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INTRODUCTION

The QCLNG Project has evolved since the draft EIS was submitted to the Coordinator General of Queensland and to the Commonwealth Minister for the Environment on 30 August 2009. This supplementary EIS (sEIS) has been prepared in response to comments and feedback on the draft report. The document describes:

- how the project has been further developed as design has progressed
- changes as a result of submissions received during project consultation
- expected social and environmental impacts and mitigation.

QGC received 40 submissions on the draft EIS. Among the issues covered, five are highlighted below as being of most common concern. These are:

- consultation and community engagement
- some uncertainty about LNG safety, this being a new industry in Queensland
- uncertainty as to how the Gas Fields and pipelines would be developed
- potential noise impacts from Gas Field infrastructure that could affect residential amenity
- the use of associated water from coal seam gas extraction and how salt extracted from the treatment of this water will be managed.

QGC understands and appreciates these concerns. QGC is grateful to those people in local communities and community organisations, local governments and State and Commonwealth Government agencies who raised issues about the proposed construction and operation of the QCLNG Project. QGC has used these submissions to guide further internal study with the aim of further enhancing the detailed design of the project.

The following sections of this Executive Summary briefly describe how QGC has addressed these issues.

Working with communities

QGC has worked with local communities to ensure that all members of the community have had an opportunity to be consulted for this project. Consultation meetings have occurred across the Surat Basin and in Gladstone and Brisbane and have involved individual meetings between key members of the QCLNG impact assessment team and community members. Many meetings have also been held in Canberra with key Ministers and members of Parliament, in particular with those Queensland Members of Parliament who represent electorates that may be affected.

In total, QGC has consulted more than 1,000 individuals, groups, and organisations since the project was announced.

QGC sees community consultation as a 'whole of life' project commitment and standard business practice. In keeping with QGC's business principles, QGC will continue to consult and engage the community:

- as the project evolves
- as required by Government agencies as the project progresses through the approval processes
- as the project is built, operated and finally decommissioned
- as required by project commitments and mitigation strategies outlined in this sEIS.

Volume 12 of this sEIS outlines QGC's longer-term consultation strategy for the QCLNG Project. QGC aims to develop the QCLNG Project in partnership with communities and with the participation of community members, residents and landowners to ensure that the benefits described in this sEIS are realised and the impacts mitigated as far as practical. To achieve this, QGC will develop, implement and audit the outcomes of these key QGC community commitments. They include:

- QGC's Codes of Conduct for employees, contractors and sub-contractors and company activities
- QGC's Social Impact Mitigation Plan which is designed to protect and enhance the social and environmental amenity and values of rural communities and residents of Gladstone and Curtis Island
- QGC's Social Investment Strategy which will support improvement of housing and social infrastructure in the Western Downs and Gladstone communities
- QGC's Local Content Strategy which aims to increase the capacity of local businesses to access QGC opportunities
- QGC's Environmental Management Plans which are designed to avoid or reduce to a practicable minimum any environmental impact caused by the construction and operation of the QCLNG Project.

These codes of conduct, strategies and management plans provide the basis for QGC to work with local communities to ensure that tangible project benefits are realised for local communities, Queenslanders and Australians.

Safety and security – A project priority

Today, it is standard practice to consider the potential for hazards and incidents and their management before building and operating facilities such as LNG plants.

QGC, BG Group, industry and governments generally are committed to ensuring that industrial activities do not increase risk to people who live near infrastructure.

Although well established as an industry globally over more than 40 years and in Australia since 1989, LNG is a new industry to Queensland. QGC understands therefore the desire of the community to understand the potential risks associated with the product and how it is transported and the measures that QGC is taking to ensure the community safety.

As described in the draft EIS, QGC has developed risk assessments for the components of the QCLNG Project. In relation to the LNG facility and loading of LNG, QGC, with BG Group, has ensured that the highest level of technical excellence is applied to the design and operations of the QCLNG Project and the export of LNG to market. QGC has engaged independent third party experts to undertake risk assessments for the LNG Facility and the loading of LNG on to its carriers. Quantitative Risk Assessments have been submitted to the Queensland Hazardous Industries Chemical Branch (HICB) for assessment.

BG Group shipping will comply with applicable international standards including the Society of International Gas Tanker and Terminal Operators (SIGTTO), and the Oil Companies International Maritime Forum (OCIMF). These standards provide guidance for the safe loading and transport of LNG across the world. New shipping channels in Gladstone are being designed according to recommendations of the Permanent Association of Navigation Congresses (PANC) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and have been tested by extensive marine simulation.

QGC has also developed a guide for communities to explain quantitative risk assessment, the technical procedure for identifying and assessing risks and hazards. This document, "Quantitative Risk Assessment Explained", details how risks and hazards are assessed and managed and what are considered internationally to be acceptable risk levels. QGC developed this guide as a direct result of community submissions. In addition, for the LNG shipping operations, a document detailing 'Anchorage and Harbour Transit Safety Zones for Gladstone Harbour has also been developed. Both of these documents are available on the QGC QCLNG webpage or from our Offices

Providing certainty to communities

Some community submissions noted that the draft EIS did not explain exactly the location of Gas Field and pipeline infrastructure.

The absence of this detail in the draft EIS is common to all major coal seam gas projects of this nature as the Gas Field development can involve many square kilometres and a development schedule over many decades. As such, it is not possible – and, indeed, not prudent – to accurately predict the location of all project infrastructure at the beginning of project development.

However, in acknowledgement of community concerns, QGC has prepared a "QCLNG Gas Fields and Pipeline Construction Plan 2010 – 2014". This plan outlines how the Gas Field will be developed in the first five years of the

project and is presented in *Volume 3, Chapter 19*. This plan outlines how and where infrastructure is likely to be located on development blocks. It also provides a matrix of engineering, social and environmental constraints which QGC has developed voluntarily and considers when determining locations for Gas Field infrastructure.

It should be noted that it is QGC's strong preference to negotiate agreements with landholders before placing infrastructure on private land.

Presentation of the QCLNG Gas Fields and Pipeline Construction Plan 2010 – 2014 and the constraints matrix provides a clearer indication to residents and others as to where infrastructure will or can be located. As the project is further refined, QGC will provide further certainty to landholders and residents about infrastructure location.

Managing environmental amenity

The development of the Gas Field will necessitate the placement of many noise sources in a rural setting. Several submissions raised as a concern the impact on environmental amenity caused by an increase in noise as a result of Gas Field development.

Since the publication of the draft EIS, development of the engineering design has resulted in an increase in the number of noise sources that may require mitigation. In response to the submissions, QGC has conducted, in parallel to the basic engineering, investigations into potential noise mitigation measures and their usefulness. These investigations have influenced the project design in terms of choice of development approach. For example, the current design of plant differs from QGCs existing operational facilities in that it now employs electric motors for compressors, and uses acoustic enclosures around compressors and engines. Similarly, a concept for extensive use of compressors at well locations has been rejected in favour of a less noise-intrusive approach.

