

NSW Independent Planning Commission  
Level 3, 201 Elizabeth St  
Sydney, NSW 2000

## **Submission regarding the Narrabri Gas Project**

### **Introduction**

I wish to register my strong opposition to the Narrabri Gas Project (the Project). I have reviewed a range of materials submitted to the Commission as part of their assessment process, including the Department of Planning, Industry and Environment's (DPIE) Assessment Report, evidence provided by the Water Expert Panel (WEP) and materials from Santos's EIS.

I have identified a number of significant concerns associated with this material which I wish to draw to the Commission's attention

In summary, I will submit that the Commission cannot adequately assess the economic and social impacts of the project based on the information available to it. I have conducted a detailed review of the economic analysis prepared by the Proponent and the Department, and have concluded that it does not meet the minimum standard required for an economic assessment of such a project.

### **Expertise and qualifications**

I am a consultant urban and regional planner, specialising in strategic planning and economic analysis. My professional experience has led to me developing expertise in the appraisal of economic and social consequences of planning decisions and their resultant impacts on communities throughout NSW.

I hold a Bachelor of Planning (Honours Class 1) from the University of NSW and I will soon be commencing a PhD in urban and regional planning at the same institution.

I will note that the views expressed in this submission are my own professional opinion and should not be taken as reflecting the views of my employer or any associated institution.

### **Requirements for evaluation under the EP&A Act 1979 and the precautionary principle**

My submission addresses the Commission's consideration of the project as per s 4.15 of the Environmental Planning and Assessment Act 1979 (NSW), hereafter referred to as 'the Act'. The commission is required to take into consideration, among other things:

- s 4.15(1)(b): the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality, and
- s 4.15(1)(e): the public interest.

The decisions of the NSW Land and Environment Court and the Court of Appeal have held that the public interest requires consideration of the principles of ecologically sustainable development (ESD). The objects of the Act at s 1.3(b) include the facilitation of ESD “by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.”

The Act takes the definition of ESD from the Protection of the Environment Administration Act 1991 (NSW), which identifies that the precautionary principle as one of the principles of ESD. The definition of the precautionary principle is outlined below as taken from the POEA Act 1991 at s 6(2)(a):

(2) For the purposes of subsection (1) (a), ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

- (a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
- (ii) an assessment of the risk-weighted consequences of various options,

Within the definition, there are two triggers to determine whether the precautionary principle should be applied, being a situation where:

1. there is the potential for serious or irreversible environmental damage, and
2. a lack of full scientific certainty is present, such as to the extent, likelihood or severity of the potential damage.

When both these triggers have been met, guidance is provided at s 6(2)(a)(i) and (ii), identifying that both public and private decisions should be guided by careful evaluation to avoid this damage wherever practical and an assessment of the risk-weighted consequences of various options.

The precautionary principle has particular relevance to this Project owing to the uncertainty associated with groundwater impacts and the potential for serious or irreversible environmental damage. This point will be expanded upon below based upon material submitted to the Commission as part of its assessment process.

### **Potential for adverse groundwater impacts**

I have reviewed an expert report prepared by Dr Matthew Currell on behalf of the NSW Environmental Defenders Office, which I understand has been submitted to the Commission for their consideration. Dr Currell’s report (2020) identifies that there are significant risks to groundwater quality and quantity associated with the Project, which he summarises as follows:

1. *Groundwater, surface water and land contamination due to leaks and spills of CSG produced water – a saline fluid containing hazardous levels of salt, arsenic and other trace elements. This poses a threat to the quality of groundwater available for potable and irrigation usage and ecosystems in the area.*
2. *Cross-contamination of important shallow aquifers with methane and other hydrocarbons from deep in the Gunnedah Basin. This may result in bore pump failures, secondary impacts to groundwater quality (e.g. contaminant mobilisation) and - in extreme cases - explosion hazard.*
3. *Long term risk of depressurisation and leakage from key water supply aquifers – e.g. the Pilliga Sandstone and Namoi Alluvium - affecting the availability of groundwater for other users in a highly allocated and water-stressed system.*
4. *Risk of land and water contamination with hazardous salt and/or brine produced through treatment of coal seam gas produced water.*

*(Currell 2020, p. 2)*

Currell further notes (2020, p. 2) that the view formed in DPIE's Assessment Report (NSW DPIE 2020a) that project would not result in any significant impacts on people and the environment has not been demonstrated nor supported by all the available evidence.

