New South Wales Government
Independent Planning Commission

Rix's Creek Continuation of Mining Project
SSD 6300

Review Report

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31 August 2018

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EXECUTIVE SUMMARY

The Rix's Creek Continuation of Mining Project (SSD 6300) (**Project**) is seeking approval to extend the existing mining operations at Rix's Creek Mine until 2038, to increase peak production and recover an additional 32 million tonnes of coal. The Project involves:

- expanding existing open-cut mining operations in Pit 3 to the northwest and mining a small area south of Pit 1 known as the 'North Pit Area';
- increasing the maximum extraction and processing rates to 4.5 Mtpa of ROM coal;
- constructing a second cut and cover tunnel (underpass) beneath the New England Highway;
- constructing a new overburden emplacement area (OEA) to the west of Pit 3;
- a final landform containing a void;
- a biodiversity offset strategy for the disturbance of 212.8ha of land and the provision of 5,808 ecosystem credits; and
- the continuation of 130 existing jobs and during peaks the generation of an additional 87 jobs at maximum production.

On 12 December 2017, the Minister for Planning requested that the then Planning Assessment Commission, now known as the Independent Planning Commission (**Commission**), conduct a public hearing and review the merits of the Project, with consideration of the likely economic, environmental, social and other impacts. The Commission notes that amendments to the *Environmental Planning and Assessment Act 1979* (**EP&A Act**) entered into force on 1 March 2018, before the completion of the review. However, the Commission is still required to undertake the review in accordance with the Minister's request, notwithstanding that the request was made prior to the amendments to the EP&A Act.

The Commission comprised of Mary O'Kane AC (Chair of the Commission), Andrew Hutton and Tony Pearson. The Commission examined the documents referred to in the Minister's Terms of Reference, including the Environmental Impact Statement, Response to Submissions, and all other relevant information relating to the Project. The Commission also received public submissions, held a public hearing, conducted a site inspection of the mine site and the surrounding locality, met with the applicant, Singleton Shire Council and the Department of Planning and Environment (**Department**), and commissioned two specialist reports.

The Commission notes that the Department's Environmental Assessment Report is a preliminary assessment of the merits of the Project. The assessment considered the potential impacts of the Project with regard to, but not limited to: air quality; noise; blasting; water resources; biodiversity; final landform; final land use and rehabilitation; and economics and social impacts. Other impacts identified by the Department include: visual; traffic and transport; agriculture; Aboriginal cultural heritage; European heritage; waste and hazards.

The role of this Review is to review the Project in accordance with the Minister's request, which includes holding a public hearing, considering all of the information and assessment provided to the Commission or generated during the review process, and then providing this report containing the Commission's conclusions to date and its recommendations. The Commission's conclusions represent its preliminary views at this stage of the assessment process.

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Giving consideration to the information available, views expressed at the public hearing, and submissions received, the Commission's preliminary view is that if the applicant can satisfactorily address the various recommendations contained within this review report the Project may have merit. The Commission notes that its views may change on any determination decision, including because of the provision of additional information in response to this review, information provided to the Commission independently of this review, additional matters raised in undertaking its final assessment of the Project, or other relevant factors. The Commission also notes that conditions of consent have not formed part of this review and would need to be given detailed consideration at the determination stage.

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RECOMMENDATIONS

Air quality

R1 that the applicant demonstrate how its operational procedures will incorporate continual improvement to further reduce the generation and dispersion of particulate matter.

R2 that the applicant develop a protocol to assist those stakeholders concerned about air quality impacts to better:

- access the data from the Upper Hunter Air Quality Network; and
- provide instruction on how to use the Environment Line provided by the NSW Government.

R3 that the applicant provide further evidence of the policies and protocols in place to manage mine-owned residences, including clarification as to whether termination rights are only triggered in relation to dust exceedances, or whether termination at any time is a general at will right of occupancy of a mine owned residence.

Noise and blasting

R4 that the applicant make available on a timely basis information relating to how it is managing noise impacts, including its adaptive management practices and how it proposes to use such practices to manage the Project's noise impacts to conform to the ANC. Such information should include the Noise Management Plan, which should be made available to the public on the applicant's website or in hard copy where requested. The Noise Management Plan published by the applicant should outline the process to be undertaken by the applicant in modifying operations where noise exceedances occur, and include a 24/7 contact number for the applicant and details of the Environment Line provided by the NSW Government.

R5 that the applicant provides a full and detailed list of all equipment to be used at the mine, including a schedule for noise attenuation, where it is planned.

R6 that the applicant commits to completing the cladding of the Coal Handling and Preparation Plant prior to the extraction of any coal under any Project consent, if approved.

R7 that the applicant update its Blast Impact Assessment to provide additional monitoring and management measures specifically related to the preservation of the Coke Ovens.

Rehabilitation and mine closure planning

R8 that in order to address the principles of *Strategic Framework for Mine Closure,* the applicant implement the recommendations of the Unger Report requiring the applicant to prepare a stakeholder engagement strategy that ensures that stakeholders' specific issues of rehabilitation and closure are addressed appropriately in the Rehabilitation Strategy.

R9 that the applicant records all targeted consultation on mine rehabilitation and closure planning within the Rehabilitation Strategy and demonstrate where issues raised in community consultation have been considered in the development of the Rehabilitation Strategy.

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R10 that the applicant collates and includes all relevant rehabilitation objectives and practices identified within the MOP and other EIS documents into the Rehabilitation Strategy so that it is a consolidated reference for the rehabilitation and closure of the mine.

R11 in order to address the principles of *Strategic Framework for Mine Closure,* the Commission recommends that the Rehabilitation Strategy:

a) identify all mine closure domains;
b) label and describe all domains including the proposed post-mining land use;
c) ensure that rehabilitation and closure objectives, performance standards and completion criteria exist for all domains;
d) consider sudden unplanned closure and temporary closure (care and maintenance);
e) include a detailed commitment register;
f) identify and consult with stakeholders to explore closure risks and opportunities further; and
g) include a plan to ensure that the Rehabilitation Strategy is updated and refined regularly to reflect changes in mine development and operational planning, and environmental conditions.

R12 that the applicant carry out an evaluation of the socio-economic impacts of mine closure during the preparation of, and in the regular updates to, a Detailed Mine Closure Plan.

R13 that the applicant include a section within the Rehabilitation Strategy outlining the knowledge base around past rehabilitation performance. This is intended to demonstrate that the site is able to achieve the proposed post-mining land use. This knowledge base should be a summary of all existing baseline aspects as they relate to mine closure and demonstrate the outcomes from past rehabilitation showing where any lessons learnt have been incorporated into the rehabilitation and mine closure planning for the site. The inclusion of this information in the Rehabilitation Strategy could further improve the provision of information to the community on progressive rehabilitation performance and site knowledge which would support the proposed post mining land uses.

R14 that the Rehabilitation Strategy be revised to demonstrate a risk based approach to rehabilitation and closure. This would include the preparation of a register outlining the risks and opportunities relating to the closure of the mine. This should include not only the risks and opportunities relating to the physical closure and rehabilitation works, but also give regard to any existing legacy or residual (future) risks in accordance with the Principles of the *Strategic Framework for Mine Closure*.

R15 that the Rehabilitation Strategy be revised to include additional detailed information around the final void water levels and water quality, including an assessment of any potential beneficial uses for the water that could be considered following closure of the mine.

Final void and final landform

R16 that the applicant prepare a trade-off study assessing the benefits of removing the western overburden emplacement area against the potential environmental impacts associated with increasing the heights of the existing North Pit Dump and South Pit Dump. Any outcomes of the trade-off study, including an assessment of any

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environmental impacts, would need to be submitted and considered as part of the final assessment of the Project.

Water – Surface water, groundwater and void water

R17 that the applicant explore opportunities to undertake an assessment of void water re-use. Where opportunities are identified, these should be included in the Rehabilitation Strategy.

R18 that the applicant investigate water impacts related to any interaction with the backfilled North Pit Void consistent with those undertaken for the South Pit Void.

Biodiversity

R19 that the applicant detail and commit to an offsetting approach for consideration by the consent authority, which includes, if necessary, details of how its approach will be staged, the timing, offset value and how it could be successfully undertaken.

Social and economic impacts

R20 that the applicant provide further information in relation to how it has determined its "base case" financial parameters, including the assumptions relating to commodity price and exchange rate forecasts, and references to other available commodity price and exchange rate forecasts.

R21 that the applicant provide a more detailed discussion of the likelihood and range of feasible alternatives to the "base case" referred to above, including, but not limited to its selection of the downside coal price scenario of 25% and the World Bank commodity price scenario.

R22 that the applicant provide further information (including relevant risk minimisation strategies) in relation to how it has considered severe downside scenarios (including, but not limited to, the World Bank commodity price scenario), in accordance with the *Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals 2012* and accompanying Technical Notes.

Heritage

R23 that the applicant prepare a Heritage Management Plan to provide the applicant with further opportunities to minimise impacts on the Coke Ovens.

R24 that the applicant's Heritage Management Plan include an evaluation of the options available to minimise the impact of any tree roots on the integrity of the Coke Ovens.

R25 that the Heritage Management Plan identify what additional research should be undertaken regarding the Coke Ovens to determine whether salvage and recording is necessary and/or possible.

R26 that the applicant's Heritage Management Plan and Rehabilitation Strategy detail how the Coke Ovens will be better accessed by the public given the historical significance of the site and provide options on how the site can be managed throughout the life of the Project and beyond mine closure.

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INTRODUCTION

The Minister's request to review the Rix's Creek Continuation of Mining Project

1. On 12 December 2017, the Minister for Planning (the **Minister**) made the following request under the former section 23D of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**) to the then Planning Assessment Commission, now known as the Independent Planning Commission of New South Wales (**Commission**):

   "I, the Minister for Planning, request the Planning Assessment Commission to:

   1. *Carry out a review of the Rix's Creek Coal Mine Extension Project* (**Review**)*, by:*
      a. *considering the EIS for the development, the issues raised in submissions, the response to submissions, any other information provided concerning the development by the applicant and any information provided during the course of the review or as part of the public hearing;*
      b. *considering the likely economic, environmental and social impacts of the development in the locality, the region and the State;*
      c. *assessing the merits of the development as a whole, having regard to all relevant NSW Government policies and guidelines; and*
      d. *providing recommendations on any additional reasonable and feasible measures that could be implemented to avoid, minimise and/or manage the potential impacts of the development;*

   2. *Hold a public hearing during the review as soon as practicable after the Department of Planning and Environment provides its preliminary assessment report to the Commission; and*

   3. *Submit its final report on the review to the Department of Planning and Environment within 12 weeks of receiving the Department's preliminary assessment report, unless otherwise agreed with the Secretary of the Department."*

2. Mary O'Kane AC, Chair of the Commission, appointed herself (as Chair), Andrew Hutton and Tony Pearson to constitute the Commission for this Review.

3. The Commission notes that amendments to the EP&A Act entered into force on 1 March 2018. However, the Commission is still required to undertake the review in accordance with the Minister's request, notwithstanding that the request was made prior to the amendments to the EP&A Act.

4. The Commission also notes that the role of this Review is not to determine whether the Project should or should not be approved. Rather, the role of this Review is limited to the matters set out above in the Minister's request.

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Existing Rix's Creek Mine and Locality

5. According to the Department's Environmental Assessment Report dated May 2018 (**Department's EAR**), mining began in the vicinity of the Rix's Creek Mine (**Mine**) in the late 1800s. The Mine is approximately five kilometres (**km**) north-west of Singleton, located in the Hunter Coalfields within the Sydney-Gunnedah Basin, with the land including and surrounding the mine disturbance footprint being an area of 1,818 hectares (**ha**).

6. Development consent (DA 49/894) for the Mine was first granted by the then Minister for Urban Affairs and Planning on 19 October 1995 for a period of 21 years from the date of the associated mining lease. ML 1432 was granted on 24 June 1998, which permitted mining until 24 June 2019. The consent has been modified on nine occasions.

7. Bloomfield Collieries Pty Limited (**applicant**) owns and operates the Mine and has done so since mining commenced. Current open-cut operations extend to the east and west of the New England Highway, and coal is extracted from the Hebden, Barrett, Liddell, Arties, Pikes Gully and Lemington seams of the Whittingham Coal Measures.

8. Within these coal measures, 35 separate coal seams are mined using multi-seam bench open-cut mining methods. The Mine produces thermal and semi-soft coking coal predominantly for export, with small quantities for domestic consumption.

9. A prominent ridgeline and the Main Northern Rail Line to the east of the Mine separate it from the western town-limits of Singleton Heights. The Mine is bounded by the Integra Open Cut Mine to the north (now known as Rix's Creek North since being acquired by the applicant in 2015).

10. The region surrounding the mine includes a range of mining, agricultural, light industrial, rural residential and residential land uses. Coal mining and supporting industries, agriculture and associated service industries, horse breeding, electricity generation, tourism, viticulture and wine production provide the largest contributions to the regional economy.

Summary of the Rix's Creek Continuation of Mining Project

11. According to the Department's EAR, the Project was lodged with the Department on 27 October 2015.

12. According to the Department's EAR, the Project has been amended since it was originally lodged. These amendments generally represent the applicant's response to issues that were raised through the Department's assessment process, including public and government agencies' submissions. Amendments have also occurred as a result of the applicant's recent acquisition of Rix's Creek North.

13. The Project was publicly exhibited by the Department from 3 November 2015 to December 2015.

14. Table 1 of the Department's EAR describes the key components of the Project as following:

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Aspect	*Existing approval*	*Proposed development*
Development Application and Mining Lease Boundaries	• ML1432 and CL352, with a total area of 1,818ha.	• an additional 170ha lease area for the new western Overburden Emplacement Areas (**OEA**) (Mining Lease Area 487).
End of Mine Life	• 2019.	• 2038.
Mining Areas	• Pits 1 ('North Pit' or 'Arties Pit'), 2 ('South Pit') and 3 ('West Pit').	• Extending Pit 3 to the northwest; and • Mining of the 'North Pit Area' just south of Pit 1.
Maximum Extraction Rate	• 16.1 million Bank Cubic Metres of material, which delivers approximately 2.8 Mtpa of run-of-mine (**ROM**) coal.	• 3.6Mtpa of ROM coal.
Mining Method	• Open-cut multi-seam bench mining involving blasting and using a truck and excavator fleet	• No change.
Mining Depth	• Pit 1 down to the Liddell and Arties Seams; • Pit 2 down to the Barrett Seam; and • Pit 3 down to the Hebden Seam.	• Increased depth in Pit 3 down to the Hebden Seam.
Overburden Emplacement and Waste Management	• Overburden material used to progressively backfill pits and emplaced in out-of-pit OEA; and • Tailings storage facilities in sections of Pit 1 (Tailings Emplacement 4) and Pit 2 (Tailings Emplacement 3).	• New OEA to accommodate overburden from the expanded Pit 3; and • Co-disposal of dried tailings with overburden and continued use of Tailings Emplacement 4.
Coal Processing	• On-site Coal Handling Processing Plant (**CHPP**) used for processing ROM coal from both the Mine and Rix's Creek North; • 4.5Mtpa ROM coal processing capacity.	• No change.
Transport	• ROM coal trucked to the on-site CHPP via internal haul roads; and • Product coal trucked to the rail loading facility at the Rix's Creek North rail loop and then railed to the Port of Newcastle via the Main Northern Railway.	• No change.
Operating Hours	• 24 hours a day, 7 days a week	• No change.
Employment	• 130 staff	• Maximum of 217 staff.

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Infrastructure	• Construction and operation of surface facilities including CHPP, coal stockpiles, administration and amenities facilities, workshop and rail loading facilities (previously completed except for rail loop and loading facility); and • Construction and operation of a cut and cover tunnel beneath the New England Highway (completed).	• Continued use of existing surface facilities with the exception of no longer constructing the proposed on-site rail loop and loading facility; and • Construction of a second cut and cover tunnel beneath the New England Highway.
Site Access	• Road access is available via Rix's Creek Lane off the New England Highway	• No change.
Disturbance Areas (as per agreed Court orders)	• Approximately 1,032ha.	• 212.8ha additional.
Biodiversity Offsets	• Establishment of a 118.32 ha biodiversity offset strategy for the impacts associated with the proposed Rix's Creek rail loop and associated loading facility, as per Mod 5; and • Retiring of 2,716 ecosystem credits in accordance with the Framework for Biodiversity Assessment (**FBA)**, as per the Court's orders.	• Establishment of a biodiversity offset strategy in accordance with either the Upper Hunter Strategic Assessment (**UHSA**) or the **FBA** for the flora and fauna impacts associated with the 212.8 ha of disturbance.
Rehabilitation and Final Landform	• Progressive rehabilitation of the mine site to pasture and trees over grass; • Final landform designed to minimise slope and OEA heights and to merge imperceptibly with adjoining undisturbed lands; • Two final voids would remain in the landform; and • Return the land to a condition suitable for a range of post-mining land uses.	• Continued progressive rehabilitation including entirely backfilling Pit 1, leaving one final void in Pit 3.

