



**THE HON MELISSA PRICE MP
MINISTER FOR THE ENVIRONMENT**

Statement of Reasons for decision to approve a management plan under the approval conditions for the Carmichael Coal Mine and Rail Infrastructure Project (EPBC 2010/5736) under the *Environment Protection and Biodiversity Conservation Act 1999*

I, MELISSA PRICE, Minister for the Environment and Energy (**Minister**), provide the following statement of reasons for my decision of 8 April 2019 to approve the Groundwater Management and Monitoring Plan (**GMMP**) dated 15 March 2019 as meeting the requirements of Adani Mining Pty Ltd's *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Approval 2010/5736 Carmichael Coal Mine and Rail Infrastructure Project condition 3.

Approval conditions

1. The approval conditions relevant to my decision are excerpted at Annexure A. These conditions do not form part of the reasons for my decision but are provided as contextual background for my decision.

Background

The approval of the action

2. On 14 October 2015, the then Minister for the Environment, the Hon Greg Hunt MP, approved the Carmichael Coal Mine and Rail Infrastructure Project (EPBC 2010/5736) (**the action**), with conditions.
3. Four groundwater dependent ecosystems (**GDEs**) are defined as water resource Matters of National Environmental Significance (**MNES**) in the approval. These are: the Carmichael River, Mellaluka Springs Complex, Doongmabulla Springs Complex and Waxy Cabbage Palm (which occurs along the Carmichael River and at Doongmabulla Springs Complex).

Purpose and operation of the GMMP

4. The purpose of the GMMP is to monitor and manage impacts to groundwater resources including aquifers of the Great Artesian Basin (**GAB**) and GDEs. The GMMP provides the basis for the early warning detection of any unexpected impacts to the Doongmabulla Springs and implementation of corrective actions if necessary. Approval of the GMMP is required prior to the first box cut, being when coal is first extracted from the mine.
5. Operation of the GMMP supports the implementation of the *Groundwater Dependent Ecosystem Management Plan (GDEMP)* required under approval conditions 5 and 6. I considered the approval of the GDEMP in conjunction with my decision on the GMMP.

Plan submission and review

6. Adani Mining Pty Ltd (the **approval holder**) submitted a GMMP, dated 15 March 2019, for approval under approval condition 3 for the action.
7. The GMMP is a combined document prepared to address both *Environment Protection Act 1994* (Qld) (**EP Act**) and EPBC Act approval conditions. The Department has also consulted with Queensland Government Department of Environment and Science (**DES**) in assessing the GMMP. In making my decision, I only considered whether the requirements under the EPBC Act approval had been met. In this regard, the requirements of the EP Act were only relevant in so far as they were expressly referred to in the EPBC approval conditions.
8. The approval holder first submitted a GMMP to the Department in August 2017 and has produced further iterations in response to feedback from the Department, CSIRO and Geoscience Australia (**GA**).

CSIRO and Geoscience Australia review

9. In 2018, to support the Department's assessment of the GMMP, CSIRO and GA were commissioned to undertake a technical review of the full suite of the approval holder's groundwater management and research plans.
10. CSIRO and GA's final report was received by the Department on 22 February 2019. The review found that the groundwater modelling that underpins the monitoring and management approaches in the GMMP is not suitable to ensure that the outcomes sought by the EPBC Act conditions are met. Specifically, CSIRO and GA found that the approval holder's groundwater model would underestimate impacts at the Doongmabulla Springs and the Carmichael River due to: the unrealistically high modelled flow in the Carmichael River; error in the bore heights used to calibrate the model; and hydraulic conductivity values used for the Clematis Sandstone and Rewan Formation.
11. On 5 April 2019, at my request, the Department met with CSIRO and GA to seek their assurance that amendments to the draft GMMP by the approval holder in response to feedback from the Department had addressed the issues they had raised in their advice. The Department provided CSIRO and GA with:
 - a. a verbal briefing on the actions undertaken by the Department in response to their advice;
 - b. a written summary of the issues CSIRO and GA had raised, what the Department had required of the approval holder in response and how the approval holder had addressed these issues in amended management plans [this document was provided to me in the Departmental briefing on 1 April 2019 and 8 April 2019]; and
 - c. copies of the final GDEMP and the final GMMP [this is the same document that was provided to me in the Departmental briefing on 1 April 2019 that I have approved].

12. In response, on 5 April 2019:

- a. CSIRO indicated that, based on the briefing provided to them, they are of the view that the approval holder's responses should satisfy CSIRO's recommendation to update the groundwater models [that is, at the next scheduled update] and are directed to address the modelling related issues and concerns raised in the advice, noting that there are components of CSIRO's concerns that will need to be addressed through the approval of the research plan [that is, the GAB Springs Research Plan (**GABSRP**) and/or Rewan Formation Connectivity Research Plan (**RFCRP**)].
- b. GA indicated that they are of the view that the approval holder has addressed the issues and concerns raised in their recommendations.

Evidence or other material on which my findings were based

13. In making my decision on 8 April 2019 to approve the GMMP under the approval conditions for the action, I took into account the Departmental briefing and recommendations provided to me on 1 April 2019 about the decision, which included:

- a. GMMP dated 15 March 2019
- b. EPBC 2010/5736 Approval Conditions
- c. CSIRO and GA advice dated 22 February 2019
- d. The Department's summary of CSIRO and GA advice and responses to that advice
- e. Department assessment of the GMMP against approval conditions.

14. I also took into account further Departmental briefing provided to me on 8 April 2019 about supplementary advice from CSIRO and GA, which included:

- a. Correspondence from CSIRO dated 5 April 2019
- b. Correspondence from GA dated 5 April 2019, and
- c. The Department's summary of CSIRO and GA advice and responses (as above).

Findings on material questions of fact

15. My decision and findings on material questions of fact were based on the information specified at paragraphs 13 and 14. I considered that there was adequate information before me to make a decision whether to approve the GMMP.

16. In making my decision, I considered whether the GMMP met the approval conditions. I considered the analysis within the Departmental briefing about each element of the conditions, as below.

The GMMP must be submitted to the Minister for approval at least three months prior to commencing excavation of the first box cut

17. I noted that the GMMP was first submitted on 1 August 2017 and that the version I approved was submitted on 15 March 2019.
18. I noted that condition 4 states the approval holder must not commence excavation of the first box cut until I have approved the GMMP in writing. I further noted that the approval holder has not yet commenced mining operations, nor excavation of the first box cut.
19. Based on this, I was satisfied that the approval holder had submitted the GMMP for approval at least three months prior to commencing excavation of the first box cut.

