ADDENDUM TO THE ASSESSMENT REPORT
BENGALLA CONTINUATION PROJECT

1. Air Quality

Introduction

The Department's assessment of the Bengalla Continuation Project (November 2014) identified potential exceedances of the 24-hour PM_{10} air quality criterion at 16 receivers around the mine, and an additional 7 receivers where the project would contribute to dust emissions greater than the annual average PM_{10} criteria (i.e. 23 in total).

When it prepared the assessment report, the Department was unable to determine whether these properties should be granted voluntary acquisition or mitigation rights under the *Voluntary Land Acquisition and Mitigation Policy*, and sought additional information from BMC to help clarify the likely impacts of the project on this land.

BMC engaged Todoroski Air Sciences to revise its modelling of predicted 'project-alone' 24-hour PM_{10} impacts at key receivers around the mine, including consideration of vacant land. This assessment includes consideration of the predicted impacts with and without a real-time reactive dust mitigation strategy for the mine (see Appendix A).

A further assessment was undertaken by Todoroski Air Sciences to assess the number of predicted exceedances of the 24-hour PM_{10} criteria at two vacant lots (Receivers 215 and 216) (see Appendix B).

For reference, the applicable air quality criteria under the *Voluntary Land Acquisition and Mitigation Policy* are reproduced below.

Table 1: *Particulate Matter Mitigation Criteria – Voluntary Land Acquisition and Mitigation Policy*

POLLUTANT	AVERAGING PERIOD	MITIGATION CRITERION		IMPACT TYPE
PM_{10}	Annual	30 µg/m^3*		Human health
PM_{10}	24 hour	50 µg/m^3**		Human health
Total suspended particulates (TSP)	Annual	90 µg/m^3*		Amenity
Deposited dust	Annual	2 g/m^2/month**	4 g/m^2/month*	Amenity

* Cumulative impact (i.e. increase in concentrations due to the development plus background concentrations due to all other sources).

** Incremental impact (i.e. increase in concentrations due to the development alone), with zero allowable exceedances of the criteria over the life of the development.

Table 2: *Particulate Matter Acquisition Criteria – Voluntary Land Acquisition and Mitigation Policy*

POLLUTANT	AVERAGING PERIOD	ACQUISITION CRITERION		IMPACT TYPE
PM_{10}	Annual	30 µg/m^3*		Human health
PM_{10}	24 hour	50 µg/m^3**		Human health
Total suspended particulates (TSP)	Annual	90 µg/m^3*		Amenity
Deposited dust	Annual	2 g/m^2/month**	4 g/m^2/month*	Amenity

* Cumulative impact (i.e. increase in concentrations due to the development plus background concentrations due to all other sources).

** Incremental impact (i.e. increase in concentrations due to the development alone), with up to 5 allowable exceedances of the criteria over the life of the development.

Incremental 24-Hour PM_{10} Impacts (Project-Alone)

With the reactive dust management measures in place, the revised modelling predicts that the project-alone 24-hour PM_{10} concentrations would exceed the criteria at 9 residences, of which all but one (Property 167) is already entitled to acquisition under either the Mt Pleasant or Mt Arthur development consents (see Table 3 and Figure 1).

Table 3: *Combined Predicted Exceedances of PM_{10} (24 hr) (50µg/m^3) Project Alone at Receivers*

ID	Prediction (days) Year 1	Prediction (days) Year 4	Prediction (days) Year 8	Prediction (days) Year 15	Prediction (days) Year 24	Project cumulative AQ ZOA	Project Noise ZOA
114	-	-	-	-	58 (1)	-	Y
118	-	-	-	62 (4)	67 (8)	Y	Y
119	-	-	-	-	51 (3)	Y	Y
155	-	-	-	-	59 (6)		Y
166	-	-	2 (1)	52 (1)	92 (44)	Y	-
167	-	-	-	-	54 (4)	-	-
168	-	56 (13)	90 (46)	83 (55)	211 (166)	Y	Y
169	-	-	-	52 (1)	88 (57)	Y	-
171	-	-	60 (10)	54 (3)	109 (83)	Y	-

The revised modelling also predicts that the 24-hour PM_{10} criteria would be exceeded as a result of the project over 25% of 4 parcels of land comprising contiguous lots of land under single ownership (see Table 4 and Figure 1).

