliope Library: Don Cameron Drive, Calliope, QLD 4680.
- Boyne Island Library: Cnr Wyndham and Hampton Drives, Boyne Island, QLD 4680.
- Miriam Vale Library: 34 Roe Street, Miriam Vale, QLD 4677.
- Mount Larcom Library: Raglan Street, Mount Larcom, QLD 4695.
- Agnes Water Library: 3 Captain Cook Drive, Agnes Water, QLD 4677.
- The Gladstone Regional Council: 101 Goonoon Street, Gladstone, QLD 4680.
- State Library of Queensland: Reception Floor 1, Stanley Place, South Brisbane, QLD 4101.
- National Library: Parkes Place, Canberra, ACT 2600.



## 1.5.6 Obtaining Copies of the EIS

EIS documentation can be obtained:

- Via download from Arrow Energy's website at [www.arrowenergy.com.au](http://www.arrowenergy.com.au).
- On compact disc by contacting 1800 038 856 or emailing [arrowlng@arrowenergy.com.au](mailto:arrowlng@arrowenergy.com.au).

Hard copies can be ordered by phone or email at a small cost (see Arrow Energy's website for details).

## 1.5.7 EIS Schedule

Milestone dates for the EIS schedule are provided in Table 1.2. This schedule shows that the environmental approvals process commenced in quarter 2, 2009, with a decision on the project targeted for quarter 3, 2012.

**Table 1.2 Target EIS milestone dates**

Milestone	Milestone Date
Initial Advice Statement lodged with the Coordinator-General	11 May 2009
Gazettal of 'significant project' declaration	12 June 2009
EPBC Act referral lodged with the Australian Government	21 July 2009
EPBC Act referral decision	21 August 2009
Draft Terms of Reference advertised for public comment	3 October 2009 to 2 November 2009
Final Terms of Reference issued	22 January 2010
EIS public notification and submission phase	Targeting first quarter, 2012
EIS Supplementary Report	Targeting second quarter, 2012
Coordinator-General EIS Evaluation Report	Targeting third quarter, 2012
Australian Government EPBC Act Assessment Report	Targeting fourth quarter, 2012

## 1.5.8 Submissions

The public may make submissions on the EIS to the Coordinator-General. The Coordinator-General must accept all properly made submissions and may accept written submissions even if they are not properly made. A properly made submission is one that:

- Is written and signed by, or for, each person (signatory) who made the submission.
- States the name and address for each signatory.
- Is made to the Coordinator-General.
- Is received on or before the last day of the submission period.

Please note that it is a statutory requirement that all submissions will be forwarded to the proponent for consideration and provision of a response to the Coordinator-General.

Submissions should be addressed to:

Attention: Project Manager, Arrow LNG Project  
By post: PO Box 15517, City East, QLD, 4002  
By facsimile: 07 3225 8282  
By email: [arrowlng@deedi.qld.gov.au](mailto:arrowlng@deedi.qld.gov.au)

For further information about the EIS process for the Arrow LNG Plant, contact the EIS Coordinator for the Coordinator-General on 07 3405 6205.

## **1.6 Public Consultation**

The final terms of reference for the project require Arrow Energy to undertake an appropriate consultation process to identify and address public and stakeholder concerns about potential project impacts.

Arrow Energy has prepared and implemented a detailed consultation program aimed at informing stakeholders about the project and obtaining their feedback. The program has sought to involve affected landholders, nearby residents, business owners, local and state government departments, Arrow Energy staff, and other interested parties. Further details on the program are contained in Chapter 4, Consultation and Communication.