

Rix's Creek Continuation of Mining Project

Response to Submissions Addendum



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1.0 Introduction

1.1 Introduction

This Response to Submissions Addendum (RTSA) report has been prepared by AECOM Australia Pty Ltd (AECOM) on behalf of Bloomfield Collieries Pty Ltd (the Proponent) to provide supplementary information to the *Rix's Creek Continuation of Mining Project Response to Submissions Report* (AECOM, 2016), as previously submitted to the Department of Planning and Environment (DP&E) in September 2016.

This RTSA has been prepared to address the assessment of a portion of land within the Project Area comprising 40.98 hectares (nominally 41 ha), referred to in this RTSA report as the Addendum Area. During investigations to clarify the extent of the approval area as originally defined in the Mines existing approvals under Development Consent 49/94, issued 19 October 1995 (DA 49/94), DP&E formed the opinion that the Mine may be currently operating outside the approved disturbance boundary as detailed in the original Environmental Impact Statement (1994 EIS). Pursuant to Condition 1(i) of the development consent for DA 49/94, the Mine, as proposed at that time was to be undertaken generally in accordance with that 1994 EIS, as modified.

On review of the available information, Bloomfield have formed the opinion that it has undertaken all mining to date in accordance with its existing consents. In response to an order to provide information issued under Section 119J of the *Environmental Planning and Assessment Act 1979* (EP&A Act), Bloomfield provided DP&E with all requested information regarding past workings. It is understood that this situation has arisen due to ambiguities in what was defined as the disturbance areas in the 1994 EIS. The DP&E review of available information is currently ongoing.

When preparing *Rix's Creek Continuation of Mining Project Environmental Impact Statement* (Project EIS) certain studies used the edge of the Mine's interpretation of the existing approved disturbance boundary to establish their studies areas. If DP&E form the opinion that the approved disturbance boundary is in fact different (smaller), then there would be gaps between these study areas and the approved disturbance boundary. Should this occur and the Project be approved, there would be a resulting gap in studies of an area 41ha in size, the Addendum Area.

This RTSA report has therefore been prepared to provide additional assessment of the Addendum Area so that it forms part of the Rix's Creek Continuation of Mining Project. Accordingly, should DP&E determine that it does not fall within the existing approval disturbance boundary it will be clear that it has approval under the Rix's Creek Continuation of Mining Project. The Project Area, as originally detailed in the Project EIS, and the Addendum Area are shown on **Figure 1**.

In addition to the assessment of the Addendum Area, since the submission of the RTS report the NSW Environment Protection Authority (EPA) has also raised additional questions in relation to the Project Air Quality Impact Assessment. Responses to those questions are also provided in this RTSA.

1.2 Assessment Review

Subsequent to the identification of the Addendum Area, Bloomfield undertook a gap analysis of the Project EIS and accompanying specialist studies to determine if additional assessment of the Addendum Area was required. It is noted that the majority of EIS supporting studies, as previously provided to DP&E as part of the Project EIS and RTS include the Addendum Area and any impacts associated with its use, including:

- Aboriginal Cultural Heritage Assessment;
- Air Quality Assessment;
- Noise and Vibration Impact Assessment;
- Blasting Assessment;
- Soils and Land Impact Assessment;
- Rehabilitation Strategy;

- Hydrology and Surface Water Study;
- Groundwater Impact Assessment;
- Historical Heritage Assessment;
- Traffic Impact Assessment;
- Social Impact Assessment;
- Economic Assessment; and
- Landscape Character and Visual Impact Assessment.

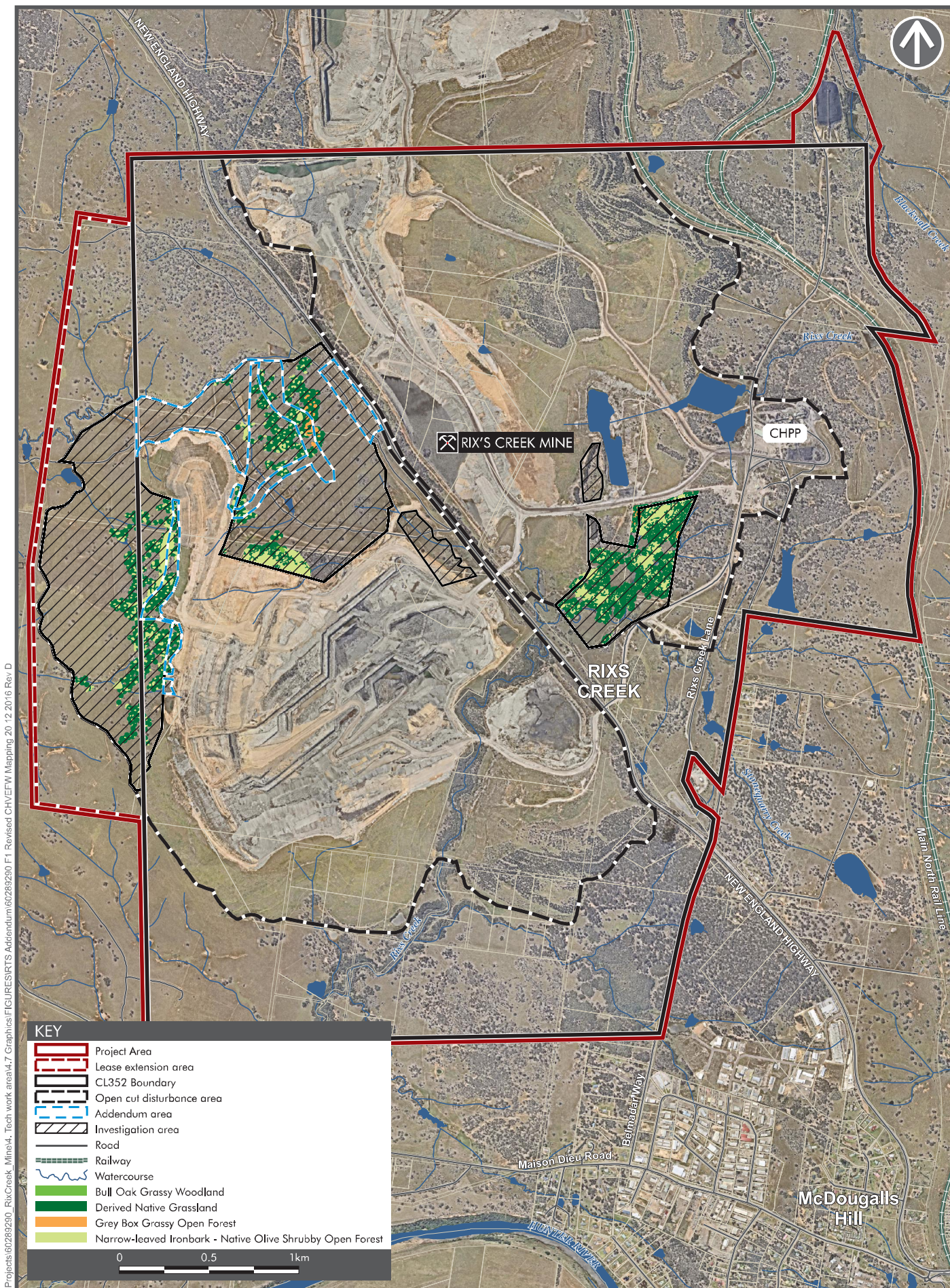
The majority of these specialist studies were undertaken independent to consideration of disturbance boundaries (e.g. Traffic Assessment) or included the entire Project Area as the study area and addressed impacts from all existing mining operations. Reference is made to the Project Area as shown on **Figure 1**.

The review identified that two specialist studies relied on the Mine's interpretation of the existing approval boundary. These are:

- Biodiversity Impact Assessment, which formed Appendix I to the Project EIS; and
- Agricultural Impact Assessment, which formed Appendix O to the Project EIS.

A review of the study areas for both these reports concluded that if DP&E deem the existing approval boundary to be smaller than currently understood by Bloomfield, then the 41ha Addendum Area would fall outside the study areas of these reports. As such additional assessment would be required of the Addendum Area in regards to both biodiversity and agriculture.

Bloomfield subsequently undertook additional investigation of potential ecological and agricultural land use impacts to ensure that these reports suitably assess the Addendum Area. Each of these matters is considered in **Section 2.0**.



