

HALING Narelle

From: MESSER Michael
Sent: Monday, 13 February 2017 2:32 PM
To: SMITH Wedeena
Subject: DNRM Associated Water Licence - timeline
Attachments: CC 3 Dewatering Schedule EHP plus NJ 8 Feb.pdf; Proposed timeline ver 5.xlsx

Hi Wedeena,

My director Rachel Burgess-Dean has identified that the latest version of the timeline for the Adani AWL that she received from Darren Moor has been extended by one day. It appears that this has come about as a result of a day extension to consultation with EHP.

Is it at all possible for you to amended your attached timeline for the Adani AWL such that is reflect our revised timeline (Please do not distribute EHP's timeline)? That is, could you please revert ID 14 to 60 days and 17 March.

Happy to discuss if you need.

Regards,

Michael



Michael Messer

A/Manager

Resource Sector Regulation and Support | Petroleum, Gas and Compliance
Department of Environment and Heritage Protection

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CONFIDENTIAL - SUMMARY OF TASKS			FEBRUARY																MARCH																		
Milestones for establishing interim panel	23/01/17	30/01/17	6	7	8	9	10	13	14	15	16	17	20	21	22	23	24	27	28	1	2	3	6	7	8	9	10	13	14	15	16	17	20	21	22	23	24
Interim Panel Terms of Reference endorsed by DG.																																					
EHP send request for quotes to potential panel members.																																					
Panel members submit quotes for membership on panel.																																					
EHP engages Interim panel members.																																					
Interim panel members consider application material.																																					
Interim panel members meet and make recommendation to DG EHP - subject to panel members availability.																																					
TASKS - EHP's evaluation of Adani AWL application material																																					
RSRS prepare draft evaluation																																					
Coal assessment centre review of draft evaluation																																					
Director (RSRS) approval of evaluation report (can stage Ch3 first, EP second once Coal has reviewed)																																					
EHP finalises evaluation of AWL application material for Panel member consideration.																																					
RSRS send summary/alert to DDG re: panel package																																					
EHP collates material for panel members including evaluation report, application material, and a draft panel recommendation.																																					
EHP provides material for panel members to consider																																					
EHP provides secretariat function to Panel for its meeting to consider AWL application and provide recommendation to DG EHP - subject to panel members availability.																																					
EHP officers amend evaluation of AWL application based on relevant panel recommendations																																					
EHP officers finalises evaluation of AWL application, and draft DG EHP advice to DG DNRM.																																					
Director approval																																					
ED approval																																					
DDG approval																																					
DG EHP approves advice (letter signed)																																					
DG EHP provides advice back to DG DNRM on AWL application.																																					

HALING Narelle

From: BURGESS-DEAN Rachel
Sent: Wednesday, 15 February 2017 6:19 AM
To: MOOR Darren
Subject: Re: Associated Water Licence (AWL) for Adani's Carmichael Coal Mine

Ok I'm free until 10am.

Still hot desking a bit this week - so not sure which phone number I'm on today - the mobile is probably easier

49-Sch4 -
Mobile

Rachel Burgess-Dean
Director, Resource Sector Regulation and Support
Petroleum, Gas and Compliance
Department of Environment and Heritage Protection
Phone - 07 3330 6308

On 15 Feb 2017, at 6:12 AM, MOOR Darren <Darren.Moor@dnrm.qld.gov.au> wrote:

Hi Rachel, I will give you a call later, although the timing elements are fine. Cheers Daz

Sent from my iPhone

On 14 Feb 2017, at 8:29 pm, BURGESS-DEAN Rachel <Rachel.Burgess-Dean@ehp.qld.gov.au> wrote:

Darren

To confirm, EHP staff do not have delegations from the DG in relation to the consultation step on the AWL - therefore it would be appreciated if you could formalise the consultation step by sending a letter and relevant information to our DG.

In relation to timeframes we have a tentative panel meeting scheduled for 8 March, we would like to send them the relevant package of materials on 1 March, therefore it would be helpful if we could have the information that is going to our DG by midday 27 Feb. This gives us just over a day to ensure we pull together an accurate and current package of materials. The current information sharing between our departments will hopefully mean that little or no changes will be required to the package we will have prepared (eg EHPs evaluation report etc) in advance of this date for the panel - but would appreciate this time (between midday 27 Feb and 1 March) to be sure.

When do you expect to receive the IHL legal review back (prior to going to Crown Law) - this will also help us to continue to work on our evaluation report?

I hope this is workable for you.

Please call me if you have any questions.

Cheers
Rachel

Sent from my iPad

Rachel Burgess-Dean
Director, Resource Sector Regulation and Support
Petroleum, Gas and Compliance
Department of Environment and Heritage Protection
Ph- (07) 3330 5904
Email - rachel.burgess-dean@ehp.qld.gov.au

On 14 Feb 2017, at 9:29 AM, MOOR Darren <Darren.Moor@dnrm.qld.gov.au> wrote:

No worries. I believe that your technical crew already have a recent version and am very comfortable with this being iterative. What date would you like the version to go to the panel? Darren

Sent from my iPhone

On 14 Feb 2017, at 9:21 am, VENZ Mark <Mark.Venz@ehp.qld.gov.au> wrote:

Thanks Darren,
There isn't an equivalent delegation in EHP to our knowledge – Rachel is checking this at the moment, so without a delegation official decision corro will still be required to the CEO our end. Rachel will get back to you directly. Further, is there any possibility we can get information earlier than the 1st (at officer level and in draft form?) so that we can package it up to go to the panel. The requirement is for them to have it one week in advance of their sitting day. This means it has to go to them the day it hits us (if it is the 1st). Any advance, albeit not final will greatly assist us to ensure this is kept on track.

Hoping you can help. Rachel will contact directly about it.

Cheers
Mark

<image003.png> **Mark Venz**
Executive Director Petroleum Gas and Compliance
Environmental Services and Regulation
Department of Environment and Heritage Protection

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<image005.png>...*make the move*

From: MOOR Darren
Sent: Monday, 13 February 2017 5:36 PM
To: VENZ Mark <Mark.Venz@ehp.qld.gov.au>
Cc: BURGESS-DEAN Rachel <Rachel.Burgess-Dean@ehp.qld.gov.au>; FEELY Alan

<Alan.Feely@dnrm.qld.gov.au>; PURTILL James
<James.Purtill@dnrm.qld.gov.au>

Subject: Associated Water Licence (AWL) for
Adani's Carmichael Coal Mine

Hi Mark,

As you are aware the Department of Natural
Resources and Mines is currently assessing the
Associated Water Licence (AWL) for Adani's
Carmichael Coal Mine.

I can confirm that I am the Chief Executive's
delegate under 1250F of the Water Act for this
decision and look forward to receiving EHP advice in
accordance with the previously agreed
timeframes.

In this context, DNRM will provide draft licence
conditions to EHP on 1 March 2017 as an input into
EHP's panel which I understand has been set up to
assist EHP's Chief Executive with the consultation
process.

I appreciate the cooperative and iterative
discussions that are occurring between our
respective technical staff. Although please let me
know if there is anything further that EHP requires.

Regards

Darren Moor
Executive Director
Central Region
Department of Natural Resource and Mines
Telephone: 07 4837 3451 **Facsimile:** 07 4837 3448
Mobile: 49-Sch4 - Mobile

209 Bolsover Street, Rockhampton Q 4700
PO Box 1762, Rockhampton Q 4700
<image006.jpg>
<image007.png>

HALING Narelle

From: MENZIES Janet
Sent: Thursday, 23 February 2017 4:16 PM
To: LARSEN Daniel
Subject: RE: For discussion today

Hi Daniel,

For the last point re: rationale for not conditioning baseline assessment just a couple of points

intent of the CG conditions which recommended bore assessments - was this to be baseline assessments (which actually outlined the purpose of a bore assessment)

it does not reference s1250G(2)(b)

Are you free for a quick 2min check in this afternoon? Please call me if you are.

Cheers

Janet

From: LARSEN Daniel
Sent: Wednesday, 22 February 2017 11:29 AM
To: MENZIES Janet
Subject: For discussion today

For discussion today – I will give you a call in about 5 mins

Daniel Larsen
Principal Project Officer, Hydrology

Department of Natural Resources and Mines

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HALING Narelle

From: MESSER Michael
Sent: Monday, 27 February 2017 10:05 AM
To: MOOR Darren
Cc: BURGESS-DEAN Rachel
Subject: Working draft of evaluation report
Attachments: AWL evaluation report_170227 (3).docx

Hi Darren,

Please find attached the working draft evaluation report we have been preparing.