He sets out that the approach taken by DPIE and the WEP is flawed because the groundwater modelling has not incorporated a robust hydrogeological conceptualisation, with the consequence of preventing decision makers and the public from being able to reasonably make informed decisions regarding the likely consequences, risks, and merits of the project (Currell 2020, pp. 2-3).

As the Commission has had the opportunity to take Dr Currell's evidence into account in its full, original form, I will avoid providing further detailed discussion of his report and move onto the key implications for the Commission's consideration.

- There is evidence showing threats of serious and irreversible environmental damage, which satisfies the first trigger for the application of the precautionary principle.
- There is a substantial degree of scientific uncertainty as the potential impacts, which satisfies the second trigger for the application of the precautionary principle.

This is further reinforced by material presented at a 27 July meeting, where the Commission heard from members of the WEP to obtain further information regarding their work on assessing the impacts of the project. One specific example from this meeting involves answers provided by the WEP in regard to the interconnectivity of aquifers and the potential for diffuse movement of methane between the Great Artesian Basin (GAB) and aquifers closer to the surface. This is best displayed in the following extract, where emphasis has been added to highlight matters relevant for the application of the precautionary principle.

*“The important thing is if it [the transport of methane] takes X million years, and sometimes it can take millions of years for these things to come to the surface, then that’s one thing. If it takes a day or two, then that’s clearly another thing. In this case, there’s no indication this is a rapid process, nor is there an indication this is volumetrically a very significant process. **That would need, you know, a different study, if you like.** So Iverach wasn’t commenting on that.*

*Those are two really important things, you know, the speed at which these things occur. We suspect it might be quite low. And the **volumetrics which again we don’t really have a handle on those** but we’ve no intimation that we’re talking here large volumes. So it’s – look, it would be very surprising if you didn’t get some methane in the system. That would be a real surprise. But you do get some and that’s fine, that’s what we’d expect.”*

(NSW IPC 2020, p. 12)

### **Treatment of the precautionary principle in the Assessment Report and recommended conditions of consent**

Both the Department in its Assessment Report and the WEP have arrived at the view that the groundwater modelling within the Project’s EIS is ‘fit for purpose’ (NSW DPIE 2020a). Further clarification was provided to the Commission at the 27 July meeting with the WEP, where the members of the WEP clarified that the model being ‘fit for purpose’ did not extend to the commencement of Stage 2 of the project and was sufficient only for the commencement of Stage 1 of the project, which involves the drilling of 25 pilot wells (NSW DPIE 2020a; NSW IPC 2020).

NSW DPIE has taken the approach of requiring that the Proponent prepares and periodically updates a transient groundwater model as part of their recommended conditions of consent (condition B37) (NSW DPIE 2020b, p. 20). This model would then be used to assess risks associated with the project and determine the siting of gas wells prior to the commencement of the construction phase of the project (Stage 2).

The updated model is to be applied iteratively in conjunction with a Groundwater Management Plan (condition B38), which is to be prepared by the Proponent prior to the commencement of Phase 1 (NSW DPIE 2020b, pp. 20-24).

The conditions (condition B35) also specify that the Proponent must also ensure that the development complies with a number of water management performance measures, some of which are reproduced herein. The proponent is to ensure (NSW DPIE 2020b, p. 18):

- That negligible environmental consequences to the Namoi Alluvial aquifers and GAB aquifers beyond those predicted in the EIS, including negligible change in groundwater levels, quality, and impact to other groundwater users.
- Negligible change to baseline methane levels in groundwater user bores in the Namoi Alluvial and GAB aquifers.

The recommended conditions also set out that the Proponent must ensure that it has enough water for all stages of the development (condition B27) and, prior to the commencement of each stage, demonstrate that it has adequate water licenses to

account for the maximum predicted water take for the applicable phase (condition B28), as based on the most recent update of the groundwater model (NSW DPIE 2020b, p. 17).

The Proponent is also required to provide a compensatory water supply in situations where water supply is adversely and directly impacted (conditions B30 and B31), with disputes as to whether the loss of water can be attributed to the development activities to be resolved by the Planning Secretary (condition B32) and in situations where the Proponent cannot provide an alternative long-term supply of water, the alternative compensation is to be provided (condition B33) (NSW DPIE 2020b, p. 17).

The Department (NSW DPIE 2020a) and the WEP (NSW IPC 2020, pp. 14-15) put forward the view that any potential adverse or unanticipated impacts will be able to be avoided through the recommended conditions of consent, which is (in their view) a proportional and precautionary response to the risks of serious or irreversible damage to the environment.

