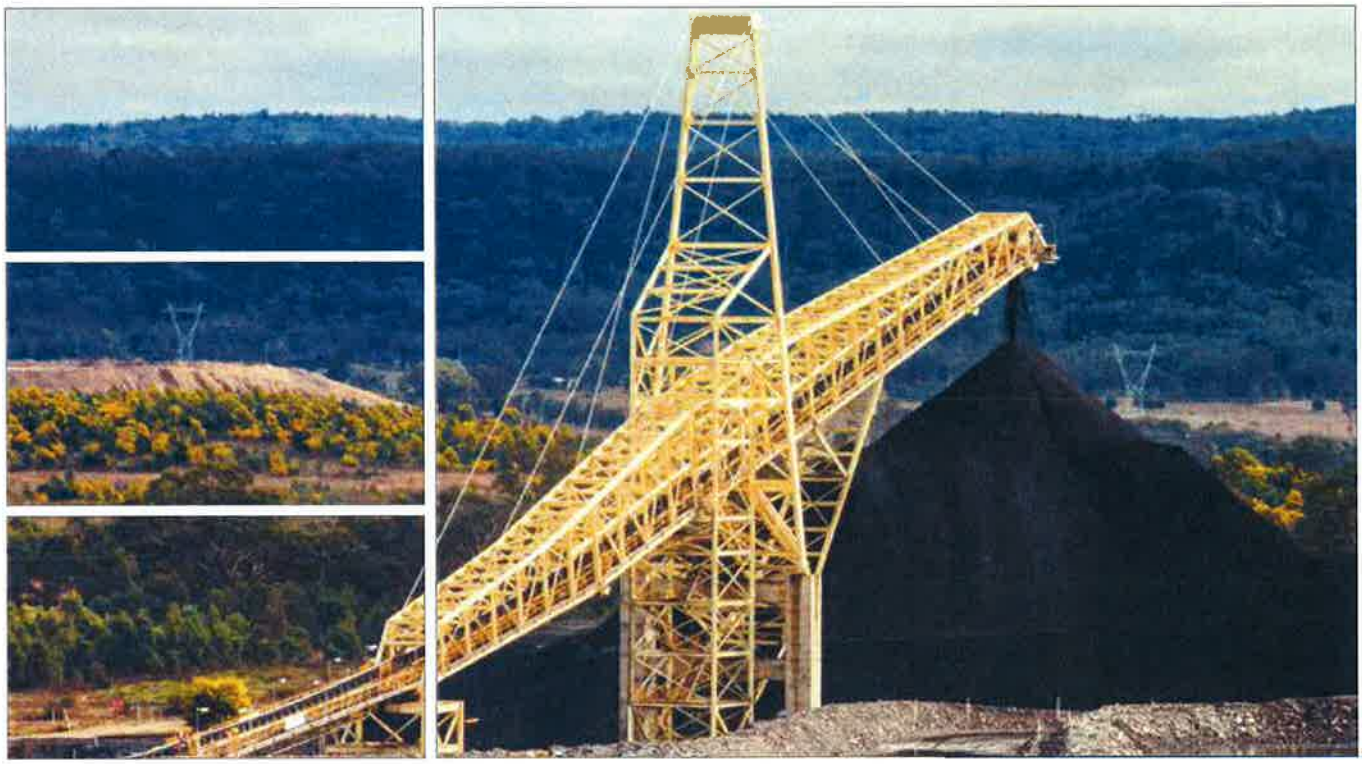
APPENDIX A: WCPL'S RESPONSE TO THE COMMISSION'S REVIEW REPORT

WILPINJONG EXTENSION PROJECT

RESPONSE TO PLANNING ASSESSMENT COMMISSION REVIEW



February 2017

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1 INTRODUCTION

Wilpinjong Coal Pty Ltd (WCPL), a wholly owned subsidiary of Peabody Energy Australia (Peabody Energy), prepared the *Wilpinjong Extension Project Environmental Impact Statement* (WCPL, 2016a) (the EIS) for the proposed Wilpinjong Extension Project (the Project) that is being assessed under Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979*.

Following public exhibition of the EIS and the preparation of responses to submissions, on 3 November 2016 the Minister for Planning issued a request to the Chair of the Planning Assessment Commission (the PAC) to carry out a review of the Project and conduct a public hearing.

The Project PAC consists of Mr Joe Woodward (chair), Mr Alan Coutts and Mr David Johnson.

The Terms of Reference for the Project PAC are as follows:

1. *Carry out a review of the Wilpinjong Extension Project, and:*
    a. *consider the EIS for the project, all issues raised in public and agency submissions, and any information provided on the project during the course of the review;*
    b. *assess the merits of the project as a whole having regard to all relevant NSW Government policies, paying particular attention to the impacts of the project on Wollar Village; and, if necessary;*
    c. *recommend appropriate measures to avoid, minimise and/or manage significant impacts of the project.*
2. *Conduct public hearings during the review as soon as practicable after the Department of Planning and Environment provides its preliminary assessment report to the Commission.*
3. *Submit its final report on the review to the Department of Planning and Environment within 10 weeks of receiving the Department's preliminary assessment report, unless the Secretary agrees otherwise.*

The Project PAC conducted a site inspection of the Wilpinjong Coal Mine on 28 November 2016.

In accordance with the Terms of Reference, the Project PAC held a public hearing on 29 November 2016 at the Mudgee Town Hall, which included presentation of verbal submissions by a number of individuals and groups. In addition to the public hearing, a wide range of written submissions were made to the Project PAC on the Project.

Following review of the EIS, the Secretary's Environmental Assessment Report (NSW Department of Planning and Environment [DP&E], 2016) and relevant submissions, the Project PAC issued the Wilpinjong Extension Project SSD 6764 Review Report (the PAC Review Report) on 20 December 2016 (PAC, 2016).

This document provides WCPL's responses to the PAC Review Report (PAC, 2016), and in particular the consolidated recommendations of the Project PAC. For ease of reference, this document addresses the PAC Review Report recommendations in the same order as provided in Section 9.1 of the PAC Review Report (*ibid*).

WCPL recognises that a number of the Project PAC recommendations are addressed directly or in part to the DP&E. However, WCPL has reviewed these recommendations and where practical has provided supplementary information or data that is potentially of relevance to the DP&E's consideration of the Project PAC's recommendations.

2 RESPONSES TO PAC REVIEW REPORT RECOMMENDATIONS

Responses to recommendations made by the Project PAC are provided in the subsections below.

2.1 Biodiversity and Offsets

Derived Native Grassland

Recommendation 1

- *should insufficient evidence be provided by the Applicant to satisfy the Department of Environment and Energy as to the identification and classification of derived native grassland, than for the purposes of establishing an appropriate offset liability, the area in question shall be deemed as satisfying the requirement for derived native grassland;*

Response

WCPL has continued to consult with the DP&E and the Commonwealth Department of the Environment and Energy with respect to the technical queries raised regarding derived native grassland identification at the Project site.

WCPL's response to the Commonwealth Department of the Environment and Energy was provided to the DP&E in November 2016. In summary, Dr Colin Driscoll has confirmed that the vegetation mapping was completed in accordance with the Commonwealth Department of the Environment and Energy's policies and guidelines, and Dr Driscoll does not support any changes to the vegetation mapping provided in the EIS.

However, WCPL has continued to proactively address this issue and recently conducted a site visit with the Commonwealth Department of the Environment and Energy and the DP&E on 21 December 2016. The purpose of the site visit was to allow the Commonwealth Department of the Environment and Energy to inspect relevant areas of grassland at the site and to discuss mapping methodology.

Following the site inspection, it is understood that the Commonwealth Department of the Environment and Energy is satisfied with the assessment methodology applied for the derived native grassland classification and will provide further advice for review by WCPL and the DP&E.

Impacts on the Munghorn Gap Nature Reserve

Recommendation 2

- *preliminary SEAR within any proposed consent requirements to minimise impacts on the Nature Reserve;*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project.

Impacts on the potential Eastern Bentwing-bat roosting site (abandoned mine adit)

Recommendation 3

- *preliminary SEAR within any proposed consent requirements to minimise impacts on the abandoned adit to protect potential roosting sites of the Bentwing Bat. In addition to this, the Applicant and Department should give consideration to the impacts of mine lighting on bat movements to and from the adit;*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project.

WCPL is aware that there is some research (e.g. Threlfall et al, 2013; Rydell, 2006) that suggests that some insectivorous bat species can modify behaviour to preferentially hunt insects that are attracted to artificial lights that contain some Ultra Violet (UV) spectra. For some of these bat species, this may in turn result in modified and increased predation by nocturnal birds of prey (owls) that may feed on these bat species (Rydell, 2006). While WCPL is not aware of any research that suggests that these effects on some other bat species are directly relevant to the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), it is recognised that this finding could have some relevance to this species as it is an insectivorous bat.

In addition to the above, it is recognised that if direct lighting was present at the adit entrance this could potentially alter the timing and/or nature of the bats entry and exit from the roost site, as there is some research to suggest the Eastern Bentwing-bat may avoid lit areas (e.g. Linley, 2016) rather than benefit from feeding on insects attracted to the lights. However, direct lighting is not proposed at the adit entrance.

It should be noted that the adit is located in an area at the foot of a heavily vegetated ridgeline that includes a series of small gullies, separated by minor localised rises and is moderately to heavily vegetated. The presence of some local topographic shielding and existing mature vegetation is expected to reduce the potential for material direct and indirect lighting impacts at the adit entrance.

Potential lighting management measures that could be employed for the duration that mining is proximal to the adit (i.e. estimated to be approximately 18 to 24 months) would include directing pit temporary lighting away from the adit and using only sufficient lighting at an elevation necessary for safety purposes when in mining in close proximity. Where practical, WCPL would also prioritise the selective use of Light Emitting Diode (LED) based lighting plants that produce zero UV output and are already operating on-site (i.e. to minimise UV light generation that may attract insects) in this area of Pit 8.

WCPL suggests that consideration of the potential lighting impacts on bat movements to and from the adit and any associated lighting management measures could be incorporated into the Biodiversity Management Plan related Draft Consent Conditions. The monitoring programme at the adit could also include consideration of periodic measurement of light levels at the adit entry before and during mining.

Availability of species credits for the Regent Honeyeater

Recommendation 4

- *given the critical status of the Regent Honeyeater, the Department and the Applicant shall provide additional evidence to confirm that any shortfall in species credits are available for purchase by the Applicant. The Commission would not be supportive of any reduction in Regent Honeyeater credit liabilities;*

Response

Due to the wide ranging habitat requirements of the Regent Honeyeater (e.g. vegetation communities that provide Regent Honeyeater habitat in the Project vicinity include the following BioMetric Vegetation Types [BVTs]: HU618, HU690, HU697, HU732, HU801, HU824, HU843, HU886, HU890, HU891 and HU910) there are significant areas of Regent Honeyeater habitat in the Wilpinjong Coal Mine region, and also in other regions of NSW.

Therefore opportunities exist for WCPL to purchase additional land in the region, and/or use other lands already owned by Peabody Energy, to satisfy any potential future species credit requirements, if required.

It is also understood that the NSW National Parks and Wildlife Service and NSW Office of Environment and Heritage (OEH) are periodically approached by landholders interested in sale of their property for potential inclusion in the reserve system, and some of these properties are known to have Regent Honeyeater habitat values.

As an example, during July 2016, OEH advised WCPL of one private property in the region that was potentially available for purchase that was approximately 800 hectares in size and adjoined an existing National Park. OEH indicated approximately 78 percent (%) of the particular private property represented Regent Honeyeater habitat, and that it could therefore potentially provide some 4,444 species credits for the Regent Honeyeater if it was purchased by a proponent and used for biodiversity offset credit purposes.

Regent Honeyeater breeding program

Recommendation 5

- *the Department should provide sufficient evidence to demonstrate that the proposed Regent Honeyeater breeding program is operational, or if not already operational, provide evidence that appropriate agreements are in place with relevant stakeholders, and that the program would become operational in less than five years;*

Response

It is anticipated that the DP&E will not require any advice from WCPL on this recommendation.

Progressive offset strategy

Recommendation 6

- *the Commission would encourage the development and adoption of a progressive offset strategy that focuses initial efforts on those land holdings that can offer the quickest biodiversity returns for endangered ecological communities and threatened flora and fauna species, for*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project.

It is noted that Enhancement and Conservation Area B (ECA-B) is associated with the existing approved Wilpinjong Coal Mine and was reserved for conservation for a number of purposes including the regeneration of endangered ecological communities, some of which may represent Regent Honeyeater habitat.

It is suggested that this recommendation could be addressed by the DP&E with inclusion of relevant proactive measures for residual regeneration areas located outside of the Project footprint and the Enhancement and Conservation Areas in the first three years, such as:

- selective direct seeding of native grasses, herbs and shrubs where regeneration is poor based on resilience mapping;
- selective revegetation of local native over-storey and shrub species within poor condition areas; and
- opportunistic supplementary tree planting.

WCPL also sees an opportunity to prioritise Regent Honeyeater habitat establishment within existing mine rehabilitation areas where rehabilitation to date has focussed on the establishment of productive pasture for grazing. In these areas, WCPL anticipates that the commencement of control of non-native species and re-seeding to a combination of suitable native plant species could be a rehabilitation priority in the first 3 years.

These pasture areas are already at final landform levels, are typically gently sloping, have been topsoiled and are still accessible to mobile equipment or farm machinery without new clearing. Subject to climatic conditions, this may offer an opportunity to prioritise the staged trial establishment of Regent Honeyeater habitat associated with the Project. In parallel WCPL would conduct re-evaluation of the previous woodland revegetation areas against contemporary BVT classifications and identify a programme of remedial measures, where this may be required.

The Biodiversity Management Plan could also potentially incorporate a summary of the management measures of relevance to the Regent Honeyeater in a single subsection of the Plan.

Long term Regent Honeyeater offset strategy

Recommendation 7

- *the Commission would encourage the Department, OEH and the Applicant to give consideration to develop a long term strategy to provide for the maximum potential habitat outcome for the Regent Honeyeater within the site and land offset areas.*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project. It is noted that the greater the number of recognised Regent Honeyeater habitat BVTs that are authorised for use in rehabilitation on-site, the greater the flexibility for WCPL to establish revegetation that reflects the local spatial variation in vegetation communities (e.g. due to local soil types and other physical characteristics of analogue sites). WCPL is of the opinion that this would increase the probability that the maximum area of recognised Regent Honeyeater habitat would be achieved.

It is therefore suggested that the Biodiversity Management Plan conditions should provide an avenue to review the target BVTs based on contemporary soil mapping and comparison to the geological/topographic characteristics of analogue sites with alternative target vegetation communities.

It is also noted that once any biodiversity offset area is transferred to the NSW National Parks and Wildlife Service (i.e. for inclusion in the National Park estate) these offset areas would then be outside of the control of WCPL.

2.2 Rehabilitation and Final Landform

Final voids

Recommendation 8

- *whilst the Commission acknowledges that the existing mining project has approval for two final voids, the Applicant and the Department should further explore opportunities to limit the extent of the pits, in particular to keep the depth shallow enough as to not form saline sinks, unless it is operationally and biophysically required. The Commission is of the view that the proposal to create an additional long term void for Pit 8 is not justified based on the information available, including stated cost, and further consideration should be given to preventing this permanent void.*

Response

In light of the Project PAC's strong recommendation with respect to the Pit 8 final void, WCPL has considered options to revise the final Pit 8 landform such that the southern end is wholly free draining (either north into Wilpinjong Creek, or west into the Cumbo Valley) and no longer includes a final void.