The following dot points should be noted on the evaluation report:

- Areas highlighted in red relates to information which we have asked DNRM to provide/clarify in the relevant material;
- Yellow highlight is areas that still need to be address however these are largely resting on the information from DNRM as noted above;
- Completion of Appendix 1- comparison with EA groundwater conditions & update of s1250E(d)(i) section to provide greater clarity and rationale for alignment.

Once you have provided the final draft documents to us today, we will be in a better position to complete the evaluation report - do you have any indication yet as to when you might be sending this through?

Regards,

Michael



Michael Messer

A/Manager

Resource Sector Regulation and Support | Petroleum, Gas and Compliance

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**Evaluation of the
Department of Natural Resources and Mines
associated water licence assessment**

**Adani Mining Pty Ltd
Carmichael Coal Project**

23 February 2017

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1. Scope

When deciding an application for an associated water licence, it is a requirement under section 1250F(2) of the *Water Act 2000* (Water Act) for the Department of Natural Resources and Mines (DNRM) to consult with the chief executive of the department (Department of Environment and Heritage Protection DG) in which Chapter 3 of the Water Act and the *Environmental Protection Act 1994* (EP Act) is administered.

In order to inform the advice to the DNRM DG, this report will evaluate the DNRM assessment of the AWL application considering:

- underground water impacts from the proposed exercise of underground water rights as required by the criteria for deciding the application under section 1250E of the Water Act;
- consistency with conditions imposed on other approvals for the Carmichael coal mine project, specifically the relevant environmental authority; and
- consistency with the purpose and functions of Chapter 3 of the Water Act.

2. Application details

Application date	20 October 2016
Applicant	Adani Mining Pty Ltd
Activity details	The taking of sub-artesian water from Betts Creek Beds (and diffuse take from adjacent formations) with the point of take on Mining Lease (ML) 70441, ML70505 and ML70506
Purpose	Dewatering
Attached land	N/A

3. Background

The applicant, Adani Mining Pty Ltd (Adani), has applied for an associated water licence (AWL) for the take of underground water from the Bandanna Formation and Colinslea Sandstone (formations within the Betts Creek Beds), and adjacent formations under MLs 70441, 70505 and 70506 for dewatering purposes. The target formations are within the Galilee Basin and the associated mining leases are located 140km north-west of Clermont.

The Carmichael Coal project proposes the extraction of up to 60 million tonnes of thermal coal per annum from both open cut and underground mining. The open cut pit and underground workings will intersect aquifers causing ingress of underground water. The underground longwall operation will result in controlled collapse of strata into mined voids as the longwall face passes through the coal seam. This change in strata can alter hydraulic conductivity and increase connectivity with overlying aquifers. The ingress of underground water into the pit and underground workings will be required to be dewatered to allow safe working conditions to access the coal resource. The dewatering of groundwater has potential for impacts on surrounding groundwater users and natural ecosystems.

Key decisions relating to the project include:

- the Queensland Coordinator General (CG) determined the Carmichael Coal project could proceed subject to conditions on 7 May 2014;
- an approval under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) was granted by the Commonwealth Department of the Environment and Energy (DoEE) on 10 October 2015;
- the MLs and Environmental Authority (EA) were subject to a Land Court hearing with a decision handed down on 15 December 2015;
- the EA for the Carmichael Coal project was issued by the Department of Environment and Heritage Protection (EHP) on 2 February 2011; and
- the MLs were granted by DNRM on 3 April 2016.

4. Evaluation of associated water licence assessment under section 1250E of the Water Act

The application for an AWL was received by the DNRM on 20 October 2016 and was supported by the document "Supporting document for Water Licence application".

In deciding whether to grant or refuse the application, the chief executive must consider the application together with the criteria listed in section 1250E (a) to (i). An evaluation of this criteria is provided below.

4.1 Section 1250E(a)

(a) if additional information has been given to the chief executive under section 111 as applied by section 1250D(4)—the additional information

On 15 November 2016 DNRM issued a request for additional information to Adani Mining Pty Ltd to provide the following by Friday 2 December 2016:

- provision of some drilling logs;
- clarification of formations tapped by a number of monitoring bores;
- identify what parameters are monitored from each monitoring bore and a statement on their condition;
- provide additional mapping showing the drawdowns for the 2015 revised model; and
- provide sensitivity analysis for surrounding bores.

Adani provided the information on 1 December 2016.

Section 7.2 of the draft AWL assessment report outlines the information requested and states it was considered and discussed in the assessment.

Summary

EHP is satisfied that the required additional information as provided by the applicant was considered by DNRM in the AWL assessment where appropriate.

4.2 Section 1250E(b)

(b) all properly made submissions about the application in response to the notice of the application published under section 112 as applied by section 1250D(4)

Section 1250D(5) of the Water Act provides that an AWL is not subject to public notification if:

- the chief executive is satisfied that the impacts on underground water of the mine were sufficiently assessed through an environmental impact statement (EIS) under the EP Act or the *State Development and Public Works Organisation Act 1971* (SDPWO Act);
- were subject to consideration in a Land Court hearing in which objectors led expert evidence on the impacts of underground water and the Land Court outcome did not specify any impediments to the granting of the application relevant to groundwater impact; and
- the Land Court outcome was given before 13 September 2016.

The Carmichael Coal project was assessed through an EIS under the SDPWO Act. The Queensland CG determined the Carmichael Coal project could proceed subject to conditions on 7 May 2014.

The MLs and EA were subject to a Land Court hearing with the objectors leading expert evidence on the impacts of underground water from Dr John Webb regarding the groundwater flow model.

The Land Court decision was handed down on 15 December 2015 in which the Land Court President concluded that the groundwater model was fit for purpose.

Summary

EHP concurs that, as provided for under 1250D(5) of the Water Act, the AWL application did not require public notification and therefore there were no public submissions for consideration.

4.3 Section 1250E(c)

(c) existing water entitlements and authorities to take or interfere with water

Key points of DNRM's assessment include:

- impacts on groundwater users are expected to be greater closer to the mining operations and where users are tapping the formations that are closer laterally to the targeted coal seams;
- large impacts on bores within the mining lease and immediately toward the south in the direction of Mellaluka Springs, particularly those tapping Permian or overlying tertiary formations;
- limited impacts expected to the east of the mining leases as coal seams subcrop;
- approximately 15 bores are predicted to experience drawdowns greater than 5m over the life of the mine. 7 of these are located within the mining leases with 3 to the north and 5 to the south of the mining leases; and
- the CG's report noted the potential for long-term impacts to water levels after mining activities cease and for a permanent reduction in the availability of groundwater to current users and the environment.

However the technical report states only 3 bores outside of the mining lease have predicted impacts of greater than 5m.

The supporting information indicates that 11 bores located within the mining leases will likely be decommissioned prior to commencement of mining operations, as the footprint of the mine, particularly the open cut areas, occupies the majority of the lease area.

The additional information provided by Adani indicates that there is also approximately 18 bores located outside of the mining tenures that would likely be within the predicted affected area. The affected area being where the long term decline in water level is predicted to be 5m or greater for a consolidated aquifer and 2m or greater for an unconsolidated aquifer.

The DNRM assessment also states that there are potentially high impacts to the Tertiary and Permian formations in the north as interaction with the predicted impacts from the proposed China Stone mine are realised. However, the China Stone project has not completed its EIS stage and therefore DNRM considers that while the cumulative assessment provides a degree of conservatism, these will be issues to be further considered in the assessment of subsequent mining project approvals.

DNRM to consider baseflow impacts

Adani provided a draft Groundwater dependent Ecosystem Management Plan (GDEMP) as supporting information which indicated that the Mellaluka, Lignum and Stories Springs in the Mellaluka Spring Complex may be accessed by stock. The GDEMP also noted that all three springs have adjacent bores installed which also provide water supply to stock. DNRM considers that the proposed **make good conditions in the** AWL will provide requirement for Adani to provide a water supply to the landholders, should the springs themselves deplete.

