

9 October 2024

Mr Darren Moor  
A/g Deputy Director-General, GeoResources  
Department of Resources  
*Proposed CSG-induced subsidence management framework*  
via email [ResourcesPolicy@resources.qld.gov.au](mailto:ResourcesPolicy@resources.qld.gov.au)

**RE: *Review of CSG-induced subsidence management framework***

Australian Energy Producers is the peak national body of the explorers and producers of essential energy – oil, gas and lower-emission fuels.

Queensland's natural gas industry supports 67,600 Queensland jobs, directly spending \$3.9 billion with around 3,477 Queensland businesses every year. In just over a decade, Queensland has built our second most valuable export industry – liquefied natural gas. Today, gas exports from Gladstone generate billions of dollars in revenue for the State, funding essential services like police, nurses and teachers. The size of our new export industry has delivered Queensland's natural gas industry with the economies of scale to reliably supply domestic gas demand. Natural gas from coal seams contributes to the nation's energy needs and agriculture is vital for the nation's food security. Both industries contribute to the Queensland economy through substantial domestic and export supply.

We support the Queensland Government's efforts to establish a practical coexistence framework and the aim to balance the importance to the state of both natural gas from coal seams (coal seam gas) and agricultural development. Effective coexistence is critical for the well-being and success of the sectors that need to work together (petroleum, mining, agriculture and renewables) and the existing approach has largely delivered these outcomes. Today, there are approximately 5,700 Conduct and Compensation Agreements (CCA) signed with landholders. More than \$1.3 billion in access payments have been made to Queensland landholders by the natural gas sector.

We welcome the opportunity to comment on the review of CSG-induced subsidence management framework and thank the Government for withdrawing the framework from the *Mineral and Energy Resources and Other Legislative Amendment Bill 2024* (MEROLA). This framework was the subject to a parliamentary inquiry by the Clean Economy Jobs, Resources and Transport Committee and our submission to the inquiry is [attached](#) to this submission.

We continue to have concerns with several elements of the proposed framework. It is unnecessarily complex and legalistic and seeks to address an issue that has not been fully tested through the numerous existing legislative provisions.

We believe that the existing legislative provisions can be clarified to ensure proponents and landholders are protected while reducing complexity and allowing vital energy production. As such, we recommend that:

- *The Office of Groundwater Impact Assessment (OGIA) deliver regional-level assessment monitoring to quantify the extent of subsidence issues and properties likely to be impacted;*
- *Complete an independent expert review to identify, consider and fully test the existing mechanisms and frameworks (and whether there are any gaps or material issues that cannot be addressed); and*
- *Develop a collaborative approach that addresses those gaps (if any) while focusing on removing duplication and complexity.*

The approach of working together with landholders and peak bodies to simplify the process will ensure a clear and balanced approach.

We have included further comments for your consideration below. If you have any questions about any matters raised in this submission, please contact me on 0434 123 780 or [kknudsen@energyproducers.au](mailto:kknudsen@energyproducers.au)

Yours sincerely



Keld Knudsen  
Queensland Director  
Australian Energy Producers

## CSG INDUCED SUBSIDENCE | PROPOSED MANAGEMENT FRAMEWORK

Australian Energy Producers | 09 October 2024

Australian Energy Producers welcomes the opportunity to provide feedback on the [CSG-induced subsidence management framework](#) which had been earlier excised from the *Mineral and Energy Resources and Other Legislation Amendment (MEROLA) Bill 2024*. These comments should be read in conjunction with our 10 May 2024 submission to the parliamentary inquiry into MEROLA<sup>1</sup>.

Australian Energy Producers supports ongoing and meaningful engagement with landholders and consideration of their concerns, and a clear framework for managing coexistence. We advocate for working together to establish processes that support ongoing development in *both* the agriculture and resources sectors, and the mutual understanding of the needs of all parties.

However, the framework as drafted could have a severe impact on energy supply and investment and increase the frustration and confusion for our members and landholders.

The complex and legalistic framework fails to recognise numerous pieces of existing Queensland and Federal legislation that also manages aspects of CSG-induced subsidence, coexistence and compensation.

### Subsidence and CSG-induced subsidence

To extract natural gas from coal seams, water is removed to reduce the hydrostatic pressure and allow the gas to flow. This process involves two key subsurface processes: fluid flow and gas flow. Fluid flow leads to the depressurisation of the coal seam and coal compaction, while gas flow can induce coal shrinkage (contraction of coal matrix). Both processes can create change in the subsurface rock and possibly result in ground movement at the surface (referred to in the framework as CSG-induced subsidence).