I submit to the Commission that accepting this position as put forward by DPIE and the WEP would raise concerns in regard to its assessment of the Project's impacts, as outlined below.

#### **Issues with the treatment of groundwater modelling**

The first point I would like to raise herein relates to the suitability of groundwater modelling for the Commission's consideration of the project. As has been noted, the groundwater modelling in the EIS is considered 'fit for purpose' for the project to proceed to Stage 1 (consisting of further exploration activities) only, with the Stage 1 activities being used to develop a more accurate model of the potential groundwater impacts. In conjunction with the Department's approach to managing groundwater risks, it is evident that there is a real potential for risks to groundwater impacts.

The limitation of the current groundwater modelling, as being fit for the purpose of proceeding to a stage where further modelling can be conducted, is a crucial one in the Commission's evaluation.

The Department's recommended conditions are designed to limit the operation of the Project in a number of circumstances, such as where greater than negligible impacts on the GAB and Namoi alluvial aquifers occur (condition B35) or where the proponent is not able to secure adequate water licenses for a specific stage of the Project (condition B28). This inherently means that Stages 2 and 3 of the Project may proceed at a reduced level of operation or the possibility that it may be unable to proceed at all.

Dr Currell's work has supported this position. I have included an extract of the relevant material below as it provides a detailed explanation of this point.

*"This [the inadequacy of the Proponent's current groundwater modelling] leaves open the prospect that:*

- a) The modelling will not produce sufficiently accurate estimates of indirect water usage from key aquifers to determine the appropriate volumes of licensed usage required to be obtained and protect existing*

values.

- b) *Updating the modelling with improved field data (incorporating the issues discussed above) could result in significantly larger predictions of indirect water usage from the project than the public and decision maker are currently presented with.*
- c) *Obtaining sufficient water licenses to account for more robust estimates of indirect groundwater usage – in a fully allocated system – may not be possible.*

*Alternatively, if the modelling continues to under-estimate indirect water usage via leakage from the overlying aquifer system (including GAB and Namoi Alluvium) following approval, then drawdown and water balance impacts of the project may be under-estimated in the licensing process, creating mis-match between the assumed and actual impact of the gas project, and further deterioration of the condition of an already stressed water resource.”*

*(Currell 2020, p. 27)*

It is evident that the current groundwater modelling used by the Proponent is not able to identify the maximum potential impact which may occur as part of the project, but despite this fact, it has been used as the basis for numerous other pieces of analysis within the Project, such as the social and economic analyses.

Consequently, the outcome of the post-consent process of groundwater monitoring and management in the conditions of consent will inevitably affect the social and economic impacts of the Project.

I contend that the Department’s recommendation for approval in the Assessment Report is flawed as it has failed to incorporate analysis of the social and economic implications of a reduced level of operation in later stages of the project.

I submit that the Commission (and the broader public) is not able to fully consider the merits and risks of the Project, including its social and economic impacts, until the implications of this further modelling work (on both groundwater and broader social and economic impacts) are able to be fully understood. Accordingly, I submit that the Commission should refuse consent for the project.

To illustrate this point further, I have provided a review of the economic assessments provided by the proponent and the Department’s Assessment Report. My review has identified a number of fundamental flaws in the assessment which prevent the economic impacts of the project from being adequately assessed.

#### **Economic analysis presented in the EIS and AR**

The project’s EIS includes a cost benefit analysis (CBA) undertaken by GHD (2016) and a Macroeconomic Assessment undertaken by ACIL Allen Consulting (2016), including the use of a computable general equilibrium (CGE) model to assess the economic impacts of the project.

The Department has commissioned Dr Brian Fisher of BAEconomics to provide a review of the economic assessment conducted by Santos as part of the EIS and the

economic impacts associated with the project more broadly. Further work was produced by Acil Allen Consulting in response to issues raised by Dr Fisher and have been appended to the DPIE Assessment report in his reporting (ACIL Allen Consulting 2018).

The Assessment Report (NSW DPIE 2020a, pp. 110-111) notes that the Department accepts the findings of Santos's economic assessment and Dr Fisher's findings as submitted in a letter to DPIE attached to the Assessment Report as Appendix H2-A.

These above three reports, contained in GHD (2016), ACIL Allen Consulting (2016) and (2018) have been collectively referred to herein as 'Santos's economic assessments'.