15. The Project is generally represented by the map shown in **Figure 1**.

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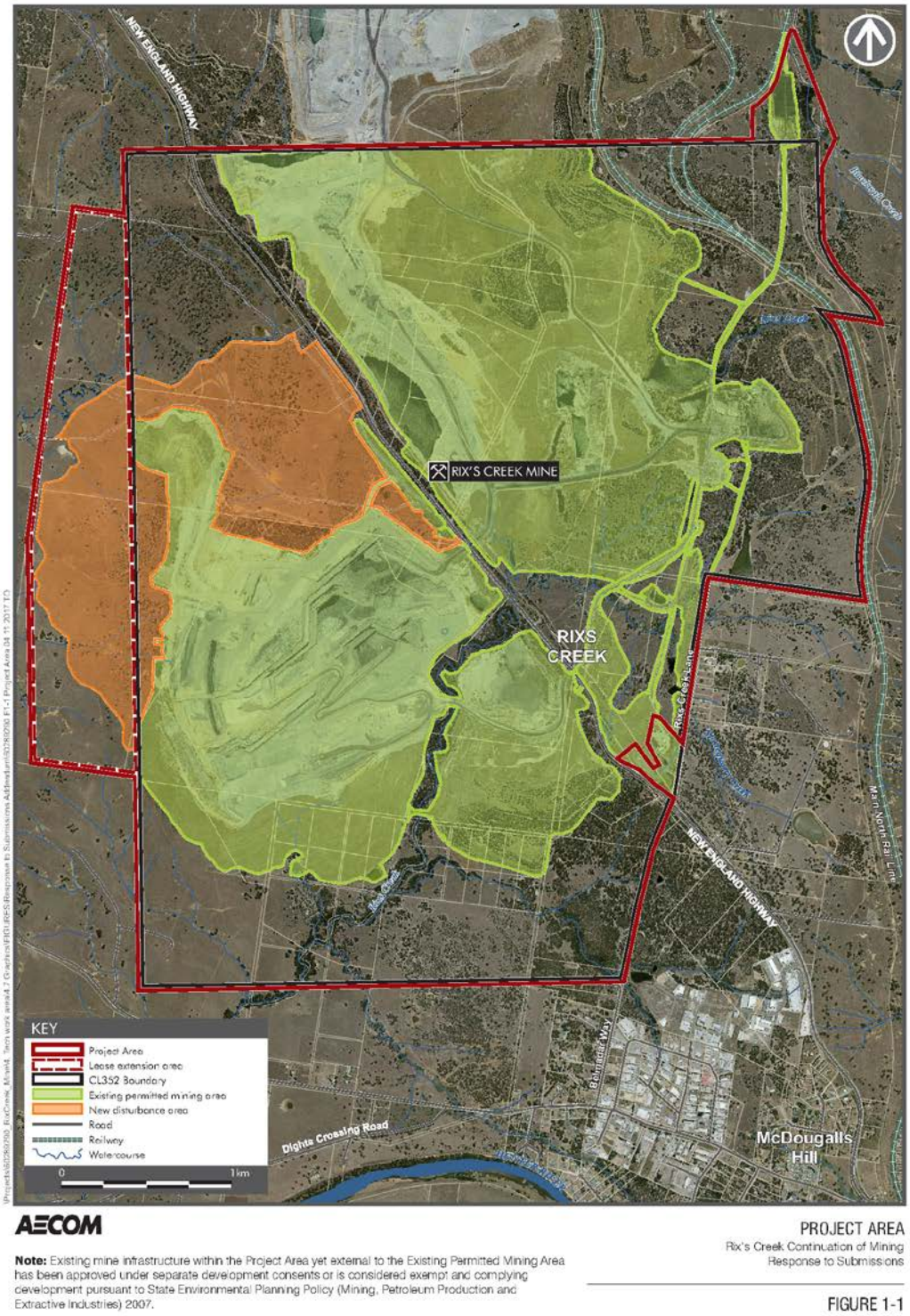

Figure 1 – Project map. Sourced from the Department's EAR.

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Land and Environment Court Proceedings

16. According to the Department's EAR, during the assessment of the Project, an investigation by the Department concluded that the applicant had undertaken land clearing and mining in breach of DA 49/94. Civil proceedings were lodged by the Department in the Land and Environment Court.

17. On 16 August 2017, the applicant agreed to the Court's consent orders and declared that it had carried out land clearing and mining in breach of DA 49/94. The consent orders resulted in a revised approved disturbance area under the existing Mine consent, and as a result the applicant submitted a revised Response to Submissions (**Revised RtS**) and therefore taking into account the revised approved disturbance area.

18. The Commission notes that this non-compliance was raised in submissions by the public at the public hearing and by the Department to the Commission. However, the Commission is of the view that the non-compliance is not relevant to this Review (while noting that the material in the Revised RtS is relevant to this Review).

THE COMMISSION'S REVIEW TASK

Information provided to the Commission to carry out this Review

19. The information provided to the Commission to carry out this Review is listed below (**the Material**):
    - Environmental Impact Statement (**EIS**), prepared by AECOM dated 26 October 2015 and its appendices;
    - Response to Submissions, prepared by AECOM dated 20 October 2016 and its appendices;
    - Revised Response to Submissions, prepared by AECOM dated 24 November 2017 and its appendices;
    - Department's EAR dated 10 May 2018 and its appendices;
    - letter to the Department dated 29 June 2018 from NSW Health regarding particulate matter exposure;
    - submissions to the Department;
    - meetings held with the Department and Singleton Shire Council (set out in paragraphs 21 and 23);
    - site and locality inspection conducted by the Commission (set out in paragraph 26);
    - submissions at the public hearing;
    - 26 written submissions received from the public;
    - *Review of rehabilitation strategy for Rix's Creek Mine – Continuation of Mining project for the Environmental Impact statement for the IPCN*, prepared by Corinne Unger dated 5 July 2018; and
    - *Expert Advice on the Mine Schedule and Final Landform,* prepared by Deswik dated 2 August 2018.

Additional information from the applicant provided during this Review

20. During the course of this Review, the applicant provided additional information responding either to enquiries from the Commission, or to matters raised by speakers at the public meeting. All information received from the applicant is available on the Commission's website, and is listed below (**the Additional Material**):

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- Meeting with the applicant (set out in paragraph 22);
- A response dated 25 May 2018 addressing matters raised from meeting held with the Commission. Attached to the response was previously prepared information on royalty calculations, backfilling the final landform, ecology, final void filling and pit void assessment;
- A letter dated 31 May 2018 from Todoroski Air Sciences on behalf of the applicant;
- A response dated 1 June 2018 from the applicant addressing matters raised from meeting held with the Commission;
- Aerial photo of the site provided by the applicant to the Commission at the site inspection;
- A copy of a presentation to the Commission from the applicant at the site visit on noise monitoring and predictive noise forecasting (4 June 2018);
- A response dated 6 July 2018 addressing NSW Health's comments on Revised RtS;
- A response dated 6 July 2018 from Todoroski Air Sciences on behalf of the applicant on 'Achievable' Noise Criteria (**ANC**);
- Applicant's response to *Review of rehabilitation strategy for Rix's Creek Mine – Continuation of Mining project for the Environmental Impact statement for the IPCN* dated 23 July 2018; and
- Applicant's response to *Rix's Creek – Expert advice on the mine schedule and final land form* dated 10 August 2018.

The Commission's meetings

21. The Commission met with the Department on 25 May 2018. The Department provided information to the Commission on the background to the Project, the current mining operation and its context within the Hunter Valley, and a summary of key aspects of the EAR. The meeting notes were made available on the Commission's website following the meeting.

22. The Commission met with the applicant on 25 May 2018. The applicant provided a MS Powerpoint presentation to the Commission, and other information on the background of the existing Mine operations, the Project, community consultation, and noise and air quality issues. The presentation and meeting notes were made available on the Commission's website following the meeting.

23. The Commission met with Singleton Shire Council (**Council**) on 4 June 2018. The following matters were raised by Council during the meeting:
    - the Voluntary Planning Agreement (**VPA**) and Council's proposed fund into which some of the VPA money would be contributed, with the income derived from the fund to be used to fund projects that enable the Council to prepare for a future that is less reliant on mining (described by Council as a 'Future Fund'). Council noted that the applicant had indicated its willingness to contribute to the proposed fund;
    - future land use planning within the Singleton local government area;
    - the growing proportion of land within the Singleton local government area being used as biodiversity offsets;
    - improved road and rail transport networks have enhanced tourist access to the region; and
    - concerns relating to the operation of the Voluntary Land Acquisition Management Policy (**VLAMP**) and use of ANC.

24. The meeting notes were made available on the Commission's website following the meeting.

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The Commission's site and locality inspection

25. The Commission inspected the site on 4 June 2018. Consistent with the Commission's *Site Inspection and Locality Tours Guidelines*, the Commission invited to the site inspection representatives of local community groups that had made a submission to the Department in respect of the Project during its public exhibition. Consequently, a representative from the following local community groups attended the site inspection:
    - the Hunter Communities Network;
    - Rix's Creek Community Consultative Committee; and
    - Denman, Aberdeen, Muswellbrook, Scone Healthy Environment Group.

26. A record of the site inspection was made available on the Commission's website on 7 June 2018 following the inspection. In summary, the Commission viewed:
    - the historic Rix's Creek Coke Ovens and Associated Works (**Coke Ovens**);
    - lookouts on the south-western overburden dump, to view into the Mine and out towards its southern neighbours;
    - lookouts on the north-western overburden dump to view the location for the proposed out-of-pit dumps, and to view the resource area to be mined in the Project;
    - the northern overburden dump rehabilitation area;
    - the highway underpass that will be relocated; and
    - the coal loading area, rail loop and the CHPP.

27. After the site inspection, the applicant made a short presentation to the Commission outlining the noise impacts and associated mitigation measures currently employed at the Mine. The local community group representatives who attended the site inspection remained for this meeting. This presentation was made available on the Commission's website on 5 June 2018.

28. In addition to carrying out the site inspection on 4 June 2018, later that day, the Commission undertook an inspection of a number of locations in the locality surrounding the site. Specifically, the Commission drove west along Maison Dieu Road, viewing the Mine from the south, before visiting the Singleton Heights area in the proximity of the Mines Rescue station as well as along Bridgeman Road as far as Retreat Road stopping at several vantage points along the route. This inspection was conducted independently by the Commission without a representative from the applicant, the Department or the local community groups.

Public hearing

29. The Commission conducted a public hearing at the Charbonnier Motor Inn, Singleton, on Wednesday 6 June 2018, to hear the public's views on the Project. A list of the 11 speakers who presented to the Commission was made available on the Commission's website, together with a transcript of the public hearing. A summary of the oral submissions made by the 11 speakers includes the following key issues:

    - Air quality:
        - cumulative air quality exceedances are expected in Camberwell with potential harm to Camberwell residents through exposure to high levels of particulate matter; and
        - there is no evidence of threshold for safe exposure to particulate matter on people.
    - Noise:

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- the Project would be unable to meet the required noise levels, particularly during noise-enhancing weather conditions;
- the Project's proximity to Singleton and Camberwell would increase the operational noise impacts on residences. There may be potential harm to the occupants in Singleton and Camberwell through exposure to high levels of noise; and
- negative impact on health because of high volume of traffic noise during certain shifts and knock-off times.

- Cumulative impacts:
  - the cumulative impacts of air quality, noise, biodiversity and species loss, and loss of land due to multiple voids has not been adequately or accurately assessed by the Department;
  - the Project will result in a significant land use conflict due to its proximity to Singleton;
  - the principles of ecologically sustainable development and intergenerational equity have not been met by this Project;
  - cumulative impacts of blasting concurrently with neighbouring mines was not considered;
  - the Department's conclusions that environmental impacts on amenity can be adequately managed are not supported;
  - the Department's report did not consider future modifications of the 18 operational mines in the area; and
  - the cumulative impacts of loss of critically endangered habitat, irreversible damage to water sources, and toxic final voids have not been adequately assessed or mitigated for the Project.
- Water:
  - the impacts on ground and surface water, the scale of the drawdown, loss of base flows to the Hunter River and accumulation of high-saline water bodies in the landscape have not been adequately assessed; and
  - there are concerns in relation to the continued permanent impact on the groundwater systems, including no plan to address the 143ha of toxic final void, which is understood to be six times saltier than seawater.
- Final void:
  - the Department's EAR fails to assess the economics of the final void's maintenance, monitoring and classification. The Department's EAR also fails to develop a plan to address the final void;
  - there will be reduced surface water flowing into the Hunter River catchment due to the 140 ha void becoming a pit lake; and
  - there are concerns in relation to the connectivity of the rehabilitated land.
- Biodiversity:
  - there is no clarity on how the 2,716 ecosystem credits required by the Land and Environment Court orders will be met in relation to the identified shortfalls in biodiversity offsetting arrangements;
  - further details of the biodiversity value catching system, associated offsetting policies and flora and fauna assessment are required;
  - loss of opportunity for species movement in the Central Hunter due to the removal of vegetation; and
  - loss of critically endangered Central Hunter Valley eucalypt forest and woodland.
- Cost benefit analysis:
  - questions raised in relation to whether the economic benefit includes such things as the devaluing of coal in the future, termination of contracts for coal, automation of the fleet; and
  - the cost benefit analysis has not included:

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- the cost of managing the final void in perpetuity;
- the cumulative loss of catchment to the Hunter River;
- the increased cost to the health system of poor air quality in the Hunter;
- the loss of ecosystem and biodiversity; and
- the project fails to meet the key goals of the Hunter Regional Plan 2036.

- Economics:
  - the applicant supports local businesses and local jobs.
- Social impacts (both positive and negative):
  - the Department's EAR acknowledges that the social impact assessment was not completed using the new assessment guidelines;
  - there are health risks to the nearby residents, especially the residents of Camberwell. The health impacts on the nearby residents are unacceptable;
  - the applicant has lost its social license to operate the Mine due to alleged land clearing in relation to the Land and Environment Court proceedings;
  - the applicant is committed to supporting the community through the provision of funding to local community, environment and education groups;
  - there is a positive culture at the Mine. The applicant is proudly an Australian owned company and privately held;
  - the Project is crucial as it will sustain local employment, generate local and regional economic benefits, and provide positive social partnerships; and
  - if approved, the Project will provide benefits of lower visibility, lower dump elevations, reduced noise levels and improved air quality.

30. Katherine Richardson SC and Kate Lindeman assisted the Commission in conducting the public hearing as Counsel Assisting.

31. This public hearing will affect appeal rights. After the public hearing, no appeal may be brought under Division 8.3 of the EP&A Act in respect of any future decisions made by the Commission as consent authority under the EP&A Act in relation to the carrying out of any development that is the subject of this public hearing.

32. The Commission accepted written submissions from the public until 13 June 2018, being one week following the public hearing. The Commission received 15 submissions during this period. All written submissions were made available on the Commission's website. A summary of the submissions key issues is provided below:
    - Air quality and dust:
      - any increase to background levels of air pollution is a key issue for community health and amenity;
      - dust and noise may be increased during the strong easterly winds which may impact on properties on the western side of the Mine and downstream of the proposed expansion; and
      - dust will have an impact on agriculture and breeding cattle.
    - Noise:
      - sleep disturbance due to night-time operations noise impacts; and
      - The level of 'adaptive' management relying on temporary shut downs cannot be guaranteed.
    - Western Spoil Emplacement Area:
      - the Project may result in a potential for contaminated water runoff from the proposed Western Spoil Emplacement area ending up in Deadman's Creek and adversely affecting downstream rural property viability. This flow to Deadman's Creek would be muddy and contaminated with leeched minerals from the Mine's workings; and

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- the Project may result in a risk for a reduced area of the Deadman's Creek catchment. This may result in less water available for downstream property needs.

