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**Underground Water Management &
Make Good Water Agreements**

“Making Make-Good Good”

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The Beginning

In 2010, the National Water Commission released a “Position Statement – Coal Seam Gas and Water”.

The National Water Commission stated:

“ The Coal Seam Gas (CSG) Industry offers substantial economic and other benefits to Australia. At the same time, if not properly managed and regulated, it risks significant, long term and adverse impacts on adjacent surface and ground water systems”



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National Water Commission raised three main concerns:

1. Low quality CSG water impacting connected surface and groundwater systems
2. Changes in pressure of aquifers due to depressurisation of the coal seam
3. Hydraulic fracturing: increasing risk of connection and cross contamination of aquifers.

Recommended an “***adaptive and precautionary management approach***” to allow for the progressive improvements in the understanding of impacts and cumulative effects of CSG activities and underground water resources.



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In December 2010, The Queensland State Government introduced extensive amendments to the Water Act 2000 (Qld).

Most noticeably:

1. Establish a new regime (entirely new Chapter 3) for managing impacts on underground water as a result of the exercise of ‘underground water rights’ by petroleum tenure holders.
2. Requirement to monitor and assess the impact on groundwater resources
3. Requirement to undertake baseline assessments - a baseline assessment plan must be developed
4. Establish benchmark data
5. Requirement for ‘Make Good’ Agreements for adversely affected bore and licenses



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- *Section 185 of Petroleum and Gas (Production and Safety) Act 2004* provides that *Coal Seam Gas (CSG)* producers have the right to take associated water as a necessary activity in the process of extracting CSG.
- Water is considered as a **by-product** and is not used directly in the gas extraction process.
- CSG producers have an obligation to 'make good' the impacts of their water extraction on existing water users.



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The Queensland Water Commission released the "Draft Surat Underground Water Impact Report" (**the Report**) for public consultation in June 2012.

The Report looked at the ground water impacts of coal seam gas development in the Surat Basin.

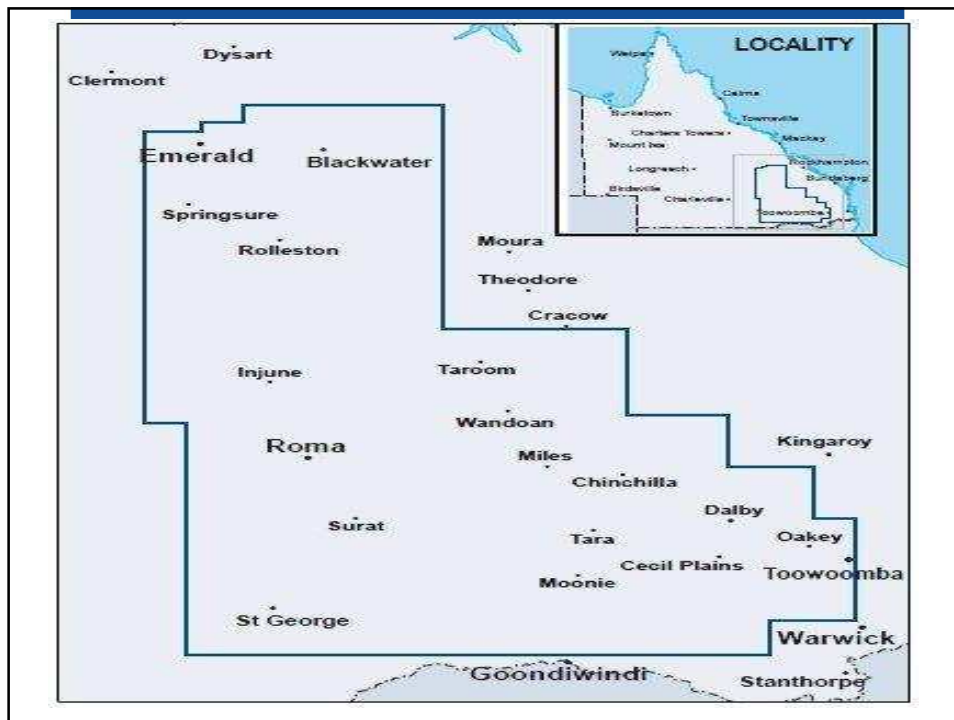
The Report was commissioned on the back of concerns raised by farmers and environmentalists in regards to the risks of irreversible damage being caused to aquifers as a result of CSG activities.