Due to the elevated location of the Pit 8 final void, WCPL has conducted initial mine planning to investigate the potential to drain the formerly proposed final void in Pit 8 to the west, as this would require less alteration to the Project final landform and associated materials balance.

This investigation suggests that the final landform in Pit 8 could potentially be amended to form a final depression in the south that has both gentler highwall and low wall slopes and a reduced final depth (i.e. depth reduced from approximately 50 m to approximately 30 m by partial backfilling).

WCPL's initial investigations suggest that the revised final landform would still be required to include some areas of moderate to steep slopes (i.e. up to approximately 37.5° or 76% slope) at highwall and low wall areas to avoid materially extending the disturbance area of the open cut. However, the revised final landform in this area would predominantly comprise more gentle slopes (i.e. 1% to 15%) and the area that could be rehabilitated to woodland vegetation would be increased.

The steeper areas of the revised final landform in Pit 8 that would be associated with these highwall and low wall areas would generally reflect natural landforms in the locality where slopes transition from steeper rocky escarpment areas around the valley perimeter onto the gently sloping valley floor.

It is noted that this revision of the Pit 8 final landform would result in material additional operational costs to WCPL and may also require the development of some temporary waste rock stockpiles within the mine footprint in the vicinity of the final depression.

Figures 1 to 3 illustrate conceptually in both plan and cross section the key differences between the Pit 8 final void as proposed in the EIS and the conceptual revised final landform in the south of Pit 8.

The option to develop a final depression is available in the case of Pit 8 because of its topographical location at the head of a valley at significant elevation above the nearest streams. This topographical location is not comparable to the Pit 2 and Pit 6 final void locations where the coal is dipping to the north and the final voids are located adjacent to the northern pit boundary.

With regard to the depth and extent of the final voids, WCPL notes that due to the low strip ratio of the Wilpinjong Coal Mine, the proposed Pit 2 and Pit 6 final voids are relatively modest (both in depth and extent) compared to the final voids approved for most other open cut coal mines in NSW. The location, depth and extent of final voids would continue to be reviewed over the life of the Project, and would ultimately be determined by detailed mine planning during the later stages of the Project.

However, subject to review of the draft conditions, WCPL is prepared to accept the recommendation regarding exploring further opportunities to limit the depth of the Pit 2 and Pit 6 final voids being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project (i.e. requiring the development of a Rehabilitation Strategy). It is noted that the PAC has also on previous occasions recognised that final voids can have both economic and hydrological/ecological benefits over backfilling of mine voids. For example, the original Independent Hearing and Assessment Panel for the Wilpinjong Coal Project (Kearns, Middlemis and Hardie, 2005) concluded:

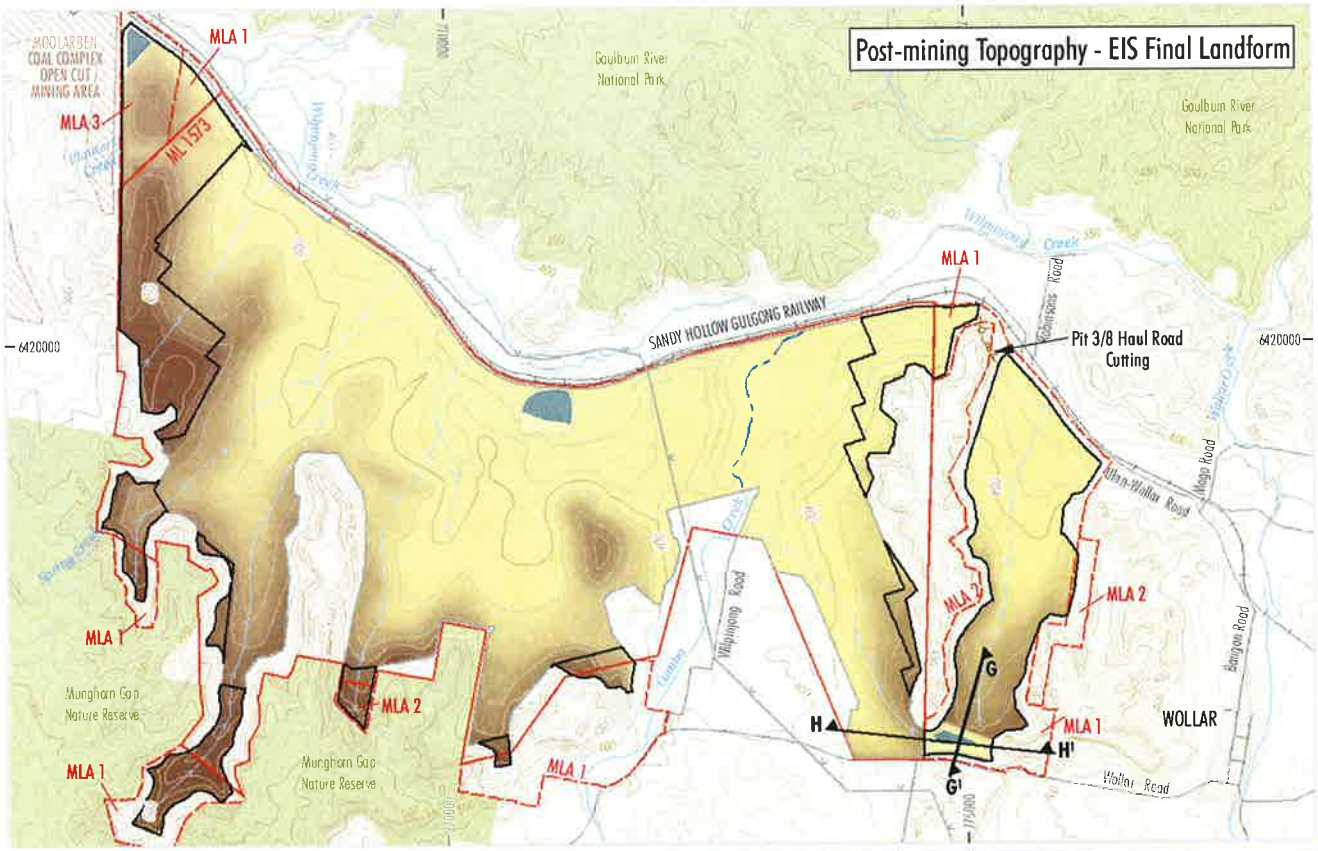
> *The available information and modelling tools were also used to predict the impacts of the final or residual mine voids. The approach and predictions have been assessed as acceptable in a hydrological sense, in that pit void lakes should develop as stable and long term hydrological sinks, and the water quality status should not change from its current beneficial use status (stock water) within a 200-year timeframe.*

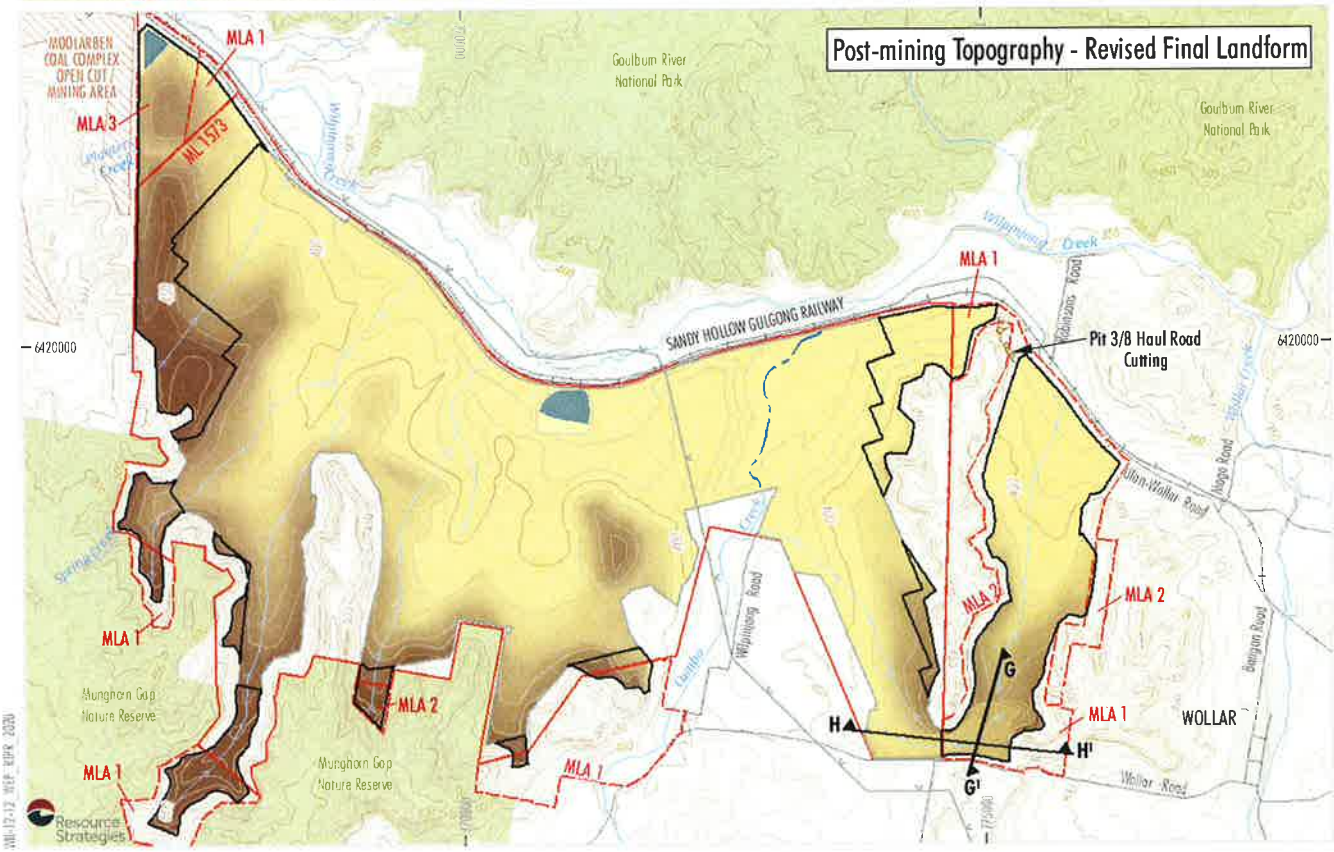
In particular, the proposed Pit 6 final void is located at the western boundary of the mine and proximal to the Moolarben Coal Complex Open Cut 4 final void that was approved as part of the Moolarben Stage 2 project by the PAC in 2015. The Pit 6 final void represents the last area of the planned sequence of mining for the Wilpinjong Coal Mine incorporating the Project (refer EIS Figures 2-8 to 2-12) and therefore represents a logical position for a final void.

A final void at this location also provides the potential opportunity to rationalise the Project's Pit 6 and Moolarben Open Cut 4 final voids and recover the associated barrier coal between the two mining operations, should this be economical in the future (refer WCPL's Response to Submissions). This is reflected in the draft Development Consent which requires that WCPL investigate options to integrate the two final voids in consultation with the proponent of the Moolarben Coal Complex.

With respect to the Pit 2 final void, this comprises the Pit 2 west dam that is currently the major Wilpinjong Coal Mine on-site water storage. It is anticipated that this water storage facility would continue to be used for water supply and on-site water management until rehabilitation activities are complete. Post-mining the catchment of the dam would be minimised and it would remain an isolated groundwater sink, consistent with the currently approved final void located in the north of Pit 3.

HydroSimulations (2015) conducted post-mining modelling of the Pit 2 and Pit 6 final voids and concluded that they would operate as sinks, with an overall groundwater gradient towards the voids. This would minimise the potential for salt to migrate from the final voids to the surrounding groundwater environment.





LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary
- Approved/Existing Open Cut and Contained Infrastructure Area
- Proposed Open Cut Extension Area
- Final Void
- Final Void Waterbody [1]

[1] Pit 8 Final Void is predicted to be dry during periods of low rainfall.

- Conceptual Cumbo Creek Realignment
- Drainage Line
- Surface Contour
- Local ETL
- TransGrid 330 kV ETL
- Cross Section Location

Elevation

360m AHD

510m AHD

Source: WCPL (2015, 2017); NSW Dept of Industry (2015); NSW Land & Property Information (2015)

N

0 2

Kilometres

MGA 94 ZONE 55

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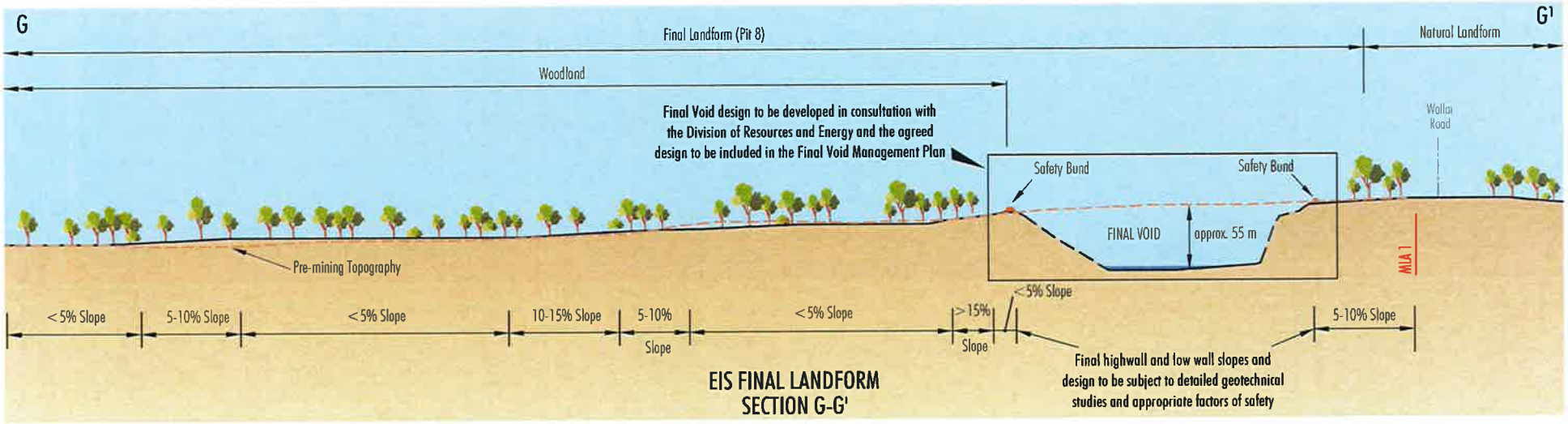
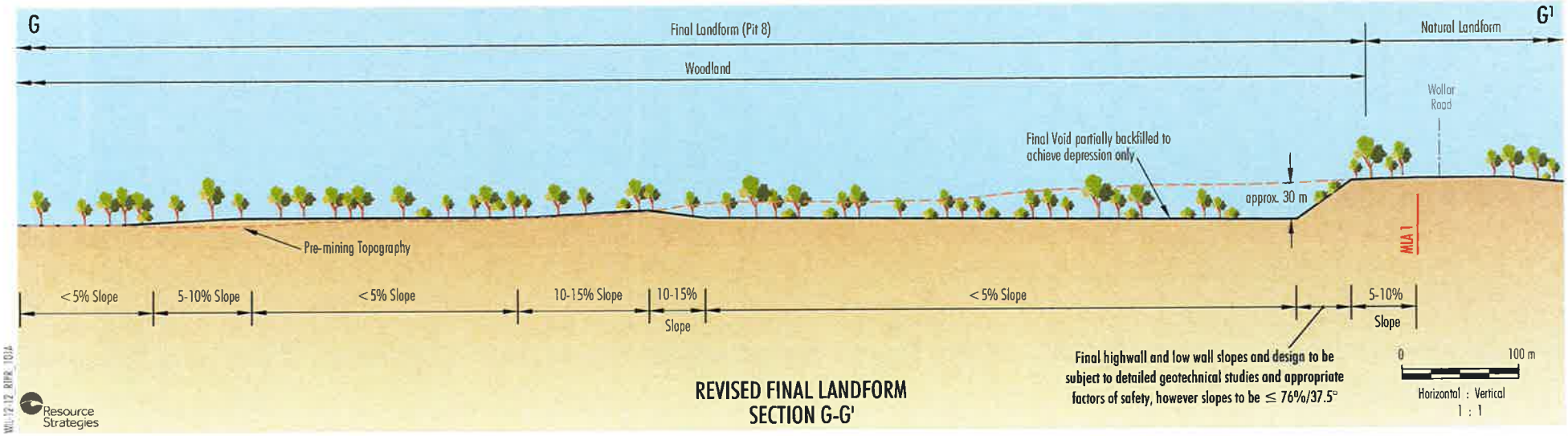
WILPINJONG EXTENSION PROJECT

Conceptual Post-mining Topography Comparison of EIS and Revised Final Landform

Figure 1





Source: WCPL (2017)

Refer Figure 1 for Cross Section location.

