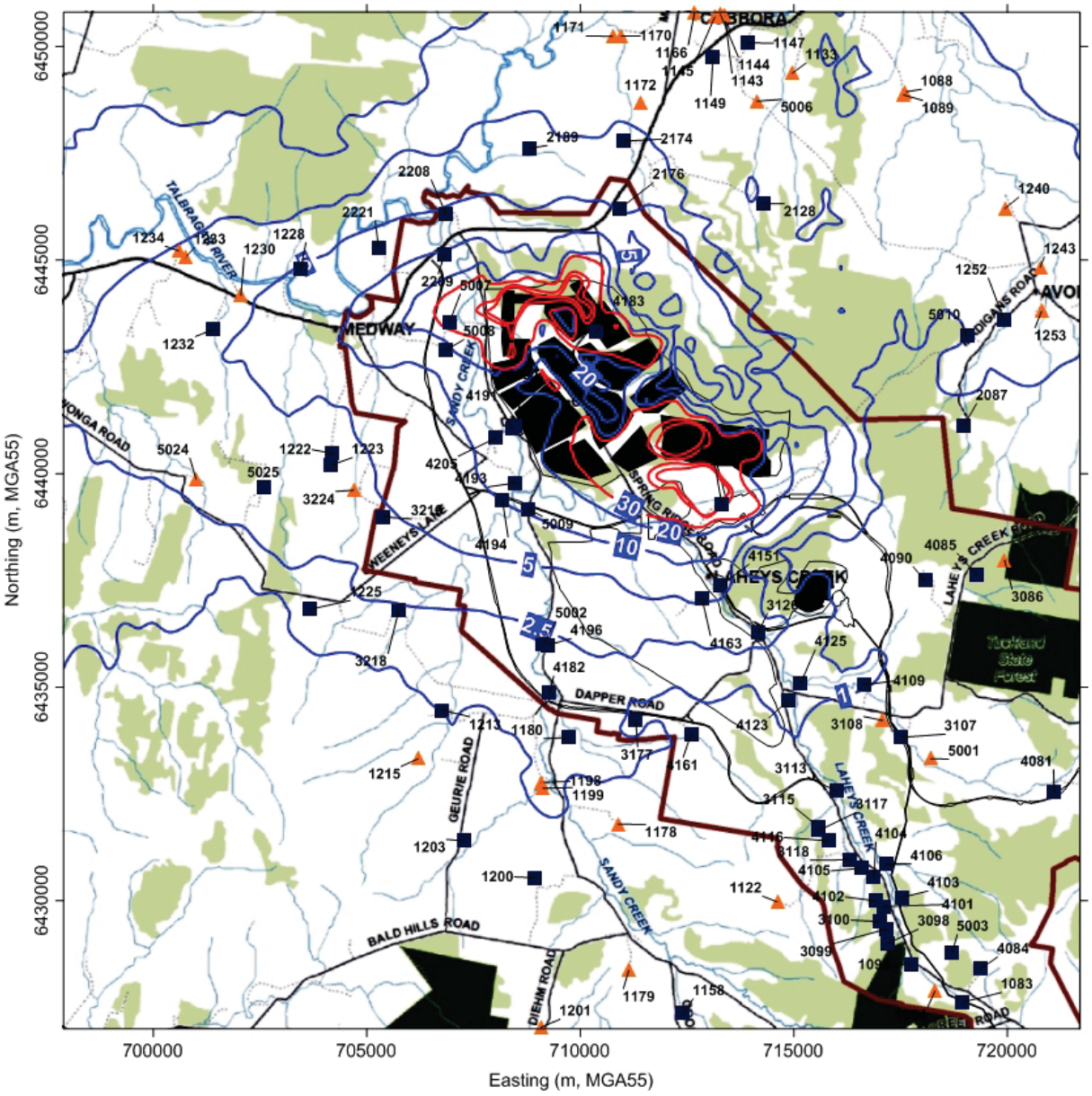

Figure C3: Incremental Annual Average PM_{10} Concentrations (µg/m³) – Year 8

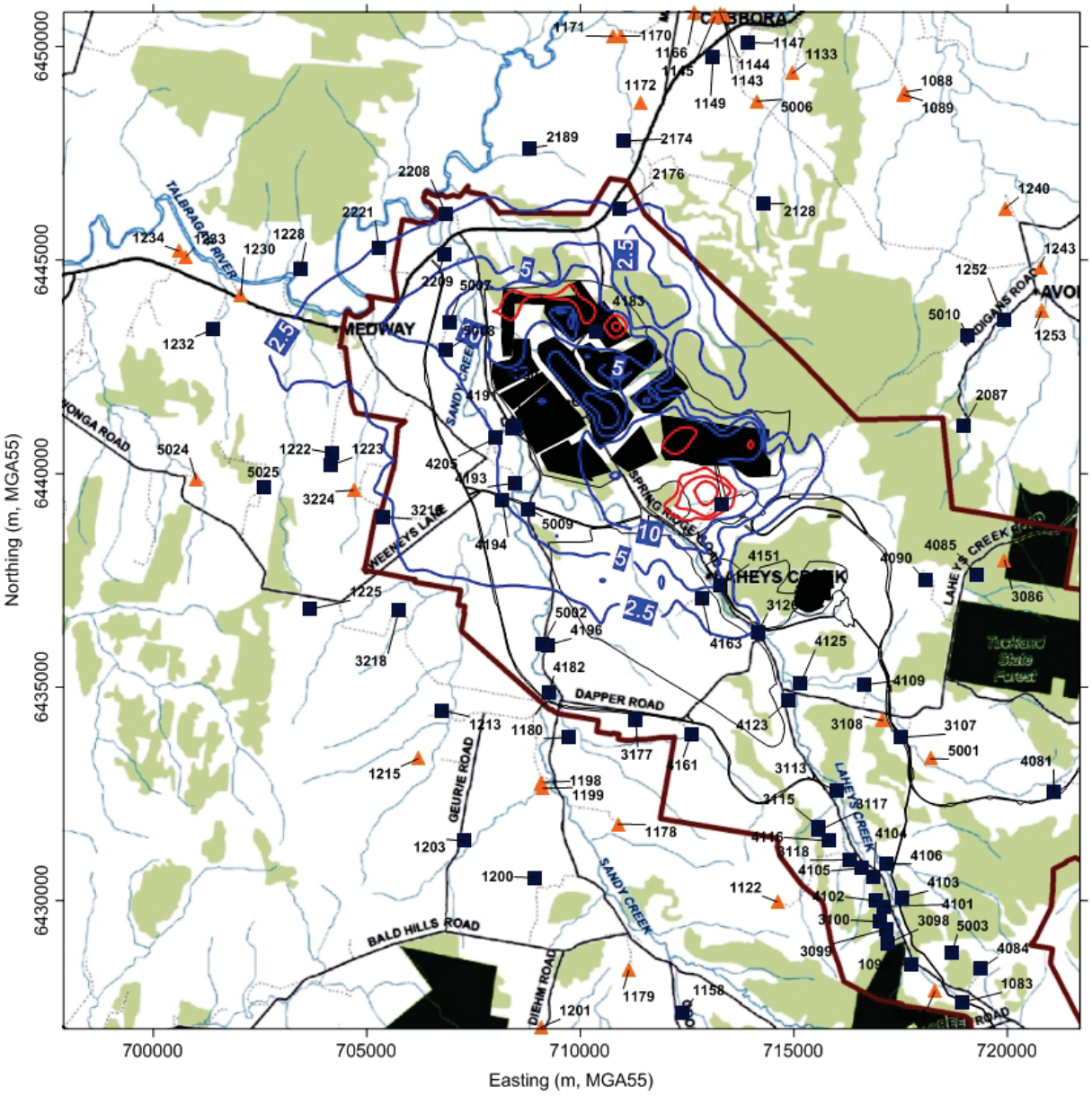

Figure C4: Incremental Maximum 24-hour Average $PM_{2.5}$ Concentrations (µg/m³) – Year 8

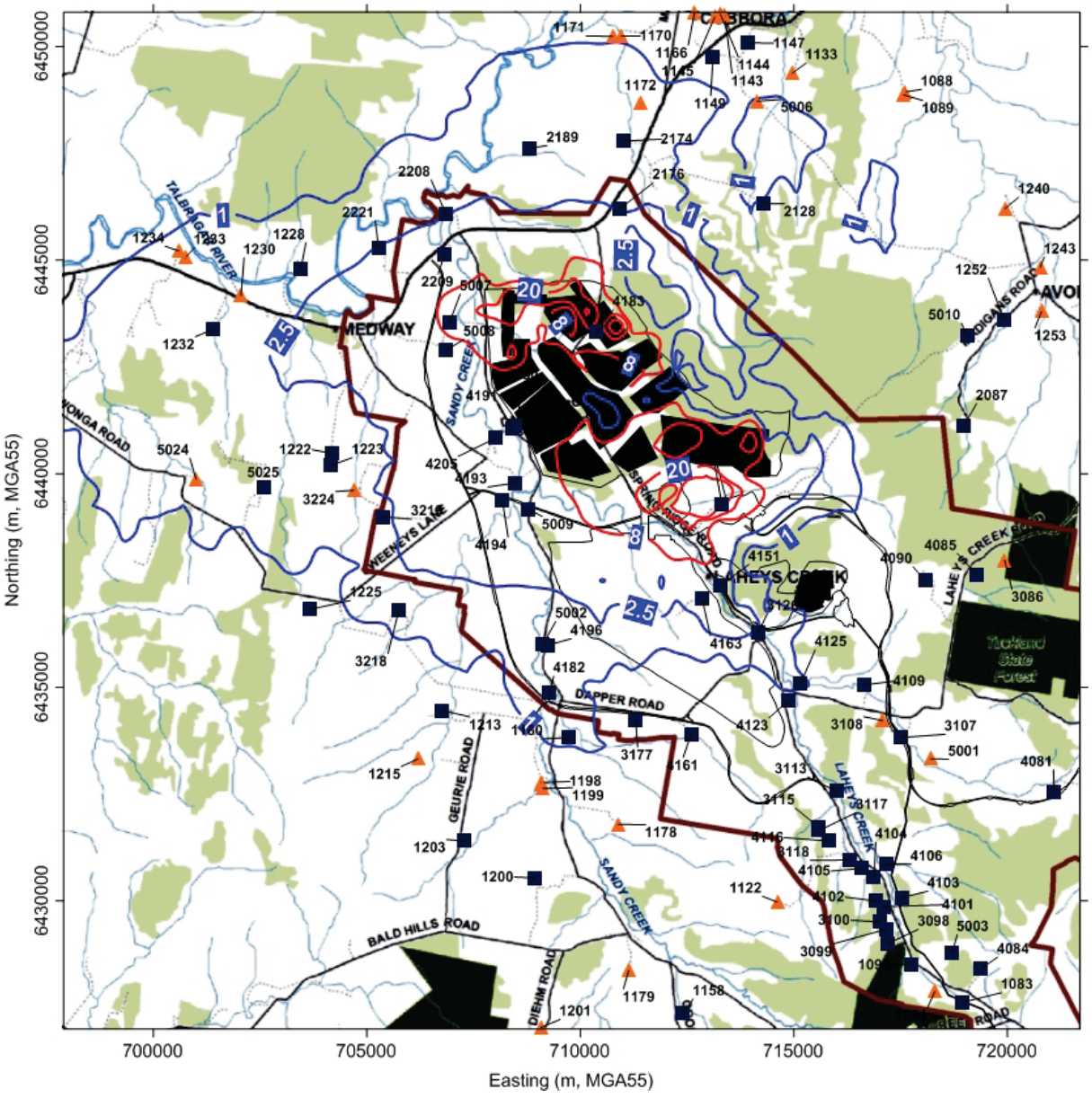

Figure C5: Incremental Annual Average $PM_{2.5}$ Concentrations (µg/m³) – Year 8

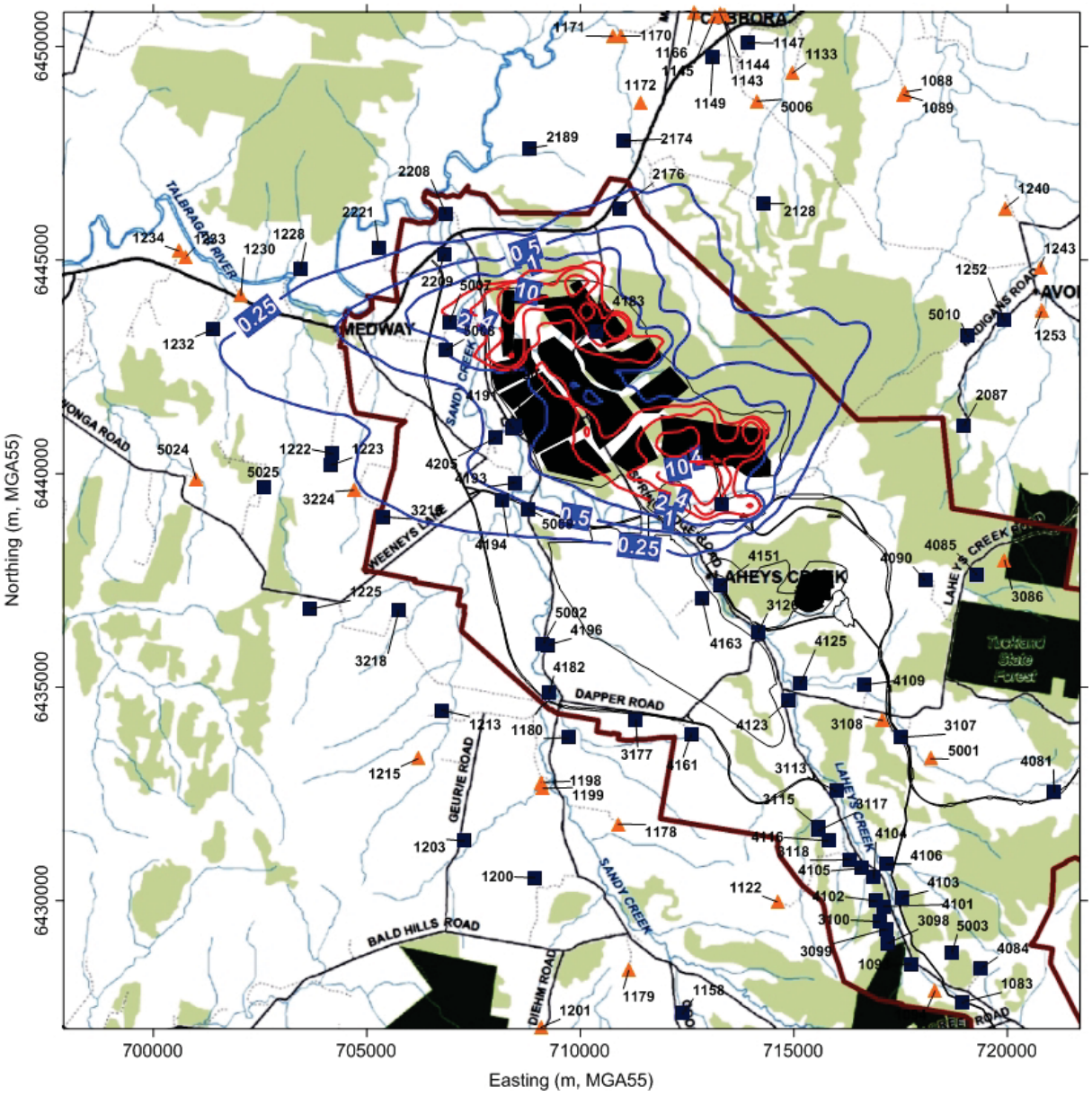

Figure C6: Incremental Annual Average Dust Deposition Rates (g/m^2/month) – Year 8

