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2 September 2019

Dianne Munro
Principal
Hansen Bailey
Via email: [redacted]

RE: Addendum to Air Quality Study for Rix's Creek South Continuation Project – Camberwell Impacts

Dear Dianne,
Todoroski Air Sciences has conducted further analysis of the existing modelling for the Rix's Creek South Continuation Project to present the potential cumulative annual average air quality impacts associated with the Project at land parcels in Camberwell. The additional land parcels are identified in **Figure A-1** and **Figure A-2** in **Appendix A**.

This is an addendum to the letter report titled *Air Quality Study for Rix's Creek South Continuation Project – Camberwell Impacts* (**Todoroski Air Sciences, 2019**). The same methodology as applied in the previous report is applied for this analysis.

Analysis of modelling predictions
The predicted contribution from each of the dust sources for the Option 2 scenario (including Ashton SEOC) at the land parcels in Camberwell are summarised in **Table 1**. The total dust levels and the percentage contribution from each of the sources for the Option 2 scenario (including Ashton SEOC) are summarised in **Table 2**.

Table 1: Predicted contribution of each dust source for Option 2 scenario (including Ashton SEOC)

Receptors	N172	N190	N191	N172	N190	N191
Source	Annual average $PM_{2.5}$ (µg/m³)			Annual average PM_{10} (µg/m³)		
Background	5.2	5.2	5.2	11.5	11.5	11.5
Rix's Creek North*	0.8	0.6	0.7	5.9	4.9	5.1
Glendell	0.4	0.3	0.3	3.2	1.9	2.0
Rix's Creek South	0.5	0.6	0.6	4.0	4.7	4.7
Ravensworth Coal Mine	0.4	0.5	0.6	3.3	4.1	4.1
Ashton SEOC	0.2	0.3	0.3	1.6	2.6	2.6
Mt Owen	0.1	0.1	0.1	0.6	0.5	0.5
Ravensworth East	0.1	0.1	0.1	0.6	0.5	0.5
Hunter Valley Operations	0.1	0.1	0.1	0.4	0.4	0.4
Total dust level (µg/m³)	**7.8**	**7.8**	**7.9**	**31.0**	**31.1**	**31.4**

*Includes Integra Underground

Table 2: Percentage contribution of each dust source and total dust level for Option 2 scenario (including Ashton SEOC)

Receptors	N172	N190	N191	N172	N190	N191
Source	**Percent of total annual average $PM_{2.5}$**			**Percent of total annual average PM_{10}**		
Background	67	66	66	37	37	37
Rix's Creek North*	10	8	8	19	16	16
Glendell	6	3	3	10	6	6
Rix's Creek South	7	8	8	13	15	15
Ravensworth Coal Mine	6	7	7	11	13	13
Ashton SEOC	3	4	4	5	8	8
Mt Owen	1	1	1	2	2	2
Ravensworth East	1	1	1	2	2	2
Hunter Valley Operations	1	1	1	1	1	1
	Annual average $PM_{2.5}$ (µg/m³)			**Annual average PM_{10} (µg/m³)**		
Total dust level (µg/m³)	7.8	7.8	7.9	31.0	31.1	31.4

*Includes Integra Underground

The summarised results in **Table 1** and **Table 2** indicate that the underlying background level is the greatest contributor to the dust levels at the land parcel locations in Camberwell, followed by the Rix's Creek North mine, Rix's Creek South mine, Ravensworth Coal Mine and Glendell.

Detailed modelling predictions for the Option 2 scenario are presented in **Table B-1** and **Table B-2** in **Appendix B**. These tables include the incremental modelling predictions for each of the modelled sources and also the background level at the time.

The contribution at the land parcel locations due to Rix's Creek South ranges from 0.5-0.6µg/m³ for annual average $PM_{2.5}$ and from 4.0-4.7µg/m³ for annual average PM_{10}. These levels are approximately 8% and 15% respectively of the total dust level predicted for these locations.

Please feel free to contact us if you would like to clarify any aspect of this report.

Yours faithfully,
Todoroski Air Sciences

Philip Henschke

References

Todoroski Air Sciences (2019)
"Air Quality Study for Rix's Creek South Continuation Project – Camberwell Impacts", prepared for Hansen Bailey by Todoroski Air Sciences, August 2019.