As a further product of this work, QGC has developed criteria against which noise impacts can be assessed. It is QGC's experience that if these criteria are met, community environmental amenity should not be reduced on the whole. Nevertheless, QGC is mindful that some people are more sensitive to noise than others. To ensure that community members can have direct access to QGC to voice concerns and enable these to be investigated and resolved, QGC has also developed a complaint and incident procedure for the QCLNG Project.

As a result of submissions, continuing discussions with key Government agencies, and further modeling and engineering, QGC has presented a holistic and achievable approach to noise management of the Gas Field in *Volume 3, Chapter 13*. This approach has been designed to protect community environmental amenity.

Associated water – working towards beneficial outcomes

Although QGC is not seeking approval through the QCLNG EIS for beneficial use or disposal of treated associated water, QGC is working with the Queensland Government to determine the most appropriate use of this water that is socially, environmentally and economically feasible.

QGC understands that many communities and industry groups may be interested in using treated associated water.

In the interim, QGC is planning a water network for the 20 year project life based on the reference case described in this sEIS. However this is dependent on negotiations for the beneficial use of this water. Thus it is anticipated that the water network required in the first five years includes approximately:

- 1,300 km of water pipelines
- 20-25 untreated water storage ponds
- 45 infield buffer storages (tanks or ponds)
- 6 treated water storage ponds
- 6 brine storages for balancing and evaporating brine

QGC's refinement of its water plans have resulted in an increase in the number of storages compared to the draft EIS, principally due to the requirement for infield buffer storages. QGC will seek to minimise the impact of infield buffer storages by using tanks instead of ponds where practicable. The area of ponds required has increased by approximately 400 ha, largely due to the increased area required for evaporation of brine. *Volume 2, Chapter 7* outlines the engineering specifications for each of these ponds.

As a result of treating associated water, salt is produced. It is likely that about 360,000 m³ of salt will be produced in the first 5 years. QGC is seeking to sell this salt to third parties as a beneficial by-product of the CSG industry. In parallel with this, QGC is also investigating the feasibility of injection of associated water into the aquifer formations. Should these options not be available the disposal of salt to purpose-built, engineered and secure landfills will be considered by QGC.

The following sections details how the project has progressed in the approval process and provides an overview of how each project component has evolved as a result of feedback from consultation and further design improvements.

1.2 THE EIS PROCESS

1.2.1 Project Evolution

The draft EIS described the QCLNG proposal, its potential impacts and mitigation strategies. It was provided for public consultation between 31 August 2009 and 19 October 2009 and comments and submissions were sought from the public and regulatory government agencies.

These comments have been summarised, considered, and used as important input to improving the design as presented in the draft EIS. This material, along with further detailed design from QGC's engineering, environmental and social impact assessment teams, together with further consultation with government agencies, has helped the project to mature into what is now described in this sEIS.

This sEIS addresses many of the issues that have been raised and puts them into context so that approvals with conditions may be considered.

This sEIS, coupled with the draft EIS, completes the formal impact assessment approval process for the QCLNG Project. However, there will be ongoing assessments of impacts throughout the project's life. QGC has developed this sEIS so that the public and government agencies can clearly see how QGC has responded to comments and how QGC intends to manage environmental and social impacts and community issues.

To this end, QGC believes that it has fulfilled its obligations with regard to the statutory EIS process. QGC has presented the project in such a way as to enable State and Commonwealth Government agencies to assess the project to determine if it can proceed through to the development approval processes of local, State and Commonwealth Government agencies.

If approved, QGC will make applications for permits and licences for all aspects of the project that are required to be approved under local, State and Federal Government laws and regulations. These agencies and government departments will be required to issue these permits and licences in accordance with those conditions set by Queensland's Co-ordinator General and the Commonwealth Minister for the Environment.

1.2.2 Project approval and construction

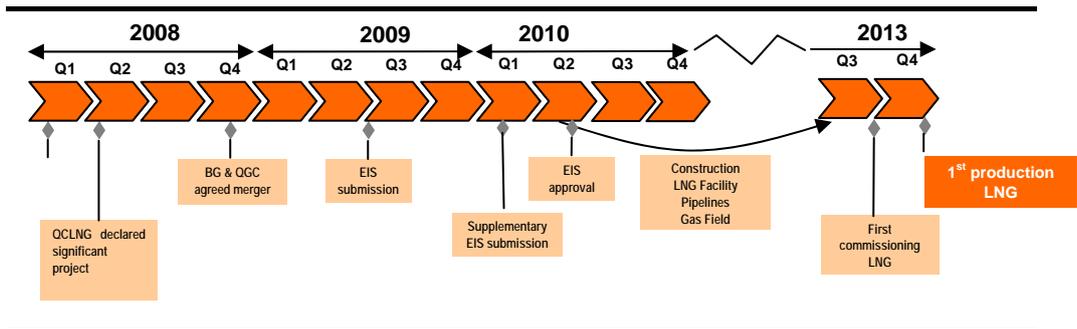
Pending receipt of approvals, QGC expects to make a final investment decision on the project as early as possible in 2010. The final investment decision depends on several critical items including timely approval of the EIS.

The project is anticipated to have a design life of at least 20 years for each LNG train. However, these trains will likely operate for significantly longer periods provided additional gas reserves are available. The first train is scheduled to begin commercial LNG production late in 2013 with the shipments of commercial quantities of liquefied natural gas (LNG) from the

Queensland Curtis LNG (QCLNG) Project scheduled to begin in 2014. Commercial production from the second train is planned 6 to 12 months later. Additional LNG trains will be constructed and commissioned as gas supply allows and subject to their commercial viability.

A high-level breakdown of timing for permits and approvals, developing the Gas Field and constructing the pipeline and LNG plant is presented in *Figure ES1* below.

Figure ES1 *Indicative approval and construction program for the QCLNG Project*



2**THE PROJECT**

QGC, a subsidiary of the BG Group, proposes to develop a liquefied natural gas project in Queensland. It is called the Queensland Curtis LNG Project (QCLNG Project).