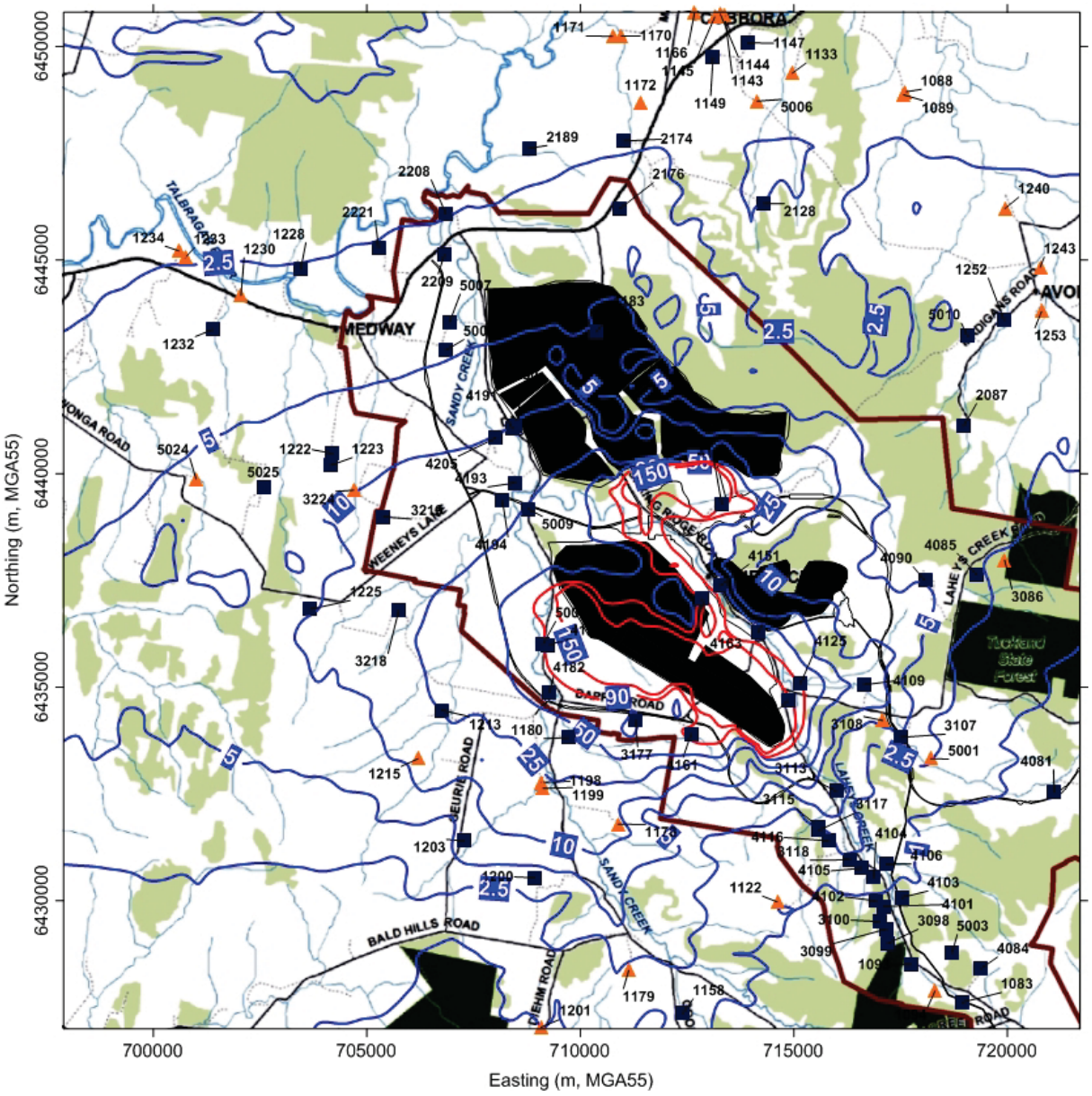

Figure C7: Incremental Annual Average TSP Concentrations (µg/m³) – Year 20

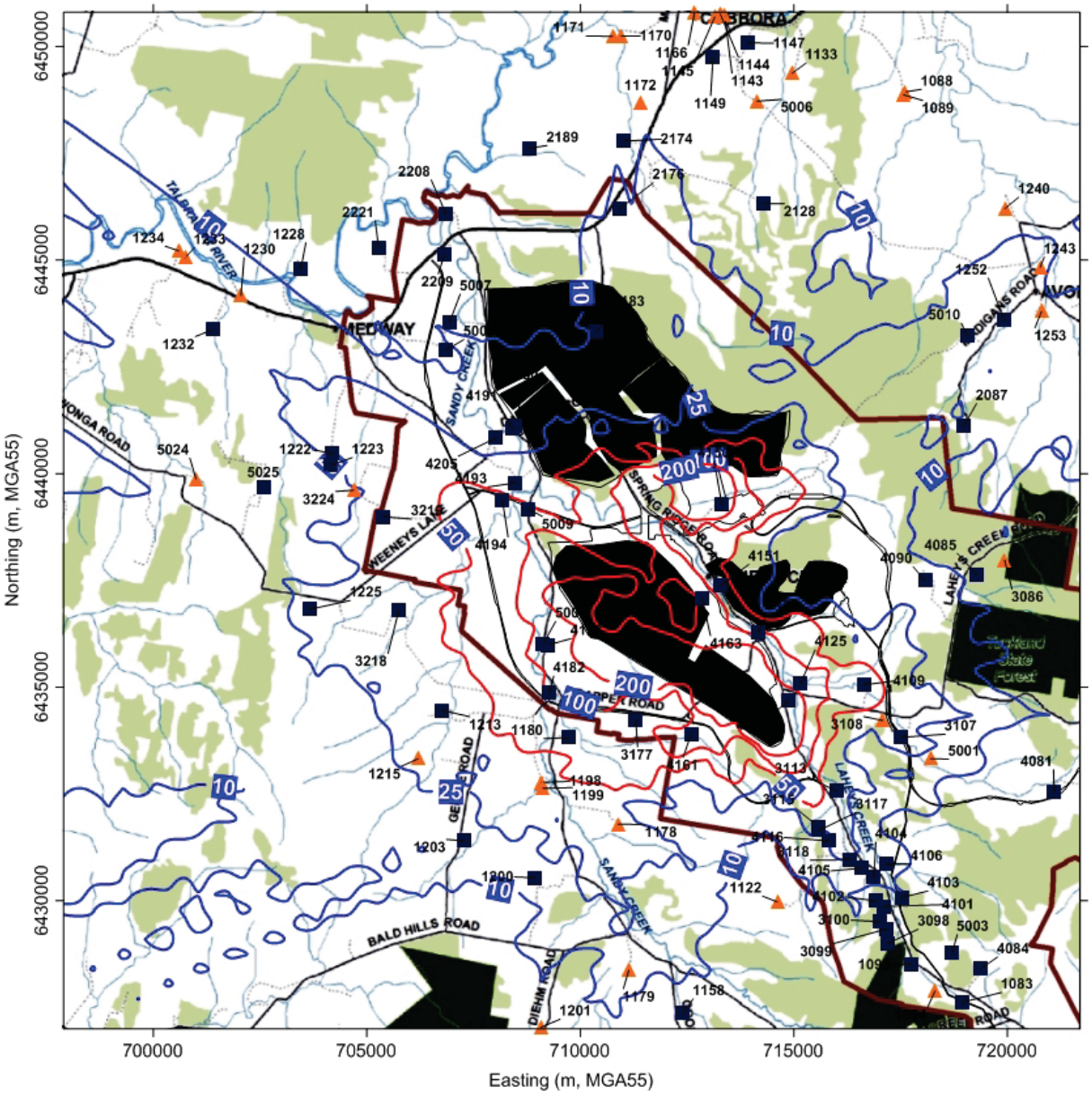

Figure C8: Incremental Maximum 24-hour Average PM_{10} Concentrations (µg/m³) – Year 20

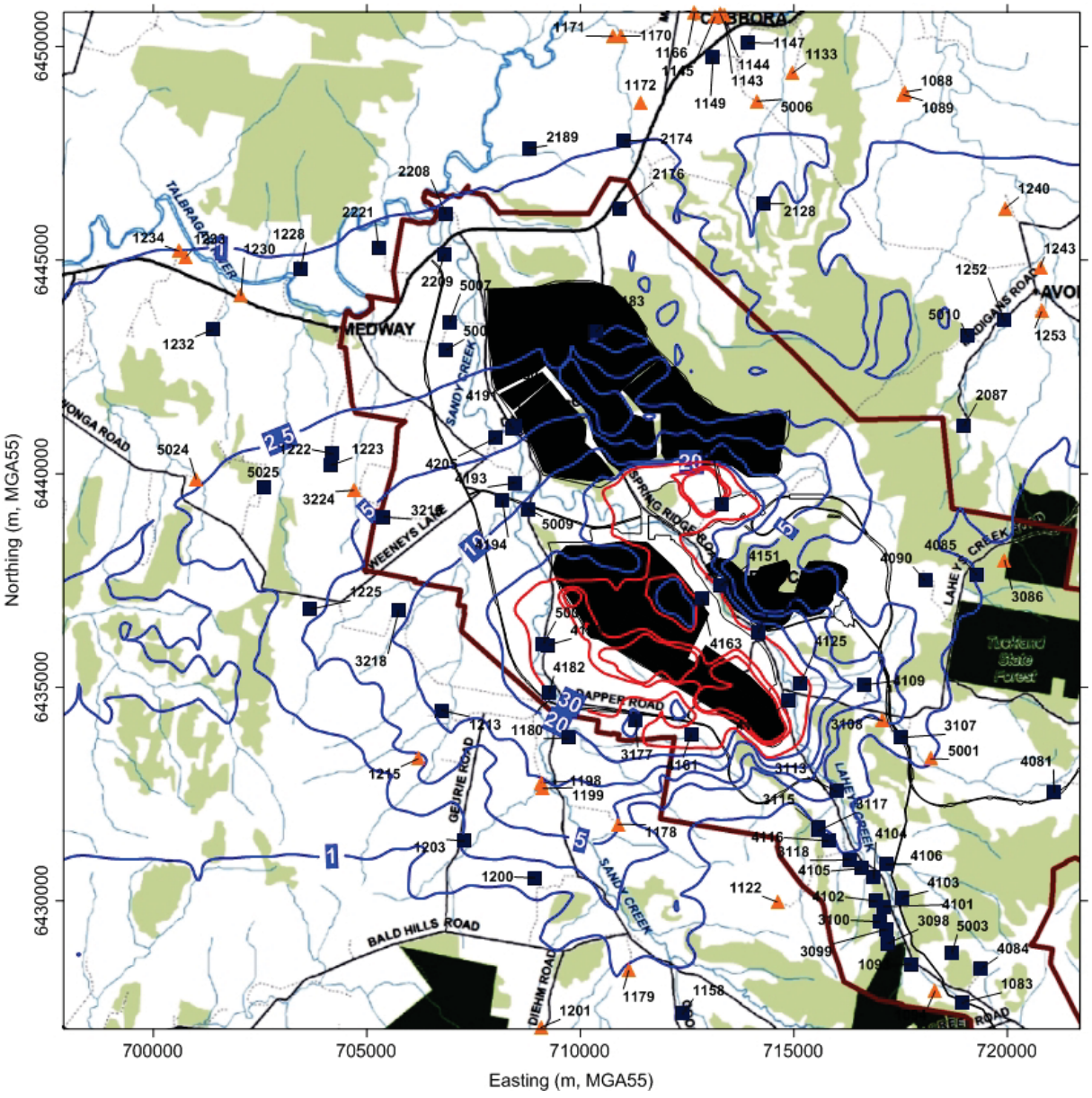

Figure C9: Incremental Annual Average PM_{10} Concentrations (µg/m³) – Year 20

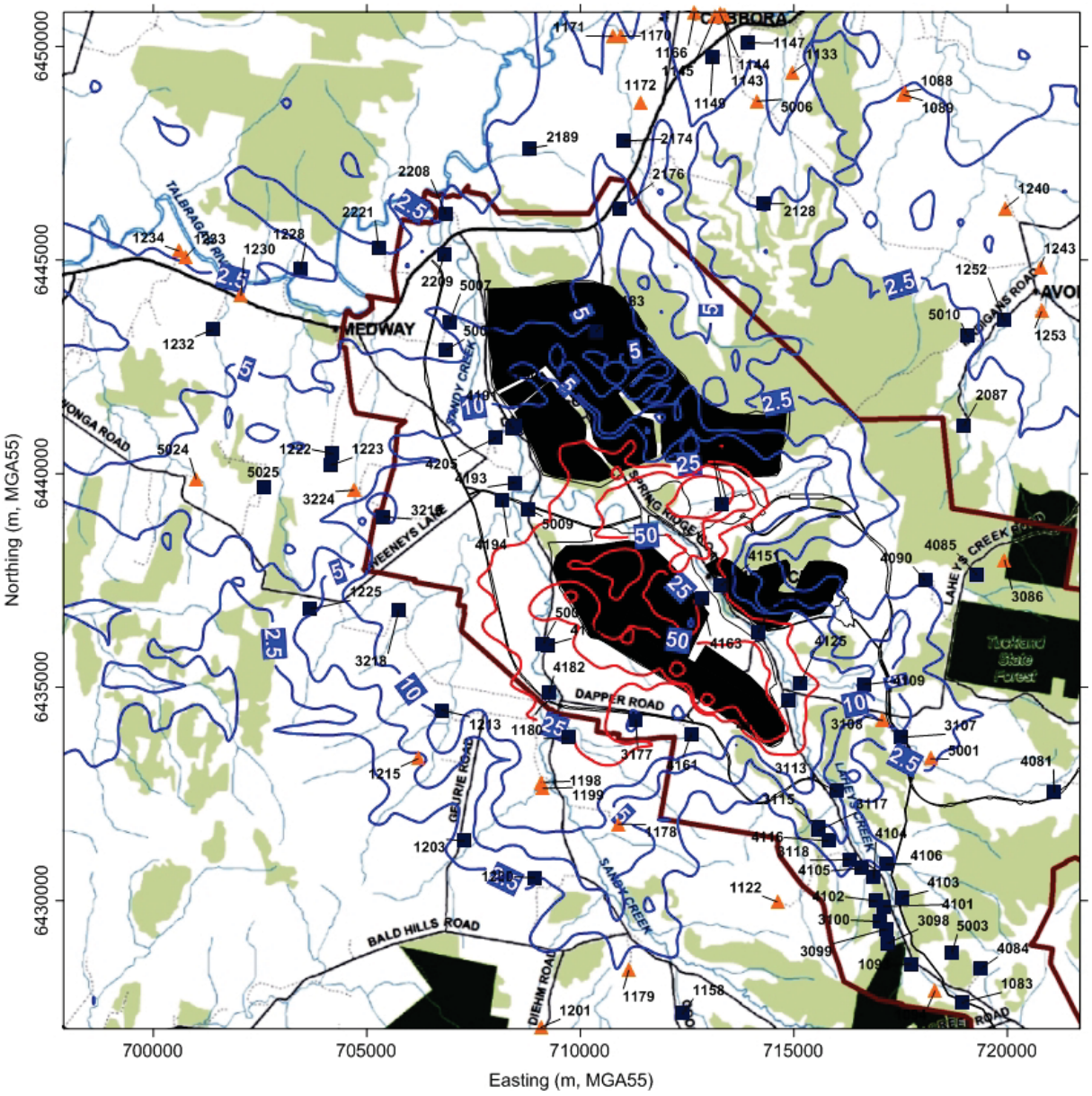

Figure C10: Incremental Maximum 24-hour Average $PM_{2.5}$ Concentrations (µg/m³) – Year 20

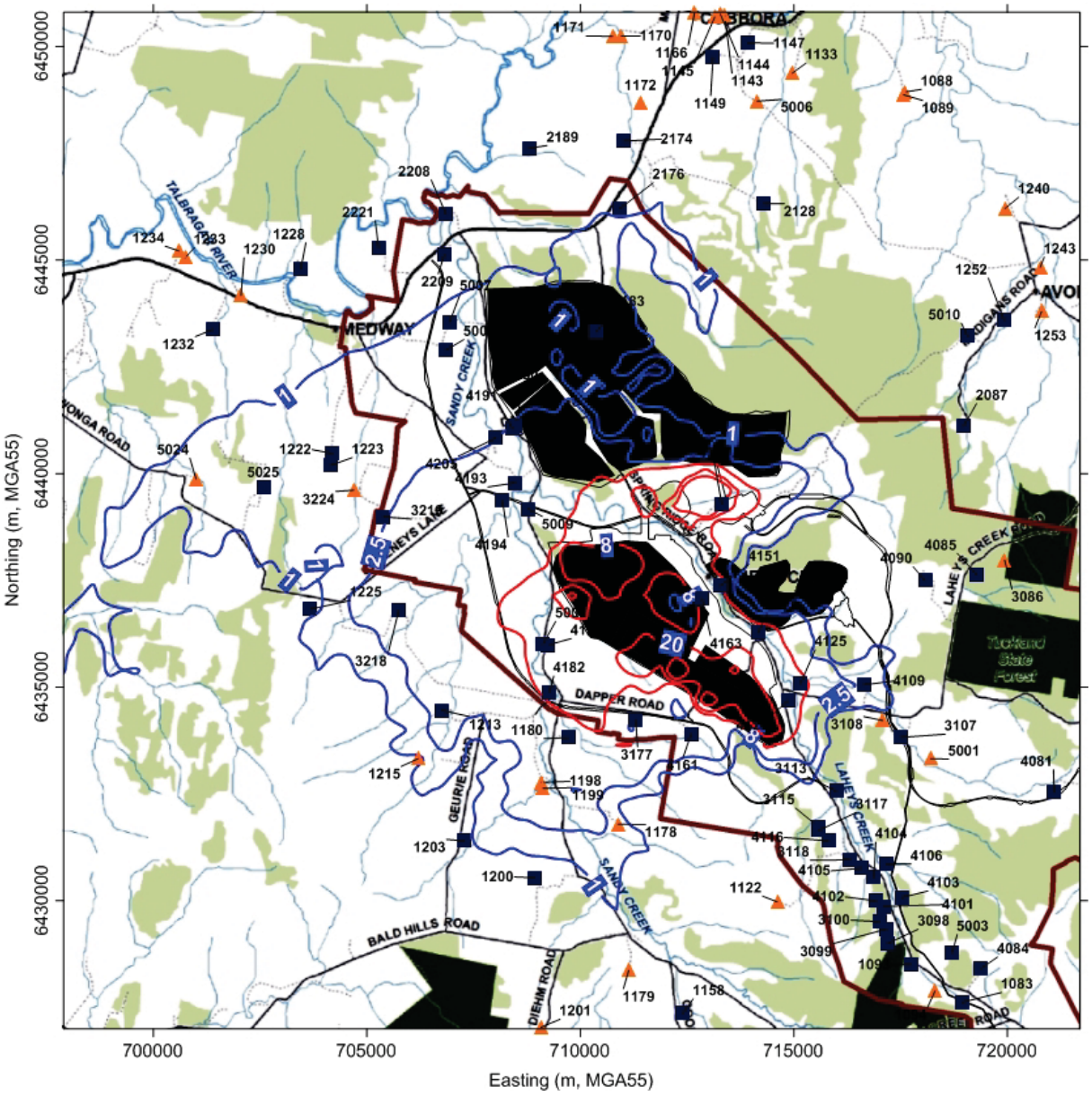

Figure C11: Incremental Annual Average $PM_{2.5}$ Concentrations (µg/m³) – Year 20