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2.0 Impact Assessment

2.1 Review of Existing Assessments

As a result of the gap analysis discussed in **Section 1.2**, Bloomfield engaged a project ecologist and agricultural specialist to undertake an assessment of the Project on the Addendum Area. The outcome of these assessment are detailed in the following sections.

2.2 Ecology Impact Assessment

The Project EIS included the following ecological assessment *Ecology Report for the Continuation of Rix's Creek Mine, Singleton LGA*, Revision 4.4, October 2015 (the Project Ecology Assessment) as completed by Eastcoast Flora Survey. This report was summarised in Section 13.0 of the EIS and attached at Appendix I. The Project Ecology Assessment and the associated fieldwork and site surveys were prepared in accordance with the Biodiversity Certification Assessment Methodology (BCAM).

The Project Ecology Assessment included an assessment of the biodiversity of the entire Project Area (refer **Figure 1**), however only assessed the potential impacts of the Project on the study area as defined in that report. As a result subsequent credit calculations did not include consideration of the disturbance of vegetation communities in the Addendum Area.

Following confirmation that additional review was required of the credit calculation to include the Addendum Area, Bloomfield met with Office of Environment and Heritage (OEH) on 27 October 2016 to discuss assessment requirements. Following that meeting correspondence dated 18 November was received from OEH (refer **Appendix A**) confirming the outcomes of those discussions and providing further details in regards to ensuring the additional assessment is consistent with the Draft Biodiversity Management Plan under the Upper Hunter Strategic Assessment (UHSA).

To satisfy OEH requirements, Bloomfield engaged ecological consultants EMM Consulting to undertake a revised credit calculation to include the Addendum Area in addition to those areas previously assessed. During this process Bloomfield also consulted with the OEH to verify credit calculations. A copy of EMMs credit calculation is provided in **Appendix B** and summarised below.

2.2.1 Revised Credit Calculations

Reference is made to **Appendix A** which provides credit calculations over:

1. The entire footprint occupying a total area of 219 ha (including the expansion area), to verify the accuracy of updated calculations when compared with previous calculations; and
2. The Addendum Area only, which occupies 40.98 ha, and has not been assessed independently, up until this point.

The landscape and biodiversity values of the area are detailed in **Table 1**. The biodiversity credits as calculated for the entire area and the Addendum area are detailed in **Table 2**.

As noted in **Appendix A** the revised credit calculation was prepared in consultation with OEH by EMM Consulting's Eugene Dodd who is an accredited BioBanking practitioner (BioBanking Accreditation No, 191).

Table 1 Landscape value

Landscape Value	Result	Comment
Size of assessment circle	2000 ha	-
Native veg cover – Before clearance	11 – 20 (19%)	Vegetation used has been derived from the Greater Hunter vegetation map. Calculations treated vegetation within the approved disturbance boundaries as cleared land.
Native veg cover – After clearance	11 – 20 (17%)	
Adjacent remnant area	501 ha	-
Connectivity Score	Local biodiversity link	-
Landscape value score	16 ha	-

Table 2 Credit Calculation Summary

Vegetation and Credit Calculations		
Vegetation Type	Area (ha)	Ecosystem Credit
Zone 1 – Forest Red Gum grassy open forest	0.81	29
Zone 2 – Bull Oak grassy woodland	0.10	2
Zone 3 – Swamp Oak- Weeping Grass grassy riparian forest	0.36	11
Zone 4 – Narrow-Leaved Ironbark – Native Olive shrubby open forest	21.23	606
Zone – 5 Grey Bow grassy open forest	1.01	25
Zone 7 – Narrow-leaved Ironbark – Native Olive shrubby open forest.	195.49	3,385
Total	219.00	4,058

Management Measures

Despite the additional offset credits required to cover the Addendum Area, Bloomfield commits to implementing those measures as previously committed to for the mitigation and management of potential ecological impacts associated with the Project.

Bloomfield operates in a manner which minimises environmental impacts as a result of its operations. The Project approach undertaken for the Rix's Creek Continuation of Mining Project is to avoid, reduce and mitigate potential impacts to biodiversity:

- Avoid the removal of vegetation and habitat in Mine planning where reasonable and feasible;
- Reduce potential impacts on biodiversity through the staged removal of vegetation and habitat, together with the inspection of habitat trees before and during felling operations; and
- Mitigate impacts on biodiversity through the implementation of the Upper Hunter Strategic Assessment and the associated purchase of ecosystem credits.

This philosophy is used as a basis for the following managing measures and practices.

Operational Procedures

As part of the EMS in operation at the Mine, there are a range of existing policies aimed at mitigating impacts to biodiversity. Prior to the clearing or impacting vegetation, the Land Disturbance Management procedure is followed which provides Mine staff with a process to be followed in order to obtain a Permit to Disturb. This permitting process is aimed at identifying potential impacts of the proposed disturbance and implementing measures to alleviate these impacts.

In addition, longer-term planning at the Mine has been undertaken to return appropriate levels of biodiversity to impacted areas as the Mine progresses as detailed in:

- Mine Operations Plan – Sets long term goals for the progression of the Mine and areas to be rehabilitated;
- Rehabilitation Management Plan – provides details regarding the implementation of rehabilitation activities in order to achieve the best rehabilitation outcomes for disturbed areas; and
- Mine Closure Plan – provides a framework for the end state of the Mine and final land use goals, including biodiversity goals, following the completion of the Project.

These plans would be reviewed and updated as necessary as part of the Project

Management and Monitoring

There is the potential for native fauna to be displaced from habitat during native vegetation clearing. To avoid adverse impacts on wildlife, significant ecological features associated with standing and dead timber would be assessed and monitored. A qualified and experienced fauna consultant would conduct pre-clearance surveys to ensure displaced wildlife is removed or relocated at the time of clearing.

The felling of trees would be undertaken between the months of March and August, avoiding times when tree hollows are used by dependant fauna for breeding purposes. If tree felling is required outside of this period, careful inspection of hollows would be undertaken by a qualified fauna ecologist, prior to and immediately after tree felling. Felled trees supporting hollows would be stockpiled for later use in rehabilitation activities.

Mining would be undertaken in a manner that would allow for the gradual dispersal of wildlife into surrounding lands, and the ongoing development of rehabilitated areas on lands already mined. Consequently, it is envisaged that the cumulative impacts on wildlife would be negligible, and no monitoring is considered necessary.

Offsetting

Offsetting the required amount of credits is the final option where impacts to biodiversity cannot be avoided or minimised. This RTSA has provided a calculation of the credits required in order to achieve the appropriate level of offsetting required by the Project. As previously detailed, this credit calculation was prepared by an accredited BioBanking assessor.

As part of the Project as described in the EIS and RTS, Bloomfield undertook reasonable steps to demonstrate that attempts have been made to obtain credits in accordance with the *Guidelines for the Mitigation of Coal Mining Impacts on Biodiversity, Upper Hunter Strategic Assessment* (OEH, 2016). A summary of these measures is detailed in **Table 3**.

Table 3 Reasonable Steps to Demonstrate Attempts to Secure Credits

Reasonable Steps	Bloomfield Group Actions
Check the approved public register for offset sites (currently the BioBanking public register) and have an expression of interest for credits on it for at least six months.	The Bloomfield Group listed its credit requirements on the Credits Wanted Register on 14 March 2016. No confirmation of credit availability was received prior to the publication of this report.
Liaise with an OEH officer and relevant local councils to obtain a list of potential sites that meet the requirements for offsetting.	Currently underway.
Consider properties for sale in the required area.	Currently underway. Bloomfield is reviewing available properties they may provide potential to source credits.
Provide evidence of why offset sites are not feasible – suitable evidence may include: <ul style="list-style-type: none"> - The unwillingness of a landowner to sell or establish an approved offset site. - The cost of an offset site itself should not be a factor unless it can be demonstrated the landowner is charging significantly above market rates. 	Subject to further investigation of the above points.

Bloomfield has reviewed the steps outlined in **Table 3** to incorporate the new credit requirement. Since confirmation of the new credit amounts, Bloomfield has incorporated the new number of credits required into their sourcing of offsets.

Commonwealth Referral

Pursuant to the provisions of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) projects that have the potential to impact upon matters of National Environmental Significance should be referred to the Commonwealth Department of Environment and Energy (DEE) to determine if additional assessment and approval requirements are necessary pursuant to that legislation.