Table 4: *Revised Modelling Predicted PM_{10} (24 hr) over 25% of Contiguous land in a single ownership*

ID	Name	Exceed Criterion (days) (50 µg/m3)
29	Jabetin Pty Limited	Year 4 (1) & Year 8 (1)
225-233	GC Sparre	Year 24 (1)
159-165, 186-187, 190-191	RB & SA Parkinson	Year 24 (1)
215 & 216	JH & CM Almond	Year 24 (1)

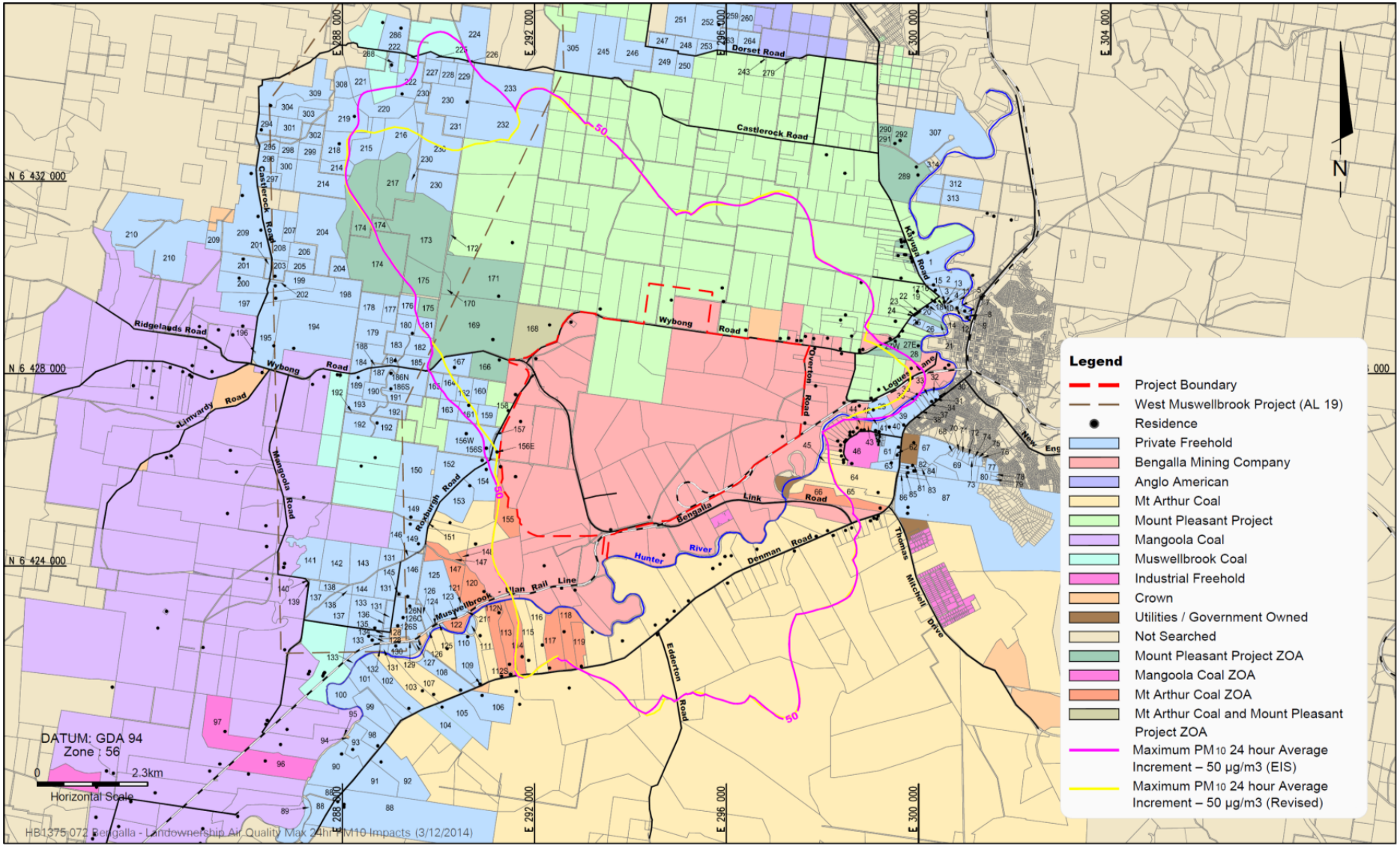

Figure 1: *Maximum 24-hour PM_{10} Impacts*

The *Voluntary Land Acquisition and Mitigation Policy* allows up to 5 exceedances of the project-alone short term 24-hour PM_{10} in regard to acquisition, but zero exceedances in regard to additional mitigation measures.

The Department has applied the policy to the revised modelling results for all air quality criteria. This has resulted in no additional properties in the air quality acquisition zone for the project apart from those that already have acquisition rights under either the Mt Arthur or Mt Pleasant approvals (see Table 5).

Table 5: *Land subject to acquisition upon request – Air Quality*

Receiver No	***Mine Acquisition Zone***
117, 118, 119, 155	Mt Arthur
166, 168, 169, 171	Mt Pleasant

In regard to mitigation, all properties with acquisition rights would also be entitled to additional air quality mitigation measures at the residence. In addition, under the *Voluntary Land Acquisition and Mitigation Policy*, properties 167 and 114 would also be entitled to additional air quality mitigation measures as these properties are predicted to exceed the short term 24-hour PM_{10} criteria on up to 4 days and 1 day respectively, over the life of the project.