The potential for subsidence because of the extraction of ground water is not unique to natural gas. When a significant amount of water is withdrawn from the ground, void spaces in rock or soil can shrink or collapse, the soil can be compacted, and the ground can subside. This process is covered extensively in water management literature and can be triggered by any activities that extract groundwater – resources, irrigation, stock or domestic use.

How much subsidence occurs on the surface can vary, and is a function of numerous factors, including the width and depth of the coal seam, the change in content, and the physical properties of the coal and overlying strata.

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<sup>1</sup> Australian Energy Producers submission to MEROLA, 10 May 2024, [00000026.pdf \(parliament.qld.gov.au\)](#)

The potential for CSG-induced subsidence to occur is not state-wide; rather it is confined to a handful of properties at the paddock scale in one part of the Surat Basin.

It is worth noting that coal seams have not generally experienced significant historical compaction and subsidence as they have not been previously extensively used for water production. This is due to the water in coal seams being generally too brackish (salty) for traditional agricultural uses. This is different to alluvial water sources which have been dewatered for decades for irrigation and have likely already experienced subsidence.

The potential for subsidence because of natural gas production has been covered in environmental scoping and approval reports for the Queensland natural gas industry (see for instance Arrow Energy Environmental Impact Statement 2011, OGIA's 2019 and 2021 Underground Water Impact Report for example). Environmental approvals and regulatory decision makers agreed that, based on the estimated magnitude of the subsidence (in the order of centimetres to tens of centimetres), and with reference to subsidence assessments for CSG activities in similar geological environments elsewhere, the risk of impacts to environmental values, to surface water and shallow groundwater systems were, and remain, very low. A range of conditions and requirements have been placed on operators to monitor subsidence, and significant investment decisions proceeded as a result of these approvals.

It is important to note that CSG-induced subsidence is not on the scale of subsidence that can occur near underground mining, such as coal mining, which is dominated by the physical removal and managed collapse of meters of strata at depth. The Office of Groundwater Impact Assessment's (OGIA) modelling of subsidence of the Surat Cumulative Management Area currently predicts that most of the cropping area around the Condamine Alluvium is likely to experience less than 10 cm of subsidence, with a maximum change in slope for most areas of less than 0.001% (1 cm per km) and up to 0.004% (4 cm per km) for some areas (IESC, 2024).

### **Status Today**

The natural gas industry in Queensland has demonstrated that the vast majority of relationships with landholders are effective, productive and constructive. 5,700 agreements have been signed with landholders across Queensland, demonstrating that the framework has largely been successful in facilitating coexistence.

However, some landholders, particularly those on the Condamine Floodplain, are concerned that subsidence associated with gas production will impact intensively farmed land. While the predicted subsidence and hence impacts from coal seam gas development are very low, "*small movements can be significant in some circumstances* (IESC, 2014)" and so need to be assessed, managed and mitigated.

Concerns primarily relate to the impact of ground movement on overland flow and the consequential impact on agricultural activity, there are also concerns regarding the impact of subsidence on certain farm infrastructure.

The independent Office of Groundwater Impact Assessment (OGIA) currently produces regional scale predictions and a monitoring framework for CSG-induced subsidence in the Underground Water Impact Report 2021 for the Surat Cumulative Management Area (OGIA). This assessment confirmed that CSG-induced subsidence has occurred and is predicted to occur in the future based on current CSG development patterns.

The translation of the compaction of underground coal seams to a movement of ground on the surface (if any) depends greatly on the geology *and* the land use, as small changes in level and slope may be inconsequential. For instance, low levels of ground movement are unlikely to impact on a property that runs cattle but a change in slope may impact on closely levelled cropping land. In this way, engagement on the occurrence of subsidence is distinct from discussions around the consequences of subsidence (the potential impact on farm operations). While existing approvals and statutes contain provisions relating to subsidence, landholders raised concerns that these do not provide adequate coverage of farm-scale consequences.

In response, the Gasfields Commission undertook two bodies of work in 2022: (a) a review of the regulatory framework; and (b) a project to assess the consequence of CSG-induced subsidence on farming enterprises. (Commission, 2023). They presented a range of recommendations to refine the framework to assess consequence and manage risk.

### **Regulatory Framework**

The Gasfields Commission's 2022 review into the regulatory framework found a range of the relevant regulatory frameworks that manage aspects of subsidence, including:

- *The Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act [Cth]),
- *The Mineral and Energy Resources (Common Provisions) Act 2014* (MERCPC Act);
- *The Water Act 2000* (Water Act);
- *The Environmental Protection Act 1994* (EP Act); and
- *The Regional Planning Interests Act 2014* (RPI Act).

The Gasfields Commission found that the regulatory framework contains "*existing protections (including for economic, environmental and land use impacts)*", however these were generally untested. They also concluded that the regulatory framework is "*complex, multi-faceted and touches on a number of state and federal regulations*".