Commented [MJ1]: Check DNRM has clarified this-conflicting advice Vs assessment report

Commented [MJ2]: Check that this is clarified in assessment report and that Adani info does not relate to 0.2m not 5m?

Commented [MJ3]: This is true for bores not for springs themselves- likely to rest with mitigation measures under EA

Summary

EHP considers that the draft AWL conditions compliment the make good framework of Chapter 3 of the Water Act and that this is a suitable strategy for the management of potential impacts to water bores. This is discussed further in sections 4.7 and 6.1 of this report.

EHP is satisfied that there is limited potential for impacts to downstream surface water entitlements and authorisations, as the predicted reduction in baseflow (up to 370ML/yr) is a relatively small proportion of flow that the Carmichael River contributes to the Burdekin River System; and therefore significant downstream impacts are not considered likely as noted in the CG's report. This is outlined further in sections 4.5, 4.7 & 4.8 of this evaluation report.

stock watering from springs...

Commented [MJ4]: If DNRM does not clarify this will have to address through GDEMP under EA

4.4 Section 1250E(d)

- (d) any environmental assessments carried out in relation to the mining tenure, including—
- (i) any conditions imposed on the mining tenure or on the environmental authority granted in relation to the mining tenure

Mining tenure conditions

DNRM states in p19 of the assessment report that the Carmichael Mining Leases were subject to standard conditions under s276 of the *Mineral Resources Act 1989 (MR Act)*. Overall these standard conditions do not highlight any issues that need to be addressed in the draft AWL assessment or conditions other than to note requirements in section 276(1)(i) of the MR Act to settle compensation with owners underlying the Mining Leases. DNRM considers that this is complemented by the draft AWL conditions requiring Adani to enter in make good agreements with owners within the affected area.

Summary

EHP concurs that the draft AWL conditions align with the standard conditions s276 of the *Mineral Resources Act 1989* which the Carmichael Mining Leases were subject to, as these standard conditions do not have any requirement relevant to the criteria for deciding the AWL under s1250E of the Water Act.

Environmental authority conditions

Groundwater trigger values

Condition E4 of the EA specifies that a Groundwater Management and Monitoring Program must be developed and certified by an appropriately qualified person which addresses all phases of the mining operation approved under this EA. The groundwater management and monitoring program must be provided to the administering authority for approval with the baseline monitoring program in Condition E3. The groundwater management and monitoring program must be developed to ensure that the plan meets the following objectives:

- validation of groundwater numerical model (including review of boundary and recharge conditions) to refine and confirm accuracy of groundwater impacts predicted;
- groundwater level monitoring in all identified geological units present across and adjacent to the mine site to confirm existing groundwater flow patterns and monitor drawdown impacts;
- identification of groundwater drawdown level thresholds for monitoring the impacts to Groundwater Dependant Ecosystems (including spring complexes and Carmichael River alluvium);

- monitoring of aquifers in the area to the south of the mining lease that may affect the Mellaluka Springs;
- identify and refine potential impacts on groundwater levels in the Great Artesian Basin Clematis Sandstone and Dunda Beds geological units;
- estimation of groundwater inflow to mine workings and surface water ingress to groundwater from flooding events using the groundwater model;
- monitoring in any identified source aquifers for alternative water supplies, relevant to any approval issued under the Water Act for the project;
- monitoring of geological units throughout all phases of project life including for the period post-closure in accordance with Appendix 1;
- identifying monitoring bores that will be replaced due to mining activities; and
- to ensure all potential groundwater impacts from mine dewatering and mine water and waste storage facilities (artificial recharge) are identified, mitigated and monitored.

Groundwater level monitoring

The existing EA Condition E9 states that: *Groundwater quality and levels must be monitored at the locations and frequencies defined in Table E1 – Groundwater monitoring locations and frequency for the mine site.* The frequency defined in Table E1 is at least 2 monthly.

The proposed DNRW AWL approval Conditions 40(b) and 41(c) refer to the reporting of monitoring bore water levels on a quarterly basis.

The CG's recommendations and EPBC Act approval conditions do not specify the frequency of monitoring water levels.

Draft AWL Condition 22 requires an initial review of the underground water monitoring program prior to the end of the 2020-2021 water year. This is to be consistent with the EA condition requiring a review of their GMMP by 2 February 2021 (based on 5 yrs from the date the EA was issued). Requirements for subsequent reviews every 5 years thereafter is also consistent with EA condition E5.

DNRW propose an additional condition 24 allowing the chief executive DNRW to request review of the underground water monitoring program any other time to ensure it continues to meet its objectives.

An evaluation of this is detailed in Appendix 1.

Summary

EHP considers the draft AWL conditions align with the conditions of the EA granted in relation to the Carmichael Coal project.

- (ii) any report prepared by the Coordinator-General under the State Development and Public Works Organisation Act 1971, section 34D evaluating the EIS prepared in relation to the mining tenure

Section 9.2 Table 2 of the draft AWL assessment report outlines how the assessment considered the Coordinator General's recommended and imposed conditions. Recommended conditions are those which the relevant government agency may consider when deciding to impose conditions on an approval. The Coordinator General recommended 2 conditions (outlined in Part A of the Coordinator General's report) to DNRW for consideration on the AWL approval. EHP is satisfied that the intent of these conditions have been achieved in the Draft AWL. An evaluation of this is detailed in Appendix 2.

The Coordinator General's report also included the following imposed condition:

Condition 2 Proponent contribution to regional water balance modelling, monitoring and assessment programs

- (a) To address potential cumulative impacts on water resources in the Belyando- Suttor sub-catchment and aquifers of the eastern part of the Galilee Basin, the proponent must, when requested by the administering authority:
- prepare, to the satisfaction of the administering authority, a groundwater and surface water monitoring and reporting program that takes into account requirements of any regional groundwater and surface water monitoring and assessment program developed in accordance with Recommendation 3, Appendix 1, Section 2, Part B of this report
 - provide monitoring results in the format and at intervals specified in the protocol for coordination of regional groundwater and surface water monitoring data to the lead agency for the surface water monitoring and assessment program (Recommendation 3, Appendix 1, Section 2, Part B of this report)
 - contribute to the ongoing operation of the regional groundwater and surface water monitoring and assessment program in Recommendation 3, Appendix 1, Section 2, Part B of this report including pro-rata funding.

DNRM is designated as the agency responsible for this condition.

Table 2 of the draft assessment report states that this was considered through proposing conditions which require the Underground Water Monitoring Program which, as defined in the Draft AWL, must meet the objective of

(c) to take into account requirements of any regional underground water monitoring and assessment program developed to address potential cumulative impacts.

Whilst this addresses the groundwater monitoring aspect of the CG imposed condition, DNRM have not provided a rationale as to how the remaining components of the CG imposed condition was considered (i.e. surface water component and contributions to the ongoing operation of the program including pro-rata funding).

Commented [MJ5]: Awaiting further rationale from DNRM in assessment report

The Coordinator General's report also included two general recommendations for which DNRM is responsible.

1) Regional water balance model

DNRM's consideration of this recommendation refers to section 6 of the draft assessment report. This section does not specifically discuss the regional water balance model. It does discuss the groundwater modelling for the Carmichael Mine project (which would incorporate a water balance model) and the outcomes of various reviews it has been subject to (peer review, IESC and Land Court). Based on this, DNRM concludes that considering the outputs of the regional model in the context of its limitations, it is helpful in understanding broader relative trends however, is not relied on, in its current form, to predict specific outputs.

Commented [MJ6]: Awaiting further rationale from DNRM in assessment report

Commented [MJ7]: Review pending DNRM assessment report

2) Regional groundwater and surface water monitoring and assessment program to address cumulative impacts.

DNRM stated that a draft regional monitoring program has been developed which was discussed with Adani for consideration when developing monitoring networks required under any relevant approval for the Carmichael Coal Project. DNRM have also been liaising with EHP regarding this regional monitoring and assessment program.

Commented [MJ8]: Awaiting further rationale from DNRM in assessment report

In addition, DNRM considered:

Comments from the Independent Expert Scientific Committee (IESC)

Add summary re: outcomes/landing on groundwater model to support scope of evaluation report

EPBC Act approval

Summarise alignment with groundwater monitoring, GAB offset strategy, groundwater model recalibration

Note additional require of GAB springs research plan and Rewan Formation Connectivity Plan to provide further information for future consideration and adaptive management.