As described in its Assessment Report, the Department recommends that BMC should only be liable for acquisition and/or mitigation where these rights are no longer available under the Mt Arthur and Mt Pleasant development consents.

Annual Average PM_{10} Impacts

The Department has also reviewed the cumulative air quality assessment commissioned by the Department for the Mangoola, Mt Arthur and Bengalla mines by Todoroski Air Sciences (January 2014). This assessment predicts annual impact criteria for PM_{10} (i.e. 30 µg/m^3) would be exceeded at 5 receivers (118, 119, 168, 292E and 292W).

The Bengalla project is predicted to contribute significantly to the air quality impacts at Receiver 168 (up to 29 µg/m^3), with a minor contribution at Receivers 118 (up to 7 µg/m^3) and 119 (up to 6 µg/m^3) and negligible contribution at the two residences on Receiver 292 (up to 1 µg/m^3).

However, the cumulative assessment indicates that properties 106 and 110 are not expected to experience exceedances of the cumulative annual average criteria. Consequently, the Department has removed reference to these properties in the acquisition zone in its recommended conditions (although both properties would retain additional noise mitigation rights).

Table 6 provides a summary of the predicted exceedances of the applicable air quality criteria based on the recently revised modelling of project-alone impacts, and the Department's regional cumulative assessment prepared in January 2014.

