
**Queensland Government Submission to the
Senate Rural Affairs and Transport Committee's Inquiry
into the management of the Murray-Darling Basin -
impact of mining coal seam gas**



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Executive Summary

The Queensland Government's submission addresses the issues raised in the Senate Inquiry's Terms of Reference relevant to the potential impacts of coal seam gas (CSG) mining, namely:

- the sustainability of water aquifers and future water licensing arrangements;
- the property rights and values of landholders;
- the sustainability of prime agricultural land and Australia's food task;
- the social and economic benefits or otherwise for regional towns and the effective management of relationships between mining and other interests; and
- other related matters including health impacts.

Each Term of Reference has been separately addressed in the Queensland Government's submission.

The CSG industry is not new. For over a decade, CSG has been produced in Queensland and fuels most of the State's gas-fired power stations. In fact, CSG is an important transition fuel - not only for Queensland, but for Australia's trading partners. Electricity generated from CSG produces around 50% fewer emissions than black coal. While the government is committed to a renewable energy future, the technology to reliably produce large amounts of electricity from renewable sources has not yet been proven as a 'transition fuel'. Gas will be an important stepping stone to a low carbon future.

The Queensland Government also has extensive experience in managing the Great Artesian Basin and is committed to its progressive rehabilitation after years of uncontrolled water loss through uncapped bores. Strong regulatory arrangements are in place to protect groundwater systems, including the Great Artesian Basin.

This experience has shown that the potential for connectivity between coal seams and water resource aquifers is low. Nonetheless, Queensland's regulatory framework has been refined to ensure that any risk posed by the CSG industry is negligible.

Queensland has implemented a leading adaptive management framework for the CSG industry. This means that environmental approvals can be amended as necessary to ensure environmental protection; responding to ongoing monitoring programs and taking into account our increasing knowledge of environmental systems. This is in addition to the rigorous assessments that are undertaken before CSG projects are approved under Queensland environmental law.

Comprehensive water management framework

Queensland has the strictest and most comprehensive CSG groundwater management framework in Australia.

The Submission outlines a range of actions taken to protect landholders and water resources including:

- Amending the *Water Act 2000* relating to groundwater bores and springs, including requirements for operators to:
 - undertake baseline and bore assessments before production or testing;
 - develop an underground water impact report; and
 - enter into 'make good' agreements.
- Adopting aquifer injection as the preferred CSG water management option whenever feasible and ensuring options for beneficial use are also considered.
- Declaring Queensland's first Cumulative Management Area in the Surat and Southern Bowen Basins to ensure the industry is managed as a whole, and avoid finger pointing between CSG companies.
- Establishing the independent Queensland Water Commission to manage the cumulative impacts of the CSG industry.
- Amending the *Environmental Protection Act 1994* to:
 - restrict the use of BTEX chemicals in fracking fluids;
 - strictly regulate and phase out evaporation dams;
 - require new and existing CSG operators to carefully manage CSG water; and
 - require ongoing monitoring and an annual evaluation of CSG water management, which can be used to amend approval conditions.
- Introducing an adaptive environmental approval regime to ensure that conditions on environmental approvals can be changed to respond to monitoring data, new information and to ensure the environment is protected.
- Requiring CSG operators to notify landholders and the government prior to and after undertaking hydraulic fracturing activities.
- Working on a code of practice, for construction of CSG wells, which will be mandatory under the *Petroleum & Gas (Production and Safety) Act 2004*. The code will protect groundwater resources from contamination and pressure loss.
- Protecting drinking water supplies through the application of stringent water quality standards for the addition of CSG associated water to drinking water sources.
- Establishing the LNG Enforcement Unit to ensure the industry complies with the strict new regulatory regime. Fifty new specialist groundwater, environmental and safety staff have been employed. A proactive compliance plan is also in place to closely monitor CSG industry actions.

Land access and valuations

The Queensland Government has implemented new land access laws that improve transparency, equity and cooperation across both the agricultural and resource sectors in relation to access to private land. The land access laws include:

- a requirement that all resource authority holders comply with a single Land Access Code;

- entry notice requirements for preliminary activities that will have no or only minor impact on landholders;
- a requirement that Conduct and Compensation Agreements be negotiated before a company comes onto a landholder's property to undertake advanced activities that are likely to have a significant impact on a landholder's business or land use – to date, about 600 of these agreements have been voluntarily negotiated between landholders and CSG proponents;
- a graduated process for negotiation and resolving disputes about agreements which ensure matters are only referred to the Land Court as a last resort; and
- stronger compliance and enforcement powers for government agencies where breaches of the Land Access Code occur.

Legislative amendments were also introduced to require CSG operators to notify landholders and the government prior to and after undertaking hydraulic fracturing activities.

The Queensland Government is funding a \$3.6 million training program, being delivered by AgForce, to assist landholders negotiate with resource companies. This initiative is being rolled out through 'FarmShed' workshops run by Agforce as part of its AgForward training program. These workshops outline to landholders their rights and responsibilities under the new land access laws and provide detailed explanation on how to negotiate a successful Conduct and Compensation Agreement.

Land valuations for rural lands affected by CSG operations currently include allowances for the effect of the CSG industry on the land value as a precautionary measure. The allowance applied varies and depends on the number of wells and extent of supporting infrastructure (for example pipelines and roads) and other relevant factors.

Due to the infancy of the industry and the subdued state of the rural property market, at this point in time, there is insufficient market sales data to provide definitive evidence about the impact of CSG operations on land values. Offsets for any negative impact on land values can be part of the negotiations for a Conduct and Compensation Agreement.

Protecting prime agricultural land

The Queensland Government is committed to protecting the best of Queensland's cropping land, known as strategic cropping land. The government's policy position is that strategic cropping land is a finite resource that must be conserved and managed for the long-term.

New legislative and planning tools are being developed to implement the policy. The new legislation will apply to development that will permanently alienate or temporarily diminish productivity of strategic cropping land resources.

The strategic cropping land policy will be implemented through three legislative and planning tools: a new Act specifically for strategic cropping land resources (including trigger maps); a new State Planning Policy under the *Sustainable Planning Act 2009*; and amendment to existing resources

legislation. The legislation will ensure that proposed developments that may impact on strategic cropping land are assessed.

The new legislation will apply to development that will permanently alienate or temporarily diminish productivity of strategic cropping land resources. Developments such as CSG, mining, urbanisation and permanent forest plantations will all be assessed if they are proposed on land likely to be strategic cropping land on the strategic cropping land trigger maps.

The strategic cropping land trigger map identifies land as potential strategic cropping land within the Murray Darling Basin, ranging from Toowoomba and Warwick to as far west as St George and Roma.

The Queensland Government is also developing a food policy - *Food for a Growing Economy: An Economic Development Framework for the Queensland Food Industry*. This policy aims to maximise growth in Queensland's food value chain by considering food production holistically.

Social and economic benefits of the CSG industry and the co-existence of mining and other interests

An economic impact report commissioned by the Queensland Government indicates that a mid-size 28 Mtpa liquefied natural gas (LNG) industry is expected to generate a total of 18, 000 jobs (direct and indirect) in Queensland, increase the Gross State Product by over \$3 billion, and provide over \$850 million in royalty revenue annually. Industry investment is expected to exceed \$60 billion, providing increased job opportunities for regional towns and additional royalties to support the Queensland Government's ongoing reconstruction efforts and vital infrastructure for long-term economic growth (refer to Queensland LNG Industry Viability and Economic Impact Study 2009).

To ensure the CSG/LNG industry investment delivers socio-economic benefits for regional towns, the Queensland Government is working with industry to maximise employment opportunities as well as ensure training and supply chain development opportunities exist across the State.

While the CSG/LNG industry represents a great socio-economic opportunity, the Queensland Government recognises the need to balance this development with other land uses. This includes supporting the co-existence of mining and agricultural activities.

The Surat Basin Future Directions Statement was launched in March 2010 and provides an effective framework to guide the Queensland Government and our regional partners in responding to the multiple interests of the region to 2030. It covers the local government areas of Toowoomba, Western Downs and Maranoa, with strong linkages through Banana to Gladstone.