- Biodiversity:
  - biodiversity impacts have not been clearly resolved and the Department's EAR has identified that further information is needed in relation to staged biodiversity offsetting; and
  - if suitable offsets are not available, then the Project is too great an impact and should be rejected including because the inadequate assessment of the threatened Squirrel Glider and the disturbed area of Central Hunter Valley Eucalypt Forest and Woodland is significant.
- Cumulative impacts:
  - the Department's EAR contained key errors and a limited analysis of cumulative impact.
- Social:
  - the Project will lead to an additional land use conflict due to its proximity to Singleton, a cumulative loss of private property and a loss of critical biodiversity and rural communities; and
  - cumulative social impacts of mining have not been assessed.
- Socio Economic:
  - the applicant is committed to supporting the community through the provision of funding to local community, environment and education groups;
  - the Project is crucial as it will sustain local employment, local and regional economic benefit and positive social partnerships; and
  - if the Project is approved, it would contribute to the ongoing economic health of the Community.
- Water:
  - the Department's recommendation that the applicant notifies downstream water users to change their behaviour if elevated dissolved metals are released in uncontrolled discharges from the mine is unacceptable;
  - downstream water users have to rely upon the applicant to provide compensatory water supplies;
  - the extension Project will cause the permanent loss of 160ha of catchment area. There is a failure to add this lost area to the cumulative loss of Hunter River catchment across the current suite of approved mining operations in the catchment; and
  - water from large rain events will enter the Hunter River through the western side of the Mine and downstream of the proposed expansion towards Deadman's Gully.
- Final Void:
  - the final void should not be approved as:
    - there is no assessment of the level of leached heavy metal contamination in the final void over time;
    - concerns whether the coal mining industry can afford to fully rehabilitate all disturbed land; and
    - despite the Department's recommendation of a Final Void Management Plan which includes the long-term management, there is no discussion of what this means post mine decommissioning and there has been no costing of this management in the economic analysis.
- Economic:
    - further information is needed on the accuracy of information in the economic assessment. There are anomalies with the economic assessment including the volume of coal to be produced to be less; the change in capital expenditure (due to the acquisition of the Integra Mine equipment) as it has not been clearly

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identified; the legacy management issues (final void management) have not been costed; and the increased environmental burden has not been costed (e.g. increase in regional air pollution, cumulative loss of catchment area and noise pollution); and

- the Project requires an updated economic assessment, including taking into account various changes to the Project and management commitments, including backfilling the final void.

Independent consultants engaged by the Commission

33. The Commission also engaged an independent consultant to provide expert advice to the Commission on the *Rix's Creek Mine Rehabilitation Strategy, 19 August 2015* and relevant parts of the Revised RtS. The consultant's report *Review of rehabilitation strategy for Rix's Creek Mine – Continuation of Mining project for the Environmental Impact statement (EIS) for the IPCN* (**Unger Report**), prepared by Corinne Unger, dated 5 July 2018, was made available on the Commission's website on 9 July 2018.

34. Separately, the Commission engaged a second independent consultant to provide expert advice to the Commission on the *Rix's Creek Mining Options Strategy Review, June 2015*. The consultant's report *Rix's Creek – Expert advice on the mine schedule and final land form* (**Deswik Report**), prepared by Deswik Mining Consultants, dated 2 August 2018, was made available on the Commission's website on 2 August 2018.

Community participation requirements and public submissions

35. The Department conducted the mandatory requirements for community participation as required by Part 1 of Schedule 1 of the EP&A Act. The Department received 131 submissions from members of the public and special interest groups. Of these, 85 submissions (65% of the total) were in support of the Project, 44 submissions (34% of the total) objected to the Project, and 2 further submissions provided comments.

36. Submissions in support considered that the Project would deliver local and regional socio-economic benefits, job security and community benefits, including the applicant's monetary contributions to local causes. Objections to the Project related to a broad range of concerns as represented by the Department's frequency distribution table, reproduced as **Figure 2**.

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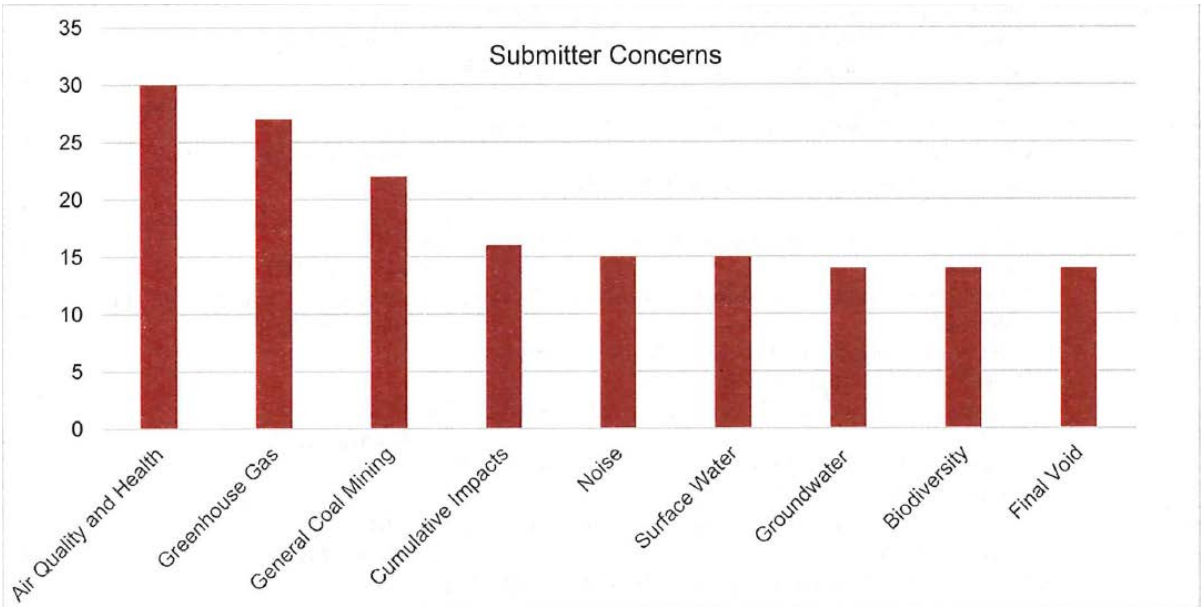

Figure 2 – Frequency distribution of issues raised in objections to the Project. Sourced from the Department's EAR.

Department's Environmental Assessment Report

37. The Department's EAR addressed the Project's justification, strategic and statutory context, and consultation with the public and relevant NSW Government agencies. It provided a detailed evaluation of air quality, noise, blasting, water resources, biodiversity, final landform, final land use and rehabilitation, economics and social impacts.

38. The Department's EAR concluded that:

"The Project represents a logical extension to the existing operations of the Rix's Creek Mine that would allow for the efficient recovery of significant coal resources with fewer environmental impacts than would arise with a greenfield Project of the same or similar scale.

The Department believes that the benefits of the Project outweigh its costs and that the proposed mine plan strikes an appropriate balance between protecting the environment and local community and realizing the significant economic benefits of the Project to the region and the State.

Consequently, the Department's preliminary findings are that the Project is in the public interest and is approvable, subject to the development of robust and contemporary conditions of consent"

Important and relevant NSW policies and guidelines

Relevant Environmental Planning Instruments

39. There are several environmental planning instruments that are relevant to the Project. They are:
    - *State Environmental Planning Policy (State and Regional Development) 2011;*

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- *State Environmental Planning Policy (Mining, Petroleum and Extractive Industry) 2007;*
- *State Environmental Planning Policy (Infrastructure) 2007;*
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;*
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection;*
- *State Environmental Planning Policy No. 55 – Remediation of Land; and*
- *Singleton Local Environmental Plan 2013*

Ecologically Sustainable Development

40. A relevant object of the EP&A Act to the Project is the facilitation of ecologically sustainable development (**ESD**).

41. The Commission notes that section 6(2) of the *Protection of the Environment Administration Act 1991* states that ESD requires the effective integration of social, economic and environmental considerations, and that ESD can be achieved through the implementation of:
    (a) the precautionary principle;
    (b) inter-generational equity;
    (c) conservation of biological diversity and ecological integrity; and/or
    (d) improved valuation, pricing and incentive mechanisms.

42. An issue raised at the public hearing was that the Project did not achieve the principles of ESD through its failure to implement intergenerational equity. This included oral submissions in relation to the cumulative impacts of final voids, impacts on critically endangered habitat and damage to water sources.

43. The Department's EAR concluded that it considered "*that the Project is able to be carried out in a manner that is consistent with the Principles of ESD*". (see page 12 of the Department's EAR).

44. The Unger Report included a high-level review of the Project's closure and rehabilitation strategy, and contained recommendations for the Commission to consider. This is further discussed at paragraphs 159-203. The Unger Report concluded that the Project's closure and rehabilitation strategy "*should be a roadmap*" to the site's ultimate transition into a post-mining landform. Relevantly, the Unger Report stated that this roadmap should include "*how leading practice guidance is being applied*" and "*how uncertainty is systematically being addressed*".

45. The Commission is of the view that, based on the Material and the Additional Material, including recommendations (paragraph 205) based on the Unger Report, the Project, subject to addressing the recommendations made by the Commission in this Review Report, has the capability to be consistent with the principles of ESD.

Upper Hunter Strategic Regional Land Use Plan

46. The *Upper Hunter Strategic Land Use Plan* (**UHSLUP**), released by the NSW Government in September 2012, maps the region's mineral resources and areas of strategic agricultural land. It states that the region makes a major contribution to the State's production of agricultural commodities, and contains about 40 per cent of the State's identified coal reserves, as well as large reserves of coal seam gas.

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47. To ensure that potential impacts on strategic agricultural lands are appropriately considered, the UHSLUP requires any mining or coal seam gas proposals located on strategic agricultural land outside an existing mining lease to be referred to the independent Mining and Petroleum Gateway Panel.

48. As the Project is not located on strategic agricultural lands, that being either Biophysical Strategic Agricultural Land or Equine and Viticulture Critical Industry Clusters, the Project is not required to be referred to the Mining and Petroleum Gateway Panel.

Hunter Regional Plan 2036

49. The *Hunter Regional Plan 2036* (**HRP**), released by the NSW Government in October 2016, provides a framework to guide the development of more detailed land use plans, development proposals and infrastructure funding decisions. It describes objectives relevant to mining in the Hunter Valley and for the growth of regional urban centres, including Singleton.

50. The HRP also states that planners should manage the ongoing use of mineral resources and prepare land use plans that respond to the lifecycle of active and emerging mining areas. Planning for important agricultural land and water resources should consider cumulative impacts. The plan also states that the *Synoptic Plan: Integrated landscapes for coal mine rehabilitation in the Hunter Valley 1999* (**Synoptic Plan**) should be reviewed in conjunction with the **UHSA** to ensure best practice rehabilitation and visual impact management for closed mines.

51. In relation to the growth of Singleton, the HRP states that the:

> *"future of Singleton lies in growing and diversifying its industry base (including primary industries), improving its housing product mix and minimising land use conflict. The mainstays of the economy are coal mining, agriculture (with growth in viticulture and related tourism), manufacturing and retail."*

Upper Hunter Strategic Assessment

52. The UHSA is a joint initiative of the NSW and Commonwealth Governments to improve the assessment and offsetting of biodiversity impacts from new or expanded mines in the Upper Hunter Valley by identifying and addressing important biodiversity issues before mine applications are lodged. The objectives of the UHSA are:
    - Environmental outcomes will be improved;
    - The assessment process will be streamlined; and
    - There will be greater certainty for the community, industry and government.

53. The applicant considered the Project under 'Path 1' of the UHSA, utilising the *Biodiversity Certification Assessment Methodology* to assess impacts on threatened species under the *Threatened Species Conservation Act 1995*.

Singleton Land Use Strategy 2008

54. Adopted by Singleton Shire Council in April 2008, the *Singleton Land Use Strategy 2008* (**SLUS**) is a strategic planning document setting out a broad range of land-use and environmental objectives for the Singleton Shire. The strategy:

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"identifies where growth and change is expected to occur, and land use planning objectives and strategies to guide this growth and change."

55. Although non-statutory, the SLUS identifies land nearby to the Mine, stating that urban expansion to the north of the town between the railway line and Bridgman Road is a possibility, although it rules out land to the west of the town for urban expansion because of *"proposals for open cut mining"* corresponding to the location of the Mine. Once mining is complete however, the SLUS states it *"would make land potentially available for urban development."*

56. The SLUS recognises that coal mining will remain a major land use, particularly in the rural west planning area, and that planners should ensure that incompatible land uses are not permitted within coal mining areas or environmental buffers. It states that discussions with the Mine should be initiated about land use opportunities north-west of the town, primarily for large industrial sites, and that a strategic review should be carried out (by the NSW Government) of future coal mining proposals, including rehabilitation, infrastructure and land use options, as well as to update the Synoptic Plan (refer Paragraph 57 - 59) for mined landscapes.

Synoptic Plan: Integrated landscapes for coal mine rehabilitation in the Hunter Valley 1999

57. The Synoptic Plan was released by the NSW Department of Mineral Resources in 1999.

58. Drawing on the rehabilitation commitments set out in the Mining Operations Plans (MOPs) of mining companies at the time, the Synoptic Plan provided a snapshot of the likely future attributes of the landscape of mined land in the Hunter Valley. The Synoptic Plan also aimed to introduce biodiversity outcomes in the rehabilitation of individual mines and to facilitate the creation of vegetation corridors between Wollemi National Park in the west of the region and Barrington Tops in the north-east.

59. Although not relevant to this Review, the Commission notes that the NSW Department of Premier and Cabinet has created a working group to lead a review of the Synoptic Plan, owing to the 20 years that have lapsed since its creation.

THE COMMISSION'S REVIEW IN RELATION TO THE MINISTER'S REQUEST

The Commission's approach to this Review

60. The original EIS for the Project was submitted to the Department in October 2015, and many of the associated technical reports were prepared earlier, in 2014 and 2015. In the time between lodging the original EIS and the Commission receiving the Department's EAR in May 2018, several aspects of the Project have been amended, and various technical reports were updated. In undertaking this Review, the Commission has given regard to Table 2 on page 9 of the Department's EAR. While the Commission is satisfied that the applicant has updated all of the technical reports that were required to be updated to the date of this Review, the Commission notes that the currency and adequacy of the Project's technical reports will need to be re-assessed by the consent authority at the time of any final determination of the Project.

61. As part of this Review the Commission has considered a range of relevant issues, which are discussed in greater detail below. The Commission's findings represent its

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preliminary views at this stage of the assessment process. The Commission notes that its views may change prior to any determination decision, including because of additional information in response to this Review, information provided to the Commission independently of this Review, additional matters raised in undertaking its final assessment of the Project, or other relevant factors.

62. The Commission has identified that the key issues for this Review are:
    - air quality;
    - noise and blasting;
    - rehabilitation and mine closure planning;
    - final void and final landform;
    - water – surface water, groundwater and void water;
    - biodiversity;
    - social and economic impacts; and
    - heritage.

Air Quality

63. During the Department's exhibition of the Project, potential air quality impacts were raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the potential air quality impacts of the Project, as referred to in paragraphs 29 and 32.

64. The applicant's EIS was accompanied by an Air Quality and Greenhouse Gas Assessment prepared by Todoroski Air Sciences, dated August 2015, with additional information provided within the Air Quality Specialist Response also prepared by Todoroski Air Sciences, dated June 2016 (collectively referred to as the applicant's Air Quality Impact Assessment (**AQIA**)). The AQIA modelled the likely dust, fume and odour emissions generated by the Project, and evaluated the potential health and amenity impacts of these emissions. The AQIA relied on dispersion modelling to predict incremental (Project only) and cumulative (Project plus background where background includes nearby mines) emissions during four years over the life of the Project (years 2017, 2020, 2023 and 2026) at all surrounding sensitive receivers during worst case weather conditions. Revised Year 7 predictions were provided in the applicant's Revised RtS to reflect the proposed reduced extraction rate from 2021 to 2023 and increased extraction rate from 2024 to 2025.

65. The Department's EAR noted that at the time of preparing the AQIA in 2015, the NSW Environment Protection Authority (**EPA**) *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (**Approved Methods 2005**) did not contain assessment criteria for $PM_{2.5}$ concentrations. However, since this time the EPA has released its *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2016* (**Approved Methods 2016**). The Department's EAR further noted that the transitional arrangements for the updated Approved Methods 2016 do not apply to the Project.

Existing air quality environment and its monitoring

66. The applicant stated that current operations utilise the Environmental Meteorological System to proactively manage air quality at the Mine.

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67. The Commission notes that due to a long history of open cut mining in the Hunter Valley, extensive air monitoring data are available that provide a detailed picture of the local air quality environment. The Office of Environment and Heritage (**OEH**) co-ordinates the Upper Hunter Air Quality Network and it publishes data from the 14 air quality monitoring stations in this network publicly on its website. The information is updated hourly. OEH also offers an Environment Line that responds to queries about environmental issues and pollution in NSW.

68. The applicant stated to the Commission at the site inspection that as part of existing operations at the Mine it has also established its own onsite air quality monitoring network that includes high volume air samplers, real time air samplers and dust deposition gauges. This air quality data supplements OEH's Upper Hunter Air Quality Monitoring Network.

69. The Department's EAR stated that existing background dust levels in the Hunter Valley are known to exceed the 24-hour PM_{10} criterion, particularly during the drier summer months. The Commission notes that there are many factors (including, for example, other mines, vehicle movements and wood smoke) that contribute to cumulative air quality impacts in the Hunter Valley.