We recommend that the focus of the Government should be on clarifying the application of the existing untested laws and protections, rather than risk further complicating the regulatory framework by introducing new provisions that rely on implementation details that are not yet available to any stakeholders.

In July 2023, the Department of Resources released a consultation document on coexistence institutions and the CSG-induced subsidence framework. This paper canvassed a range of amendments to implement risk-based management framework for coal seam gas-induced subsidence (CSG-induced subsidence). This consultation abruptly culminated in the legislative amendments presented to stakeholders in the *Mineral and*

Energy Resources and Other Legislation Amendment Bill 2024, which was introduced to Queensland Parliament on 18 April 2024. Industry had not seen any exposure drafts of this legislation.

While we supported aspects of the legislation (such as the risk categorisation process), the proposed subsidence framework is duplicative, overly complicated and technically complex. It further confuses the framework for landholders and industry alike. Image 1 below illustrates our attempt to map the process to follow for achieving an agreement as established in the proposed new subsidence framework.

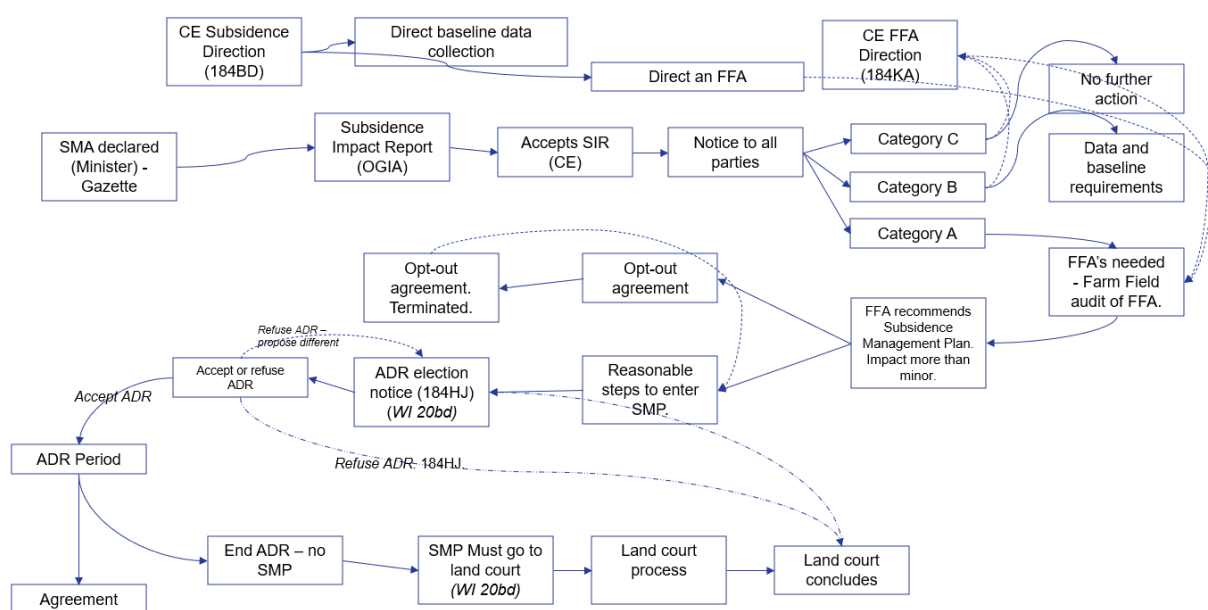


Image 1. Proposed subsidence management framework. MEROLA

Industry also raised concerns about the duplicative nature of the subsidence framework with the other pieces of legislation. For example, impact on agricultural land and compensation provisions are already established in the *Mineral and Energy Resources (Common Provisions) Act* and the *Regional Planning Interest Act*.

Australian Energy Producers provided detailed comment on the Parliament's inquiry into the *Mineral and Energy Resources and Other Legislation Amendment Bill 2024* and these are [attached](#) for your consideration.

### Clarify and strengthen the existing framework

The Gasfields Commission's conclusion in the 2022 review of the CSG induced subsidence is that the regulatory framework is "complex and generally untested", (Gasfields Commission Queensland, 2022). Further progressing the subsidence framework without first clarifying the current untested framework and further defining the problem may result in an over-engineered response and risk add further complexity (see again image 1).

Landholders who could be affected by subsidence are covered under existing agreements, frameworks, and legislation. This includes the *Queensland State Development Public Works Organisation Act 1971*, *Environmental Protection Act 1994*, *Regional Planning Interests Act 2014*, *Water Act 2000*, *Mineral and Energy Common Provisions Act 2014*, the *Petroleum and Gas (Production and Safety) Act 2004* and the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999*. These are detailed in **Appendix A**.