The intent of the report is to monitor and manage the impacts on surrounding water supplies and to 'make good' any impairment to supplies caused by the exercise of these rights.

The Report focuses on the Surat Cumulative Management Area (**SCMA**)



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The report has identified **21,000** water bore within the Surat Basin used for grazing, irrigation, industrial and urban consumption.

Estimated that **215,000 ML** of water is currently extracted from the basin per year.

Water extraction from CSG production is anticipated to be in the order of **110,000 megalitres** of water per year for the life of the industry. Based on approval for 16,000 wells

It is estimated that the water produced over the life of CSG industry would be the equivalent of filling the **Sydney Harbour.....5 times!**



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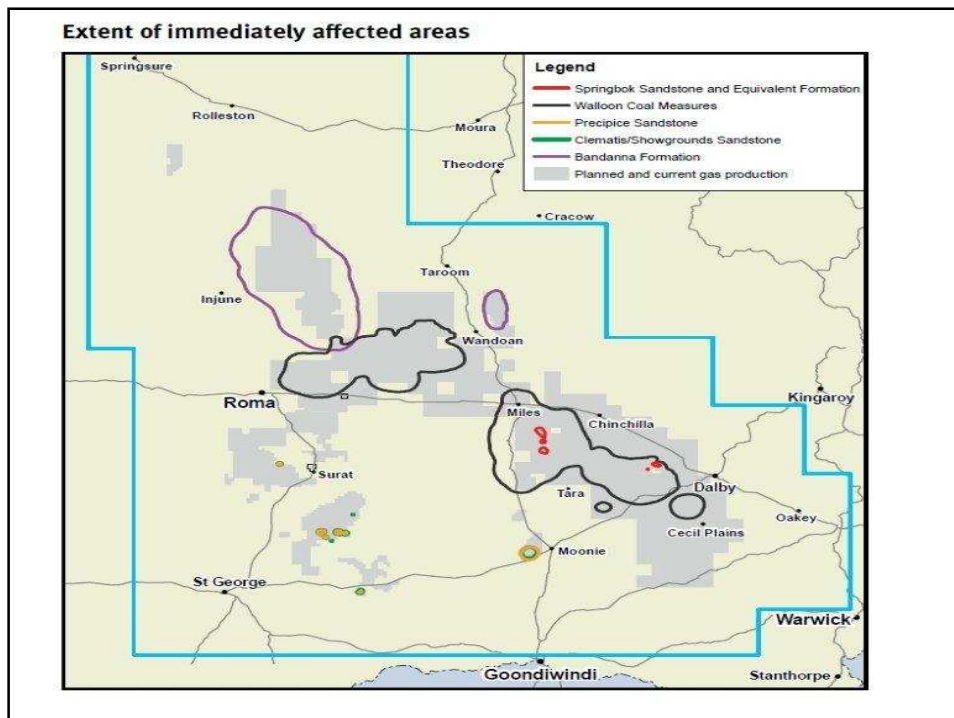
The Report highlights that as result of CSG extraction some aquifers will experience a drop in water levels, in extreme cases up to **150 meters**.

85 registered bores will be adversely affected within the next three years

500 registered bores are expected to experience a decline in water levels over the life of the CSG industry.

71 springs within the SCMA and of those **5 springs** are expected to be adversely affected.

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Long Term Affected Areas

Of the 500 registered bores to be impacted:

400 tap the Walloon Coal Measures;

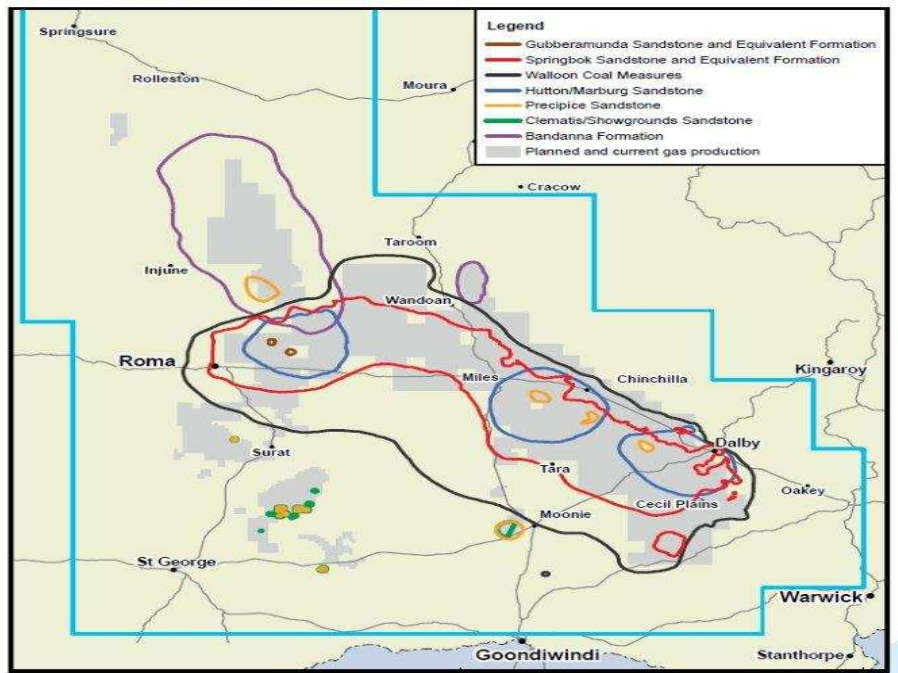
104 tap the Springbok Sandstone;