Appendix A

Additional receptor locations

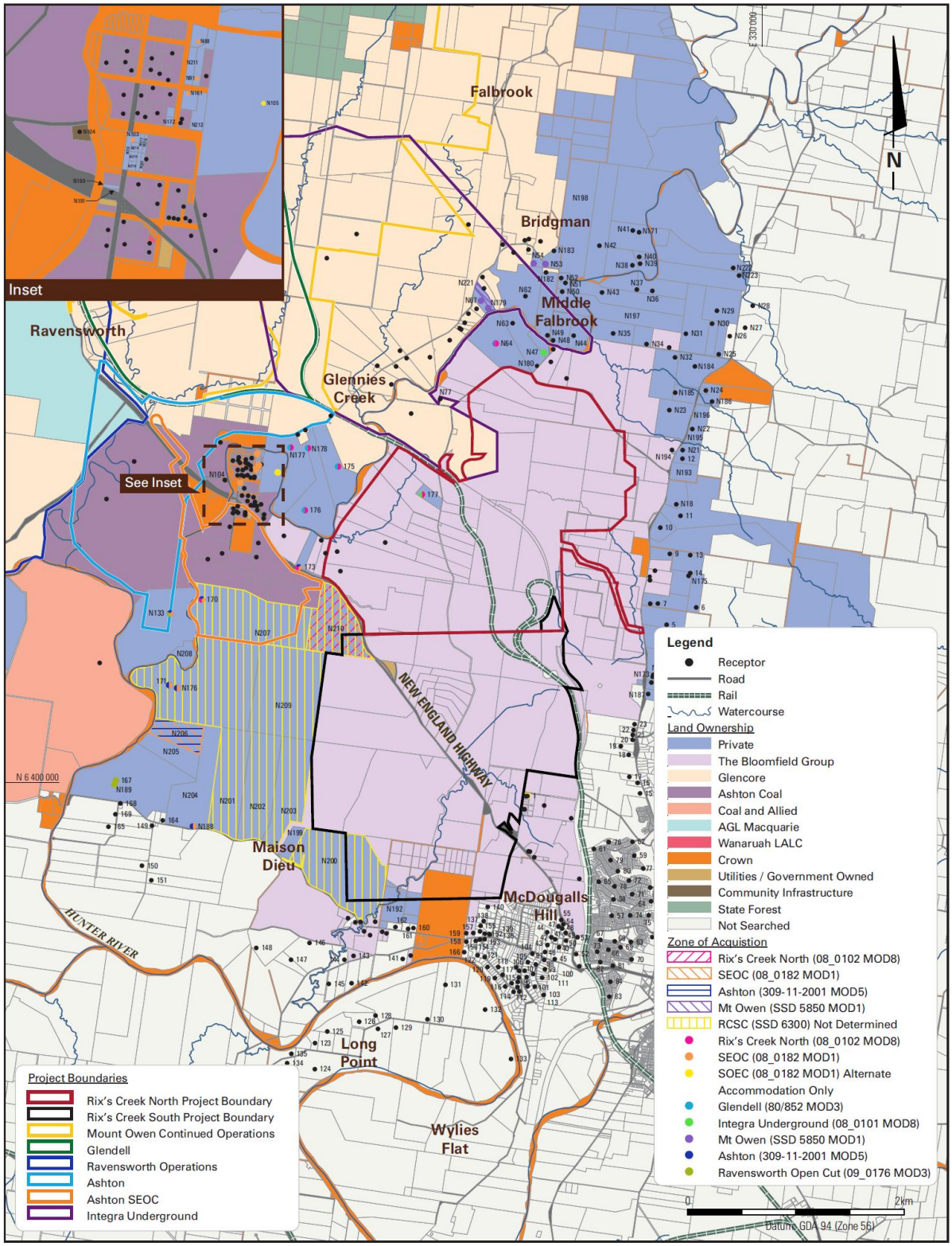

Figure A-1: Additional receptor locations (also refer to Figure A-2)

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Figure A-2: Details of additional receptor locations (N172, N190 and N191) in Camberwell

Appendix B

Detailed analysis tables

Table B-1: Analysis of annual average predictions – Rix's Creek Option 2 2023

Receptor ID	Annual average $PM_{2.5}$ Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North*	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	0.5	0.2	0.4	0.1	0.8	0.1	0.1	0.4	5.2	7.8
N190	0.6	0.3	0.3	0.1	0.6	0.1	0.1	0.5	5.2	7.8
N191	0.6	0.3	0.3	0.1	0.7	0.1	0.1	0.6	5.2	7.9
	Annual average PM_{10} Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North*	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	4.0	1.6	3.2	0.4	5.9	0.6	0.6	3.3	11.5	31.0
N190	4.7	2.6	1.9	0.4	4.9	0.5	0.5	4.1	11.5	31.1
N191	4.7	2.6	2.0	0.4	5.1	0.5	0.5	4.1	11.5	31.4