Significant obligations have been placed on CSG/LNG proponents through conditions imposed in Coordinator-General's evaluation reports to mitigate the cumulative growth impacts of their

projects. CSG/LNG proponents are required to assess the cumulative impacts on regional infrastructure such as roads, railways and housing. Government approvals will be conditioned in order to manage the identified impacts on significant regional infrastructure.

In addition, CSG Engagement Committees have been established as part of the Queensland Government's consultative approach to managing relationships between the CSG/LNG industry and other land interests. A Surat Basin CSG Engagement Committee has been established as well as two regional CSG committees with a focus on the Roma and Dalby areas.

Background

A liquefied natural gas (LNG) industry based on coal seam gas (CSG) is rapidly emerging in Queensland and eight proponents are seeking to establish LNG plants, mostly in Gladstone. The LNG industry is a major new potential export industry for Queensland. The industry involves extracting CSG, piping the CSG to Gladstone, liquefying it to produce LNG and exporting the LNG to international markets.

Three large LNG projects have received approval from the State and Commonwealth Governments - Queensland Gas Company (QCLNG), Gladstone LNG (GLNG) and Australia Pacific LNG (APLNG). All three have announced their final investment decision. This enables the companies to start building major infrastructure such as the LNG pipelines and other expansion activities.

The Queensland Government has taken strong action to ensure that the industry develops in a sustainable way – protecting the environment, our health and communities. We want to see the best future for the next generation of Queenslanders, and this means a healthy environment balanced with economic opportunity.

Term of Reference 1: Comprehensive Water Management Framework

CSG is a natural gas consisting primarily of methane, which collects in underground coal seams by bonding to the surface of coal particles. The coal seams are generally filled with water, and it is the pressure of the water that keeps the gas as a thin film on the surface of the coal.

The process of releasing CSG for production involves the extraction of water from the coal seams. As the water pressure in the coal seams is reduced, gas flows from the coal seams into a gas production well (Figure 1).

The total volumes of water produced by the industry will be significant and are distributed in time (Figure 2). However, water from individual CSG bores is only produced for a relatively short period of time and will vary in volume.

CSG resources in Queensland are located primarily in the Surat and southern Bowen Basins. The Surat Basin is a part of the Great Artesian Basin. Exploration is also being carried out in other parts of Queensland.

The Great Artesian Basin

While any impact on underground water resources is a concern, there has been particular focus on the possible consequences for the Great Artesian Basin in Queensland.

The Great Artesian Basin is the largest known artesian basin in the world and is a complex groundwater system. It has been studied for many years and the knowledge about the Great Artesian Basin is documented in a range of scientific papers and reports. It is managed under the Queensland *Water Act 2000* through the *Water Resources (Great Artesian Basin) Plan 2006* and is the subject of a long term bore capping program jointly funded by the State and Commonwealth governments along with landholders. This provides a sound basis of our current understanding.

A range of modelling and monitoring activities are ongoing in the Great Artesian Basin. Over \$2 million is currently being spent on upgrading, surveying and equipping the monitoring network across the Great Artesian Basin in Queensland. CSG operators are also undertaking project-specific monitoring and modelling activities. This information will build on the data collected under the Great Artesian Basin monitoring network in Queensland.

In addition, the Queensland Water Commission has commenced development of a regional groundwater model to predict possible cumulative impacts of CSG extraction. The Commonwealth Government has also commenced a scientific study about the Great Artesian Basin, lead by

CSIRO. The study includes assessment of the water resources in the Great Artesian Basin and is expected to be completed in late 2012.

The Great Artesian Basin comprises several sub-basins that are separated to some extent by ridges in the underlying rock formations. The Surat Basin is one of these sub-basins. The Surat Basin comprises many layers of rock some of which are permeable (known as aquifers) which often contain good quality water suitable for consumptive use.

Although the aquifers of the Great Artesian Basin are separated from each other by low permeability rocks, some degree of interconnection between aquifers should be assumed in any precautionary management program. The degree of interconnection will depend on just how impermeable the separating layer is and its thickness. These factors can vary between locations.

The artesian nature of the aquifers proves that there is relatively low vertical connectivity. This is supported by measurable differences in pressure and water quality between aquifers.

The coal seams of the Surat Basin that are the target for CSG development are collectively known as the Walloon Coal Measures. This is a geologic formation which is largely mudstone, but with some sandy layers and coal layers within it. Water in the Walloon Coal Measures is generally of poor quality, limiting its suitability for consumptive use.

An independent expert study commissioned by the Commonwealth Government to meet the requirements of Section 255AA of the *Water Act 2007* (Cwlth) reported that, consistent with advice received from Geoscience Australia, although significant volumes of water will be extracted from the Great Artesian Basin in some project areas due to CSG activities, the changes to regional groundwater balances in the main alluvial systems of the Murray Darling Basin are expected to be relatively minor. The report also confirmed the importance of an adaptive management regime supported by monitoring and management of groundwater systems.

CSG and Water Resources

The CSG industry in Queensland is currently regulated by a number of Acts, including the: *Petroleum and Gas (Production and Safety) Act 2004*; *Petroleum Act 1923*; *Environmental Protection Act 1994*; *Water Act 2000*; *Water and Supply (Safety and Reliability) Act 2008*; the *Nature Conservation Act 1992*; the *Sustainable Planning Act 2009* and the *State Development and Public Works Organisation Act (1971)*. The Commonwealth *Environment Protection and Biodiversity Conservation Act (1999)* and the *Commonwealth Water Act 2007* may also apply in certain cases.

Queensland's *Water Act 2000* has recently been amended to introduce a new regulatory framework to manage the cumulative impact on water supply bores and springs from the extraction of groundwater by petroleum tenure holders, including the CSG industry. It requires petroleum tenure holders to:

- provide baseline assessment plans and conduct baseline bore assessments;

- determine potential impacts to landholder's water supply bores and enter into 'make good' agreements with bore owners if bore supply is likely to be impaired by a petroleum tenure holder's extraction of underground water;
- avoid and manage impacts on springs; and
- respond to groundwater modelling by the Queensland Water Commission which will identify areas that are likely to experience groundwater level decline and therefore areas where bores may experience an impaired capacity.

Underground Water Impact Reports are required to be prepared for all petroleum tenures, including CSG, where production testing or in production. Underground Water Impact Reports are required to:

- estimate the quantity of water to be extracted over the period of the report (minimum of three years) and, based on modelling, identify the predicted decline in water levels in the coal seam and in adjacent aquifers from CSG activities;
- map aquifers likely to experience a decline in water level beyond the bore trigger thresholds established in legislation (5 meters for a consolidated aquifer and 2 meters for an unconsolidated aquifer) as follows:
 - *immediately affected areas* - decline will exceed the bore trigger threshold within the report period; and
 - *long-term affected areas* - decline will exceed the bore trigger threshold outside the report period
- develop a water monitoring strategy to determine the extent of impacts of groundwater extraction for CSG activities and ensure that changes are progressing as modelled; and
- develop strategies for assessing risks to springs and for preventing or minimising impacts where the water level in the aquifer that the spring overlies is predicted to decline more than the trigger threshold of 0.2 meters.

Bore assessments and 'make good' arrangements must be negotiated with landholders in areas identified as likely to be affected. Water supply from bores must be made good if there is an impaired capacity.

The *Water Act 2000* also establishes the independent role of the Queensland Water Commission to oversee the management of the cumulative impacts of CSG activities on underground water. The *Water Act 2000* allows for the establishment of Cumulative Management Areas in areas of intensive development where the impacts of water extraction by individual tenure holders overlap.

On 18 March 2011 the Queensland Government declared the first Cumulative Management Area in the Surat and Southern Bowen Basin areas, including the alluvium of the Condamine River. This area is referred to as the Surat Cumulative Management Area (Figure 3).

The Surat Cumulative Management Area was declared after consideration of:

- the location of petroleum and gas operations;

- the geology of the area;
- the potential for interconnectivity between aquifers in the area; and
- the cumulative impacts of water extraction by petroleum tenure holders.

The Queensland Water Commission is preparing a region-wide groundwater model that will identify, in advance, any impacts on aquifers. This model will cover all projects, assist in the development of strategies to manage potential impacts on groundwater resources, and protect the environment from the risk of cumulative impacts. This will avoid any finger-pointing between companies. Groundwater is being managed on a regional scale and the interactions of all projects will be considered at the same time.