The Project was referred (EPBC Act Referral No. 2014/7348) to the Department of Environment and Energy (Cwth) in September 2014. The Project was reviewed on the referral information. The referral information included consideration of the entire Project Area, including the Addendum Area, existing mining areas and areas that are likely to be mined between the time of referral and the determination of SSD_6300.

A decision on the referral was made by DEE on 21 November 2014 under Section 75 of the EPBC Act. This decision confirmed that the Project was not a controlled action. As a result of this decision no further assessment or approval of the Project was required pursuant to the EPBC Act.

Given that the Project was determined to be not a controlled action, and that this decision was made taking into consideration the entire site footprint, not just areas proposed to be disturbed as part of the Project, this decision remains valid for the portion of the Project area in question. Therefore no further assessment or evaluation of this area is required under the EPBC Act.

Conclusion

Should the Addendum Area be included in the Project disturbance area, an appropriate amount of offset credits have been determined by an accredited BioBanking practitioner, in consultation with OEH, to offset Project impacts.

2.2.2 Agricultural and Land Use

A detailed Agricultural Impact Statement (AIS) was prepared for the Project. This AIS formed Appendix O to the Project EIS. Following the identification of the Addendum Area, the same

agricultural consultant undertook additional assessment of that area. A copy of the of the AIS Addendum report is attached at **Appendix B** and the results summarised below.

Soils and Land Capability

The Addendum Area has historically been used as a native pasture with a history of beef cattle grazing in the same way that other areas within the Project Area have historically been used. That is the raising of wiener cattle for sales through the Singleton Cattle Yards at the ages of 7 – 9 months.

The soils of the Addendum Area were previously defined in the Soils and Land Impact Assessment (SLR, 2015) which formed Appendix P to the Project EIS. The report identified the Addendum Area as containing a mix of the following soil types:

- Eutrophic Brown Chromosol, and
- Subnatric Brown Sodosol.

These soils types are identified as having moderate (Eutrophic Brown Chromosol) to low (Subnatric Brown Sodosol) fertility.

Based on the assessment undertaken by SLR (2015), the majority of the 41 ha area comprises Class 4 – Moderate capability land. This land has moderate to high limitations for high-impact land uses. These limitations restrict the potential for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations require specialized management practices with a high level of knowledge, expertise, inputs, investment and technology.

A small component is Class 5 – Moderate-low capability land. This land has high limitations for high-impact land uses. Grazing can be conducted on this land at low stocking rates and low productivity levels. Other enterprise alternatives are limited and unlikely to be practical or viable with the additional management requirements of this land.

Agricultural Production Impact

The Agricultural Impact Statement attached to the Project EIS assessed an area of 170ha of lost production and determined a loss of agricultural production of between:

- \$30,072 per year based on 2014 cattle prices; or
- Up to \$45,108 per year at the maximum improved production level with higher inputs, using the 2015 prices for beef cattle. This is a production level of \$265 per hectare per year.

The additional 41 ha area is similar in agricultural capability to the entire 170 ha assessed for the EIS. The additional 41 ha would result in a production of an additional \$10,879 per year. This would increase the total value of lost production as a result of the Project to \$55,987 per year based on 2015 cattle prices.

Management Measures

The use of rehabilitation to return the final landform area to grazing productivity, where appropriate, would continue to be the Mine's primary management measure for minimising impact to agricultural production. This is achieved through remediating land and returning to pasture as soon as practical following the completion of mining.

Rehabilitated land has been in use for grazing since 2013 including an area of 67ha on the west pit out of pit emplacement area. Rehabilitation efforts have resulted in pastures which are demonstrating higher production capacities than the pre-existing native pastures. As discussed in **Appendix B** trials undertaken by the NSW Department of Primary Industries in association with the Upper Hunter Mining Dialogue, have demonstrated successfully the ability to return rehabilitated areas to grazing. It should be noted that the ability to return rehabilitated areas to grazing and minimise impact to agricultural production has not been factored into the revised prediction for loss of productivity. It is therefore considered that the revised prediction represents a worst case with actual impacts likely to be much lower.

A detailed description of the Project's proposed rehabilitation strategy is contained in Section 25.0 of the Project EIS and supported by the Rehabilitation Strategy which formed Appendix Q to the EIS.

These documents provide a detailed description of Bloomfield's proposed approach to rehabilitation and returning rehabilitated areas to pasture where appropriate.

Conclusion

The additional 41 ha area not available for grazing will result in an additional agricultural productivity loss of around \$10,879. However, the grazing undertaken on the 67 ha of rehabilitated land will more than compensate for this loss of agricultural grazing production on the 41 ha of native pasture.

3.0 Air Quality

Correspondence dated 15 November 2016 was received from the EPA following their review of the RTS report. The EPA raised additional questions in regards to:

- Providing clarifications in regards to properties that may experience exceedances of the PM10 24hour criteria;
- Further quantifying potential diesel fume emissions; and
- Potential impacts to receivers at Maison Dieu, the Country Acres Caravan Park and Maitland Diesel Service.

Each of these elements is discussed below and a formal response from the Project air quality specialist is provided at **Appendix D**.

3.1 Estimated 24-hour PM10 Impacts from the proposal

The EPA indicated that there is no comment regarding the six receptors assessed as experiencing additional exceedances on a cumulative basis but not exceeding due to Project-only emissions.

The Project Air Quality Impact Assessment (AQIA) provides a comprehensive assessment of the potential cumulative 24-hour PM10 impacts that may arise due to the Project. In Section 9.6 of the AQIA, the assessment examines cumulative 24-hour PM10 impacts. The assessment follows the EPA's approved methods, and is made by conducting a detailed analysis at ten receptors, including the six receptors that EPA appears to be referring to (R19, R51, R140, R151, R163 and R164).

The executive summary in the AQIA also identifies that nine receptors are predicted to experience elevated dust impacts. All of these receptors are predicted to experience cumulative annual average dust levels above the applicable NSW EPA impact assessment criteria and the criteria in the NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP).

When reviewing the results of the AQIA the differences between the NSW EPA impact assessment criteria and the VLAMP impact assessment criteria for 24-hour average PM10 impact need to be recognised. The EPA criterion identifies impacts that may or may not be significant. The VLAMP identifies a subset of the EPA impacts that are significant at two levels:

- Significant enough to warrant mitigation; and
- Significant enough to warrant acquisition.

The AQIA makes comment in regard to these receptors and predicted that they would experience additional cumulative 24-hour average PM10 impacts per the EPA assessment criteria, but that the impacts are not significant (i.e. acceptable per the VLAMP without the need for mitigation or acquisition).

The EPA has taken data from Section 9.6 for the six receptors and has presented this data in its summary of impacts. Thus it must be aware of this section of the report. However it is not clear why the EPA does not appear to acknowledge that

Reference is made to Section 9.6 of the AQIA which concludes that "All other privately owned receptors would experience less impacts (except Receptor 1, which has an agreement in place with the Project)."

3.2 Diesel Emissions

The EPA note that the estimated change in PM2.5 diesel combustion generated emissions as detailed in the RTS report is considerably greater than that of PM10 emissions. EPA notes that the RTS provided additional information in regards to diesel emissions generated from haul road traffic however needs to consider other diesel emissions sources such as from loaders and dozers.

The changes in the PM2.5 emissions are calculated as instructed by EPA and are clearly shown in the information previously submitted. The table also shows the changes in the PM2.5 impacts, which are of primary relevance to the assessment of impacts arising due to the Project. Whilst, the changes in

the PM_{2.5} emissions presented to the EPA are considerably greater than the changes in PM₁₀ emissions (i.e. 11.1% vs 1.3%), the changes in the PM_{2.5} impacts are also presented to the EPA in the same table and are clearly inconsequential to the assessment. For example, the EPA was advised that the maximum predicted PM_{2.5} impact due to the Project is 1 µg/m³ at the most impacted private receptor, and similarly that the maximum predicted change in PM_{2.5} impact due to the Project is 0.1 µg/m³.

It is further noted in the previously provided response that revisions to the Project due to the acquisition of the Integra mine would result in the maximum impacts being lower than presented, and quantifies this to be approximately 20% less than shown. Therefore the maximum PM_{2.5} impact would be approximately 0.8 µg/m³ due to the Project, and the change in PM_{2.5} impact would be approximately 0.08 µg/m³. This change in the level of impact would have no bearing on the conclusions or findings of the assessment.