The GMMP must be informed by the results of the groundwater flow model re-run

20. The GMMP must be informed by the results of the groundwater flow model re-run provided for in condition 23.
21. I noted that the approval holder had re-run the groundwater flow model as required by condition 23 and that the results of the model re-run are described and compared to other available model scenarios in section 2.3 of the GMMP. These other scenarios include the model used in the Supplementary Environmental Impact Statement (**SEIS model**), which predicted the highest magnitude of impacts. I noted that the approval holder had used the results from the SEIS model for the GMMP.
22. I noted the information in the Departmental brief that CSIRO and GA had advised that the SEIS model was the most appropriate of those available to underpin the GMMP.
23. I accepted the advice of CSIRO and GA that the SEIS model was the most appropriate available model on which to base the GMMP. I was also satisfied that this advice had been informed by the results of the groundwater flow model re-run, which had been compared to the results of the SEIS model. I was therefore satisfied that the GMMP was informed by the results of the groundwater flow model re-run provided for in condition 23.
24. I also noted that, while CSIRO and GA found that the SEIS model was the most appropriate of those available, they did not consider it fit-for-purpose (refer paragraph 10). I accepted the Department analysis that it is appropriate for the approval holder to address these identified model limitations at the next scheduled review within two years of the first box cut. I was satisfied that this allows the model, monitoring and management of groundwater to be adapted as further information is obtained and reduces the risk of unexpected impacts over time. I came to this conclusion because:
 - a. the groundwater model re-run required under condition 23 to inform the GMMP has been completed and approved;
 - b. the next scheduled review is required under the EPBC Act and Queensland Environmental Authority (**EA**) approval conditions, as part of requirements for the approval holder to regularly review its groundwater model and update its management plans (refer paragraph 69);

- c. the approval holder has committed in the GMMP to revising the plan following the next scheduled review of the groundwater model within two years of the first box cut. Given the approval holder is required to implement the approved GMMP (see condition 4), I was satisfied that the approval holder would be required to comply with this commitment;
- d. I accepted Departmental advice that there is negligible risk of impacts to GAB aquifers or GDEs within this period; and
- e. I noted supplementary advice from CSIRO and GA on 5 April 2019 (see paragraph 12) that the approval holder's responses should satisfy their recommendations to update the groundwater models.

The GMMP must contain details of a groundwater monitoring network

- 25. Based on the information in the Departmental brief, including the GMMP itself, I was satisfied that details of a groundwater monitoring network were contained in sections 3, 4 and 5 of the GMMP.

The GMMP must contain details of a groundwater monitoring network that includes control monitoring sites (condition 3(a)(i))

- 26. Condition 3(a)(i) of the approval specifies that the GMMP must include details of a groundwater monitoring network that includes control monitoring sites.
- 27. I noted that the description of the groundwater monitoring network in section 5.5 of the GMMP included control monitoring bores, or control monitoring sites.
- 28. I had regard to the Departmental advice that control monitoring bores should generally be located outside the zone of potential impact. I also noted while that section 5.5 of the GMMP explains that this is not always possible as these bores would have to be located outside the mine lease and long-term access cannot be assured, it does identify a number of control monitoring bores that are located outside the zone of potential impact. Additional control monitoring bores inside the zone of potential impact are also identified in section 5.5.
- 29. I noted that the control monitoring bores identified by the approval holder that are located outside of the potential impact zone are predicted to have zero drawdown. I further noted that those control monitoring bores identified by the approval holder inside the potential impact zone have a maximum predicted drawdown below natural fluctuation. I noted the Departmental advice that these bores can be utilised during all phases of the project to monitor natural groundwater level and chemistry changes and then compared to the mine monitoring bore network to aid in assessing if change is due to approved mining or natural fluctuation.

30. I noted the Departmental advice that the intent of this requirement was to ensure the monitoring network was capable of separating out non-project influences on water resources. I noted and accepted Departmental advice that non-project groundwater impacts are likely to be limited in extent and localised and therefore identifiable via the trend analysis methods specified in section 4.7.2.2 of the GMMP. In addition, given the presence of control monitoring bores outside the impact zone (i.e. with zero drawdown), and the limited drawdown predicted at the other identified control monitoring bores, I considered that the monitoring network described in the GMMP would be capable of separating out non-project influences on water resources.

31. On this basis, I was satisfied that the requirement in condition 3(a)(i) was met.

The GMMP must contain details of a groundwater monitoring network that includes sufficient bores to monitor potential impacts on the Great Artesian Basin (GAB) aquifers (whether inside or outside the project area (condition 3(a)(ii))

32. Condition 3(a)(ii) of the approval states that the GMMP must contain details of a groundwater monitoring network that includes sufficient bores to monitor potential impacts on the GAB aquifers (whether inside or outside the project area).

33. I noted the groundwater monitoring network contained in the GMMP includes groundwater monitoring bores that are located adjacent (to the west) of the mine lease within the GAB aquifers (see section 3.1 of the GMMP). In particular, I noted that Table 23 of the GMMP identifies that there will be two bores in the Moolayember Formation, 10 in the Clematis Sandstone, 5 in the Dunda Beds and 7 bores, with multiple vibrating wire piezometers, installed in the Rewan formation.

34. I further noted that CSIRO and GA recommended that the approval holder install more bores to monitor the deeper groundwater units in the central zone between the mine and the Doongmabulla Springs Complex. I noted that, consistent with advice from CSIRO and GA, the approval holder committed, in section 7 of the GMMP, to install additional nested monitoring bores in the Dunda Beds and Rewan Formation at, or within 500m of, three existing Clematis Sandstone monitoring locations between the mine and the Doongmabulla Springs. I further noted that in section 7 of the GMMP the approval holder commits to investigate drilling into deeper Permian age units for the purpose of acquiring data for monitoring purposes and to capture information if required under relevant research programs.

35. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with the commitments in the GMMP concerning the number and location of monitoring bores, including those commitments in section 7 to the installation of the further nested bores.

36. With these additional commitments, I agreed with the Department's advice that the bore network in the GMMP is sufficient to monitor potential impacts on the GAB aquifers (whether inside or outside the project area).

37. For these reasons, I was satisfied that the groundwater monitoring network in the GMMP includes sufficient bores to monitor potential impacts on the GAB aquifers (whether inside or outside the project area). I was therefore satisfied that the requirement in condition 3(a)(ii) was met.