As a result of the Department's acceptance of these findings, the faults and omissions with Santos's economic assessments which I will identify in my submission below can be taken as being faults and omissions within the Assessment Report, unless specifically noted otherwise

### **Uncertainty in constraints to operation associated with groundwater impacts**

Santos's economic assessments does not directly incorporate the potential for a reduced level of operation of the project resulting from groundwater constraints (as described above).

In the CBA prepared by GHD, a sensitivity test is provided at Table 5-3 to model the impacts of a 10% reduction in gas production estimates across all years. This has resulted in a decrease in the benefit-cost ratio (BCR) from 1.39 and 1.43 (for the self-generated and grid supplied electricity options respectively) to 1.26 and 1.29 (GHD 2016, pp. 23, 26). This demonstrates that the project's BCR is sensitive to reductions in output, which may be further compounded by variations in the assumed forecast gas prices.

Given the recommended conditions establish that the project's level of operation will be constrained by groundwater impacts (as part of the recommended conditions of consent), along with the fact that the scale of this constraint cannot be adequately determined until the revised groundwater modelling is produced post-approval, this represents a significant risk that the project's BCR is unreliable.

The Assessment Report does not address this concern, despite adopting the constraints on production where groundwater impacts are identified as part of its proportional and precautionary, which would inevitably reduce output. This represents an inconsistency with the approach taken by the Department, and I submit that the Commission cannot rely upon its findings in this regard.

Further to this point, I will detail in the following sections that the Department's Guidelines for assessing such proposals have not been followed.

### **Economic assessment guidelines**

DPIE has produced Guidelines (NSW DPE 2015) and supporting Technical Notes (NSW DPIE 2018) for the economic assessment of Mining and CSG projects, which state:

*"In general, these Guidelines and the Technical Notes must be treated as setting out minimum standards for the economic assessment. Proponents*

*may, at their discretion, present calculations based on alternative methodologies or assumptions. However, if this is done, these alternative results should be clearly presented as supplementary to the main results. Proponents should also present a detailed justification for why the alternative parameters should be considered, along with supporting research and analysis.”*

*(NSW DPE 2015, p. 6)*

The Technical Notes (NSW DPIE 2018, p. 24) state that an environmental assessment of a project’s groundwater impacts should determine “the potential impacts of the proposed project, including maximum potential impact, and the level of confidence for model projections.”

The assessment of impacts is to be conducted through a three-step process.

1. Assess the nature and magnitude of potential impacts of the proposed project
2. Assess the wider implications of these impacts for users of the water resource
3. Evaluate the economic significance of potential impacts on water resources

#### **Timing of guidelines and economic analysis**

I note that the project’s EIS and the supporting analysis prepared by GHD and Acil Allen Consulting were prepared after the 2015 release of the NSW Guidelines and prior to the release of the Technical Notes which support the Guidelines, which were released in April 2018 (NSW DPIE 2018).

Obviously, the economic assessments by GHD and Acil Allen Consulting submitted as part of the Project’s EIS will be unable to respond to the detail contained within the Technical Notes as they had not been produced by DPIE.

Despite this, it has been noted above that further economic analysis was conducted by Santos’s consultants in response to questions raised by Dr. Fisher as part of his review commissioned by the Department. This additional analysis was conducted after DPIE issued the Technical Notes, as evidenced by the supplementary report from Acil Allen Consulting dated 11 September 2018. Dr Fisher’s review did not raise the issue of compliance with Technical Notes when reporting to DPIE (Fisher 2018).

No information was provided as part of the revised economic assessments as to why the analysis was not updated to reflect the Technical Notes, given that the submission was clearly being updated to be compliant with the NSW Guidelines (of which the technical notes are an integral part).

I submit that, given the issuance of the updated economic analysis on 11 September 2018, the revised economic analysis has not been prepared in line with the appropriate NSW Guidelines at that date in 2018, and that the acceptance of the findings in the DPIE Assessment Report represents a position which is inconsistent with the Department’s own policy and is a failure to take into account a relevant consideration. Specific inconsistencies with the Guidelines and Technical Notes will be presented in the sections below.

Furthermore, I submit that the Commission, in its consideration of the project, should take into account the Guidelines and supporting Technical Notes (as they currently



stand) as a model for best practice assessment of projects, irrespective of whether Santos's economic assessments or the DPIE assessment report have adequately incorporated them.

### **Assessing the nature and magnitude of potential impacts**

The Technical Notes (NSW DPIE 2018, p. 27) set out a guide to categorising the extent of mining activity impacts on the water system at Table 1, which utilises the guidance from produced for undertaking a Review of Environmental Factors, to classify impacts as being either 'low adverse' or 'high adverse'. Project proponents are required to consider these characteristics when describing and assessing the potential impact of their proposed activity.