Within the Cumulative Management Area, the Queensland Water Commission is responsible for preparing an Underground Water Impact Report covering all CSG tenures. The report for the Cumulative Management Area must be approved by the Department of Environment and Resource Management (DERM). The report assigns responsibilities to individual tenure holders in relation to matters such as 'make good' obligations for bores, management of impacts on springs and monitoring.

The Queensland Water Commission will use the model in preparing the Underground Water Impact Report for the Surat Cumulative Management Area and to make recommendations to DERM about groundwater management.

In addition, the Queensland Water Commission's statewide role is to:

- maintain a database of relevant groundwater information about baseline data and ongoing monitoring data; and
- advise the regulator on matters relating to impacts on groundwater caused by the exercise of underground water rights by petroleum tenure holders, including the adequacy of underground water impact reports prepared by tenure holders outside Cumulative Management Areas.

CSG and the environment

CSG water typically contains highly variable concentrations of salts and other impurities. Queensland's environmental authority regime ensures that this water will be managed in a manner which has minimal impact on the environment or other water users while recognising that, in many cases, it is a valuable resource which can be beneficially reused.

CSG operations in Queensland must conform to the highest standards of environmental responsibility as set out within new and revised government legislation. All CSG operators are subject to rigorous environmental assessment processes and must be issued an environmental authority from DERM before they can commence operations (including exploration).

Additional environmental assessments occur through specialised Environmental Impact Statements processes for large-scale or significant developments (such as large-scale CSG fields,

gas pipelines and LNG processing plants), and also as part of the assessment process for environmental authority applications.

As part of this process, new CSG activities are required to develop an Environmental Management Plan. The Environmental Management Plan identifies and manages potential impacts on the surrounding environment. Where potential risks or impacts are identified, conditions are included in the environmental authority to ensure that the activity is properly managed to minimise environmental harm. The health of the surrounding environment is regularly monitored to ensure the environmental authority conditions are met.

CSG Water Management

The reinjection of CSG water to coal seams or treatment and injection to water supply aquifers must be investigated as a first priority, and pursued where feasible. Injection to water supply aquifers includes virtual reinjection, where treated water is provided to water users in exchange for a temporary reduction in take from their existing groundwater allocation.

CSG proponents are required to assess the potential to use CSG water for aquifer injection or coal seam reinjection, as part of their CSG water management plans, and as a condition of their Commonwealth Government approval.

Industry proponents are undertaking trials in relation to coal seam reinjection and aquifer injection. The Healthy Headwaters project, jointly funded by the State and Commonwealth Governments, is currently progressing studies on a feasibility assessment of injecting CSG water to the Condamine Alluvium. A number of companies, particularly the CSG/LNG companies have been required to undertake injection trials as part of the conditions of their approvals.

Before considering the release of treated CSG water to rivers or creeks, beneficial use must also be considered. Beneficial use includes agricultural, industrial or potable uses and could include growing crops, forestry, supplementing town water supply and industrial use (e.g. power stations). A rigorous approvals process must be followed prior to any of these uses and stringent water quality and monitoring requirements will be imposed to ensure there are no adverse impacts.

As a least-preferred option, disposal of CSG water to a watercourse is conditioned through the tenure holder's environmental authority, issued under the *Environmental Protection Act 1994*. If CSG discharges are allowed to occur, the water must be treated to the standard of the water in the watercourse and the flow regime has to emulate the natural flow as closely as possible.

If the watercourse is also a source of supply for town and community drinking water supplies, drinking water quality standards must be met.

Disposal of CSG water in evaporation dams is strictly regulated and existing dams are being phased out.

Other recent initiatives relating to the management of CSG water include:

- The development of a code of practice, for the construction of CSG wells, which will be mandatory under the *Petroleum & Gas (Production and Safety) Act 2004*. The code will set minimum technical requirements that will minimise risks to groundwater resources. In particular, the code will protect groundwater resources from contamination and pressure loss, both of which can result from poorly constructed or poorly decommissioned wells.
- Legislative amendments to the *Water Supply (Safety and Reliability) Act 2008* to protect health where CSG water is discharged into the environment, including surface waters, aquifer injection and direct augmentation of drinking water. Stringent water quality standards have been set by Queensland Health in accordance with the National Water Quality Management Strategy. The protection of public and environmental health is paramount, and these standards ensure that drinking water supplies will be safe.
- The implementation of legislative amendments to the *Environmental Protection Act 1994* to:
 - restrict the use of BTEX (Benzene, Toluene, Ethylbenzene, Xylene) chemicals in fracking fluids;
 - require new and existing environmental authority holders to submit a plan outlining the proposals for managing of their CSG water. The plan requires operators to identify how they propose to manage their CSG water including criteria against which they are to measure the effectiveness of these management options.
 - require an annual report on this plan which can be used to amend approval conditions.
- A CSG/LNG Hotline (132523) has been established to respond quickly to community enquiries.

DERM is finalising a new guideline and manual for dams constructed as part of an Environmentally Relevant Activity. The guideline and manual will set rigorous new design and performance standards for CSG water and brine dams. This will ensure any impacts from storage of CSG water or brine are minimised and there is no leakage to land or groundwater.

Going forward, the Queensland Government will continue to evaluate Environmental Impact Statements and assess applications for amendment of environmental authorities for the existing CSG projects. Stringent environmental conditions will be imposed of these activities with severe penalties for non-compliance.

CSG Water and the Basin Salinity Management Strategy (BSMS)

The Basin Salinity Management Strategy 2001-2015 provides the framework to manage salinity in the Murray Darling Basin so that salinity export is capped and environmental, economic and cultural assets are protected. The Queensland Government is a partner to the Strategy.

Queensland's obligations to manage salinity in the Queensland section of the Basin (QMDB) are set out in Schedule B – Basin Salinity Management to Schedule 1 – Murray-Darling Basin Agreement of the *Water Act 2007*. These include end-of-valley salinity targets, offsetting of any salt

increases, monitoring and reporting including five year rolling salinity audits and assessment of potential accountable actions.

Release of CSG water directly to river systems is not a preferred water management option under the Queensland Government policy. However, if unavoidable, the CSG water must be treated to a defined standard and the disposal may require an environmental authority under the *Environmental Protection Act 1994*. An approval of treated CSG water discharge to watercourses will consider Queensland's obligations under the Murray Darling Basin Salinity Management strategy where appropriate and relevant to impacts on environmental values. Strict conditions will be applied.

Salt and brine management

CSG water typically contains significant concentrations of salts. The salinity of CSG water is variable and is usually measured by the concentration of total dissolved solids. The total dissolved solids values may vary from 200 to more than 10 000 milligrams per litre.

Under the management framework, unless CSG water is reinjected to the coal seams of similar receiving water quality, or used in an environmentally acceptable way, it must be treated to a standard defined in an environmental authority before disposal, injection to aquifers, or before being supplied to others to be used for a beneficial purpose.

The treatment of CSG water may result in the following waste streams, which must be managed:

- waste water with a higher concentration of salts;
- solid salt left behind after this water evaporates;
- salt contaminated material (e.g. the lining of a dam that contained CSG water); and
- brine from any advanced waste water treatment of CSG water.

The management of waste products must be authorised by an environmental authority issued under the *Environmental Protection Act 1994*, or a development approval under the *Sustainable Planning Act 2009*. Applications for CSG environmental authorities must be accompanied by specific information about how wastes will be managed, treated and disposed of. The CSG operator must show how they have worked through the waste management hierarchy.

The government requires CSG operators to demonstrate that waste management proposals have considered the most acceptable solution first, before considering less acceptable solutions.

For the management, treatment and disposal of brine and solid salt, the waste management hierarchy in order of preference is:

- First, waste reuse or recycling by chemically processing or treating brine, or salt residues, to create useable or saleable products (e.g. soda ash);
- Then, injection of brine into a natural underground structure that is geologically isolated and does not contain groundwater that could otherwise be used for potable or agricultural purposes;
- Then waste disposal of:

- solid salt (not including brine) disposed of in an existing licensed regulated waste disposal facility; or
- salt (not including brine) into a purpose built licensed regulated waste disposal facility on freehold land owned by the CSG operator. The CSG operator can only locate purpose-built facilities on land they own. If salt is to be disposed of in this way the CSG operator must ensure that the footprint and the number of any purpose-built facilities is minimised.