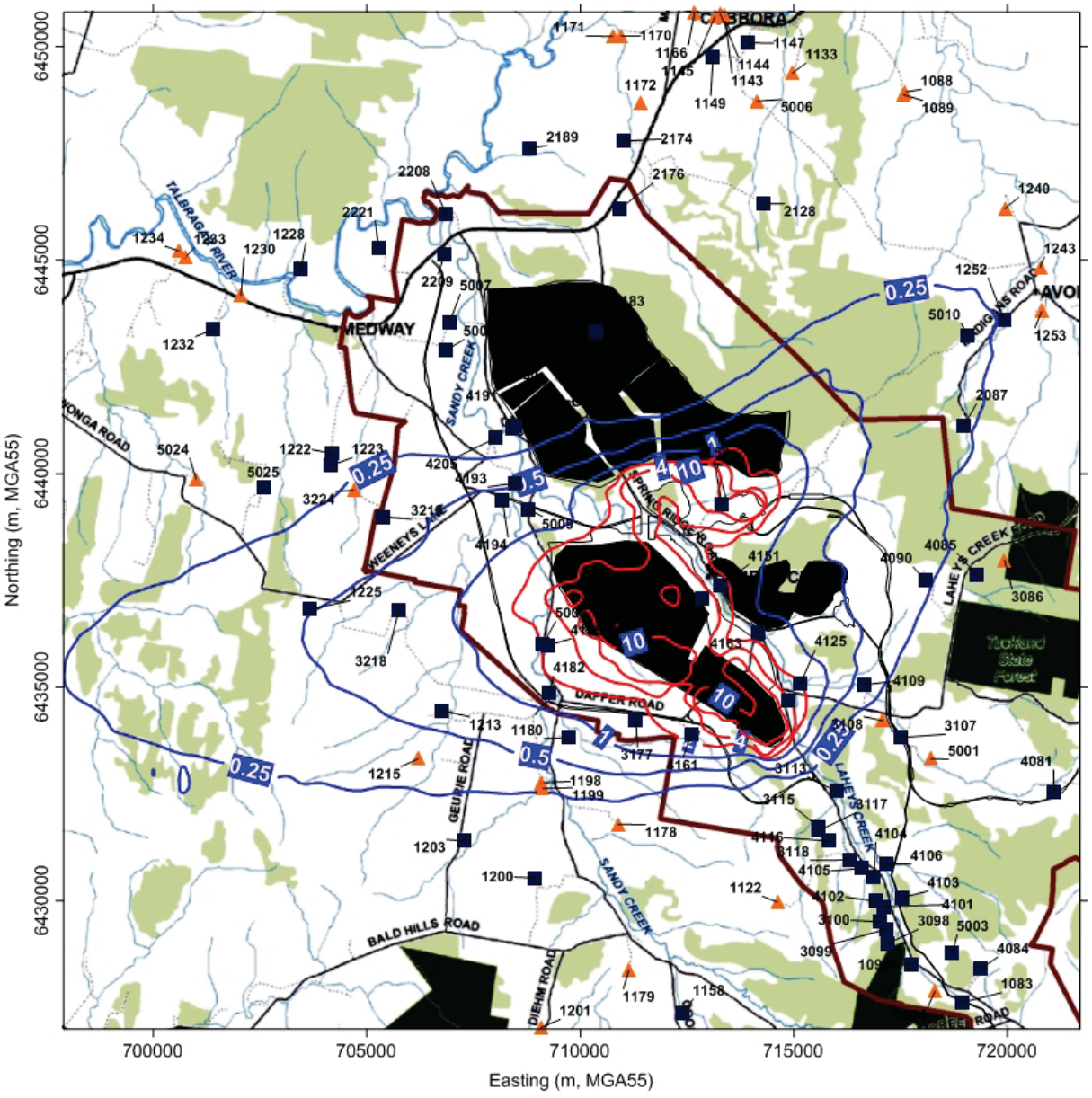

Figure C12: Incremental Annual Average Dust Deposition Rates (g/m^2/month) – Year 20

Appendix D

Cumulative Air Pollutant Isopleths

Scenarios	Pollutant	Averaging Period	Figure No.
Year 8	PM_{10}	Highest 24-hour	D1
	PM_{10}	Annual average	D2
	$PM_{2.5}$	Highest 24-hour	D3
	$PM_{2.5}$	Annual average	D4
	TSP	Annual average	D5
	Dust Deposition	Annual average	D6
Year 20	PM_{10}	Highest 24-hour	D7
	PM_{10}	Annual average	D8
	$PM_{2.5}$	Highest 24-hour	D9
	$PM_{2.5}$	Annual average	D10
	TSP	Annual average	D11
	Dust Deposition	Annual average	D12

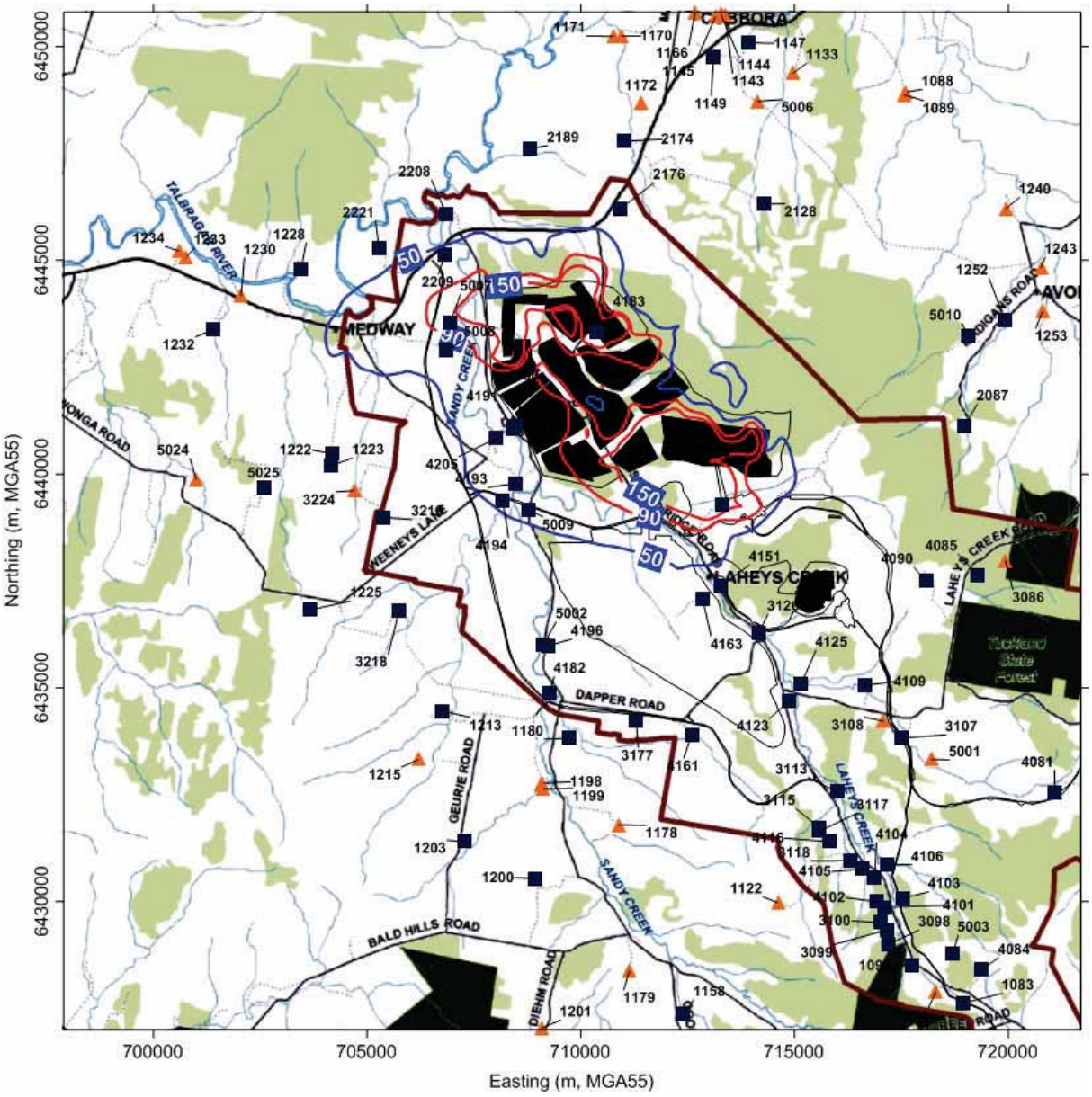

Figure D1: Cumulative Annual Average TSP Concentrations (µg/m³) – Year 8

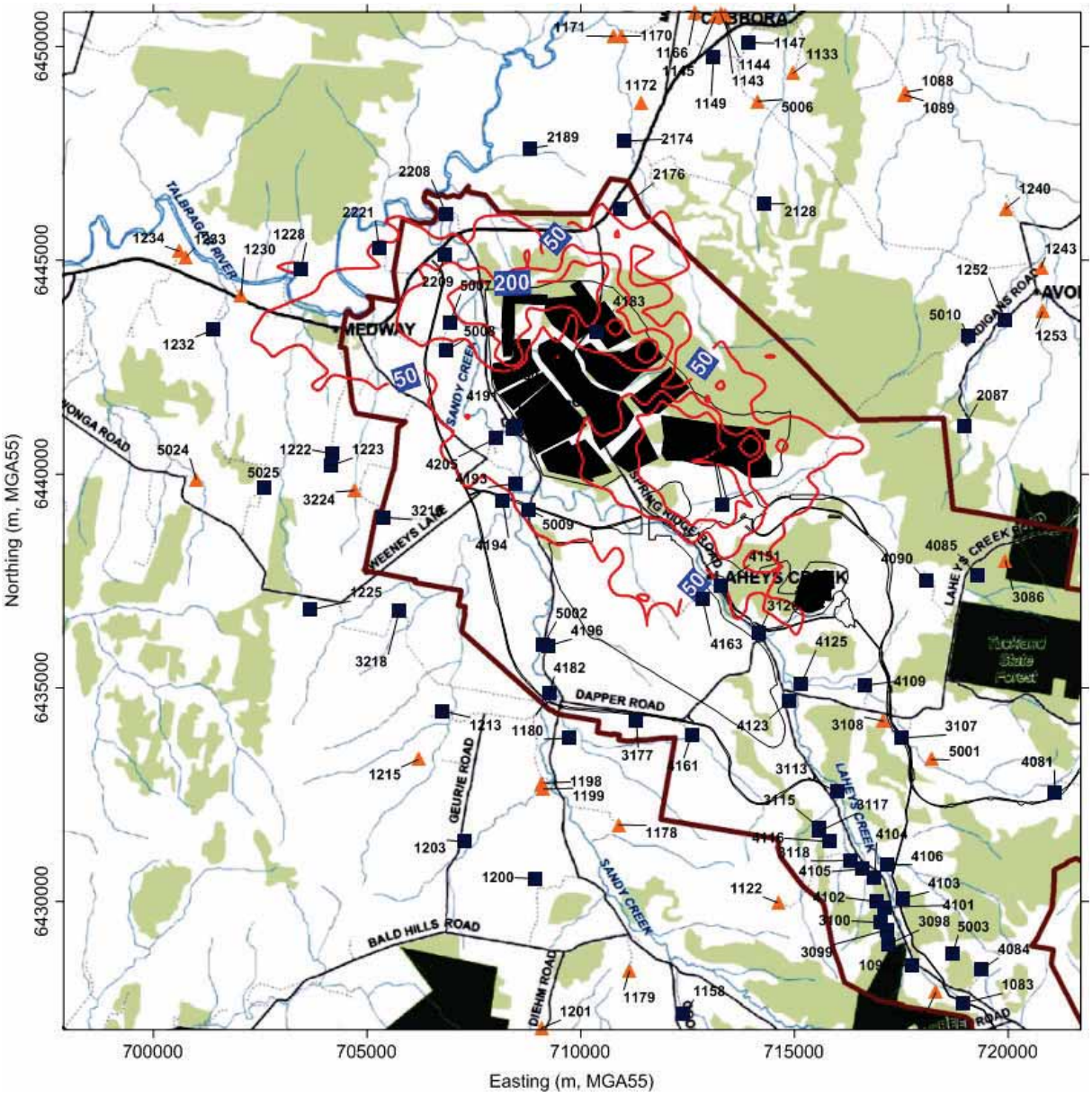

Figure D2: Cumulative Maximum 24-hour Average PM_{10} Concentrations (µg/m³) – Year 8

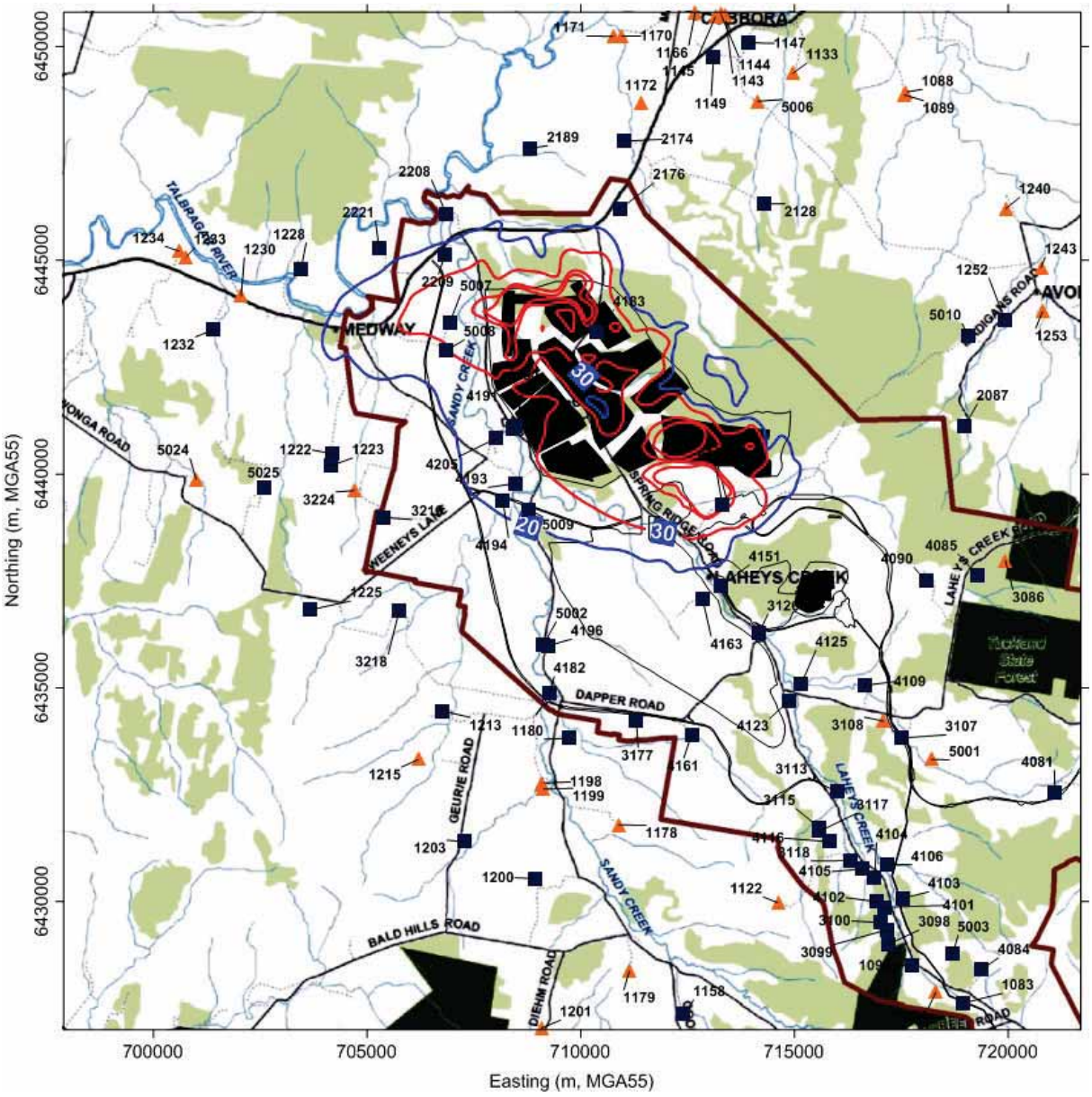

Figure D3: Cumulative Annual Average PM_{10} Concentrations (µg/m³) – Year 8

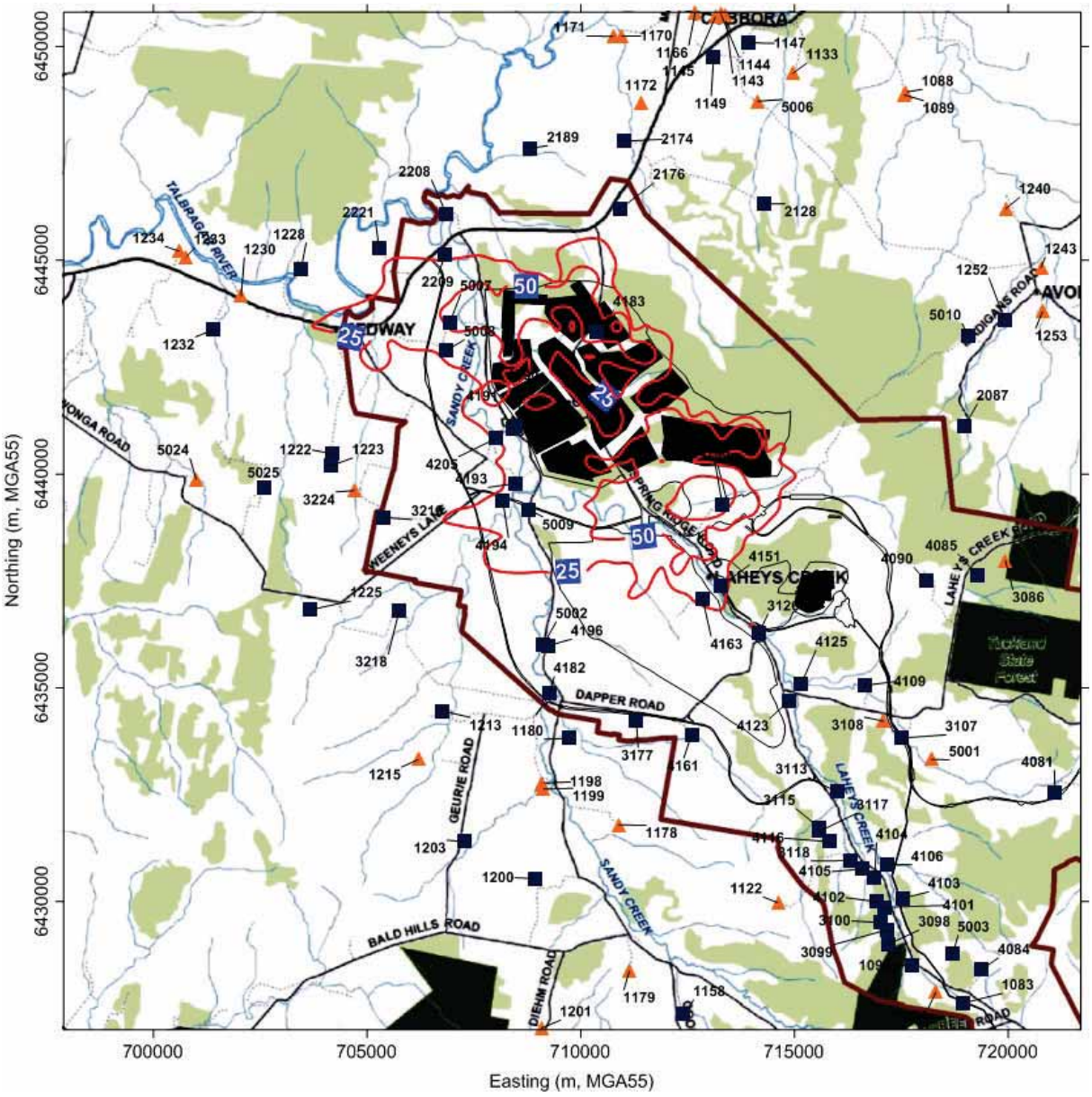

Figure D4: Cumulative Maximum 24-hour Average $PM_{2.5}$ Concentrations (µg/m³) – Year 8