23 tap the Hutton Sandstone; and

1 bore taps the Gubberamunda Sandstone.



Extent of long-term affected areas



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Bore Baseline Assessment

A **Baseline Assessment** must be undertaken prior to significant CSG production taking place in the local area.

A baseline assessment must include:

- (a) The level of water (standing water height)
- (b) The quality of water (ph, ec, temp etc)
- (c) How the bore is constructed
- (d) The type of infrastructure used to pump water

Do not require a **pump test** to be undertaken.

Do not require inclusion of water yield and recharge rates.

It is a crucial part of the make good process – establishing the existing parameters of a bore **before** CSG water extraction commences.



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Trigger Thresholds

The Water Act imposes '**trigger thresholds**' to determine whether a water bore is being adversely affected.

A '**trigger threshold**' is the amount of decline in water level of an aquifer or bore impacted by CSG operations, over and above the natural variations in water height.

The production of a bore (whether stock and domestic or irrigation) is a complex interaction between:

- aquifer depth and characteristic
- the type of pump used and available water column above the pump
- casing and screen depth
- natural water level fluctuations



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Trigger Thresholds

Due to complexity, it is very difficult to define and ultimately prove what has caused a reduction in a bores performance.

Landholder will blame CSG, CSG will blame natural variability!

In an attempt to counter this, current legislation has applied defined 'trigger thresholds' dependent on the type of bore and its location

These thresholds are:

5 meters: all consolidated aquifers, such as those in sandstone and fractured rock aquifers

2 meters: all unconsolidated aquifers such as those in alluvial aquifers.

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Will my bore be affected?

If you are concerned that your property may be in an area likely to be impacted by CSG companies you can do a simple search to determine what assessment has been conducted on your bore.

All you need is your registered bore number and go to

<http://www.qwc.qld.gov.au/csg/bore-search.php>.

Enter the bore number and relevant details will be provided on your bore, free of charge.

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402 Direction by chief executive to undertake baseline assessment (s402)

If the chief executive reasonably considers the bore is likely, in the future, to be affected by the exercise of a petroleum tenure holder's underground water rights.

The chief executive may, by notice given to the holder, direct the holder to undertake a baseline assessment of the water bore that complies with this section and section 396.

The notice must state the following:

- (a) where the bore is situated;
- (b) why the chief executive considers the bore is likely to be affected by the exercise of the holder's rights;
- (c) a reasonable period within which the assessment must be undertaken;
- (d) that a copy of the notice given under section 405 must be given to the chief executive at the same time the notice is given under that section.



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Make Good Water Agreements

If CSG activities 'adversely affect' or impair the capacity of an existing water bore, then the responsible CSG company must undertake restoration measures to restore the bore's capacity or provide the bore owner with an alternative water supply.

Obligation falls to the petroleum tenement holder within which the affected bore is located to 'make good' no matter whether they have active production in tenement.

Restoration measures can be negotiated between the bore owner and the CSG company.



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Obligation to negotiate general agreement (406)

- (1) This section applies to each petroleum tenure holder:
 - (a) from the start day for the holder's tenure; and
 - (b) until an underground water impact report applies to the holder's petroleum tenure.
- (2) For each water bore the holder reasonably believes has an impaired capacity, the holder must use the holder's best endeavours to negotiate and enter into an agreement with the bore owner of the bore about the following matters:
 - (a) the reasons for the bore's impaired capacity;
 - (b) the measures the holder will take to ensure the bore owner has access to a reasonable quantity and quality of water for the authorised use and purpose of the bore;
 - (c) any monetary or non-monetary compensation payable to the bore owner for impacts on the bore.