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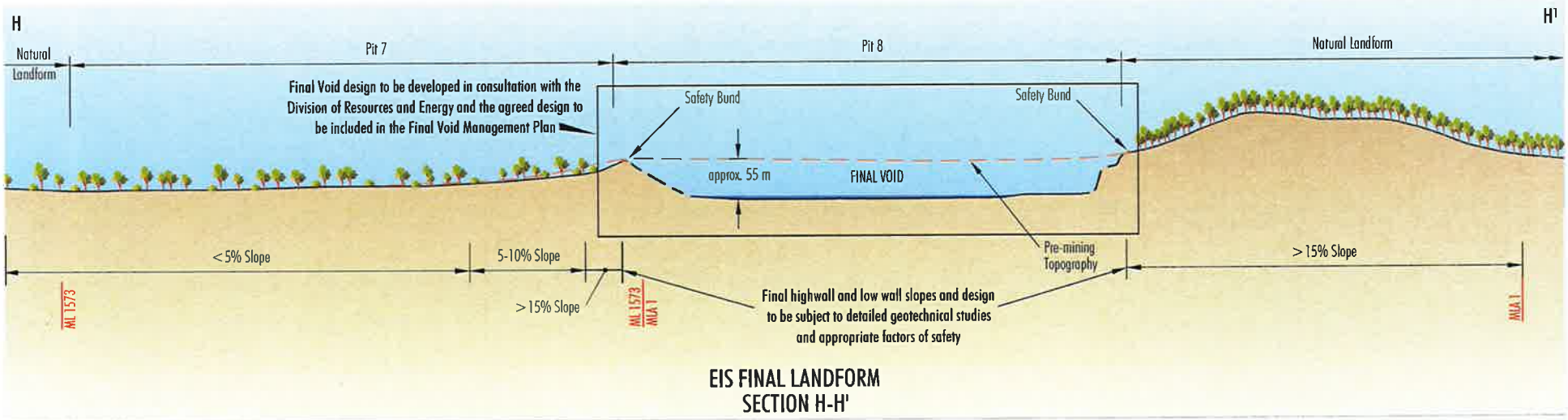
WILPINJONG EXTENSION PROJECT

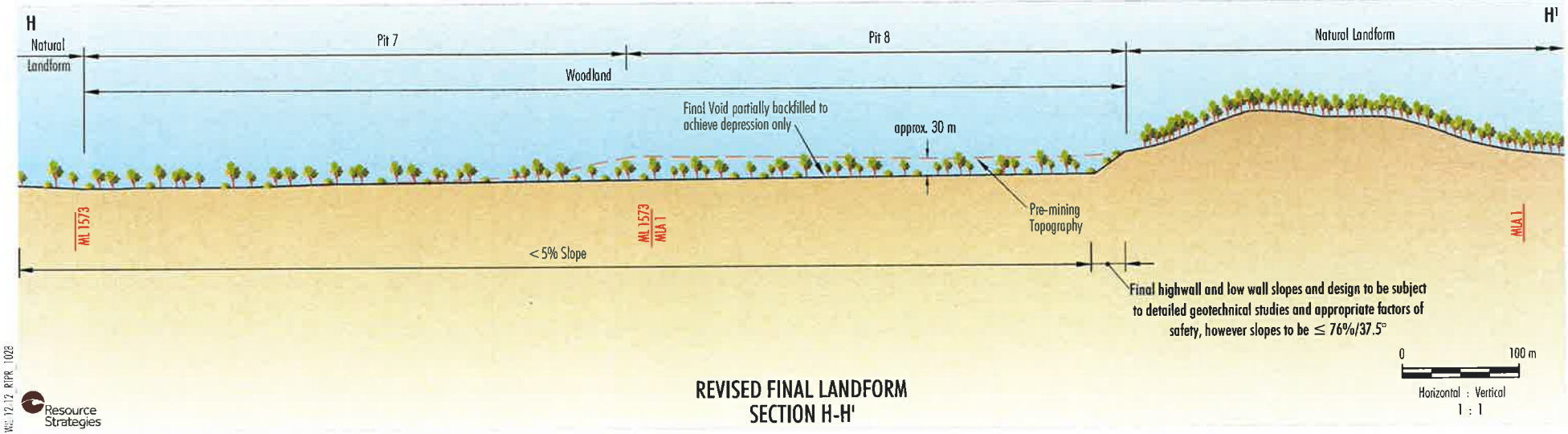
Conceptual Cross Section G

Comparison of EIS and Revised Final Landform

Figure 2



EIS FINAL LANDFORM
SECTION H-H'



REVISED FINAL LANDFORM
SECTION H-H'

Resource Strategies

W: 12.12_RTPR_1028

Source: WCPL (2017)

Refer Figure 1 for Cross Section location.

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WILPINJONG EXTENSION PROJECT

Conceptual Cross Section H
Comparison of EIS and Revised Final Landform

Figure 3

2.3 Water Quality

Clarification of incremental Project impacts

Recommendation 9

- *the final assessment report should present the modelling and prediction information as being independent of the existing mining operations, however cumulative impacts of the whole of project are still to be presented. This will permit a clear delineation of the proposed project impacts;*

Response

WCPL interprets this recommendation as a request for further clarification regarding the potential incremental and cumulative impacts to water resources presented in Section 5.4 of the Secretary's Environmental Assessment Report.

WCPL suggests that the DP&E could potentially include summary tables in Section 5.4 of the Secretary's Environmental Assessment Report, where relevant, to separately describe potential impacts of the existing/approved Wilpinjong Coal Mine, and the Project incorporating the approved Wilpinjong Coal Mine.

Example summary tables are provided as Tables 1 and 2 for potential surface water and groundwater impacts, respectively.

Table 1
Potential Surface Water Impacts Summary

Parameter	Existing/Approved Wilpinjong Coal Mine	Wilpinjong Coal Mine Incorporating the Project	Incremental Change
Maximum catchment area intercepted [a]	24.1 km²	23.8 km²	-0.3 km²
Catchment area captured by final voids [b]	0.2 km²	0.3 km²[#]	0.1 km²[#]
Baseflow loss – Wilpinjong Creek to Wollar Creek confluence [c, d]	0.37 ML/day	0.37 ML/day	<0.005 ML/day
Baseflow loss – Wollar Creek to Goulburn River confluence [c]	0.37 ML/day	0.40 ML/day	0.03 ML/day
Baseflow loss – Goulburn River to Hunter River confluence [c]	0.37 ML/day	0.41 ML/day	0.04 ML/day
Increase in the long term average salinity of Wilpinjong Creek [d]	Not Applicable	0.8%	Nil

km^2 = square kilometres, ML/day = megalitres per day.

[#] Note that this area is inclusive of the Pit 8 final void. The Pit 8 final landform would be revised to be free draining however these areas would remain largely unchanged due to the small catchment area of the Pit 8 final void and these numbers being rounded to the nearest 0.1 km².

Sources: a - Section 8.5 of the EIS Surface Water Assessment (WRM Water & Environment, 2015).
b – Table 8.1 of the EIS Surface Water Assessment (WRM Water & Environment, 2015).
c – Table 8.2 of the EIS Surface Water Assessment (WRM Water & Environment, 2015).
d – Correspondence to the Department of Primary Industries – Water (DPI-Water), 6 July 2016.

Table 2
Potential Groundwater Impacts Summary

Parameter	Existing/Approved Wilpinjong Coal Mine	Wilpinjong Coal Mine Incorporating the Project	Incremental Change #
Maximum groundwater inflow	5.4 ML/day [a]	4.6 ML/day [b]	-0.8 ML/day
Average groundwater inflow	2.7 ML/day [a]	1.9 ML/day [b]	-0.8 ML/day
Licensable take (peak) during mining - alluvium	185 ML [c]	171 ML [d]	-14 ML
Licensable take (peak) during mining – hard rock	1,979 ML [a]	1,099 ML [d]	-880 ML

ML/day = megalitres per day, ML = megalitres.

Note: # Some changes in predicted impacts may relate to modelling improvements/differences (i.e. due to updates to the modelling methodology for the Project and more contemporary data), rather than Project impacts.

Sources: a – Table 1 of the Modification 6 Environmental Assessment Groundwater Assessment (HydroSimulations, 2014).
b – Section 9 of the EIS Groundwater Assessment (HydroSimulations, 2015).
c – Table 19 of the Modification 5 Environmental Assessment Groundwater Assessment (HydroSimulations, 2013).
d – Table 7-1 of the EIS Groundwater Assessment (HydroSimulations, 2015).

Agency concerns regarding existing mining impacts

Recommendation 10

- *where an agency raises concerns regarding existing mining impacts, such as salinity increases within Wilpinjong Creek, the Department should in its final assessment report give significant time to clearly describe the concerns, how the agency believes the concern should be best managed, and how the Department in reaching its final conclusion has addressed those concerns, and where possible specific management outcomes should be referenced by way of conditions of consent;*

Response

It is understood that initial concerns raised by the NSW Department of Primary Industries – Water (DPI-Water) and the Commonwealth Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (the IESC) have been addressed in the draft conditions proposed by the DP&E. The DP&E may wish to make reference to further consultation with the DPI-Water, including the final letter response received 15 July 2016, and the IESC, including the final advice received 2 September 2016, and how the issues raised by these agencies have been specifically addressed in the Draft Consent Conditions associated with the Water Management Plan.

In particular, the DPI-Water raised a number of key concerns during the assessment of the Project and each was subsequently addressed by WCPL. The key concerns raised by the DPI-Water and how these were addressed is described in summary form below:

- In its original submission on the EIS dated 18 March 2016 the DPI-Water raised changing salinity levels recorded in two groundwater bores located approximately 3.6 km east of existing workings and an observed increase in the salinity of Wilpinjong Creek from 2013 to 2014. In particular, the DPI-Water raised concerns that the increasing salinity in Wilpinjong Creek and these bores was related to impacts of the existing mine. The DPI-Water also raised concerns as to the findings of the Wilpinjong Extension Project Groundwater Assessment regarding the Aquifer Interference Policy minimal impact criteria of 'no increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity'.
    - WCPL and HydroSimulations subsequently met with the DPI-Water in May 2016 to discuss the issues raised and how WCPL intended to respond.
    - In its Response to Submissions dated May 2016, WCPL illustrated how the bores in question were located up-gradient of the mine and the results at the DPI-Water bores may have been related to recent climatic conditions and site specific factors. WCPL also confirmed that the range of salinity observed in Wilpinjong Creek in 2013 to 2015 (up to approximately 7,500 µS/cm) was well within the range of salinity observed in 2006 to 2007 (up to approximately 16,000 µS/cm) and presented more contemporary data that demonstrated the salinity in Wilpinjong Creek had significantly reduced following a period of higher rainfall. WCPL also re-iterated the findings of the EIS, which determined that the potential incremental long term effects of the Project on Wilpinjong Creek were negligible and therefore the 1% long-term average salinity test on Wilpinjong Creek would not be triggered by the proposed Project.
- The DPI-Water then clarified in June 2016 that due to an observed recent rising salinity trend in Wilpinjong Creek its concern primarily related to whether the existing approved Wilpinjong Coal Mine would meet the Aquifer Interference Policy 1% long-term average salinity test in the absence of ongoing licensed water releases (it is noted that the Wilpinjong Coal Mine was approved prior to the Aquifer Interference Policy coming into force).
    - HydroSimulations and WCPL then provided further water quality data and advice to the DPI-Water to address its concern, inclusive of further statistical analysis of baseline data and quantitative assessment against the Aquifer Interference Policy minimal impact criteria (1% long-term average salinity test) for Wilpinjong Creek. It is noted that this supplementary HydroSimulations advice was subsequently appended to the Secretary's Environmental Assessment Report in Appendix E.
    - WCPL then met with the DPI-Water, Department of Premier and Cabinet and the DP&E in July 2016 to discuss the DPI-Water's concerns and the response provided.
- The DPI-Water then provided its letter response dated 15 July 2016 which stated in summary that it accepted the modelling conducted demonstrated that the downstream impacts were within the Aquifer Interference Policy minimal impact criteria. The DPI-Water also requested that some further statistical analysis be included in the Water Management Plan Consent Conditions for the Project to increase the understanding of the drivers for salinity increases on Wilpinjong Creek.

It is noted that Condition 30(a), Schedule 3 of the draft Development Consent requires that WCPL prepare the Water Management Plan in consultation with the DPI-Water and also requires statistical trend analysis of salinity in local creeks.

Further discussion of pre-mining water quality is provided in the response to Recommendation 18.

Baseline surface water and groundwater data

Recommendation 11

- *the Department is to give consideration to requiring, through the implementation of conditions of consent, the establishment of baseline surface water and groundwater data to enable the development of a reference point to establish the impacts of mining on water resources within the locality;*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project. WCPL suggest this can be addressed with a requirement to present baseline water resources data in the relevant components of the Water Management Plan.

Sediment dam design requirements

Recommendation 12

- *the Department should ensure that the water balance assumptions are updated prior to finalising the preliminary SEAR to ensure it is reflective of the outcomes of requiring sediment dams to be designed to cater for the 95 percentile 5 day rainfall event;*

Response

WRM Water & Environment has conducted sensitivity testing of the Project water balance by altering the sediment dam design criteria, to cater for the 95th percentile 5 day rainfall event, without altering any other parameters of the EIS water balance.

The analysis indicates that the volume and frequency of sediment dam overtopping events would be reduced, however there would be no material change to the overall EIS water balance or material environmental implications associated with the change.

WRM Water & Environment's advice in this regard is provided in Appendix A.

Mine water definition clarification

Recommendation 13

- *reference on page 60 of the preliminary SEAR is captured and managed so as to not pose a risk to the environment;*

Response

The EIS defines 'mine water' as groundwater inflows and runoff from mine workings, Coal Handling and Preparation Plant process water (including recycled water from the coal waste areas) and surface drainage from catchment areas containing mine infrastructure (e.g. workshop areas and coal stockpiles).

In summary, the water management strategy for the Project, as for the existing Wilpinjong Coal Mine, involves directing mine water to contained water storages, which would continue to be managed and operated in accordance with Environment Protection Licence 12425 requirements.

The contained water storages are operated to provide freeboard for storm storage. The freeboard would be maintained by transferring excess water to other contained water storages or, in the event that relevant storages had insufficient freeboard, by pumping or drainage to an open pit.

The water management strategy for the existing Wilpinjong Coal Mine and the Project are detailed in Sections 2.1.6 and 2.12 of the EIS.