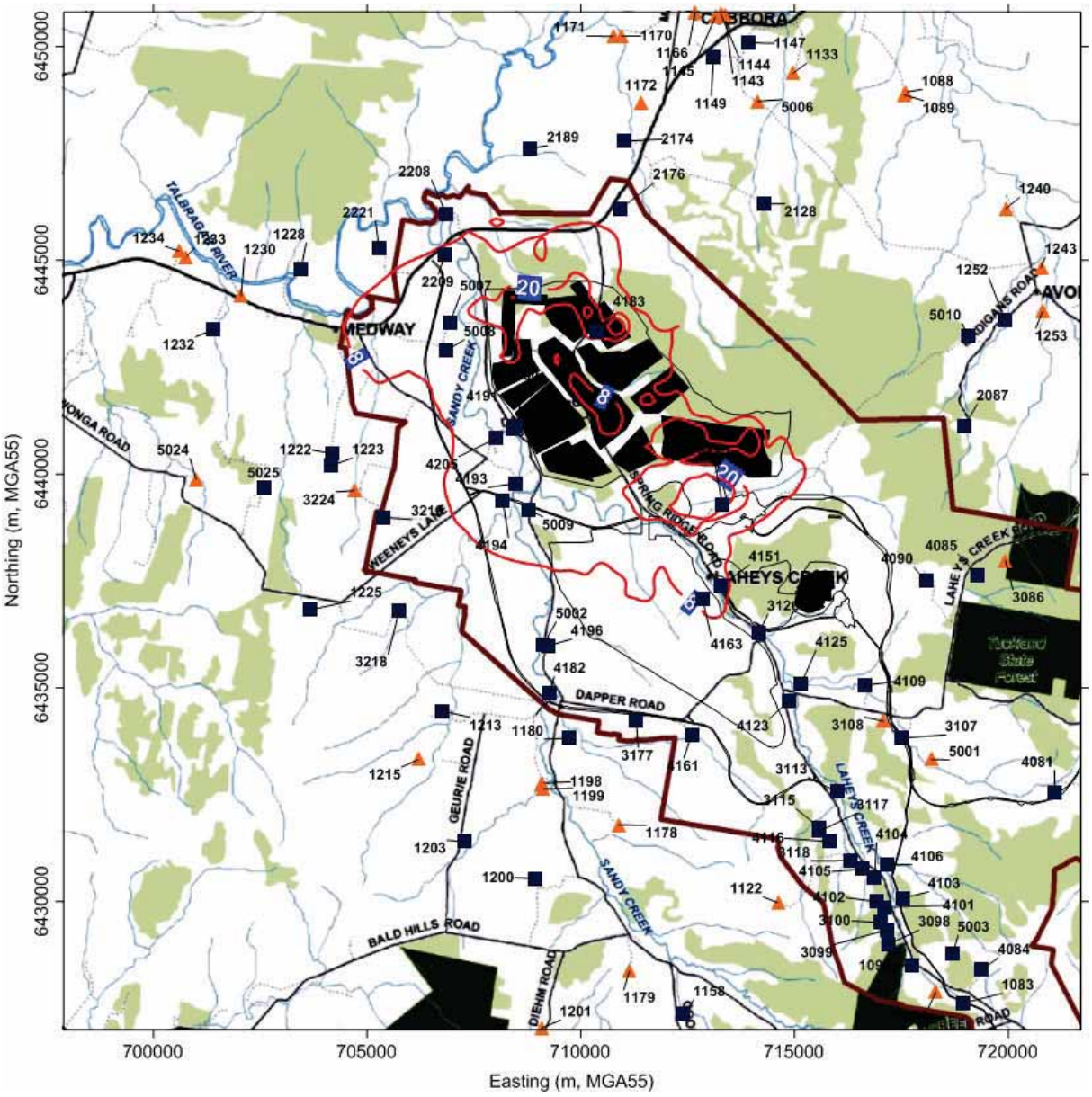

Figure D5: Cumulative Annual Average $PM_{2.5}$ Concentrations (µg/m³) – Year 8

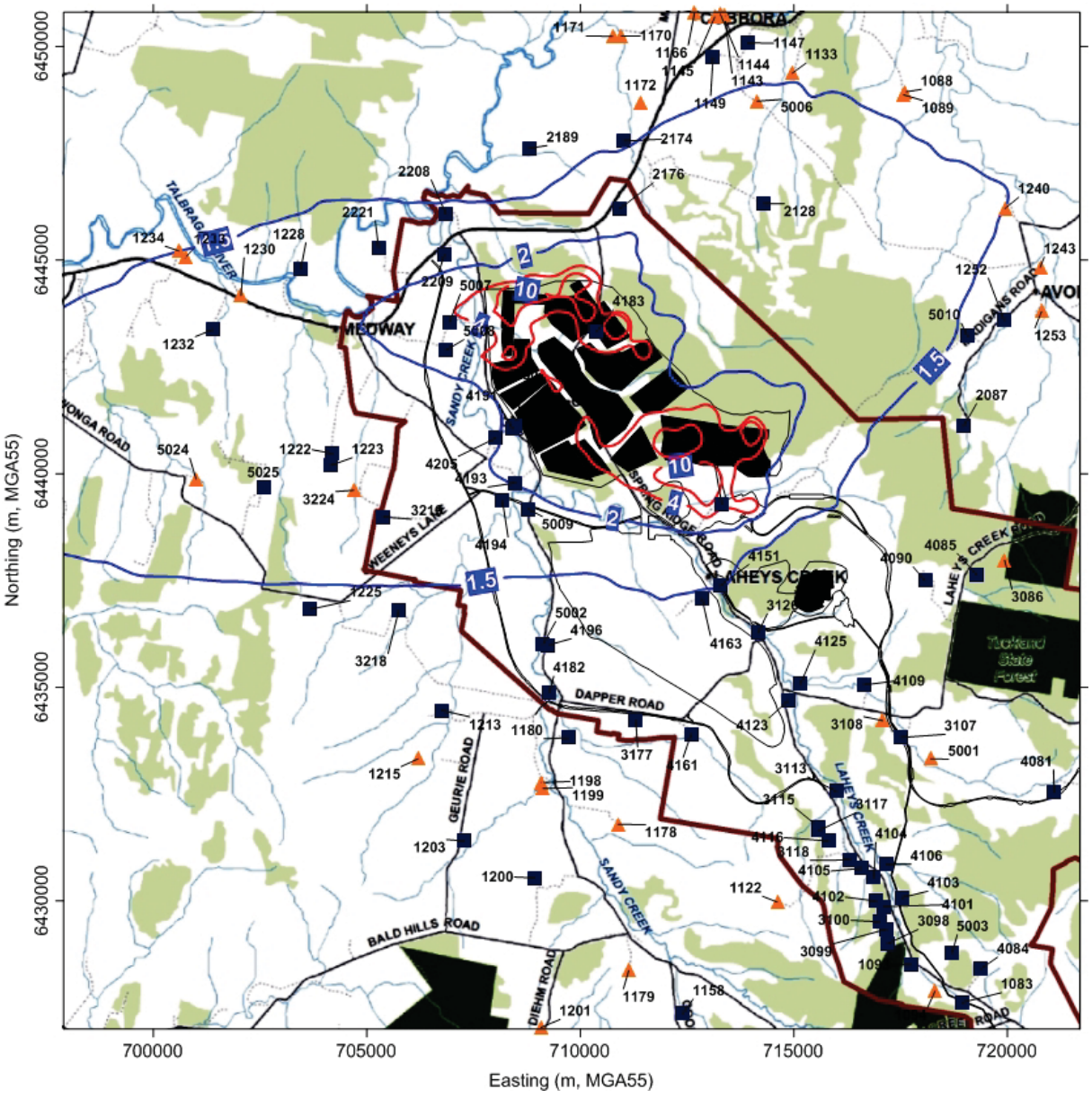

Figure D6: Cumulative Annual Average Dust Deposition Rates (g/m^2/month) – Year 8

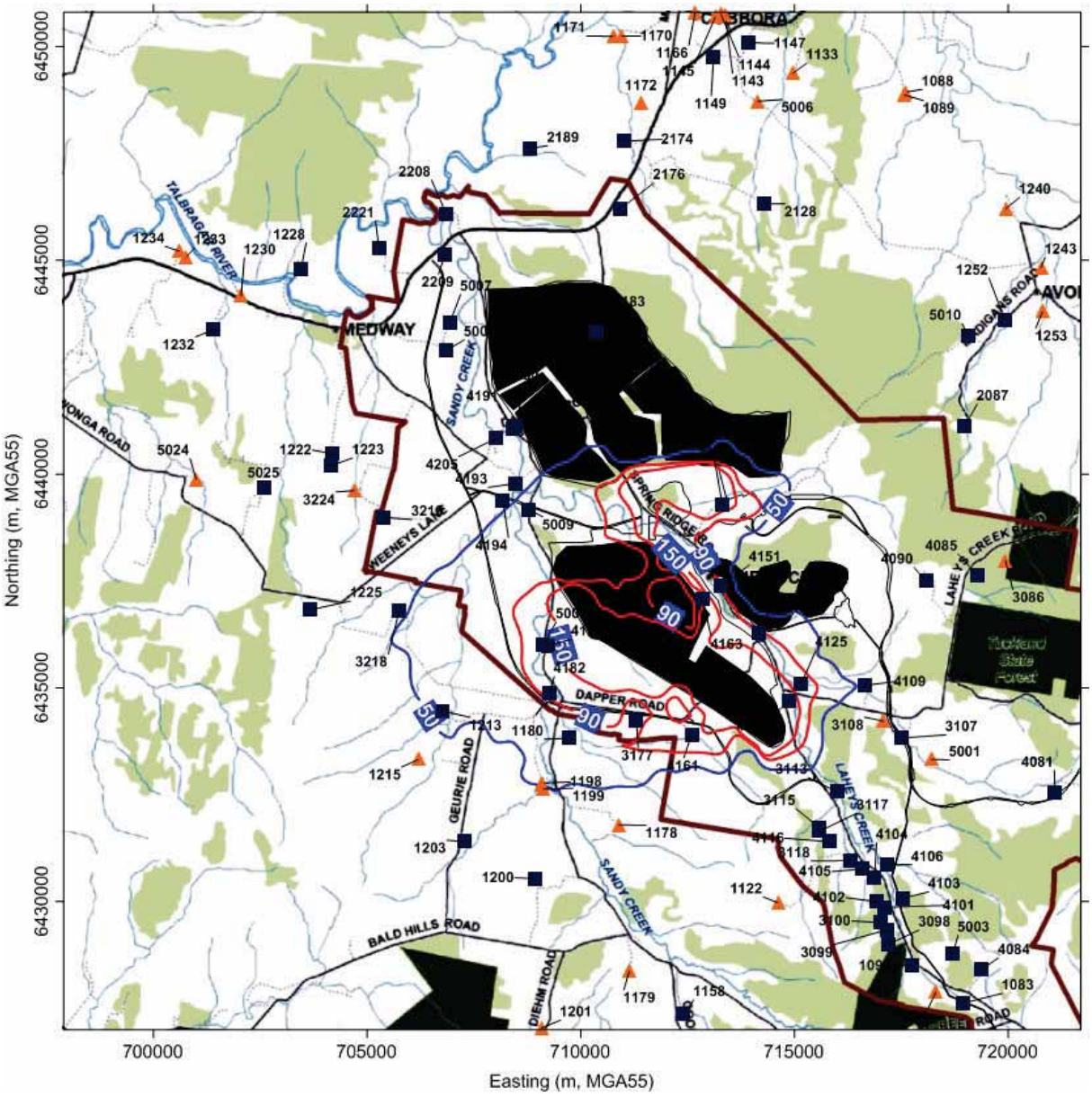

Figure D7: Cumulative Annual Average TSP Concentrations (µg/m³) – Year 20

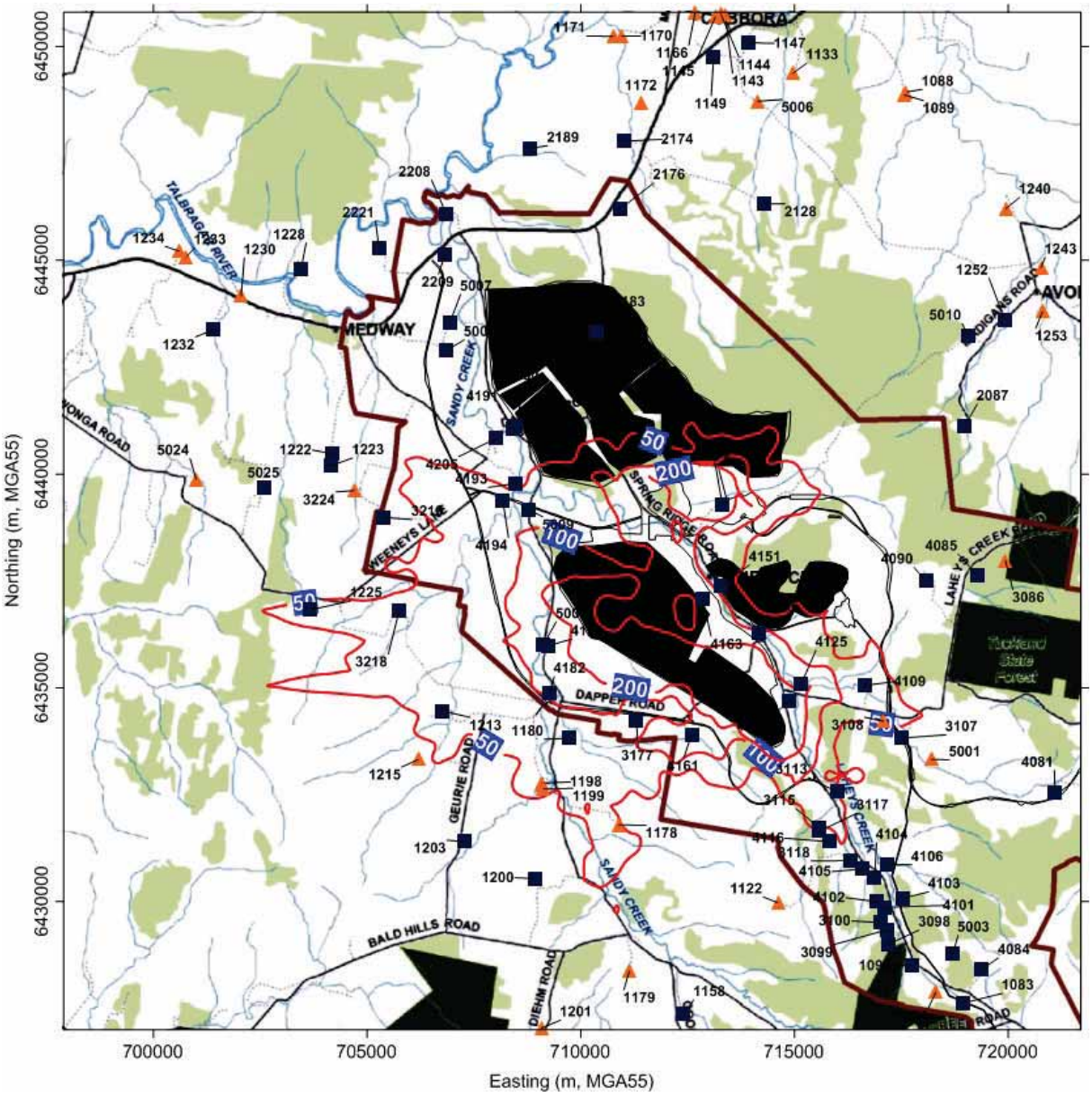

Figure D8: Cumulative Maximum 24-hour Average PM_{10} Concentrations (µg/m³) – Year 20