70. NSW Health wrote to the Department on 29 June 2018 stating "*that there is no evidence of a threshold below which exposure to particulate matter (PM) is not associated with health effects. Therefore it is important that all reasonable and feasible measures are taken to minimise human exposure to PM.*"

71. The existing Mine is located in close proximity to the residential areas of Singleton Heights and Camberwell. This proximity means that the air quality impacts of the Project, and cumulative air quality impacts, need to be adequately considered and mitigated.

Air quality impacts

72. The AQIA identified that the Project, in isolation from any other sources of reduced air quality, would result in an exceedance of the 24-hour PM_{10} criterion at one receiver (R1) (see Figure 3 below) for up to 19 days per year. Additionally, the applicant's AQIA identified that no other receivers are predicted to experience exceedances of the incremental 24-hour PM_{10} criterion.

73. The AQIA identified that over the life of the Project, seven receivers (R1, R170, R171, R173, R175, R176 and R177) are predicted to experience exceedances of the cumulative annual average PM_{10} criterion. These receivers are marked below in Figure 3.

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Figure 3 – Location of sensitive receivers. Sourced from Figure 6 of the Department's EAR (White line identifies site boundary. Red circles represent sensitive receivers identified in paragraph 73)

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Cumulative air quality impacts

74. The AQIA stated that the modelling for the Project indicates that the cumulative background particulate matter is likely to occasionally exceed the 24-hour PM_{10} and $PM_{2.5}$ criteria. According to the Department's EAR, the EPA requested that the applicant undertake an assessment of the Project's predicted impacts on cumulative air quality at nearby privately-owned residences. This assessment was included in the applicant's Revised RtS.

75. Predictions in the AQIA show that nine receivers (R19, R61, R140, R151, R163, R164, R170, R171 and R173) are likely to experience exceedances of the cumulative 50 $\mu g/m^3$ 24-hour PM_{10} criterion for between 1 and 5 additional days per year throughout the life of the Project.

76. The EPA stated that additional cumulative exceedances may be experienced at other residences surrounding the nine receivers identified. The applicant's Revised RtS stated that the nine receivers would be subject to the greatest potential impact from the Project and that the impact on surrounding receivers would be either similar or less. The EPA stated in subsequent advice that no further assessment was required.

77. The AQIA stated that the likely cause of these exceedances would be the result of elevated background levels of PM_{10} from other nearby mining operations. On all days where an exceedance is predicted, the Project's contribution is predicted to be low.

78. The Department's EAR concluded that the predicted additional days of PM_{10} exceedance are likely due to elevated background levels rather than a result of the Project's contribution. It also noted that acquisition or mitigation under the VLAMP does not apply with regard to cumulative air quality impacts.

Blast fumes

79. The AQIA included an assessment of potential blast-related fumes. The predicted blast fumes are likely to be within the 1-hour average NO_2 criterion of 246 $\mu g/m^3$ at all nearby private residences for all blasts occurring between 9am and 3pm in all modelled years. Between 3pm and 5pm, and under adverse weather conditions, predicted blast fumes may exceed the maximum NO_2 blast criterion.

80. The Revised RtS stated that the NO_2 levels represented a worst-case unmitigated event and were generally unlikely to occur. To mitigate potential impacts, the applicant identified that blasting would only be undertaken following consideration of prevailing weather conditions. In the event of adverse weather conditions, such as temperature inversions or elevated wind speeds, blasting would be rescheduled.

81. The Department's EAR concluded that the Department was generally satisfied that blast fumes emission could be managed to comply with the NO_2 criterion.

Diesel emissions

82. The AQIA included dispersion modelling of diesel powered equipment emissions for each indicative mine plan year. This modelling predicted that no private or Mine-owned receivers would experience exceedance of the maximum 1-hour average and annual average criteria for NO_2 concentration.

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83. The EPA raised concerns in its submission to the Department that the use by the applicant of an emissions control factor for diesel exhaust emissions was not appropriate. Also, that the AQIA only provided an estimation of emissions from diesel engines used on haul roads and did not include emissions from other equipment.

84. The Revised RtS provided a recalculation of particulate matter emissions following the removal of the control factor for diesel exhaust emissions and other equipment. It modelled that the maximum predicted increase of $PM_{2.5}$ emissions at most privately owned residences would be 0.1 $\mu g/m^3$.

85. The Department's EAR concluded that it was satisfied that if required the EPA could manage specific sources of NO_2 emissions under any Pollution Reduction Program (**PRP**) that it chose to attach to the Environmental Protection Licence (**EPL**) for the Project. Furthermore, the Department states that the EPA was satisfied with the applicant's progress and commitments to delivering the PRP.

Odour emissions

86. The AQIA also included an assessment of odour impacts from spreading of bio-solids to assist with rehabilitation. The Project is proposing to continue spreading bio-solids at its existing rate of approximately 10,000 tonnes per year.

87. The Department's EAR concluded that odour emissions from bio-solids are unlikely to have a significant impact at nearby private receivers, and furthermore there are also multiple mitigation measures available to the applicant to manage odour impacts should they arise.

Mine owned residences

88. The AQIA identified that a number of properties surrounding the Project are owned by the applicant and tenanted. Dust levels at many of these Mine-owned properties would exceed the applicable air quality criteria for privately owned properties.

89. The Department's EAR noted that there are no applicable air quality criteria for Mine-owned properties. However, the applicant must inform tenants leasing such affected properties of any potential health risks associated with predicted air quality impacts.

90. The Department's EAR recommended that standard conditions requiring the applicant to advise landowners (in the case of a property owned by a neighbouring mine) and tenants (in the case of Mine-owned properties) of any property significantly affected by air quality emissions, of the possible health and amenity impacts of elevated dust concentrations, in consultation with NSW Health.

91. The Commission makes a conclusion and recommendations on mine owned residences in paragraphs 101 and 102.

Mitigation and management

92. The Department's EAR stated that the applicant currently implements a number of air quality mitigation measures under the Mine's existing EPL, which include a PRP and Air Quality and Greenhouse Gas Management Plan. The PRP identifies and assesses the practicality of implementing further best practice measures over time.

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93. The Department's EAR stated that a number of mitigation practices are already employed onsite by the applicant to reduce PM_{10} and $PM_{2.5}$ particulate matter including:
    - restricting vehicle speeds on haulage roads, minimising haulage distances, and treating road surfaces with water;
    - minimising disturbance areas to reduce wind erosion, applying interim stabilisation on inactive areas, and undertaking progressive rehabilitation;
    - watering drill and blast areas to suppress dispersion of drill cuttings and monitoring meteorology prior to blasting;
    - minimising unloading drop heights and watering stockpiles;
    - ceasing mining operations when visible dust is generated and modifying operations during adverse weather conditions; and
    - enclosing conveyers and chutes and other dust generating facilities.

94. Overall, the Department's EAR stated that the existing dust mitigation and management measures at the Mine reflect best practice dust control and the continued implementation of an updated Air Quality and Greenhouse Gas Management Plan and use of the monitoring network would allow the applicant to identify and avoid potential exceedances of air quality criteria at privately-owned residences.

95. The Commission notes, based on the acquisition provisions in the VLAMP, receivers are eligible for voluntary acquisition rights when exceedances of the 24-hour PM_{10} criterion are predicted to occur.

96. The Department's EAR identified that receiver R1 has an existing negotiated agreement with the applicant, and that the remaining six eligible receivers (R170, R171, R173, R175, R176 and R177) are currently subject to acquisition rights from other nearby mining operations, notably Ashton South East Open Cut and the neighbouring Rix's Creek North.

97. The Department's EAR concluded that it is generally satisfied that the increase in air quality impacts associated with the Project would be relatively minor. Furthermore, it concluded operational measures could be implemented to minimise potential impacts, particularly during adverse meteorological conditions.

Air Quality – Commission's conclusions and recommendations

98. The Commission notes that the applicant has undertaken an assessment of air quality to predict the likely impacts of the Project. The Commission notes that the Project's predicted air quality impacts have been assessed using data from the current mining operation at Rix's Creek, and that this Project is an extension to the current mining operation that has an air quality monitoring network already in place.

99. The Commission notes the background air quality in particular at Camberwell and Maison Dieu and also the letter from NSW Health to the Department dated 29 June 2018 identifying health impacts relating to particulate matter exposure.

100. The Commission notes that the Upper Hunter Air Quality network of surrounding air quality monitors at Camberwell, Maison Dieu, Singleton Northwest and Singleton currently measure the air quality in the area, not just the Mine, and that this allows monitoring of cumulative air quality impacts in the area.

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101. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - concerns raised by the community in relation to air quality impacts are not unreasonable, and are supported by NSW Health's observation that there is no minimum acceptable level of exposure to particulate matter;
    - that the Project's overall predicted air quality impacts are likely to be compliant with the VLAMP, subject to the continued ongoing implementation of mitigation measures outlined within the Pollution Reduction Program;
    - that the appropriate acquisition rights have been afforded to private residences (satisfying the criteria of the VLAMP Policy) where air quality impacts are unlikely to be able to be mitigated to reach VLAMP compliant levels;
    - that steps taken by the applicant to implement the PRP reflect the applicant's intent to better manage particulate matter;
    - there is considerable data on air quality in the region surrounding the Mine available from the Upper Hunter Air Quality network to inform the community of the current status of air quality within the region; and
    - sufficient protocols to inform tenants about air quality exceedances at Mine-owned residences have not yet been demonstrated by the applicant.

102. Based on the Commission's conclusions, as listed in paragraph 101, the Commission makes the following recommendations:

    R1 that the applicant demonstrate how its operational procedures will incorporate continual improvement to further reduce the generation and dispersion of particulate matter.

    R2 that the applicant develop a protocol to assist those stakeholders concerned about air quality impacts to better:
    - access the data from the Upper Hunter Air Quality Network; and
    - provide instruction on how to use the Environment Line provided by the NSW Government.

    R3 that the applicant provide further evidence of the policies and protocols in place to manage mine-owned residences, including clarification as to whether termination rights are only triggered in relation to dust exceedances, or whether termination at any time is a general at will right of occupancy of a mine owned residence.

Noise and blasting

Noise impacts

103. During the Department's exhibition of the Project, potential noise impacts were raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the potential noise impacts of the Project, as referred to in paragraphs 29 and 32.

104. The EIS included an Environmental Noise Assessment, prepared by Global Acoustics. Supplementary noise information was provided in January 2016 by Global Acoustics as Appendix J of the applicant's Revised RtS (collectively referred to as the applicant's Environmental Noise Assessment (**ENA**)). The ENA included predictions of what the applicant believed to be the potential worst-case noise levels at privately-owned

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residences, and an evaluation of the potential health and amenity impacts of these noise levels. The ENA used noise modelling to predict noise levels for all years over the life of the Project under both neutral and noise-enhancing weather conditions.

105. The ENA was undertaken in accordance with the *NSW Industrial Noise Policy* (**INP**), *NSW Road Noise Policy, Rail Infrastructure Noise Guidelines* and included consideration of the VLAMP.

106. On 27 October 2017, the EPA released the Noise Policy for Industry (**NPI**), which replaced the INP as the relevant NSW Government policy for the management and control of industrial noise sources. However, as the lodgement of the Project with the Department predated the release of the NPI, the transitional arrangements provide that the INP continues to apply as the relevant NSW Government policy for the assessment and determination of the Project with the exception of low frequency noise impacts.

Existing noise environment

107. The applicant's current operations utilise the Environmental Meteorological System to proactively manage noise at the Mine.

108. The Department's EAR stated, since the Mine was first approved on 19 October 1995, Singleton Heights and other communities in close proximity to the Mine have grown significantly. The Mine now operates in a complex rural-suburban noise environment that is affected by a number of other significant noise sources, including other mines and non-mining transport infrastructure such as the New England Highway and the Main Northern Railway.

109. The Department's EAR stated that a review of the Mine's attended noise monitoring results between 2014 and 2017 showed no exceedances of its existing noise criteria, which the Commission notes were originally set in 1995 and are in excess of current noise criteria established under more contemporary consents. However, the Mine continues to receive noise complaints, which the Department's EAR indicated was likely to be the result of the Mine's close proximity to Singleton Heights and surrounding communities, the large number of potentially affected privately-owned residences, and the higher noise criteria established under the Mine's original consent than that established under more contemporary policies.

110. The Department's EAR stated that noise complaints received between 2014 and 2017 predominantly came from residents located to the south of the mine near Maison Dieu and McDougalls Hill.

111. Furthermore, the Department's EAR stated that noise complaints increased significantly in 2016 by 23 to 38. Thirty-three of these complaints were made by two individual receivers. Furthermore, the Department's EAR stated that the recommencement of mining operations in 2016 at Rix's Creek North may have contributed to the increase in the noise complaints that year. In 2017, the number of noise complaints reduced slightly to 33.

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Project Specific Noise Levels and Achievable Noise Criteria

112. Under the INP, Project Specific Noise Levels (**PSNLs**) are calculated based on the more stringent requirement of a project's intrusiveness criteria (i.e. background noise environment +5 dB) or the general amenity criteria (i.e. noise criteria specific to land use and associated activities). In this instance the PSNLs were based on the intrusiveness criteria.

113. The INP also permits alternate ANC for existing operations with predicted exceedances of their PSNLs, following the implementation of all reasonable and feasible noise mitigation measures.

114. The ENA stated that the Project would be unable to reduce its proposed noise emissions to meet the calculated PSNLs, particularly during noise-enhancing weather conditions. The Department's EAR explained that this was largely due to the north western urban fringe of the Singleton township expanding closer to the Mine over the past 10-15 years, together with more recent and stringent noise standards applying to the Project than when the Mine was approved more than 20 years ago.

115. Consequently, as the applicant would be unable to achieve the calculated PSNLs, it has proposed in its ENA an alternate ANC of 42dB(A) at three noise assessment groups (**NAGs**) and 40dB(A) at all other receivers. These noise criteria compare to the Mine's existing noise criteria under DA 49/94 (refer figure 4).

116. The Department's EAR identified the proposed ANC criteria below (refer figure 4).

	Existing Noise Criteria under DA 49/94		Proposed Criteria		
NAG	L_{A10} dB(A) day/night	L_{A10}dB(A) converted to L_{Aeq} dB(A)	**PSNLs** (ie background + 5 dB (A)) $L_{Aeq15\ minute}$ dB(A) day/evening/night	**ANC** $L_{Aeq15\ minute}$ dB(A) in all periods	**Sleep Disturbance Criteria** $L_{A1,1\ minute}$ dB(A)
A	42/40	47/45	38/38/38	42	48
B	42/40	47/45	43/42/37	42	47
C	42/40	47/45	43/42/37	42	47
D	-		36/36/35	40	45
E	-		36/36/35	40	45
F	-		36/36/35	40	45
G	-		39/39/37	40	48
H	-		38/38/37	40	47
I	-		37/37/37	40	47
J	-		39/39/37	40	47
K	38/38	42/42	35/35/35	40	45
L	-		37/37/37	40	47
M	-		39/39/38	40	48
N	-		45/42/39	40	49
O	-		35/35/35	40	45

Figure 4: The impact on Noise Assessment Groups from the Existing Rix's Creek Mine noise criteria, PSNLs and ANC. Sourced from the Department's EAR.

117. The Department and EPA both endorsed the use of ANC instead of PSNLs as the target noise limits for the Project. The Commission notes that the ANC were endorsed by these agencies because the applicant had implemented a number of PRP recommendations around the mitigation of noise at the Mine site including:
    - designing the progression of mining to ensure the southern emplacement area

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continues to shield noise for receivers located to the south of Pit 3 near Belmadar Way and Maison Dieu Road;
- programming overburden emplacement at different locations and varying elevations to increase distance of separation and shield emplacement during noise-enhancing weather conditions;
- redesigning haul roads to shield truck noise;
- constructing noise barriers near the ROM pad and southern side of the haul route;
- committing to the cladding of part of the CHPP;
- progressively attenuating mobile equipment (e.g. truck fleet); and
- developing a predictive noise model to proactively manage noise in the field.

118. The Department's EAR noted that all of the measures had been implemented by the applicant, with the exception of the cladding of the CHPP. The Department recommended that the cladding of the CHPP be completed before commencement of any coal extraction under the Project.

119. The Commission has given consideration to the use of ANC for the Project. The Commission acknowledges that the proposed ANC are between 2-5 dB(A) lower than the existing approved noise criteria and that the applicant has implemented a number of the PRP recommendations to further reduce noise impacts.

120. The Commission notes that the adoption of ANC was supported by the Department and EPA, conditional on the successful implementation of the PRP. During the site inspection on 4 June 2018, the applicant informed the Commission that it intended to complete the PRP recommendations (i.e. finish cladding of the CHPP).

121. The Commission makes a conclusion on the application of ANC for the Project and a recommendation on the cladding of the CHPP in paragraphs 136 and 137.