The GMMP must contain details of a groundwater monitoring network that includes a rationale for the design of the monitoring network with respect to the nature of potential impacts and the location and occurrence of MNES (whether inside or outside the project area) (condition 3(a)(iii))

38. I noted that, as per paragraph 3, the approval conditions define MNES to include four GDEs: the Carmichael River, Mellaluka Springs Complex, Doongmabulla Springs Complex and Waxy Cabbage Palm (which occurs along the Carmichael River and at Doongmabulla Springs Complex).
39. I also noted that section 5.6 of the GMMP describes the rationale for the design of the groundwater monitoring network, by reference to each of these four GDEs, including their location and occurrence. The objective for each GDE monitoring bore is described in Table 57 of the GMMP. I noted that these objectives include providing an early warning for, assessing, and verifying the nature of potential impacts. I noted that Figure 27 of the GMMP shows that these bores are located in the vicinity of each GDE and, in the case of the off-lease spring complexes, between the mine and the GDE.
40. I also noted that section 2.2.8 of the GMMP describes three surface water flow monitoring stations located on the Carmichael River, which will allow for identification of impacts on the Carmichael River and associated riparian GDEs. This section also describes that a flow meter has been installed at Joshua Spring, part of the Doongmabulla Springs Complex, to monitor the possible impacts of changes in flow from the spring to the Carmichael River GDE.
41. As per paragraph 34, I noted that, in relation to monitoring of potential impacts on MNES, the approval holder has committed to installing an increased number of monitoring bores outside of the Project area between the mine and the Doongmabulla Springs Complex.
42. On this basis, I agreed with the Department's conclusions that the GMMP contains a groundwater monitoring network that includes a rationale for the design of the monitoring network with respect to the nature of potential impacts and the location and occurrence of MNES (whether inside or outside the project area).
43. I was therefore satisfied that the requirement in approval condition 3(a)(iii) was met.

The GMMP must contain baseline monitoring data (condition 3(b))

44. To meet approval condition 3b, the GMMP must contain baseline monitoring data.

45. I was satisfied that the GMMP does contain baseline monitoring data, based on a formal monitoring network with regular sampling events from 2013 to 2017. I particularly noted that the GMMP describes the expansion of the monitoring network over time and the collation of baseline data, with the final baseline dataset being from September 2011 to April 2017.
46. I noted that the groundwater level baseline data is summarised by GDE location in Table 38 of the GMMP. The Department advised that most of the water level data gathered has been verified through the Queensland Department of Natural Resources, Mines and Energy (DNMRE), and hydrographs exist for over 80 bores. I noted that the approval holder commits to include updated and clearly defined bore reference levels in the model review, and include how any changes to these levels affect model performance. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with these commitments.
47. I further accepted that water quality baseline data was presented in Appendix D for the bores listed in Table 46 of the GMMP.
48. I also noted that the approval holder committed in section 3.5.4 of the GMMP to collecting spatially comparable groundwater level and quality data prior to the occurrence of predicted impacts associated with project activities (i.e. baseline monitoring data) from the additional bores that they will install to monitor the deeper groundwater units in the central zone between the mine and the Doongmabulla Springs Complex, in response to the recommendation by CSIRO and GA. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with this commitment.
49. For these reasons I was satisfied that the GMMP contained baseline monitoring data and was therefore compliant with approval condition 3(b).

The GMMP must contain details of proposed trigger values for detecting impacts on groundwater levels and a description of how and when they will be finalised and subsequently reviewed in accordance with state approvals (condition 3(c))

50. Under approval condition 3c, the GMMP must include details of proposed trigger values for detecting impacts on groundwater levels and a description of how and when they will be finalised and subsequently reviewed in accordance with state approvals.
51. I noted that the GMMP includes groundwater level trigger values based on percentages of modelled drawdown, which are shown in Table 41. These triggers are described in section 5.3 of the GMMP in relation to GDEs and GAB aquifers.
52. The trigger values included in the GMMP are:
 - a. If groundwater levels vary by 50% of the predicted drawdown, above natural fluctuation, in unconfined aquifers;

- b. If groundwater levels/potentiometric levels vary by 75% of the predicted drawdown, above natural fluctuation, in the confined aquifers;
- c. For bores where groundwater levels are predicted to decline by more than 10 metres as a direct result of coal mining, the groundwater level thresholds are 90% of the predicted maximum drawdown levels plus half of the natural fluctuation;
- d. In cases where the predicted drawdown is lower than the natural fluctuation, the highest predicted drawdown plus half of the natural fluctuation is taken as the trigger value.

53. I was satisfied that these trigger values were adequate, because:

- a. On 22 February 2019, CSIRO and GA advice was that the triggers submitted by the approval holder in an earlier version of the GMMP were not suitable due to modelling limitations (see paragraph 9). The approval holder therefore adopted in the final GMMP a more conservative approach for triggers, which the Department considers will compensate for the residual uncertainty in the model until the model and management plans are updated at the next regular review within two years of the first box cut.
- b. Under the more conservative approach described in section 5.3.5.2 of the GMMP, the approval holder will compare the actual measured groundwater level data to predicted drawdown to assess the rate of change. In the instance the drawdown rate of the actual data is steeper/ faster than the predicted rate, an investigation will be commenced into the cause of the drawdown rate change. Corrective actions will be applied if mining is found to be the cause of the change.
- c. On 5 April 2019 (see paragraph 12), supplementary advice was provided to me:
 - i. from CSIRO that the approval holder's responses are directed to address the modelling related issues and concerns raised in the advice, noting that there are components of CSIRO's concerns that will need to be addressed through the approval of the research plan; and
 - ii. from GA that they are of the view that the approval holder has addressed the issues and concerns raised in their recommendations.
- d. I noted the Departmental advice that trigger exceedances are only reported if exceeded on two consecutive events, which could allow for exceedances to occur for over six months before they are reported to the Department. However, I accepted Departmental advice that this poses a low residual risk to MNES, as changes in groundwater level are expected to be relatively slow (i.e. years to decades).
- e. If triggers values are amended following the next scheduled model review within two years of the first box cut and the GMMP being updated, the approval holder will be required to submit the revised GMMP to the Department. I noted that if the revised trigger values will result in a new or increased impact on MNES, they must be submitted to me for assessment and approval.

54. I was therefore satisfied that the GMMP includes details of proposed trigger values for detecting impacts on groundwater levels as required by condition 3(c).
55. I further noted the information in the GMMP and the Departmental advice that these trigger values will be finalised by Queensland DES upon approval of the GMMP under the EA.
56. On this basis, I was satisfied that the requirements of condition 3(c) were met.