Summary

EHP is satisfied that DNRM has considered all appropriate reports referred to by the CG in relation to the Carmichael Coal project.

4.5 Section 1250E(e)

(e) any information about the effects of taking, or interfering with, water on natural ecosystems

DNRM discussed potential impacts to natural ecosystems considering:

- predicted impacts to the Great Artesian Basin;
- Doongmabulla Spring Complex;
- Mellaluka Spring Complex; and
- groundwater dependent ecosystems linked to the Carmichael River baseflow.

Predicted impacts to the Great Artesian Basin

DNRM note that the model suggests leakage of 730-766ML/yr from the Clematis Sandstone of the Great Artesian Basin (GAB) will occur during the mining phase with 330ML/yr predicted post mining. DNRM is satisfied that the groundwater model presents a reasonable prediction of a possible range of impacts on the GAB and that these drawdown impacts are predicted to be low.

Doongmabulla Spring Complex

DNRM's assessment discusses key points and conclusions of the Land Court proceedings in relation to the source aquifer of the Doongmabulla Spring Complex. This includes:

- whilst it is unlikely that there was a continuous preferential pathway from the Colinlea Sandstone through the Rewan Formation, there was evidence to the contrary which raised some uncertainty as to the existence of faulting;
- there is also uncertainty as to the source aquifer of the Little Moses Spring and evidence about the groundwater flow directions in the Colinlea Sandstone have also raised further uncertainty as to the source aquifer of the Doongmabulla Spring Complex;
- if the source aquifer is below the Rewan Formation in the Colinlea Sandstone, the Doongmabulla Spring Complex will be lost as a consequence of dewatering caused by the mining operation. There is thus a threat of serious environmental damage. However, there is scientific uncertainty as to environmental damage because it is by no means certain that the Colinlea Sandstone is the source of the Doongmabulla Spring Complex; and
- Land Court President concluded that the precautionary principal should be applied and considered that the conditions in the EA and EPBC Act approvals were appropriate for mitigating the risk of threat to the ecological values of the springs.

Following the Land Court proceedings, DNRM has established the position that:

- the source of the Doongmabulla Spring Complex is considered to be from formations overlying the Rewan Formation (Dunda Beds and/or Clematis Sandstone).

- the chloride data presented by Mr Bradley to the Land Court shows a closer correlation for the Joshua Spring with the Clematis Sandstone than the Colinlea.

Therefore ...

Commented [MJ9]: DNRM to provide further context and rationale

Therefore risk is low? What are the implications for this conclusion?

This is new info/position from land court so it needs to be expanded upon

Mellaluka Spring Complex

DNRM's assessment discusses key points and conclusions of the Land Court proceedings regarding the Mellaluka Spring Complex:

- source of Mellaluka Spring Complex is generally considered to be from the Permian Colinlea Sandstone. This was generally accepted in the Land Court Proceedings;
- Lignum and Stories springs are expected to be significantly impacted, even in the base case, up to 8.2m during operational phase (40-50yrs) and up to 25m post closure (60yrs). This will cause the springs to dry up;
- these springs are used as stock watering points; and
- the Land Court President concluded that although the Mellaluka Springs may be permanently dried by the mine, it is agreed that they do not support vegetation of exceptional ecological value and no submissions were made that the potential loss of those springs was an issue to be addressed by the Court.

DNRM concludes that the predicted adverse impact on the Mellaluka Springs has been considered by the Land Court in relation to the granting of the EA

EHP considers it important to note that the EA does not explicitly authorise any adverse impacts to occur to the environmental values associated with the Mellaluka Spring Complex as a result of the tenure holder's extraction of underground water. The Mellaluka Spring Complex is to be managed under the GDEMP required under EA Condition I10.

Commented [MJ10]: This may be misleading as the land court conclusion only related to establishing that there was no exceptional ecological value- it didn't conclude that there was no value at all and therefore impacts were authorised under the EA.

Groundwater dependent ecosystems linked to the Carmichael River baseflow

DNRM's assessment discusses key points and conclusions of the Land Court proceedings regarding impacts to the Carmichael River baseflow and potential impacts to associated GDEs:

- the SEIS groundwater model indicates that the long term baseflow impacts on the Carmichael River are predicted to range from 290-353m³/day upstream of the mine site, and range from 916-1016m³/day downstream of the mine site;
- this is approximately 3.6-6.7% impact upstream and 16-31% impact downstream. The supporting information also suggests that there will be a 5% reduction in no flow periods upstream and a 30% reduction in no flow periods downstream;
- the mine's Groundwater Dependent Ecosystems Management Plan (GDEMP) noted that impacts from reduction in baseflow are likely to be minimal on the western part of the mining lease area, however riparian vegetation in the eastern half of the lease may be more sensitive to changes in baseflows than increasing depth to groundwater. There is a predicted 800m stretch in the eastern area where drawdowns are expected to be between 1-4m which may result in the death of some or all of the canopy trees; and
- the Land Court President concluded that the offset and management conditions on the EA would be sufficient to avoid, mitigate or offset potential damage to the waxy cabbage palm.

DNRM concludes that the impacts on reduced baseflow on local ecosystems have been addressed by the Land Court and will be managed through the EA conditions. In addition, DNRM considered broader impacts to the downstream catchment and noted that:

- in the broader catchment, the long term baseflow impacts on Carmichael River from underground water take is predicted to range from 916-1016m³/day (334 to 370 ML/year)

downstream of the mine site, compared to the estimated medium annual flow of 350000ML at streamflow site 120301B 70km further downstream;

- the Coordinator General's report noted the relatively small proportion of flow that the Carmichael River contributes to the Belyando/Burdekin River System, and did not consider that there is potential for significant downstream impacts on surface water resources;
- the proponent has committed to undertake detailed monitoring of groundwater levels and flows in the Carmichael River corridor both upstream and downstream of the mine site; and
- based on superposition of drawdown contours from the two projects of Carmichael and China Stone (noting this project has not yet completed the EIS stage and this is a conservative approach), it is concluded that there is unlikely to be cumulative impacts extending to the Carmichael River.

In conclusion, the assessment report states that DNRM is satisfied that the reduction in baseflow will not have broader impacts in the catchment downstream.

Summary

EHP is satisfied that DNRM has considered all relevant available information to identify potential impacts on natural ecosystems as a result of the take or interference of water.

4.6 Section 1250E(f)

(f) any information about the effects of taking, or interfering with, water on the physical integrity of watercourses, lakes, springs and aquifers

The assessment notes that the GDEMP required under the EA identifies an 800m stretch of river where the drawdown in the alluvium is expected to be between 1-4m and that the loss of large trees growing in the banks and channel bars could result in increased instability of the banks and channel bars. DNRM has not addressed this further as it will be managed under the EA.

DNRM note that the SEIS Revised Subsidence Assessment is not predicting subsidence under the Carmichael River and that DNRM considers subsidence to be an effect of the mining operation and not from the extraction of underground water.

DNRM state there is no evidence that indicates the extraction of groundwater will have an adverse impact on the physical integrity of the springs.

While depressurisation may not be a significant contributing factor to the risk of subsidence, EHP considers that the potential for it to contribute should not be ruled out completely on the basis of absent information. However, EHP is satisfied that risks from subsidence on aquatic ecosystems will be adequately addressed through the GDEMP and other monitoring, investigation, reporting and adaptive management as required under the EA.

Does not discuss depressurisation from dewatering only the actual removal of the aquifer itself.

Commented [MJ11]: DNRM to provide further rationale

Summary

EHP is satisfied that the draft AWL assessment has adequately considered information about the effects on the physical integrity of watercourses, lakes, springs and aquifers particularly in regards to depressurisation and the risks of subsidence.

4.7 Section 1250E(g)

(g) strategies for the management of impacts on underground water, including the impacts of dewatering

Existing water entitlements/ water users

As outlined under subsection (c) above, DNRM identified potential impacts to existing groundwater users. The draft AWL conditions outline requirements for make good obligations (bore assessments and make good agreements) for:

- water bores in the current identified affected area;
- additional water bores should there be a change in the affected area - identified through regular reporting and Performance Review Reports; and
- water bores in the affected area identified in a Pre-Closure Report - to account for potential impacts at any time after mining activities cease.