Protecting groundwater quality

The Queensland Government has amended its environmental laws to ensure that BTEX chemicals are not actively used in fracking activities and has introduced BTEX standards which set tough benchmarks that all petroleum and gas (including CSG) operators must comply with.

The BTEX standards apply automatically to all new and existing petroleum and gas activities as a condition of their approval and are both practical and enforceable with heavy penalties for non-compliance.

The standards ban the addition of BTEX chemicals in fracking fluids. The standards, which aim to protect environmental and human health, reflect established levels in the Australian Drinking Water Guidelines and the Australia and New Zealand Environment Conservation Council Guidelines for Fresh and Marine Water Quality.

Overview of the CSG Project Assessment Framework

Together, State and Commonwealth regulatory assessments are the primary point of control of project development. This is an ongoing process and includes the future sharing of information such as the Underground Water Impact Reports and groundwater modelling work undertaken by the Queensland Water Commission.

Both State and Commonwealth conditions require progressive monitoring by CSG operators and are adaptive to allow adjustment to approvals on the basis of monitoring results. This allows any unforeseen environmental impacts to be addressed by the proponent if they arise. It ensures that the proponents, not the environment, bear the risk of outcomes departing from projections.

State Assessment

Carrying out CSG activities requires a Petroleum Lease (issued under the *Petroleum and Gas (Production and Safety) Act 2004*). Prior to the issue of a petroleum lease the proponent must obtain an environmental authority under the *Environmental Protection Act 1994*. Applications for environmental authorities for major CSG projects may trigger assessment by Environmental Impact Statement either under the *State Development and Public Works Organisation Act 1971* or the *Environmental Protection Act 1994*.

Environmental authorities regulate many aspects of a CSG project. An Environmental Management Plan, including a Coal Seam Gas Water Management Plan, is required to support an application for an environmental authority. The Environmental Management Plan must comply with the relevant provisions of the *Environmental Protection Act 1994*. CSG activities should also address the requirements of the following policy and guidelines (available on the DERM website):

- ‘Coal Seam Gas Water Management Policy; and
- ‘Preparing an environmental management plan for coal seam gas activities’

The Government’s *CSG Water Management Policy* will prevent salt produced through CSG activities from contaminating the environment and encourage the beneficial use of treated CSG water.

To ensure that any risks to the environment from the typically salty CSG water are managed, proposals are subject to a stringent environmental assessment process. Applications must be supported by detailed information regarding:

- volumes and quality of CSG water expected to be produced;
- the management options that will be employed to ensure the environment is protected;
- treatment, storage and disposal of the water;
- criteria against which the success of the management options will be assessed; and
- actions that will be taken if the criteria are not satisfied.

The Queensland Government has taken proactive steps by introducing an adaptive management framework to regulate CSG water management. This framework can respond to any unforeseen issues that may arise due to the inherent uncertainty around forecast quantities and qualities of CSG water to be produced. CSG companies are required to report annually to the government on their water management program. The Government has the power to require improved water management practices and amend approvals to enforce environmental standards.

The *CSG Water Management Policy* also currently deals with:

- use of CSG water;
- previously constructed evaporation dams;
- design standards for CSG water aggregation and brine dams;
- transitional arrangements for existing dams; and
- management of saline effluent and solid salt wastes from water treatment and evaporation processes.

The following policy and guidelines (available on the DERM website) are also relevant:

- ‘Approval of coal seam gas water for beneficial use’; and
- ‘Model conditions for coal seam gas activities’.

Both of these documents assist and inform DERM’s decision-making, and ensure the process is transparent and consistent.

Commonwealth Assessment

Separate approvals apply at a Commonwealth level. If a CSG project is likely to affect 'matters of national environmental significance', the CSG project is also subject to approval by the Commonwealth Government under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999*. Some Great Artesian Basin springs are matters of national environmental significance and therefore the major CSG projects proposed have recently been subject to Commonwealth approval.

The Commonwealth approvals set conditions requiring tenure holders to monitor water levels in aquifers and to propose drawdown limits and trigger limits for potentially impacted aquifers. If the extraction of CSG water causes the water level in an aquifer to approach or equal the trigger threshold, a review of activities by CSG operators is required, a further adaptive management system.

Commonwealth approval conditions on LNG projects are considered complementary to the Queensland approval conditions imposed in accordance with the Queensland regulatory framework.

Commonwealth Water Act (2007) - Section 255AA Requirements

An independent expert study was commissioned by the Commonwealth Government to meet the requirements of Section 255AA of the *Water Act 2007* (Cwlth) in order to determine the potential impacts of the proposed CSG developments on southern Queensland alluvial groundwater and rivers forming part of the Murray-Darling Basin system inflows.

Section 255AA of the *Water Act 2007* (Cwlth) states:

“Prior to licences being granted for subsidence mining operations on floodplains that have underlying groundwater systems forming part of the Murray-Darling system inflows, an independent expert study must be undertaken to determine the impacts of the proposed mining operations on the connectivity of groundwater systems, surface water and groundwater flows and water quality.”

Professor Chris Moran from the Centre for Water in the Minerals Industry Sustainable Minerals Institute of University of Queensland was contracted to undertake this independent expert study for the Santos, BG/QGC, and APLNG LNG projects.

The study reported that, consistent with earlier advice received from Geoscience Australia, although water will be extracted from the Great Artesian Basin in some project areas due to CSG activities, the changes to regional groundwater balances in the main alluvial systems of this part of the Murray Darling Basin may be relatively minor. The report also confirmed the importance of an adaptive management regime supported by monitoring and management of groundwater systems.

Additionally it is expected that the regulatory framework imposed by the government will provide adequate surety that the potential impacts of CSG activities can be managed or mitigated, and that any impact on the Basin water resources will be minimised.

Compliance, Investigation, Enforcement and Monitoring

To ensure that the CSG industry complies with the strict new regulatory regime, the government has established an LNG Enforcement Unit in the Surat Basin. Fifty new specialist groundwater, environmental and safety staff have been employed. The new officers have been placed in Dalby, Roma, Toowoomba, Gladstone, Rockhampton, Emerald and Brisbane.

Since November 2010, the LNG Enforcement Unit has received 258 enquiries about the CSG industry. To date, 208 of these enquiries have been resolved and 50 are currently being investigated.

Of all enquiries and complaints case managed by the LNG Enforcement Unit, the vast majority have been finalised by providing information to landholders in addition to facilitating their contact with CSG proponents, ultimately resolving their concerns.

Of all complaints and enquiries received to date, only 47% relate to a CSG company and fifteen can be directly attributed to CSG activities. To date, no landholder bores have been found to have been impacted as a result of CSG water extraction and six are currently being investigated.

The LNG Enforcement Unit has also undertaken a range of compliance activities in relation to CSG matters. A proactive compliance plan is in place to closely monitor company actions. 300 water bores will be inspected for quality and level in 2011. A further 300 will be inspected in 2012. So far, more than 202 bores have been inspected and the monitoring has not detected anything of concern to date. Random audits and inspections of all CSG activities are carried out regularly.

DERM has developed the *CSG/LNG Compliance Plan 2011*. This plan sets out the department's compliance activities to address the key areas of the CSG/LNG industry that have the potential to affect the environment and natural resources. In particular, the focus has been on establishing strong monitoring programs and ensuring effective management of reports and complaints. A total of 187 proactive inspections and audits will be undertaken across an extensive range of CSG operations including dredging, fracing, water discharges and well construction and completion reports. The plan is available on the DERM website at http://www.derm.qld.gov.au/environmental_management/coal-seam-gas/pdf/csg-compliance-plan.pdf.

Term of Reference 2: Land access and valuations

Land Access Laws

The Queensland Government has implemented new land access laws that ensure transparency, equity and cooperation across both the agricultural and resource sectors in relation to access to private land.

The laws give force to the *Land Access Policy Framework* which was developed in close consultation with the Land Access working group comprising of representatives from AgForce, Queensland Farmers' Federation, Australian Petroleum Production and Exploration Association and Queensland Resources Council.