For clarification, the estimate of PM_{2.5} emissions includes consideration of all sources, including loaders and dozers are included in the modelling and in the assessment of potential impacts.

3.3 Potential Impacts at Maison Dieu, Country Acres Caravan Park and Maitland Diesel Service

The EPA considered that cumulative assessment documentation is incomplete. Not all the receptors assessed as experiencing additional days exceeding the 24-hour PM₁₀ cumulative impact assessment criterion are identified in the assessment documents.

As described in **Appendix D**, the AQIA provides a comprehensive assessment of cumulative 24-hour PM₁₀ impacts is the subject of approximately 25% of the AQIA in the EIS and additional assessment work that has been conducted as requested by the EPA. The impacts at these identified receivers are described as:

- The number of days of cumulative 24-hour PM₁₀ impact at the most impacted private receptors in the Gowrie and McDougal's Hill area is not more than 5 days of impact in the year of greatest impact, and all other receptors in this area would have less additional days of impact at all other times.
- The one additional day of cumulative 24-hour PM₁₀ impact at the most impacted receptor in the area that the EPA now defines as Maison Dieu, in the year of greatest impact, is approximately 51.6 µg/m³. The impact arises due to a small increase in impacts from the Project when the background level is 50.0 µg/m³. The next most impacted receptor would experience a reduction in impacts due to the Project on this day, and is predicted to experience only one day of impact at a level of 50.1 µg/m³ when the background level is 48.2 µg/m³. On the basis of these results and as it is known that the impacts due to the Project at all other receptors in this locality will be lower, it is estimated that there would not be additional days of impact due to the Project at any other receptor, beyond that presented in the assessment. If however there are additional days of impact, any such effect due to the Project would be low and well within the level of accuracy or measurement in the OEH monitoring equipment.

If the EPA wishes to conduct a more comprehensive review of the provided information in regards to these receptor reference is made to the detailed time series assessment of cumulative impacts at the most impacted receptors as provided in the AQIA, specifically Figures 9.2 to 9.9 in the AQIA, and the updated figures provided in the RTS for receptor R45. This shows a general decrease in impacts over the life of the Project

4.0 Management Measures

The management and mitigation measures presented in the Project EIS, and updated in the RTS report, which are applicable to both ecology and agricultural impacts are detailed in **Table 4**.

Table 4 Ecology and Land Management Mitigation Measures

Ref#	Factor	Management and Mitigation Measures	Timing
Ecology			
13.5	Potential impacts to biodiversity	Mine planning will avoid the removal of vegetation and habitat where reasonable and feasible.	Duration of the Project
13.5	Potential impacts to biodiversity	Vegetation and habitat will only be removed in a staged manner with the inspection of habitat trees carried out before and during felling operations.	Duration of the Project
13.5	Potential impacts to biodiversity	Upper Hunter Strategic Assessment ecosystem credits will be purchased, or equivalent via a VPA or agreement with the Minister for the Environment.	Duration of the Project
13.5.1	Potential impacts to biodiversity	The Mine will provide offsets in accordance with the Upper Hunter Biodiversity Plan including monetary contributions to the Upper Hunter Offset Fund as calculated through OEH calculators.	Duration of the Project
13.5.2	Potential for native fauna to be displaced from habitat during native vegetation clearing.	Significant ecological features associated with standing and dead timber will be assessed and monitored. A qualified and experienced fauna consultant will conduct pre-clearance surveys to ensure displaced wildlife is removed or relocated at the time of clearing.	Duration of the Project
13.5.3	Potential for native fauna to be displaced from habitat during native vegetation clearing.	Inspection of hollows will be undertaken by a qualified fauna ecologist prior to and immediately after tree felling. Felled trees supporting hollows will be stockpiled for later use in rehabilitation activities.	Duration of the Project
Soil, Land Capability and Land Use			
14.7	Geotechnical Stability Management	The Mine stability monitoring program will continue to be implemented for the duration of the Project.	Duration of the Project
14.7	Geotechnical Stability Management	Prior to Mining activities reaching the extent of the 2026 conceptual Mine Operations Plan (whether that occurs before or after 2026), 3D mathematical computer modelling of the rest of Project (2026 – 2037) mining stability will be undertaken to reassess the potential stability impact of ongoing mining.	Prior to Mining activities reaching the extent of the 2026 conceptual mine plan
14.7	Soils Management	A soil stripping and management plan will be prepared to guide all topsoil stripping activities. As a minimum the management plan will include the following measures: <ul style="list-style-type: none"> Details regarding appropriate soil stripping depths for the various soil types across the Mine. The planned usages of anticipated top soil volumes as they become available. Stripping 	Duration of the Project

		<p>and stockpiling quantities will be matched to the Mine's ability to reuse stockpiled topsoils to minimise the time it is stockpiled.</p> <ul style="list-style-type: none"> • Soil will preferably be stripped in a slightly moist condition. Material will not be stripped in either excessively dry or wet conditions. Whilst mining and construction schedules dictate stripping times, consideration should be given to near term weather forecasts. • Stripped material will be placed directly onto areas to be rehabilitated and spread immediately (if mining sequences, equipment scheduling and weather conditions permit) to avoid the requirement for stockpiling. Stockpiles will not be placed near major drainage lines. • Soil will be graded or pushed into windrows with graders or bulldozers for later collection by open bowl scrapers or for loading into rear dump trucks by front-end loaders. • Soil transported by dump trucks will be placed directly into storage. Soil transported by scrapers will be pushed to form stockpiles by other equipment (e.g. bulldozer) to avoid tracking over previously laid soil. • The surface of soil stockpiles will be left in as coarsely structured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established. • As a general rule, a maximum stockpile height of 3 m will be maintained. Clayey soils will be stored in lower stockpiles for shorter periods of time compared to coarser textured sandy soils. • If long-term stockpiling is planned (i.e. greater than 12 months), stockpiles will be seeded and fertilised as soon as possible. An annual cover crop species that produces sterile florets or seeds should be sown. • Prior to re-spreading stockpiled topsoil onto reshaped overburden, an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and / or "scalping" of weed species prior to topsoil spreading. • An inventory of available soil will be maintained to ensure adequate topsoil materials are available for planned rehabilitation activities. • Topsoil will be spread, treated with fertiliser and seeded in one consecutive operation. 	
14.7	Post Mining Land Use Agriculture	A Mine Operations Plan will be prepared and implemented in consultation with DRE to establish a rehabilitation framework.	Commencement of Project
14.7	Post Mining Land Use Agriculture	The existing Rehabilitation Management Plan will be reviewed and updated to include areas to be disturbed and rehabilitated as part of the Project. This will include the rehabilitation of proposed agricultural areas to establish ecosystems for grazing.	Commencement of Project

5.0 Conclusion

This Response to Submissions Addendum Report has assessed potential impacts of the Rix's Creek Continuation of Mining Project on a 41ha portion of the Mine site referred to as the Addendum Area. The Addendum Area is currently being reviewed by DP&E to confirm whether it is within the existing Mines approved disturbance boundary or the Project disturbance area. Should this not be the case, this RTSA details the required level of biodiversity offset credits required in order to offset the Project. This equates to 4,058 offset credits for the Project when incorporating the Addendum Area. The revised credit calculation was undertaken by an accredited BioBanking practitioner in consultation with the OEH.

The review of the agricultural production potential of the Addendum Area concluded that based on 2015 cattle prices the removal of the Addendum Area from grazing would potentially result in a loss of \$10,879 per year. This loss in production is considered negligible in the context of the Project and its resulting economic benefits. Regardless Bloomfield intends to continue to maintain its rehabilitation strategy and return appropriate areas to grazing following the completion of mining. This would further reduce and potentially offset the loss of grazing land as a result of the Project.

A review of the management measures included in the RTS Report has been undertaken. This review concluded that the management measures as previously proposed would continue to apply to the Project. Should DP&E conclude that the Addendum Area falls outside the boundaries of the existing approved disturbance area, this RTSA has demonstrated that it can suitably be included in the Project and potential impacts be appropriately offset.

Additional questions raised by the EPA in relation to the Project AQIA have been addressed. It is considered that the information previously provided in the EIS, AQIA and RTS report have adequately addressed all air quality assessment requirements.