EHP considers that the draft AWL conditions compliment the make good framework of Chapter 3 of the Water Act and that this is a suitable strategy for the ongoing management of potential impacts to water bores. This is discussed further in section 6.1 of this report.

Natural ecosystems (groundwater dependent ecosystems)

As outlined under subsection (e) above, DNRM identified potential impacts to natural ecosystems including the GAB, Doongmabulla Spring Complex, Mellaluka Spring Complex and groundwater dependent ecosystems linked to the Carmichael River baseflow. The strategies considered as part of the DNRM assessment are outlined below.

GAB strategy

As recommended by the CG, DNRM proposes draft conditions to manage the potential for leakage by:

- identifying high and low trigger threshold levels in the Dunda Beds and Clematis Sandstone aquifers;
- if the low impact trigger level is reached in any Rewan Formation or Clematis Sandstone bore, the proponent must notify DNRM within 30 days and conduct an investigation into the causes of the lower water levels; and
- if the high impact trigger level is reached, the proponent must complete an independent investigation to determine the cause and provide a written report to DNRM within 30 days. If found to be caused by the proponent operations, the proponent would be required to contract an independent consultant to fully investigate and model the potential impact upon the GAB and offset any take of water from the GAB as determined by DNRM.

Commented [MJ12]: Why is DNRM satisfied with the CG recommendation- satisfied that nothing further is required to manage risks?

Further rationale to be provided outlining the diffuse take from GAB and why DNRM is satisfied etc and also tie into that why licence states 'and adjacent formations'

DNRM note that the EPBC Act approval is also conditioned to develop an offset strategy to offset any impacts by returning at least 730ML/annum to the GAB for a minimum of 5 years. DNRM has therefore proposed draft AWL Condition 55 to allow the chief executive to clarify that offset measures taken under the EPBC Act approval can be recognised as meeting the offset requirement under draft AWL Condition 54.

To meet this offset requirement, the proponent will need to request DNRM to reserve a volume of groundwater equivalent to the assessed average annual take over the life of the project from GAB aquifers identified in the EIS, from the Water Resource (Great Artesian Basin) Plan 2006 and the Great Artesian Basin Water Resource Operations Plan 2007 State reserve. The proponent has access to this State reserve as the project is a Coordinated Project under the SDPWO Act. The average annual take across the life of the project identified in the EIS is approximately 766ML. While this is DNRM's preferred method of managing the GAB groundwater offset, alternative proposals may be acceptable that will offset an equivalent volume of water. Any alternative would need to apply to water to which the Water Resource (Great Artesian Basin) Plan 2006 applies and be within the Plan's area.

Doongmabulla Spring Complex

DNRM is satisfied that further knowledge on the source of the springs is adequately conditioned in the EPBC Act approval requiring a GAB Springs Research Plan which includes methods to inform the source of the spring complex. In addition the EPBC Act approval requires a Rewan Formation Connectivity Research Plan to determine the presence of fracturing.

The EA approval conditions which relate to Doongmabulla Springs are:

- Condition I10 - The proponent must develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP) to detail the management of threats to defined environmental values and to report results and corrective actions for each GDE (including Mellaluka Springs) over the full period of mining activities and for a period of 5 years post mining rehabilitation.

DNRM notes that the GDEMP required under the EA proposes monitoring of the Joshua Spring and Moses Springs within the Doongmabulla Spring Complex. **DNRM has proposed to condition the AWL to require ongoing monitoring at these sites at a minimum frequency of quarterly.**

Mellaluka Spring Complex

DNRM is of the view that the predicted adverse impact on the Mellaluka Springs was considered by the Land Court in relation to the granting of the EA.

The EA approval conditions which relate to Mellaluka Springs are:

- Condition E4(d) - Monitoring of aquifers in the area to the south of the mining lease that may affect the Mellaluka Springs; and
- Condition I10 - The proponent must develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP) to detail the management of threats to defined environmental values and to report results and corrective actions for each GDE (including Mellaluka Springs) over the full period of mining activities and for a period of 5 years post mining rehabilitation.

The GDEMP indicates that the overarching objective for the Mellaluka Springs will be to enhance ecological values of the surrounding landscape with a view to achieving no-net-loss.

In addition, the DNRM draft assessment notes that the EPBC Act approval includes a condition to conduct future baseline research into the Mellaluka Spring Complex and requires a Matters of National Environmental Significance Management Plan to include management measures to address impacts resulting from the drawdown at the springs.

DNRM notes that the GDEMP required under the EA proposes monitoring of the Mellaluka Spring, Stories Spring and Lignum Spring within the Mellaluka Spring Complex monthly for two wet seasons. **DNRM has proposed to condition the AWL to require ongoing monitoring at these sites at a minimum frequency of quarterly.**

Groundwater dependent ecosystems linked to the Carmichael River baseflow

DNRM is satisfied that the reduction in baseflow will not have broader impacts in the catchment downstream and that the impacts on reduced baseflow on local ecosystems have been addressed by the Land Court and will be managed through the EA conditions.

EHP concurs with the draft assessment report that results of the ongoing monitoring and research of GDEs (including Doongmabulla Springs, Mellaluka Springs and GDEs linked to the Carmichael River baseflow) under existing EA and EPBC Act approval conditions will monitor and manage any potential impacts. EHP considers that the draft AWL conditions compliment the Carmichael Mine EA conditions and achieve the CG's recommendations.

Commented [MJ13]: DNRM to provide further justification why- what is the outcome...to provide certainty that pressure will be monitored for adaptive management for model?

Commented [MJ14]: DNRM to provide further justification why- what is the outcome...to provide certainty that pressure will be monitored for adaptive management for model?

Monitoring, review and reporting

The requirements for the Underground Water Monitoring Program and Performance Review Report align with the Underground Water Impact Report (UWIR) requirements (including water monitoring strategy and review requirements) of Chapter 3 of the Water Act. EHP is therefore satisfied that the draft AWL would be capable in delivering the requirements for the adaptive management of underground water. That is, it will establish an effective monitoring and review framework that aligns with the relevant EA to adaptively manage potential impacts as a result of the tenure holder's exercise of underground water rights.

Summary

EHP considers that the draft AWL conditions:

- compliment the make good framework of Chapter 3 of the Water Act and that this is a suitable strategy for the ongoing management of potential impacts to water bores;
- compliment the Carmichael Mine EA conditions;
- achieve the CG's recommendations; and
- would be capable in delivering the requirements for the adaptive management of underground water. That is, it will establish an effective monitoring and review framework that aligns with the relevant EA to adaptively manage potential impacts as a result of the tenure holder's exercise of underground water rights.

EHP concurs with the draft assessment report that results of the ongoing monitoring and research of GDEs (including Doongmabulla Springs, Mellaluka Springs and GDEs linked to the Carmichael River baseflow) under existing EA and EPBC Act approval conditions will monitor and manage any potential impacts.

4.8 Section 1250E(h)

(h) strategies and policies for the relevant coastal zone

The DNRM AWL assessment states:

- that the mine is located within the Burdekin River Basin Catchment approximately 390km upstream of the Burdekin River mouth;
- therefore the predicted reduction in baseflow (max 370 ML/yr) from the mining activities will not impact on the relevant coastal zone;
- this is supported by the CG's report which noted that it is considered that there is not potential for significant downstream impacts to surface water resources; and
- DNRM is satisfied due to the distance of the mine from the coast, that the take of underground water will not have impacts on the coastal zone.

No further grounds supporting this position are provided nor was it specifically stated which strategies or policies relevant coastal zone were considered.

However, EHP is aware of the CG's conclusion that there is unlikely to be any direct impacts to the Great Barrier Reef Marine Park as a result of the project.

Key points supporting this conclusion with regards to the exercise of underground water rights are:

- despite the predicted reduction in baseflow (max 370 ML/yr) from the mining activities, there are significant groundwater recharge systems between the project site and the coast which are not dependent on the groundwater systems surrounding the mine site;
- the significant distance between the project area and the coast (including that it is upstream of the Burdekin Falls Dam);

Commented [MJ15]: DNRM to provide further rationale
Perhaps tie in points from section 10.4 of assessment report

- mitigation measures (including the Water Quality Management Plan checks of streams for scouring and sediment deposition and water quality) will reduce the likelihood of likelihood of exacerbated levels of contaminants or suspended solids entering in the mine area catchment which will also decrease sedimentation entering the Carmichael and Belyando River catchments and subsequently the Burdekin River Basin and Burdekin Falls Dam, thereby preventing any potential impacts to the waters entering the Great Barrier Reef World Heritage Area.