The land access laws include:

- a requirement that all resource authority holders comply with a single Land Access Code;
- entry notice requirements for preliminary activities that will have no or only a minor impact on landholders;
- a requirement that Conduct and Compensation Agreements be negotiated before a company comes onto a landholder's property to undertake advanced activities that are likely to have a significant impact on a landholder's business or land use;
- a graduated process for negotiation and resolving disputes about agreements which ensure matters are only referred to the Land Court as a last resort; and
- stronger compliance and enforcement powers for government agencies where breaches of the Land Access Code occur.

The Land Access Code allows for a consultative approach to land access issues. It clearly set out the Queensland Government's expectations of resource companies for consultation, compensation and behaviour when operating on private land. Importantly, the new Land Access Code provides landholders with greater protection and security in their dealings with resource companies.

While many agreements between landholders and CSG proponents are not reported to government, there are very few instances of formal mediation and dispute resolution processes – indicating that the vast majority of agreements are mutually agreed.

To date, about 600 Conduct and Compensation Agreements have been voluntarily negotiated between landholders and CSG proponents.

Additional regulations have been put in place to deliver transparency in the petroleum and gas industry and ensure landholders are kept fully informed about the type and extent of authorised activities conducted on their land. Companies must give landholders at least 10 business days'

written notice before undertaking petroleum and CSG activities on their land. Companies must again notify landholders in writing within 10 business days of completing those activities.

Mandatory notification applies to the following activities:

- carrying out and completing hydraulic fracturing - notification must include the intended and actual chemicals and volumes used;
- drilling, completing, altering and abandoning a well or bore; and
- carrying out and completing a seismic survey or scientific or technical survey.

Within two months of completing hydraulic fracturing activity, companies must also submit a detailed report to the Queensland Government that includes the composition of all fracking fluids and chemicals used in each well.

Supporting documentation has been released by the Queensland Government and includes factsheets about the new land access laws, a standard Conduct and Compensation Agreement and a negotiation tip sheet for landholders.

Assisting landholders in negotiating with CSG companies

The Queensland Government is funding a training program, to assist landholders negotiate with resource companies. This initiative is being rolled out through detailed information forums and 'FarmShed' workshops.

These workshops outline to landholders their rights and responsibilities under the new land access laws and provide detailed explanation on how to negotiate a successful Conduct and Compensation Agreement. The workshops began in April 2011 and have been positively received.

In addition, the Queensland Government has allocated resources across the state to assist landholders and companies in their negotiation processes. The Department of Employment, Economic Development and Innovation (DEEDI) hosted nine landholder and resource industry information sessions on the new laws in late 2010.

A new DEEDI Mines office was opened in Dalby in January 2011 with a Mining Registrar and Deputy Mining Registrar. These officers are trained in mediation conferencing and are able to assist in negotiations and dealings between landholders and resource companies.

In many cases informal discussions between landholders and resource tenure holders result in positive outcomes. Where mediation conferences are required, these generally result in a negotiated outcome.

Compliance and enforcement under Land Access

The Queensland Government is developing a compliance strategy to ensure compliance with the new land access laws.

In March 2011, a compliance project was initiated in order to develop a regulatory framework to support and ensure the effective implementation of the Land Access Code. A *Compliance and Enforcement Guideline* for the Land Access Code has been developed.

A database has been established to log and record details of landholder and resource tenure holder complaints and issues. The database will be used to establish trends and target education towards high risk and problematic areas and issues. It will also determine the suitability of current education and extension strategies and identify where the current communication strategy can be enhanced.

A proactive communication strategy, combined with a focused education strategy for stakeholders, will ensure more balanced and mutually agreeable outcomes for both landholders and resource companies.

The Queensland Government has developed a proactive annual compliance plan and is also providing ongoing compliance support and guidance for Mining Registrars and regional staff.

Land Valuations

The Valuer-General is the independent head of State Valuations and is accountable for delivering statutory land valuations in Queensland. The powers and responsibilities of the Valuer-General include directing, controlling and managing the statutory valuation of land in accordance with the *Land Valuations Act 2010*.

Land valuations for rural lands affected by CSG operations currently include allowances for the effect of CSG projects on the land value as a precautionary measure. The allowance applied depends on the number of wells and extent of supporting infrastructure (for example pipelines and roads) and other relevant factors.

Due to the infancy of the industry and the subdued state of the rural property market, at this point in time, there is insufficient market sales data to provide definitive evidence about the impact of CSG operations on land values. Offsets for any negative impact on land values can be part of the negotiations for a Conduct and Compensation Agreement.

Term of Reference 3: Sustainability of prime agricultural land

Strategic Cropping Land

Agricultural land resources are important to Queensland, supporting regional communities and providing a resource base for food and fibre production.

The Queensland Government is committed to protecting the best of Queensland's cropping land, known as strategic cropping land. The Queensland Government's policy position is that strategic cropping land is a finite resource that must be conserved and managed for the long-term. Such land should be protected from those developments that would result in its permanent alienation (that is, when a use on or near strategic cropping land will endure for 50 years or more and prevents cropping during that time or in the future) or diminished productivity.

Strategic cropping land is subject to a range of competing land uses, including agriculture, resource developments, and urban development.

The strategic cropping land policy will be implemented through three legislative and planning tools:

- A new Act specifically for strategic cropping land resources – the legislation will describe how strategic cropping land is identified and will include indicative trigger maps of where strategic cropping land may exist. Criteria will then be used for validating on-site whether the land is in fact strategic cropping land. The legislation will provide a process for assessing and deciding whether development can proceed on strategic cropping land. It is intended that the strategic cropping land legislation will be introduced into Parliament in late 2011.
- A new State Planning Policy under the *Sustainable Planning Act 2009* – a new State Planning Policy will guide planning and development assessment under the *Sustainable Planning Act 2009*. The new State Planning Policy will operate in tandem with *State Planning Policy 1/92: Development and the Conservation of Agricultural Land*, which protects a broader range of agricultural land from development.
- Amendments to resources tenure legislation (including the *Petroleum and Gas (Production and Safety) Act 2004*) will be made to recognise the requirements of the new Act. These amendments will require assessment of the impact on strategic cropping land and will condition tenure accordingly.

The legislation will ensure that proposed developments that may impact on strategic cropping land are assessed. Developments such as CSG, mining, urbanisation and permanent forest plantations will all be assessed if they are proposed on land likely to be strategic cropping land on the strategic cropping land trigger maps.

The proposed criteria for identifying strategic cropping land on-ground were developed by Queensland Government soil scientists and agronomists together with independent soils experts. The criteria also underwent stakeholder feedback, technical assessment across 128 sites in Queensland, as well as an independent expert review undertaken by an experienced soil scientist.

Strategic Cropping Land in the Murray-Darling Basin

The strategic cropping land trigger map identifies land within the Murray Darling Basin, ranging from Toowoomba and Warwick to as far west as St George and Roma. While the trigger map is a broad scale indicator of likely strategic cropping land, it is the on-ground assessment against the strategic cropping land criteria that will define the extent of protection at a property level.

Two areas of strategic cropping land are identified on the strategic cropping land trigger map:

- *Strategic Cropping Protection Areas*: areas of the State that are under imminent development pressure – one in Central Queensland in the Emerald-Springsure region, and one in Southern Queensland covering the Darling Downs, Lockyer Valley, Granite Belt and South Burnett. The Strategic Cropping Protection Area (Southern) includes areas of the Murray Darling Basin such as Stanthorpe, Warwick, Toowoomba, Oakey, Dalby and Chinchilla; and
- *Strategic Cropping Management Area*: includes many regions that are important to Queensland's cropping and horticultural industries. The Strategic Cropping Protection Areas includes areas of the Murray Darling Basin such as Goondiwindi, St George, Surat, Roma, Miles and Tara.

The trigger maps are available on the DERM website at <http://www.derm.qld.gov.au/land/planning/strategic-cropping/mapping.html>. The trigger map for the Southern Strategic Cropping Land Protection Area is at Figure 4.

Strategic cropping land that is part of the Strategic Cropping Protection Areas:

- Will be land that meets the strategic cropping land criteria; and
- Will not be able to be permanently alienated by development, except in rare and limited exceptional circumstances.