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Appendix A

OEH Credit Calculation

Appendix A OEH Credit Calculation

23 November 2016

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PO Box 506
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John Hindmarsh

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Re: Rix's Creek BioCertification Calculation

Dear John,

This letter provides the results of the ecosystem credits and landscape scores calculated for the Rix's Creek development. The vegetation data (plot and transects) were provided by Stephen Bell of Eastcoast Flora Survey, with impact areas provided by Rix's Creek Pty Ltd. These credit calculations build on work by Colin Driscoll of Hunter ECO, which have previously been audited by Paul Hillier of the Office of Environmental and Heritage.

Two separate calculations were undertaken:

- 1) The entire footprint occupying a total area of 219 ha (including the expansion area), to verify the accuracy of updated calculations when compared with previous calculations; and
- 2) The expansion area only, which occupies 40.92 ha, and has not been assessed independently, up until this point.

The credit calculations were completed by myself (BioBanking Accreditation Number, No 191) and are provided in Appendix A.

Yours sincerely

A handwritten signature in black ink, appearing to read 'E Dodd'.

Eugene Dodd
Senior Ecologist
edodd@emmconsulting.com.au

Appendix A

Table 1 **Biocertification credits and landscape scores**

Vegetation zone details	Vegetation zone area	Percent cleared value	EEC	Red Flag	Loss of SV score	LV score (certification area)	Landscape Tg value	Area of veg zone certified	Number of credits required	Gain SV score offset	10 percent good mgmt (offset)	LV score offset
Entire area												
HU812_Moderate/Good_Zone 1 Forest Red Gum grassy open forest on floodplains of the lower Hunter	0.81	0	Yes	Yes	72.40	16	0.56	0.81	29	15.60	7.24	21
HU906_Moderate/Good_Zone 2 Bull Oak grassy woodland of the central Hunter Valley	0.1	53	No	Yes	47.92	16	0.57	0.1	2	16.08	4.79	21
HU945_Moderate/Good_Zone 3 Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley	0.36	62	Yes	Yes	63.33	16	0.62	0.36	11	18.67	6.33	21
HU819_Moderate/Good_Zone 4 Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter	21.23	32	Yes	Yes	56.60	16	0.58	21.23	606	14.40	5.66	21
HU962_Moderate/Good_Zone 5 Grey Box grassy open forest of the Central and Lower Hunter Valley	1.01	0	No	Yes	45.83	16	0.56	1.01	25	19.17	4.58	21
HU819_Low_Zone 7 Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter	195.49	32	Yes	No	30.73	16	0.58	195.49	3385	19.27	3.07	21
Total	219								4058			
Expansion area only												
HU812_Moderate/Good_Zone 1 Forest Red Gum grassy open forest on floodplains of the lower Hunter	0.01	0	Yes	Yes	72.40	16	0.56	0.1	4	15.60	7.24	21

Table 1 **Biocertification credits and landscape scores**

Vegetation zone details	Vegetation zone area	Percent cleared value	EEC	Red Flag	Loss of SV score	LV score (certification area)	Landscape Tg value	Area of veg zone certified	Number of credits required	Gain SV score offset	10 percent good mgmt (offset)	LV score offset
HU819_Moderate/Good_Zone 4 Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter	3.4	32	Yes	Yes	45.49	16	0.58	3.4	81	26.51	4.55	21
HU962_Moderate/Good_Zone 5 Grey Box grassy open forest of the Central and Lower Hunter Valley	0.39	0	No	No	31.25	16	0.56	0.39	7	19.75	3.13	21
HU819_Low_Zone 7 Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter	37.12	32	Yes	No	20.83	16	0.58	37.12	484	19.17	2.08	21
Total	40.92								576			

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Appendix B

Accredited BioBanking Practitioner Credit Calculation

Appendix B Accredited BioBanking Practitioner Credit Calculation



**Office of
Environment
& Heritage**

DOC16/537754-1
SSD 6300

Mr John Hindmarsh
Senior Environmental Officer
Rixs Creek Pty Limited
jhindmarsh@bloomcoll.com.au

Dear Mr Hindmarsh

Information requirements for the revised footprint of the Rixs Creek Coal Mine Extension Project

I refer to the outcomes of the meeting between Rixs Creek Pty Limited and the Office of Environment and Heritage (OEH) on 27 October 2016, discussing the biodiversity requirements to address the addition of 40.98 hectares to the footprint of the Rixs Creek Coal Mine Extension Project.

This letter has been prepared to provide Rixs Creek with guidance on what information is required to ensure that the Rixs Creek Coal Mine Extension Project remains consistent with the draft Biodiversity Management Plan under the Upper Hunter Strategic Assessment (UHSA). Please note, since the preparation of OEH's comments on the public exhibition of the Environment Impact Statement (EIS), updates to the draft Biodiversity Management Plan have occurred. The latest requirements are reflected in this letter.

If you require any further information regarding this matter please contact Robert Gibson, Regional Biodiversity Conservation Officer, on 4927 3154.

Yours sincerely

 18 NOV 2016

RICHARD BATH
Senior Team Leader Planning, Hunter Central Coast Region
Regional Operations

Enclosure: Attachments A, B and C

ATTACHMENT A: INFORMATION REQUIREMENTS FOR THE REVISED FOOTPRINT OF THE RIXS CREEK COAL MINE EXTENSION PROJECT

The details below outline the information requirements for the Rixs Creek Coal Mine Extension Project to be consistent with the UHSA. The document being prepared must address each of the below points. It is probable that several information requirements can be met by referring to information provided in the publically exhibited EIS, response to public submission or other publically available documents.

Requirements for maintaining consistency with the Upper Hunter Strategic Assessment

The additional response to public submission document must fulfil the following requirements. OEH recommends that the document refer to a revised footprint that considers the whole impact of the Project, rather than attempting to address the additional 40.98 hectares in isolation.

- The report components that relate to the Biodiversity Certification Assessment Methodology (BCAM) must be prepared by an accredited assessor.
- Ensure that all information requirements listed in Appendix A of the Biodiversity Certification Operational Manual (2015), available from the OEH website, are met.
- The report will consider and describe all reasonable measures to avoid impacts on biodiversity and will provide reasons why impacts cannot be further avoided.
- The report must include details of how the proponent has applied the *Guidelines for the mitigation of coal mining impacts on biodiversity* (Attachment B). In determining the reasonableness of measures aimed at minimising impacts on biodiversity, a proponent can also take into account:
 - industry best practices and standards that avoid and minimise impacts
 - the proportion of the total cost of the major project that is dedicated to biodiversity protection
 - the risk of failure of the mitigation measure.
- State the number and type of biodiversity credits required to offset the development as calculated using the BCAM credit calculator (Attachment C).
- Prepare a figure and state the area of vegetation within the project area that conforms to the Central Hunter Valley Eucalypt Forest and Woodland (CEEC).

ATTACHMENT B: APPENDIX C OF UHSA - GUIDELINES FOR THE MITIGATION OF COAL MINING IMPACTS ON BIODIVERSITY

(Please see separate attachment)

ATTACHMENT C: BIODIVERSITY CREDIT CALCULATIONS

Biodiversity value	Result	Comment	
Landscape value			
Size of assessment circle	2000		
Native veg cover – Before clearance	11-20 (19%)	Vegetation used has been derived from the Greater Hunter vegetation map. Calculations treated vegetation within the approved disturbance boundaries as cleared land.	
Native veg cover – after clearance	11-20 (17%)		
Adjacent remnant area	501		
Connectivity value	Local biodiversity link		
Landscape value score	16		
Vegetation and credit calculations			
BVT	Area (ha)	Ecosystem Credit	Comment
Zone 1_Forest Red Gum grassy open forest	0.81	29	
Zone 2_Bull Oak grassy woodland	0.10	2	
Zone 3_Swamp Oak - Weeping Grass grassy riparian forest	0.36	11	
Zone 4_Narrow-leaved Ironbark - Native Olive shrubby open forest	21.23	606	
Zone 5_Grey Box grassy open forest	1.01	25	
Zone 7_Narrow-leaved Ironbark - Native Olive shrubby open forest (DNG)	195.49	3,385	
Total	219.00	4,058	