The GMMP must contain details of groundwater level early warning triggers and impact thresholds for the Doongmabulla Springs Complex, informed by groundwater modelling and corrective actions and/or mitigation measures to be taken if the triggers are exceeded where caused by mining operations, to ensure that groundwater drawdown as a result of the project does not exceed an interim threshold of 0.2 metres at the Doongmabulla Springs Complex (condition 3(d))

57. I noted that details of early warning triggers and impact thresholds for the Doongmabulla Springs Complex are set out in section 5.3 of the GMMP. This section includes details of early warning triggers (referred to as low impact thresholds), which relate to a percentage of the total drawdown predicted at designated bores in the Clematis Sandstone and Dunda Beds. Section 5.3 of the GMMP also includes impact thresholds (referred to as high impact thresholds), which relate to a higher percentage of the total predicted drawdown at these bores in the Clematis Sandstone and Dunda Beds, as well as specific thresholds on the timing and rate of drawdown.
- a. These early warning triggers and impact thresholds are based on outputs from the SEIS model (discussed further below in relation to condition 3(d)(i)) and advice from CSIRO and GA as per paragraph 53.
 - b. In section 7 of the GMMP, the approval holder commits to defining early warning triggers and impact thresholds for the additional nested bores described in paragraph 34 once the model is reviewed. I accepted Departmental advice that these triggers will provide an even earlier warning of potential impacts to the springs.
 - c. The approval holder also commits that any updated early warning triggers and impact thresholds will be submitted as part of necessary revisions of the GMMP after the model review within two years of the first box cut.
 - d. I was satisfied that the approval holder will be required to comply with these commitments, given condition 4 requires the approval holder to implement the approved GMMP. I noted that if the revised triggers and thresholds will result in a new or increased impact on MNES, they must be submitted to me for assessment and approval. I accepted that this process will ensure that these triggers and limits are set at levels adequate to ensure the protection and long-term viability of the Doongmabulla Springs Complex.

58. I also noted that the GMMP sets out corrective actions and mitigation measures to be taken if the triggers are exceeded and an investigation concludes the exceedance was caused by mining operations. These are:
- a. If an early warning trigger is exceeded due to mining operations (refer section 5.3.5.1 of the GMMP), the approval holder commits to undertake additional monitoring in GAB and Permian aquifers and increase the monitoring of GDE health.
 - b. If an impact threshold is exceeded due to mining operations (refer section 5.3.5.3 of the GMMP), the approval holder commits to refine the groundwater model, increase monitoring, review the mine plan, review the GMMP and implement outcomes from the GABSRP for the management, prevention and remediation of impacts on Doongmabulla Springs Complex.
 - c. If the exceedance investigation finds that impacts are predicted to be beyond those allowed in the project approvals (refer section 4.7.2.2 of the GMMP), the approval holder will commence planning of further mitigation activities with regards to water availability at the springs which may include limiting thickness of extraction of coal seams and reviewing extraction of multiple coal seams for the underground longwall mining and freezing mine development at current levels until the completion of investigations and assessments which conclude that further development will not exceed approved impacts.
59. The triggers and thresholds are based on the SEIS model, which predicted worst-case groundwater impacts of 0.19 m to the Joshua Spring, part of the Doongmabulla Springs Complex. This impact is less than the interim threshold of 0.2m defined under the approval conditions. The thresholds and triggers are defined well before this maximum impact at Joshua Spring would occur, both in space (bores are located at regular intervals along the likely paths for propagation of drawdown from the mine toward the springs) and magnitude (the triggers and thresholds escalate as drawdown impacts increase over time at each bore).
60. I was satisfied that the conservative nature of these thresholds and triggers means that corrective actions and/or mitigation measures described above will be taken to ensure that groundwater drawdown as a result of the project does not exceed the interim threshold of 0.2 metres at the Doongmabulla Springs Complex.
61. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with the commitments in the GMMP concerning the early warning triggers and impact thresholds and to apply the stated corrective actions and mitigation measures should those triggers be exceeded as a result of mining operations.

62. Based on the information above, I was satisfied that the GMMP contains details of groundwater level early warning triggers and impact thresholds for the Doongmabulla Springs Complex, informed by groundwater modelling and corrective actions and/or mitigation measures to be taken if the triggers are exceeded where caused by mining operations, to ensure that groundwater drawdown as a result of the project does not exceed an interim threshold of 0.2 metres at the Doongmabulla Springs Complex, and that condition 3(d) had been met.

The early warning triggers and impact thresholds must be informed by groundwater modelling in accordance with conditions 3(e)(i), 22, 23 and 24 and the relevant requirements of the environmental authority held under the Environmental Protection Act (1994) (Qld) (in particular requirements arising in response to the conditions at Appendix 1, Section 1, Schedule E of the Coordinator-General's Assessment Report)

63. I accepted that the modelling described in paragraph 57.a that informed the early warning triggers and impact thresholds was in accordance with EPBC Act approval conditions 22, 23 and 24. This is because the model re-run report had been provided (condition 23), as had its peer review (condition 22), and its results had been reviewed in order to inform the selection of the model which underpinned GMMP (condition 24; refer paragraphs 21 to 23).
64. I accepted that revised groundwater modelling in accordance with condition 3(e)(i) and the relevant requirements of the Qld EA has not yet occurred, because the scheduled review of the model required by the Qld EA has not yet occurred.
65. However I noted that the approval holder makes commitments in the GMMP to address these requirements, as set out below at paragraphs 66. Given that condition 4 requires the approval holder to implement the approved GMMP, I was satisfied that the approval holder would be required to comply with these commitments.
66. I accepted that the early warning triggers and impact thresholds will be informed by groundwater modelling in accordance with condition 3(e)(i) and the relevant requirements of the EA, particularly schedule E¹, because:
- a. The approval holder commits in the GMMP to review the groundwater model within two years of the first box cut and every 5 years thereafter, in accordance with the requirements of the EA condition E6.
 - b. Schedule E of the EA specifies that groundwater level monitoring locations and thresholds will be finalised based on information provided to the administering authority under condition E8 (b) and the refined modelling under EA condition E6.

¹ Schedule E of the EA arose in response to the conditions at Appendix 1, Section 1, Schedule E of the Coordinator-General's Assessment Report

- c. The approval holder commits in section 7 of the GMMP that the groundwater model review will include:
 - i. an independent review and update of the groundwater conceptual model;
 - ii. an independent review of the numerical groundwater model; and
 - iii. an independent review of the water balance calculations, in accordance with condition 3(e)(i).
- d. The approval holder also commits in section 7 of the GMMP that recommendations of the modelling reviews will be incorporated in the revised / updated GMMP, including a table of changes made in response to the independent reviews. I accepted that this would include updates to early warning triggers and impact thresholds if recommended by the groundwater model review.