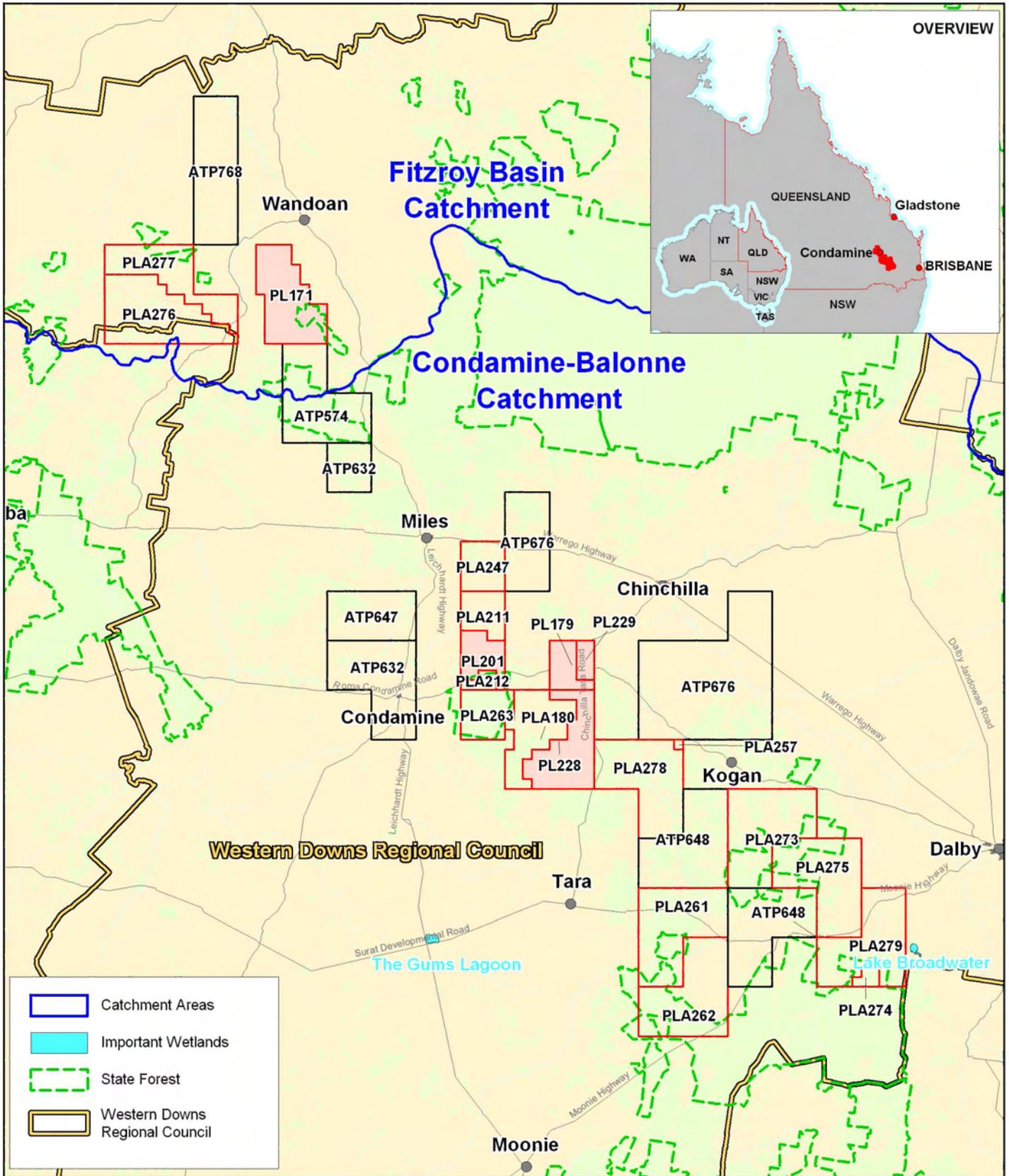
The QCLNG Project consists of four main components:

- An expansion of QGC's existing coal seam Gas Fields in the Surat basin of southern Queensland
- 700 km of underground pipelines, including about 340¹ km underground gas transmission pipeline to take gas to Curtis Island near Gladstone
- A natural gas liquefaction facility and marine facilities at Curtis Island
- Shipping operations to load the liquefied natural gas for export.

To provide some context as to the project's footprint, *Figure ES2* outlines the location of the Gas Field, *Figure ES3* outlines the location of the pipeline component, while *Figure ES4* outlines the location of the LNG component.

The following section provides an overview of each of these components.

1 The Pipeline length as describe in the Figure ES2 depicts a 388.2km pipeline as a result of the KPO for the Export Pipeline starting at Miles. This has since been moved and the Export Pipeline now starts at Woleebee Creek.



Legend:

- Catchment Areas
- Important Wetlands
- State Forest
- Western Downs Regional Council

Legend:

- Gas Fields - Authority to Prospect
- Gas Fields - Petroleum Lease Application
- Gas Fields - Petroleum Lease

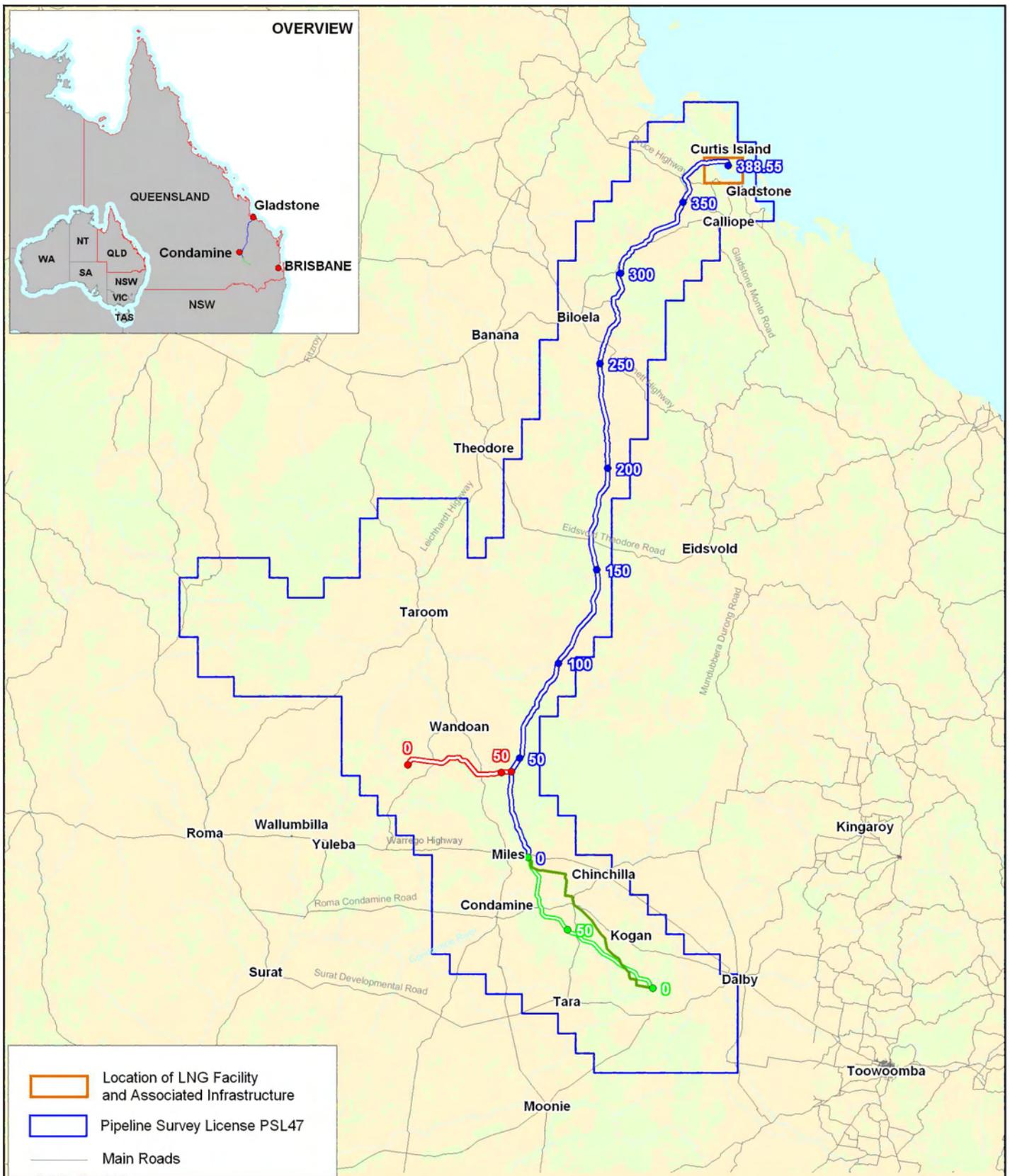
Source Note:
 1:250,000 Topographic vector copyright Geoscience Australia
 QLD Protected Areas, Catchment Areas and Important Wetlands sourced from Environmental Protection Agency