*Includes Integra Underground

Table B-2: Analysis of annual average predictions – Rix's Creek Option 2 2023 (excluding Ashton SEOC)

Receptor ID	Annual average $PM_{2.5}$ Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	0.5	-	0.4	0.1	0.8	0.1	0.1	0.4	5.2	7.6
N190	0.6	-	0.3	0.1	0.6	0.1	0.1	0.5	5.2	7.5
N191	0.6	-	0.3	0.1	0.7	0.1	0.1	0.6	5.2	7.5
	Annual average PM_{10} Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	4.0	-	3.2	0.4	5.9	0.6	0.6	3.3	11.5	29.4
N190	4.7	-	1.9	0.4	4.9	0.5	0.5	4.1	11.5	28.6
N191	4.7	-	2.0	0.4	5.1	0.5	0.5	4.1	11.5	28.8

*Includes Integra Underground

Table B-3: Analysis of annual average predictions – Rix's Creek Reduced Schedule 2023

Receptor ID	Annual average $PM_{2.5}$ Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	0.5	0.2	0.4	0.1	0.8	0.1	0.1	0.4	5.2	7.8
N190	0.6	0.3	0.3	0.1	0.6	0.1	0.1	0.5	5.2	7.8
N191	0.6	0.3	0.3	0.1	0.7	0.1	0.1	0.6	5.2	7.9
	Annual average PM_{10} Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	3.8	1.6	3.2	0.4	5.9	0.6	0.6	3.3	11.5	30.8
N190	4.5	2.6	1.9	0.4	4.9	0.5	0.5	4.1	11.5	31.0
N191	4.5	2.6	2.0	0.4	5.1	0.5	0.5	4.1	11.5	31.2

*Includes Integra Underground

Table B-4: Analysis of annual average predictions – Rix's Creek Reduced Schedule 2023 (excluding Ashton SEOC)

Receptor ID	Annual average $PM_{2.5}$ Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	0.5	-	0.4	0.1	0.8	0.1	0.1	0.4	5.2	7.6
N190	0.6	-	0.3	0.1	0.6	0.1	0.1	0.5	5.2	7.5
N191	0.6	-	0.3	0.1	0.7	0.1	0.1	0.6	5.2	7.5
	Annual average PM_{10} Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	3.8	-	3.2	0.4	5.9	0.6	0.6	3.3	11.5	29.2
N190	4.5	-	1.9	0.4	4.9	0.5	0.5	4.1	11.5	28.4
N191	4.5	-	2.0	0.4	5.1	0.5	0.5	4.1	11.5	28.7

*Includes Integra Underground

Table B-5: Analysis of annual average predictions – Rix's Creek Option 1 2023

Receptor ID	Annual average $PM_{2.5}$ Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	0.5	0.2	0.4	0.1	0.8	0.1	0.1	0.4	5.2	7.8
N190	0.6	0.3	0.3	0.1	0.6	0.1	0.1	0.5	5.2	7.8
N191	0.6	0.3	0.3	0.1	0.7	0.1	0.1	0.6	5.2	7.9
	Annual average PM_{10} Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	3.9	1.6	3.2	0.4	5.9	0.6	0.6	3.3	11.5	31.0
N190	4.6	2.6	1.9	0.4	4.9	0.5	0.5	4.1	11.5	31.0
N191	4.6	2.6	2.0	0.4	5.1	0.5	0.5	4.1	11.5	31.3

*Includes Integra Underground

Table B-6: Analysis of annual average predictions – Rix's Creek Option 1 2023 (excluding Ashton SEOC)

Receptor ID	Annual average $PM_{2.5}$ Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	0.5	-	0.4	0.1	0.8	0.1	0.1	0.4	5.2	7.6
N190	0.6	-	0.3	0.1	0.6	0.1	0.1	0.5	5.2	7.5
N191	0.6	-	0.3	0.1	0.7	0.1	0.1	0.6	5.2	7.5
	Annual average PM_{10} Modelling prediction (µg/m³)									
	Rix's Creek South	Ashton SEOC	Glendell	Hunter Valley Operations	Rix's Creek North	Mt Owen	Ravensworth East	Ravensworth Coal Mine	Background	Total
N172	3.9	-	3.2	0.4	5.9	0.6	0.6	3.3	11.5	29.3
N190	4.6	-	1.9	0.4	4.9	0.5	0.5	4.1	11.5	28.5
N191	4.6	-	2.0	0.4	5.1	0.5	0.5	4.1	11.5	28.7

*Includes Integra Underground