Summary

EHP believes further conditions are not required on the draft AWL in consideration of strategies and policies for the relevant coastal zone based on the following:

- the mine project area is a significant distance (390km) from the Burdekin River Mouth and is upstream of the Burdekin Falls Dam;
- the predicted reduction in baseflow (up to 370ML/yr) is a relatively small proportion of flow that the Carmichael River contributes to the Burdekin River System and therefore significant downstream impacts are not considered likely as noted in the CG's report; and
- the EA manages the potential risks for downstream impacts to environmental values (including those associated with the coastal zone).

4.9 Section 1250E(i)

(i) the public interest

The DNRM AWL assessment states that public interest matters relating to the effects on natural ecosystems or other water users are addressed under the previous criteria. EHP considers this conclusion appropriate.

The section therefore focuses on the economic and social benefits of the project, given that the ability to take underground water is a statutory right of the resource tenure.

DNRM concludes that it is satisfied, based on information supplied, statements by the CG, and statements by the Land Court President that the project presents a net benefit for the public good. EHP supports this position on the premise that potential impacts resulting from the mining activity will continue to be adaptively managed in accordance with the conditions stated on the relevant approvals. That is, the AWL, the EA and the EPBC Act approval.

Summary

EHP is satisfied that the DNRM AWL assessment has considered the public interest and is consistent with the Land Court decision.

5. Consistency with the purpose and functions of Chapter 3 of the Water Act

5.1 Make good framework

The make good framework for water bores under Chapter 3 of the Water Act comprises the following obligations for resource tenure holders:

- **bore assessments** - to determine if a water bore has, or is likely to have an impaired capacity as a result of a resource tenure holder's exercise of underground water rights;
- **make good agreements** - an agreement between the resource tenure holder and the bore owner that provides for the outcome of a bore assessment, whether the bore has, or is likely to have an impaired capacity and if so, the make good measures for the bore to be taken by the responsible tenure holder; Chapter 3 establishes a framework for dispute resolution for make good agreement negotiations, including establishing processes for conference or independent alternative dispute resolution (ADR);
- **compliance with the make good agreements**; and
- **if asked to vary the make good agreement - negotiate the variation.**

A precursor to make good obligations is the requirement for resource tenure holders to undertake baseline assessments which establish benchmark data for water bores prior to any impact of the resource tenure holder exercising underground water rights.

The framework of Chapter 3 is relevant when considering the potential impacts to underground water users (water bore owners) in particular for AWL assessments. This relates to the criteria stated in section 1250E (c) and (g):

- (c) existing water entitlements and authorities to take or interfere with water
- (g) strategies for the management of impacts on underground water, including the impacts of dewatering

An evaluation of how obligations, requirements and provisions of Chapter 3 are considered and addressed in DNRM's AWL assessment is outlined below.

Make good obligations

EHP is satisfied that draft AWL Conditions 1-4 which establish make good obligations align with the make good framework of Chapter 3. This is outlined in Appendix 3.

Commented [MJ16]: Draft Conditions have changed-require check and update

Pending wording re: impaired capacity and affected area for triggering a bore assessment

Commented [MJ17]: Check when draft DNRM conditions provided

Bore assessments

EHP is satisfied that draft AWL Conditions 5-9 relating to bore assessments replicate the requirements of Chapter 3. This is outlined in Appendix 3.

Make good agreements

EHP is satisfied that draft AWL Conditions 10-13 relating to make good agreements replicate the requirements of Chapter 3. This is outlined in Appendix 3.

It is noted that dispute resolution provisions are not included in the draft conditions however as outlined in DNRM's assessment report....

Commented [MJ18]: DNRM draft condition to state Division 4, Part 5 of Chapter 3 applies.

Not sure an AWL condition can give this power?

Therefore dispute resolution outcomes can be delivered through these alternative measures thus achieving the same outcome as the dispute resolution provisions of Chapter 3.

Complying with the make good agreements

EHP considers that draft Conditions 3, 4 and 57 adequately ensure that Adani must comply with a make good agreement.

Variation of make good agreement

Where a make good agreement is entered into outside of Chapter 3 requirements (including one entered into as a result of an AWL licence requirement), under section 407 of the Water Act the agreement is taken to be a make good agreement for the purposes of Chapter 3. This therefore enables either party to access the provisions to vary the make good agreement. As a result, EHP considers that a condition on the AWL relating to the ability to vary a make good agreement is not required as this function can be accessed through Chapter 3 if required.

Baseline assessments

Section 1250G(2)(b) states that the AWL conditions may require the holder of the licence to undertake a baseline assessment of water bores in the area of the holder's mining tenure.

DNRM estimates there are approximately 12 water bores located within the tenure areas however all of these will be required under draft AWL Condition 3 to undertake a bore assessment as they are located within the affected area. Therefore EHP concurs that it is not necessary for the draft AWL conditions to require baseline assessments to be undertaken for water bores within the tenure areas.

Commented [MJ19]: DNRM needs to confirm in assessment report

In addition, for water bores located outside of the tenure areas, EHP is satisfied that the draft AWL establishes a conservative affected area (with a trigger threshold of 0.2m at any time), and that requirement under draft AWL Condition 3 to undertake a bore assessment for water bores within the affected area is a suitable risk management approach. For any remaining bores, should the need for either a baseline assessment or a bore assessment be identified, the chief executive administering Chapter 3 may direct a resource tenure holder to undertake that assessment.

Summary

EHP considers that the AWL assessment adequately considers the potential impacts to water bores and that the draft AWL conditions compliment the make good framework of Chapter 3 of the Water Act.

EHP is satisfied that the draft AWL establishes a make good framework to address:

- water bores in the current identified affected area;
- additional water bores should there be a change in the affected area- identified through regular reporting and Performance Review Reports; and
- water bores in the affected area identified in a Pre-Closure Report - to account for potential impacts at any time after mining activities cease.

If any other potential impacts are identified and cannot be managed under the AWL, the provisions under Chapter 3 to direct a resource tenure holder to undertake a bore assessment and subsequently enter into a make good agreement can be utilised.

5.2 Ongoing monitoring and revision of groundwater model

A significant component of the Chapter 3 framework is the obligation for resource tenure holders to prepare and submit an UWIR which describes, makes predictions about and manages the impact of underground water extraction by resource tenure holders. The UWIR establishes responsibilities for resource tenure holders and ensures that measures and programs such as water monitoring strategies and spring impact management strategies are in place to respond to impacts on underground water.

Final reports, which resource tenure holders are also obligated to prepare and submit, include similar information to an UWIR but there are some differences in the required inclusions as final reports are produced at the end of a resource tenure. In particular, final reports account for make good obligations and spring impact management strategies required in the long term after the tenure has ended.

The monitoring, collection and review of information and reporting requirements of an UWIR or final report play an important role in the adaptive management of underground water. Importantly, an EA under the EP Act may be amended in response to the contents of an UWIR. As resource tenure holders that obtain an AWL are not obligated to prepare and submit an UWIR (section 369A of the Water Act), it is vital that the requirements and functions of an UWIR are considered in the assessment of an AWL.

An evaluation of how UWIR and final report obligations, requirements and provisions of Chapter 3 are considered and addressed in DNRM's AWL assessment is outlined below.

Hydrogeological conceptualisation, predicted impacts, model

Section 6 of the draft assessment report discusses the groundwater modelling for the Carmichael Mine project (which would incorporate a water balance model) and the outcomes of various reviews it has been subject to (peer review, IESC and Land Court). Based on this, DNRM concludes that considering the outputs of the regional model in the context of its limitations, it is helpful in understanding broader relative trends however, is not relied on, in its current form, to predict specific outputs. DNRM considers that further refinement would improve the model outputs and predictive confidence. Therefore DNRM have proposed the review and reporting requirements discussed below.

EHP concurs with this conclusion and does not consider that any further detailed analysis of the hydrogeological conceptualisation or modelling is appropriate or necessary. Therefore, the draft AWL assessment and draft AWL conditions have been evaluated on the assumption that the model outputs are an acceptable basis on which to inform a decision.