Projection UTM MGA Zone 56 Datum GDA 94

0 10 20 30 40
 Kilometres

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 A BG Group business	Project	Queensland Curtis LNG Project	Title	Location of Gas Field Component
	Client	QGC - A BG Group business		
 Environmental Resources Management Australia Pty Ltd	Drawn	Mipela	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.	
	Approved	CDP		sEIS Executive Summary Figure ES2
	Date	23.12.09		File No: QC02-T-MA-00156



Legend:

- Export Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point
- Woleebee Creek Route & Kilometre Point
- Alternate Gas Collection Header Route

Source Note: 1:250,000 Topographic vector copyright Geoscience Australia

Projection UTM MGA Zone 56 Datum GDA 94

0 50 75 100 Kilometres

N

 <p>QUEENSLAND CURTIS LNG A BG Group business</p>	Project Queensland Curtis LNG Project		Title Pipeline Project Study Area
	Client QGC - A BG Group business		
 <p>ERM Environmental Resources Management Australia Pty Ltd</p>	Drawn Unidel	sEIS Executive Summary Figure ES3	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved CDP	File No E05-P-MA-96243	
	Date 19.01.2010	Revision Supplementary	

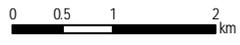


Legend

- Proposed QCLNG Site Boundary
- QCLNG Footprint Plant Layout
- Proposed Export Pipeline
- R.G. Tanna Marine Operations Terminal & Aggregate Loadout Facility
- Auckland Point Marine Facility

Source Note: Aerial Photo - Department of Infrastructure and Planning for QCLNG Project
 Site Info Australia - Piney Bowes MapInfo

Projection: UTM MGA Zone 56 Datum: GDA 94



 A BG Group business	Project Queensland Curtis LNG Project		Title Location of LNG Components
	Client OGC - A BG Group business		
 Environmental Resources Management Australia Pty Ltd	Drawn KP	Executive Summary Figure ES4	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.
	Approved RS	File No: 0086165b_SUP_GIS08_ES4	
	Date 25.01.10	Revision 0	

2.1 QGC APPROACH

How QGC works, consults and communicates with communities and develops the QCLNG Project components safely is described below.

2.1.1 Working with and in communities

Throughout the life of the Project, QGC will organise several community committees in the Gas Field, pipeline corridor and Gladstone. These committees will provide advice on community needs and issues to QGC to inform project design, definition in implementation of social and environmental management plans.

Furthermore, QGC will continue to consult affected landholders and seek their input in developing and implementing systems that prevent or mitigate environmental and social impacts when Gas Field or pipeline infrastructure is to be located on their land.

QGC and its contractors will continue to consult local governments on the location of workers accommodation camps. It will also consult businesses and other stakeholders to maximise the benefits of camps to local towns while minimising potential adverse impacts as a result of any poor worker behaviour or increased numbers using community facilities and services.

QGC's consultation with traditional owners and submissions from these groups reinforced the importance of managing impacts on indigenous and cultural values. QGC will continue to consult and work with the traditional owners to identify potential areas of value and to avoid these where possible in the development of all components.

2.1.2 Community safety

A risk assessment for the Gas Field and pipeline components has resulted in the development of comprehensive emergency management plans, including the establishment and maintenance of adequate safety zones for each infrastructure type to ensure that the risk to people is minimised as far as possible. When locating infrastructure on private land, QGC will ensure that land owners are familiar with the infrastructure and any safety procedures including emergency numbers will be provided.

QGC is developing transport management plans in consultation with local governments and State government services such as Main Roads, Police and Emergency Services to ensure that driver safety for all road users is not compromised in any way as a result of transporting project materials and infrastructure to the Gas Field, pipeline route or LNG facility. Where road safety issues have been identified, QGC is working with local and State governments to determine if road or intersection up-grades are required. QGC is investigating opportunities to minimise road transport by using rail or air transport where feasible.

QGC will continue to work with local and State emergency services as the project develops to deliver appropriate response plans for bushfire prevention and management, primary health care and emergency medical services and other emergency response procedures required as a result of the project's development.

In relation to the LNG facility and LNG loading, QGC is working with the Queensland Government and regulatory agencies to demonstrate that the QCLNG facilities are safe.

The following sections provide an outline of the Project components and how these have evolved since the release of the draft EIS. It should be noted that although there have been some changes to the design and scale of the development, this is not affected the overall risk assessment that was outlined in the draft EIS for each of the Project components.

3 PROJECT COMPONENTS

3.1 GAS FIELD

The Gas Field component includes the expansion of QGC's CSG operations in Queensland, which currently supply the domestic gas market, to allow for the export of LNG. The project is anticipated to have a life of at least 20 years.

In the first five years of the project, QGC proposes to continue drilling wells to prove gas reserves. This will involve about 1,500 wells across all of QGC's Surat Basin tenements. Concurrently over this period, QGC will develop four central processing plants, about 20 smaller field compressor stations, lay about 2,200 km of small-diameter gas gathering lines and about a 540 km of large-diameter gas transport pipelines, and build three desalination plants to treat associated water. The water treatment program will also involve a range of small and medium-size holding ponds. Additionally, QGC expects to build between about 10 camps by 2012 for worker accommodation.

Table ES1 outlines the first five-year infrastructure development schedule.