Cumulative groundwater drawdown

Recommendation 14

- *the Department is to confirm that the cumulative impact assessment of groundwater includes what has occurred / been approved by the existing mining operations at Wilpinjong, or alternatively it clearly delineates the two projects and provides information on the experienced drawdown against what was predicted for the existing operation;*

Response

The cumulative groundwater impact assessment conducted for the Project was completed for the Wilpinjong Coal Mine incorporating the Project. The following scenarios were modelled using the calibrated numerical groundwater model:

- transient prediction (Wilpinjong Coal Mine incorporating the Project);
- transient prediction (cumulative including Moolarben Coal Complex);
- transient recovery (Wilpinjong Coal Mine incorporating the Project); and
- steady state final void predictions.

Note that contemporary groundwater modelling related to the currently approved Wilpinjong Coal Mine is also available in the *Wilpinjong Coal Mine Modification 5 Environmental Assessment* (WCPL, 2013) and the *Wilpinjong Coal Mine Modification 6 Environmental Assessment* (WCPL, 2014), and a summary is provided in Table 2 (refer response to Recommendation 9).

Make good provisions for the Wollar Public School

Recommendation 15

- *the Department is to ensure that an appropriate regulatory regime is developed through*

  School;

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project. WCPL suggests make good provisions for bores that experience greater than 2 metres (m) of drawdown due to the Wilpinjong Coal Mine can be suitably incorporated into the Groundwater Management Plan conditions.

Extent of drawdown on alluvial aquifers

Recommendation 16

- *the Department is to provide further clarification as to the full extent of drawdown on the alluvial aquifers within and around the project site to enable a full assessment of the predicted impacts;*

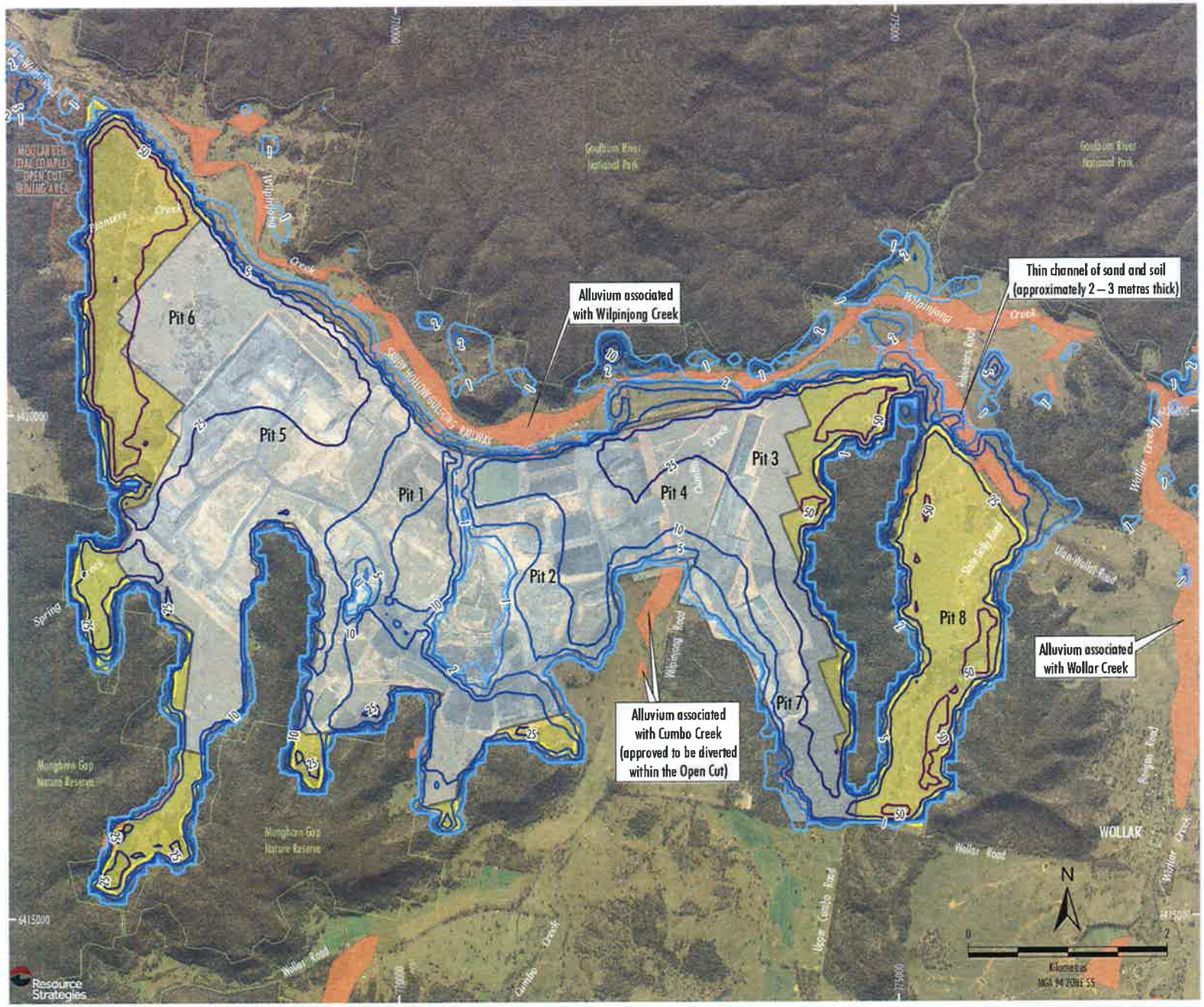
Response

The extent of unconsolidated sediments in the vicinity of the Wilpinjong Coal Mine was interpreted by HydroSimulations (2015) based on review and inspection of a number of data sources, including:

- Western Coalfield Map (Yoo, 1998);
- DPI-Water's mapping of 'Highly Productive' alluvium (of the Wollar Creek Water Source);
- transient electro-magnetic (TEM) geophysical surveys; and
- exploration (geological) data and logs.

The interpreted extent of unconsolidated sediments outside the open cut and contained infrastructure areas is shown on Figure 4. Alluvial deposits are associated with Wilpinjong and Cumbo Creeks in the vicinity of the Wilpinjong Coal Mine, and along Wollar Creek to the east of Pit 8 (HydroSimulations, 2015). Exploration bores to the north of Pit 8 also indicate the presence of a few metres of sand or soil (HydroSimulations, 2015).

The predicted water table drawdown due to the Wilpinjong Coal Mine incorporating the Project and the interpreted extent of unconsolidated sediments are shown on Figure 4. Minimal drawdown (approximately 1 m) is predicted in the aquifers of the shallow alluvial groundwater system along Wilpinjong Creek and less around Wollar Creek.



LEGEND

- Approved/Existing Open Cut and Contained Infrastructure Area
- Relocated Block Bank and Cumbo Creek Disturbance Area
- Proposed Open Cut Extension Area
- Interpreted Extent of Unconsolidated Sediments*

Predicted Groundwater Drawdown Contours#

- 1 metre
- 2 metres
- 5 metres
- 10 metres
- 25 metres
- 50 metres

* Unconsolidated sediments located within the open cut and contained infrastructure area are not shown on this figure.
\# Predicted water table drawdown due to the Wilpinjong Coal Mine incorporating the Project (end of mining).

Source: WCPL (2015); NSW Dept of Industry (2015); HydroSimulations (2015)
Orthophoto: WCPL (Jun 2015; Jun 2014)

Peabody ENERGY

WILPINJONG EXTENSION PROJECT

Predicted Water Table Drawdown and Interpreted Extent of Unconsolidated Sediments

Figure 4

WIL-12-12_WEP_RTPR_205A

The predicted drawdown is consistent with the historical data from monitoring bores at the Wilpinjong Coal Mine, which is presented and discussed in the EIS Groundwater Assessment (HydroSimulations, 2015) as well as in annual compliance reports to relevant government agencies.

WCPL notes that as described in Section 6.3.3 of the PAC Review Report, the DPI-Water has concluded that the Project meets the Level 1 impact requirements of the NSW Aquifer Interference Policy (NSW Government, 2012) on the alluvial aquifer.

Significance of impacts

Recommendation 17

- *where the Department elects to make statements regarding the significance of an impact it should provide a numerical description as to the extent of that impact;*

Response

It is noted that on review of Section 5.4 of the Secretary's Environmental Assessment Report, this Project PAC recommendation appears to relate to the statement that the DP&E is satisfied the Project could be managed to avoid significant impacts on water resources (refer to the 'Conclusion' subsection on page 64 of the Secretary's Environmental Assessment Report). Other statements regarding the significance of impacts within Section 5.4 of the Secretary's Environmental Assessment Report appear to quantify the extent of the potential impact.

WCPL notes that the latter half of the statement reiterates that the Project is predicted to meet the *minimum impact considerations* under the NSW Aquifer Interference Policy (NSW Government, 2012). The statement regarding significant impacts may therefore be related to the minimum impact considerations of the NSW Aquifer Interference Policy. To clarify, the DP&E could state that groundwater drawdown is not predicted to exceed 2 m at a subsurface water supply construction such as a bore or well on any privately-owned land.

However, it is possible that the use of the term 'significant impact' in this instance may be related to the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (the Significant Impact Guidelines for Water Resources) (Commonwealth Department of the Environment and Energy, 2013).

As this may comprise a multifaceted assessment that includes consideration of the value of a water resource and potential impacts on the hydrological characteristics and water quality of the water resource, to clarify, the DP&E could reference the Significant Impact Guidelines for Water Resources in its conclusion.

Existing poor water quality

Recommendation 18

- *in determining the impact of mining on groundwater quality, the Department should provide evidence to support the statement that groundwater and surface water quality is relatively poor and that this is not the result of ongoing mining operations within the locality; and*

Response

The NSW Government acknowledged the presence of high background salinity levels in the Wollar catchment prior to the development of the Wilpinjong Coal Mine, as described in the *Hunter River Water Quality and River Flow Objectives* (NSW Government, 2006) as follows:

> *Available water quality data indicate that the water quality in these streams is often inadequate to support most of the desired environmental values, particularly for healthy aquatic ecosystems, for swimming and drinking, and for irrigation of moderately salt-tolerant crops. This is partly because of high phosphorous levels in the north-west, due to basalt geology, and high background salinity levels in the Bylong, Growee, Wollar, Wybong and Dart Rivers, and minor tributaries of the regulated section of the Hunter River.*

WCPL also notes that the *Wilpinjong Coal Project Environmental Impact Statement* (WCPL, 2005) contains a description of the existing groundwater and surface water quality in the vicinity of the Wilpinjong Coal Mine prior to commencement of mining. This description noted that (WCPL, 2005):

- Wilpinjong Creek – Electrical conductivity (EC) was greater downstream of the confluence with Cumbo Creek than upstream of the confluence (average EC of 3,921 µS/cm downstream, compared with an EC range of 681 to 2,990 µS/cm upstream). Recorded EC values were significantly higher than the guideline trigger values for the protection of aquatic ecosystems (i.e. 350 µS/cm).
- Wollar Creek – EC recorded immediately downstream of the Village of Wollar indicated an average of 1,878 µS/cm. Downstream of the confluence with Wilpinjong Creek, recorded EC indicated an EC range of 1,690 to 3,500 µS/cm.
- Cumbo Creek – Average EC levels of 4,323 to 4,933 µS/cm upstream of the proposed mine. A highly saline groundwater seep (EC of 11,000 to 12,000 µS/cm) enters Cumbo Creek immediately east of Wilpinjong Road, immediately upstream of the proposed mine. The water quality of the groundwater seep is consistent with the poorer quality groundwater associated with the Nile Subgroup which subcrops in the area. EC recorded immediately upstream of the confluence with Wilpinjong Creek indicates an average EC of 7,223 µS/cm.

The baseline groundwater and surface water data referenced in the Wilpinjong Coal Project Environmental Impact Statement (WCPL, 2005) also includes monitoring results reported in the *Greater Wollar Creek Catchment Dryland Salinity Groundwater Investigation* (the Wollar Salinity Investigation) (NSW Department of Infrastructure, Planning and Natural Resources, 2003).

A relevant finding of the Wollar Salinity Investigation (conducted in 2001, some 5 years before mining commenced), as reported in the Wilpinjong Coal Project Environmental Impact Statement (WCPL, 2005), was that surface water flows from the Wilpinjong valley towards Wollar resulted in increased salinity levels, which was attributed to evapo-concentration effects and saline groundwater input from deeper groundwater aquifers into the shallower systems and alluvium.

It is noted that the salinity levels in groundwater bores that were raised as a potential concern by the DPI-Water in its original submission on the Project in March 2016, and also in relation to a rising trend in Wilpinjong Creek salinity levels raised in its advice to DP&E dated 8 June 2016 were both generally consistent with the range of salinity in local water groundwater and surface quality monitoring in drier periods as described in the Wilpinjong Coal Project Environmental Impact Statement (WCPL, 2005), previous water quality studies in the area, and also directly observed by WCPL in dry periods such as experienced immediately prior to and following the commencement of mining at Wilpinjong Coal Mine in 2006/07.

The strong correlation between observed salinity and rainfall trends (both pre-mining and during mining) was highlighted in the advice from HydroSimulations (HydroSimulations, 2016) incorporated in Appendix E to the Secretary's Environmental Assessment Report. In particular, WCPL would like to bring to the DP&E's attention Figure 1 in the advice from HydroSimulations (Electrical Conductivity Trends in Wilpinjong Creek), which illustrates salinity variation over the period 2005 to 2015.

Specialist recommendations regarding ongoing management of impacts

Recommendation 19

- *where a specialist expert report makes recommendations as to the ongoing management of an impact, the Department shall ensure that these are appropriately adopted through conditions of consent or other appropriate means.*

Response

It is understood that recommendations for ongoing management made by specialist experts such as the DPI-Water and the IESC will be considered by the DP&E and where relevant included in the Draft Consent Conditions (e.g. Water Management Plan Draft Consent Conditions requirements). It is noted that in particular Draft Condition 30, Schedule 3 contains specific reference to addressing the IESC recommendations and also requires the Surface Water Management Plan to provide a statistical trend analysis of salinity and other parameters to address the request of the DPI-Water.

2.4 Indigenous and Non-Indigenous Heritage

Performance management measures regarding impacts on sites of significance

Recommendation 20

- *develop clear performance management objectives to be applied to any development consent which specify the acceptable level of impact on sites of significance;*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project. WCPL suggests that the approved level of impact on sites of significance could be specified in the Aboriginal Cultural Heritage Management Plan, along with management measures to protect sites that are located proximal to, but outside of the Project site.

Consultation regarding acceptable impacts on items of significance

Recommendation 21

- *that the Department, OEH and the Applicant take all reasonable steps to consult, and where possible reach an agreement with the local Aboriginal community as to the level of acceptable impacts on items of significance;*

Response

WCPL notes that extensive consultation has been undertaken to date with relevant Aboriginal stakeholders, with particular involvement of the OEH, regarding the identification, significance and potential impacts on items of archaeological and cultural significance.

This consultation involved a number of formal stages, including notification/registration of Aboriginal parties, proposed methodology review and information sessions, field surveys, and review of the draft Project Aboriginal Cultural Heritage Assessment, conducted between October 2012 and November 2015 in accordance with the OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) and the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005).

Additional consultation with Registered Aboriginal Parties has continued on a quarterly basis since lodgement of the EIS.

Additional consultation would also be undertaken with the relevant stakeholders when the existing Wilpinjong Coal Mine Aboriginal Cultural Heritage Management Plan is updated to reflect the Project.