Monitoring strategy

Draft AWL Conditions 29 to 37 outline the requirements for the Underground Water Monitoring Program. The alignment of this program with EA monitoring requirements are discussed above in section 5.

Review and reporting requirements

Draft AWL Conditions 38 to 41 outline requirements for Performance Review Reports which account for the incorporation of new information collected under the Underground Water Monitoring Program, the subsequent review and update of the groundwater model and associated affected area.

The draft AWL conditions require three different types of Performance Review Reports, each with slightly different requirements, although achieving a common outcome. The frequency of these reports is also convoluted.

Performance Review Report (draft AWL Condition 38 & 39) 1st year only
 Performance Review Report (draft AWL Condition 38 & 40) 2nd year only
 Performance Review Report (draft AWL Condition 38) - every year up to year 6 then two yearly after that.
 Requirement to review and recalibrate model (draft AWL Condition 41) - every 5 years therefore may also be in conjunction with a Performance Review Report.

Commented [MJ20]: DNRM needs to provide clarity on these

Within the first 20 years after the first box cut, the only years which will not require a Performance Review Report are 9, 11, 13, 15, 18 and 20. However, draft AWL Condition 43 states the chief executive may call for an unscheduled Performance Review Report at any other time.

In addition, draft AWL Condition 42 states that the chief executive may request the licensee to review or adjust the groundwater model, particularly if there is reasonable belief that the predictions are not representative of actual monitoring data or impacts. It is expected that this decision would be informed by the Annual Monitoring Report which must be submitted in the years where a Performance Review Report is not required by draft AWL Condition 37.

The draft AWL conditions require greater clarity on the specific requirements to clearly demonstrate they are specific, measureable, achievable, relevant and time specific. However, EHP does acknowledge that the intent of the draft AWL conditions align with the Chapter 3 requirements to review the accuracy of the predicted affected area and an analysis of whether there has been a material change in the information or predictions used to determine the affected area on an annual basis. In addition, Chapter 3 requires an UWIR to be resubmitted every 3 years, essentially requiring a full review and update of the groundwater model.

Condition 40(b)(ii) refers to scenarios - this should be clarified
 (iv) - not clear to what sections of Condition 40 the peer review applies to

Commented [MJ21]: Need to check when draft AWL conditions provided

Condition 41 - not clear on how model is to be recalibrated and at what point. This condition should be clarified for enforceability
 Condition 43 - needs clarification
 Condition 44 - primarily a definition and is convoluted

Final Report

EHP is satisfied that draft AWL Conditions 56 to 59 relating to the closure of Carmichael Coal Mine operations align with Chapter 3 of the Water Act final report obligations and requirements, specifically:

- draft Condition 56 requirement for a Pre-Closure Report requiring:
 - o updated monitoring information;
 - o recalibration of the groundwater flow model;
 - o plans showing predicted impact to at least 190 years after the commencement of pumping;
 - o identification of bores in an affected area; and
 - o identification of predicted long term impacts on springs and river baseflow and recommendations and strategies to mitigate or offset these predicted impacts, including timeframes for implementation.

- Draft Condition 57 - requirement to undertake a bore assessment, enter into a make good agreement and comply with that agreement for any bore within the affected area which is not already subject to a make good agreement

Check enforceability of Conditions 58 & 59

6. Outcome and recommendations

EHP has evaluated DNRM's assessment of the AWL application including the proposed draft AWL conditions and concludes that:

1. the draft AWL conditions compliment the Carmichael Mine EA conditions;
2. the draft AWL conditions achieve the CG's recommendations;
3. the draft AWL conditions compliment the make good framework of Chapter 3 of the Water Act and establish a suitable strategy for the ongoing management of potential impacts to water bores;
4. the intent of the draft AWL conditions align with the Chapter 3 requirements to review the accuracy of the predicted affected area and an analysis of whether there has been a material change in the information or predictions used to determine the affected area on an annual basis;
5. the draft AWL conditions would be capable in delivering the requirements for the adaptive management of underground water. That is, it will establish an effective monitoring and review framework that aligns with the relevant EA to adaptively manage potential impacts as a result of the tenure holder's exercise of underground water rights; and
6. the draft assessment report conclusion that existing EA and EPBC Act approval conditions will monitor and manage any potential impacts to GDEs (including Doongmabulla Springs, Mellaluka Springs and GDEs linked to the Carmichael River baseflow) is supported by EHP.

7 Appendix 1- AWL draft condition comparison with Environmental Authority Schedule E- Groundwater

EA Condition	DNRM consideration	EHP evaluation
<p>E3- baseline groundwater monitoring program</p> <p>Must be developed by a appropriately qualified person and implemented by 2nd June 2016.</p> <p>The program must result in a groundwater dataset at least 30 days prior to box cut excavation</p> <p>The data set must:</p> <p>(a) contain a representative groundwater quality samples from the geological units identified as potentially affected by mining activities including Quaternary alluvium, Tertiary sediments, Bandanna Formation, Colinlea Sandstone, Clematis Sandstone, Rewan Formation, Dunda Beds, and Early Permian sediments;</p> <p>b) include at least 12 sampling events that are no more than 2 months apart over a 2 year period, so as to determine background groundwater quality;</p> <p>c) include background groundwater quality in hydraulically isolated background bore(s); and</p> <p>d) allow for the identification of natural groundwater level trends and groundwater contaminant trigger levels.</p>	<p>It is not considered required to condition the need for a baseline monitoring program as it is covered by the EA and has already been undertaken.</p> <p>It is likely DNRM will obtain this information when it is submitted to EHP, however if not, it is required in the first performance review report through proposed condition 39.</p>	

8 Appendix 2- AWL draft condition comparison with Coordinator General recommended conditions

CG's Recommended Condition	DNRM consideration	EHP evaluation
<p>Condition 5. Great Artesian Basin aquifer threshold levels</p> <p>(a) Prior to the commencement of 'active dewatering' of aquifers within the Dunda Beds and Clematis Sandstone and following analysis of groundwater monitoring data obtained from monitoring bores in these geological units (pursuant to condition E8 of the Environmental Authority), the proponent must present a report outlining recommendations for low impact and high impact threshold levels for approval by the relevant administering authority for the Water Act 2000. The report must:</p> <p>i. Provide recommendations for low impact and high impact threshold levels for the Dunda Beds and Clematis Sandstone (pursuant to condition E13 of the Environmental Authority)</p> <p>ii. Include an assessment of natural seasonal variation in the Dunda Beds and Clematis Sandstone aquifers</p> <p>iii. Outline the investigation protocol when low impact and high impact threshold levels are exceeded, including any requirements for additional modelling or monitoring required</p> <p>(b) If, the low impact threshold level is reached in any Dunda Beds or Clematis Sandstone bore, the proponent must notify</p>	<p>Draft AWL condition 41 states that the licensee must submit a report to the chief executive outlining recommendations for low and high impact trigger thresholds. This report must be submitted at least two months prior to the take of interference of water.</p> <p>Draft AWL condition 41(a)</p> <p>Draft AWL condition 41(b)</p> <p>Draft AWL condition 41(c)</p> <p>Draft AWL condition 43</p>	<p>EHP is satisfied that draft AWL condition 41 meets the intent of CG recommended condition 5(a).</p> <p>Draft AWL condition 41 specifies a suitable timeframe for the submittal of the report- two months prior to the take of interference of water under the AWL.</p> <p>Draft AWL condition 41 does not specifically reference that it is pursuant to condition E8 and E13 of the Environmental Authority however, this is not necessary as the draft AWL conditions do not conflict with those of the Environmental Authority and it is acknowledged that the baseline monitoring program required under EA condition E8 will inform the determination of the trigger thresholds and that following approval by the chief executive of the Water Act (as required by draft AWL condition 41), the EA will be amended to include those trigger thresholds into condition E13.</p> <p>EHP is satisfied these conditions align.</p>