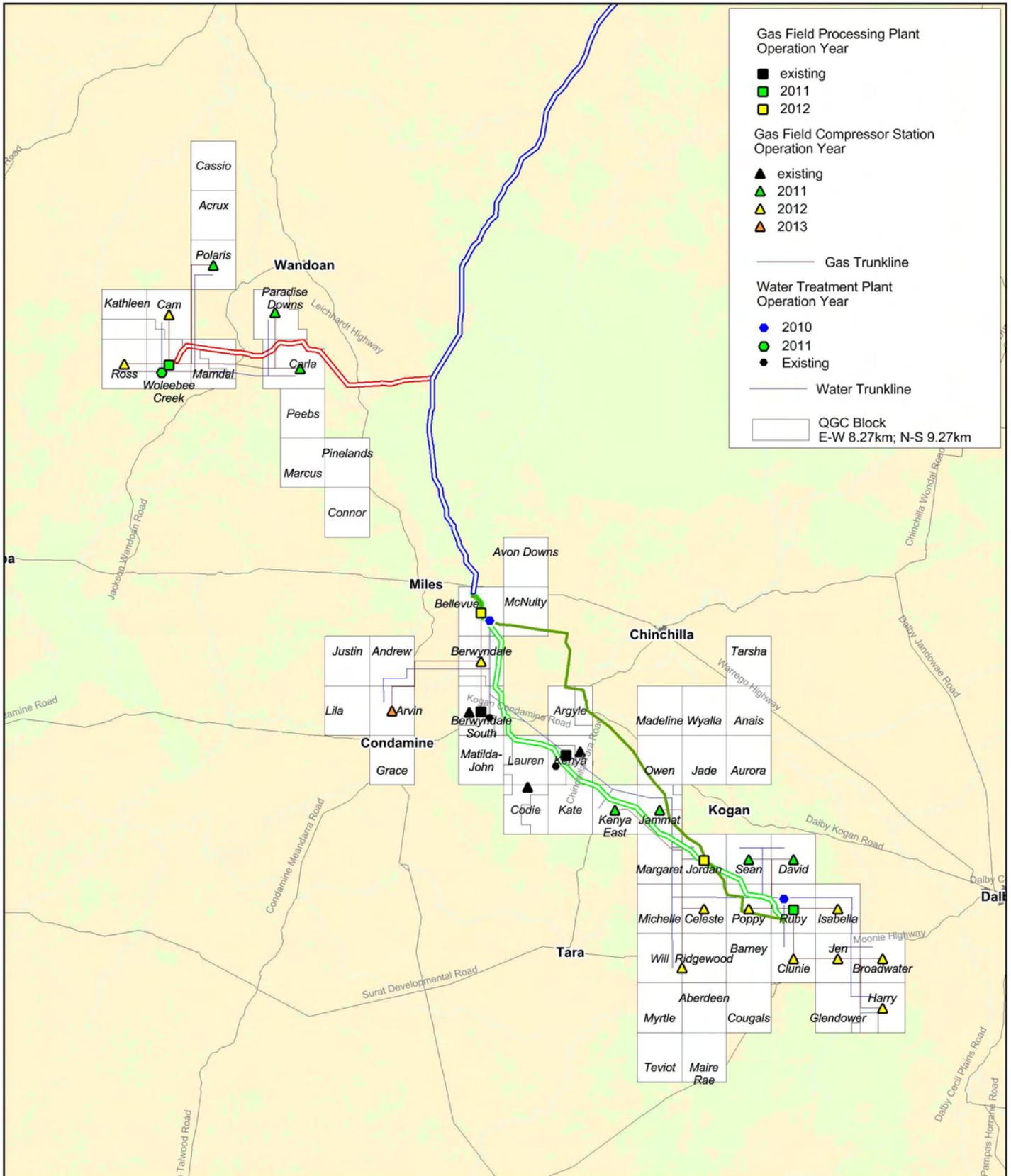
Table ES1 5 Year Infrastructure Development Schedule

Infrastructure/Activity (number / km)	Year					QCLNG Project total to 2014
	2010	2011	2012	2013	2014	
Central Processing Plants (CPPs)	0	0	4	0	0	4
Field Compression Stations (FCSs)	0	0	12	8	0	20
Gathering lines – Gas and Water (km)	270	150	230	650	900	2,200
Infield Storages (pond or tank)	0	2	4	13	26	45
Balancing, Emergency ponds and Brine Storage	0	8	9	7	4	28
Landfill sites	0	1	1	1	0	3
Gas and Water Trunklines (km)	0	60	330	150	0	540
Wells	150	100	130	370	500	1,250 - 1,500

Infrastructure/Activity (number / km)	Year					QCLNG Project total to 2014
	2010	2011	2012	2013	2014	
Water Treatment Plants	0	1	1	1	0	3
Workers accommodation camps	2	6	2	0	0	10

Over the 20-year life of the project, QGC will continue to update all environmental and field development management plans required by Government agencies to reflect the next stage of the Gas Field development. The full description of the Gas Field Component for which QGC will be seeking approval for is detailed in *Volume 2, Chapter 7*.

A field development map is provided below in *Figure ES5*, which shows the development program for QGC tenements.



Legend:

- Export Pipeline & Kilometre Point
- Upstream Infrastructure Corridor & Kilometre Point
- Woleebee Creek Route & Kilometre Point
- Alternate Gas Collection Header Route

Source Note:

1:250,000 Topographic vector copyright Geoscience Australia

Projection UTM MGA Zone 56

Datum GDA 94



<p>QUEENSLAND CURTIS LNG A BG Group business</p>	Project	Queensland Curtis LNG Project		Title	Gas Field Areas and Major Facilities to 2014
	Client	QGC - A BG Group business			
<p>ERM Environmental Resources Management Australia Pty Ltd</p>	Drawn	Unidel	sEIS Executive Summary	Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.	
	Approved	CDP	File No: QC02-T-MA-00164		
	Date	20.01.10	Revision		

3.1.1 **Constraints matrix for Gas Field**

QGC has developed a planning scheme that prescribes social, environmental and engineering constraints that will be applied in developing the Gas Field.

The social and environmental constraints matrix is described in *Volume 2, Chapter 7*. A summary of these constraints to minimise social and environmental impacts is provided below.

Social constraints considered by the project in locating Gas Field infrastructure include but are not limited to:

- locations of noise sensitive receptors
- locations of towns and their immediate surrounds
- rural residential areas and land zoned for future residential purposes
- land used for economic activity
- locations of community facilities
- cultural heritage sites and places of community importance
- existing movement patterns i.e. local and district roads, and relationship to social uses and townships.

Environmental constraints considered by the project in locating Gas Field infrastructure include but are not limited to:

- locations of rare and endangered fauna and flora
- topography constraints
- ability of soil to erode or cause erosion problems
- locations of sensitive receptors such as residences
- avoidance of Good Quality Agricultural Land and land under cropping
- Ecologically Sensitive Areas as defined by Department of Environment and Natural Resources
- Wetlands
- Woodlands fringing drainage lines.

Social and environmental constraints define those areas within the Gas Field project area that are or may not be suitable for particular types of Gas Field infrastructure. These constraints have been mapped and provided to QGC's Gas Field design team. The Gas Field design team, overlays these maps to determine where infrastructure may be able to be located. The mapping also includes the likely mitigation required to minimise or avoid impacts on the social environment. Social and environmental constraints maps are being continually updated with the results of consultation and site-specific research as initial infrastructure locations are confirmed.