## Duplication

During the consultation on the *Mineral Energy and Other Resources Legislation Amendment Bill (MEROLA)*, Australian Energy Producers raised concerns with the duplicative nature of the provisions. There is a scenario that a landholder and a producer could be negotiating access and compensation under the Petroleum legislation (and with the Mineral and Energy Common Provisions Act provisions), while also engaged in a process for the same land under the Regional Planning legislation. This could lead to parallel dispute resolution process through *both* the planning court and the land court.

This duplication has been acknowledged and not resolved. The Department responded that this duplication would be considered at some point in the future so that the “*regulation complements existing protections*”<sup>2</sup> However, this work is best undertaken *before* complex new legislation is introduced into law.

There is a risk that provisions are not just duplicative but may also be contradictory. For example, if a regional interests authority contains conditions about water, do the conditions of the Environmental Authority relating to water become ineffective as the regional interests authority has 'covered the field'? A further unintended consequence is that there may be many different conditions about the same subject imposed.

Australian Energy Producers suggests that government consider this issue further in consultation with industry.

## Recommended approach

Australian Energy Producers advocates for a subsidence management framework which minimises the uncertainty for landholders and industry. Queensland needs a framework for swiftly assessing subsidence impacts and understanding the consequences of those impacts on the landholder's business.

Economic impacts on farming activity should be rehabilitated and compensated through a transparent and objective science-based system.

Queensland's existing system of make-good agreements for groundwater impacts provides a good template for addressing subsidence impacts (Gasfields Commission, 2024). The connection between groundwater extraction and subsidence risks also suggests that the

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<sup>2</sup> Response to Committee on Mineral and Energy Resources and Other Legislation Amendment Bill 2024

existing framework for having an industry-funded public data set used to independently model impacts is also a sensible starting point for subsidence.

Queensland needs a system where the knowledge, experience and time-series data from landholders is deployed to best understand the farm-scale risks and consequences from subsidence. The subsidence management framework needs to provide incentives for landholders and farmers to share their local expertise in managing and mitigating subsidence impacts.

Australian Energy Producers recommends that the Office of Groundwater Impact Assessment (OGIA) OGIA should immediately commence work on the Subsidence Impact Report (SIR) so that the number of affected properties can be quantified. The industry's expectation, grounded in our experience, is that the impacts are far from universal and perhaps subsidence consequences that need mitigation may only apply to a handful of properties.

Australian Energy Producers recommends that the Department (or perhaps Coexistence Queensland) should host an engagement process with peak industry bodies to simplify and refine the Department's existing subsidence framework. These discussions can help design a management framework that better reflects the full spectrum of existing regulations. Australian Energy Producers is confident that with some goodwill on all sides, many of the important operational details of a simple, practical subsidence management framework, with clear pathways for landholders and proponents can be developed.

Australian Energy Producers note that in May, the view from the Queensland Farmers' Federation (QFF) and Cotton Australia was that existing section 22 of the *Regional Planning Interests Act* (RPI Act) should be retained to ensure the continuation of rights of landholders. Our understanding is that QFF's view remains that the subsidence framework needs to remain anchored in the RPI Act processes. Significant duplication will be introduced if this section is of the RPI Act is retained.

While we have some reservations about the ability of the RPI Act to manage constructive coexistence, we are happy to work towards a solution under the RPI Act, if the other duplicative and potentially inconsistent elements of the existing framework are excised.



## Recommendations

1. The Office of Groundwater Impact Assessment (OGIA) deliver regional-level assessment monitoring to quantify the extent of subsidence issues and properties likely to be impacted;
2. Complete an independent expert review to identify, consider and fully test the existing mechanisms and frameworks (and whether there are any gaps and material issues that cannot be addressed); and
3. Develop a collaborative approach that addresses those gaps (if any) while focusing on removing duplication and complexity.

The view of Australian Energy Producers is that the proposed subsidence framework is not yet fit for purpose. It is too complex, too uncertain, procedurally cumbersome and risks duplicative assessments.

ATTACHMENT A – Existing legislation that covers subsidence.