Operational noise impacts

122. The ENA contained modelling of four stages over the life of the Project. The stages taken were from years 2017, 2020, 2023 and 2026, representing both day and evening to reflect the variances in acoustic conditions. All modelling scenarios were based on what the applicant believed to be the likely worst-case scenarios, which included all major surrounding open cut operations, CHPP plant items and rail infrastructure operating simultaneously at maximum sound power. In addition, the ENA stated that the cumulative noise assessment included the contribution of Rix's Creek North (formerly Integra Coal Operations). The ENA also stated that noise impacts from other nearby mines made a negligible contribution to the cumulative noise assessment.

123. The modelling contained in the ENA predicted that there would be no exceedances of the ANC across all noise assessment groups (**NAGs**) under neutral weather conditions. However, under noise enhancing weather conditions, the modelling contained in the ENA predicted many exceedances of the ANC across most NAGs in the day, evening and night periods.

124. The ENA stated that the number of noise exceedances during these weather events is predicted to decrease over the life of the Project as mining progresses away from the residential areas of Singleton Heights.

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125. Furthermore, the ENA identified that the scenario in which the largest exceedances (referred to in paragraph 122 - 124) would occur during *"maximum train frequency (6 trains per week), and the frequency of the dozer operating, the train loading and adverse weather conditions"*. This scenario was included even though it was highly unlikely to occur and could be avoided through the scheduling of equipment and use of the noise monitoring network to implement operational controls to reduce noise.

126. The ENA stated that it is likely that progressive, or temporary, shutdown of plant and equipment would be necessary for around thirty per cent (30%) of the winter period to achieve compliance with the ANC at all times. The Department's EAR stated that the applicant has committed to adjusting operations to comply with the ANC and considered that there was sufficient flexibility in the applicant's proposed production schedule to accommodate this adaptive management without having a material impact on its operations.

127. The Department's EAR stated that the applicant's approach to modifying operations, particularly with the use of real-time and predictive modelling, is adequate for managing exceedances.

128. The Department's EAR recommended that, to ensure that the procedures for modifying operations are well understood and communicated, the applicant prepare a Noise Management Plan (**NMP**) that includes a detailed description of the staged and temporary shutdown procedures that would be implemented to achieve compliance with the ANC.

129. The Department's EAR concluded that noise associated with the Project should be able to be managed through the development of contemporary conditions, including a NMP.

130. The Department's EAR also recommended the ongoing review and implementation of all reasonable and feasible noise management measures. On this basis, the Department was confident that the noise management system could be operated to minimise the likelihood of adverse noise impacts, especially during adverse meteorological conditions.

131. The Commission makes a conclusion and recommendation on accessibility of the NMP and details of equipment to be used at the Project in paragraphs 136 and 137.

Construction noise

132. The ENA did not quantitatively assess the construction noise impacts from the cladding of the CHPP, constructing an earth bund on the southern side of the coal haul route, and establishing the second cut and cover tunnel beneath the New England Highway.

133. The Department's EAR concluded that the construction of the cut and cover tunnel should be managed under the Interim Construction Noise Guidelines (**ICNG**). The Department's EAR concluded that all construction works are expected to be within operational noise limits as they are temporary and would occur during daytime hours.

134. The Commission makes a conclusion on construction noise in paragraphs 136.

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Noise – Commission's conclusions and recommendations

135. The Commission notes that the applicant has already undertaken all but one of the noise mitigation measures recommended under the current PRP to reduce noise impacts on sensitive receivers.

136. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - concerns raised by the community in relation to noise impacts are not unreasonable, and are supported by the Project's inability to operate under the Project Specific Noise Levels;
    - that the applicant has undertaken an adequate assessment of the Project's predicted noise impacts, including investigating scenarios in which exceedances of the ANC occur;
    - the Project is eligible to operate under Achievable Noise Criteria as set out in INP, as long as the applicant can demonstrate that all reasonable and feasible noise mitigation measures either have been, or will have been, implemented prior to coal extraction under any Project consent, if approved;
    - the applicant's adaptive management practices appear adequate for managing noise impacts from the Project;
    - that circumstances that could give rise to an exceedance are unlikely to occur with any frequency, and, if they did occur, they could be avoided through the use of the applicant's real-time noise monitoring network and the application of adaptive management practices, including ceasing operations;
    - further measures could be put in place so that the applicant make available on a timely basis information relating to how it is managing noise impacts, including its adaptive management practices and how it proposes to use such practices to manage the Project's noise impacts to conform to the ANC.
    - additional noise mitigation could be achieved upon completion of the cladding of the Coal Handling and Preparation Plant; and
    - construction noise is not predicted to exceed the Project's operational noise limits and can be managed under the Interim Construction Noise Guidelines.

137. Based on the Commission's conclusions, as listed in paragraph 136, the Commission makes the following recommendations:

R4 that the applicant make available on a timely basis information relating to how it is managing noise impacts, including its adaptive management practices and how it proposes to use such practices to manage the Project's noise impacts to conform to the ANC. Such information should include the Noise Management Plan, which should be made available to the public on the applicant's website or in hard copy where requested. The Noise Management Plan published by the applicant should outline the process to be undertaken by the applicant in modifying operations where noise exceedances occur, and include a 24/7 contact number for the applicant and details of the Environment Line provided by the NSW Government.

R5 that the applicant provides a full and detailed list of all equipment to be used at the mine, including a schedule for noise attenuation, where it is planned.

R6 that the applicant commits to completing the cladding of the Coal Handling and Preparation Plant prior to the extraction of any coal under any Project consent, if approved.

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Blasting

138. The applicant's EIS included a Blast Impact Assessment, prepared by Terrock Consulting Engineers, dated October 2015. The Blast Impact Assessment assessed the potential ground vibration, airblast overpressure and flyrock impacts of the Project's blasting events on nearby sensitive receivers.

139. The Blast Impact Assessment was revised by Terrock Consulting Engineers in March 2017 as part of Appendix K within the Revised RtS, and more recently in February 2018 as a result of changes to blast monitoring locations. The Blast Impact Assessment and revised Blast Impact Assessment within the Revised RtS is collectively referred to as the applicant's Blast Impact Assessment (**BIA**).

Existing blast environment

140. The applicant currently utilises the Environmental Meteorological System to proactively manage blasting at the Mine.

141. The BIA identified that prior to blast initiation, the applicant establishes safety exclusion zones for on-site personnel, equipment and sensitive receivers around each blast site. This includes the temporary closure of the New England Highway when blasting occurs within 500m of the Highway, with the prior approval of Roads and Maritime Services (**RMS**).

142. The Department's EAR identified that a review of the applicant's mine blast monitoring results between 2014 and 2017 indicated that there have been no exceedances of the blast criteria.

Predicted blast impacts

143. The BIA proposed that blasting activities be conducted in a similar manner to what is currently occurring at the Mine, which is approximately 10 blasts per week, commonly around 11am or 2pm.

144. The Department's EAR recognised that blasting impacts would generally move away from Singleton towards Camberwell as mining progresses to the northwest in the later years of the Project.

145. The BIA identified that all existing privately-owned residences would be more than 500m from blasting activities, and are therefore unlikely to be affected by flyrock. Furthermore, the applicant stated that blasting is restricted to outside a 500m range of the New England Highway unless approved by RMS. The applicant also stated that it would design blasts to minimise the potential for flyrock when blasting close to the New England Highway.

146. The BIA included an assessment of the potential impacts of blasting on the Coke Ovens. Heritage NSW raised concerns with the proposed monitoring measures for the Coke Ovens and recommended that the site be monitored for both ground vibration levels and visual damage. In its Revised RtS, the applicant committed to establishing specific ground vibration limits for the Coke Ovens and undertaking monitoring to demonstrate compliance with these limits.

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147. The Department's EAR concluded that the BIA's predictions are representative of normal blasting practice. The Department's EAR noted that the applicant has further opportunity to modify blast design and scheduling to reduce impacts. The Department's EAR considered that the proposed blasting activities would have a low risk of impacting nearby privately-owned residences, infrastructure or heritage items. In addition, the Department's EAR noted that the applicant would be required to prepare and implement a Blast Management Plan (**BMP**) as a condition of consent. The BMP would be required to describe and apply to all blasting practices, including design, implementation, initiation and performance evaluation.

148. The Department's EAR noted that cumulative blasting impacts were not considered as part of the BIA. Notwithstanding, the Department's EAR considered that any cumulative blasting impacts could be avoided by the applicant liaising with other nearby mines to avoid concurrent blasting. The Department's EAR stated that this would be recommended as a condition of consent.

149. The Department's EAR concluded "*that the blast impacts of the Project could be appropriately managed through the ongoing application of existing practices, and the preparation and implementation of a contemporary Blast Management Plan".*

150. The Commission makes a recommendation on blasting and the Coke Ovens in paragraph 153.

Blasting – Commission's conclusions and recommendations

151. The Commission notes that the Project will generate a relatively small number of blasts per week. Furthermore, the Commission notes the Department's statement that, historically, blasting from the existing Mine has not been a major issue.

152. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusion:
    - the Project's overall blast impacts are generally acceptable, subject to the implementation of an appropriate/ contemporary Blast Management Plan.

153. Based on the Commission's conclusion, as listed in paragraph 152, the Commission makes the following recommendation:

    R7 that the applicant update its Blast Impact Assessment to provide additional monitoring and management measures specifically related to the preservation of the Coke Ovens.

Rehabilitation and mine closure planning

154. The Commission heard concerns from speakers at the public hearing and received written submissions regarding the Project's rehabilitation and mine closure planning, as referred to in paragraphs 29 and 32.

155. The EIS included a Rehabilitation Strategy that set out overarching rehabilitation outcomes and objectives to guide the rehabilitation program for the existing Mine and the Project. Generally, the Rehabilitation Strategy set out to:
    - minimise any offsite environmental impacts such as dust emissions, water pollution,

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impact to visual amenity, weeds spread and odour;
- commit to the ongoing management of rehabilitated land at a level similar to adjacent land; and
- ensure proposed post-mining land use will be compatible with surrounding land-uses.

156. The Department's EAR concluded that it was generally satisfied that the proposed rehabilitation would deliver appropriate environmental outcomes. However, the Department's EAR did recommend that more work could be done on the Rehabilitation Strategy to provide a broad framework for life-of-mine rehabilitation, and that it should outline, in detail, the stages and timing of proposed rehabilitation across the site, incorporating future opportunities to improve rehabilitation outcomes including integration with Rix's Creek North and investigating any beneficial post-mining land use options.

157. The Department's EAR also recommended that the applicant prepare a MOP and a Rehabilitation Management Plan (**RMP**). These plans are required to detail specific rehabilitation performance and completion criteria, measures to meet these criteria, and a program to monitor, review and report on the effectiveness of these measures.

158. The applicant is seeking approval for mining operations to be extended through to the closure of the mine in 2038. Mine closure issues are therefore an important consideration for the Commission.

Independent expert report (Unger, July 2018)

159. The Commission engaged Corinne Unger, a mine rehabilitation and closure planning specialist, to undertake an independent expert review of the Rehabilitation Strategy giving consideration to the Director-General Requirements (**DGRs**).

160. On 5 July 2018, Unger finalised the *Review of rehabilitation strategy for Rix's Creek Mine – Continuation of Mining Project for the Environmental Impact statement for the IPCN* (**Unger Report**). The report found that:

> *"The Rehabilitation Strategy for Rix's Creek Continuation of Mining Project should be a roadmap for the company and its external stakeholders that integrates mine rehabilitation and closure (MR&C) throughout the life of mine. The Strategy and the process of its development must instill confidence and trust in those external stakeholders that the company has a rigorous and timely understanding of its MR&C risks and opportunities. It must also provide assurance that the company is systematically working toward the reduction of uncertainty and creation of value during mining in order to create beneficial post-mining uses."*

161. The Unger Report made a number of recommendations in relation to where the applicant's Rehabilitation Strategy could be improved, to which the applicant responded. The Unger Report was made available on the Commission's website on 9 July 2018, and the applicant's response was made available on the Commission's website on 24 July 2018. The Unger Report concluded that further efforts could be made by the applicant to improve the Rehabilitation Strategy, having regard to the *Strategic Framework for Mine Closure*, which is a requirement of the DGRs. The individual

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recommendations from the Unger report along with the responses from the applicant are discussed below:

Rehabilitation Strategy title

162. The Unger Report recommended that terminology could be improved and that the Commission *"may like to consider changing the title of the rehabilitation strategy document to "Mine Rehabilitation and Closure Strategy" in keeping with the closure content required by the Director General."*

163. In its response to the Unger Report dated 23 July 2018, the applicant does not disagree with the title change, however states that the MOP is the appropriate location for a number of the rehabilitation objectives rather than the Rehabilitation Strategy, and that the role of the MOP is to provide a platform for a prescriptive approach to landform and landscape design and an approach that facilitates the ability to incorporate changes in context of the land use component of mine closure. In doing so, the applicant stated in its response that the opportunities are provided in the MOP for optimising post-mine land use in the context of the environmental, social and economic perspectives.

164. The Commission notes that the applicant has a range of rehabilitation objectives in place and that they are distributed across a range of documents including the Rehabilitation Strategy, the applicant's Annual Reviews and the MOP.

165. The Commission notes documents such as the applicant's Annual Reviews and MOP are not components of the Project approval process. By elevating the relevant rehabilitation objectives, obligations and outcomes into the Rehabilitation Strategy further certainty and confidence can be provided around the progressive rehabilitation and closure planning being undertaken by the applicant. Furthermore, the MOP is a secondary approval derived from a condition of authorisation (i.e. Mining Lease) issued under the Mining Act 1992 and is not a component of the Project approval.

166. The Commission makes a conclusion on the title of the Rehabilitation Strategy and a recommendation on the relocation of the MOP rehabilitation information within the Rehabilitation Strategy in paragraphs 204 and 205.

Unger Report: Stakeholder engagement for mine rehabilitation and closure

167. The Unger Report stated that the Rehabilitation Strategy document (AECOM, 2015) gives only "*cursory attention to stakeholder engagement*" for rehabilitation planning. The Unger Report identified that no information is provided by the applicant on the expectations of stakeholders in relation to rehabilitation at the Project.

168. Furthermore, the Unger Report stated that the Rehabilitation Strategy was deficient in explaining how stakeholders will be affected by mine rehabilitation and closure process outcomes. The Unger Report noted that the Commission "*may like to consider requiring the company to develop and implement a…stakeholder engagement strategy that ensures the specific issues of mining rehabilitation and closure strategy are addressed appropriately*."

169. The applicant's response stated that considerable stakeholder consultation had been undertaken when developing the Project, including consultation with the Community Consultative Committee (**CCC**) and Upper Hunter Mining Dialog, which addressed the

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topics of mine rehabilitation standards, final land use and mining voids. The applicant accepted that improvements could be made to enhance public participation, and the linking of information contained within the MOP to the Rehabilitation Strategy.

170. The Commission acknowledges that the applicant has undertaken consultation with members of the local community in various formats.

171. The Commission notes that stakeholder involvement is a key objective of the *Strategic Framework for Mine Closure* in order to have the interests of all stakeholders considered in the mine closure planning process.

172. The Commission makes a recommendation on stakeholder engagement for mine rehabilitation and closure in paragraph 204.

Unger Report: Social Impacts

173. The Unger Report states that there are opportunities for the Rehabilitation Strategy to include an opportunities' assessment to evaluate social risks and opportunities. The Unger Report suggested that the Commission *"may like to consider asking the company to identify in their work program when a social impacts and opportunity evaluation will be undertaken with the goal of identifying these aspects early to bring about opportunity realisation and risk reduction integral to rehabilitation and closure planning, implementation and engagement."*

174. The applicant's response stated that it did not agree with the recommendation to evaluate the social impacts of mine rehabilitation and closure. The applicant stated that the DGRs do not require a social impact assessment as part of the Rehabilitation Strategy.

175. The Commission has taken into consideration both the recommendation of the Unger Report and the applicant's response.

Unger Report: Integration of regulatory requirements

176. The Unger Report noted that the Rehabilitation Strategy should provide a single source document that integrates all relevant regulatory requirements and guidance in an integrated manner. The Unger Report stated that not only must landform design and vegetation-related objectives be addressed, but also the following: environmental protection such as surface and groundwater water quality and contamination, final voids and land use, as well as heritage values, aesthetics and stakeholder acceptance.

177. The Unger Report recommended that the Commission *"may like to consider requiring the company to show that it understands how to integrate the regulatory and other requirements for good mine rehabilitation and closure in one high level overview that addresses all rehabilitation domains, activities and planning processes including internal and external stakeholder engagement".*

178. The applicant suggested that an Appendix could be added to its Rehabilitation Strategy to show the linkages to the landform design and vegetation related objectives, site management plans and legislative framework applying to the site.

179. The Commission notes the applicant's willingness to show linkages between landform

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design and vegetation related objectives, site management plans and legislative framework applying to the site.

180. The Commission makes a recommendation on the Rehabilitation Strategy showing linkages to the landform design and vegetation related objectives in paragraph 205.