Social and environmental constraints and mitigations will be used in:

- Refining locations for central processing plants, field compressor stations and water management infrastructure
- Locating wells, gathering lines and trunklines
- Location of works accommodation and management strategies
- Locations for logistic and other construction-related sites
- Developing social impact management plans addressing behavioural issues and community safety
- Landholder consultation
- Driving engineering solutions for matters that affect social and environmental values.

Although there have been some increases in the amount of infrastructure being required for the development of the Gas Field, the overall impact assessment post implementation of social and environmental mitigations has determined that the impacts range from negligible to minor for most aspects and moderate for transport during the construction period. It should be noted, that the Gas Field will be progressively developed and progressively rehabilitated and thus the impacts are not considered to be long-term.

3.2

PIPELINE

The pipeline component of the QCLNG Project has been refined following further detailed design of the Gas Field Component. The pipeline is still considered in 2 parts, namely:

- 1 the Export Pipeline
- 2 the Gas Collection Header.

The changes outlined in the sEIS result from the inclusion of a direct east-west route of the gas Collection Header from Woleebee Creek to the Export Pipeline a distance of approximately 55 km. This northern portion of the gas Collection Header will connect with the southern portion along what was previously the first 40 km of the Export Pipeline route. The southern portion of the gas Collection Header will connect the Miles and the Ruby Gas Field area; a distance of approximately 100 km. This results in a gas Collection Header of approximately 195 km between the Ruby and Woleebee Creek Gas Fields.

Due to the changes to the gas Collection Header the Export Pipeline has been reduced in length by approximately 40 km; the 40 km removed from the Export Pipeline now forms part of the gas Collection Header.

The route for the Export Pipeline lies within the Queensland government's Callide Gladstone Corridor. QGC is a Party to the joint technical working

group which is working to determine the actual location of the various proposed gas pipelines within this corridor.

3.2.1 *The Narrows Crossing*

The pipeline route across the Narrows will lie within the Callide Gladstone Corridor (CGC), but outside the Great Barrier Reef Coast Marine Park. However, selection of the final Narrows Crossing Pipeline route will be dependent on a number of factors, including technical engineering suitability, environmental and cultural aspects as well as State and local government requirements.

The construction methodology for The Narrows crossing is under investigation. The sEIS assesses two techniques for the installation of the pipeline across the Narrows Crossing:

- open-cut trenching
- Horizontal Directional Drilling (HDD).

A combination of both is possible, pending confirmation from geotechnical investigations. Ancillary activities required for The Narrows crossing include a rock groyne and landing ramp for the purposes of construction access.

3.2.2 *Constraints matrix for Pipeline Design*

As for the Gas Field, QGC has developed a number of social and environmental constraints which has been applied to the final route design and location of pipeline infrastructure.

The constraints also relate to social, environmental and engineering factors. A summary of these constraints which were used to minimise social and environmental impacts is provided below.

Social constraints considered by the project in locating pipeline infrastructure include:

- Pipeline routes to avoid all major townships
- Locations of towns and their immediate surrounds
- Rural residential areas and land zoned for future residential purposes
- Locations of community facilities
- Cultural heritage sites and places of community importance
- Existing movement patterns i.e. local and district roads, and relationship to social uses and townships.

Environmental constraints considered by the project in locating pipeline infrastructure include:

- Threatened Species and Ecological Communities as defined under the

EPCB Act

- Environmentally Sensitive Areas as defined by the DERM
- Endangered Regional Ecosystems (RE) and ‘Of Concern REs’ as defined under the Vegetation Management Act
- Wetlands and Waterways
- Topography
- Ability of soils to erode
- Good Quality Agricultural Land and cropping land.

Social and environmental constraints and mitigations will be used in:

- Refining locations for the final pipeline routes
- Logistics of transporting and stockpiling pipeline
- Locating gathering lines and trunklines
- Location of works accommodation and management strategies
- Locations for logistic and other construction-related sites
- Developing social impact management plans addressing behavioural issues and community safety
- Landholder consultation
- Driving engineering solutions for matters that affect social and environmental values.

3.2.3 Construction Summary

Construction of the Pipeline Component will be undertaken as outlined in *Table ES2* below.

Table ES2 Pipeline Component Construction Summary

Activities	Timing (months)
<i>Vegetation Clearing, trenching when required, laying of pipe, testing, rehabilitation (on-going)</i>	18 – 24 months 36+ months for tunnelling activities, were this method to be used Normal time between clear and grade and restoration – 4 months
<i>Construction Spreads</i>	Export Pipeline 3, plus special crossing team. Collection Header 2, plus special crossing team

3.3 LIQUEFIED NATURAL GAS

The LNG Component of the Project comprises development, construction and operation within the Curtis Island Industry Precinct of the Gladstone State Development Area (GSDA) of a LNG processing plant with production capacity up to 12mtpa, nominally comprising three identical LNG processing units or “trains” each with an average 4 mtpa production capacity. *Figure ES6* is a photomontage representation of the LNG Facility as would be seen from the Targinie foreshore.

Figure ES6 Photomontage of LNG Facility from Targinie Foreshore



The LNG process comprises gas pre-treatment, liquefaction and subsequent storage, as outlined below:

- **Gas pre-treatment** Raw gas (or feed gas) from the Gas Field Component is piped to the LNG Facility where it is cleaned to remove any impurities such as carbon dioxide and water.
- Gas received from the Export Pipeline is metered at the inlet for custody transfer.
- **Liquefaction** The treated gas is cooled through a cryogenic process using the ConocoPhillips Optimized Cascade ProcessSM. At this low temperature the gas becomes a liquid. Essentially, liquefaction technology makes it more economical to safely store and transport natural gas.
- QGC plans to commission Train One in mid 2013 and Train Two approximately 6 to 12 months later. A third parallel train (covered by this EIS) is planned.
- The average production capacity of each train is approximately 4 mtpa as it takes into consideration the expected average feed gas-flow rates and long-term availability of the processing equipment.
- **LNG storage** Following the liquefaction process, the LNG is stored in specially designed, fully contained storage tanks. QGC proposes to initially construct 2 LNG storage tanks each with a capacity up to 140,000 m³. A third tank of similar capacity will be constructed and commissioned when the third LNG train is built.

- The LNG storage tanks chosen for the QCLNG Project are full containment tanks with a 9% nickel-steel inner container and a pre-stressed concrete outer container. In normal service the inner, primary container will provide liquid containment and prevent ingress of LNG into the space between the primary and secondary containers.
- The outer, secondary container is a self-supporting tank with a domed concrete roof. This is designed for vapour containment and to hold the thermal insulation of the primary container.

Active measures such as a fire and gas detection system, firewater system, and overpressure protection are included in the design.