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p><b>Water Act 2000 (Qld)</b></p> | <p>Chapter 3 of the Queensland <i>Water Act 2000</i> is administered by DESI and prescribes the requirements for the contents of the triennial Underground Water Impact Reports (UWIR).</p> <p>Section 370 of the Water Act creates an obligation on a resource company to give underground water impact reports for a cumulative management area, or a resource tenure. Division 4 outlines the requirement for a UWIR. Section 376(da) <i>a description of the impacts on environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights</i>; Section 376(dbb) <i>an assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights, water management and monitoring strategy.</i></p> <p>Legislative changes in 2016 extended the scope of environmental values to be assessed as part of a UWIR, and both the 2019 and 2021 UWIR independently assessed the risk of cumulative subsidence from gas production in Queensland.</p> <p>The 2019 UWIR for the Surat Cumulative Management Area (CMA) provided a risk-based assessment on the likelihood of subsidence occurring as a result of gas extraction. This assessment identified that risks to Environmental Values (EVs) as low or moderate with the exception of one reach of Woleebee Creek near Wandoan, where the risk is relatively high and further data was required to better understand the resilience or susceptibility of these features to subsidence.</p> <p>Regarding changes to the requirements for UWIR assessments updated in the DESI Guideline <i>ESR/2016/2000 – Underground water impact reports and final reports</i>, the 2021 UWIR was required to provide a risk-based approach to the assessment of impacts from subsidence. Where impacts are predicted, the following is required to be provided:</p> <ul style="list-style-type: none"> <li>• a description of the potential impacts to the physical integrity of confining geological formations</li> <li>• surface subsidence predictions presented on maps with appropriate contour increments and a scale appropriate for assessment of surface subsidence impacts</li> <li>• a description of the methodology used to make the predictions, including an assessment of the accuracy and precision of the predictions</li> <li>• a description of the environmental values of subsided land</li> <li>• an analysis of potential subsidence impacts on environmental values</li> </ul> |
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|                                               | <ul style="list-style-type: none"> <li>• a description of the potential changes in the composition of vegetation communities due to areas of permanent ponding or changed drainage caused by subsidence; and</li> <li>• a subsidence monitoring program including monitoring locations, rationale, methods and frequency.</li> </ul> <p>Specifically, this guideline provides that relevant information submitted and accepted under the <i>Environmental Protection Act 1994</i> (EP Act) requirements can be utilised to address these requirements of an UWIR and that this information builds upon information submitted as part of environmental authority application requirements under section 126A(2)(d) of the EP Act.</p> <p>The 2021 UWIR for the Surat CMA contained comprehensive modelling of CSG-induced subsidence, including development of a 3D geomechanical model for part of the Condamine Alluvium. It also included an analytical model across the Surat Basin and the development and testing of monitoring methods for subsidence including field surveys, securing of remote-sensing data, and follow-up analysis to identify existing areas of subsidence.</p> <p>The key findings from the 2021 UWIR with respect to subsidence included:</p> <ul style="list-style-type: none"> <li>• hundreds of metres of CSG depressurisation will result in a few centimetres of subsidence at the ground surface</li> <li>• OGIA's modelling of subsidence predicts that most of the cropping area around the Condamine Alluvium is likely to experience less than 100 mm of subsidence, with a maximum change in slope for most areas of less than 0.001% (10 mm per km) and up to 0.004% (40 mm per km) for some areas.</li> <li>• natural movement of up to 25 mm/year is observed away from CSG fields while observations from satellite data indicate that about 100 mm of CSG-induced subsidence has occurred around the CSG fields near Condamine Alluvium.</li> <li>• the monitoring strategy comprises the establishment of baseline slope and trend monitoring using airborne and satellite data.</li> </ul> |
| <p><i>Existing obligations under MERC</i></p> | <p>The <i>Mineral and Energy Resources (Common Provisions) Act 2014</i> (MERC) Part 7, Division 1 provides a general liability for resource authority holders to compensate landholders who are affected by the project development.</p> <p>This provision provides a broad basis for landholders to be compensated for any material consequence of a resource activity. Australian Energy Producers believe that this obligation extends to landholders off tenure and on tenure, regardless of whether they are hosting infrastructure.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**Environmental  
Protection Act 1994  
(Qld)**

Gas activities must hold an Environmental Authority and are subject to assessment against the requirements of the Act. Any assessment under the Environmental Protection (EP) Act must look at impacts such as subsidence to environmental values including land. The Environmental Protection Regulation defines the environmental objectives and performance outcomes for land which includes landform and captures activities that disturb land and landform.