Unger Report: Domains

181. The Unger Report identified that additional work could be undertaken to clearly identify domains (being physical locations) across the proposed mine. It was suggested that the Commission *"may like to consider requiring the company to:*
   a) identify all mining rehabilitation and closure domains on maps from present to post-closure,
   b) label and describe all domains,
   c) ensure objectives, performance standards and completion criteria exist for all domains, and
   d) identify stakeholders that need to be consulted to explore post-closure domain risks and opportunities further."

182. The applicant's response acknowledged that a number of improvements could be made to better reflect and acknowledge domains that are omitted in the Rehabilitation Strategy.

183. The Commission notes the applicant's willingness to identify domains across the proposed mine within the Rehabilitation Strategy.

184. The Commission makes a recommendation on domains in paragraph 205.

Unger Report: Management of knowledge

185. The Unger Report stated that the applicant's MOP had done little to evaluate past rehabilitation performance and that there was little evidence of the applicant managing its mine rehabilitation knowledge. The Unger Report concluded that the Commission *"may like to consider requesting the company to develop a mine rehabilitation and closure strategy knowledge base for Rix's Creek (and Integra) and cross-reference this in the mine rehabilitation and closure strategy, as well as making it available as a standalone document"* and *"may like to consider asking the company to provide an independent evaluation of land capability of rehabilitated mine landforms identified in the MOP".*

186. The applicant's response stated that the evidence of successful rehabilitation is typically made available through Annual Reviews and inspections from regulatory authorities. The applicant suggested that a centralised summary document drawing out the knowledge from each domain could be provided on the company website as an overarching document.

187. The Commission notes that the applicant is subject to regular inspections from regulatory authorities and publishes details of its rehabilitation performance in Annual Reviews.

188. The Commission makes a recommendation on the management of knowledge in paragraph 205.

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Unger Report: Rehabilitation objectives, standards and completion criteria

189. The Unger Report stated that the applicant's Rehabilitation Strategy lacked clear alignment between rehabilitation objectives, performance standards and completion criteria. It stated that the Rehabilitation Strategy document must clearly provide links to evidence of what is known, what is not known and also explain how knowledge gaps will be resolved. Furthermore, the Unger Report stated that the work schedule for that evidence and knowledge gathering should be included showing the timing and interconnectedness of each part of the Rehabilitation Strategy. The Unger Report recommended that the Commission: *"may like to consider requesting the company to use consistent language to describe objectives, performance standards and completion criteria throughout, then they should clearly articulate the Mine Rehabilitation and Closure Strategy objectives, performance standards and completion criteria for all domains."*

190. The applicant's response stated that it could improve its Rehabilitation Strategy by revising the way it describes the evidence of what is known and what is not known, in the context of the performance indicators and criteria.

191. The Commission notes the applicant's willingness to improve the description of evidence of what is known and what is not known, in the context of the performance indicators and criteria.

192. The Commission makes a conclusion and recommendation on rehabilitation objectives, standards and completion criteria in paragraph 204 and 205.

Unger Report: Risk and opportunity evaluation

193. The Unger Report suggested that the applicant's Rehabilitation Strategy did not adequately evaluate slow incubating environmental risks or social risks. It was stated that the Rehabilitation Strategy should evaluate the most significant issues so the company and regulatory agencies could give appropriate attention to them. It was recommended that the Commission *"may like to consider requiring the company to engage an appropriately qualified independent mine closure specialist to facilitate a workshop to undertake a Rehabilitation Strategy risk and opportunity assessment, to produce a Rehabilitation Strategy risk register that will be updated from time to time."*

194. The applicant's response stated that much of the risk and opportunity evaluation exists within other documents, being the MOP, the response to submissions, Annual Reviews, Water Management Plan, and Erosion and Sediment Control Plan. The applicant did however note that improvements could be made to these documents.

195. The Commission notes the applicant's response that indicates that the information on risks and opportunities exists in other documents, however it also notes that this information does not readily exist in an easily-accessible centralised source that can be considered by all stakeholders.

196. The Commission makes a conclusion and recommendation on risk and opportunity evaluation in paragraph 204 and 205.

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Unger Report: Final Voids

197. The Unger Report stated that the Rehabilitation Strategy provides no evidence on the salinity levels in the pit lake, ecosystem health, batter revegetation, fluctuating water levels or how post-mining access will be managed. Accordingly, the Unger Report recommended that the Commission *"may like to consider requesting a detailed design of the final void in the context of surface and groundwater systems. Seek also a more rigorous assessment of pit lake water levels and quality over time post-closure, via modelling in order to highlight key design implications early rather than late in the mine's life."*

198. The applicant's response considered the request for more detail around the design and assessment of the final void but noted that Appendix S of the 2015 Environmental Assessment Groundwater Impact Assessment and Appendix G of the Revised RtS contained significant information detailing the assessment of final voids.

199. The Commission notes the applicant's response identifying that information on final voids exists across a number of documents and the revised environmental assessments.

200. The Commission makes a recommendation on addressing final voids in the Rehabilitation Strategy in paragraph 205.

Unger Report: Work program for mining rehabilitation and closure

201. The Unger Report noted that a work program within the Mine Rehabilitation and Closure Strategy could be developed to identify when specific studies will be undertaken so that the integrated program can be understood by the company as well as others. Currently there are many commitments presented in the Rehabilitation Strategy document in a manner that gives little assurance that the company is tracking these commitments and will address them systematically. It was recommended that the Commission *"may like to consider requiring the company to develop and maintain a 'Commitments register' for all Mine Rehabilitation and Closure Strategy actions required"* and *"may like to consider requiring the company to replace vague commitments with firm commitments."*

202. The applicant responded to the effect that a commitments register was not necessary as the MOP contains the relevant rehabilitation commitments. The Commission notes the applicant's response that this information currently exists within the MOP.

203. The Commission makes a conclusion on the applicant's need to maintain a commitment register in paragraph 204.

Rehabilitation and mine closure planning – Conclusions and recommendations

204. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - the Project's rehabilitation objectives, obligations and outcomes of future rehabilitation are dispersed across the Rehabilitation Strategy, the applicant's Annual Reviews and the MOP;
    - improvements could be made to the Rehabilitation Strategy to better inform the community of the applicant's proposed approach to rehabilitation and closure:
        - including an opportunity to collate all existing rehabilitation and closure

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information into one consolidated document.

- that an evaluation of the social risks and opportunities associated with mine rehabilitation and closure should be considered in the Rehabilitation Strategy, however that an evaluation of the social impacts would not be required at this stage due to the proposed life of the mine being 2038;
- the Commission agrees with concerns that there is a need for greater clarity and certainty around rehabilitation outcomes, in particular the potential post-mining land uses for the site;
- that the applicant has undertaken stakeholder consultation around mine closure (in particular on post-mining land use options) during the preparation of the Rehabilitation Strategy, however the level of stakeholder engagement specifically around rehabilitation and closure could be improved;
- that the applicant has demonstrated a commitment to progressive and final rehabilitation of the Project;
- that, due to the importance of the final void water levels and water quality, this information should be consolidated and contained within a specific section of the Rehabilitation Strategy;
- the Commission is satisfied that the name of the Rehabilitation Strategy is appropriate and should be retained;
- the Commission does not accept that the requirements contained within a MOP represent a comprehensive list of all relevant commitments relating to rehabilitation and closure which can include numerous commitments from a wide range of sources; and
- the impacts (such as socio-economic) associated with mine rehabilitation and closure commitments will be adequately addressed as part of ongoing operation compliance in the preparation of the applicant's Detailed Mine Closure Plan.

205. Based on the Commission's conclusions, as listed in paragraph 204, the Commission makes the following recommendations:

R8 that in order to address the principles of *Strategic Framework for Mine Closure,* the Commission accepts the recommendation of the Unger Report requiring the applicant to prepare a stakeholder engagement strategy that ensures that stakeholders' specific issues of rehabilitation and closure are addressed appropriately in the Rehabilitation Strategy.

R9 that the applicant records all targeted consultation on mine rehabilitation and closure planning within the Rehabilitation Strategy and demonstrate where issues raised in community consultation have been considered in the development of the Rehabilitation Strategy.

R10 that the applicant collates and includes all relevant rehabilitation objectives and practices identified within the MOP and other EIS documents into the Rehabilitation Strategy so that it is a consolidated reference for the rehabilitation and closure of the mine.

R11 in order to address the principles of *Strategic Framework for Mine Closure,* the Commission recommends that the Rehabilitation Strategy:

a) identify all mine closure domains;
b) label and describe all domains including the proposed post-mining land use;

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c) ensure that rehabilitation and closure objectives, performance standards and completion criteria exist for all domains;
d) consider sudden unplanned closure and temporary closure (care and maintenance);
e) include a detailed commitment register;
f) identify and consult with stakeholders to explore closure risks and opportunities further; and
g) include a plan to ensure that the Rehabilitation Strategy is updated and refined regularly to reflect changes in mine development and operational planning, and environmental conditions.

R12 that the applicant carry out an evaluation of the socio-economic impacts of mine closure during the preparation of, and in the regular updates to, a Detailed Mine Closure Plan.

R13 that the applicant include a section within the Rehabilitation Strategy outlining the knowledge base around past rehabilitation performance. This is intended to demonstrate that the site is able to achieve the proposed post-mining land use. This knowledge base should be a summary of all existing baseline aspects as they relate to mine closure and demonstrate the outcomes from past rehabilitation showing where any lessons learnt have been incorporated into the rehabilitation and mine closure planning for the site. The inclusion of this information in the Rehabilitation Strategy could further improve the provision of information to the community on progressive rehabilitation performance and site knowledge which would support the proposed post mining land uses.

R14 that the Rehabilitation Strategy be revised to demonstrate a risk based approach to rehabilitation and closure. This would include the preparation of a register outlining the risks and opportunities relating to the closure of the mine. This should include not only the risks and opportunities relating to the physical closure and rehabilitation works, but also give regard to any existing legacy or residual (future) risks in accordance with the Principles of the *Strategic Framework for Mine Closure*.

R15 that the Rehabilitation Strategy be revised to include additional detailed information around the final void water levels and water quality, including an assessment of any potential beneficial uses for the water that could be considered following closure of the mine.

Land use capability

206. The applicant's EIS contained a Soil and Land Impact Assessment (**SLIA**) prepared by SLR Consulting June 2015. The SLIA stated that the current land uses on site are predominately low intensity cattle grazing, with some natural regrowth within fenced areas that prohibit stock grazing. The grazing land comprises predominately improved pasture grasses.

207. OEH's 2012 *Land and Soil Capability Assessment Scheme* identified the proposed disturbance areas as primarily Class 4 (moderate land capability) and Class 5 (moderate to low land capability).

208. The SLIA agreed with OEH, identifying that the soil classifications of the post mining landform within the study area will need to include areas of Class 4, 5, 6 and 8, and

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considered that the rehabilitated landform should be suitable to various intensities of grazing over the majority of the land.

209. Figure 5 of the Department's EAR identified a comparison between pre and post-mining land capabilities:

Slope	Class	Pre-mining areas		Post-mining areas		
		Area (ha)	% of total land	Area (ha)	% of total land	% Change
< 10	2	9.6	0.5	9.6	0.5	nil
10	4	496.4	25	1078.2	54	+117%
10-18	5	1096.2	55	681.7	34	-38%
> 18	6	402.4	20	154.4	8	-62%
Unclassified pit lake		-	-	80.7	4	
	Total	**2004.6**	100	**2004.6**	100	

Figure 5: Pre-mining and post-mining land classification. Sourced from the Department's EAR.

210. The Department's EAR stated that the applicant is committed to returning all land affected by the Project to a better land capability than its pre-mining condition and thereby ensuring it is suitable for a range of post-mining land uses.

211. The Department' EAR concluded that the post-mining landform would be suitable for agricultural activities such as grazing. However, given its proximity to Singleton, higher-order post-mining land uses such as residential and industrial development may be more beneficial for sections of the Project area, post 2038. The applicant has, in its Rehabilitation Strategy, committed to investigating higher-order land use opportunities prior to mine closure.

Land use capability - Conclusion

212. The Commission has considered the Material and Additional Material. The Commission at this stage has reached the conclusion that it is generally satisfied with the information on land use capability.

Final Void and Final Landform

213. During the Department's exhibition of the Project, the final void was raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding concerns with the Project's final void and final landform, as referred to in paragraphs 29 and 32.

214. To inform its EIS, the applicant undertook an integrated mine planning and final landform design process for the Project, with the stated aim of minimising final landform impacts. This process included an initial Mine Options Strategy Review to assist with identifying feasible mine plan options for the Project.

215. The Commission notes that five options were examined by the applicant for scheduling purposes and consideration of the likely flow-on effects for the final landform design. The environmental impacts of each option were also considered.

216. The applicant's EIS stated that the preferred final option relating to the final landform

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made three improvements on its initial concept design. This included the following:

- the incorporation of best practice micro/macro relief to replicate natural landscapes and natural drainage patterns to both improve visual aesthetics, and manage run-off and prevent erosion;
- the reduction in the number of final voids in the post-mining landscape on the southern side of the New England Highway (from two to one). While the overall void area would increase by 19ha, the area of land inundated by water in the final void would not increase compared to what is currently approved (80.7ha); and
- an organic shape and gentle slopes of the final void, including reprofiling the highwall slopes to improve public safety, stability and future land use potential.

217. The Department's EAR concluded that it was satisfied with the proposed mine plan and final landform as it would facilitate sustainable post-mining land use outcomes. As the design is conceptual in nature, the Department noted that there would be further opportunity to refine the landform as part of the detailed mine planning process and staged rehabilitation process under the MOP and Rehabilitation Strategy. The Department considered that this refinement should continue to focus on incorporating micro-relief techniques and integrating post-mining landform with Rix's Creek North.

218. During the public hearing, the applicant stated that considerable refinement of the final void and final landform had occurred in developing the five options when preparing the EIS. However, the applicant noted that the ultimate location and geometry of the final void was influenced by the coal deposit, the application of safe mining methods, and the location of the New England Highway.

219. The applicant's EIS stated that in comparison to other mines within the Hunter Valley the overall size of the void for this Project is relatively small. The applicant noted that this Project seeks approval for a final void of 140ha, where other mines have approved voids as large as 1,500ha.

220. Whilst the Commission notes this, when the area of the proposed final void is considered as a proportion of the total disturbed mining area, the final void represents a considerable percentage of the mining footprint. In addition to this, the Commission notes that the proposed mine plan includes the disturbance of an additional 171ha of land for the establishment of an out-of-pit OEA.

221. In order to undertake a more informed review of the final void and final landform, the Commission engaged Deswik to undertake a high-level review of the Project's mine plan to ascertain whether there were any opportunities to decrease the size of the final void and the out-of-pit OEA. The scope of work for Deswik required it to work with and rely on mine planning and scheduling information provided by the applicant.

Independent expert report (Deswik, August 2018)

222. On 2 August 2018, Deswik finalised the *Expert Advice on the Mine Schedule and Final Landform* (previously defined as the **Deswik Report**). Deswik's analysis focused on three key areas, including, a review of the final dump slope angles, the proposed dump heights and opportunities to reduce the size of the proposed final void. The Deswik Report was made available on the Commission's website on 2 August 2018, and the applicant's response was made available on the Commission's website on 13 August 2018. The individual recommendations from the Deswik Report along with the

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applicant's responses are discussed below:

Deswik Report: Disturbed Area – Final dump slope angles in the OEA

223. The Deswik Report stated that the current western out-of-pit OEA is designed with a total volume of 21 million loose cubic metres (**Mlcm**) with the final slope batter angle being 10 degrees.

224. The Deswik Report also stated that by steepening the final slope angle to a maximum 18 degrees while maintaining the current dump height the total disturbance footprint of the dump could be reduced by 16ha from 108ha to 92ha.

225. The applicant's response to the Deswik Report dated 10 August 2018 stated that the proposed increase in slope angle could cause potential movement of soil materials and associated loss of nutrients and chemicals from the rehabilitated landform into waterways and storages, connected to Deadmans Creek, with consequent reductions in water quality. A concern of this nature was raised during the public exhibition of the Project. Additionally, such loss of soil may cause a potential deterioration in the productive capacity for cattle grazing as a final landuse.

226. The Commission notes the applicant's concerns in relation to landform stability and the potential water quality impacts, recognising that the potential reduction in disturbance area by steepening the slopes does not represent an appropriate trade-off.

227. The Commission makes a conclusion in relation to increasing final slope batter angles and the consequential landform stability and potential water quality impacts in paragraph 240.

Deswik Report: Disturbed area – Dump heights

228. The Deswik Report noted that the current North Pit Dump (north of the New England Highway) has been designed to a maximum height of RL140 to blend in with local topography. It was further noted that by increasing the dump height a further 20m to a limit of RL160, the overall capacity of the North Pit Dump would increase by 20Mlcm. The Deswik Report acknowledges that, to increase the height of the North Pit Dump and maintain the current slope batter angles, approximately 110ha of previously rehabilitated area to the east of the dump would need to be disturbed.