In addition to the LNG process and storage components outlined above, the LNG Facility on Curtis Island includes:

- LNG loading, including jetty and docking facilities
- utilities and supporting services which include:
 - Power Production Plant and power distribution systems to train substations.
 - Water Treatment facilities including service, drinking and demineralization.
 - Water Supply facilities i.e. water intake or wells, pipeline and storage.
 - Marine facilities: Construction Dock and Material Offloading Facility (MOF).
 - Loading facilities for LNG Storage tanks for LNG.
 - Civil works including all buildings and roads inside the LNG site boundary.
 - Plant Air and instrument air system.
 - Nitrogen system (production, storage and distribution).
 - Flare system.
 - Fire Water system and facilities including storage.
 - Waste disposal and waste water treatment facilities.
 - All tie-ins between and interconnecting pipework between Trains and Common facilities where applicable.
 - Control room and training facilities including simulation facilities.
 - Security equipments and facilities including CCTV, gate control systems, fence etc.
 - Gas Detection facilities and all associated alarm systems. This does not include equipment inside the train (after the first termination rack in the instrument building).
 - Refrigerant Make-up Storage.
 - Process control and safety systems. This does not include equipment inside the train (after the first termination rack in the instrument building).

- Telecommunications systems.

Ferry terminals and staging areas on Gladstone mainland will be developed for transit to and from the Facility by ferry and/or water taxi. This infrastructure will also allow for the ongoing transit of personnel, plant, materials and equipment to the LNG Facility and waste removal from the Facility. The terminals and staging areas will have roll-on roll-off capability to allow rapid embarkation and debarkation transport of trucks and mobile equipment. Auckland Point will be the primary ferry terminal and staging area for the construction phase of the Project. For operations, the ferry terminal and staging area is proposed along the shoreline behind the existing RG Tanna Coal Terminal. The RG Tanna Coal Terminal will also be used for loading aggregate during construction.

Operational workforce for the LNG Facility is anticipated to consist of a total permanent workforce of approximately 200 workers, plus additional Project personnel based in Brisbane. The LNG Facility will operate 24 hours per day.

3.3.1 Construction Summary

Construction of the LNG Component will be undertaken in five main stages as outlined in *Table ES3* below.

Table ES3 LNG Component Construction Summary

Phase	Key activities	Timing (months)
<i>Site preparation</i>	Establishment of a construction dock to allow mobilisation of personnel, materials and equipment to site early in the Project and in advance of MOF construction Fencing Clearing and mulching of vegetation Bulk earthworks Construction of the MOF	1 – 12
<i>Civil work, foundations and structures</i>	Concrete batching for foundations and tanks Construction of marine facilities (i.e. LNG jetty)	12 – 20
<i>Mechanical and electrical fit-out</i>	Installation and testing	20 – 40
<i>Systems integrity</i>	Installation and testing	30 – 45
<i>Energisation and introduction of hydrocarbons</i>	Pre-commissioning and start-up	35 onwards

Peak numbers for direct and indirect personnel for the construction of the initial two-train facility will vary across the LNG Facility construction schedule. Total peak construction workforce will be approximately 3,330 personnel (including off-shift personnel), plus additional craft supporting indirect work and other QGC supervisory personnel.

Construction personnel engaged from within the Gladstone region will continue to live in their current residences and commute daily to the Curtis Island construction site, staging out of Auckland Point. For non-local personnel, a temporary construction camp on the Curtis Island site is planned. It is expected that about 1,700 people will use this facility.

Although, there have been some changes in the layout of the LNG facility and marine operating facilities as a result of detailed design and plant optimisation, the overall risk assessment as detailed in the draft EIS, has not changed.

3.3.2 *Dredging works for marine facilities operations*

The draft EIS described dredging required to support the development of the QCLNG project. Specifically, it referred to the dredging and options for disposal of the dredged material from the Swing Basin and Channel and Marine Offloading Facility (MOF).

Subsequent to the public release of the draft EIS, the Gladstone Ports Corporation (GPC) released for public comment EISs referring to dredging and strategic infrastructure required to support the development of the Port. In addition, evolution of the QCLNG Project design and understanding of its dredging requirements has progressed.

Thus, the scope of this sEIS has been amended to include the 'early works' dredging aspects of the QCLNG Project only. These are defined as:

- Construction dock and access channel.
- Materials offloading facility and access channel.
- Pipeline crossing of the Narrows, Targinie and Humpy Creeks.

Since the release of the draft EIS, the following changes have occurred with regard to other dredging and dredged material disposal projects:

- The Gladstone Port Western Basin Master Plan was released for public comment at the end of August 2009. The draft master plan strategically identifies current and future land and marine uses, infrastructure development (including pipeline corridors, transport networks and potential bridge access to Curtis Island), as well as port activities, common-user channels, dredging and disposal options over the next 30 years to 2039. The plan also examines conservation areas and the potential for environmental areas to be set aside as part of the required mitigation measures.

- The GPC published in November 2009 an EIS for the Western Basin Dredging and Disposal (WBDD) Project. This addresses the impacts of strategic dredging and disposal of dredge material required to support the continued expansion and modernisation of Gladstone Port. It includes the dredging required for the swing basin and channel and the MOF facility of the QCLNG Project.
- The GPC published in October 2009 an EIS for the construction of a reclamation area as a northern extension to Fisherman's Landing. This corresponds to the project referred to in the QCLNG draft EIS as Fisherman's Landing 153 ha project.

As a result of these developments, review of the relative approvals timelines of overlapping projects, and taking into account of comments received on the draft EIS concerning overlap in project proposals, this EIS addresses only those 'early works' involving dredging that are critical to the commencement of construction of the QCLNG facility as described in *Volume 2, Chapter 14*.

The dredging activities and methods are described in *Volume 6* of this sEIS while the impacts of these works are described in *Volume 5, Chapter 8*. Impacts related to relevant matters of National Environmental Significance are discussed in *Volume 14*.

QGC has proposed that the dredging works as described in this sEIS are approved with appropriate and relevant conditions to allow QGC to apply for the necessary approvals for the dredging works described in 2.14.2. QGC recognises dredging will not be possible until permitted disposal sites are available for QGC spoil.

As a result of the assessment approach by the GPC for its strategic port development proposals, QCLNG's impact on Gladstone Harbour through dredging for which QGC is solely responsible is considered to be minor.

4

PROJECT EVOLUTION – A CYCLE OF CONTINUOUS IMPROVEMENT

In completing work to support the sEIS, several options have been identified that could further reduce the overall social and environmental impact of the Project. These options relate predominantly to impacts in the Gas Fields and with construction of the pipeline.

The QCLNG Project will continue to evolve past the EIS process with optimisation of design and plans expected to further mitigate environmental and social impacts and as such the EIS can be considered to represent a 'worst case' scenario or to have taken a conservative approach to the assessment of impacts. The Project will evolve based on:

- continued negotiations with Government and community stakeholders
- detailed engineering and construction design
- outcomes of the QCLNG EIS process.

To illustrate these potential improvements to the Project, and to provide guidance as to what may still be able to be achieved based on current discussions and further engineering design, the following information is provided.

Detailed Design of Field Compression Stations (FCS's)

One area still under investigation is the use of higher capacity electric motor driven machines for field compressor stations. The employment of these machines would lead to:

- A reduction in the number of machines required (potentially by half).
- Limited requirement for additional facilities at well sites later in field life.