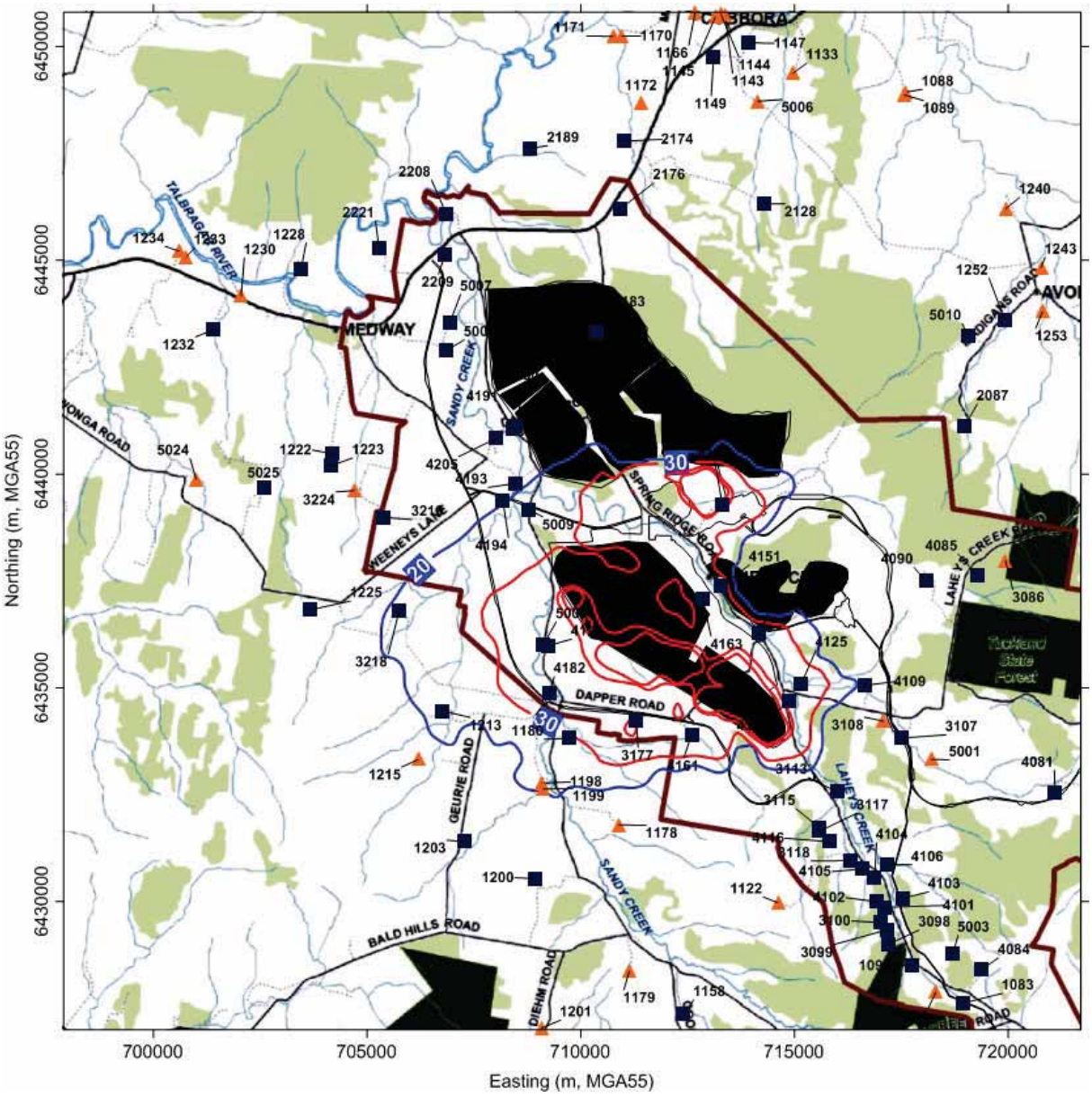

Figure D9: Cumulative Annual Average PM_{10} Concentrations (µg/m³) – Year 20

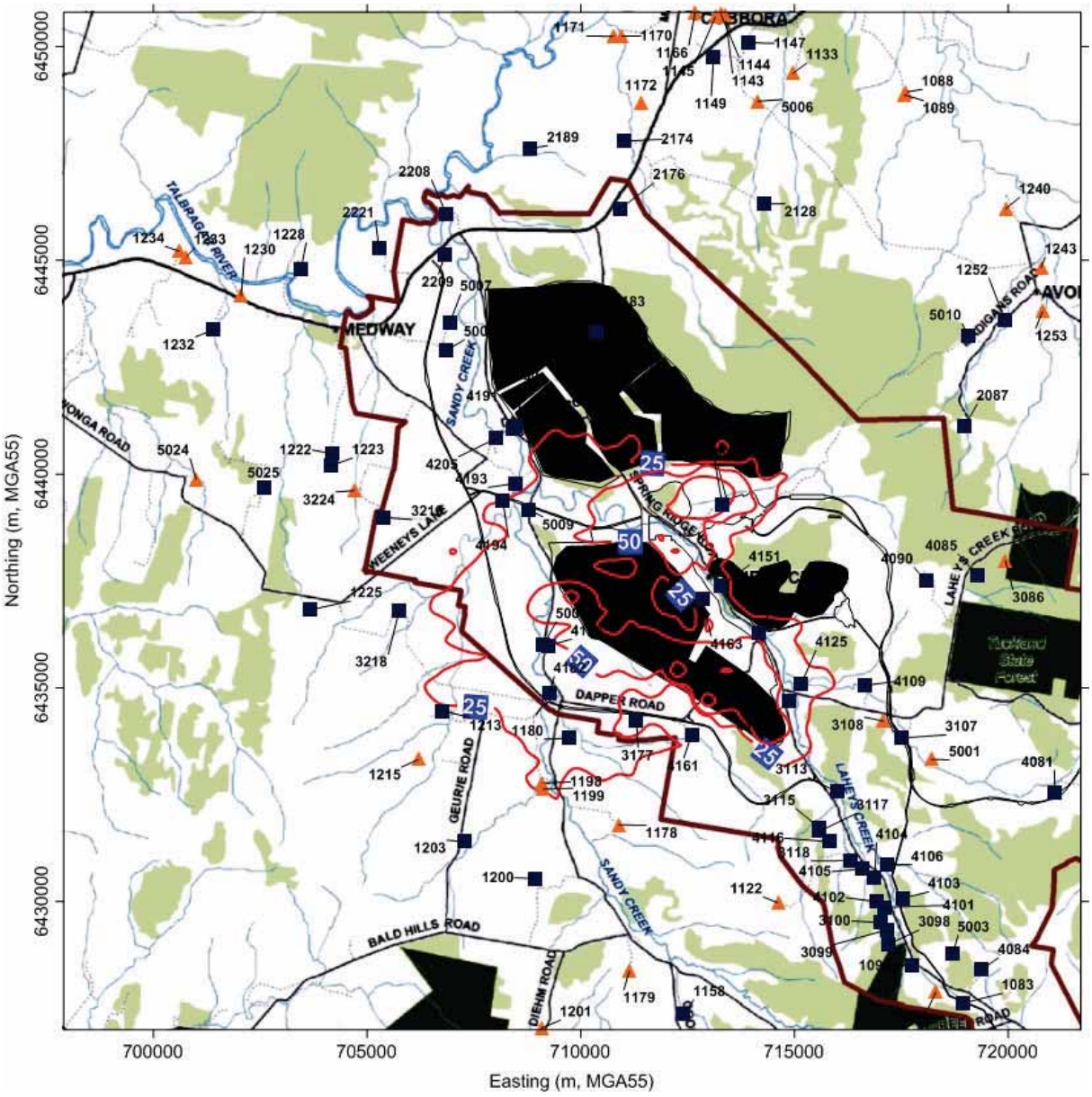

Figure D10: Cumulative Maximum 24-hour Average $PM_{2.5}$ Concentrations (µg/m³) – Year 20

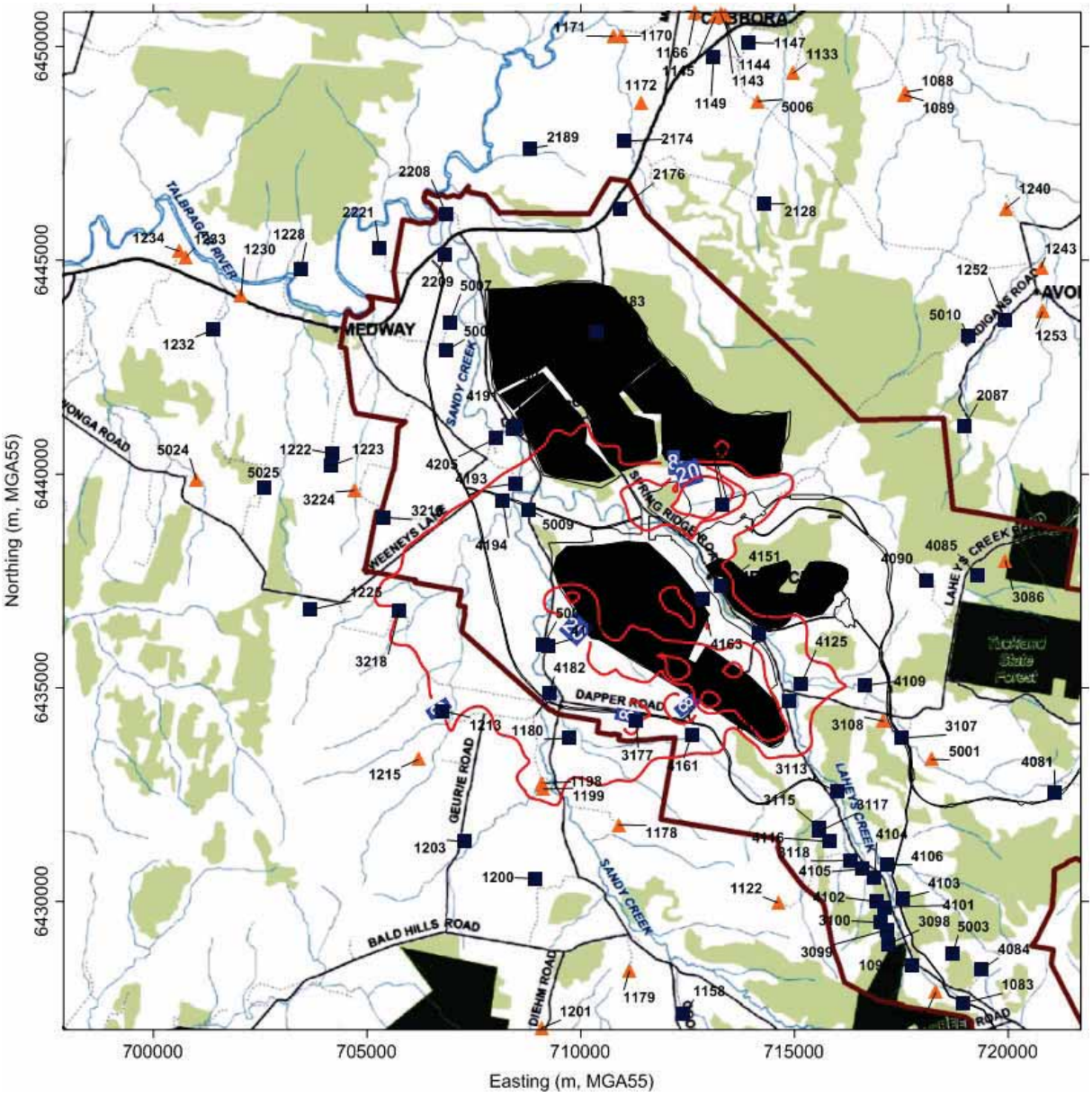

Figure D11: Cumulative Annual Average $PM_{2.5}$ Concentrations (µg/m³) – Year 20

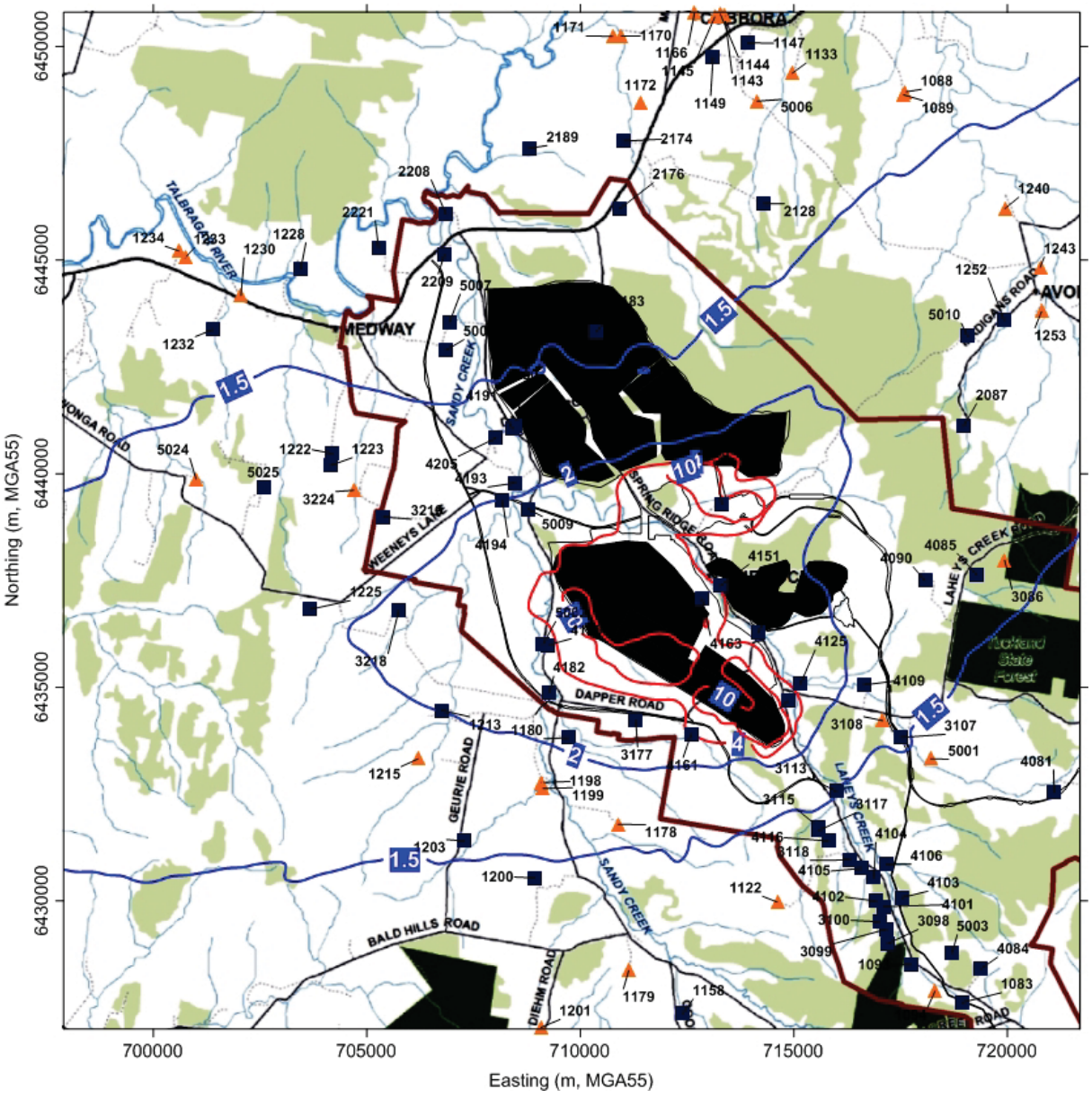

Figure D12: Cumulative Annual Average Dust Deposition Rates (g/m^2/month) – Year 20

Appendix E

Vacant Land Assessment

As discussed in **Section 5.1.5**, one land owner is predicted to experience a maximum 24-hour average PM_{10} concentration greater than the 50µg/m^3 across more than 25% of the total rateable property area at some time during the life of the Project.

A list of the impacted individual lots predicted to be impacted is presented in **Table E1**, while the spatial extent of the maximum 24-hour average PM_{10} concentration footprint and the location of the affected properties is illustrated in **Figure E1**.

Table E1: Lot/DP Numbers for Privately-Owned Vacant Land with Greater than 25% of Land Area Impacted by Project – All Mine Years

Land Owner	Lot/DP Numbers
Land Owner 1	16//754305, 51//754305, 52//754305, 109//754305, 1//1136261,

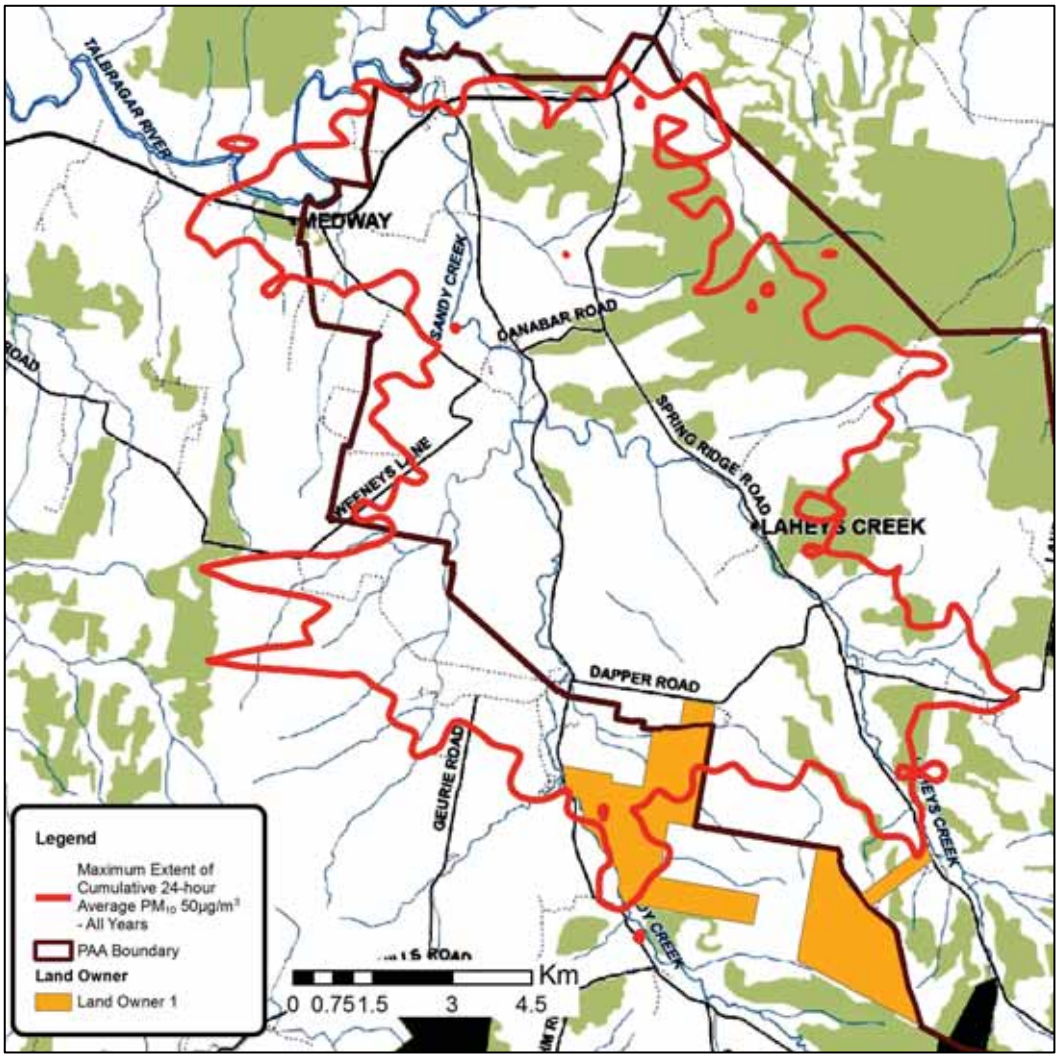

Figure E1 – Surrounding Private Land and Maximum Predicted Cumulative 24-hour Average PM_{10} 50µg/m^3 Contour – All Modelled Years Combined

Appendix I

Revised mine plan - noise assessment

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13 August 2013

Trish McDonald
Health, Safety, Environment & Community (HSEC) Manager
Cobbora Holding Company
First Floor, 133-135 King Street
Newcastle NSW 2320

Re: Cobbora Coal Project revised mine plan

Dear Trish,

1 Introduction

EMGA Mitchell McLennan Pty Limited (EMM) has reviewed the revised mine plan for the Cobbora Coal Project (the Project) in response to the recommendations in the PAC Review report (April 2013). The review included remodelling of the mining areas and plant locations for Year 8 and Year 20. Results of the modelling were compared to the results presented in the environmental assessment (EA) to determine potential changes to noise levels and affected residences.