Strategic cropping land that is part of the Strategic Cropping Protection Areas:

- Will need to have a history of cropping;
- Will need to meet the strategic cropping land criteria; and
- Will be strongly managed by requiring any proposed development to avoid and minimise to the maximum extent possible any impacts on identified strategic cropping land. Where this is not possible and strategic cropping land will be permanently alienated, the development proponent will be required to mitigate their impacts to ensure Queensland's agricultural cropping productive capacity is maintained.

Examples of developments that may permanently alienate strategic cropping land include open-cut mining, long-wall mining, large water storage ponds and compressor stations (such as those used in CSG operations). These activities can result in long-lasting changes to the soil caused by new construction, extensive excavation, subsidence or contamination of land.

The policy will also apply to activities that have a temporary affect on strategic cropping land. These are activities where the land is able to be restored to its previous strategic cropping land condition at a later date. For example, activities such as pipelines or wells associated with petroleum and gas production and geothermal developments generally have a smaller footprint and may have a temporary impact. These activities will still be assessed under the strategic cropping land policy to ensure appropriate conditions requiring full restoration are applied.

The strategic cropping land policy is a key component of an integrated set of policies across government that deal with the co-existence of the mining and agricultural sectors. These include the land access policy framework and the coal seam gas water policy.

How the Strategic Cropping Land policy will affect the CSG industry

Well designed CSG operations are very likely to be accommodated under this policy without permanently alienating the land. For example, gas wells and pipelines are usually considered to have a temporary impact. This type of infrastructure carried out in an appropriate manner is likely to be able to proceed on strategic cropping land.

High impact CSG infrastructure such as water storage ponds and gas compression stations permanently impact on strategic cropping land and a proponent would not be able to undertake these activities on confirmed strategic cropping land in Strategic Cropping Protection Areas, except in limited 'exceptional circumstances'.

Some CSG companies are already making efforts to structure their developments in a way which facilitates co-existence with strategic cropping land. For example, CSG proponents who have committed to actions such as:

- increasing the spacing between wells and adopting a flexible approach to the placement of wells;
- undertaking a trial of constructing and restoring a transmission pipeline on intensively farmed land using world-leading practices to demonstrate that soils can be removed and replaced in layers to maintain the existing soil profiles; and
- Ensuring that the area can be rehabilitated with precision to minimise impacts on farming businesses.

State Planning Policy 1/92: Development and the Conservation of Agricultural Land

In addition to the strategic cropping land policy, the Queensland Government has a long standing commitment to protect the State's valuable land resources. This commitment was outlined in *State Planning Policy 1/92: Development and Conservation of Agricultural Land* (State Planning Policy 1/92).

State Planning Policy 1/92 was introduced to protect a broad range of agricultural land in Queensland through local government planning, including land that may be used for grazing, cropping and other agricultural activities.

Before areas are designated for urban development, significant public consultation and assessment processes are undertaken including consideration of agricultural land under State Planning Policy 1/92. All local governments within the Queensland section of the Murray Darling Basin are required to address the issue of protecting good quality agricultural land to the satisfaction of the Department of Local Government and Planning, and DERM. State Planning Policy 1/92 will continue to apply to the broader range of agricultural land not captured under the proposed Strategic Cropping Land State Planning Policy.

Australia's food task

The Queensland Government is currently developing a food policy - *Food for a Growing Economy: An Economic Development Framework for the Queensland Food Industry*. This policy aims to maximise growth in Queensland's food value chain by considering food production holistically. It centres on the following seven themes:

1. reputation and the consumer;
2. innovation, productivity and skills;
3. planning and regionalisation;
4. trade and investment;
5. resources, sustainability and the environment;
6. food supply and continuity; and
7. health, safety and food information.

Queensland's reputation for safe food stems largely from adherence to nationally agreed food safety standards. These essentially cover all aspects of food production and processing, right up to the stage the consumer takes their food home from the supermarket or enjoys a meal in a restaurant. Being able to trace food back to its source is a critical element of any food safety system. In Queensland, traceability is the cornerstone of our regulatory food safety schemes in the primary production and processing sectors.

The Queensland Government is cognisant of the unique requirements of 'clean green' food producers in maintaining the integrity of their certified produce. Discerning consumers in overseas markets look for the 'clean and green' products that Queensland has to offer. Maintaining this reputation is critical to attracting investment in the Queensland food sector into the future. For this reason, the Queensland Government is working closely with the Biological Farmers Association to finalise a negotiation tip sheet specifically for organic growers, outlining the kinds of conditions that need to be included in Conduct and Compensation Agreements to enable an organic enterprise to continue to operate on the same land as CSG operations.

Term of Reference 4: Social and economic benefits of CSG mining and the co-existence of mining and other interests

Social and economic benefits for regional towns

An economic impact report commissioned by the Queensland Government indicates that a mid-size 28 Mtpa LNG industry is expected to generate a total of 18,000 jobs (direct and indirect) in Queensland, increase the Gross State Product by over \$3 billion, and provide over \$850 million in royalty revenue annually. Industry investment is expected to exceed \$60 billion, providing increased job opportunities for regional towns and additional royalties to support Queensland Government's ongoing reconstruction efforts and vital infrastructure for long-term economic growth.

To ensure the CSG/LNG industry investment delivers socio-economic benefits for regional towns, the Queensland Government is working with industry to maximise employment opportunities as well as ensure training and supply chain development opportunities exist across the State.

Although the projects are in the early phases of procurement, Australian firms have secured lucrative supply contracts in fields such as construction, engineering, manufacturing, operation and maintenance. Examples include:

- ATCO Structures and Logistics (Brisbane based) - supply of 800 modular housing units for the QCLNG workers camp;
- Enerflex (Brisbane based) - \$193 million contract to assemble compressor units and manufacture triethylene glycol dehydration units in Brisbane for QCLNG;
- Aluminium Boats Australia (Brisbane based) - \$21 million contract to manufacture 3 passenger ferries for the GLNG project;
- Easternwell (Toowoomba based) - \$80 million contract with QCLNG for well drill and completion services;
- Ostwald Brothers (Dalby based) - \$60 million constructions services contract with QCLNG;
- John Holland - \$150 million contract to construct marine offloading facilities for the GLNG project; and
- McMahon Holdings - \$150 million contract to complete downstream construction civil works for the GLNG project.

Ensuring local businesses are given the opportunity to compete for contracts in the CSG/LNG industry is a priority. To this end, the Queensland Government is working with Industry Capability Network (ICN) Queensland to develop a tier barometer to assist small to medium enterprises establish where they fit in the supply chain. To date, ICN Queensland has assisted project proponents with close to 1,000 enquiries regarding local products and services.

DEEDI is also attracting international firms to establish a regional presence and new supply chain capability to Queensland. An example is the attraction of Enerflex, which will establish the first compressor and associated equipment assembly and fabrication plant in the state, creating 190 new jobs.

Along with Skills Queensland and Energy Skills Queensland (ESQ), the Queensland Government has implemented numerous training and skilling programs so local communities are job ready and able to enter the CSG/LNG industry. Initiatives rolled out to date include:

- A \$5 million fund, matched by industry, for the CSG/LNG Industry Training program;
- a funding allocation of \$240 000 for the establishment of a Skills Formation Strategy (SFS) managed by ESQ. The SFS has established:
 - a CSG Drilling Employment and Training program (an initiative of ESQ and BoysTown) and to train 180 people from Indigenous and mature-aged target groups for employment in the 700+ drilling jobs anticipated over the next two years. To date 44 people have completed training and another 15 will commence in Gympie on 14 June 2011.
 - a Gladstone Workforce Skilling Strategy, providing pre-employment training for Indigenous and long term unemployed in the Gladstone region. This program for 210 participants is supported by the Commonwealth Government, the Department of Education and Training and DEEDI. As at 31 May 2011, 65 participants are enrolled.
- the establishment of an internet and telephone hotline (13 25 23) for registration of interest regarding training and employment opportunities.

Moving forward, the Queensland Government will continue to work cooperatively with industry and regional communities to capitalise from the benefits of CSG/LNG industry development.

Managing relationships between the resources sector and other interests

The Queensland Government recognises the need to balance CSG/LNG development with other land uses. This includes supporting the co-existence of the resources sector and agricultural activities.