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Appendix C

Agricultural Assessment

Appendix C Agricultural Assessment



NEIL NELSON AGVICE P/L

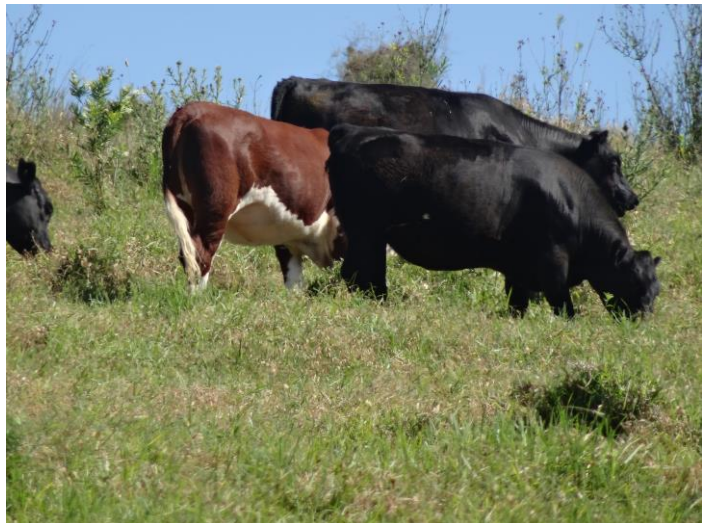
Agricultural Consultancy Services

Rix's Creek Continuation of Mining Project

Agricultural Impact Assessment

Addendum: Additional 41 ha

November 2016



Report prepared by

Neil Nelson, BScAgr, MAppSc

Principal Neil Nelson Agvice P/L

Agricultural Consultancy Services

Singleton NSW

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Agricultural Impact Assessment

Addendum (41 ha additional land)

An additional area inside the current mining consent is to be assessed for agricultural impacts.

In the Rix's Creek continuation project this area was described as being disturbed under the current development consent approval DA49/94. To date the area has not been disturbed and was not assessed previously for loss of agricultural production.

The additional area covers 41 ha and consists of native pastures that have had a history of beef cattle grazing as part of a larger grazing enterprise. Management has been similar to that described in the original assessment. The beef cattle enterprise was conducted as part of the whole farm cattle breeding enterprise. Weaner cattle and cull cows are the main production from the area. Weaners are young stock sold through Singleton Saleyard generally at 7-9 months of age.

This beef enterprise is a common one conducted in the Hunter Valley region, particularly on lower quality pasture types.

The low productivity of the pastures is a consequence of the low natural fertility of the soils which support native pasture types with some introduced species.

Soils

The Soils and Land impact Assessment study conducted as part on the EIS (Appendix P) covered this 41 ha area.

Soil types found over this 41ha area include:-

- Eutrophic Brown Chromosol, and
- Subnatric Brown Sodosol.

Eutrophic Brown Chromosol soils were located within the steeper mid to upper slopes and ridgelines. They are limited to pockets of less than 20ha and are not contiguous.

These soils are of moderate fertility. The topsoil's are shallow in depth and slightly acidic. They have moderate Cation Exchange Capacities and are non-saline and non sodic, with moderate Organic Carbon levels. The subsoil's are mildly – moderately alkaline, heavy clay's with strong structure and high cation exchange capacity. They are sodic and imperfectly drained.

This soil type is potentially more productive for grazing enterprises than the more common subnatric brown sodosol's, though the available phosphorus in the topsoil is still low.

Subnatric Brown Sodosol soils have low natural fertility levels. The topsoil's are generally moderately acidic and non-saline, with moderate cation exchange capacity. Subsoil's are moderately alkaline, sodic, imperfectly drained and can be saline. Soil analyses (Appendix 1) show that topsoil organic carbon levels are low –moderate (under permanent native pasture).

Typically the topsoil's of these Subnatric Brown Sodosol's have a poor balance of cations, with the calcium/magnesium ration being low – very low and exchangeable sodium levels elevated.

Available soil phosphorus levels in the topsoil's are low. This limits the productivity of these soils and the types of pastures that can persist at these fertility levels.

These soils have low topsoil fertility and poor quality subsoil's, resulting in limitations for agriculture. Low intensity grazing of permanent pastures is the most common enterprise conducted on these soils.

Land Capability Impact Assessment.

The majority of the 41 ha area comprises Class 4 – Moderate capability land. This land has moderate to high limitations for high-impact land uses. These limitations restrict the potential for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations require specialized management practices with a high level of knowledge, expertise, inputs, investment and technology.

A small component is Class 5 – Moderate-low capability land. This land has high limitations for high-impact land uses. Grazing can be conducted on this land at low stocking rates and low productivity levels. Other enterprise alternatives are limited and unlikely to be practical or viable with the additional management requirements of this land.

The limitations need to be carefully managed to prevent long-term degradation.

Loss of Agricultural Production

The Agricultural Impact Statement for the continuation project looked at 170 ha of lost production and determined a loss of from \$30,072 at 2014 cattle returns, up to \$45,108 at the maximum improved production level with higher inputs, using the 2015 prices for beef cattle. This is a production level of \$265 per hectare per year.

The additional 41 ha area is similar in agricultural capability to the entire 170 ha accessed for the EIS. The additional 41 ha would produce an additional \$10,879. This would increase the total value of lost production to \$55,987 using 2015 cattle prices.

Mitigation Measures DRAFT 2

Rehabilitated land is being grazed at Rix's Creek mine. The rehabilitated land is providing additional agricultural production in the form of beef cattle production. The productivity of the rehabilitated pasture is proving to be higher than the natural pasture base.

An area of the rehabilitation has been fenced off and grazed since the beginning of 2013. The area comprises 67 ha on the west pit out of pit overburden emplacement.

The rehabilitated area is a product of the rehabilitation methodology that has been explained in detail in the Rehabilitation Strategy Appendix Q of the EIS.

It has resulted in a pasture dominated by tropical summer grasses that are expressing a higher productivity for beef production than the original natural pastures.

Trials conducted at the site have indicated that the land is expected to be capable of higher productivity.

Comparisons of Pasture Productivity

Trials have been conducted at Rix's Creek mine, monitoring pasture quality; pasture quantity and species composition of the pasture under four different fertilizer treatments, with a comparison to native pasture. The trials show that the improved pasture species sown on rehabilitated sites were capable of producing more productive pastures that also have higher forage quality compared to local undisturbed native pastures.

Pasture grown on rehabilitated areas treated with biosolids produced more pasture, green leaf and total leaf dry matter over the two year trial period than other treatments and native pasture.

Biosoils is an integral part of the rehabilitation practice implemented across the Rix's Creek mine site. It provides a source of nutrient and organic matter and has been used for many years due to the improved rehabilitation results achieved with its use. The trial shows that the advantages can result in greater beef cattle productivity when the rehabilitated land is grazed.

The ability of rehabilitated pasture to have higher productivity than native pasture has also been shown by several grazing trials conducted across the Upper Hunter.

NSW Department of Primary Industries (with support from the Upper Hunter Mining Dialogue) has conducted trials on two different mines in the Upper Hunter. A larger, scientifically analyzed trial has been conducted over a longer period by Glencore at their Liddell mine. The four years of trial has experienced a range of seasonal conditions during the comparisons..

These trials have compared the growth rates of steers grazing pastures sown on land rehabilitated after mining with the growth rates of steers grazing adjacent native pasture sites. Comparison across the two studies and the three sites has shown that steers grazing rehabilitated pasture land have achieved growth rates equal to or well above steers grazing adjoining undisturbed native pastures. Tropical pasture grasses sown into the rehabilitated sites are able to provide higher pasture productivity than many of the native pasture species (Griffiths, McCormack and Nelson, 2016).

The pastures remained stable with pasture grass composition not changing more than normal seasonal variation and ground cover remained above 70 percent throughout the studies. Where soil fertility is highest the productivity level on the rehabilitated pastures is greater.

The studies indicated that the stocking rates could have been higher in some rehabilitated sites due to surplus herbage being available for grazing.

These formal trials support the Rix's Creek data that sustainable beef production can be conducted at higher production levels on rehabilitated pastures than native pasture.

The two studies, across the three sites provide strong evidence that with successful rehabilitation, selection of species and pasture management, rehabilitated mine land can be used for profitable grazing.

The 67 ha of rehabilitated land now being grazed would more than compensate for the lost agricultural production in the additional 41ha of native pasture unavailable for grazing.



Cattle grazing rehabilitated pastures at Rix's Creek west pit out of pit overburden emplacement.

Conclusion

The additional 41 ha area not available for grazing will result in an additional agricultural productivity loss of around \$10,879. However, the grazing undertaken on the 67 ha of rehabilitated land will more than compensate for this loss of agricultural grazing production on the 41 ha of native pasture.