As has been addressed earlier in this submission, there has been the potential for adverse impacts on groundwater identified as part of the Department's Assessment Report and the evidence provided by the WEP, and particularly in Dr Correll's work. Santos's economic assessment does not include an assessment of impacts associated with the project in the prescribed form. This omission is inconsistent with the requirements set out in the technical notes.

The Technical Notes go on to assert that "potentially large adverse effects that are feasible but have a low probability should be considered as being 'High adverse' and discussed appropriately (NSW DPIE 2018, p. 28).

Based on the framework described in Table 1 of the technical notes (NSW DPIE 2018, p. 27), it is highly likely that a large number of the assessable characteristics (e.g. size, scope, level of confidence in predicting impacts) would fall under the 'high adverse' rating. This underscores the fact that the omission of a formal assessment in line with Table 1 of the Technical Notes represents a serious flaw in the Santos's economic assessments and DPIE's acceptance of their findings in the Assessment Report.

### **Assessing the wider implications of these impacts for users of the water resource**

The Technical Notes set out that an assessment of the importance of water resources for other uses is required to be conducted, including an assessment of reliance of other users on the water resource, along with stating "the level of economic analysis should be commensurate with the importance of the water resources being impacted, and the potential quantitative and qualitative impact of the project" (NSW DPIE 2018, p. 28).

Santos's economic assessments contain some discussion of the importance of water resources for other users. Section 2.5 of the macroeconomic assessment by ACIL Allen Consulting (2016, pp. 13-14) notes that agricultural industries within the Narrabri LGA rely heavily on irrigation to support production, with the availability of water being the major constraint for irrigated agriculture, along with the fact that numerous towns within the Narrabri LGA rely upon groundwater for town water supplies.

Reference is made to a report prepared by the Murray Darling Basin Authority (2011, pp. 941, 951) which identifies that Narrabri would suffer an economic shock if the level of irrigated agriculture was reduced, with a larger impact on other towns in the Shire such as Wee Waa. An extract from the conclusions of the report is supplied, noting that for communities within the Namoi Catchment:

- *For a 20% reduction in the long-term cap equivalent (LTCE) water entitlements, there would be significant loss of economic activity in water dependent communities*
- *For a 40% reduction, there would be major loss of economic activity in water dependent communities and significant loss of activity in more diverse centres*
- *For a 60% reduction, a catastrophic loss of economic activity in water dependent communities and major loss of activity in more diverse centres would result*

*(Murray Darling Basin Authority 2011, p. 962)*

This demonstrates an extremely high level of importance of the water resources within the locality, which is required to have a commensurate level of economic analysis as per the Technical Notes (NSW DPIE 2018, p. 28).

Santos's economic analysis assumes that there will be no or minimal impact on groundwater availability and quality resulting from the project, being based on the numerical modelling of groundwater impacts submitted as part of the project. The evidence of the WEP notes that while this modelling is suitable for the project to proceed to the first stage of development, it is not suitable for the project to proceed to later stages. This is evidence of the fact that it is not suitable to determine the maximum potential impact of the project, which is a requirement for consideration under the Technical Notes (NSW DPIE 2018, p. 24).

As a result of this, it is my professional view that Santos's economic analysis does not contain an appropriately commensurate level of analysis to satisfy the requirements of the Technical Notes, particularly in terms of the uncertain and potential impact on agricultural uses, given this industry's significance to the region as demonstrated in the report by the Murray Darling Basin Authority (2011).

I submit to the Commission that the a commensurately high level of economic analysis would require sensitivity analysis using assumptions which identify the maximum potential impact on other water users within the locality. This should incorporate a reduced agricultural output as a direct cost of the project and CGE modelling of the indirect economic impacts of this reduced output within the Project's locality. Qualitative discussion of the potential impacts on townships identified as being at higher economic risk from reduced water availability (e.g. Wee Waa) should also be discussed, given their greater level of exposure to economic shocks to the agricultural industry.

The Commission should also note that there are likely a range of flow-on social impacts which would arise as a result of such economic impacts in these centres which would need to be considered as potential impacts of the Project.

Including such an analysis as I have outlined above would remove this impediment to Santos's economic analysis to meeting the requirements set out in the Technical Notes, specifically to both:

- provide a level of analysis commensurate to the importance of the water resource (NSW DPIE 2018, p. 28), and

- which incorporates consideration of the maximum potential impact and the level of confidence for model projections (NSW DPIE 2018, p. 24).