The Surat Basin Future Directions Statement was launched in March 2010 and provides an effective framework to guide the Queensland Government and our regional partners in responding to the multiple interests of the region to 2030. It covers the local government areas of Toowoomba, Western Downs and Maranoa, with strong linkages through Banana to Gladstone.

The Surat Basin Future Directions Statement includes a number of headline initiatives:

- Surat Basin regional development forum which was attended by stakeholders representing community, industry, and local and state government;

- developing a regional planning framework covering the Surat Basin region, including a regional vision, strategic directions and regional land use patterns;
- determining the preferred settlement pattern for the Surat Basin region to guide planning and service delivery;
- conducting a regional transport investigation and developing a regional transport strategy covering various transport modes as well as alternative or complementary non-infrastructure solutions to transport issues in the region;
- developing a resource town housing affordability strategy;
- developing guidelines to improve the consistency and quality of social impact management plans;
- developing an economic development strategy for the Surat Basin region, focusing on action plans to drive growth in the region's priority sectors and attracting investment to take advantage of the region's growth potential;
- continuing to develop and implement the land access policy framework to address land access issues between agricultural and resource sector stakeholders;
- developing a coordinated workforce development plan to support ongoing workforce needs arising from the impacts of rapid industry growth in the Surat Basin;
- developing a policy and planning framework to manage strategic cropping land to strike a balance between the competing land use interests of agriculture and mining; and
- continuing to implement the *CSG Water Management Policy* initiatives including developing guidelines for performance standards to be met by beneficial uses of CSG water and implementing an adaptive approvals regime.

Significant obligations have been placed on CSG/LNG proponents through conditions imposed on developments to mitigate the cumulative growth impacts of their projects. CSG/LNG proponents are required to assess the cumulative impacts on regional infrastructure such as roads, railways and housing. Government approvals will be conditioned in order to manage the identified impacts on significant regional infrastructure.

In addition, CSG Engagement Committees have been established as part of the Queensland Government's consultative approach to managing relationships between the CSG/LNG industry and other land interests. A Surat Basin CSG Engagement Committee has been established as well as two regional CSG committees with a focus on the Roma and Dalby areas.

The Surat Basin CSG Engagement Committee is chaired by former AgForce Queensland president John Cotter who, as a landholder, brings a vast experience in regional and rural issues to the position. The mayors of the Western Downs and Maranoa regional councils and the Deputy Mayor of the Toowoomba regional council serve on the Committee, as do the chairs of the Basin Sustainability Alliance, Jimbour Action Group, and Concerned Landholders Roma North group.

Part of the ongoing work of the Committee includes:

- investigating options for improving communications with the community in relation to water quality monitoring; and
- exploring ways to improve the partnerships between the CSG companies and landholders in relation to the existing agricultural business being conducted on the farm.

Term of Reference 5: Protection of human health

While the health impacts of CSG operations are considered to be low, the Queensland Government has taken a number of measures to ensure that the CSG/LNG industry does not cause any adverse impacts on human health:

- Human health impacts are assessed as part of the environmental assessment process conducted by DERM. CSG operators must be issued an environmental authority from DERM before they can commence operations. Queensland Health is consulted if DERM believes that a particular CSG activity poses human health risk. The environmental approval will be conditioned accordingly.
- Under the *Water Supply (Safety and Reliability) Act 2008*, for a CSG recycled water scheme to supply CSG recycled water (directly or indirectly) either into a water source used as a drinking water supply or directly to a drinking water service provider as a source of drinking water, a responsible entity must have an exclusion decision made by DERM, or an approved CSG Recycled Water Management Plan.
- Drinking water supplies will be protected where CSG water is discharged into the environment, including discharge to surface water, aquifer injection or indirect augmentation of drinking water supplies. Queensland Health sets stringent water quality standards for addition of CSG associated water to drinking water sources to ensure that drinking water supplies are protected.
- Gas safety is closely monitored. Current legislation requires robust safety management systems to be developed, implemented and regularly audited by all CSG operators. All activities are subject to risk assessment and adequate controls are required to be in place to manage risk including supervision and training of staff. Industry compliance with this framework requires regular audits, inspections, reviews and investigations. A CSG Well Head Safety Program and associated audit, conducted by the DEEDI, found that 98% of well heads tested showed no reportable leaks.
- The duration of storing fracking water in dams is also specified under environmental authorities issued by DERM, thus minimising exposures to potential volatile organic compound emissions.
- Queensland Health supports air quality monitoring at critical points around the emission sources (evaporation dams and well heads) to confirm preliminary modelling results. These results can be used to assess the health risks.
- Environmental Management Plans (required to be provided as part of the environmental authority assessment process) must include an assessment of the impacts of the petroleum activities on air quality. This assessment includes the identification of the qualities of the air environment that are conducive to human health and wellbeing. It also must include impact modelling of point source air emissions to demonstrate that the ground level concentrations in the air shed for the specified air contaminants in the *Environmental Protection (Air) Policy 2008* are being met. The environmental authority will also contain a prohibition on causing air nuisance.

- A comprehensive compliance strategy has been implemented ensure that CSG operations are undertaken in accordance with the regulatory framework, and human health is protected. Under the *CSG/LNG Compliance Plan 2011* the Queensland Government has committed to undertaking site audits of CSG operations including fracking activities, and sampling of water bores to ensure that reports provided by CSG producers are accurate and verified.