References:

Griffiths, N.W, Mc Cormick, L.H and Nelson, N.R. (2016) "Grazing on rehabilitated mine land - Upper Hunter Study", Proceedings of Australian Grasslands Conference, Armidale, June 2016.

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Appendix D

Air Quality Response

Appendix D Air Quality Response

9 December 2016

John Hindmarsh
Senior Environmental Officer
Rix's Creek Pty Limited
Via email: jhindmarsh@rixs.com.au

RE: Rix's Creek Coal Mine Extension Project - Response to Environment Protection Authority's Air Quality Assessment Review RTS

Dear John,

The following outlines additional information and clarification to address the New South Wales (NSW) Environment Protection Authority (EPA) comments on the Response to Submissions (RTS) report in relation to the Rix's Creek Coal Mine Extension Project (SSD 6300). Each key EPA comment is shown in grey italics, and is followed by the response to the EPA comment.

Estimated 24-hour PM₁₀ Impacts from the proposal

There is no comment regarding the six receptors assessed as experiencing additional exceedances on a cumulative basis but not exceeding due to project-only emissions.

This is not correct.

Approximately 25% of the Air Quality and Greenhouse Gas Assessment Rix's Creek Continuation of Mining Project by Todoroski Air Sciences, August 2015, hereafter referred to as the AQA, is devoted to assessing the cumulative 24-hour PM₁₀ impacts that may arise due to the Project. For example:

- ✦ Pages 6 to 9 of the AQA outline the various criteria that were considered in regard to 24-hour PM₁₀ impact assessment (and other parameters).
- ✦ The opening three paragraphs of Section 9 – Dispersion Modelling Results note the complexity of cumulative 24-hour PM₁₀ impact assessments and direct the reader to Section 9.6 which is dedicated to assessing the cumulative 24-hour PM₁₀ impacts of the Project.
- ✦ Section 9.6 on pages 78 to 88 of the AQA presents an analysis of the potential 24-hour PM₁₀ impacts at these six potentially most impacted receptors covering eleven pages ;
- ✦ Appendix F of the AQA (appendix L of the EIS) covering 65 pages, presents a detailed analysis of the potential 24-hour PM₁₀ impacts at these six potentially most impacted receptors, individually and for each potential day of impact.

In Section 9.6 of the AQA, the assessment examines cumulative 24-hour PM₁₀ impacts in three areas where data is available for such an assessment. The assessment follows the EPA methods, and is made by conducting a detailed analysis at ten receptors, including the six receptors that EPA appears to be referring to (R19, R51, R140, R151, R163 and R164).

The executive summary in the AQA is one page long and identifies that nine receptors are predicted to experience elevated dust impacts. All of these receptors are predicted to experience cumulative annual average dust levels above the applicable NSW EPA impact assessment criteria and the criteria in the NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP).

The EPA may be overlooking the differences between the NSW EPA impact assessment criteria and the VLAMP impact assessment criteria for 24-hour average PM₁₀ impact.

The EPA criteria identifies impacts that may or may not be significant. The VLAM identifies a subset of the EPA impacts that are significant at two levels; significant enough to warrant mitigation, and significant enough to warrant acquisition.

The EPA comment may however arise simply because there is no comment about these six receptors in the executive summary of the AQA and the EPA believes that there should be. It is noted that it would be unusual for any executive summary to explicitly list and identify impacts that are not significant. To do so would be befuddling to the ordinary reader for which the summary is intended.

Thus it is not clear what the EPA concern may be.

As the EPA is not an ordinary reader, but is an expert reviewer, it is directed to the content and findings of the detailed assessment in the AQA and additional information it has been provided.

The cumulative PM₁₀ 24-hour average impact assessment in the AQA focuses on the most impacted receptor locations with reference to three locations surrounding the site where the data required to conduct this assessment are available. These receptor locations include the six receptors, which are not predicted to experience incremental impacts or cumulative annual average impacts.

The Assessment makes comment in regard to these six receptors and predicted that they would experience additional cumulative 24-hour average PM₁₀ impacts per the EPA assessment criteria, but that the impacts are not significant (i.e. acceptable per the VLAMP without the need for mitigation or acquisition).

The EPA has taken data from Section 9.6 for the six receptors and has presented this data in its summary of impacts. Thus it must be aware of this section of the report. However it is not clear why the EPA does not appear to acknowledge that Section 9.6, also concludes that *"All other privately owned receptors would experience less effects (except Receptor 1, which has an agreement in place with the Project)."*

Further comments in this regard are also provided in relation to the assessment of impacts at Maison Dieu.

Diesel Engine Emissions

The EPA advise the DPE that the change to estimated emissions of PM_{2.5} is considerably greater than that of PM₁₀ but has not been discussed. Additionally that:



- *The RTS has estimated emissions from diesel engines used on haul roads. This is only a part of the diesel engines that will be used for the proposal. Estimation of emissions from the use of diesel engines is incomplete as it does not include equipment such as loaders and dozers; and*
- *The gap in estimated emissions can be resolved by further information obtained should the proposal be approved. This includes information on:*
 - *Baseline diesel emissions based on as sold original engine manufacturer configuration;*
 - *In-service diesel emissions based on in-service operating configuration, incorporating the impact of any field efficiency or emission reduction measures or other engine modifications or changes implemented relative to the baseline engine condition; and*
 - *Best practice emission controls, considering all reasonable and feasible control management strategies.*

Noted.

The DPE should be advised that;

The changes in the PM_{2.5} emissions are calculated as instructed by EPA and are clearly shown in the table provided to EPA. The table also shows the changes in the PM_{2.5} impacts, which are of primary relevance to the assessment of impacts arising due to the Project.

Whilst, as the EPA states, the changes in the PM_{2.5} emissions presented to the EPA are indeed “considerably greater” than the changes in PM₁₀ emissions (i.e. 11.1% vs 1.3%), the changes in the PM_{2.5} impacts are also presented to the EPA in the same table and are clearly inconsequential to the assessment.

It is not clear why, in the context of an air quality impact assessment, the EPA does not advise DPE that the response to EPA’s request shows that the maximum PM_{2.5} impact and the change in the maximum PM_{2.5} impact is trivial. For example, the EPA was advised that the maximum predicted PM_{2.5} impact due to the Project is 1µg/m³ at the most impacted private receptor, and similarly that the maximum predicted change in PM_{2.5} impact due to the Project is 0.1µg/m³.

It is further noted that the response also advises EPA that revisions to the Project due to the acquisition of the Integra mine would result in the maximum impacts being lower than presented, and quantifies this to be approximately 20% less than shown. Thus the maximum PM_{2.5} impact would be approximately 0.8µg/m³ due to the Project, and the change in PM_{2.5} impact would be approximately 0.08µg/m³.

This change in the level of impact would have no bearing on the conclusions or findings of the assessment.

The impacts are discussed. The discussion concludes; *“Therefore to answer EPA’s question; it is not expected that there would be any significant change in total emissions, nor in resultant impacts.”*

Also, it is observed that the PM_{2.5} emissions from all sources, including loaders and dozers are included in the modelling and in the assessment of potential impacts. It is not clear why the EPA would imply otherwise.

Impacts of proposal included in section 16 and Executive Summary

The EPA advise that the RTS has clarified that the annotation ‘There are no days in the year assessed that have higher total levels than those shown in the table’ applied to tabulated PM₁₀ concentrations.



Noted.

Impacts at Maison Dieu, Country Acres Caravan Park, Maitland Diesel Service

The EPA believe that cumulative assessment documentation is incomplete. Not all the receptors assessed as experiencing additional days exceeding the 24-hour PM₁₀ cumulative impact assessment criterion are identified in the assessment documents.

The assessment of cumulative 24-hour PM₁₀ impacts is the subject of approximately 25% of the AQA in the EIS and additional assessment work that has been conducted as requested by the EPA.

The assessment is conducted per the EPA methods and is complete. It is not clear why the EPA believes otherwise.

As noted in the AQA, there are practical limitations in assessing cumulative 24-hour PM₁₀ impacts. Issues include that the actual background levels in reality will differ from those at the only available monitoring location (which may be many kilometres away), variance in the actual background levels across an area in any particular 24-hour period, or other factors such as the fixed location of sources in the model for every hour of the year, or the inherent overestimation of short term impacts that is built into the regulatory models used. It also needs to be understood that the level of accuracy of the OEH monitors in measuring the background PM₁₀ levels applied in the assessment is approximately +/- 25% (i.e. +/- 12.5 µg/m³ when the level is 50µg/m³).