<p>the relevant administering authority within 30 business days and provide a report pursuant to (a)(iii)</p> <p>(c) If the high impact threshold level is reached in any Dunda Beds or Clematis Sandstone bore, a suitably qualified person must complete an investigation pursuant to (a)(iii) and provide a written report to the relevant administering authority within 60 business days</p> <p>(d) If the investigation under (c), concludes that the exceedance of the high impact threshold level is a result of mining activities, the proponent must initiate a review of the latest groundwater model pursuant to condition E6 of the Environmental Authority and a review of the Groundwater Monitoring and Management Plan pursuant to condition E5 of the Environmental Authority and obtain any necessary approvals as a result</p> <p>(e) If the high impact threshold level is reached, the proponent may be required to construct additional monitoring bores</p> <p>(f) The proponent must offset the predicted take of water from the Great Artesian Basin for the life of the project as determined by the administering authority.</p>	<p>Draft AWL condition 44</p> <p>Draft AWL condition 45(a) & (b)</p> <p>Draft AWL condition 24</p> <p>Draft AWL condition 45(c)</p>	<p>EHP is satisfied these conditions align. It is noted that draft AWL condition 44 includes the term appropriately qualified person as opposed to suitably qualified person as recommended by the Coordinator General.</p> <p>The draft AWL conditions 45 does not require the review of the latest groundwater model pursuant to EA condition E6 or the GMMP pursuant to condition E5. Instead it requires a review of the latest underground water model and Underground water monitoring program required under the Draft AWL conditions.</p> <p>Draft AWL condition 24 states that 'The licensee must, if directed by the chief executive, make any amendments considered necessary to the Underground Water Monitoring Program to ensure that it continues to meet the objectives specified in definitions.' It is possible that this may include to construction of additional monitoring bores. Therefore draft AWL condition 24 would achieve the intent of CG condition 5 (e)</p> <p>EHP is satisfied these conditions align.</p>
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<p>Condition 6. Water security</p> <p>(a) In accordance with condition E3 and E4 of the Environmental Authority, the proponent must collect data that identifies natural groundwater level trends for identification of the water level impact from the mining operation on authorised water users</p> <p>(b) Within 3 years following the Coordinator-General's Evaluation Report, the proponent must provide a report to each potentially unduly affected authorised water users and the administering authority. The report must include a summary of the collected baseline information and address potential impacts to the groundwater supplies of those users</p> <p>(c) In the report required by condition (b), the proponent must:</p> <ol style="list-style-type: none"> identify operational bores for each potentially affected authorised water user for each operational bore: <ol style="list-style-type: none"> identify natural groundwater levels and water quality; identify the condition and supply capacity of the bore; identify the operational requirements and current use of the bore; clearly outline the predicted decrease in water level at the bore due to the proposed mining operations; provide an initial assessment of the likely water supply impacts to the affected authorised water users, and timing of those impacts, during and following the project activity. outline of the potential future 	<p>DNRM note that EA condition E3 requires a baseline monitoring program. DNRM consider that a AWL condition is not required as it is required to be submitted in the first performance review report under draft AWL condition 39.</p> <p>To Coordinator General's recommended condition 6 (b) and (c) have not been specifically conditioned in the draft AWL as:</p> <ul style="list-style-type: none"> Draft AWL condition 7 requires the licensee to undertake bore assessments; Draft AWL condition 12 requires a notice of outcome of the bore assessment to be given to the bore owner 30 business days after the bore assessment is complete; Following the completion of a bore assessment, draft AWL condition 14 requires the licensee to enter into a make good agreement with the bore owner. This agreement must include the outcome of the bore assessment, the likelihood of impaired capacity and, if required, make good measures. 	<p>EHP concurs that a condition is not required.</p> <p>EHP is satisfied that draft AWL conditions 7, 12 & 14 achieve the intent of the Coordinator General's recommended condition 6 (b) & (c) and more appropriately align with the make good framework established under Chapter 3 of the Water Act. Therefore it is not required to be specifically included on the draft AWL.</p>

<p>actions (make good measures) which would ensure the potentially unduly affected authorised water users will have access to a reasonable quantity and quality of water for the authorised use and purpose of the bore/s</p> <p>(d) The proponent must enter into agreements with all potentially unduly affected water users (as defined in conditions of the water licence or relevant legislation at the time) about the make good measures outlined in condition (c), or other negotiated arrangement</p> <p>(e) The agreement must be entered into at least 5 years prior to the time an unduly affected water user is predicted to become unduly affected due to dewatering operations (based on the latest version of the numerical groundwater model at the time).</p> <p>Note: an operational bore would have a demonstrated use to a landholder</p> <p>Definition-Unduly affected</p> <p>(a) a material reduction in the supply of water from the pre-existing bore relative to the supply available immediately prior to the taking of the water by the proponent, or</p> <p>(b) a material increase in the cost of maintaining the supply of water from the pre-existing bore relative to the cost of supply immediately prior to the taking of water by the proponent, or</p> <p>(c) the taking of water by the proponent causes a material reduction in the quality of water</p>	<p>Draft AWL conditions 7 & 8 require that the licensee must enter into make good agreements for all water bores in the affected area.</p> <p>DNRM changing 5 year requirement?</p> <p>DNRM note that previously, water licences used the term unduly affected however, for consistency with Chapter 3 of the Water Act, the Draft AWL conditions utilise the term 'impaired capacity' as defined under section 412 of Chapter 3 of the Water Act.</p> <p>Part (a) of the unduly affected definition aligns with s412(a) of Chapter 3.</p> <p>Parts (b) and (c) align with s412(b) noting that the cost of maintaining the bore is not specifically mentioned however it is</p>	<p>EHP is satisfied that draft AWL conditions 7 & 8 achieve the intent of the Coordinator General's recommended condition 6 (d) and more appropriately align with the make good frame works established under Chapter 3 of the Water Act. Therefore it is not required to be specifically included on the draft AWL.</p> <p>EHP is satisfied that the definition of 'impaired capacity' in the draft AWL aligns with the Coordinator General's definition of 'unduly affected'.</p>
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	considered that if a bore can no longer provide a reasonable supply (as stated in s412(b), unless make good measures are undertaken, that this may include an increase in cost.	
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9 Appendix 3 - AWL draft condition comparison with Chapter 3 of the Water Act

AWL Draft Condition	Purpose	Corresponding Chapter 3 Section
	Identifying water bores to which make good obligations apply	s363 - water bores to which Chapter 3 applies
7	Requirement for licensee to undertake a bore assessment, enter into a make good agreement and comply with that agreement for all water bores located in an affected area	s409(1) - make good obligations for an immediately affected area bore Note: immediately affected area is considered the equivalent of affected area.
8	If there is a change in the affected area and new bores are identified in that area, licensee must undertake a bore assessment, enter into a make good agreement and comply with that agreement for all water bores located in an affected area	s409(1) - make good obligations for an immediately affected area bore Considering requirements under: <ul style="list-style-type: none"> – s376(e) requirement for an UWIR to annually review the accuracy of the immediately affected area maps; and – s370(2)(c) requirement for an UWIR (which may identify an immediately affected area) to be given every 3 years
9	What a bore assessment must establish	s411 - what is a bore assessment
10	In undertaking a bore assessment the licensee must comply with the Bore Assessment Guideline	s414 - in undertaking a bore assessment responsible tenure holders must comply with guidelines made by the chief executive under s413 The current Bore Assessment Guideline was approved by the chief executive under s413 on the XXX
11	Requirement to notify bore owner 10 business days before undertaking a bore assessment	s415 - notice of intention to undertake bore assessment
12	Notice of outcome of bore assessment	s419 - notice of outcome of bore assessment
13	Notice of outcome must include requirement specified in Condition 6(c) of the CG's report	N/A
14	When a make good agreement is required	s423(2)- requirement to enter into a make good agreement
15	What a make good agreement must provide for including that the agreement may be terminated during the cooling off period	s420- What is a make good agreement for a water bore Note: definition of make good measure in Draft AWL refers to s421.
16	The Licensee must reimburse the bore owner for any accounting, hydrogeology, legal or valuation costs the bore owner necessarily and	s423(3)(a) and (4)- requirement to reimburse the bore owner

Commented [W22]: Linked in def straight to Ch 3

	reasonably incurs in negotiating or preparing a make good agreement	
17	The Licensee must advise the chief executive by written notice if the Licensee enters into a make good agreement	s423(3)(b)- requirement to advise the chief executive if the tenure holder enters into a make good agreement
18	Dispute resolution-states the provisions of Division 4, Part 5 of Chapter 3 of the Act will apply	Division 4, Part 5 of Chapter 3

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