229. Furthermore, the Deswik Report noted that South Pit Dump had been designed to height RL117 to blend in with local topography. Increasing the South Pit Dump height by 23m to RL140 while maintaining the current slope batter angles would increase the capacity of the South Pit Dump by 2Mlcm.

230. The Deswik Report noted that this additional dump capacity created by increasing the height of the North Pit Dump and the South Pit Dump would have the potential to eliminate the need for the out-of-pit OEA, thereby removing the need to disturb the 171ha of currently undisturbed land west of the existing Mine footprint.

231. The Deswik Report stated that if this option was to be considered there would be a need to also consider the trade-off between disturbing currently undisturbed farming land and the existing vegetation communities present and disturbing an area that is currently

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under rehabilitation.

232. The Deswik Report stated that hauling overburden to the North Pit Dump would not increase haulage costs significantly.

233. The applicant's response to the Deswik Report suggested that a trade-off study could be undertaken assessing the increased height of the North Pit Dump with respect to re-disturbance of previously rehabilitated areas and haulage costs.

234. During the site inspection the Commission was shown an area of active rehabilitation that had already commenced at the North Pit Dump. The Commission was advised by the applicant that if this option to increase North Pit Dump height was considered it would require disturbing some maturing rehabilitation which includes open grassland and stands of trees.

235. The Commission makes a recommendation in relation to increasing dump heights in paragraph 241.

Deswik Report: Final voids

236. The Deswik Report stated that there were limited opportunities to reduce the final void through changes to the mine schedule or operations. The Deswik Report investigated the implications of not mining the Hebden and Lower Barrett seams. The Deswik Report also noted that by removing the lower coal seams to be mined (Hebden and Lower Barrett) the final void could be reduced, however the final void *"was not significantly reduced"* and it could result in adverse effects on the Project's production rates and mine plan such that it was not practical.

237. To this end, the Deswik Report concluded that there were "*no practical means to significantly reduce the size of the final void*".

238. In its response to the Deswik Report, the applicant identified that waste materials from the Hebden and Lower Barrett seams were proposed for use to backfill the void. The applicant's response to the Deswik Report stated that not mining the Hebden and Lower Barrett seams was unlikely to reduce the size of the void, and that it would likely change the location of the void. Furthermore, not mining the Hebden and Lower Barrett seams would have a negative economic impact on the Project.

239. The Commission has considered the Deswik Report and the applicant's response. The Commission makes a conclusion in relation to the final void in paragraph 240.

Final void and final landform – Conclusions and recommendations

240. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - previously approved landform heights limited opportunities to consider a trade-off between the benefits of increasing the height of out-of-pit overburden emplacement areas and the environmental impacts associated with such a height increase;
    - by investigating the possibility of increasing the dump heights in the North Pit Dump and South Pit Dump there could be substantial environmental benefits by entirely removing the need for an out-of-pit OEA with a footprint of 171ha, including, but not limited to, reducing the loss of land currently used for agriculture, as well as

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significantly reducing the biodiversity impacts of the Project and the amount of biodiversity offsets that the applicant would be required to secure;

- by increasing the North Pit Dump and South Pit Dump there may be a number of other potential flow-on environmental consequences such as additional impacts relating to, but not limited to, air quality, noise and visual amenity;
- increasing the final slope batter angles of the OEA from 10 to 18 degrees is not supported due to the associated potential environmental consequences; and
- that there appears at this stage to be no practical measures available to the applicant to further reduce the size of the final void.

241. Based on the Commission's conclusions, as listed in paragraph 240, the Commission makes the following recommendation:

R16 that the applicant prepare a trade-off study assessing the benefits of removing the western overburden emplacement area against the potential environmental impacts associated with increasing the heights of the existing North Pit Dump and South Pit Dump. Any outcomes of the trade-off study, including an assessment of any environmental impacts, would need to be submitted and considered as part of the final assessment of the Project.

Water – Surface Water, Groundwater and Void Water

242. During the Department's exhibition of the Project, water impacts were raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the Project's impacts on surface water, groundwater and void water, as referred to in paragraphs 29 and 32.

243. The EIS included a Groundwater Impact Assessment (**GIA**) prepared by RPS Group, dated September 2014, and a Surface Water Study (**SWS**) prepared by JP Environmental, dated October 2015. The water studies were subsequently updated as part of the Revised RtS. In addition to surface water and groundwater impact assessments, the water studies also investigated the potential impacts of the Project on water resources and other water users.

Surface water

244. The SWS stated that the Project area spans three surface water catchments that drain to ephemeral watercourses and eventually to the Hunter River. These catchments are the Rix's Creek catchment (67% of the Project area), an unnamed tributary (commonly referred to as 'Dead Mans Gully') catchment (25% of the Project area) and the Station Creek catchment (8% of the Project area). These catchments have been modified by past mining operations, leading to a reduction of the catchment in areas, along with minor changes to flow rates.

245. The SWS stated that its existing water management system utilises the Mine's voids, dams and the historical underground mine workings for water storage. Consequently, the Mine is, and the Project is proposed to be, a nil discharge site and therefore will not discharge water into the Hunter River under the Hunter River Salinity Trading Scheme (**HRSTS**).

246. The SWS stated that clean water (runoff from undisturbed areas) is largely diverted away

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from the site or captured in clean water dams that overflow into the off-site environment. Sediment-laden water (runoff from OEAs) is captured in sediment dams, treated as necessary, and released to the environment when water quality objectives can be met.

247. The EIS stated that monitoring results to date show that there have been no observable impacts on off-site water quality and that the volume of water sourced from the site's central water dam provides sufficient supply to satisfy the Mine's requirements (i.e. for dust suppression, coal washing, etc.). The applicant noted that the site is also not licensed to extract water from the Hunter River.

248. The SWS and Revised RtS stated that the Project would result in catchment loss equivalent to approximately 45 megalitres per year, which represents a <1% reduction in the entire Hunter River catchment area.

249. The SWS stated that current operations maintain a 20m buffer between mining operations and Rix's Creek to prevent and/or minimise any direct interaction with Rix's Creek, and as mining generally progresses away from Rix's Creek in the future, this buffer will be maintained.

250. The SWS stated that the Mine was not affected by flooding associated with the Hunter River, however mine planning had considered the need to prevent inundation from the flooding of Rix's Creek. The Commission notes that OEH was not satisfied that flood risks had been adequately considered in the EIS.

251. The Revised RtS responded to OEH's concerns and concluded that the Project would not exacerbate the existing flood risk to surrounding private properties but identified potential impacts to the applicant's assets. To minimise this risk, the applicant committed to reviewing the adequacy of the existing flood protection measures to ensure that containment berms are of adequate height and integrity. OEH was generally satisfied that the applicant's Revised RtS addressed its concerns regarding flood risks.

252. The SWS stated that the Project's surface water impacts are proposed to be managed consistent with current surface water management practices at the Mine. The applicant's water monitoring results for its current Mine show that its current management practices generally lead to acceptable outcomes. However, the monitoring results for the SWS did indicate elevated dissolved metals across all water classes compared to the Australian and New Zealand Environment and Conservation Council (**ANZECC**) Guideline trigger levels for ecosystem protection. The EPA and the Department requested that the applicant further investigate these elevated levels, particularly the elevated aluminium content.

253. The Revised RtS noted that the high aluminium levels are attributable to clays and suspended solids, with regards to the sediment dams in Dead Mans Gully. Further analysis of the aluminium confirmed that it would not pose a toxicological danger to the environment and, on this basis, the applicant's Revised RtS concluded that it is not anticipated that adverse health impacts would occur for either humans or livestock.

254. The Department's EAR recommended that the applicant notify its neighbours in the event of any elevated water quality results so that they may make informed decisions about the use of catchment water for stock watering. Additionally, any loss in flow or impact to water quality attributed to mining operations should be compensated for with an alternate water supply.

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Management and mitigation

255. The SWS and Revised RtS proposed a number of mitigation measures to minimise surface water impacts. The measures included:
    - all water management structures being designed in accordance with the *Managing Urban Stormwater Soils and Construction including Volume 2E Mines and Quarries* guidelines;
    - continued management of sediment-laden water to minimise risks to the receiving environment and downstream water users;
    - commitment to reviewing and upgrading existing flood mitigation works;
    - upstream and downstream monitoring of watercourse flow rates and quality and monitoring of key water storages; and
    - data collection at least annually to update and validate the water balance model.

256. The Department's EAR concluded that the Project would not lead to significant surface water impacts beyond those already experienced, subject to implementation of the mitigation and management measures proposed. The Department's EAR further concluded that the applicant has proposed a range of suitable mitigation, management and monitoring measures in its EIS and Revised RtS. With these measures in place, the Department's EAR found that the risks of impacts to surface water resources are likely to be low, and that the Project could be suitably managed through imposing performance measures and the conditions of consent.

257. The Commission makes a conclusion on surface water in paragraph 272.

Groundwater impacts

258. The GIA and Revised RtS noted that the surrounding groundwater environment is characterised by a porous and fractured hard rock groundwater system within the Permian coal measures and a shallow groundwater system within the unconsolidated regolith/alluvium.

259. The GIA stated that groundwater monitoring has been undertaken since 2010 and results to date show that mining has had little impact on groundwater levels and quality.

260. The GIA stated that the groundwater model predicts the extent of maximum drawdown to increase slightly, but that it should continue to be limited to areas in and around the centre of Pit 3. This drawdown is expected to occur entirely within the Project area, where there are no other groundwater users or groundwater dependent ecosystems.

261. The GIA's groundwater model predicts that there would continue to be significant localised impacts on the hard rock groundwater system. The applicant stated that these impacts are acceptable as they are largely contained within the Project area and limited to a less productive saline groundwater source, rather than the more productive non-saline alluvium.

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Management and mitigation

262. The GIA proposed a range of mitigation and management measures to minimise groundwater impacts. The applicant committed to undertake quarterly groundwater monitoring for pH, electrical conductivity, total dissolved solids, major ions, nutrients and dissolved metals. Additionally, the applicant proposed to develop Project-specific trigger values derived using statistical analysis of monitoring data.

263. The GIA stated that the applicant is committed to commissioning an annual review of monitoring data by a hydrogeologist in order to assess the impacts of the Project on the groundwater environment, and to compare observed impacts with predicted impacts.

264. The Department's EAR stated that the potential groundwater impacts are acceptable, and that the predicted impacts are largely unavoidable due to the inherent relationship between the coal seams to be extracted and the hard rock aquifers contained within them. Furthermore, the Department's EAR concluded that impacts are predicted to be localised and limited to 'less productive' groundwater sources. The Department's EAR considered that the applicant's proposed mitigation, management and monitoring measures in its EIS and Revised RtS would ensure that groundwater impacts are minimised and/or promptly identified and responded to.

265. The Commission makes a conclusion on surface water in paragraph 272.

Quantity and composition of void water

266. The GIA stated that the proposed final void would continue to function as a groundwater sink, with inflows to the pit from surface and groundwater, exceeding water loss from evaporation until 2138, when the void water level would reach an equilibrium level of 50m AHD. As groundwater inflows to the void are saline, this would generally prevent the release of saline water into the surrounding environment, but as a result the salinity of the pit lake would rise over time.

267. The GIA predicts the final void would fill with water and stabilise at around 50 m AHD around 100 years post-mining. This equates to a pit lake surface area of approximately 80.7 ha.

268. The GIA conservatively predicted a final void salinity level of approximately 11,000 microsiemens/ centimetre (µS/cm) at the end of mining. Over time, the salinity of the water in the final void would slowly increase and has been modelled to reach 31,000µS/cm after 2,000 years. For context, the applicant's GIA noted that the salinity of sea water is approximately 50,000µS/cm.

269. The GIA stated that some minor seepage into the groundwater system (i.e. subsurface outflow) is predicted. However, the applicant considered that the long-term impact of these outflows on off-site groundwater quality will be negligible. Monitoring in downstream locations would be required to ensure that this is the case.

270. The Department's EAR concluded that the impact of the final void on water quality was acceptable, and that it was satisfied water impacts for the following reasons:
    - the loss to the Hunter River catchment area due to the final void is acceptable;
    - the high salinity quality of the void water is acceptable as it will have negligible flows impacts into off-site groundwater

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- the final void will present a low risk to public safety; and
- the final void will be outside the 100-year recurrence interval flood prone area of the Hunter River.

271. The Commission makes a conclusion on the quantity and composition of void water and recommendations on opportunities for further assessment of the void and void water in paragraph 272 and 273.

Surface water, groundwater and void water – Commission's conclusions and recommendations

272. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - concerns raised by the community in relation to the Project's potential impacts on groundwater, surface water and void water are not unreasonable, and this is supported by the limited information on the long-term impacts of high saline water bodies within the Hunter Valley landscape;
    - that the applicant has adequately identified likely surface water impacts. In addition, where impacts are predicted, the Commission is satisfied that the applicant has adequately identified appropriate management and mitigation measures;
    - that the applicant has adequately identified likely groundwater impacts. In addition, where impacts are predicted, the Commission is satisfied that the applicant has identified management and mitigation measures;
    - that the applicant has adequately considered the quantity and composition of the South Pit Void water and likely impacts on the surrounding environment. Furthermore, the Commission is satisfied that due to the nature of the geology, the South Pit Void water impacts are likely to be largely contained to the site and are not likely to generate water flow into off-site groundwater;
    - inadequate information has been provided on the water related impacts associated with backfilling the North Pit Void; and
    - the Commission is of the view that additional assessment could be undertaken by the applicant within its Rehabilitation Strategy to investigate the future post-mining opportunities for the void and void water re-use opportunities, and that this assessment could be updated regularly through the Project's consent life, if approved.

273. Based on the Commission's conclusions, as listed in paragraph 272, the Commission makes the following recommendations:

    R17 that the applicant explore opportunities to undertake an assessment of void water re-use. Where opportunities are identified, these should be included in the Rehabilitation Strategy.

    R18 that the applicant investigate water impacts related to any interaction with the backfilled North Pit Void consistent with those undertaken for the South Pit Void.

Biodiversity

274. During the Department's exhibition of the Project, biodiversity impacts were raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the Project's biodiversity impacts, as referred to in

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paragraphs 29 and 32.

275. The EIS included a Biodiversity Assessment that assessed the Project's biodiversity impacts, prepared by Eastcoast Flora Survey and undertaken in accordance with the UHSA. Supplementary biodiversity information was provided in October 2017 by EMM Consulting as part of Appendix B within the applicant's Revised RtS. The Biodiversity Assessment and supplementary information provided as part of the Revised RtS is collectively referred to as the applicant's Biodiversity Assessment (**BA**). The BA included a specialist ecological assessment based on targeted flora and fauna surveys, a desktop review of ecological databases and previous studies relevant to the Project area, including surrounding developments.

276. OEH in its submission dated February 2017 identified some gaps in the BA in respect of its UHSA and FBA assessments, which were likely to require a recalculation of the required ecosystem credits. Following consultation with OEH by the Department, the applicant provided a further revised BA in March 2018, prepared by EMM Consulting.

277. The BA described the Project area as naturally undulating landscape comprising remnant woodland vegetation, woodland communities and derived native grassland. The proposed disturbance area to the north of Pit 3 has been identified as a highly modified landscape, due to past grazing activities. Specifically, vegetation in this area is a low condition derived native grassland with scattered paddock trees.

Biodiversity impacts

278. The applicant stated in its Revised RtS that the Project would disturb an additional 212.8 ha of land. Of this, 48.2 ha is woodland or forest vegetation and 164.58 ha is derived native grassland. Some of this vegetation conforms to the definition of an Endangered Ecological Community (**EEC**) under the *Biodiversity Conservation Act 2016*, including:
    - 0.22 ha of Hunter Lowlands Redgum Forest; and
    - 0.76 ha of Central Hunter Grey Box-Ironbark Woodland.

279. The applicant noted that the Project would involve the clearing of small areas of EEC that would be unlikely to impact the survival of these communities. Furthermore, the applicant proposed to offset the residual impacts in accordance with either the FBA or UHSA.

280. The BA stated that 16 threatened fauna species have the potential to occur within, or in close proximity to, the proposed disturbance area. Three of these species, the Brush-tailed Phascogale, Squirrel Gilder and Green-thighed Frog, required targeted surveys. The BA stated that the Project would remove only minimal amounts of Squirrel Glider habitat. The applicant stated that this should not have an impact on the species as no direct impact on den sites would occur as a result of the Project. No suitable habitat was identified within the Project area associated with the other potentially occurring fauna species.

281. The Department's EAR stated that the existing practice of undertaking pre-clearance surveys would be sufficient for avoiding and minimising any unexpected impacts to flora and fauna species and populations prior to vegetation removal.

282. The BA stated that the applicant is committed to engaging a suitably qualified ecologist to undertake pre-clearance surveys of any potential habitat sites.