Table 6: *Revised Air Quality Exceedances*

Location	NO_2	PM_{10}		TSP	DD
	1 hour max	**24-hour Average (Increment)**	**Annual Average**	**Annual Average**	**Annual Average**
	246 µg/m^3	**50 µg/m^3**	**30 µg/m^3**	**90 µg/m^3**	**4 g/m^2/mth**
	Year (Impact)	**Year (# of days above criteria)**	**Year of Impact (Contribution/Impact)**		
114	-	Year 24 (1)	-	-	-
117	-	-	-	Year 24 (94)	
118	-	Year 15 (4) Year 24 (8)	Year 8 (5/32) Year 15 (7/36)	Year 24 (92)	-
119	-	Year 24 (3)	Year 15 (6/33)	Year 24 (92)	-
155	-	Year 24 (6)	-	-	-
166	-	Year 8 (1) Year 15 (1) Year 24 (44)	-	-	-
167	-	Year 24 (4)	-	-	-
168	Year 24 (277)	Year 4 (13) Year 8 (46) Year 15 (55) Year 24 (166)	Year 4 (17/32) Year 8 (20/43) Year 15 (29/42)	Year 24 (147)	Year 24 (5.5)
169	-	Year 15 (1) Year 24 (57)	-	-	-
171	-	Year 8 (10) Year 15 (3) Year 24 (83)	-	-	-
292	-	-	Year 24 (1/39)	-	-

Notes to Table:

1. *Receivers currently subject to acquisition rights under the Mt Arthur project approval are shaded blue.*
2. *Receivers currently subject to acquisition rights under the Mt Pleasant development consent are shaded green.*
3. *Receiver 168 is currently subject to acquisition under both Mt Arthur and Mt Pleasant planning approvals.*
4. *Receivers subject to acquisition upon request for noise impacts due to the Bengalla Continuation Project are shown **bold**.*

Noise

During BMC's review of the air quality impacts on surrounding receivers, it identified that a newly constructed residence on Property 167, and that the EIS had not assessed the potential noise impacts of the project at this residence.

The assessment of noise impacts at this receiver are based on the modelling in the EIS. This modelling indicates that noise levels are likely to exceed the project specific noise level by more than 3 dB (i.e. 38.3 dBA) during the day and evening periods, but would comply with the noise criteria at night.

The *Voluntary Land Acquisition and Mitigation Policy* provides that where the project specific noise levels are predicted to be exceeded by between 3 and 5 dBA and the development would contribute more than 1 dB to the total industrial noise level then the impacts are considered to be 'moderate' and the receiver should be entitled to a range of additional noise mitigation treatments.

Accordingly, the Department has recommended that Property 167 be afforded the right to request both additional noise and air quality mitigation at the residence to minimise the amenity impacts of the project. The Department has also recommended conditions requiring BMC to comply with applicable noise limits at this receiver.

Final Void

BMC examined a number of options for the final landform and final void at the mine in the EIS for the project (see Appendix A):

- Option 1 – 'Blast and Doze' the void to provide a stable final landform (i.e. the project);
- Option 2 – Backfill the void to the original surface level; and
- Option 3 – Backfill to re-establish natural drainage.

After considering the economic costs and environmental constraints of each option, the EIS concluded that option 1 is the only viable option.

Following the Department's request for further information to support this position, BMC also considered a fourth option, to reduce the amount mined in the last six strips to raise the floor of the final void.

For each of the 4 options, BMC compared the amount of additional material to be transported to complete the design landform, and the relative cost. A summary of this analysis is provided in Table 7.

Table 7: *Final void options analyis*

Final Void Option	Waste Volume (Mlcm)	Total Waste Cost ($M)
Option 1 – Blast & Doze	27	44
Option 2 – Backfill to Original Surface	339	1,017
Option 3 – Minimum Backfill	292	876
Option 4 – Raise Pit Floor	122	488

Mlcm = Million loose cubic metres

BMC's analysis indicates that the key issue for the three alternatives to the preferred option is the significant additional volume of earth that would need to be moved and shaped to achieve the final landforms, and the associated economic cost. Option 4 is also estimated to reduce the amount of coal that could be extracted by approximately 25 million tonnes. The Department also notes that the movement of significant amounts of additional material would have associated noise and air quality impacts.

Based on this further analysis, the Department accepts BMC's conclusion that the option proposed in the EIS (i.e. to retain a stabilised final void) remains the most economically and operationally viable option for the project.