These potential changes have net environmental benefits of a reduction in:

- the infrastructure footprint required for field compressor stations
- the requirement for compression at wellheads
- transportation related to the delivery and construction of this equipment
- resultant noise and greenhouse emissions.

Water – capturing the asset

A major issue for any CSG field development is how to best deal with the water that is produced with the gas. QGC is striving for some form of beneficial use of coal seam water to ensure the optimal development of this resource. It is an aspiration shared by the community, landholders and government.

The sEIS has presented a scenario that this water would be treated using reverse osmosis, so it can be used for forestry. While this is technically

viable, forestry requires large amounts of land which can result in a high demand for land and the need to store large volumes of water.

Therefore, QGC's preferred option is to develop a beneficial use scheme with a third party such as the Queensland Government, a local government or another industry. This treated water could be beneficially used by making it available for:

- farming or agriculture use
- industrial use
- restoration of flows to rivers and creeks
- other community or industry uses as permitted.

Thus, QGC anticipates that current and on-going negotiations may well result in this beneficial asset being made available to community and industrial groups including Queensland farmers.

Logistics – creating logistical solutions to reduce road impacts

QGC's transport assessment has assumed that all equipment and infrastructure for the Gas Field and pipeline construction will be delivered by road. This assumption has been used for planning to ensure that QGC did not underestimate the impacts on Queensland roads if other transport options were not available at the time of construction. However, QGC believes that alternative options will be available and that potential road and traffic impacts will be reduced. For example:

- QGC and rail service providers are working together to determine feasible options to transport the bulk of QGC's infrastructure components and equipment by rail to key areas within the Gas Field and pipeline corridor. If agreement can be reached over coming months, the impact on the road systems and greenhouse gas emissions from Project vehicles can be reduced significantly
- QGC is continuing to evaluate using LNG as a partial replacement for diesel for its engines should a small LNG facility being proposed by a third party in the Condamine area be completed in time for construction schedule of the Gas Field. One major heavy-industry engine maker has advised that it has been able to modify large diesel engines which would allow them to run on 20% diesel and 80% LNG. This would reduce the amount of diesel to be transported by road from the coast to the fields and the Project's greenhouse gas emissions.

Electric Power – moving to a better environmental solution

When the QCLNG draft EIS was prepared, the use of electric power to drive equipment and infrastructure was not considered viable. However, recent developments by several power generation companies have indicated that power may be available to be used at most QGC locations.

If this can be done and at the level of power generation that meets QGC needs, it will mean that a large number of generators will not be required. This will result in a reduction in:

- the generating equipment requirements at site, and hence the associated noise emissions
- the overall plant footprint
- greenhouse gas emissions
- road transport impacts.

Construction methodology – working towards reduced impacts

A key factor that defines the size of the site work force is the construction philosophy. The number of workers on site can be reduced through the prefabrication of equipment. While this approach will be at the cost of a higher logistical challenge, the option of using the rail system and limiting the size of packages where possible, QGC may be able to reduce the construction work force and, consequently, the size of camps required to support the work on site.

Summary

This section has outlined how QGC is working towards providing better solutions to the issues identified through improved engineering and design, and community and government feedback. It is committed to continuing to work with the Queensland Government and other parties to improve its reference case in relation to:

- noise management
- associated water – capturing the resource
- ensuring Queensland's roads remain safe for all users by employing other transport options when available
- continuing to work towards solutions to reduce workforce numbers which, in turn, will reduce the potential impacts associated with construction camps.

As the project moves from concept design and selection to final detailed design and construction, the Project concept will evolve. Through the implementation of the QGC and BG Group plc business principles relating to environment and social performance, QGC will continue to find and implement ways to reduce impacts and deliver positive outcomes through each stage of the Project.

5

ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 SUMMARY

Following the submission by BG/QGC of referrals under the *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act), the Commonwealth Minister for the Environment, Heritage, Water and the Arts determined that certain components of the QCLNG Project were Controlled Actions under the Act because of their potential to cause significant impacts upon Matters of National Environmental Significance (MNES) protected by the EPBC Act. He required that these Project components be subject to an EIS level of assessment for the following MNES (termed the Controlling Provisions) for his assessment and approved before they proceed:

- World Heritage
- National Heritage Places
- Listed threatened species and communities
- Listed Migratory species
- Commonwealth Marine

The Project components have been assessed for their potential to result in significant impacts to these MNES, with reference to the Department of the Environment, Heritage, Water and the Arts Significant Impact Guidelines. The assessment has concluded that by implementing the construction and design features and mitigation measures identified in the EIS, the Project will not have significant impacts upon MNES.

6

CONCLUSION

The QCLNG EIS has assessed the environmental, social, cultural heritage and economic impact of each component of the project. In particular, the assessment relates to:

- Individual community members including indigenous groups and families.
- Communities, towns and Gladstone and Toowoomba.
- Industry.
- Agricultural, farming and fishing interests and businesses.
- Local suppliers.
- Cultural places or events within the project area.
- The receiving environment including impacts on fauna and flora.

The assessment has been updated since the draft EIS (which was based on the Q4 2009 reference case) to account for changes to project design. The conclusion of the assessment is that the project will have minor to moderate impacts which can be mitigated (through measures described in this sEIS) and through appropriate conditioning by government agencies.

The assessment has also identified several major potential benefits. Some of these include:

- More than 5,000 direct jobs during construction and more than 1000 direct jobs for project operation.
- A\$30 billion in value-added activity in the first eight years of operation from 2014.
- A multi-billion-dollar capital injection during primary construction of the project's core components – Gas Field, pipeline, LNG facility and marine facilities.
- An additional A\$950 million in wages and salaries between 2010 and 2021 in the Darling Downs, A\$700 million in the Fitzroy region and about A\$1 billion in the rest of Queensland will be generated as a result of the development of the QCLNG Project.
- A total contribution to Darling Downs region gross regional product of about A\$14.1 billion between 2010 and 2021, an 11.1% increase over gross regional product in 2006-07.
- A total increase in gross regional product of about A\$13.4 billion for the Fitzroy Region, a 7.7% increase over 2006-07.

The QCLNG Project will be a major infrastructure project for Gladstone and regional Queensland and the rest of Australia.

It is destined to provide long-lasting benefits for indigenous people through project initiatives focused on 'closing the gap' between indigenous and non-indigenous Australians.

This project will set new social and environmental benchmarks for CSG to LNG developments in Australia and around the world.

By using new technologies, innovative plant design and measureable and auditable social and environmental performance standards, QGC and BG group plc are developing a project that is committed to:

- Leadership.
- Technical excellence.
- Transparent and open decision making and communication.
- Communities.
- Indigenous Australians.
- Environmental management.
- Social performance.
- Ecological sustainable development.

With this commitment, QGC submits this sEIS and the draft EIS to the Coordinator-General of Queensland, the Commonwealth Minister for the Environment and to those members of the community who made a submission on the QCLNG draft EIS.