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Requirement to enter into make good agreement and reimburse bore owner (s423)

Tenement Holders must use their best endeavours to enter into a make good agreement for the bore with the bore owner by:

- (a) the day that is 40 business days after the bore assessment is undertaken; or
- (b) if the chief executive agrees to a later day—that day.

The holder must reimburse the bore owner for any accounting, legal or valuation costs the claimant necessarily and reasonably incurs in negotiating or preparing a make good agreement, other than the costs of a person facilitating an ADR requested by the bore owner.



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When does a water bore have an impaired capacity (s412)

An **existing water bore** has an impaired capacity if:

- (a) there is a decline in the water level of the aquifer at the location of the bore because of the exercise of underground water rights; and
- (b) the bore can no longer provide a reasonable quantity or quality of water for its authorised use or purpose.

A **new water bore** has an impaired capacity if:

- (a) there is a decline in the water level of the aquifer at the location of the bore because of the exercise of underground water rights; and
- (b) the decline is more than the decline predicted at the location of the bore in the relevant report ie 5 meter in consolidated formation; and
- (c) the bore can no longer provide a reasonable quantity or quality of water for its authorised use or purpose.



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Make Good Water Agreements

Restoration measures may include:

- adding a rising main to lower the pump setting in the bore
- increasing the water column above the pump
- improving pressure at bore head, ie new headwork's and piping
- changing the pump to suit decreased water level in the bore
- deepening bore to allow it to tap a deeper part of the aquifer
- reconditioning of bore to improve hydraulic efficiency
- drilling a new bore
- providing an alternate water supply

The bore owner and CSG company may also agree to a monetary settlement.

If agreement cannot be reached – ADR or Land Court



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Make Good Water Agreements

Enter into a 'Make Good' agreement with companies '**before**' activities commence.

More accurately described as a 'settlement deed' for loss of bore in some cases

Establish clear characteristics of the bore, its capacity and recharge rate

Request companies undertake a '**pump test**' on the bore

Establish clear **trigger thresholds** – including yields and recharge rates

Establish clear make good arrangement and **alternative water sources**

Obtain valuation and expert advice (hydrologist) prior to execution

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Compensation

Section 436 of the Water Act provides that compensation may include:

- (a) Diminution of any of the following because of the impacts on the bore of the exercise of underground water rights by petroleum tenure holders;
 - (i) the value of the bore owner's land on which the water bore is located;
 - (ii) the authorised use or purpose the bore owner has or would have made, of water from the water bore; or
- (b) Any cost to the bore owner, or loss the bore owner suffers, caused by the impaired capacity of the water bore.

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424 Negotiating variation of make good agreement (s424)

If, after entering into a make good agreement for a water bore, either party to the agreement considers a matter stated in the agreement is not appropriate because:

- (a) of a material change in circumstances; or
- (b) 1 or more of the make good measures agreed to is not effective; or
- (c) another effective and more efficient make good measure is available.

Examples

1. The impacts on a water bore because of the exercise of underground water rights are substantially greater than predicted in an underground water impact report.
2. A change in the authorised activities conducted in the area of a tenure is causing a substantial change in the impact of the exercise of underground water rights on aquifer water levels.



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Case study 1 - the baseline assessment

- CSG Company requests access to land to assess bore
- Provides report to landholder and asks to sign-off
- Assessment has bore as not adversely affected
- Assessment has water source from Mooga Sandstone and bore 'abandoned'
- Closer review - bore drill log showed bore sourced water from Walloons and pump difficult to start but not abandoned
- Determined to be potentially affected although outside of CMA area
- Still waiting on response to MGA.



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Case study 2 – the backup bore

- Landholder contacted by CSG for an immediately affected bore
- CSG company undertakes a base line assessment
- Bore was unequipped as solar pump being renewed and not used due to good season
- Baseline assessment comes back that bore will be affected but because not equipped considered to be a “back up” bore only used during drought



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Case study 3 – bore not in affected area

- Landholder outside CMA and affected area
- Located in between three major CSG development fields
- Bore starts to show signs of ‘impaired capacity’
- Contacts local land access agent for CSG which owns tenement
- CSG company claim not to be the cause of the impact and no trigger as outside of CMA



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