The assessment includes an assessment of extraction and rail spur noise levels in accordance with the recently introduced *Rail Infrastructure Noise Guideline* (RING) (Environment Protection Authority (EPA) 2013).

2 Model comparison

The noise model for the EA was updated to incorporate the modified Year 8 and Year 20 mining areas and plant items. The key differences between these years as presented in the EA and as revised are:

- reduced number of mobile plant, in particular associated with a stacker and reclaimer replacing the mobile plant (primarily dozers) at the processing and coal load-out area;
- reduced number of mining areas open simultaneously; and
- increased waste rock emplacements heights, resulting in an improved attenuation of noise from haul roads due to shielding.

A comparison of the operating plant as assessed in EA and for the revised mining areas is presented in Table 1. For consistency, this comparison includes the revised mine plan (extraction) and proposed rail spur as an $L_{eq(15\text{-minute})}$. It is noted that the *Industrial Noise Policy* (INP) (EPA 2000) approach to the on-site rail spur has subsequently been superseded by Appendix 3 of the RING (EPA 2013). This letter report provides a summary of rail spur noise in isolation from coal extraction in accordance with the RING.

Table 1 Plant comparison - EA assessment mine plan versus revised mine plan for Year 8 and Year 20

Area	Plant	Lw, dB(A)	EA assessment mining areas		Revised mining areas	
			Year 8	Year 20	Year 8	Year 20
			Number	Number	Number	Number
CHPP	CHPP	111	1	1	1	1
	Rail	83	1	1	1	1
	Rail loadout	108	1	1	1	1
	Conveyor	98	1	1	1	1
	FEL	114	1	1	2	2
	Dozer D11	115	4	4	1	1
	Dozer D10	113	1	1	0	0
	D11 Tractor	115	2	2	0	0
	Reclaimer	112	0	0	1	1
	Stacker	103	0	0	1	1
Mining	Dozer D11	115	9	10	8	9
	Dozer D10	113	9	9	2	3
	Grader	108	5	5	3	3
	Drill	114	4	4	4	5
	Water cart	114	6	6	4	4
	Excavator 400T	116	7	6	3	3
	Excavator 600T	118	4	5	5	8
	Haul trucks	116	46	52	32	44
Total			**101**	**108**	**70**	**88**

3 Results

3.1 Comparison of EA and revised mining area

A comparison of noise levels for Year 8 and Year 20 (EA and revised) mining areas is provided in Table 2 for calm, prevailing winds and inversion meteorological conditions. The assessment includes the rail spur noise levels to allow comparison with noise levels presented in the EA.

The results incorporating the rail spur with extraction are significantly higher for receivers closest to the spur. This impact is somewhat misleading as the rail passby on the spur is the main acoustic contributor to received noise levels that is anticipated to occur only 10 times within a 24 hour period.

The extraction and rail spur scenario is representative of the recently superseded INP approach to noise assessments, where extraction noise and rail spur noise were combined and assessed over a fifteen minute L_{eq} metric. For consistency, this comparison adopted the same assumptions as the EA including adopting a relatively low train speed so comparisons can be made between old and new rail spur. Notwithstanding, a comparison of proposed train speeds between the $L_{eq(15\text{-}min)}$ and a $L_{eq(period)}$ have been provided in Section 3.3.

Modelling of the revised Year 8 and Year 20 mining areas predicts that noise levels will generally be the same or lower at private residences to those presented in the EA. The exception is at private residences 3062 and 3108 where an increase in train speed along the rail spur results in an increase in noise levels compared to the EA. The RING requires that rail spur noise is assessed separately to mining extraction noise.

The key contributors to reduction in noise levels are the removal of several dozers around the coal processing plant, the reduced number of mining areas and the increase in dump heights improving attenuation of noise from haul roads.

Table 2 Operational noise level comparison (INP) - EA assessment mine plan versus revised mine plan for Year 8 and Year 20

Receptor ID	PSNL All periods	EA mining area,						Revised mine area					
		Year 8 $L_{eq(15\text{-}min)}$, dB(A)			Year 20 $L_{eq(15\text{-}min)}$, dB(A)			Year 8 $L_{eq(15\text{-}min)}$, dB(A)			Year 20 $L_{eq(15\text{-}min)}$, dB(A)		
		Calm	Winds	Stability F	Calm	Winds	Stability F	Calm	Winds	Stability F	Calm	Winds	Stability F
1001 - 1172	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35
1178	35	<35	<35	<35	<35	<35	**36**	<35	<35	<35	<35	<35	35
1198	35	<35	<35	<35	<35	<35	≤35	<35	<35	<35	<35	<35	35
1199	35	<35	<35	<35	<35	<35	≤35	<35	<35	<35	<35	<35	<35
3021	35	<35	**38**	**39**	<35	**38**	**39**	<35	**36**	**37**	<35	**36**	**37**
3022	35	<35	**38**	**39**	<35	**38**	**39**	<35	**36**	**37**	<35	**36**	**37**
3024	35	<35	**37**	**38**	<35	**37**	**38**	<35	35	**36**	<35	35	**36**
3029	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35
3035	35	<35	**36**	**37**	<35	**36**	**37**	<35	<35	35	<35	<35	35
3041[6]	35	<35	<35	36	<35	<35	**36**	<35	<35	<35	<35	<35	<35
3043[6]	35	<35	38	39	<35	38	39	<35	36	36	<35	36	36
3044 - 3052	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35
3057[6]	35	38	39	43	38	39	43	41	43	46	41	43	46
3062	35	<35	<35	<35	<35	<35	<35	**37**	**40**	**42**	**37**	**40**	**42**
3063	35	<35	<35	<35	<35	<35	<35	<35	<35	35	<35	<35	35
3065 - 3086	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	≤35
3108	35	**43**	**45**	**48**	**43**	**45**	**48**	**47**	**47**	**50**	**47**	**48**	**50**
3218 - 3236	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35
5001	35	**38**	**43**	**44**	**38**	**43**	**44**	**36**	**42**	**42**	**36**	**42**	**42**
5003 - 5006	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35
5011 - 5022	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35
5023[6]	35	<35	38	38	<35	38	38	<35	36	36	<35	36	36
5024 - 5025	35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35

Notes: 1. Calm: no wind or temperature gradient; 2. Winds: 2.3 m/s 247.5^{o} (WSW); 3. Inversion: F class stability; 4. Bold - receptors that fall into the management zone (>35 dB(A) and ≤40 dB(A); 5. Bold/grey - receptors that fall into the affectation zone (>40 dB(A)). 6 CHC owned or amenity agreement in place (criteria not applied).

3.2 Extraction

An assessment has been completed for coal extraction onlyin accordance with the INP (EPA 2000).

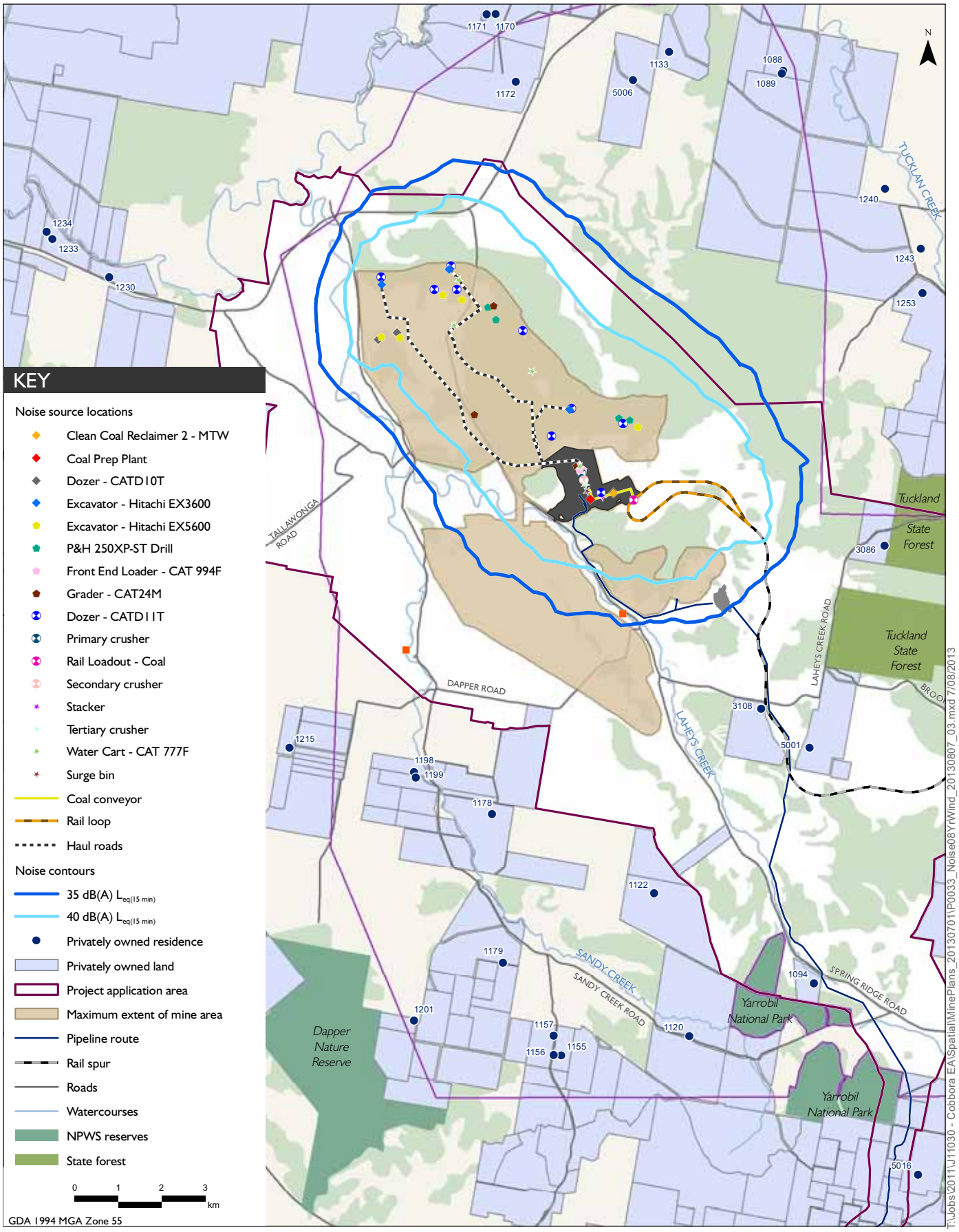
Table 3 provides the results for extraction-only during calm and prevailing weather conditions. The results for the extraction only scenario include the rail loop, but not the rail spur. Figures 1 to Figure 4 provide the noise contours for the revised mine plan.

Results of the extraction only scenario identify that the revised mine plan would satisfy the project specific noise level (PSNL) at all private residences with the exception of 3108 where a 1 dB(A) exceedance is predicted.

Table 3 Operational noise levels extraction only (INP) - revised mine plan for Year 8 and Year 20

Receptor ID	PSNL	Revised mine area, extraction only					
	All periods	Year 8 $L_{eq(15\text{-}min)}$, dB(A)			Year 20 $L_{eq(15\text{-}min)}$, dB(A)		
		Calm	Winds	Stability F	Calm	Winds	Stability F
1001 - 1172	35	<35	<35	<35	<35	<35	<35
1178	35	<35	<35	<35	<35	<35	<35
1198	35	<35	<35	<35	<35	<35	35
1199	35	<35	<35	<35	<35	<35	35
3021	35	<35	<35	<35	<35	<35	<35
3022	35	<35	<35	<35	<35	<35	<35
3024	35	<35	<35	<35	<35	<35	<35
3029	35	<35	<35	<35	<35	<35	<35
3035	35	<35	<35	<35	<35	<35	<35
3041	35	<35	<35	<35	<35	<35	<35
3043	35	<35	<35	<35	<35	<35	<35
3044 - 3052	35	<35	<35	<35	<35	<35	<35
3057	35	<35	<35	<35	<35	<35	<35
3062	35	<35	<35	<35	<35	<35	<35
3063	35	<35	<35	<35	<35	<35	<35
3065 - 3086	35	<35	<35	<35	<35	<35	<35
3108	35	<35	<35	<35	<35	**36**	**36**
3218 - 3236	35	<35	<35	<35	<35	<35	<35
5001	35	<35	<35	<35	<35	<35	<35
5003 - 5006	35	<35	<35	<35	<35	<35	<35
5011 - 5022	35	<35	<35	<35	<35	<35	<35
5023	35	<35	<35	<35	<35	<35	<35
5024 - 5025	35	<35	<35	<35	<35	<35	<35

Notes: 1. Calm: no wind or temperature gradient; 2. Winds: 2.3 m/s 247.5^{o} (WSW); 3. Inversion: F class stability; 4. Bold - receptors that fall into the management zone (>35 dB(A) and ≤40 dB(A); 5. Bold/grey - receptors that fall into the affectation zone (>40 dB(A)).



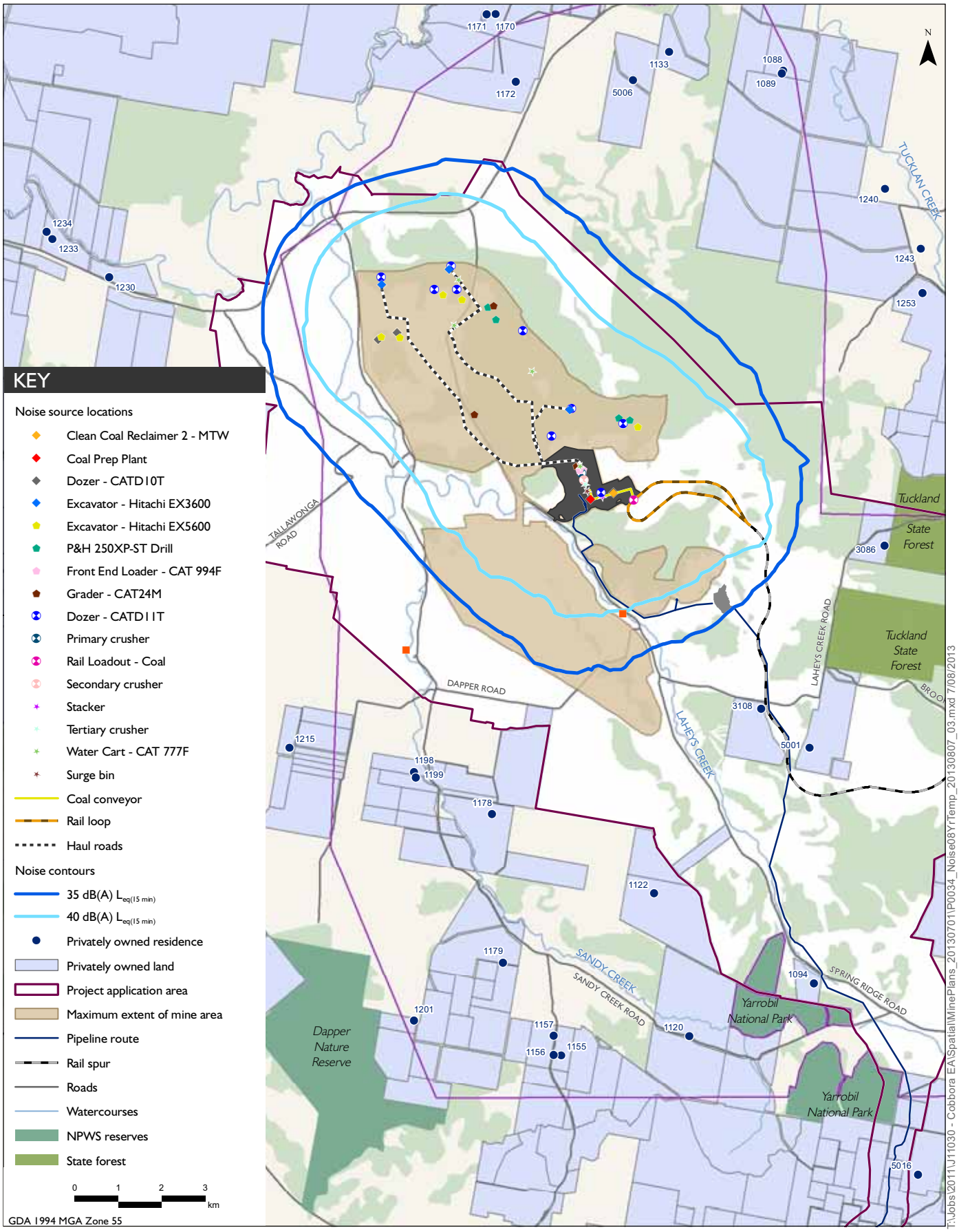
EMM

Year 8 Prevailing wind meteorological conditions (extraction only)