67. On this basis, I was satisfied that the requirement in condition 3(d)(i) was met.

The interim drawdown threshold required under condition 3(d) may be replaced with a new drawdown threshold, if the approval holder applies to the Minister for approval to change it, and submits further evidence supported by further groundwater modelling and other scientific investigations (such as those required in conditions 25 and 27), that a new drawdown threshold will ensure the protection and long-term viability of the Doongmabulla Springs Complex (condition 3(d)(ii))

68. As the approval holder has not applied to me for approval to change the interim drawdown threshold, I was satisfied that this requirement did not apply.

The GMMP must contain details of the timeframe for a regular review of the GMMP in accordance with the requirements of the environmental authority issued under the Environment Protection Act 1994 (Qld), and subsequent updates of the GMMP including how each of the outcomes at condition 3(e)(i)-(iv) will be addressed (condition 3(e))

- 69. Condition 3(e) requires that the GMMP contain details of the timeframe for a regular review of the GMMP in accordance with the requirements of the EA, and subsequent updates of the GMMP.
- 70. In respect of the timeframe for a regular review of the GMMP, the EA issued under the EP Act requires under condition E5 that the GMMP be reviewed by an appropriately qualified person with a report provided on the outcome of the review to the administering authority by 1st July 2020. After the initial review, the review must be conducted by 1 July every five (5) years following.
- 71. I noted that section 1.10.1 of the GMMP includes details of timeframe for the regular review consistent with EA condition E5. I noted that the outcomes of this regular review of the GMMP would be submitted to authorities under the EP Act and EPBC Act. In section 7 of the GMMP, the approval holder commits that the recommendations of the reviews will be incorporated in the revised / updated GMMP document including a table of changes made in response to the independent reviews.

72. Based on this information I was satisfied that the GMMP contained details of the timeframe for a regular review of the GMMP in accordance with the requirements of the EA, and subsequent updates of the GMMP, as required by condition 3(e).
73. Under condition 3e, the timeframe must include how each of the outcomes of the following will be incorporated:

3(e)(i) Independent review and update of the groundwater conceptual model, as well as the numerical groundwater model and water balance calculations as necessary, to incorporate monitoring data

74. I noted that in compliance with EA condition E6, the GMMP states that the numerical groundwater model is to be reviewed, using the GMMP data and measured mine dewatering volumes, within two years of the initial box cut excavation and then at least every five years afterwards. This is in accordance with the EPBC Act requirement that the regular review of the GMMP include the independent review and update of the numerical groundwater model.
75. I also noted that in section 2.2.9 of the GMMP the approval holder states that results of studies with respect to the groundwater conceptual understanding (undertaken through the RFCRP and GABSRP) will inform EA condition E6 numerical modelling review and updates. The model reviews, updates, and revised predictions will be provided to both the State and Commonwealth regulators for review, as well as an independent auditor.
76. Further, I noted that the approval holder commits in section 7 of the GMMP that the modelling review will include:
- a. an independent review and update of the groundwater conceptual model;
 - b. an independent review of the numerical groundwater model; and
 - c. an independent review of the water balance calculations.
77. The approval holder also commits that the recommendations of the reviews, which include incorporation of monitoring data, will be incorporated in the revised / updated GMMP document including a table of changes made in response to the independent reviews.
78. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with the commitments in the GMMP concerning independent review and update of the groundwater conceptual model, as well as the numerical groundwater model and water balance calculations as necessary, to incorporate monitoring data, and the additional commitments to revise or update the GMMP. In addition I noted that under condition 33, any revisions to the GMMP must be submitted to the Department, and if the updates to the GMMP would result in a new or increased impact to MNES, the approval holder must submit the revised plan to me for assessment and approval.
79. I was therefore satisfied that the requirement in condition 3(e)(i) was met.

3(e)(ii) Future baseline research required by the Queensland Coordinator-General into the Mellaluka Springs Complex (Appendix 1, Section 3, Condition 1 of the Coordinator-General's Assessment Report)

80. I noted the Department's advice that this requirement is not applicable as it relates to baseline research on the Black-throated Finch (**BTF**). This is because baseline studies since the EPBC approval was granted have determined that the Mellaluka Springs Complex does not provide BTF habitat. A letter from the Office of the Coordinator-General, dated 22 July 2016, was written to Adani confirming the Department and Queensland government's acceptance of this finding. As such, I was satisfied that there is not, and will not be in the future, any requirement for updates to the GMMP based on research concerning the BTF at the Mellaluka Springs Complex that is required by the Queensland Coordinator-General.
81. I was therefore satisfied that the approval holder was not required to include additional information in the GMMP to meet condition 3(e)(ii).

3(e)(iii) The GAB Springs Research Plan

82. I noted that the approval holder commits in the GMMP:
- a. section 1.10.2 that all relevant data collected for the various research plans (e.g. the GABSRP) will be considered in the subsequent iterations of the GMMP and groundwater model re-run(s).
 - b. section 1.8.3 and 7.1.1 that the data from the GABSRP, including possible assessment of the interim thresholds, will be used to inform regular reviews of the GMMP as shown in Figure 3, including revising the monitoring regime, updating the triggers, and formulating optimum mitigation measures.
83. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with the commitments in the GMMP concerning the incorporation of the results of the GABSRP into the regular review of the groundwater model and the GMMP.
84. I was therefore satisfied that the requirement in condition 3(e)(iii) was met.

3(e)(iv) The Rewan Formation Connectivity Research Plan

85. As above, I noted that the approval holder commits in the GMMP:
- a. section 1.10.2 that all relevant data collected for the various research plans [including the RFCRP] will be considered in the subsequent iterations of the GMMP and groundwater model re-run(s).
 - b. section 1.8.3 and 7.1.1 that the data from the RFCRP, including aquitard assessment results, will also be used to inform regular reviews of the GMMP as shown in Figure 3, including revising the monitoring regime, updating the triggers, and formulating optimum mitigation measures.

86. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with the commitments in the GMMP concerning the incorporation of the results of the RFCRP into the regular review of the groundwater model and the GMMP.
87. I was therefore satisfied that condition 3(e)(iv) was met.
88. On this basis of paragraphs 74 to 85, I was satisfied that the timeframe included how each of the relevant outcomes in conditions 3(e)(i)-(iv) would be incorporated.