Diagrams and Maps

Figure 1: Extraction of CSG and CSG Water

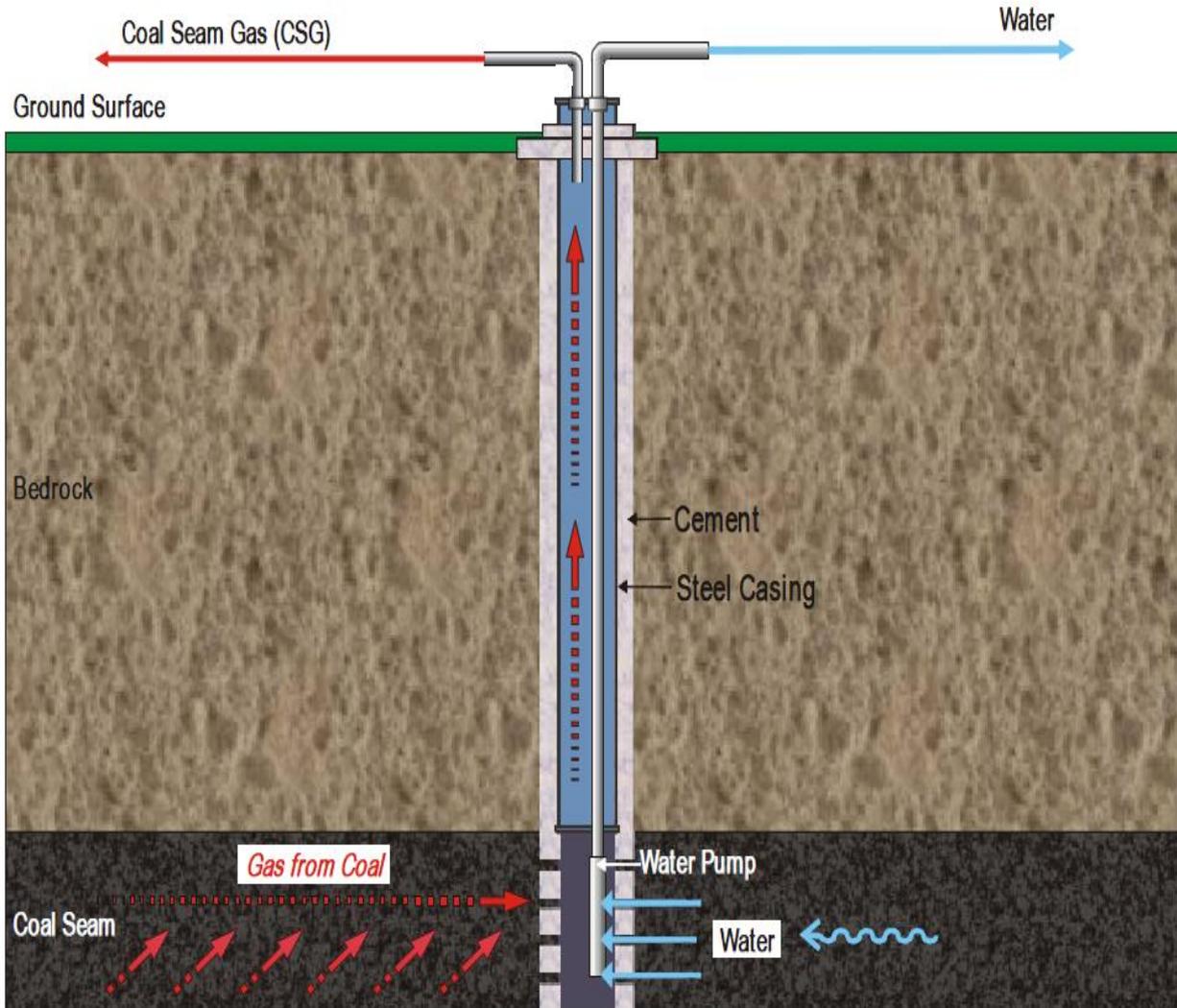


Figure 2: Profile of Water and Gas Extraction

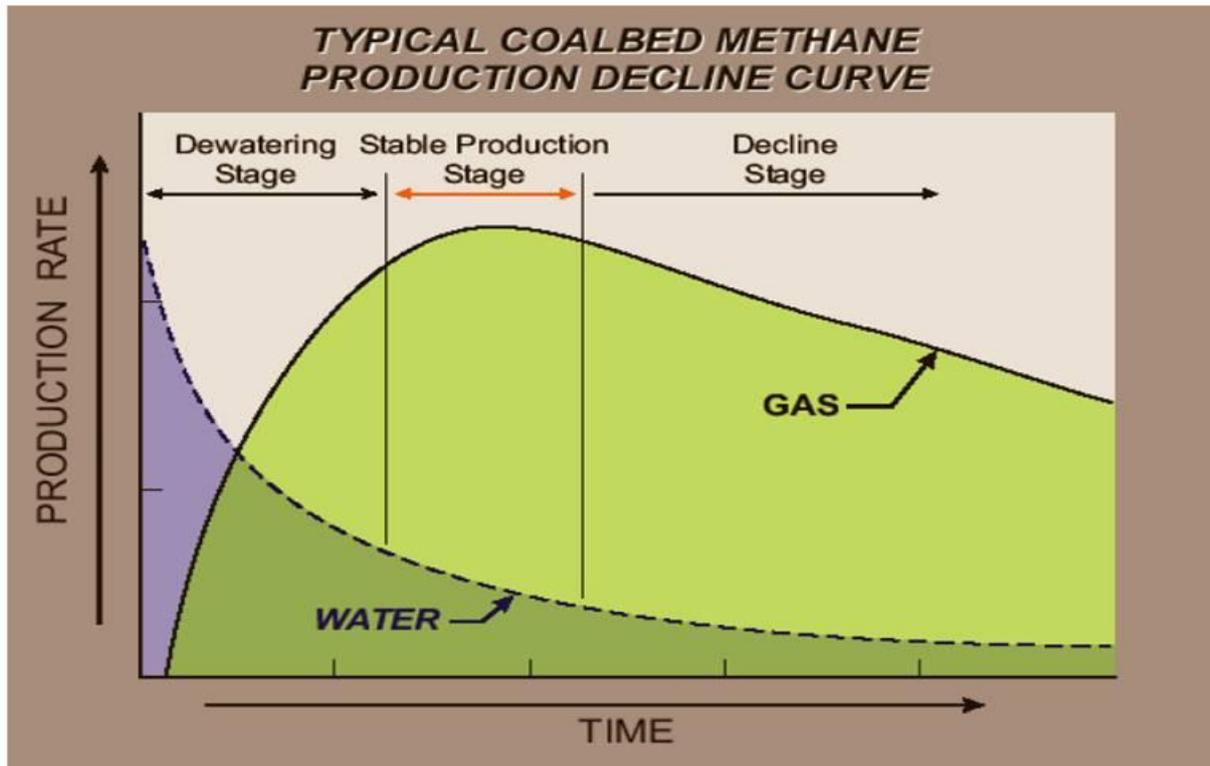


Diagram courtesy of CH4 Pty Ltd (Arrow Energy Limited)

Figure 3: Surat Cumulative Management Area

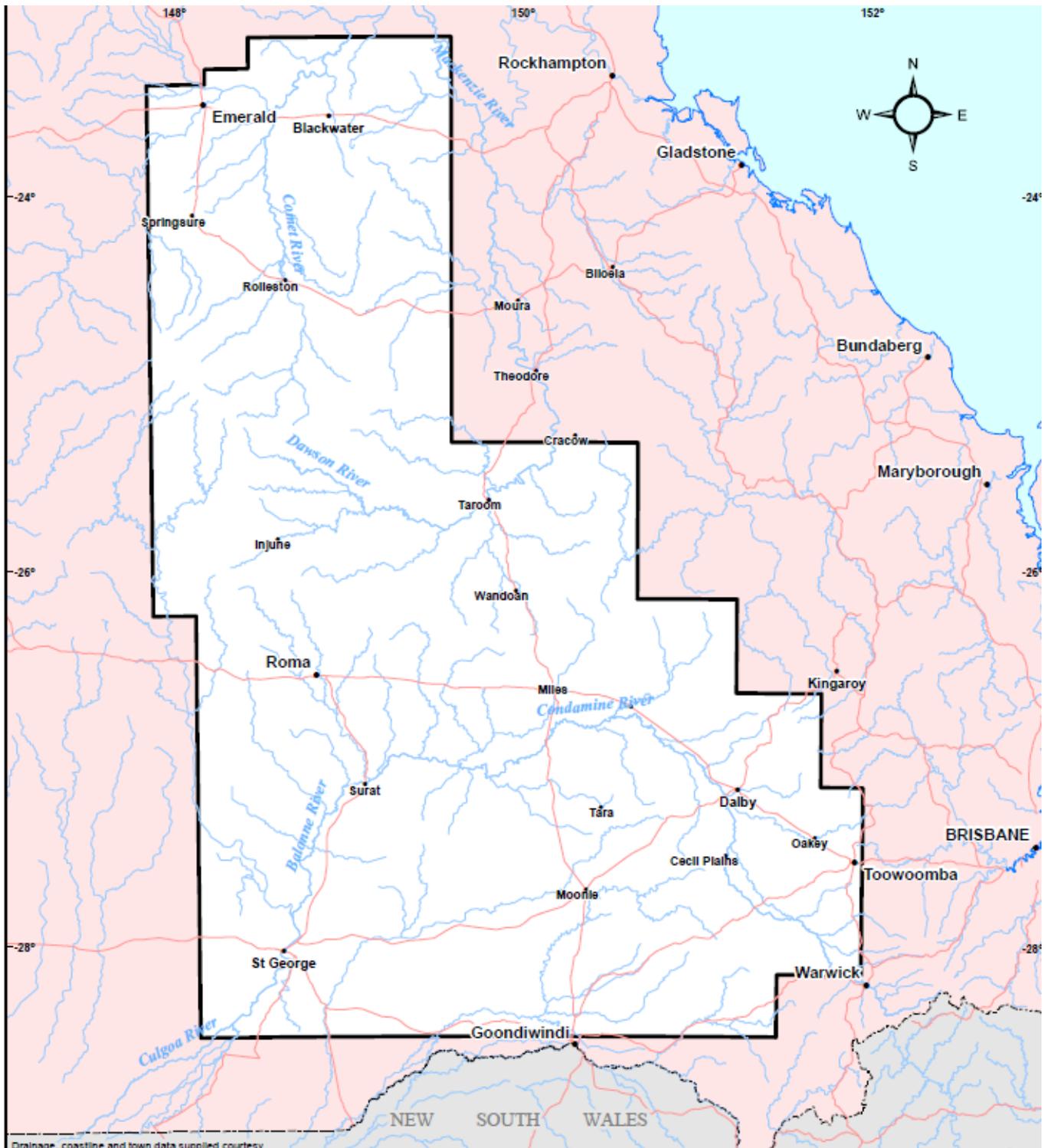


Figure 4: Mapping of Strategic Cropping Land Protection Area (Southern)