Impact avoidance regulatory regime

Recommendation 22

- *the Department should ensure that a strong regulatory management regime is in place which puts an emphasis on impact avoidance for significant sites, and where avoidance is not possible the suitable recording and salvage of artefacts; and*

Response

The Aboriginal Cultural Heritage Management Plan for the Wilpinjong Coal Mine states that the preferred strategy for management of significant sites is *in situ* conservation (i.e. avoidance of impacts). The Aboriginal Cultural Heritage Management Plan also however provides a range of potential mitigation measures, including recording and salvage of artefacts where impacts are permitted to occur within the development footprint of the approved mine.

The Aboriginal Cultural Heritage Management Plan would be updated to reflect the Project, including the addition of a detailed suite of site-specific and general management and mitigation measures that have been developed in consultation with the Registered Aboriginal Parties.

Regional archaeological investigation

Recommendation 23

- *the Department, in consultation with the OEH should engage in discussions with mine operators within the western coalfields regarding participating in a voluntary capacity to the contribution to a regional investigation into Indigenous and non-Indigenous archeology within the region.*

Response

WCPL would be open to further consultation on regional Indigenous and non-Indigenous archaeological information sharing.

It is noted that each of the mines in the Western Coalfield has completed cultural heritage assessments in order to receive approval to commence or extend approved mining operations. Cumulatively, these assessments already provide an extensive and detailed description of Indigenous and non-Indigenous archaeology in the region. It is also noted that Draft Condition 46, Schedule 3 requires the completion of additional archaeological investigations in the Project biodiversity offset areas. WCPL would be agreeable for these offset area investigations to be collated with investigations by other applicants in the region to inform a regional study.

2.5 Noise and Blasting

Voluntary acquisition of receiver 102

Recommendation 24

- *the Department should exhaust all reasonable means to reach a position of agreement with the Applicant that the voluntary acquisition of private residences within Wollar be extended to include the residence known as 102 within the preliminary SEAR. In the absence of this, consideration should be given to setting a noise level of 35 dB(A), rather than 37 dB(A) as recommended by the Department given the reference in the INP (see 6.5.1 above) that 2 dB(A) above the statutory limit is deemed to be in compliance;*

Response

WCPL notes that in the Draft Consent Conditions for the Project, the DP&E has recommended noise limits at Receiver 102 of 36 A-weighted decibels (dBA) during the day and evening, and 38 dBA during the night, based on the noise assessment conducted for the EIS. This is consistent with the recommendations of the independent peer review, commissioned by the DP&E, conducted by Wilkinson Murray Pty Ltd.

WCPL has previously offered potential acquisition to the owner of Receiver 102 on a voluntary basis and therefore would not object to this landholder also being provided acquisition upon request rights in the Development Consent for the Project. It is noted however, that this approach is not consistent with current NSW Government policy as outlined in the *Voluntary Land Acquisition and Mitigation Policy - For State Significant Mining, Petroleum and Extractive Industry Developments* (the VLAMP) (NSW Government, 2014), based on the Project noise level predictions.

Road noise along Ulan Road

Recommendation 25

- *the Applicant should take all reasonable measures to ensure that private residences along the Ulan Road are aware that mitigation measures are available where road noise exceedances occur and information on how this is conducted should be reflected through a statement of commitments or other means as considered appropriate by the Department;*

Response

WCPL concurs with this recommendation, and understands that notification of relevant landholders on Ulan Road has already occurred under the Ulan Road Strategy. WCPL will continue to work co-operatively with the Mid-Western Regional Council, Ulan Coal Mines Limited and Moolarben Coal Operations Pty Ltd to implement the Ulan Road Strategy. It is noted that a number of mitigation measures are either in the process of being implemented, or have been offered, at some 19 properties located on Ulan Road. These measures include improvements to glazing, installation of air conditioning and/or other site-specific measures.

Further consultation with the Environment Protection Authority

Recommendation 26

- *the Department should engage in further consultation with EPA to resolve any residual noise assessment issues;*

Response

WCPL is unaware of any residual noise assessment issues that the Environment Protection Authority (EPA) may have, as the EPA indicated that it was satisfied with the response provided 24 May 2016 in the *Wilpinjong Extension Project Response to Submissions* (the Response to Submissions) (WCPL, 2016b), as outlined in Section 4.5 of the Secretary's Environmental Assessment Report.

Performance targets in Blast Management Plan

Recommendation 27

- *the Department should give consideration to the creation of specific performance targets for blasting and vibration impacts on sensitive sites which would then be reflected by conditions of consent, and incorporated in an appropriate Blasting Management Plan for the site; and*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project. WCPL suggests that blast overpressure and vibration performance targets for relevant sensitive sites can be described in the Wilpinjong Coal Mine Blast Management Plan.

Direct response to comments raised by Day Design Pty Ltd on behalf of the Wollar Progress Association

Recommendation 28

-

  Association.

Response

It should be noted that the Response to Submissions (WCPL, 2016b) document is structured in three parts, with the first being responses to regulatory submissions, the second being responses to organisations' submissions (e.g. the Wollar Progress Association) and the third being public submissions. Where more than one submission raised similar issues, the previous responses were not repeated, rather reference was made to the previous response.

It appears Day Design Pty Ltd may not have reviewed the Response to Submissions in its entirety in drafting its contribution to the Wollar Progress Association's submission to the Project PAC (Day Design Pty Ltd, 2016). Notwithstanding, a response is provided to each of the key subjects raised in Day Design Pty Ltd's contribution to the Wollar Progress Association's submission to the Project PAC below.

In summary, in WCPL's opinion, the Day Design Pty Ltd contribution to the Wollar Progress Association's submission has not raised any material noise assessment issues that have not already been addressed to the satisfaction of the EPA and the DP&E in the original Response to Submissions, or subsequent correspondence with the EPA and DP&E.

Recommendations in the Initial Day Design Review

The ambient noise level data measured in 2004 during the day at 900 St Laurence O'Toole Catholic Church should be re-analysed to determine the correct RBL.

The daytime Rating Background Level (RBL) adopted for the Village of Wollar was established by studies undertaken for the *Wilpinjong Coal Project Environmental Impact Statement* (WCPL, 2005) and has been accepted by the NSW Government for every assessment since. Daytime period noise is not a critical period for noise concern from the community or for WCPL in maintaining noise compliance and therefore no response was considered necessary, given the EPA did not raise any concerns regarding the daytime RBL adopted for the Village of Wollar.

The data sample taken in December 2012 at St Laurence O'Toole Catholic Church used to determine whether a low frequency modifying factor should be applied, should be re-analysed to determine the C-A difference for each 15 minute set of data, rather than the mean difference. This will allow a more accurate comparison to determine whether a low frequency modifying factor should be applied.

Day Design Pty Ltd should refer to the response in Section 2.1 of the Response to Submissions where both mean and individual 15 minute results are discussed. It is also reiterated that the assessment was based on a number of conservative assumptions as it was not conducted for compliance purposes.

WCPL also notes that additional analysis of the data collected in December 2012 against the modified DEFRA criteria stated in the *Draft Industrial Noise Guideline* is provided in Appendix G-2 of the Secretary's Environmental Assessment Report.

The same data sample taken in December 2012 should be re-analysed to determine the $L_{A1(1min)} - L_{A90(15min)}$ *for each 15 minute set of data. This will allow a more accurate comparison to determine whether sleep disturbance is likely.*

An assessment of the potential for sleep disturbance is presented in Section 7.4 of the Project Noise and Blasting Assessment. The December 2012 long-term data was not collected for the purposes of sleep disturbance assessment and was not collected by attended monitoring.

The proposed mitigation for Year 2024, should be applied from Year 2018 and the benefit of attenuation to the Pit 8 coal and waste fleets be realised 6 years earlier. If this were carried out 6 years earlier in 2018, based on SLR calculations, the PSNLs would be met up until 2024.

As articulated in the EIS, the cost to attenuate mobile equipment includes both significant capital expenditure and significant additional ongoing operational costs (e.g. for maintenance). The EIS presents the noise mitigation that was considered reasonable and feasible by WCPL in light of the number of private receivers in the Village of Wollar at that time.

WCPL notes that the EIS assessment of reasonable and feasible mitigation measures for the Project was supported by Wilkinson Murray Pty Ltd in its independent peer review, as well as the DP&E in the Secretary's Environmental Assessment Report.

Low Frequency Noise

The issue of Low Frequency Noise (LFN) remains unresolved. SLR has assessed LFN using an approach that is not consistent with the INP or the dING and have found that a modifying factor need not be applied. This approach is incorrect.

The Department's assessment (page 26) notes that the EPA monitored LFN in June 2016 and found the difference between dBC and dBA to be greater than 15 dB, which results in a modifying factor of 5 dB required to be applied. In that case that mine noise was 30-31 dBA without the modifying factor and 35-36 dBA with the modifying factor.

If the noise from the Wilpinjong Extension Project is higher than that measured by the EPA in June 2016, which is predicted in the SLR report, it is reasonable to assume that the noise would contain significant low frequency content, which is typical for mining related noise, and therefore a modifying factor would be required in accordance with the INP.

Applying a modifying factor for low frequency noise will significantly change the outcome of the noise assessment as the noise emission at a particular location can change from being complying with the INP noise criteria to being significantly exceeding the INP noise criteria (+5dB above).

The issue of LFN and whether a modifying factor is likely to be required should be resolved prior to development approval to provide certainty for both Peabody Energy and the residential community of Wollar and surrounds.

As noted in an earlier response above, additional analysis of low frequency noise is provided in Section 2.1 of the Response to Submissions and Appendix G-2 of the Secretary's Environmental Assessment Report. This documentation supports the SLR Consulting conclusion that the Wilpinjong Coal Mine's noise emissions do not contain "dominant low frequency content".

In its final peer review for the DP&E, Wilkinson Murray Pty Ltd confirmed it concurred with the low frequency noise assessment.

WCPL notes that the Draft Consent Conditions in the Secretary's Environmental Assessment Report include assessment of low frequency noise using the modified DEFRA criteria, which represents the NSW Government's most contemporary policy position on the monitoring/evaluation of low frequency noise and application of modifying factors (draft Condition 6 of Appendix 6).

Voluntary Acquisition

I note that the long term strategy of Peabody Energy is to acquire as many private residences in the Wollar community as possible. This is supported by the statement "WCPL is continuing to purchase properties through its noise acquisition strategy and currently only 5 residences remain in private ownership .... WCPL state that they would accept alternative outcomes such as affording all remaining private residence landowners in the Village of Wollar acquisition upon request rights under the Development Consent."

For those residents who live in the Wollar area, they are faced with two options. The first is to accept purchase of their property by WCPL and leave the Wollar area.

The second is to reject the offer from WCPL and remain in Wollar.

My understanding is that the predicted noise level at residential premises is above the minimum acquisition level, there will be no noise criteria applied to those premises if the project is approved. Therefore there will be no noise limit at these residences. This does not seem like a reasonable second option and in my opinion the residents would be subjected to offensive noise as defined by the Protection of the Environment Operations Act 1997.

In addition, the residential premises just outside of the Wollar Village would be subjected to much the same noise levels as in the Wollar Village. Even if the entire Wollar Village is bought by WCPL, the predicted noise level from the extension project will adversely impact these other residences.

Acquisition does not reduce the noise impact for all residences and therefore noise controls will still be required.

The EIS Noise and Blasting Assessment was prepared in accordance with the Project's Secretary's Environmental Assessment Requirements, which specifically refer to the *NSW Industrial Noise Policy* (EPA, 2000) and the VLAMP (NSW Government, 2014).

Accordingly, results predicted for the Project have been characterised in accordance with the VLAMP (NSW Government, 2014), and the proposed mitigation strategy has been developed in consideration of applicable NSW Government policies. WCPL has therefore assessed the Project in the context of NSW Government policies and guidelines that apply to the assessment and development of coal mine projects.

WCPL notes that with the implementation of the Project noise mitigation measures, no private residences were predicted to experience Project noise levels above acquisition criteria, as stated in the EIS Noise and Blasting Assessment.

WCPL would also like to highlight that there are no privately-owned residences 'just outside of Wollar Village'. The closest privately-owned dwelling to the Village of Wollar is Receiver 102, over 5 kilometres from the village (and this dwelling is rarely occupied).

Noise Controls

The letter from WM dated 15 August 2016 discusses the value of proposed noise controls and whether $14 million or $56 million is reasonable to achieve a further 2 dBA reduction.

There is no discussion of the overall cost of the project, the expected profits or the percentage of turnover. I am not an expert in costs, however I would have thought that the reasonableness of costs of noise controls is relative to other costs and profits of the project.

For WM to conclude that "mitigation to achieve noise levels below 37 dBA are not warranted in terms of being reasonable and feasible" is outside of their expertise, especially if the perspective of other costs/profits are not discussed.

It is true that a 2 dB change in noise level is considered negligible, however if the consent noise limit is set to 37 dBA instead of 35 dBA as "a 2 dB change in noise level is considered negligible" and then when compliance is measured at 39 dBA it is stated that "a 2 dB change in noise level is considered negligible" the overall result is 4 dB above the INP noise limit, which is 1 dB from being a significant exceedance.

If the predicted noise level of 37 dBA with $14 million in noise controls is conservative, as is stated by SLR, then the noise limit should be set at 35 dBA allowing for a 2 dB exceedance when measuring compliance in accordance with the INP.

WCPL is not in a position to comment on whether Wilkinson Murray Pty Ltd took into account the economic assessment of the Project when determining the reasonableness of the Project's noise mitigation strategy.

However, WCPL understands that Wilkinson Murray Pty Ltd is qualified to advise the DP&E on what is reasonable and feasible in this context as that would be a reasonable expectation for such a peer review. WCPL understands that Wilkinson Murray has extensive experience in noise impact assessments for State Significant Development projects in NSW and associated peer reviews. The company therefore would have significant experience in what is considered reasonable mitigation in light of the number of private residences involved, and would likely have taken this experience into consideration when reviewing the reasonableness of the Project's noise mitigation strategy in the context of current NSW Government Policy (e.g. the VLAMP).

WCPL is of the opinion that the proposed conditions have been set based on NSW Government policy and reflect the assessment requirements and process for determining noise limits in NSW.

2.6 Social Impacts and Wollar Village

Social impact on the Village of Wollar post mining closure

Recommendation 29

- *the Applicant and Department should give further consideration in establishing what the social impact on the locality, and particularly Wollar Village will be post mining closure;*

It is acknowledged that socio-economic effects would occur at the cessation of mining, when WCPL employees that use Peabody-owned dwellings in the local area may leave to find employment elsewhere. This could further exacerbate previous social impacts in the Wollar area if there is no alternative source of local accommodation demand, and the dwellings were to remain vacant.

The socio-economic environment in the Mid-Western Regional Local Government Area and the local employment and accommodation demand present at the end of the Project life would be subject to future development and the economic climate at that time. It is therefore suggested that the most appropriate place to consider potential adverse social impacts of mine closure, and if necessary address these impacts, would be in a Mine Closure Plan to be developed prior to mine closure that can reflect the socio-economic climate at the time.

The Mine Closure Plan would be developed for the Project in consultation with the Mid-Western Regional Council, the DP&E and the local community, and would include consideration of potential adverse social impacts on the Village of Wollar due to the reduction in employment at Project closure (refer Section 7.2.11 of the EIS). Consistent with the Mid-Western Regional Council's request in its submission on the EIS, the Mine Closure Plan would be developed at least three years before the workforce numbers are expected to significantly decline (e.g. at least three years prior to closure).

Strategy for the management of mine-owned assets in the Village of Wollar

Recommendation 30

- *the Applicant, in consultation with the Department should prepare a long term strategy for the management of mine owned assets within Wollar Village. The strategy should include details on maintenance or replacement of assets where possible, or the timely removal and remediation of assets should maintenance or replacement not be a viable option on public safety grounds. The Applicant would be encouraged to take all possible and reasonable measures to preserve the village fabric; and*

Response

Subject to review of the draft conditions, WCPL is prepared to accept this recommendation being addressed with inclusion of relevant conditions in the Draft Development Consent for the Project.