The AQA assesses cumulative 24-hour average PM₁₀ impacts in the area of concern identified by the EPA (south east of the Project) per the EPA guidelines. This is done by way of a specific assessment at the most impacted private receptors in the locality, namely R61 and R140. These locations show potential additional exceedances above the EPA 24-hour PM₁₀ impact assessment criteria when applying data from the Singleton NW monitor to represent the background levels. The AQA concludes that *"All other privately owned receptors would experience less effects (except Receptor 1, which has an agreement in place with the Project)."*

The EPA nevertheless requested a specific further assessment of cumulative 24-hour average PM₁₀ impacts. The EPA request is specific to the Maitland Diesel Service (R20) and Country Acres Caravan Park (R45) and states *"The EPA requires the potential impacts at these receptors to be assessed."*

This was duly conducted as requested by the EPA.

The supplementary assessment results provided to the EPA re-affirm the AQA conclusions that cumulative 24-hour average impacts above the EPA criteria would occur in this area and that nearby receptors would not experience greater impacts that presented in the AQA. When examining the time series plots, the additional information provided further concludes that there would be *"a general decline in overall impacts over time"*.

The EPA defined that *"Maison Dieu lies behind an arc from receptor R140 and M18"*. This is an area to the southeast of the Project, and the EPA was specifically concerned about impacts in this area under prevailing north-westerly winds. The EPA has now changed its definition of Maison Dieu to an entirely different area which encompass receptors R149, R150, R165, R167, R168 and R169. The area that EPA now defines as Maison Dieu is to the east south-east of the Project, and there are no significant prevailing winds from the Project towards that location. This area is outside the area of any significant influence of impact due to Project.



This would be evident from any reasonable review of the predicted cumulative PM₁₀ isopleths (e.g. Figure E-13 in the AQA), the tabled results and the assessment of impacts that is provided to the EPA that shows that the Project has no significant impact at the locality that EPA now defines as Maison Dieu.

It is noted that EPA now defines as Gowrie and McDougal's Hill the area that it previously defined as Maison Dieu.

In regard to residences at Maison Dieu and similarly at Gowrie and McDougal's Hill, the EPA states that it *"agrees that a conservative assessment of [cumulative 24-hour average PM₁₀] impacts is available"*. The EPA correctly observes that the assessment at the most impacted locations in these area shows that cumulative 24-hour PM₁₀ impacts would occur on a few days per annum, and that impacts may also occur at receptors immediately near to the most impacted locations.

Although EPA transcribed the maximum number of days of impact at the most impacted locations in the AQA into its summary of impacts, the EPA does not appear to acknowledge that the AQA assessment show the impacts are small and that there would be less impact at all other receptors immediately near these most impacted locations.

It is possible that the EPA may be seeking an explicit assessment of cumulative 24-hour PM₁₀ impacts at all receptors where any additional day of impact may arise. As outlined in the AQA, this is not feasible or practical. To do this would take weeks of labour and add many hundreds of pages of additional tabulated data to the report. As there is no background data at each of the receptor locations with which to conduct such an assessment with any accuracy beyond that in the presented assessment, this would not add any further meaningful information to the assessment.

For example, the background monitoring levels recorded at the OEH Singleton NW monitor during 2012 indicate a level of 50.0µg/m³ on the 27 September 2012 and 49.9µg/m³ on the 21 October 2012. Thus any prediction of impact due to the Project that is equal to or greater than 0.05µg/m³ and 0.15 µg/m³ respectively would show an additional day of impact on these days. Similarly the OEH Maison Dieu monitor recorded a level of 50.0µg/m³ on 7 November 2012, and any Project impact equal to or greater than 0.05µg/m³ would result in an exceedance on this day in the vicinity of the monitor.

In the context that the measured data would be up to approximately 12.5µg/m³ higher or lower than measured at the monitor (and approximately up to more than 12.5µg/m³ higher or lower anywhere else), it is clear that any impacts predicted due to small changes in dust on such days of high background level are meaningless in any overall assessment of impact from the Project.

This Project, any other mining project in the upper Hunter, and most day to day activities conducted by an individual near an assessment location, such as mowing the lawn, using a bbq, farming activities, or the smoke from the wood heater from just one house would result in PM₁₀ levels equal to or greater than 0.05 µg/m³ at receptor in their near vicinity. Thus any additional such activity on the days when the recorded, representative background level is say 50.0 or 49.9µg/m³, would exceed the EPA criteria.

By way of example, at the most impacted receptor location 151 in the vicinity of what EPA has now defines as Maison Dieu, for modelling scenario Year 2023 (for the original most impacting phase of the Project which is now much less impacting in the revised Project), two days of additional exceedance occur due to the Project.



On the two days of additional impact, the predicted level of impact due to the Project is respectively 2.0 and 1.9 $\mu\text{g}/\text{m}^3$ and the background level is 50.0 and 48.2 $\mu\text{g}/\text{m}^3$ leading to an impact of 52.0 and 50.1 $\mu\text{g}/\text{m}^3$ (see Table F-65 of the AQA, but note that the predicted Project impacts are reduced approximately 20% in the revised Project, leading to a single day of impact at a level of approximately 51.6 $\mu\text{g}/\text{m}^3$).

It is reasonable to assume that the EPA would already understand that there must be some reasonable cut – off point in the level of detail that can be considered and presented in any reliable assessment of cumulative 24-hour PM_{10} impacts, (and especially in any one page executive summary).

For clarity, as the impact from the Project in the areas now defined as Maison Dieu by the EPA is not significant, and represents a small fraction of the level of precision in the measurement data on the days of any potential concern, any further detailed assessment of cumulative impacts in this area is not reasonable or warranted. This was the case at the time the assessment was prepared in 2014, and is more so the case for the revised Project which has less impacts in the worst case year assessed.

Nevertheless, to specifically address the EPA comment the following response is provided:

1. The number of days of cumulative 24-hour PM_{10} impact at the most impacted private receptors in the Gowrie and McDougal's Hill area is not more than 5 days of impact in the year of greatest impact, and all other receptors in this area would have less additional days of impact at all other times.
2. The one additional day of cumulative 24-hour PM_{10} impact at the most impacted receptor in the area that the EPA now defines as Maison Dieu, in the year of greatest impact, is approximately 51.6 $\mu\text{g}/\text{m}^3$. The impact arises due to a small increase in impacts from the Project when the background level is 50.0 $\mu\text{g}/\text{m}^3$. The next most impacted receptor would experience a reduction in impacts due to the Project on this day, and is predicted to experience only one day of impact at a level of 50.1 $\mu\text{g}/\text{m}^3$ when the background level is 48.2 $\mu\text{g}/\text{m}^3$. On the basis of these results and as it is known that the impacts due to the Project at all other receptors in this locality will be lower, it is estimated that there would not be additional days of impact due to the Project at any other receptor, beyond that presented in the assessment. If however there are additional days of impact, any such effect due to the Project would be low and well within the level of accuracy or measurement in the OEH monitoring equipment.

It is trusted that the above information assists the EPA to adequately evaluate the assessment per its guidelines for conducting a cumulative 24-hour PM_{10} impact assessment.

If the EPA wishes to conduct a more comprehensive assessment, it may wish to consider the detailed time series assessment of cumulative impacts at the most impacted receptors, which shows a general decrease in impacts over the life of the Project (i.e. refer to Figures 9.2 to 9.9 in the AQA, and the updated figures in the Response to Submissions for R45).

Estimation of emissions from all bare ground

The comparison showed that the method used by Todoroski 2015 was moderately conservative, estimating total emissions from the mine to be approximately 230 tonnes compared to 165 tonnes for the detailed estimate and as such the EPA acknowledge that the issues has been clarified.



Noted.

Information on derivation of the emission rate of nitrogen dioxide from blasting

The RTS clarified that the value used was the maximum value listed by the CSIRO in their study of Hunter Valley blasts. This was chosen because the study found no correlation between the amount of explosive used and the resulting production of nitrogen dioxide.

Noted.

Please feel free to contact me directly to clarify any aspect of this letter.

Yours faithfully,

Todoroski Air Sciences



Aleks Todoroski