The GMMP must contain provisions to make monitoring data available to the Department and Queensland Government authorities (if requested) on a six monthly basis for inclusion in any cumulative impact assessment, regional water balance model, bioregional assessment or relevant research required by the Bioregional Assessment of the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations (condition 3(f))

89. Under condition 3(f), the GMMP must contain provisions to make monitoring data available to the Department and Queensland Government authorities (if requested) on a six-monthly basis for inclusion in any cumulative impact assessment, regional water balance model, bioregional assessment or relevant research required by the Bioregional Assessment of the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations.
90. I noted that the GMMP outlines in section 4.8 that interpreted monitoring data will be disseminated to Queensland and the Department on a six monthly basis, consistent with the agreed reporting requirements of the EA (condition E15). I further noted that the approval holder commits in section 4.8 of the GMMP that this data will be provided to the Department in a format specified by the administering authority.
91. I noted that the approval holder has committed to provide the following elements in the six-monthly monitoring data report to the Department, subject to the Department's approval:
- a. Details regarding any changes to the existing monitoring network from the previous report (for example, new monitoring bores coming online)
 - b. The most recent monitoring results in comparison with groundwater quality triggers and groundwater level thresholds
 - c. Histories of complaints regarding groundwater level drawdown or groundwater chemistry in private water bores
 - d. The results of any investigation(s) into potential environmental harm, details of mitigation and / or rehabilitation plans, and results (if applicable)
 - e. Groundwater level hydrographs, and trend analysis; and
 - f. Assessments of long term trends in the groundwater quality data.

92. I was satisfied that this data could be used by the Department or Queensland Government authorities for inclusion in any cumulative impact assessment, regional water balance model, bioregional assessment or relevant research required by the Bioregional Assessment of the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations, as necessary.
93. On this basis, and in accordance with the Department's advice, I was satisfied that the requirement in condition 3(f) was met.

The GMMP must contain provisions to make monitoring results publicly available on the approval holder's website for the life of the project (condition 3(g))

94. Condition 3(g) requires that the GMMP contain provisions to make monitoring results publicly available on the approval holder's website for the life of the project.
95. I noted that in section 4.6.2 of the GMMP, the approval holder commits that verified groundwater monitoring data (including groundwater quality and level, rainfall data and figures showing the groundwater monitoring points) will be made available to the public through the approval holder's website. The data will be uploaded to the website within 4 weeks of the finalisation of the 6 monthly reports. The GMMP (section 4.8) also states that Commonwealth-conditioned monitoring results will be publicly available on Adani's website for the life of the Project.
96. Given that the approval holder is required by condition 4 to implement the approved GMMP, I was satisfied that the approval holder would be legally required to comply with the commitments in the GMMP concerning making monitoring results publicly available on its website for the life of the project.
97. I agreed with the Department's advice that this requirement has been met. On this basis, I was satisfied that condition 3(g) was met.

The GMMP must include a peer review by a suitably qualified independent expert and a table of changes made in response to the peer review (condition 3(h))

98. Under condition 3(h), the GMMP must contain a peer review by a suitably qualified independent expert approved by the Minister in writing, and a table of changes made in response to the peer review.
99. I noted that the approval holder appointed JBT Consulting to undertake an independent review of the draft GMMP. I was satisfied that JBT Consulting was a suitably qualified independent expert that was approved by the Minister's delegate in writing.
100. I further noted that comments and recommendations by JBT Consulting arising from the independent peer review of the draft GMMP were included at Appendix F to the GMMP. I also noted that a table of changes and modifications to the GMMP made by the approval holder in response to the peer review was included in the GMMP at Appendix G.
101. I was therefore satisfied that the requirements of approval condition 3(h) were met.

Other issues identified by CSIRO and Geoscience Australia

102. Based on Departmental advice within the summary document described at paragraph 13.d, as well as supplementary advice on 8 April 2019 from CSIRO (paragraph 14.a) and GA (paragraph 14.b), I accepted that the issues identified by CSIRO and GA on earlier versions of the GDEMP and GMMP had been addressed in the final versions of the plans submitted to me for approval. Where these issues related to requirements of the approval conditions, they have been included in my analysis above.

For the reasons in paragraphs 17 to 101 I was satisfied that the GMMP met the requirements of approval condition 3. I therefore decided to approve the GMMP on 8 April 2019.

Signed

A handwritten signature in dark ink, appearing to read 'Melissa Price', is written over a horizontal dotted line.

MELISSA PRICE

22 May 2019

Annexure A – Excerpts of Relevant Approval Conditions

Groundwater management and monitoring plan

3. At least three months prior to **commencing excavation of the first box cut**, the **approval holder** must submit to the **Minister** for approval a Groundwater Management and Monitoring Plan (GMMP). The GMMP must be informed by the results of the groundwater flow model re-run (condition 23) and contain the following:
- a) details of a groundwater monitoring network that includes:
 - i) control monitoring sites
 - ii) sufficient bores to monitor potential **impacts** on the Great Artesian Basin (GAB) aquifers (whether inside or outside the **Project Area**)
 - iii) a rationale for the design of the monitoring network with respect to the nature of potential impacts and the location and occurrence of **Matters of National Environmental Significance** (whether inside or outside the **Project Area**).
 - b) baseline monitoring data
 - c) details of proposed trigger values for detecting **impacts** on groundwater levels and a description of how and when they will be finalised and subsequently reviewed in accordance with **state approvals**
 - d) details of groundwater level early warning triggers and impact thresholds for the Doongmabulla Springs Complex, informed by groundwater modelling and corrective actions and/or mitigation measures to be taken if the triggers are exceeded where caused by mining operations, to ensure that groundwater drawdown as a result of the project does not exceed an interim threshold of 0.2 metres at the Doongmabulla Springs Complex
 - i) the early warning triggers and impact thresholds must be informed by groundwater modelling in accordance with Conditions 3e)i, 22, 23 and 24 and the relevant requirements of the environmental authority held under the Environmental Protection Act (1994) Qld (in particular requirements arising in response to the conditions at Appendix 1, Section 1, Schedule E of the Coordinator-General's Assessment Report)
 - ii) the interim drawdown threshold required under condition 3d) may be replaced with a new drawdown threshold, if the approval holder applies to the Minister for approval to change it, and submits further evidence supported by further groundwater modelling and other scientific investigations (such as those required in conditions 25 and 27), that a new drawdown threshold will ensure the protection and long-term viability of the Doongmabulla Springs Complex
 - e) details of the timeframe for a regular review of the GMMP in accordance with the requirements of the environmental authority issued under the *Environmental Protection Act 1994* (Qld), and subsequent updates of the GMMP, including how each of the outcomes of the following will be incorporated:
 - i) independent review and update of the **groundwater conceptual model**, as well as the **numerical groundwater model** and water balance calculations as necessary, to incorporate monitoring data