However, the Department notes that it has recommended a range of conditions to manage the rehabilitation of the mine, including:

- specific rehabilitation objectives for incorporating micro-relief into the final landform and minimising the size and depth of the final void to the greatest extent practicable; and
- a detailed rehabilitation management plan that must be prepared in consultation with relevant government agencies and Muswellbrook Shire Council, and which incorporates the detailed measures that would be implemented to ensure compliance with the rehabilitation objectives, including the final landform, final void, and the potential final land uses for the site.

APPENDIX A – ADDITIONAL INFORMATION FROM BMC (9 DECEMBER 2014)

APPENDIX B – SUPPLEMENTARY AIR QUALITY AND NOISE ASSESSMENT 20 JANUARY 2015

APPENDIX C – RECOMMENDED REVISONS TO THE DRAFT DEVELOPMENT CONSENT CONDITIONS 1 TO 4 OF SCHEDULE 3

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Acquisition Basis	***Receiver No***
Noise	152, 153, 154, 156

Note: To interpret the land referred to in Table 1, see the applicable figure in Appendix 4.

2. If acquisition is no longer available for the owner of the land listed in Table 2 under the relevant mining approval shown in the table, and the Applicant receives a written request for acquisition from the owner of the land, then the Applicant shall acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 2: Land subject to acquisition upon request

Acquisition Basis	***Receiver No***	***Mine***
Noise	112, 113, 114, 120	Mt Arthur
Noise & Air	117, 118, 119, 155	
Noise & Air	166, 168, 171	Mt Pleasant
Air	169	

Notes: To interpret the land referred to in Table 2, see the applicable figure in Appendix 4.

ADDITIONAL MITIGATION UPON REQUEST

3. Upon receiving a written request from the owner of any residence on the land listed in Tables 1 and 2 (unless the landowner of that land has requested acquisition) and on the land listed in Table 3, the Applicant shall implement additional:
   (a) noise mitigation measures (such as double-glazing, insulation and/or air conditioning); and/or
   (b) air quality mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning),

   at any residence in consultation with the owner.

   These measures must be reasonable and feasible, and directed towards reducing the noise and/or air quality impacts of the development on any residence.

   If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 3: Land subject to additional noise and/or air quality mitigation upon request

Mitigation Basis	***Receiver***
Noise & Air Quality	167
Noise	105, 106[3], 108, 110[3], 126, 146, 156, 161[2], 169[2], 184
Air Quality	114[3]

Notes:
1. *To interpret the land referred to in Table 3, see the applicable figure in Appendix 4.*
2. *The Applicant is only required to provide additional mitigation for this property if these rights are no longer available under the development consent for the Mt Pleasant mine.*
3. *The Applicant is only required to provide additional mitigation for this property if these rights are no longer available under the project approval for the Mt Arthur mine.*

NOISE

Noise Criteria

4. Except for the noise-affected land in Tables 1 and 2, the Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Noise Criteria dB(A)

Location	***Day***	***Evening***	***Night***	
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
110, 156, 161	*40*	*40*	*40*	*45*
106, 108	*39*	*39*	*39*	*45*
27, 169	*39*	*39*	*36*	*45*
105, 126	*38*	*38*	*38*	*45*
22, 23, 24, 25, 29, 43, 44	*38*	*38*	*36*	*45*
167	*38*	*38*	*35*	*45*
19, 64, 66	*38*	*37*	*36*	*45*
180, 184, 186	*37*	*37*	*35*	*45*
146	*37*	*37*	*37*	*45*
102, 130, 145, 189	*36*	*36*	*36*	*45*
All other privately-owned residences	*35*	*35*	*35*	*45*

Note: To interpret the land referred to in Table 4, see the applicable figure in Appendix 4.

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy*. Appendix 5 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

APPENDIX D – REVISED DRAFT DEVELOPMENT CONSENT