Cobbora Coal Project

Responses to PAC Review

Figure 1



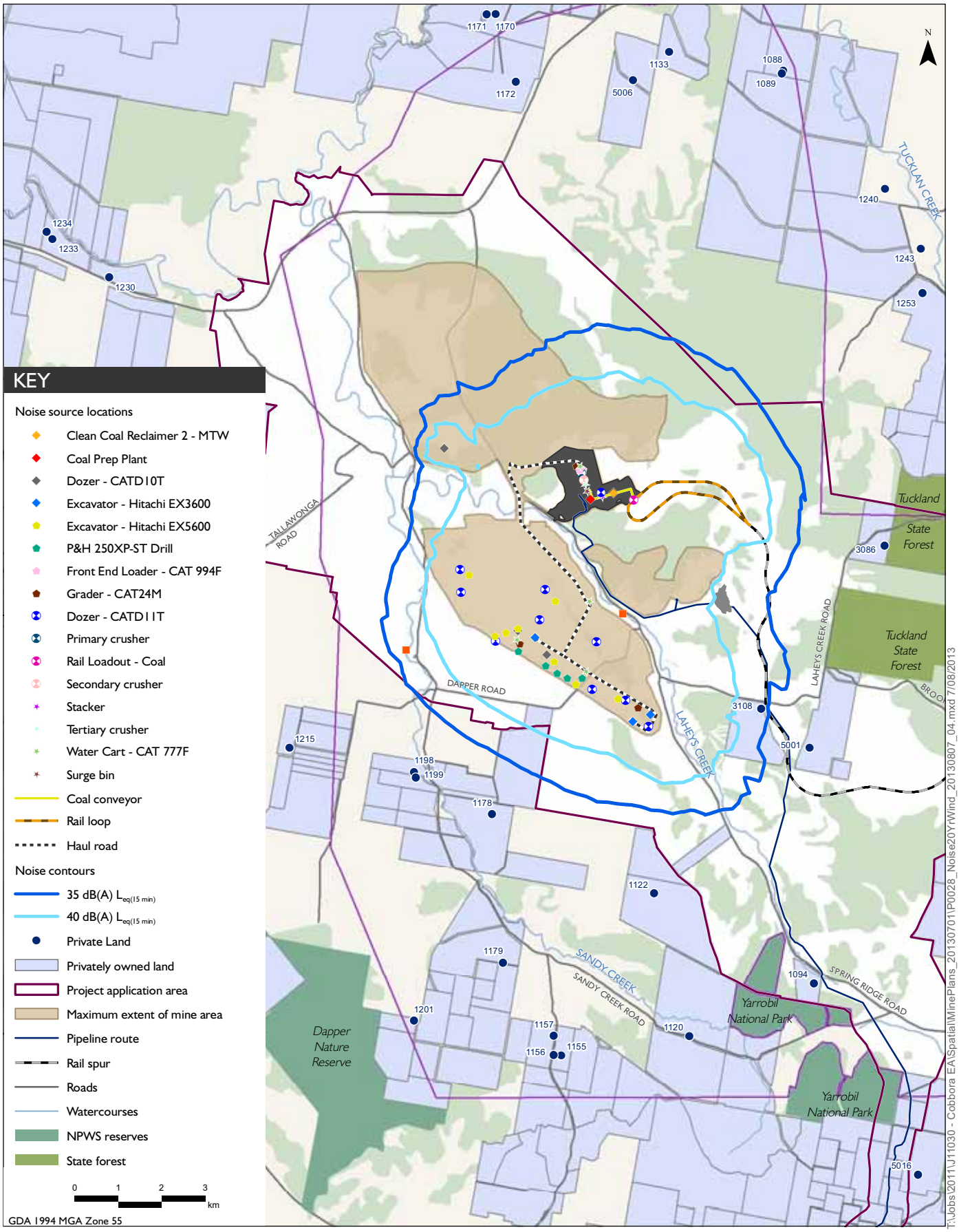
EMM

Year 8 Temperature inversion meteorological conditions (extraction only)

Cobbora Coal Project

Responses to PAC Review

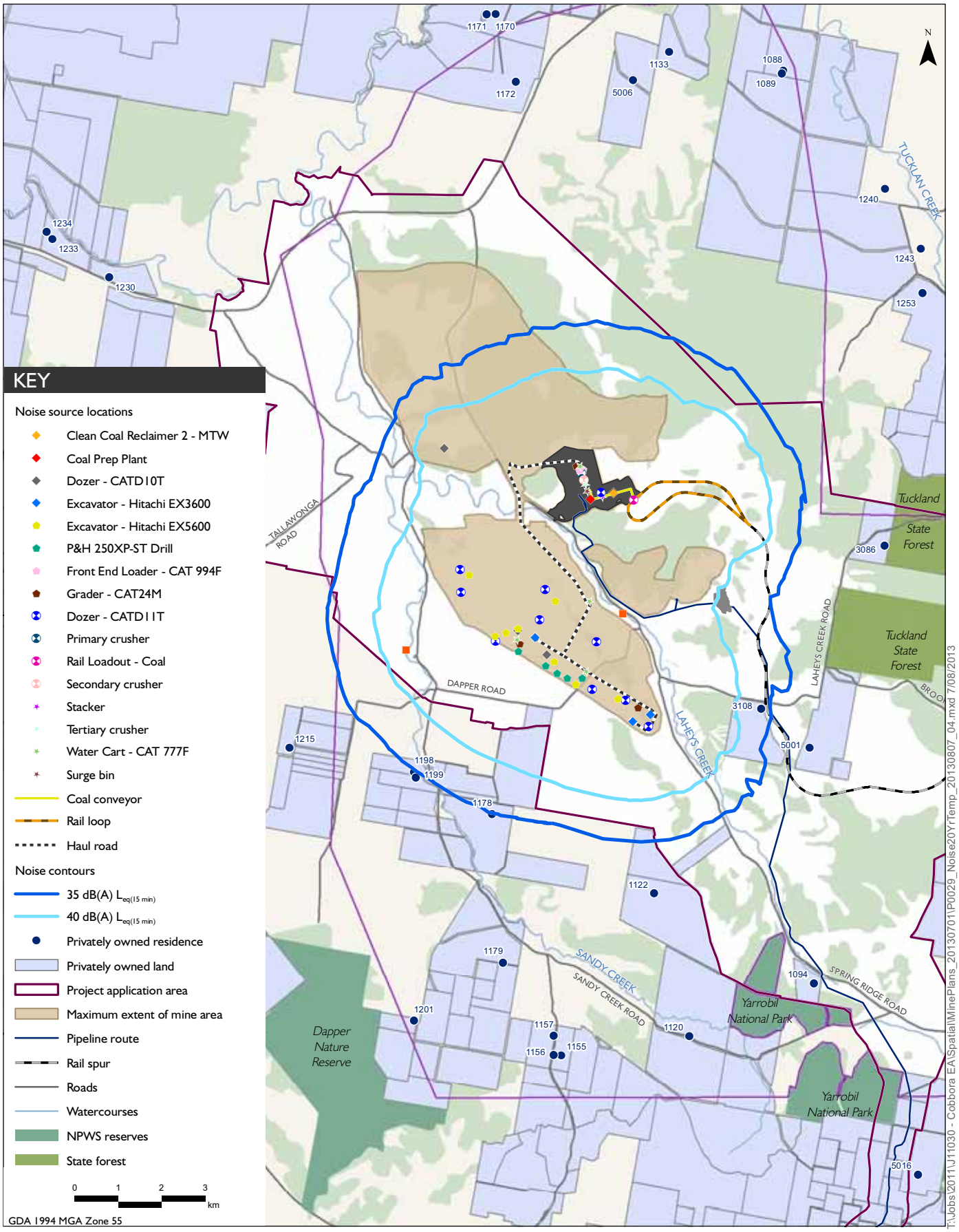
Figure 2



Year 20 Prevailing wind meteorological conditions (extraction only)

Cobbora Coal Project
Responses to PAC Review

Figure 3



Year 20 Temperature inversion meteorological conditions (extraction only)

Cobbora Coal Project
Responses to PAC Review

Figure 4

3.3 Rail spur

EMM have recalculated noise levels for three discreet receptors (3062, 3108 and 5001) in accordance with Appendix 3 of the RING for planned train movements (seven movements per day (7 am to 6pm) and three movements per night (10pm to 6 am)).

Additionally, a comparison has been made between the INP's method ($L_{eq(15\text{-}min)}$) and the RING ($L_{eq(period)}$) using the proposed rail speed profile along the rail spur.

Detailed analysis of train speeds were completed for the section of track between receptor 3108, 5001 and 3062. The analysis was based on data provided in *Cobbora Mine Spur Line – Train Simulations*, (Interfleet Technology Pty Limited 2012).

Preliminary model results identified elevated noise levels for receptors 3108 and 5001. Therefore, speed reductions to unloaded trains were applied to reduce noise levels at these receptors. The speed adjustments have been committed to by CHC that would see unloaded trains reduce their speed from 80 km/hr to 60 km/hr. This commitment will see the speed limits signposted along the rail spur. A reduction in train speed consequently reduces the overall received noise level. It is not possible to reduce the speed of loaded trains due to the steep track grade from chainage 14.5 to chainage 18.5. The speed limits adopted in the noise modelling are provided in Table 4. The speeds are governed by whether the train is loaded and the gradient of the track.

Table 4 Average train speeds used in rail spur noise modelling

Chainage start[1] (km)	Chainage end (km)	Loaded speed (km/hr)	Unloaded speed (km/hr)	Average speed (km/hr)
7.0	8.5	65	60	63
14.5	15.0	29	60	45
15.0	15.5	41	60	51
15.5	16.0	50	60	55
16.0	16.5	58	60	59
16.5	17.0	67	60	64
17.0	17.5	73	60	67
17.5	18.0	76	60	68
18.0	18.5	80	60	60
18.5	19.0	80	60	70

Note: 1. Chainage distance is the kilometre distance from the main line junction of the Dunedoo-Gulgong Rail Line to the rail load out area.

Table 5 presents the results of a comparison between the $L_{eq(15\text{-}min)}$ and $L_{eq(period)}$, using the proposed rail speed profile along the rail spur. This provides a comparison between the superseded INP approach and the newly released RING policy.

Table 5 Comparison of $L_{eq(15\text{-}min)}$ versus $L_{eq(period)}$ for the revised spur line

Receptor ID	Chainage (km)	Revised rail spur noise level		
		$L_{eq(15\text{-}min)}$, dB(A)	$L_{eq(day)}$, dB(A)	$L_{eq(night)}$, dB(A)
3108	18.1	58	50	47
5001	16.2	49	41	38
3062	8.1	53	45	42

Table 5 shows that results for $L_{eq(period)}$ are significantly lower as anticipated, for the day or night period, compared with the 15-minute assessment period.

Results of the planned movement scenario in comparison with the RING criteria are summarised in Table 6. It is noted that the RING adopts day (7am to 6pm), evening (6pm to 10pm) and night (10pm to 7am) assessment periods. For completeness, this assessment has assumed three train movements in the evening or three train movements in the night periods in order to demonstrate an assessment against all periods. This is a conservative assumption as it is anticipated that the three train movements would occur between the period of 6pm to 7am.

Table 6 Rail spur noise levels for planned rail movements - $L_{eq(period)}$

Receptor ID	Chainage (km)	RING criteria[1], L_{eq}, dB(A)			Revised rail spur noise level, L_{eq}, dB(A)		
		Day	Evening	Night	Day	Evening	Night
3108	18.1	50/55	45/50	40/45	50	51	47
5001	16.2	50/55	45/50	40/45	41	42	38
3062	8.1	50/55	45/50	40/45	45	45	42

Note: 1. acceptable/recommended maximum noise level.

Modelling identified that lowering the average train speed reduced noise levels, although compliance with the RING acceptable criteria is not achieved at 3108 and 3062. Therefore, earth mounds (barriers), were considered and committed to by CHC as a feasible noise control option and were incorporated into the noise model for the two receptors:

- residence 3108, 1.8 m in height from ground level of the track and 250 m long; and
- residence 3062, 3.5 m in height from ground level of the track and 200 m long.

Modelled noise levels with inclusion of the barriers are provided in Table 7. These show that, the RING criteria can be satisfied at the residences with the use of the barriers. Noise attenuation varies for each barrier due to a combination of receiver and rail spur elevation.

Table 7 Rail spur noise levels planned rail movements - $L_{eq(period)}$

Receptor ID	Chainage (km)	RING criteria L_{eq}, dB(A)			Revised rail spur noise level L_{eq}, dB(A)			Reduction, dB
		Day	Evening	Night	Day	Evening	Night	
3108	18.1	50/55	45/50	40/45	41	42	38	9
3062	8.1	50/55	45/50	40/45	43	43	40	2

4 Summary

Modelling of the revised Year 8 and Year 20 mining areas predicts that noise levels will generally be lower or similar to those presented in the EA. Operational noise from the extraction only scenario would satisfy the PSNL for all receptors with the exception of at residence 3108 where predictions are 1 dB(A) above the PSNL. Notwithstanding, CHC commit to the following to reduce impacts to the community:

- CHC has comprehensively modelled noise and has, or will, either acquire properties or reach noise amenity agreements to achieve relevant EPA criteria;
- management plans will reduce noise during adverse wind or weather conditions;
- CHC will conduct real time and regular attended compliance noise monitoring which will provide input to adaptive management strategies; and
- CHC has, or will, buy properties or reach amenity agreements with all willing landowners along the rail spur if EPA noise criteria are exceeded.

Rail spur noise would comply with the RING acceptable noise criteria for all assessed receptors following incorporation of reasonable and feasible mitigation. The mitigation includes establishment of barriers adjacent to the rail spur adjacent to the two assessed receptors in combination with a reduction maximum train speed along the rail spur.

Yours sincerely,

Oliver Muller
Associate, Senior Acoustic Scientist
omuller@emgamm.com
Review: PT

Appendix J

Revised mine plan - impacts to Aboriginal sites

All Aboriginal heritage sites recorded in the PAA and the management measures that will be implemented at the sites impacted by the Project are listed in Table J.1. The sites where impacts or management measures are different from those in the PPR&RTS report are shaded.

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
CBR-RSH-01	Aboriginal rockshelter	Mining Area A	Salvage excavation	Moderate
CBR-GG-01	Grinding grooves	None	Fence and avoid	Moderate
CBR-GG-02	Grinding grooves	Mining Area C	Salvage and relocate	Moderate
Grinding Groove 01	Grinding Grooves	None	Fence and avoid	Moderate
Grinding Groove 02	Grinding Grooves	None	Fence and avoid	Moderate
Grinding Groove 03	Grinding Grooves	None	Fence and avoid	Moderate
Grinding Groove 04	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 05	Grinding Grooves	None	Fence and avoid	Moderate
Grinding Groove 06	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 07	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 08	Grinding Grooves	None	Fence and avoid	High
Grinding Groove 09	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 10	Grinding Grooves	None	Avoidance	Low
Grinding Groove 11	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 12	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 13	Grinding Grooves	None	Avoidance	Moderate
Grinding Groove 14	Grinding Grooves	None	Fence and avoid	High
Grinding Groove 15	Grinding Grooves	None	Fence and avoid	Low
Grinding Groove 16	Grinding Grooves	None	Avoidance	Low
Hearth 01	Hearth	None	Avoidance	Moderate
Hearth 02	Hearth	None	Avoidance	Moderate
Hearth 03	Hearth	None	Avoidance	Moderate
Hearth 04	Hearth	Mining Area A	Salvage excavation	Moderate
Hearth 05	Hearth	Mining Area A	Salvage excavation	Moderate
Hearth 06	Hearth	None	Avoidance	Moderate
Hearth 07	Hearth	None	Avoidance	Moderate
Hearth 08	Hearth	None	Avoidance	Moderate
Hearth 09	Hearth	None	Avoidance	Moderate
Hearth 10	Hearth	None	Fence and avoid	Moderate
Hearth 11	Hearth	None	Fence and avoid	Moderate
Hearth 12	Hearth	None	Fence and avoid	Moderate
Hearth 13	Hearth	None	Avoidance	Moderate
Hearth 14	Hearth	None	Avoidance	Moderate
Hearth 15	Hearth	None	Avoidance	Moderate
BBS Dubbo LALC Spring Ridge Rd	Open stone artefact	None	Avoidance	Moderate

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
BBS Dubbo LALC Travelling Stock Route	Open stone artefact	None	Avoidance	Moderate
CBR-IF-01	Open stone artefact	Mining Area A	Collection	Low
CBR-IF-02	Open stone artefact	Mining Area A	Collection	Moderate
CBR-IF-03	Open stone artefact	Mining Area A	Collection	Moderate
CBR-IF-04	Open stone artefact	Mining Area B	Collection	Moderate
CBR-IF-05	Open stone artefact	None	Avoidance	Low
CBR-IF-06a	Open stone artefact	None	Avoidance	Low
CBR-IF-06b	Open stone artefact	None	Avoidance	Low
CBR-IF-07	Open stone artefact	None	Avoidance	Low
CBR-IF-08	Open stone artefact	None	Avoidance	Low
CBR-OS-01	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-02	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-03	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-04	Open stone artefact	Mining Area A	Collection	High
CBR-OS-05a	Open stone artefact	Mining Area A	Salvage excavation	High
CBR-OS-05b	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-06	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-07	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-08	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-09 'Big Scald'	Open stone artefact	Mining Area A	Collection	High
CBR-OS-10	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-11	Open stone artefact	Mining Area A	Salvage Excavation	Moderate
CBR-OS-11a	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-12 'Waterhole'	Open stone artefact	Mining Area A	Salvage excavation	High
CBR-OS-13a	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-13b	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-14	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-15	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-16	Open stone artefact	Mine dams	Collection	Low
CBR-OS-17	Open stone artefact	None	Fence and avoid	Low
CBR-OS-18	Open stone artefact	None	Avoidance	Moderate
CBR-OS-18a	Open stone artefact	None	Fence and avoid	Low
CBR-OS-18b	Open stone artefact	None	Avoidance	Low
CBR-OS-19	Open stone artefact	Mining Area A	Collection	Moderate
CBR-OS-20	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-21	Open stone artefact	Mining Area B	Collection	Moderate
CBR-OS-22	Open stone artefact	RW Pipeline	Collect and set aside	Low
CBR-OS-23	Open stone artefact	None	Avoidance	Low