The DESI guideline for Environmental Impact Assessment (EIS) assessments (ESR/2020/5312) outlines detailed requirements for the assessment of subsidence impacts:

*If underground mining or aquifer dewatering would cause subsidence of the ground surface, use a suitable and adequate model to estimate where and by how much the surface will subside. Provide a detailed description of the estimated subsidence in the Land section of the EIS. In the Water section of the EIS, use a hydrological model to predict how subsidence would alter and/or retain the flow of water under a range of rain events and flow conditions. Assess the significance of the changes to flow caused by subsidence, including: reduction of downstream flow; increased infiltration due to surface cracks and/or pooling; effects on soil salinity (e.g. due to evaporation of pooled water, or shallower water table); and effects on ecology.*

*Assess how any changes to stream flow, overland flow, or subsidence may impact on groundwater recharge or discharge.*

*Describe measures that would be used to mitigate the impacts of subsidence on water flow and infiltration, and assess any residual impacts.*

The DESI guideline for application requirements for activities with impacts to land (ESR/2015/1839) further outlines the specific requirements for assessing subsidence impacts under the EP Act, with specific reference to the environmental value of land as outlined on the following page:

**Guideline**

Application requirements for activities with impacts to land

**Subsidence**

Where the proposed ERA involves, or may involve, **subsidence** applicants are encouraged to provide details of how this will be managed within a **subsidence** management plan. The management plan should include options for mitigating any impacts associated with **subsidence** and specify how these mitigation methods will be implemented.

The management plan should address all of the potential impacts resulting from **subsidence** at the site, including:

- The physical condition of surface drainage:
  - erosion
  - areas susceptible to high levels of erosion such as watercourse confluences
  - incision processes
  - stream widening
  - tension cracking
  - lowering of bed and banks
  - creation of in-stream waterholes
  - changes to local drainage patterns.
- Overland flow:
  - capture of overland flow by **subsided** long-wall panels
  - increased overbank flows due to lowering of high bank watercourses
  - the portion of local and large scale catchment likely to be captured by **subsided** long-wall panels and the associated impacts on downstream users.
- Land condition and future suitability.

The DESI guideline (ESR/2016/3275) Requirements for site-specific and amendment applications – underground water rights also outlines requirements to:

- a description of the potential impacts to the physical integrity of confining geological formations
- surface subsidence predictions presented on maps with appropriate contour increments and a scale appropriate for assessment of surface subsidence impacts
- a description of the methodology used to make the predictions, including an assessment of the accuracy and precision of the predictions
- a description of the environmental values of subsided land
- an analysis of potential subsidence impacts on environmental values
- a description of the potential changes in the composition of vegetation communities due to areas of permanent ponding or changed drainage caused by subsidence; and
- a subsidence monitoring program including monitoring locations, rationale, methods and frequency.

In addition to these powers the EP Act provides multiple powers to regulate subsidence through the grant of an EA or amendment of existing EA conditions:

- s.215 for example, if an OGIA assessment identified specific issues; or
- s.207 (1)(h) as a result of the exercise of underground water rights.

When managing subsidence in the coal sector under the EP Act, Environmental Authorities for coal projects often contain the following conditions:

*A subsidence monitoring program and management plan must be developed and maintained by an appropriately qualified person. The subsidence monitoring and management plan must at a minimum include:*

- a) subsidence monitoring prior to mining;*
- b) rehabilitation methodology if required to ensure achievement of authorised post mining land use;*
- c) land management practices pre and post mining;*
- d) monitoring program that specifies location, frequency and type of monitoring;*

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|                                                         | <ul style="list-style-type: none"> <li>e) include map of soil survey types overlaid with locations of subsidence monitoring transects;</li> <li>f) investigation to be undertaken if subsidence monitoring detects changes in excess of modelled subsidence (interim of 35mm);</li> <li>g) identification of environmental impacts and potential environmental impacts;</li> <li>h) control measures for routine operations to minimise likelihood of environmental harm;</li> <li>i) contingency plans and emergency procedures for non-routine situations; and</li> <li>j) periodic review of environmental performance and continual improvement.</li> <li>k) The subsidence management and monitoring plan must be implemented for all stages of the mining activity.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Conduct and Compensation Agreements (CCA)</b></p> | <p>Conduct and Compensation Agreements (CCAs) are a constructive process for reaching agreement with landholders who are immediately impacted by a resource project's development footprint. Australian Energy Producers understand that many companies' standard CCA template contains the provisions akin to those below to manage impacts of CSG induced subsidence:</p> <p><b>Subsidence and overland flow</b></p> <ul style="list-style-type: none"> <li>1. We will monitor the Land for subsidence: <ul style="list-style-type: none"> <li>(a) On a regional scale in accordance with our Commonwealth conditions of approval and will make publicly available an annual report demonstrating compliance with our Commonwealth conditions of approval, including: <ul style="list-style-type: none"> <li>(i) An analysis of regional CSG related subsidence; and</li> <li>(ii) Comparison to the trigger levels required by our Commonwealth conditions of approval.</li> </ul> </li> <li>(b) On a local scale to identify any defects or changes to the surface or subsurface, including sinkholes or variation in surface levels and associated impacts.</li> </ul> </li> </ul> <p><b>Regional Subsidence</b></p> <ul style="list-style-type: none"> <li>1. Should subsidence occur as a result of the production of underground water and gas (Regional Subsidence) and it is determined you have suffered a loss as a consequence of subsidence arising from activities and as demonstrated by the monitoring in clause X.x, we will: <ul style="list-style-type: none"> <li>a) Undertake an inspection of the affected area of land;</li> </ul> </li> </ul> |