However, such an analysis is unable to be performed at this time since the total maximum impact on other water users cannot be identified without a more robust groundwater model. I will also note that the Department's proposed approach of producing this modelling post-approval does make provision for these potential impacts to be adequately considered.

### **Evaluating the economic significance of potential impacts on water resources**

The third step set out in the requirements of the Technical Notes involves measuring the economic significance of potential impacts on water resources. This is conducted through two measures (NSW DPIE 2018, p. 28):

- the market price of water, and
- other factors potentially not captured by the market price.

The Technical Notes state that:

*Market prices provide an indication of the value of water in competing uses, and should be considered the primary way to value the impacts on water quantity. The cost of water entitlements and water access rights are direct costs and **should be specifically noted and included in the proponent's operating and capital costs**. These assets may hold a material value at the end of the project evaluation time period, which should be included as a direct benefit for inclusion as part of the CBA, in line with the Guidelines.*

(NSW DPIE 2018, p. 28) [original emphasis]

The CBA prepared as part of Santos's economic analysis does not specifically note the cost of water entitlements and water access rights, with only a single figure being provided for total capital costs, being \$3.57 billion and \$5.47 billion in nominal terms for the construction and operational phases respectively (GHD 2016, p. 15).

Consequently, there are two outcomes which can be inferred, being that the cost of water entitlements and water access rights is:

- included in the CBA as part of the total capital costs of \$3.57 billion, or
- not included in the CBA at all.

Both of these two outcomes constitute a further direct inconsistency with the provisions of the Technical Notes, for which no explanation has been provided. The Assessment Report does not provide further discussion of the matter and accepts the results presented as part of Santos's economic assessments, which again represents a failure of the Department to assess the project in line with its own guidelines.

Conducting the economic analysis in line with the guidelines requires that the project quantify the cost of water entitlements required as part of the Project. The Department's approach in leaving this undetermined at this time, instead being dependant on the outcomes of the groundwater model developed post-approval means that an economic assessment which conforms to the guidelines is not possible until this model has been produced. Consequently, I submit that the economic impacts

of the project are not able to be assessed by the Commission, to the minimum standard required and based on the information available.

**Noncompliance with the minimum required standard**

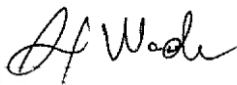
The above points highlight, among other concerns as to the veracity of the economic assessments conducted by both Santos and the Department, that compliance with the guidelines has not been met, and indeed cannot be met until further modelling of the groundwater impacts has been conducted.

The guidelines clearly state *"In general, these Guidelines and the Technical Notes must be treated as setting out minimum standards for the economic assessment"* (NSW DPE 2015, p. 6).

I submit that Santos's economic assessments and the Department's Assessment Report do not meet the minimum standard required for the economic assessment of the proposal.

I further submit that the Commission should set aside the results of this analysis in their evaluation of the likely impacts of the proposed development.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Reg Wade', written in a cursive style.

Reg Wade

**List of references:**

- ACIL Allen Consulting 2016, 'Narrabri Gas Project Appendix U2 - Economic Impact Report'.
- ACIL Allen Consulting 2018, *Narrabri Gas Project - Economic Impact Supplementary Report*.
- Currell, M. 2020, *Expert Report: Risks to groundwater associated with the Narrabri Gas Project*, RMIT University, Melbourne, VIC.
- Fisher, B.S. 2018, *Narrabri Gas Project (SSD 6367) Assessment Report - Appendix H2 - A - Economics Expert Advice*, Sydney, NSW, viewed 6 Aug 2020, <<https://www.planningportal.nsw.gov.au/majorprojects/project/10716>>.
- GHD 2016, *Narrabri Gas Project Environmental Impact Statement: Economic Assessment*.
- Murray Darling Basin Authority 2011, *Guide to the proposed Basin Plan*, Canberra, ACT.
- NSW DPE 2015, *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*, Sydney, NSW.
- NSW DPIE 2018, *Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*, Sydney, NSW.
- NSW DPIE 2020a, *Narrabri Gas Project (SSD 6367) Assessment Report*, Sydney, NSW.
- NSW DPIE 2020b, *Narrabri Gas Project Recommended Conditions*, Sydney, NSW.
- NSW IPC 2020, *Narrabri Gas Project - WEP Meeting*, NSW Government, Sydney, Australia.