WCPL therefore proposes inclusion of a draft condition as follows:

Village of Wollar Plan

X1 *Within 12 months of the date of this consent, unless the Secretary agrees otherwise, the Applicant must prepare a Village of Wollar Plan for the development to the satisfaction of the Secretary. This plan must:*

(a) describe the measures that will be implemented to assist postal services to the local community and public ablutions in the Village of Wollar[1];

(b) describe the measures that will be implemented to assist the amenity of the Village of Wollar[1], including the maintenance of company-owned land;

(c) describe the measures to provide public access to cemeteries located on company-owned land;

(d) describe the measures that would be implemented to maintain company-owned assets in the Village of Wollar[1];

(e) include a protocol for determining whether maintenance or replacement of company-owned assets is not a viable option and removal and remediation of a site is required; and

(f) include a protocol for the timely and safe removal of derelict or unsafe company-owned residences, if required.

[1] – Land in the locality of Wollar that is zoned RU5 (Village) in the Mid-Western Regional Local Environmental Plan 2012.

X2 *The Applicant must implement the approved Village of Wollar Plan for the development.*

In addition, it is noted that the Division of Resources and Energy (within the NSW Department of Industry) holds the unallocated Exploration Licence (EL) 6676, which covers the entire area between the Wilpinjong Coal Mine and the Bylong Coal Project mining tenements. It is known that potentially economical coal resources are located within this EL. The Village of Wollar may therefore be proximal to other mining developments by any proponent that is granted an exploration tenement within this Licence area in the future, and this may influence future land use.

WCPL therefore requests that some form of review process is incorporated in any Village of Wollar Plan Draft Consent Conditions to reflect the fact that the Village of Wollar may be affected by other future mining developments (or future Local Government or State Government infrastructure provision decisions) and if this was to occur the Project Village of Wollar Plan could be reviewed and revised to reflect the contemporary context, to the satisfaction of the Secretary.

Encouragement of engagement with the local community

Recommendation 31

- *The Applicant should develop a workplace strategy that actively encourages employees at the mine to become engaged within the local community, particularly through organisations such as the RFS who rely heavily on volunteers.*

Response

WCPL concurs with this suggestion and will augment its induction material on-site to stress the importance of volunteering in the community to both staff and contractors. While the number and nature of volunteers in the workforce varies, WCPL encourages employees to volunteer in areas of particular interest and relevance to them. This includes sporting, community support, Rural Fire Service (RFS) and many other areas in the wider community that reflects the high level of the Wilpinjong Coal Mine workforce residing in the Mid-Western Regional Local Government Area.

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Appendix A

EIS Water Balance – Sensitivity to Revised Sediment Dam Sizing

1052-06-A1

Ian Flood
Manager Project Development & Approvals
Wilpinjong Coal Pty Ltd
c/- Resource Strategies
Suite 2 Level 3, 24 McDougall St
Milton Qld 4064

23 January 2017

Subject: Wilpinjong Extension Project - Sediment Dam Sizing Sensitivity Analysis

Dear Ian,

As part of the surface water assessment for the Wilpinjong Extension Project (WEP) Environmental Impact Statement (EIS), a total of 38 proposed sediment dams were sized in accordance with the guidelines provided in the document *Managing Urban Stormwater, Soils and Construction* (Landcom, 2004). The sediment basin settling zone volume was based on the 90th percentile 5-day duration rainfall at Scone (35.9 millimetres [mm]), with a volumetric runoff coefficient of 0.64.

The New South Wales Environment Protection Authority (EPA) has advised Wilpinjong Coal Pty Ltd (WCPL) that for the updated Environment Protection Licence for the WEP, the EPA will require that the sediment dams are sized for the 95th percentile 5 day duration rainfall at Central Tablelands (44 mm).

On this basis, WRM Water & Environment has updated the sizing of the proposed sediment dams and re-run the water balance model to evaluate the effect of revising the sediment dam sizing on the results of the water balance provided in the WEP EIS. The outcomes of this work are provided as Attachment 1. For ease of reference, the results are presented in the same format as Section 5.3 and Section 7.3 of the WEP EIS surface water assessment.

Note that this assessment has been undertaken on the basis that all other parameters and assumptions associated with the WEP EIS water balance are unchanged.

In summary, the results indicate increasing the size of the WEP sediment dams to accommodate the 95th percentile 5 day duration rainfall at Central Tablelands would:

- reduce the frequency of sediment dam overflows; and
- reduce the volumes released during sediment dam overflows.

Comparisons of the forecast sediment dam overflows (i.e. the forecast sediment dam overflows for the WEP compared with the forecast overflows with the increased dam sizes) are provided in Figures 1 and 2.

As shown on Figure 2, under very wet (1%) climate conditions, the annual sediment dam overflows would reduce by up to approximately 11% annually. Under wet (10%) climate conditions, the annual sediment dam overflows would reduce by approximately 7%.

Overall, the analysis of the revised sediment dam sizing indicates increasing the size of the sediment dams to accommodate the 95th percentile 5 day duration rainfall at Central Tablelands has a negligible impact on other aspects of the water balance model and no material environmental implications.

For and on behalf of

WRM Water & Environment Pty Ltd

Michael Batchelor

Director/Principal Engineer

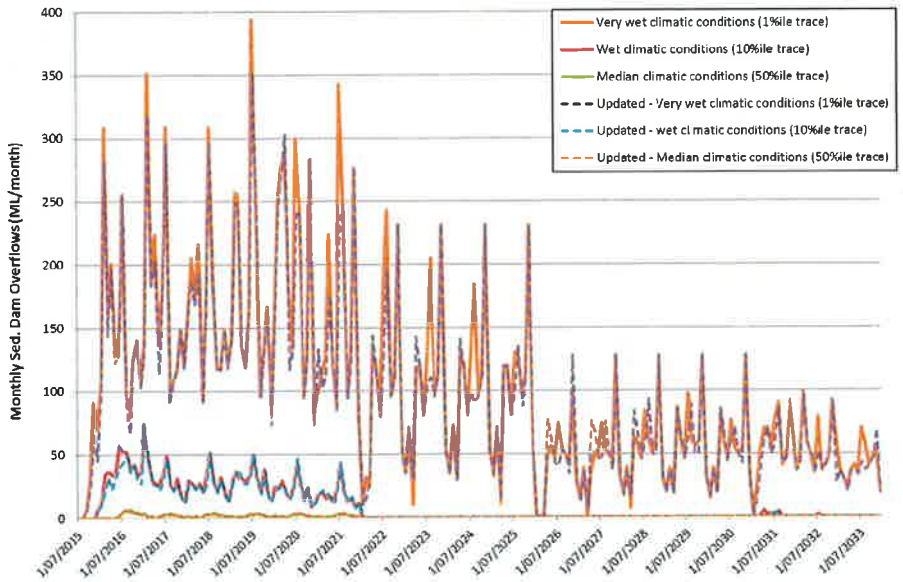

Figure 1 - Forecast monthly sediment dam overflows, comparison of results

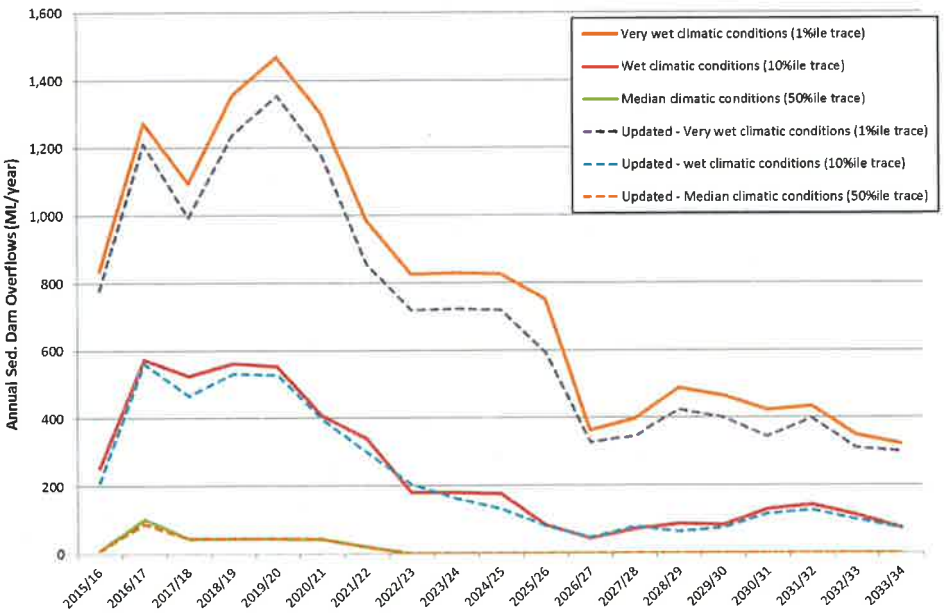

Figure 2 - Forecast annual sediment dam overflows, comparison of results

Attachment 1

1 Sediment basin sizing (Section 5.3 of the WEP EIS Surface Water Assessment)

There are a total of 38 sediment dams proposed over the life of the Project. The sediment dam volumes have been based on the following design standards and methodology:

- "Type F" sediment basins consistent with SD 6-4 (page 6-19, Landcom 2004);
- total sediment basin volume = settling zone volume + sediment storage volume. The sediment storage volume is the portion of the basin storage volume that progressively fills with sediment until the basin is de-silted. The settling zone is the minimum required free storage capacity that must be restored within 5 days after a runoff event;
- sediment basin settling zone volume based on 95th percentile 5-day duration rainfall (44 mm for Central Tablelands) with an adopted volumetric event runoff coefficient for disturbed catchments of 0.64; and
- solids storage volume = 50 percent (%) of settling zone volume.

Table 1.1 provides the revised sediment dam volumes and the associated pump requirements to restore the settling zone capacity within 5 days.

Table 1.1 - Revised sediment dam sizing

Sediment dam	Maximum catchment area (ha)	Total volume required (ML)	5-day pump requirement (L/s)
SD1A	136.6	57.7	134
SD1B	45.1	19.1	44
SD2A	15.1	6.4	15
SD2C	198.0	83.6	194
SD2D	44.9	19.0	44
SD2E	34.4	14.5	34
SD3A	44.1	18.6	43
SD3B	29.2	12.3	29
SD3C	41.0	17.3	40
SD3D	68.7	29.0	67
SD3E	29.0	12.2	28
SD4A	15.6	6.6	15
SD4B	34.5	14.6	34
SD4C	26.0	11.0	25
SD4D	24.9	10.5	24
SD4E	51.6	21.8	50
SD4F	31.0	13.1	30
SD5A	55.8	23.6	55
SD5B	73.1	30.9	71
SD5C	81.0	34.2	79

Sediment dam	Maximum catchment area (ha)	Total volume required (ML)	5-day pump requirement (L/s)
SD5D	103.2	43.6	101
SD5E	234.2	98.9	229
SD6A/B	17.4	7.3	17
SD6A	135.9	57.4	133
SD6B	100.4	42.4	98
SD6C	88.7	37.5	87
SD6D	117.7	49.7	115
SD7A	14.5	6.1	14
SD7B	26.5	11.2	26
SD7C	21.1	8.9	21
SD7D	114.5	48.4	112
SD7E	24.5	10.3	24
SD8A	37.4	15.8	37
SD8B	37.1	15.7	36
SD8C	13.3	5.6	13
SD8D	148.3	62.6	145
SD8E	83.7	35.4	82
SD8F	67.1	28.3	66

ha = hectares, ML = megalitres, L/s = litres per second.

1.1 SEDIMENT DAM COLLECTION SYSTEM - OPERATING RULES

The model operating rules for the sediment dam collection system are based on the recommendations in the guidelines 'Managing Urban Stormwater Soils and Construction Guideline: Mines and Quarries' (DECC 2008). The operating rules are as follows:

- runoff from disturbed areas will be captured in sediment dams and, if capacity is available, pumped to mine water storages;
- pump capacities will be sized to empty sediment dams in 5 days;
- runoff from rehabilitated areas established for more than two years will be directed to a sediment dam and released off-site; and
- sediment dams will overflow when rainfall exceeds the design criteria (95th percentile 5 day rainfall).

2 Water balance model results (Section 7.3 of the WEP EIS Surface Water Assessment)

2.1 OVERALL WATER BALANCE

Water balance results for all of the 108 modelled realisations are presented in Table 2.1, averaged over each model phase.

The results show that on average over the life of the WEP:

- average external water supply is minimal, with an annual average demand in the final three phases of 1 to 2 ML;
- the largest demand from the water management system is initially Coal Handling and Preparation Plant (CHPP) usage (for the first phase), and dust suppression usage for the five remaining phases;
- the average annual combined mine water demand (including CHPP make-up and dust suppression) supplied from the water management system ranges between approximately 698 ML/year and 1,333 ML/year, with the highest demand in Year 2020;
- overflows do not occur from the mine water system;
- the average annual Reverse Osmosis (RO) Plant discharge ranges between approximately 276 ML/year and 950 ML/year, with the highest discharge in Year 2018;
- the average annual overflow volume from the sediment dams ranges between 25 ML/year and 161 ML/year, and is highest in Year 2018; and
- the combined average annual overflow volume from diverted and rehabilitated catchments ranges between 115 ML/year and 607 ML/year, and is highest in Year 2031.

Note that the results presented in Table 2.1 are for the average of all realisations and will include wet and dry periods distributed throughout the mine life. Rainfall yield for each stage is affected by the variation in climatic conditions within the adopted climate sequence.

The simulated performance of the WEP water management system under different climatic scenarios (i.e. median, low and high rainfall scenarios) is presented in Table 2.2.

Table 2.1 - Revised average annual water balance - all realisations

	Year 2016	Year 2018	Year 2020	Year 2024	Year 2028	Year 2031
Water inputs (ML/year)						
Catchment runoff	1,676	1,953	2,073	2,062	1,846	1,898
Direct rainfall	419	449	409	328	304	204
Groundwater inflows	973	924	646	432	482	190
External water supply	0	0	0	2	1	2
GROSS WATER INPUTS	**3,068**	**3,326**	**3,128**	**2,824**	**2,633**	**2,294**
Water outputs (ML/year)						
Evaporation from water surfaces	670	793	750	606	599	418
CHPP demand	609	613	542	471	355	195
Dust suppression demand	525	698	791	770	543	503
RO Plant discharge	276	950	668	459	522	747
Storage overflows - mine water dams	0	0	0	0	0	0
Storage overflows - sediment dams	114	161	151	52	25	26
Outflows - rehabilitated catchments	0	47	219	383	445	567
Outflows - diverted catchments	115	204	221	158	89	40
GROSS WATER OUTPUTS	**2,309**	**3,466**	**3,342**	**2,899**	**2,578**	**2,496**
Water balance (ML/year)						
Change in storage volumes	759	-140	-214	-75	55	-202

Note: Totals in gross inputs/outputs may differ to the sum of the individual components due to rounding.