- b) Consult with you regarding the extent of impact, options for addressing the impacts and timeframe for implementing the options;
- c) Where remediation works are to be undertaken these works may include but are not limited to backfill with material brought onto the Land, compaction, levelling and reseeded as necessary;
- d) Consult with you about the chosen solution;
- e) Undertake a program of monitoring of the areas affected by Regional Subsidence after the remediation works as set out in clause n(1)(c) have been completed. The terms and frequency of the monitoring program shall be agreed between the parties at the time that the remediation works are completed; and
- f) If the monitoring as referred to in clause x.X indicates that the Subsidence has not been addressed, we will undertake the steps as set out in clauses x.Y a) to (d) and revise the management and monitoring plan.

**Localised Subsidence**

1. Should subsidence or any impacts from overland flow occur (Localised Subsidence) as a result of the Activities as described in Schedule 2, including excavation and construction activities we will remediate the Land affected as soon as reasonably practicable having regard to the nature and extent of the Subsidence and impact from overland flow, the requirements of the Environmental Authority and the Landholder's reasonable requirements for its management.
2. If Localised Subsidence is identified by either party the following process applies:
  - a. The party provides information relating to the Localised Subsidence to the other party;
  - b. We will undertake an inspection of the Land affected by the Localised Subsidence within 3 Business Days;
  - c. We will consult with you in relation to the identified Localised Subsidence regarding remediation works we propose to undertake, and agree the timeframe for the commencement and completion of those works;
  - d. Remediation works may include but are not limited to backfill with material brought onto the Land, compaction levelling and reseeded as necessary;
  - e. Undertake a program of monitoring of the areas affected by Localised Subsidence after the remediation works as set out in clause x.X have been completed. The terms and frequency of the monitoring program shall be agreed between the parties at the time that the remediation works are completed; and
  - f. If the monitoring as referred to in clause x.X indicates that the Subsidence has not been addressed, we will undertake the steps as set out in clauses x.Y (a) to (d) and revise the management and monitoring plan.



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|                                                          | <p><b>Safety</b></p> <ol style="list-style-type: none"> <li>1. Where there is subsidence that presents a safety concern, for example sinkholes, the affected Land will be fenced within 24 hours to prevent injury to people or livestock, and remediation will commence as soon as practicable after our inspection of the affected area of Land.</li> </ol> <p><b>Further Claims for Regional Subsidence and Localised Subsidence_</b></p> <ol style="list-style-type: none"> <li>1. Where you may be eligible to make Further Claims, we will negotiate with you about such claims to address the impact. It is acknowledged by the parties that each claim made by you relates only to that event of subsidence.</li> <li>2. If we do not remedy subsidence or impacts from overland flow in accordance with clause X.X, then clause Y.Y (Dispute Resolution) shall apply.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Regional Planning Interests Act 2014 (Qld)</b></p> | <p>The Queensland <i>Regional Planning Interests Act</i> (RPI Act) regulates gas activity including management of subsidence. In 2022, in response to recommendations from the Queensland Audit Office's (QAO) performance audit report "Managing coal seam gas activities", the GasFields Commission Queensland conducted a review into whether the RPI Act effectively manages the coexistence between natural gas activities and agricultural interests. In the final report of the review involving all relevant stakeholders, the issue of subsidence was not identified. A resource activity or a regulated activity cannot be carried out in an area of regional interest unless a person holds or is acting under a Regional Interests Development Approval (RIDA). The statutory Guidelines (09/14) for the RPI Act requires the following assessments with respect to potential subsidence issues:</p> <p><b>Understanding the condition of land</b></p> <p>Notwithstanding the potential for assessing any activity and site-specific attributes, the basic components of any assessment of pre-activity condition are likely to include the following:</p> <ul style="list-style-type: none"> <li>• terrain, landform and slope</li> <li>• site lithology</li> <li>• current land use</li> <li>• previous site disturbance and modification</li> <li>• site and soil hydrology</li> </ul> |

- *soil surface condition*
- *vegetation and groundcover, including crops*
- *microrelief*
- *soil depth (including depths >1 metre) and*
- *soil profile descriptions, incl. for each horizon or layer.*