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
CBR-OS-24	Open stone artefact	RW Pipeline	Collect and set aside	Low
CBR-OS-25	Open stone artefact	RW Pipeline	Collect and set aside	Low
CBR-OS-29a	Open stone artefact	Haul Road	Collection	Moderate
CBR-OS-29b	Open stone artefact	None	Fence and avoid	Moderate
CBR-OS-29c	Open stone artefact	Haul Road	Collection	Moderate
CBR-OS-29d	Open stone artefact	None	Avoidance	Moderate
CBR-OS-29e	Open stone artefact	None	Avoidance	Moderate
CBR-OS-29f	Open stone artefact	Mine dams	Collection	Moderate
CBR-OS-29g	Open stone artefact	Mining Area C	Collection	Moderate
CBR-OS-29h	Open stone artefact	Mining Area C	Collection	Moderate
CBR-OS-29i	Open stone artefact	None	Avoidance	Moderate
CBR-OS-29j	Open stone artefact	None	Avoidance	Moderate
CBR-OS-29k	Open stone artefact	None	Avoidance	Moderate
CBR-OS-29l	Open stone artefact	None	Avoidance	Moderate
CBR-OS-30	Open stone artefact	Mining Area C	Collection	Moderate
CBR-OS-31a	Open stone artefact	Mining Area B	Collection	Moderate
CBR-OS-31b	Open stone artefact	Mining Area B	Collection	Low
CBR-OS-31c	Open stone artefact	Mining Area B	Collection	Moderate
CBR-OS-31d	Open stone artefact	None	Fence and avoid	Moderate
CBR-OS-31e	Open stone artefact	Mining Area B	Collection	Low
CBR-OS-32	Open stone artefact	None	Avoidance	Low
CBR-OS-33a	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-33b	Open stone artefact	Mining Area A	Collection	Low
CBR-OS-34a	Open stone artefact	Haul Road	Collection	Moderate
CBR-OS-34b	Open stone artefact	None	Fence and avoid	Low
CBR-OS-35	Open stone artefact	Haul Road	Collection	Moderate
CBR-OS-36	Open stone artefact	Emplacement	Collection	Low
CBR-OS-37a	Open stone artefact	None	Avoidance	Low
CBR-OS-37b	Open stone artefact	None	Avoidance	Low
CBR-OS-37c	Open stone artefact	None	Avoidance	Low
CBR-OS-38a	Open stone artefact	Haul Road	Collection	Low
CBR-OS-38b	Open stone artefact	Emplacement	Collection	Low
CBR-OS-39a	Open stone artefact	Emplacement	Collection	Low
CBR-OS-39b	Open stone artefact	Emplacement	Collection	Low
CBR-OS-39c	Open stone artefact	Emplacement	Collection	Low
CBR-OS-40	Open stone artefact	Emplacement	Collection	Low
CBR-OS-41	Open stone artefact	None	Avoidance	Low
CBR-OS-42	Open stone artefact	Rail spur & RW Pipeline	Collection	Low

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
CBR-OS-43	Open stone artefact	Rail spur & RW Pipeline	Collection	Moderate
CBR-OS-44a	Open stone artefact	Rail spur & RW Pipeline	Salvage excavation	Moderate
CBR-OS-44b	Open stone artefact	None	Avoidance	Low
CBR-OS-45	Open stone artefact	None	Avoidance	Low
CBR-OS-46a	Open stone artefact	None	Avoidance	Low
CBR-OS-46b	Open stone artefact	None	Avoidance	Low
CBR-OS-47a	Open stone artefact	None	Fence and avoid	Moderate
CBR-OS-47b	Open stone artefact	None	Avoidance	Moderate
CBR-OS-48	Open stone artefact	None	Avoidance	Low
CBR-OS-49	Open stone artefact	Rail spur & RW Pipeline	Collection	Low
DTG/OC21 - Medway 2	Open stone artefact	None	Avoidance	Moderate
DTG/OC22 - Sandy Creek	Open stone artefact	None	Avoidance	Moderate
Fords Creek;Cobbora;	Open stone artefact	None	Avoidance	Moderate
IF 01-Glass Flake	Open Stone Artefact	None	Fence and avoid	Low
IF 02-Brown Silcrete Core	Open Stone Artefact	None	Fence and avoid	Low
IF 03-Pounding Stone	Open Stone Artefact	None	Fence and avoid	Low
IF 05-Ground Edge Axe	Open Stone Artefact	Mine dams	Collection	High
IF 06-Grinding Bowl	Open Stone Artefact	None	Avoidance	Low
IF 07-Hammer Stone	Open Stone Artefact	None	Fence and avoid	Low
IF 08-Anvil	Open Stone Artefact	None	Avoidance	Low
IF 09-Grinding Bowl	Open Stone Artefact	None	Avoidance	High
IF 10- Grinding Bowl	Open Stone Artefact	None	Avoidance	High
IF 11-Grinding Bowl	Open Stone Artefact	None	Avoidance	Low
IF 12-Small Hammer Stone	Open Stone Artefact	None	Fence and avoid	Low
IF 14	Open Stone Artefact	None	Avoidance	Low
IF 15	Open Stone Artefact	None	Collect and set aside	Low
IF 16	Open Stone Artefact	None	Collect and set aside	Low
IF 17	Open Stone Artefact	None	Avoidance	Low
IF 18	Open Stone Artefact	None	Avoidance	Low
IF O4-Knife Sharping Stone	Open Stone Artefact	None	Avoidance	Low
SAC 01	Open Stone Artefact	None	Avoidance	Moderate
SAC 02	Open Stone Artefact	None	Avoidance	Low
SAC 03	Open Stone Artefact	None	Avoidance	Low

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
SAC 04	Open Stone Artefact	None	Avoidance	Low
SAC 05	Open Stone Artefact	None	Avoidance	Low
SAC 06	Open Stone Artefact	None	Avoidance	High
SAC 07	Open Stone Artefact	None	Avoidance	Moderate
SAC 08	Open Stone Artefact	None	Fence and avoid	Low
SAC 09	Open Stone Artefact	None	Avoidance	Moderate
SAC 10	Open Stone Artefact	None	Avoidance	Low
SAC 11	Open Stone Artefact	Mining Area A	Collection	Low
SAC 12	Open Stone Artefact	Mining Area A	Collection	Moderate
SAC 13	Open Stone Artefact	Mining Area A	Collection	Low
SAC 14	Open Stone Artefact	None	Fence and avoid	Low
SAC 15	Open Stone Artefact	None	Fence and avoid	Low
SAC 16	Open Stone Artefact	None	Fence and avoid	Low
SAC 17	Open Stone Artefact	None	Avoidance	Low
SAC 18	Open Stone Artefact	None	Avoidance	High
SAC 19	Open Stone Artefact	None	Avoidance	Low
SAC 20	Open Stone Artefact	None	Fence and avoid	Low
SAC 21	Open Stone Artefact	None	Fence and avoid	Low
SAC 22	Open Stone Artefact	None	Fence and avoid	High
SAC 23	Open Stone Artefact	None	Fence and avoid	High
SAC 24	Open Stone Artefact	None	Fence and avoid	Moderate
SAC 25	Open Stone Artefact	None	Fence and avoid	Moderate
SAC 26	Open Stone Artefact	None	Fence and avoid	Low
SAC 27	Open Stone Artefact	None	Fence and avoid	Low
SAC 28	Open Stone Artefact	None	Fence and avoid	Moderate
SAC 29	Open Stone Artefact	Haul Road	Collection	Moderate
SAC 30	Open Stone Artefact	None	Avoidance	Low
SAC 31	Open Stone Artefact	None	Avoidance	High
SAC 32	Open Stone Artefact	None	Avoidance	Moderate
SAC 33	Open Stone Artefact	None	Avoidance	Moderate
SAC 34	Open Stone Artefact	None	Avoidance	High
SAC 35	Open Stone Artefact	None	Fence and avoid	Low
SAC 36	Open Stone Artefact	None	Avoidance	Moderate
SAC 37	Open Stone Artefact	Mining Area B	Collection	Low
SAC 38	Open Stone Artefact	None	Fence and avoid	Low
SAC 39	Open Stone Artefact	None	Avoidance	Low
SAC 40	Open Stone Artefact	None	Avoidance	Low
SAC 41	Open Stone Artefact	RW Pipeline	Collect and set aside	Low
SAC 42	Open Stone Artefact	RW Pipeline	Collect and set aside	Moderate
SAC 43	Open Stone Artefact	RW Pipeline	Collect and set aside	Low

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
SAC 44	Open Stone Artefact	RW Pipeline	Collect and set aside	Low
SAC 45	Open Stone Artefact	None	Avoidance	Low
SAC 46	Open Stone Artefact	RW Pipeline	Collect and set aside	Moderate
SAC 47	Open Stone Artefact	RW Pipeline	Collect and set aside	Low
SAC 48	Open Stone Artefact	None	Avoidance	Low
SAC 59	Open Stone Artefact	None	Avoidance	Low
SAC 60	Open Stone Artefact	None	Avoidance	Low
SAC 61	Open Stone Artefact	None	Avoidance	Low
SAC 62	Open Stone Artefact	None	Avoidance	Low
SAC 63	Open Stone Artefact	None	Avoidance	Low
Sandy Creek;Cobbora;	Open stone artefact	None	Avoidance	Moderate
The Gap;Cobbara;	Open stone artefact	None	Avoidance	Moderate
The Gap;Cobbora;	Open stone artefact	None	Avoidance	Moderate
YBCR-OS2 with PAD	Open Stone Artefact	None	Avoidance	Moderate
Shelter 01	Rockshelter with PAD	None	Avoidance	Low
Shelter 02	Rockshelter with PAD	None	Fence and avoid	Moderate
Shelter 03	Rockshelter with PAD	None	Avoidance	Moderate
Shelter 04	Rockshelter with PAD	None	Avoidance	Moderate
Shelter 05	Rockshelter with PAD	None	Avoidance	Moderate
Shelter 08	Rockshelter with PAD	None	Avoidance	Moderate
BBS; Dubbo LALC; Road Reserve 2	Scarred Tree	None	Avoidance	Moderate
DR-ST2	Scarred Tree	None	Avoidance	Moderate
DR-ST3	Scarred Tree	None	Avoidance	Moderate
DR-ST4	Scarred Tree	None	Avoidance	Moderate
DR-ST5	Scarred Tree	None	Avoidance	Moderate
TRE 01	Scarred Tree	None	Avoidance	Low
TRE 02	Scarred Tree	None	Avoidance	Low
TRE 03	Scarred Tree	None	Avoidance	Low
TRE 04	Scarred Tree	None	Avoidance	Moderate
TRE 05	Scarred Tree	None	Avoidance	Moderate
TRE 06	Scarred Tree	None	Avoidance	Low
TRE 07	Scarred Tree	None	Fence and avoid	Moderate
TRE 08	Scarred Tree	None	Fence and avoid	Moderate
TRE 09	Scarred Tree	None	Fence and avoid	Moderate
TRE 10	Scarred Tree	None	Fence and avoid	Low
TRE 11	Scarred Tree	None	Fence and avoid	Low
TRE 12	Scarred Tree	None	Fence and avoid	Low
TRE 13	Scarred Tree	None	Avoidance	Moderate
TRE 14	Scarred Tree	None	Fence and avoid	Low

Table J.1 Impacts to Aboriginal heritage sites

Site name	Site type	Project impact	Management	Scientific significance
TRE 15	Scarred Tree	None	Fence and avoid	Low
TRE 16	Scarred Tree	None	Fence and avoid	Low
TRE 17	Scarred Tree	None	Fence and avoid	Low
TRE 18	Scarred Tree	None	Avoidance	Moderate
TRE 19	Scarred Tree	None	Avoidance	Moderate
TRE 20	Scarred Tree	None	Avoidance	Low

Appendix K

Revised project - economic assessment

Gillespie Economics

Environmental and Resource Economics: Environmental Planning and Assessment

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Phil Towler
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Dear Phil

Re: Cobbora Project Economic Assessment

Gillespie Economics prepared an Economic Assessment of the Cobbora Coal Project as part of the Environmental Assessment. At that time, the Project was intended to provide coal to NSW coal-fired power generators at a negotiated financial price and provide some coal for other domestic and export markets. I understand that the NSW Government now intends to sell or lease the Cobbora Coal Project and that the contracts to supply coal to coal-fired power stations in NSW will be terminated.

Attached is an analysis of the implications of the intended sale or lease of the Cobbora Coal Project for the findings of the Economic Assessment previously undertaken for the Project.

Regards

29/7/13

Rob Gillespie
Principal
Gillespie Economics

ATTACHMENT 1

Introduction

On 1 July 2013, the NSW Government announced that it intends to sell or lease the Cobbora Coal Project and that the agreements with Origin Energy, Macquarie Generation and Delta Electricity to supply coal to four large coal-fired power stations in NSW will be terminated. The coal will now be supplied domestically (most likely for power generation) or will be exported.

The Cobbora Coal Project Environmental Assessment (EA) Economic Assessment (August 2012) provided:

1. A benefit-cost analysis (BCA) of the Project; and
2. A regional economic impact assessment of the Project.

This letter identifies the implications of ownership changes for the two components of the Economic Assessment reported in the EA.

Benefit Cost Analysis

The BCA determined that the Project would have net production benefits of $2,014M and that all of this net production benefit would accrue to Australia. Including values for the environmental, cultural and social costs and benefits of the Project to Australia that were not already incorporated in the estimate of net production benefits, the Project was estimated to have net benefits to Australia of between $1,946M and $2,138M and hence is desirable and justified from an economic efficiency perspective. As explained in Section 19.2.1 of the Preferred Project Report and Response to Submissions (February 2013), the estimated closure cost increased from $69M to $340M due to additional work to back-fill the mine voids. This is a net present value difference of $65M (based on a discount rate of 7%) and therefore the adjusted net benefits to Australia would be between $1,872M and $2,073M.

The estimate of the net production benefit of the Project was based on a shadow price for the coal rather than the negotiated financial price for sale to NSW coal-fired power generators. The shadow price for coal reflects its true economic value, and in the BCA was the world price for this coal allowing for its lower energy value.

Because the BCA used the economic value of the coal rather than the negotiated financial value of the coal, a change in ownership structure for the Project does not change the estimate of the total net production benefits of the Project. However, it does change the distribution of net production benefits and potentially the level of net production benefit that accrues to Australia and NSW.

In the Economic Assessment, the net production benefits of the Project were identified as mainly accruing to:

- the NSW Government via royalties (estimated at $407M or $158M present value at 7% discount rate) which are subsequently used to fund provision of government infrastructure and services across the State, including the local region; and
- coal-fired power generators in NSW through the provision of lower cost coal and subsequently NSW electricity consumers (and to a lesser extent Australian electricity consumers) through the provision of lower cost electricity (estimated at $1,856M).

It was identified that net profit accruing to Cobbora Holding Company (CHC) and its shareholder and company tax accruing to the Commonwealth Government would most likely be minimal given the cost recovery nature of the Project.

If the Project is purchased or leased at its full economic value, the purchase/lease price will reflect the discounted after tax and after royalties net profit over the life of the Project. Net profit from the commercial Project will therefore be captured by the NSW Government. Company tax and royalties will also accrue from the Project as mining occurs.

Under this scenario, the total net production benefit to Australia would still be the same as previously estimated, however the distribution of the net production benefits would change. Table 1 provides a broad comparison of the distribution of the net production benefits of the Project under CHC ownership and if sold or leased.

Table 1 – Distribution of Net Production Benefits of the Project with Different Ownership

Component of Net Production Benefit	Original Cobbora Project	Sale/Lease of Project
Net Profit	Zero as a cost recovery project	Positive net profit but captured by NSW Government in sale price/lease price
Company Tax	Zero as a cost recovery project	Positive as now a commercial project
Royalties	Positive ($158M present value)	Positive and greater than original project estimate due to the greater level of revenue
Cheap coal to NSW Generators	Positive ($1,856M present value)	Zero
Community contributions	Positive (unquantified)	Positive (unquantified)

While the net production benefit to Australia will not change under the new scenario, the net production benefit that accrues to NSW will be reduced as the Project will no longer deliver low cost coal to NSW coal-fired power generators and some of the net production benefit would accrue to the Commonwealth Government via company tax, rather than NSW.

If the sale or lease price of the Project does not reflect the full economic value of the mine then some of the net profit will be shared between the NSW Government and the new purchaser – this may reduce the total net production benefit to Australia if the purchaser has overseas shareholders.

Regional Economic Impact Assessment

Using input-output analysis, the Economic Assessment of the Project estimated that it would make up to the following contribution to the regional economy:

- $714M in annual direct and indirect regional output or business turnover;
- $184M in annual direct and indirect regional value-added;
- $102M in annual direct and indirect household income; and
- 1,170 direct and indirect jobs.

For the NSW economy, the operation of the Project was estimated to make up to the following contributions:

- $1,307M in annual direct and indirect output or business turnover;
- $472M in annual direct and indirect value-added;
- $267M in annual direct and indirect household income; and
- 3,150 direct and indirect jobs.

These estimates were based on the revenue, expenditure and employment profile associated with Project. Selling the coal at a market price rather than a lower negotiated price would increase the estimated value for direct output and direct value-added but would not change household income and employment.

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