Table 2.2 - Revised indicative WEP water management system performance

	90%ile (Low) Rainfall 19-Year Period (Cycle 24)	50%ile (Median) Rainfall 19-Year Period (Cycle 75)	10%ile (High) Rainfall 19-Year Period (Cycle 58)
Average water inputs (ML/year)			
Catchment runoff	1,894	1,990	2,216
Direct rainfall	295	350	403
Groundwater inflows	549	549	549
External water supply	0	0	0
GROSS WATER INPUTS	**2,738**	**2,889**	**3,168**
Average water outputs (ML/year)			
Evaporation from water storages	595	617	684
CHPP demand	438	438	438
Dust suppression demand	649	631	631
RO Plant discharge	514	677	798
Storage overflows - mine water dams	0	0	0
Storage overflows - sediment dams	27	43	138
Outflows - rehabilitated catchments	343	352	309
Outflows - diverted catchments	177	129	198
GROSS WATER OUTPUTS	**2,743**	**2,887**	**3,196**

Note: The difference between the total average inflows and total average outflows is the change in water stored on-site relative to existing stored water volumes.
%ile = percentile

2.2 MINE WATER DAM INVENTORY

Figure 2.1 shows the combined forecast inventory for the key mine water storages (Pit 2 West and Pit 1S Dam) over the 19-year forecast.

To prevent uncontrolled discharges from the mine water storages, maximum operating volumes (MOV) have been set for the mine water storages. The MOV is the volume at which pumping from the open cut pits and sediment dams into the mine water system ceases. This was included as an operating rule in the Operational Simulation Model. Also shown is the combined Full Supply Volume (FSV), which is the combined capacity of these dams.

The initial MOV volumes for Pit 2 West and Pit 1S Dam are 2,280 ML and 420 ML, respectively. From Year 2016 onwards, the MOV for Pit 1S Dam increases to 1,320 ML until its decommissioning in Year 2031.

The forecast modelling results for the combined mine water dams show the 10%ile mine water inventory will be around the MOV (i.e. the effective capacity of the mine water system) over the first 4 to 5 years of the simulation.

The results indicate that the site is very sensitive to climatic conditions, which is to be expected given the relatively large catchments reporting to the site storages and pits. This response to climatic conditions decreases over time, as additional catchments are rehabilitated and diverted around the water management system.

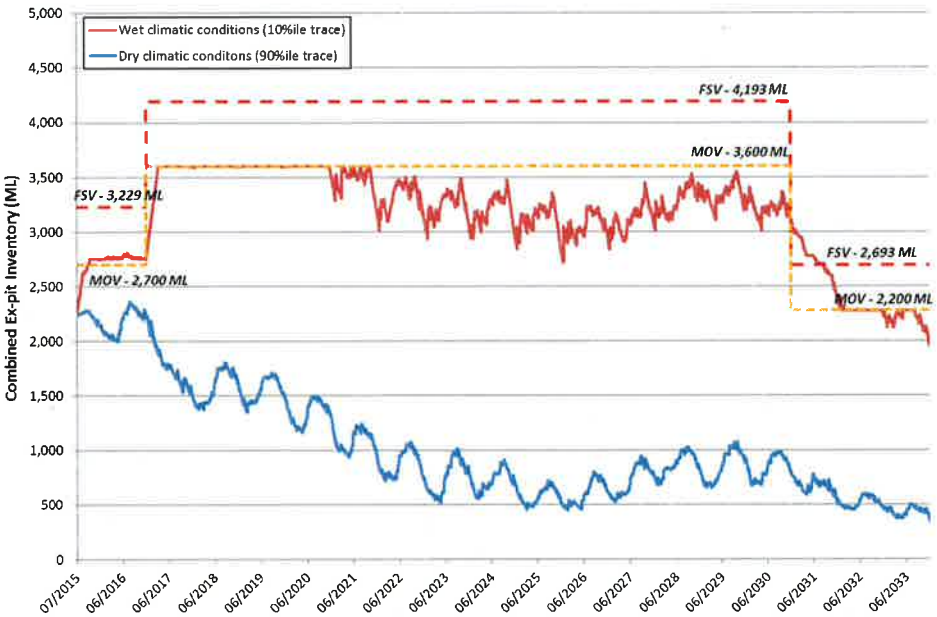

Figure 2.1 - Revised forecast mine water inventory

2.2.1 In-pit storage

Figure 2.2 shows the forecast inventory for the combined mining pits over the 19 year simulation. A build-up of water in the mining pit generally occurs when the mine water storages are too full to accept additional pit water.

The forecast modelling results for the combined mining pit inventory are summarised as follows:

- The 1%ile combined pit inventory reaches around 3,200 ML by the start of Year 2017.
- The 10%ile combined pit inventory reaches around 1,360 ML by the start of Year 2017.

The results show that there is a chance that significant quantities of water will need to be stored in-pit in order to supplement the site storages, particularly in the first 5 years of the simulation.

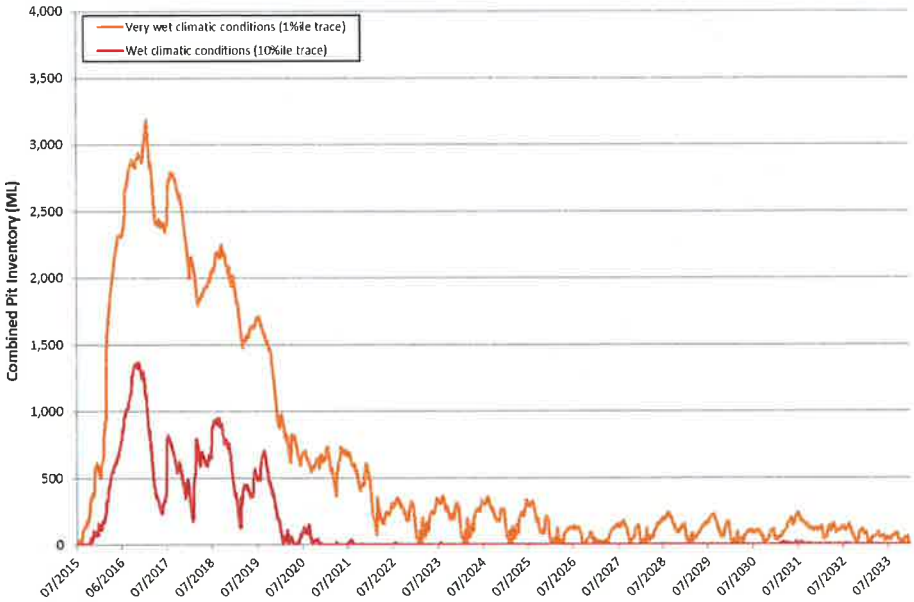

Figure 2.2 - Revised forecast pit water inventory

The modelling results show the following:

- During the simulation period, the 1%ile inventory for:
    - Pit 1N will reach around 420 ML.
    - Pit 2E will reach around 50 ML.
    - Pit 2S will reach around 170 ML.
    - Pit 3 will reach around 450 ML.
    - Pit 4 will reach around 390 ML.
    - Pit 5N will reach around 2000 ML.
    - Pit 5S will reach around 430 ML.
    - Pit 6N will reach around 280 ML.
    - Pit 6S will reach around 65 ML.
    - Pit 7 will reach around 210 ML.
    - Pit 8 will reach around 150 ML.

- During the simulation period, the 10%ile inventory, for,:
    - Pit 1N will reach around 75 ML.
    - Pit 2E will reach around 10 ML.
    - Pit 2S will reach less than 5 ML.
    - Pit 3 will reach around 145 ML.
    - Pit 4 will reach around 210 ML.
    - Pit 5N will reach around 840 ML.
    - Pit 5S will reach around 220 ML.
    - Pit 6N will reach around 150 ML.
    - Pit 6S will reach less than 5 ML.
    - Pit 7 will reach around 100 ML.
    - Pit 8 will reach less than 5 ML.

The predicted operational risk of more than 200 ML of water stored in each of the open pits over the life of the WEP (i.e. potential disruption to mining operations) is summarised in Table 2.3.

Table 2.3 - Revised estimate of WEP risk of disruption to mining operations

Open Cut Pit	Percentage of Days where Volume Stored In-pit is Greater than 200 ML		
	Median for Modelled Simulations (%)	95th Percentile for Modelled Simulations (%)	Highest for Modelled Simulations (%)
Pit 1 - North	0.0	1.5	4.2
Pit 2 - East	0.0	0.0	0.0
Pit 2 - South	0.0	0.0	0.9
Pit 3	0.0	2.4	5.1
Pit 4	0.0	3.1	5.3
Pit 5 - South	1.0	13.0	17.1
Pit 5 - North	0.0	12.6	16.1
Pit 6	0.0	4.5	7.0
Pit 7	0.0	0.0	7.6
Pit 8	0.0	0.0	0.2

2.3 EXTERNAL MAKEUP REQUIREMENTS

Water from external sources is required to meet operational water demands, primarily during extended dry climatic periods. In addition to the water captured within the water management system from surface runoff within the operational areas and groundwater inflows, water will also need to be sourced from the external sources (such as via the existing/approved Wilpinjong Coal Mine borefield).

A key objective of the mine site water management system is to maximise the reuse of on-site surface water runoff and groundwater inflows. Recycling mine water will minimise the volume of water from external sources that is required to satisfy site demands. However, the volume of water captured on site is highly variable dependent upon climatic conditions. Hence, the required makeup water volume from the external sources is likely to vary significantly from year to year.

Figure 2.3 and Figure 2.4 shows the total monthly and annual modelled demand for water from external sources over the 19 year simulation.

The modelling results show that from Year 2020 onwards, up to 130 ML/year may be required from external sources during very dry climatic conditions. This equates to a maximum monthly requirement of up to 35 ML/month. However under most climatic conditions, there is no external water requirement (i.e. external water requirements under both dry and median climatic conditions are zero).

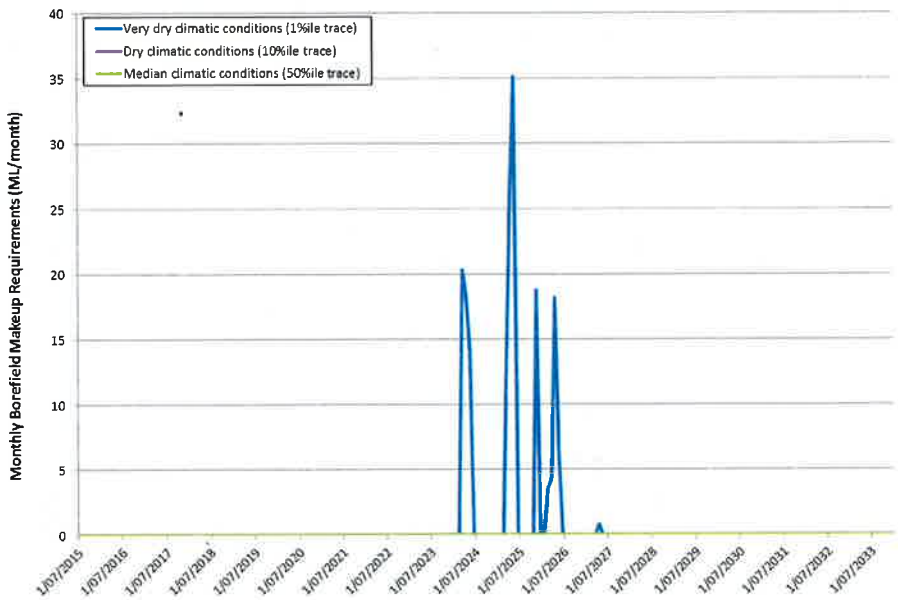

Figure 2.3 - Forecast monthly external water requirements - No change

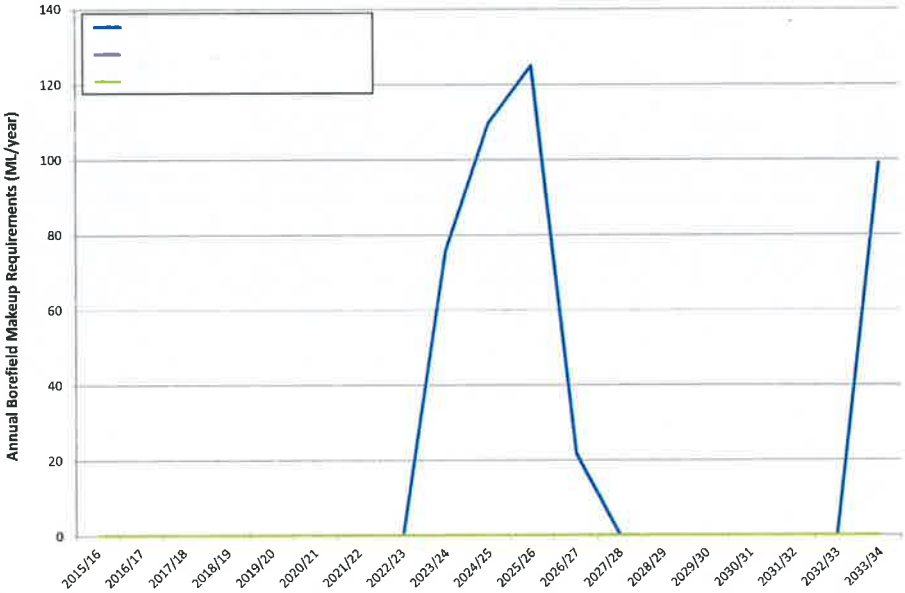

Figure 2.4 - Forecast annual external water requirements - No change

2.4 REVERSE OSMOSIS PLANT DISCHARGES

The water balance model is configured to discharge treated water, in accordance with the rules outlined in Section 6 of the WEP Surface Water Assessment. The potential for controlled releases from the WEP has been assessed using a forecast assessment simulation. The predicted annual controlled discharge volume is provided in Table 2.4 and Figure 2.5. The results show that:

- During both very wet climatic conditions (1%ile) and wet climatic conditions (10%ile), modelled controlled releases are between 270 ML/year and 1,280 ML/year. Under these climatic conditions, the RO Plant operates almost 100% of the time.
- During median climatic conditions (50%ile), modelled controlled releases are between 270 ML/year and 1,280 ML/year, with the peak in Year 2031.
- During both dry climatic conditions (90%ile) and very dry climatic conditions (99%ile), modelled controlled releases only occur in the first three years of the simulation, with a peak annual discharge of around 545 ML/year.

Table 2.4 - Revised summary of simulated RO Plant discharges

Operational period	Annual RO Plant discharge (ML/year) 1%ile	10%ile	50%ile	90%ile	99%ile
Phase 1 (Year 2015-16)	280 to 780	270 to 700	270 to 560	265 to 545	250 to 535
Phase 2 (Year 2017-18)	1,275 to 1280	1,270 to 1,275	1,000 to 1,250	0 to 540	0 to 300
Phase 3 (Year 2019-21)	1,275 to 1280	1,270 to 1,275	425 to 770	0	0
Phase 4 (Year 2022-25)	1,275 to 1280	1,260 to 1,265	310 to 415	0	0
Phase 5 (Year 2026-30)	1,275 to 1280	1,260 to 1,275	370 to 660	0	0
Phase 6 (Year 2031-33)	1,275 to 1280	1,275 to 1,280	560 to 1,280	0	0

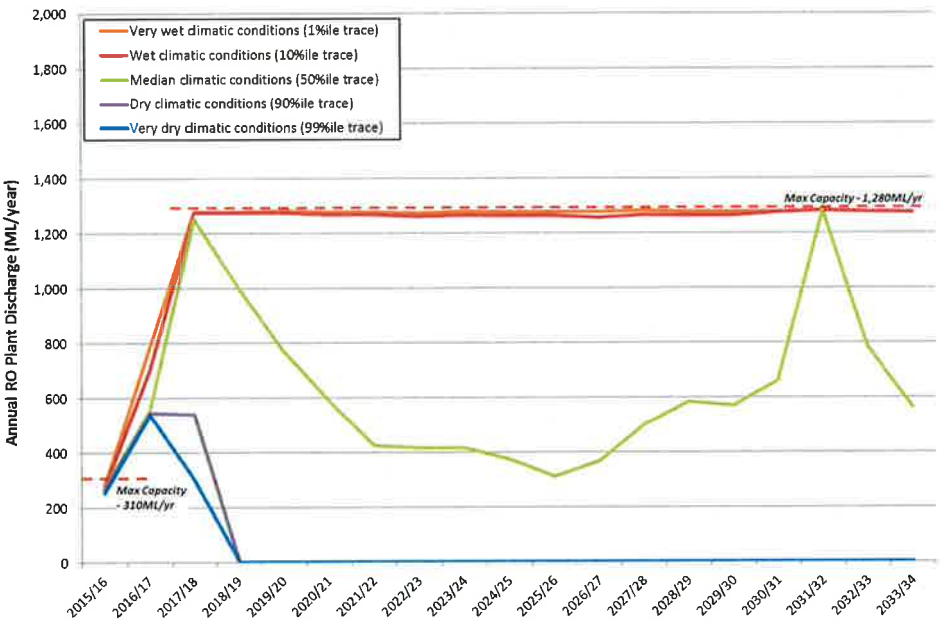

Figure 2.5 - Revised forecast annual controlled releases

2.5 UNCONTROLLED SPILLS - MINE WATER SYSTEM

The model of the water management system has been configured to ensure no uncontrolled discharge of water from mine water storages to the receiving environment. As such, the modelled results show no spills from the mine water system under any climatic scenarios, including during very wet climatic scenarios (1%ile).