- ii) future baseline research required by the Queensland Coordinator-General into the **Mellaluka Springs Complex** (Appendix 1, Section 3, Condition 1 of the **Coordinator-General's Assessment Report**)
 - iii) the GAB Springs Research Plan (Conditions 25 and 26)
 - iv) the Rewan Formation Connectivity Research Plan (Conditions 27 and 28).
 - f) provisions to make monitoring data available to the **Department** and Queensland Government authorities (if requested) on a six monthly basis for inclusion in any cumulative impact assessment, regional water balance model, bioregional assessment or relevant research required by the **Bioregional Assessment of the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations**
 - g) provisions to make monitoring results publicly available on the **approval holder's** website for the life of the project
 - h) a peer review by a **suitably qualified independent expert** and a table of changes made in response to the peer review.
4. The **approval holder** must not **commence excavation of the first box cut** until the GMMP has been approved by the **Minister** in writing. The approved GMMP must be implemented.

***Note:** Many elements of the GMMP are also required under the state approval for the project. Where possible, a combined document should be prepared that addresses both state government and EPBC Act approval conditions.*

Matters of National Environmental Significance management plan/s

5. At least three months prior to **commencement of mining operations**, the **approval holder** must submit to the **Minister** for approval **Matters of National Environmental Significance** plan/s for the management of direct and indirect **impacts of mining operations** on MNES.

***Note:** If the MNESMP does not address any specific future activities (eg possible additional seismic surveys or specific mining stages) it should be updated in accordance with Condition 33.*

6. The MNESMP must incorporate the results of the groundwater flow model re-run (condition 23) where relevant, and be consistent with relevant recovery plans, threat abatement plans and approved conservation advices and must include:
- a) a description of **environmental values** for each of the **Matters of National Environmental Significance** addressed in the plan
 - b) details of baseline and **impact** monitoring measures to be implemented for each of the **Matters of National Environmental Significance** including control and **impact** sites to be monitored throughout the life of the project. The monitoring must provide sufficient data to quantify likely **impacts** resulting from **mining operations**, including **subsidence** and changes in groundwater levels, to set habitat management goals (Conditions 6e) and 6f))
 - c) details of potential **impacts**, including area of **impact**, on each of the **Matters of National Environmental Significance** from **mining operations**, including **impacts** from:
 - i) vegetation clearing

- ii) **subsidence** from underground mining, including **subsidence** induced fracturing and any changes to groundwater or surface water flow
 - iii) mine dewatering
 - iv) earthworks
 - v) noise and vibration
 - vi) emissions (including dust)
 - vii) light spill and other visual **impacts**
 - viii) stream diversion and flood levees
 - ix) weeds and pests.
- d) measures that will be undertaken to mitigate and manage **impacts** on **Matters of National Environmental Significance** resulting from **mining operations**. These measures must include but not be limited to:
- i) the use of fauna spotters prior to and during all vegetation clearing activities to ensure **impacts** on **Matters of National Environmental Significance** are minimised
 - ii) measures to avoid **impacts** on **Matters of National Environmental Significance** and their habitat located in the **Project Area**, but outside areas to be cleared, constructed upon and / or undermined, including adjacent to cleared areas
 - iii) measures to rehabilitate all areas of **Matters of National Environmental Significance** habitat
 - iv) habitat management measures including but not limited to management of **subsidence** and groundwater **impacts** of the project.
- e) goals for habitat management for each relevant **Matters of National Environmental Significance**
- f) a table of specific criteria for assessing the success of management measures against goals, and triggers for implementing corrective measures if criteria are not met within specified timeframes. This table must include but not be limited to measures relating to **subsidence** and groundwater **impacts**, including early warning triggers for impacts on groundwater at the **Doongmabulla Springs Complex** and the **Carmichael River**. Goals and triggers must be based on the baseline condition of the relevant **Matters of National Environmental Significance** as determined through baseline monitoring (see Conditions 3b) and 6b)). Corrective measures must include provision of offsets where it is determined that corrective management measures have not achieved goals within specified timeframes (see Conditions 11 m) and 11 o))
- g) an ongoing monitoring program to determine the success of mitigation and management measures against the stated criteria in Condition 6f), including monitoring locations, parameters and timing. Monitoring for water resource **Matters of National Environmental Significance** must include hydrogeological, hydrological and ecological parameters

- h) details of how compliance will be reported
- i) details of how the MNESMP will be updated to incorporate and address outcomes from research undertaken for **Matters of National Environmental Significance** under this and any **state approvals**, including updating of goals, criteria and triggers (as required under Conditions 3c), 3d), 6e) and 6f))
- j) provisions to ensure that **suitably qualified and experienced persons** are responsible for undertaking monitoring, review, and implementation of the MNESMP
- k) In the event that the future baseline research required by the Queensland Coordinator-General (Appendix 1, Section 3, Condition 1 of the **Coordinator-General's Assessment Report**) identifies that the **Mellaluka Springs Complex** provides high value habitat for the **black throated finch**, the **approval holder** must include management measures to address **impacts** resulting from drawdown at the **Mellaluka Springs Complex** in the MNESMP
- l) details of how, where habitat for an **EPBC Act listed threatened species or community** not previously identified and reported to the **Department** is found in the **Project Area**, the **approval holder** will notify the **Department** in writing within five business days of finding this habitat, and within 20 business days of finding this habitat will outline in writing how the conditions of this approval will still be met (refer Condition 11 h)).

Groundwater Flow Model Review

- 22. The **approval holder** must submit to the **Minister**, within one month of this approval, a peer review of the adequacy of the current groundwater flow model to characterise groundwater **impacts**. This review must consider the parameters used into the groundwater flow model, the required additional modelling information and the model re-runs outlined in Condition 23. The peer review must be undertaken by a **suitably qualified independent expert**. The peer review report should identify any additional information requirements.
- 23. The **approval holder** must provide a report to the Minister for the re-run of the groundwater flow model. The model revisions and re-runs must incorporate the following parameters in the scenarios and address the following additional information requirements:
 - a) re-define the current General Head Boundary (GHB) arrangement, as agreed by the **Department** in writing, including the following:
 - i) remove the GHB from its current location in all layers to the western edge of the model domain
 - ii) review and justify the GHB conductance values used in the model to reflect the differences between aquifers and aquitards and also between aquifers (e.g. Clematis and Colinlea Sandstones), and modify if required
 - iii) GHB cell elevations to be re-set using data as agreed by the **Department** in writing
 - iv) report on the **impacts** on groundwater levels and net flows between the model domain for the revised GHB boundaries and compare with previous modelling results.