#### **Statistical validation**

*Due to the requirement for the restoration of the land to its pre-activity condition, the methodology applied in assessing pre-activity condition needs to be rigorous. This increased rigour extends to the intensity of sites used to characterise an area under assessment. The higher density of assessment sites then allows for meaningful and reliable statistical probabilities to be applied when assessing the success of the restoration, instead of relying on less objective means.*

#### **Restoration plan**

*Information requirements for demonstrating land will be restored to pre-activity condition will be best presented through a detailed restoration plan which contains the following:*

- 1) *information on the nature of impact on the land and methods used to determine impact*
- 2) *characterisation of the pre-activity (current) condition of the land and soils RPI Act Statutory Guideline 09/14 5*
- 3) *evaluation of the nature and risk of any predicted impacts on the land*
- 4) *evidence that scientifically proven and practical methods do exist for restoring the land*
- 5) *detail on the application of the restoration methods including timeframes*
- 6) *a monitoring program including benchmarking and progress milestones*
- 7) *a fully costed estimate of identified restoration works*
- 8) *restoration criteria against which successful restoration can be demonstrated.*

*Environmental Protection and Biodiversity Conservation Act 1999 (Cth)*

In addition to the multiple State powers managing subsidence, subsidence associated with gas production is also regulated through Environment Protection and Biodiversity Conservation Act (EPBC) approvals which require predictive modelling and ongoing monitoring of subsidence. There is an extensive program of assessment, monitoring and reporting regarding subsidence across the Surat and Bowen Basin as a result of existing EPBC approval conditions.

The most recent EPBC approval for a Queensland based gas producer (June 2024) contained conditions such as:

*If a subsidence investigation trigger specified in the Water Monitoring and Management Plan is detected, the approval holder must notify the department in writing within 5 business days of the detection.*

*Within 40 business days of detecting an investigation trigger the approval holder must submit a Subsidence Mitigation Action Plan to the department for the Minister's approval to mitigate harm to protected matters. In preparing the Subsidence Mitigation Action Plan, the approval holder must ensure that it:*

*is prepared by suitably qualified water resources expert;*

- a) assesses the potential extent and severity of actual and potential impacts to protected matters from existing and predicted subsidence, including timing of expected impacts;*
- b) includes commitments from the approval holder to implement suitable mitigation measures, tailored to site-specific conditions, impact cause, timing and magnitude;*
- c) if relevant, includes commitments from the approval holder to implement procedural changes to the Action to prevent further subsidence;*
- d) schedules the implementation of mitigation measures and/or procedural changes, including reporting to the department, tailored to the anticipated timing of impacts; and*
- e) contains procedures to evaluate the effectiveness of the mitigation measures and/or procedural changes and adapt the response accordingly.*

*The approved Subsidence Mitigation Action Plan must be implemented until at least the completion of the Action.*

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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|                                | <p><i>If the Minister is not satisfied with the Subsidence Mitigation Action Plan required, or if the Minister is not satisfied that the proposed mitigation measures and/or procedural changes will prevent further subsidence, the Minister may direct in writing that the approval holder:</i></p> <ul style="list-style-type: none"> <li><i>a) provide specified additional data and/or evidence;</i></li> <li><i>b) implement specified corrective actions and/or procedural changes at the expense of the approval holder; and</i></li> <li><i>c) pause the taking of a specified part of the Action until the Minister subsequently advises in writing that the approval holder may resume taking the specified part of the Action.</i></li> </ul> <p>As another example, a recent EPBC approval (EPBC 2010/5344<sup>1</sup>) conditions the project (condition 13g) to:</p> <p><i>13. Prior to commencement, the proponent must submit a Stage 1 Coal Seam Gas Water Monitoring and Management Plan (Stage 1 WMMP) for the approval of the Minister, who may seek the advice of an expert panel. The Stage 1 CSG WMMP must include:</i></p> <ul style="list-style-type: none"> <li><i>(g) a program to monitor subsidence impacts from the action, including trigger thresholds and reporting of monitoring results in annual reporting required by condition 28. If trigger thresholds are exceeded, the approval holder must develop and implement an action plan to address impacts within 90 calendar days of a trigger threshold being exceeded.</i></li> </ul> <p>On page 11, paragraph 84 of the Proposed Approval Decision Brief (Assessment Report)<sup>2</sup> the department stated that:</p> <p><i>84. The Department is of the view that monitoring, trigger thresholds and corrective actions for subsidence are consistent with the approval conditions in place for the already approved CSG projects and will adequately address subsidence impacts from the project on water resources.</i></p> |
| <p><b>Land Access Code</b></p> | <p>Resource companies undertaking work on private land, including the onshore gas industry, have to comply with mandatory <a href="#">Land Access Code</a>. The Code (schedule 1) contains mandatory conditions relating to land access.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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