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283. The Department's EAR concluded that the Project would not significantly increase impacts on threatened fauna species beyond those associated with existing approved operations. The Department's EAR also stated that any incremental impacts could be appropriately managed through conditions of consent for pre-clearance surveying and the preparation and implementation of a Biodiversity Management Plan.

Biodiversity offsets

284. The Department's EAR states that the Project would result in the disturbance of 212.8 ha of vegetation. Figure 6 from the Department's EAR identifies the various plant community types proposed for disturbance and their associated ecosystem credit values.

Plant community	Disturbance area (ha)	Ecosystem credits required (FBA)
HU812 - Moderate / Good - Zone 1 *Forest Red Gum grassy open forest on floodplains of the lower Hunter*	0.22	13
HU906 – Moderate / Good – Zone 2 *Bull Oak grassy woodland of the central Hunter Valley*	0.1	4
HU819 – Moderate / Good – Zone 4 *Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter*	17.62	872
HU962 – Moderate / Good – Zone 5 *Grey Box grassy open forest of the Central and Lower Hunter Valley*	0.76	28
HU819 Moderate / Good Zone 7 *Derived native grassland (Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter)*	164.58	4,057
HU819 Moderate / Good Zone 8 *Derived native grassland (Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter, CHVEFW)*	29.5	834
Total vegetation	***212.8***	***5,808***

Figure 6: Plant communities within the disturbance area and ecosystem credits required. Sourced from the Department's EAR.

285. The BA noted a number of options to retire the ecosystem credits required to offset the Project's biodiversity impacts, including:
- paying into the Biodiversity Conservation Fund;
- purchasing suitable credits on the market; and
- creating land-based offset sites with suitable biodiversity values.

286. The applicant proposed in its BA to offset the Project by providing a mixed approach of securing land-based offsets and making financial payments into the Biodiversity Conservation Fund.

287. The applicant also proposed in its BA two general stages for ecosystem credit retirement based on the progression of operations to the northwest in Pit 3, and has outlined an indicative number of credits, and the timing of when ecosystem credits, would be required for each stage.

288. The Department's EAR concluded that a staged approach to offsetting may be acceptable in light of the Project's progressive impacts on biodiversity over the 21-year

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mine life. However, further clarification would be required on the associated disturbance areas for each of applicant's proposed stages. Furthermore, the Department considered that credit requirements must be retired before the commencement of clearing in the associated disturbance area, or at the very least identified before the commencement of clearing in the associated disturbance area and secured within 18 months.

289. The Department's EAR concluded that it was satisfied that the staged approach could ensure suitable offsets are secured, prior to or (at worst) soon after impacts occur.

290. The Department's EAR concluded that the required ecosystem credits could be obtained and that the retirement of these credits would sufficiently compensate for residual biodiversity impacts, and that although a definitive offset strategy has not yet been identified, identification and/or retirement of suitable credits prior to the commencement (in stages) of clearing under the Project, would ensure that suitable ecosystem credits are secured to offset the Project's biodiversity impacts.

291. The Commission makes a number of conclusions and a recommendation on the biodiversity offset approach in paragraph 294 and 295.

Biodiversity – Commission's conclusions and recommendations

292. The Commission notes the Department's conclusions in paragraph 288 - 290. In addition, noting that there are a number of options available to offset the ecosystem credit requirements that will need to be resolved as part of any final assessment.

293. The Commission notes that although there are a number of options available to the applicant to acquire ecosystem credits, the applicant has not provided sufficient information in relation to the proposed approach(es) for offsetting the Project's biodiversity impacts. The Commission notes that the applicant is not required to offset the Project prior to approval, however the Commission also notes that the applicant is required to provide sufficient information in relation to its proposed approach(es) to retiring ecosystem credits to enable the consent authority to undertake a proper assessment of the Project's biodiversity impacts.

294. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
- the Project's biodiversity impacts have been adequately considered and the applicant has a number of options available to it to mitigate any biodiversity impacts;
- the applicant has stated its commitment to retiring the Project's ecosystem credits, however it has not provided sufficient information in relation to its proposed approach to offsetting the Project's biodiversity impacts; and
- incremental impacts on threatened species could be managed through appropriate management protocols. These protocols would need to be outlined in the Biodiversity Management Plan and include training for the supervisors on the relevant requirements

295. Based on the Commission's conclusions, as listed in paragraph 294, the Commission makes the following recommendation:

R19 that the applicant detail and commit to an offsetting approach for consideration by the consent authority, which includes, if necessary, details of how its approach will be staged, the timing, offset value and how it could be successfully undertaken.

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Social & Economic Impacts

296. During the Department's exhibition of the Project, social impacts and economic impacts were raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the Project's social and economic impacts, as referred to in paragraphs 29 and 32.

Social Impacts

297. During the Department's exhibition of the Project, social impacts were raised as a significant concern in public submissions, as referred to in paragraph 19 and Figure 2. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the social impacts of the Project, as referred to in paragraphs 29 and 32.

298. The submissions to the Commission noted the current contributions of the applicant to the local community and the generation of employment opportunities as the key positive social impacts.

299. The applicant's EIS included a Social Impact and Opportunity Assessment (**SIOA**) that considered the social costs and benefits of the Project. The SIOA included a social profile analysis, an assessment of the potential impacts on the local and regional communities, and consideration of mitigation and management measures in response to these potential negative impacts.

300. The SIOA stated that there are a range of community issues associated with the Project's potential negative social impacts that predominantly relate to amenity, health and wellbeing arising from air quality, noise, blasting and visual impacts. The applicant noted in the SIOA that these impacts generally satisfy the relevant NSW Government criteria, or that mitigation and management strategies are proposed to reduce the impact to acceptable levels where the impact occurs.

301. The applicant stated in its SIOA that its management and monitoring programs, and communication procedures, include the following:
    - operation of a 24-hour community hotline;
    - regular CCC meetings;
    - ongoing consultation with immediate neighbours and interested stakeholders; and
    - ongoing dissemination of information to the community through print media, information sessions and online interest group forums.

302. The Department's EAR assessed the SIOA and concluded that the Project would have potential negative social impacts that are directly linked to a range of environmental impacts. However, the Department's EAR considered that the Project would not substantially change the severity and extent of existing social impacts.

303. The Department's EAR also acknowledged that the Project would result in positive social impacts, particularly local and regional employment and ongoing community funding initiatives.

304. The Commission makes a conclusion on social impacts in paragraph 305.

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Social Impacts – Commission's conclusions and recommendations

305. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - the negative social impacts largely stem from environmental impacts. However, the Commission is satisfied that the potential longer term negative social impacts of the mine closure could be dealt with through the Rehabilitation Strategy consultation requirements referred to in paragraph 205;
    - the Commission is satisfied that the Project's overall social impacts are reasonable, subject to the continued implementation of mitigation measures outlined by the applicant; and
    - the Commission is satisfied that at this stage the Project's positive social impacts will exceed its negative social impacts for the local community and region.

Voluntary Planning Agreement

306. The Department's EAR identified that the applicant has proposed to contribute to local infrastructure through a VPA with Singleton Council.

307. The status of the VPA was discussed during the Commission's meeting with Council on 4 June 2018. At this meeting, Council indicated that it was considering changes to the way in which it administers proceeds collected from VPAs.

308. Changes discussed by Council with the Commission included establishing a 'Future Fund'. Although the Future Fund had not received formal Council endorsement at the time of the Commission's meeting with Council, Council stated that the applicant had indicated its support of the proposed Future Fund.

Economics

309. The applicant's EIS Economic Assessment (**EA**) comprised three documents, that being the *Economic Assessment* prepared by KPMG, July 2015, *Economic Specialist Response*, prepared by KPMG, March 2017, *Economic Assessment,* prepared by KPMG, March 2018. The EA evaluated the Project's potential direct and indirect economic costs and benefits for local and regional communities, and the State. This included a cost benefit analysis (**CBA**) that estimated the net present value (**NPV**) of the Project based on the forecast costs and benefits and a computable general equilibrium (**CGE**) analysis to quantify potential flow-on effects to the wider economy.

310. The applicant stated in its EA that the EA was prepared generally in accordance with the NSW Government's Economic Evaluation in Environmental Impact Assessments (2003) and the Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals 2012 (**Economic Guidelines 2012**).

311. The Department commissioned the Centre for International Economics (**CIE**) to provide an expert review of the EA. CIE was specifically asked to critically analyse the assumptions, methodology and outcomes in the CBA. CIE identified that the applicant's assessment was broadly consistent with the Economic Guidelines 2012, but identified several areas requiring further consideration. These issues included:
    - calculation of wage premia against the industry average wage as opposed to the mining sector wage;

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- consideration of alternative carbon prices to test the estimate of Green House Gas Emission (**GHGE**) costs; and
- quantification of the Project's air quality impacts.

312. The applicant's Revised RtS responded to the CIE's recommendations and included an amended EA that accounted for changes made to the Project's capital expenditure, employment generation, production profile, air quality and GHGE estimates.

313. The amended EA concluded that the Project would result in an overall benefit for the State of $272.1 million NPV. This benefit included $104.3 million in royalties to the NSW Government, $116.9 million in wage premiums and $50.9 million in company tax attributable to NSW.

314. The Department's EAR stated that there is inherent uncertainty in estimating costs and benefits over the life of a mine, and concluded that overall, the Project would generate a minimum net benefit to the State of approximately $120 million NPV and contribute to employment and expenditure in the local and regional economies.

315. The Commission makes a number of recommendations on the Project's economic impacts in paragraph 319.

Economics – Commission's conclusions and recommendations

316. The Commission notes that the Economic Guidelines 2012 and accompanying Technical Notes require a detailed discussion of risk and uncertainty in key areas of the cost-benefit analysis. Furthermore, the cost-benefit analysis requires an assessment of not only the likely outcomes but also a discussion of a range of feasible alternatives. High impact low probability outcomes (for example extreme downside coal price scenarios) should be considered in the analysis.

317. The Commission also notes that the applicant's CBA indicates that the Project is sensitive to variations in key inputs.

318. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - the applicant's economic assessment is generally consistent with the *NSW Government's Economic Evaluation in Environmental Impact Assessments (2003)* and the Economic Guidelines 2012, however the provision of additional information in certain key areas would assist the consent authority to undertake a more informed evaluation of the Project's economic benefits and impacts;
    - The Commission is not satisfied that the economic assessment has adequately considered a range of high impact low probability scenarios in accordance with the requirements of the Economic Guidelines 2012;
    - the Commission is not satisfied with the extent of disclosure in relation to the section of the project's "base case" financial parameters. The Commission is of the view that greater disclosure of the rationale for the use of this information is relevant in order to assess the probability and impact of various downside scenarios, including early or unplanned closure and circumstances that might give rise to a Project CBA of less than 1.0; and
    - the Commission is not satisfied that the economic assessment has adequately considered the impact of severe downside scenarios on the 'base-case' scenario, including an assessment of how the applicant would manage such scenarios.

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319. Based on the Commission's conclusions, as listed in paragraph 318, the Commission makes the following recommendations:

R20 that the applicant provide further information in relation to how it has determined its "base case" financial parameters, including the assumptions relating to commodity price and exchange rate forecasts, and references to other available commodity price and exchange rate forecasts.

R21 that the applicant provide a more detailed discussion of the likelihood and range of feasible alternatives to the "base case" referred to above, including, but not limited to its selection of the downside coal price scenario of 25% and the World Bank commodity price scenario.

R22 that the applicant provide further information (including relevant risk minimisation strategies) in relation to how it has considered severe downside scenarios (including, but not limited to, the World Bank commodity price scenario), in accordance with the *Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals 2012* and accompanying Technical Notes.

Heritage

320. During the Commission's site visit on 4 July 2018 the Commission viewed the Coke Ovens. The Commission also heard concerns from speakers at the public hearing and received written submissions regarding the Project's impacts on heritage, as referred to in paragraphs 29 and 32.

Aboriginal cultural heritage

321. The applicant's EIS contained an Aboriginal Archaeological and Cultural Heritage Impact Assessment, prepared by AECOM dated September 2014. Supplementary heritage information was provided in November 2017 by AECOM as part of Appendix C within the applicant's Revised RtS. The Aboriginal Archaeological and Cultural Heritage Impact Assessment and supplementary heritage information provided by the applicant is collectively known as the (**AACHIA**).

322. The AACHIA identified that 21 Aboriginal sites would be disturbed by the Project. Pursuant to the Land and Environment Court consent orders (referred to in paragraph 16 - 18) this was revised down to 17 sites, with the applicant later clarifying (in Appendix C of its Revised RtS) that the number of sites proposed to be disturbed would be 16. Of the sites proposed to be disturbed, two were assessed as having moderate Aboriginal cultural heritage significance, and the remaining 14 as being of low Aboriginal cultural heritage significance. The applicant committed to salvaging all 16 sites and undertaking archaeological excavation adjacent to Dead Man's Gully, in consultation with Registered Aboriginal Parties (**RAPs**).

323. The Department's EAR stated that the Project's potential impacts on Aboriginal cultural heritage are minor.

324. The Department's EAR concluded that, with appropriate management conditions in place, the Project's potential impacts on Aboriginal cultural heritage are acceptable.

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325. The Commission has considered the assessment of Aboriginal cultural heritage in the applicant's AACHIA and the Department's EAR.

Aboriginal cultural heritage – Conclusion

326. The Commission has considered the Material and Additional Material. The Commission at this stage has reached the conclusion that it is generally satisfied with the information on Aboriginal cultural heritage.

Historic mining heritage

327. The applicant's Heritage Impact Assessment (**HIA**) prepared by AECOM noted the existence of four historic (European) heritage items on the site, the "Mound with Historic Material", a Vertical Shaft with Fencing, Granbalang Trig Station and the Coke Ovens.

328. The applicant proposed in its HIA to undertake archival recording and surface collection at all of these sites.

329. The Department's EAR stated that Heritage NSW recommended that additional historical research be undertaken regarding the potential association of these items with the Coke Ovens to determine whether salvage and recording is necessary and/or possible. The Department's EAR noted that the applicant agreed to undertake this additional research following determination, but prior to disturbing these items.

330. The Department's EAR concluded that the Project's potential impacts on European heritage could be managed under a Heritage Management Plan (**HMP**) and conditions of consent requiring the historical research to be completed.

331. During the site inspection, the applicant explained to the Commission the heritage importance of the Coke Ovens to early mining operations within the Rix's Creek area. The applicant further explained to the Commission that tree roots have been, and continue to, interact with the Coke Ovens and that they were slowly degrading the structural integrity of the Coke Ovens. The applicant noted that it had considered removing the trees however was concerned that this could lead to further degradation or damage to the Coke Ovens.

332. The Commission makes a conclusion and a number of recommendations on the historic mining heritage in paragraph 333.

Historic mining heritage – Commission's conclusions and recommendations

333. In this Review, the Commission has considered the Material and Additional Material. The Commission at this stage, has reached the following conclusions:
    - the Coke Ovens are an important site as they represent historical evidence of early mining operations in the Hunter Valley;
    - the applicant has taken the appropriate steps to manage the Project's impacts on European cultural heritage;
    - overall the Project's historic (European) heritage impacts are reasonable, subject to Heritage NSW's recommendation for additional research regarding the Coke Ovens to determine whether salvage and recording is necessary and/or possible and the continued implementation of mitigation measures outlined by the applicant; and
    - the applicant could further facilitate access to the Coke Ovens for research and

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interpretation and contribute to the preservation of the Coke Ovens during the life of the mine and following into closure.

334. Based on the Commission's conclusions, as listed in paragraph 333, the Commission makes the following recommendations:

R23 that the applicant prepare a Heritage Management Plan to provide the applicant with further opportunities to minimise impacts on the Coke Ovens.

R24 that the applicant's Heritage Management Plan include an evaluation of the options available to minimise the impact of any tree roots on the integrity of the Coke Ovens.

R25 that the Heritage Management Plan identify what additional research should be undertaken regarding the Coke Ovens to determine whether salvage and recording is necessary and/or possible.

R26 that the applicant's Heritage Management Plan and Rehabilitation Strategy detail how the Coke Ovens will be better accessed by the public given the historical significance of the site and provide options on how the site can be managed throughout the life of the Project and beyond mine closure.

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COMMISSION'S CONCLUSION

335. In response to the Minister's Terms of Reference, the Commission has carefully considered the Project and the Material and Additional Material. The Commission has considered relevant NSW Government Policy in its review of the Project.

336. Having considered the information submitted to date, the Commission's preliminary view is that the Project as a whole has merit if the various recommendations contained within this Review report can be satisfactorily addressed. However, the Commission notes that its views may change on any determination decision, including because of the provision of additional information in response to this review, information provided to the Commission independently of this review, additional matters raised in undertaking its final assessment of the project, or other relevant factors. The Commission also notes that conditions of consent have not formed part of this review and would need to be given detailed consideration at the determination stage.

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