- b) review and justify the recharge parameters for the Clematis Sandstone to represent the flux into the recharge beds of the GAB, and modify if required
 - c) document outflow mechanisms used in the model for the **Doongmabulla Springs Complex** and individual model layers, using maps to show the spatial distribution of model discharges
 - d) document and incorporate known licensed groundwater extractions within the model domain
 - e) document and justify any other changes made as part of the model re-runs that are not outlined above
 - f) as per the IESC information guidelines provide an assessment of the quality of, and risks and uncertainty inherent in, the data used in the background data and modelling, particularly with respect to predicted potential scenarios
 - g) provide adequate data (spatially and geographically representative) to justify the conceptualisation of topographically driven flow from south to north (and west to east) in both shallow and deeper aquifers.
24. The outcomes of the model re-runs are to be reviewed in order to inform the development of the GMMP and the Rewan Formation Connectivity Research Plan, and to correct any subsequent inaccuracies in the **Matters of National Environmental Significance** management plan/s, prior to submitting to **the Minister** for approval.

Research and management requirements

GAB springs research plan

25. At least three months prior to **commencing excavation of the first box cut**, the **approval holder** must submit for the approval of **the Minister** a GAB Springs Research Plan that investigates, identifies and evaluates methods to prevent, mitigate and remediate ecological **impacts** on the **EPBC listed community of native species dependent on natural discharge of groundwater from the Great Artesian Basin** (GAB Springs community), including the **Doongmabulla Springs Complex**, in the Galilee Basin. The GAB Springs Research Plan must include but is not limited to the following:
- a) research aims and rationale with reference to existing scientific research on GAB spring hydrogeology and ecology
 - b) identify priority actions for potential offsets to protect and manage the GAB springs
 - c) personnel responsible for conducting research and their qualifications
 - d) timeframes for research and reporting

- e) methods, including but not limited to, conceptualisation of the hydrogeology of the springs, geological and geochemical surveys to inform the source aquifer/s for the **Doongmabulla Springs Complex**, ecological surveys to determine the composition of the GAB springs community, an assessment of transferability of approaches to prevent and mitigate hydrological **impacts** on springs in the Surat Basin, determination of water requirements (including ecological response thresholds) of the GAB springs community, and development and evaluation of methods to prevent, remediate and mitigate ecological **impacts**
 - f) an analysis of potential mitigation activities, such as but not limited to, re-injection to the groundwater source aquifer to maintain pressure head, flows and ecological habitat at the **Doongmabulla Springs Complex**
 - g) an explanation of how research outcomes will directly inform the monitoring, management, prevention, mitigation and remediation of **impacts** on the **Doongmabulla Springs Complex**
 - h) a peer review of the draft GAB Springs Research Plan, by a **suitably qualified independent expert** and a table of changes made in response to the peer review
 - i) The GAB Springs Research Plan must be published on the proponent's website for the life of the project. Research outputs must be submitted to **the Minister** within ten business days of completion, and be made available for the **Bioregional Assessment of the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations**
26. The **approval holder** must not **commence excavation of the first box cut** until the GAB Springs Research Plan has been approved by **the Minister** in writing. The approved GAB Springs Research Plan must be implemented.

Rewan Formation Connectivity Research Plan

27. At least three months prior to **commencing excavation of the first box cut**, the **approval holder** must submit for the approval of **the Minister** a Rewan Formation Connectivity Research Plan ('Rewan Research Plan') that characterises the Rewan Formation within the area **impacted** by the mine. The Research Plan must be informed by the results of the groundwater flow model re-run (condition 23) and include but not be limited to the following:
- a) research aims
 - b) personnel responsible for conducting research and their qualifications
 - c) timeframes for research and reporting

- d) methods, including, but not limited to, seismic surveys to determine the type, extent and location of fracturing, faulting and preferential pathways (including any fracturing induced by longwall mining **subsidence**, including any fracturing impacting on the **Doongmabulla Springs Complex**) and an examination of the hydraulic properties (including but not limited to petrophysical analysis and facies mapping) of the Rewan Formation, to better characterise the Rewan Formation and the contribution of fracturing, faulting and preferential pathways to connectivity, including a description of how research will be undertaken in a manner that does not cause **impacts on Matters of National Environmental Significance** (unless the activities will be undertaken in accordance with a plan approved pursuant to conditions of this approval)
- e) an explanation of how research will inform the GMMP, any regional groundwater and surface water monitoring and assessment program, or **Bioregional Assessment for the Galilee Basin sub-region and the Lake Eyre Basin and any subsequent iterations**
- f) a peer review of the Rewan Research Plan, by a **suitably qualified independent expert**, approved by **the Minister** in writing, and a table of changes made in response to the peer review

28. The **approval holder** must not **commence excavation of the first box cut** until the Rewan Research Plan has been approved by **the Minister** in writing. The approved Rewan Formation Connectivity Research Plan must be implemented.

Standard conditions

33. The approval holder may choose to revise a plan or strategy approved by the **Minister** under conditions 3, 5, 9, 20, 25 and 27 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan or strategy would not be likely to have a **new or increased impact**. If the approval holder makes this choice they must:

- a) notify the **Department** in writing that the approved plan or strategy has been revised and provide the **Department** with an electronic copy of the revised plan or strategy;
- b) implement the revised plan or strategy from the date that the plan or strategy is submitted to the **Department**; and
- c) for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan or strategy would not be likely to have a **new or increased impact**.

33A. The approval holder may revoke their choice under condition 33 at any time by notice to the **Department**. If the approval holder revokes the choice to implement a revised plan or strategy, without approval under section 143A of the Act, the plan or strategy approved by the **Minister** must be implemented.

33B. Condition 33 does not apply if the revisions to the approved plan or strategy include changes to environmental offsets provided under the plan or strategy in relation to the matter, unless otherwise agreed in writing by the **Minister**. This does not otherwise limit the circumstances in which the taking of the action in accordance with a revised plan or strategy would, or would not, be likely to have **new or increased impacts**.

33C.If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the revised plan or strategy would be likely to have a **new or increased impact**, then:

- a) Condition 33 does not apply, or ceases to apply, in relation to the revised plan or strategy; and
- b) The approval holder must implement the plan or strategy approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 33, 33A and 33B in the period before the day the notice is given.

At the time of giving the notice the **Minister** may also notify that for a specified period of time that condition 33 does not apply for one or more specified plans or strategies required under the approval.

33D.Conditions 33, 33A, 338 and 33C are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised plan or strategy to the Minister for approval.