2.6 SEDIMENT DAMS

The adopted design standard for sediment dams does not provide 100% containment for captured runoff. Hence, it is possible that overflows will occur from sediment dams if rainfall exceeds the design standard.

The potential for overflows from the proposed sediment dams has been assessed using a forecast assessment simulation. The predicted monthly and annual combined sediment dam overflows are provided in Figure 2.6 and Figure 2.7. The results show that:

- During very wet climatic conditions (1%ile) where rainfall events often exceed the required design standard, modelled sediment dam overflows are between 300 ML/year and 1,354 ML/year (up to 350 ML/month). The majority of the overflows occur in the first 5 to 6 years of the simulation.
- During wet climatic conditions (10%ile) where rainfall events sometimes exceed the required design standard, modelled sediment dam overflows are between 45 ML/year and 560 ML/year (up to 70 ML/month). The majority of the overflows occur in the first 5 to 6 years of the simulation.
- During median climatic conditions (50%ile) where very few rainfall events exceeding the design standard occur, modelled sediment dam overflows are between 0 ML/year and 90 ML/year.
- During both dry climatic conditions (90%ile) and very dry climatic conditions (99%ile) where few or no rainfall events exceeding the design standard occur, modelled sediment dam overflows are negligible.

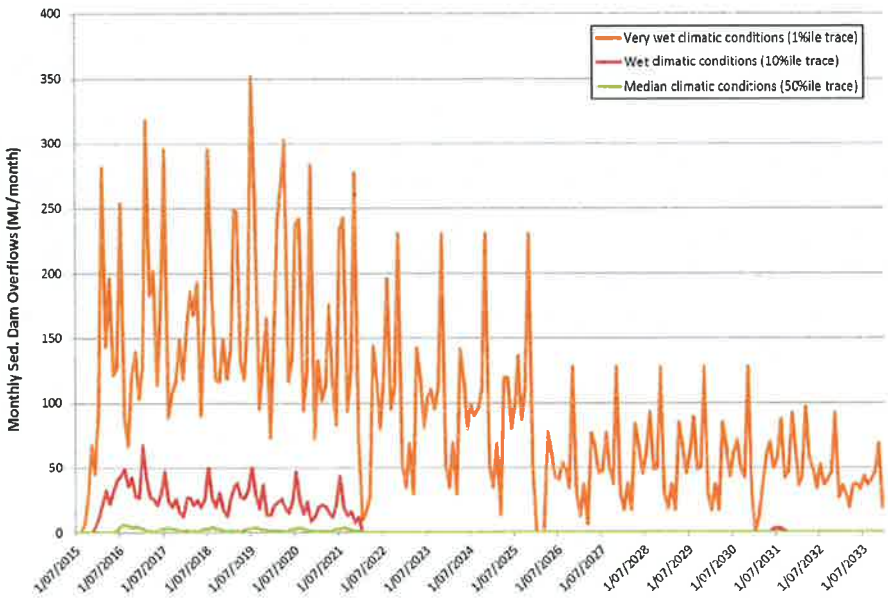

Figure 2.6 - Forecast monthly sediment dam overflows

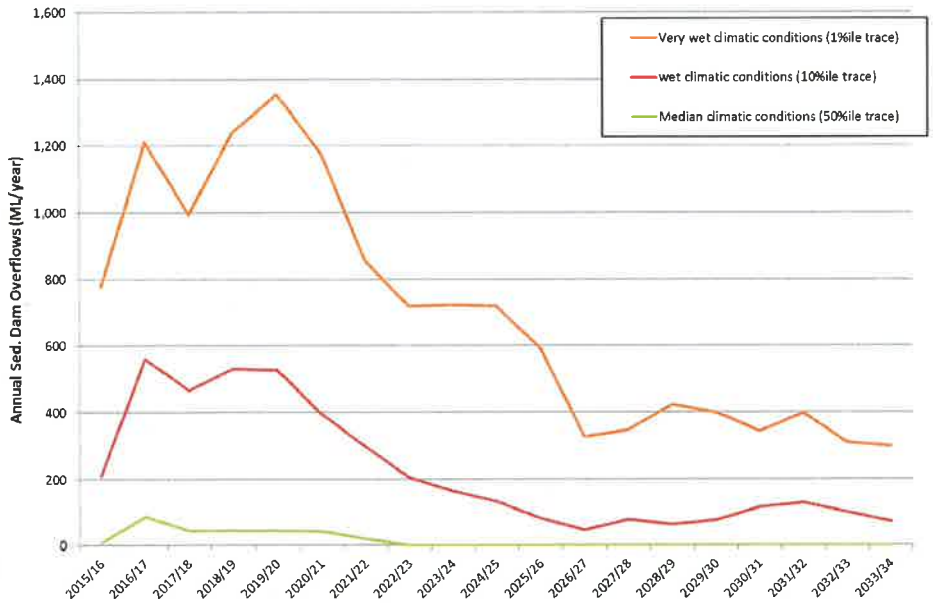

Figure 2.7 - Forecast annual sediment dam overflows

2.7 SURFACE RUNOFF SALT BALANCE

Figure 2.8 shows a schematic diagram of the salt inputs and outputs from the WEP. Salt inputs to the WEP include salts in the groundwater inflows, catchment runoff and external water. Salt outputs from the WEP include salts which are lost through the process plant in the product material, site demands (including dust suppression) and offsite discharges from the RO Plant, overflows from the sediment dam system and runoff from rehabilitated/diverted catchments (there are no modelled offsite discharges of untreated mine water). Salt inflows from direct rainfall were assumed to be zero.

Table 2.5 shows the average annual salt balance for the WEP. The results indicate the following:

- the largest contributor to the WEP salt load is from runoff, however the groundwater inflows also contribute significant salt load to the WEP; and
- net loss from the CHPP demand and dust suppression usage contributes the greatest salt loss from the WEP.

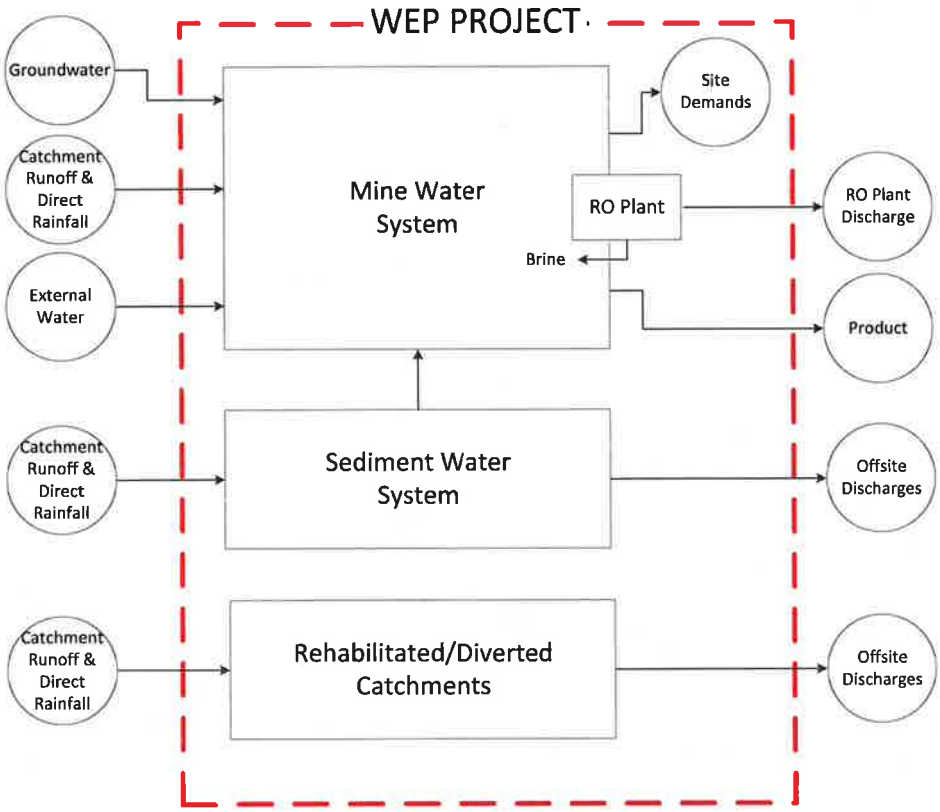

Figure 2.8 - WEP surface water salt load schematic

Table 2.5 - Revised average annual salts balance during the WEP - all realisations

	Year 2016	Year 2018	Year 2020	Year 2024	Year 2028	Year 2031
Salt inputs (tonnes/year)						
Catchment runoff	4,558	5,137	5,393	5,309	4,632	4,761
Direct rainfall	0	0	0	0	0	0
Groundwater inflows	2,919	2,772	1,939	1,296	1,446	569
External water supply	0	0	0	7	2	6
GROSS SALT INPUTS	**7,477**	**7,909**	**7,332**	**6,612**	**6,080**	**5,336**
Salt outputs (tonnes/year)						
Evaporation from water storages	0	0	0	0	0	0
Onsite salt disposal or loss						
CHPP demand	805	1,742	1,908	1,916	1,431	1,791
Dust suppression demand	724	1,952	2,736	3,084	2,123	4,459
Total	***1,529***	***3,694***	***4,644***	***5,000***	***3,554***	***6,250***
Offsite salt flux						
RO Plant discharge	134	475	334	230	261	373
Storage overflows - mine water dams	0	0	0	0	0	0
Storage overflows - sediment dams	317	454	421	118	59	64
Outflows - rehabilitated catchments	0	126	569	972	918	1,167
Outflows - diverted catchments	184	327	353	253	142	64
Total	***635***	***1,382***	***1,677***	***1,573***	***1,380***	***1,668***
GROSS SALT OUTPUTS	**2,164**	**5,076**	**6,321**	**6,573**	**4,934**	**7,918**
Salt retained on site (tonnes/year)						
Change in salt storage in the Water Management System structures	5,313	2,833	1,011	39	1,146	-2,582

3 Impact of revised sediment dam sizing

The changes to the proposed sizing of the sediment basins and pumps have resulted in a 40% increase in dam capacity. This proposed change in sizing has had a small impact of the water balance model results, with the most material change being a reduction in total volume released from sediment basins. A comparison of the original and revised water balance modelling results for sediment dam overflows is provided in Figure 3.1 and Figure 3.2, and summarised as follows:

- For 1% (very wet) climate conditions, the annual sediment dam overflows reduce by up to 11% (annually); and
- For 10% (wet) climate conditions, the annual sediment dam overflows reduce by up to 7% (annually).

The proposed sediment dam changes have a negligible impact on the rest of the water balance model and no material environmental implications.

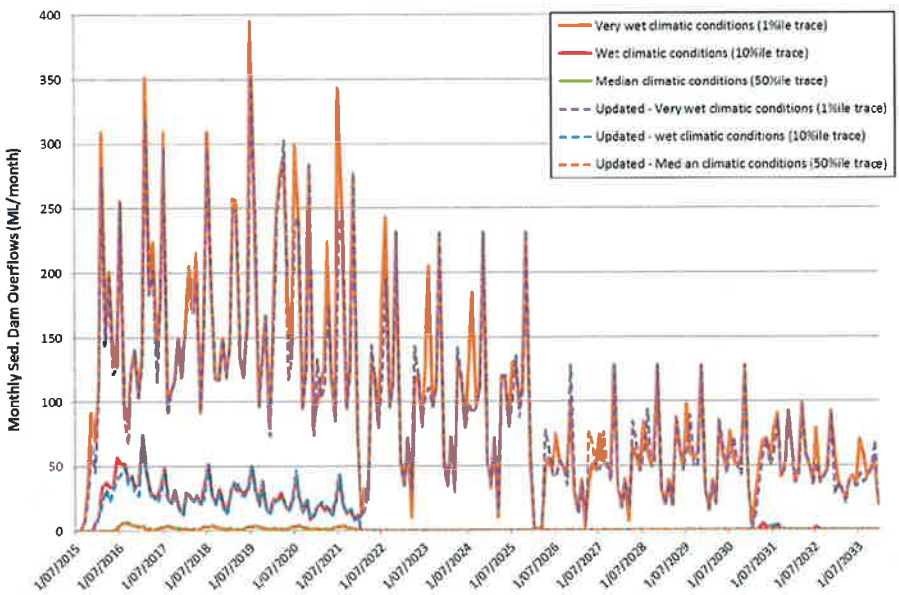

Figure 3.1 - Forecast monthly sediment dam overflows, comparison of results

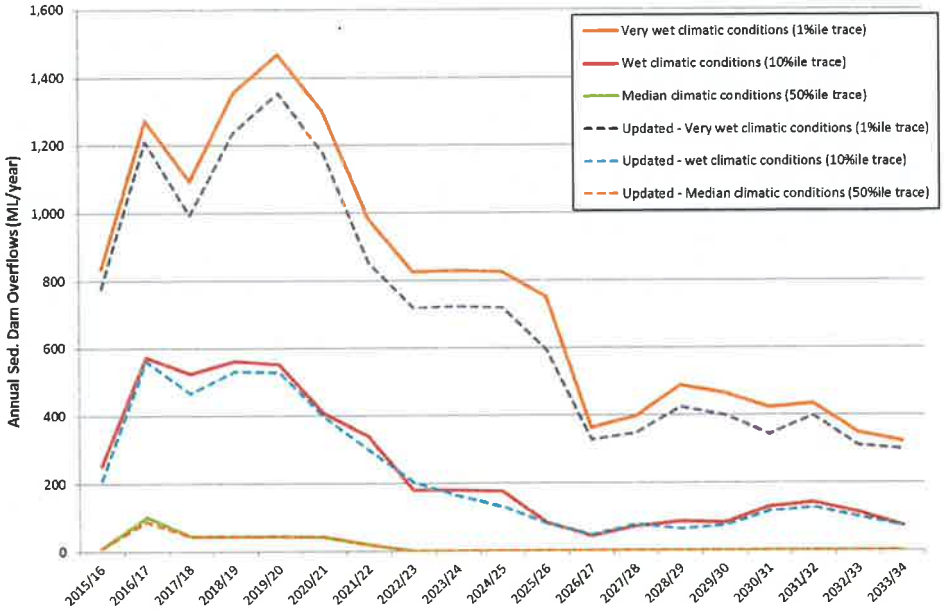

Figure 3.2 - Forecast annual sediment dam overflows, comparison of results

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