H Revised Noise and Vibration Assessment

Report

Revised Noise and Vibration Assessment

Kevin's Corner Mine

22 APRIL 2012

Prepared for

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42626920

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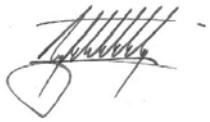

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Abbreviations

Abbreviation	Description
HGPL	Hancock Galilee Pty Ltd
HCPL	Hancock Coal Pty Ltd
KC	Kevin's Corner
ACP	Alpha Coal Project
AARC	Australasian Resource Consultants
WHO	World Health Organisation
EP Act	Environmental Protection Act 1994 (Queensland);
EPP(Noise)	Environmental Protection (Noise) Policy 2008
ANZEC	Australian and New Zealand Environment Council
NSW RTA	New South Wales Road Traffic Authority
ToR	Terms of Reference
PFS	Pre Feasibility Study
CoP	Code of Practice
EM Plan	Environmental Management Plan
ML	Mining Lease
MLA70425	Subject Mining Lease
CHPP	Coal Handling Preparation Plant
TLO	Train Load Out Facility
ROM	Run of Mine
OLC	Overland Conveyor
STP	Sewerage Treatment Plant
MIA	Mine Industrial Area
m	Metres
km	Kilometres
m/s	Metres per second
mm/s	Millimetres per second
km/h	Kilometres per hour
m^3	Cubic metres
T	Tonnes
Mt	Million tonnes
Mtpa	Million tonnes per annum
Ha	Hectares
PPV	Peak Particle Velocity
P	Pressure (Overpressure)

Executive Summary

URS Australia Pty Ltd (URS) prepared and issued a Noise and Vibration Impact Assessment, dated 5 April 2011 as part of the EIS application process on behalf of Hancock Galilee Pty Ltd (HGPL) for the proposed Kevin's Corner Project (Mine) (the Project). The assessment was prepared in accordance with the Terms of Reference (ToR) dated June 2009, the *Environmental Protection Act 1994* and the Environmental Protection (Noise) Policy 2008.

Noise and vibration impacts associated with the site's proposed construction and operation were assessed in accordance with the relevant draft EPA Ecoaccess guidelines (EPA Ecoaccess Guideline Planning for Noise Control, EPA Ecoaccess Guideline Noise and Vibration from Blasting and EPA Ecoaccess Guideline Assessment of Low Frequency Noise). Off-site road traffic noise was assessed against the Department of Main Roads' Road Traffic Noise Management Code of Practice criteria. Rail noise associated with the Project was assessed in accordance with Queensland Rail's Code of Practice for Railway Noise Management criteria.

The EIS was issued for public display between 31 October and 12 December 2011. Since these dates there has been a revision to the rail alignment design.

This report provides a supplementary assessment to the original EIS noise and vibration study. Updated modelling predictions were undertaken after the detailed design of the rail alignment and responses are provided to the submissions from Queensland Health, DERM and the Barcaldine Regional Council to the EIS.

Additional to the Rail Noise Assessment, an industrial noise assessment was undertaken to consider the Kevin's Corner rail spur as an industrial noise source. Train movements have been assumed similar as in the EIS and the impact has been determined in terms of industrial noise limits defined by Ecoaccess guidelines used in the EIS.

Even though full compliance is predicted when assessing rail noise to the Queensland Rail's Code of Practice rail noise criteria, the noise modelling determined potential for marginal to considerable impact from the rail noise spur when considered as industrial noise source at three noise sensitive receptors Surbiton, Eulimbie and Surbiton South. Exceedances of up to 8 dB of the night-time operational noise criterion at the most affected receptor (Eulimbie) are predicted and noise control measures are recommended to reduce the negative impact.

Cumulative rail noise modelling of Kevin's Corner and Alpha Rail Line predicted potential for up to 13 dB exceedance at Eulimbie and 4 dB at Surbiton South of the WHO sleeping conservation criterion. This was found to be due to proximity of the Alpha Rail Line to the Eulimbie and Surbiton South Homesteads. It was therefore determined that between the Kevin's Corner rail and the Alpha Rail Line, the latter dominates and controls the rail noise levels at those two sensitive receptors.

1

Background

1.1 Summary of EIS Noise and Vibration Assessment

URS Australia Pty Ltd (URS) prepared and issued a Noise and Vibration Impact Assessment (NVIA), dated 5 April 2011 as part of the EIS application process on behalf of Hancock Galilee Pty Ltd (HGPL) for the proposed Kevin's Corner Project (the Project). The assessment was prepared in accordance with the Terms of Reference (ToR) dated June 2009, the *Environmental Protection Act 1994* and the Environmental Protection (Noise) Policy 2008. The NVIA was included in Volume 2, Appendix P of the EIS and summarised in Volume 1 (Section 15). Noise and vibration impacts associated with the site's proposed construction and operation were assessed in accordance with the relevant draft EPA Ecoaccess guidelines (EPA Ecoaccess Guideline Planning for Noise Control, EPA Ecoaccess Guideline Noise and Vibration from Blasting and EPA Ecoaccess Guideline Assessment of Low Frequency Noise). Off-site road traffic noise was assessed against the Department of Main Roads' Road Traffic Noise Management Code of Practice criteria. Rail noise associated with the Project was assessed in accordance with Queensland Rail's Code of Practice for Railway Noise Management criteria.

Noise modelling undertaken for the EIS noise assessment indicated that the proposed operational and construction activities would comply with the established criteria at the existing receptor locations without the requirement for any specific construction noise mitigation measures.

The EIS was issued for public display between 31 October to 12 December 2011 and five submissions relating to noise and vibration were received within this period.

Since these dates the only Project Description revision that would have any material influence on the conclusions of the original assessment, relates to the minor re-routing of the proposed rail alignment.

This report provides a supplementary assessment to the original EIS NVIA, dated 5 April 2011. Specifically, it addresses the noise and vibration related submissions and provides an updated rail noise assessment.

1.1.1 Noise Sensitive Receptors

Table 1-1 sets out the nearest potentially affected noise sensitive receptor locations considered by the EIS NVIA and their respective distances from the mining lease boundary and closest open cut pit area boundary.

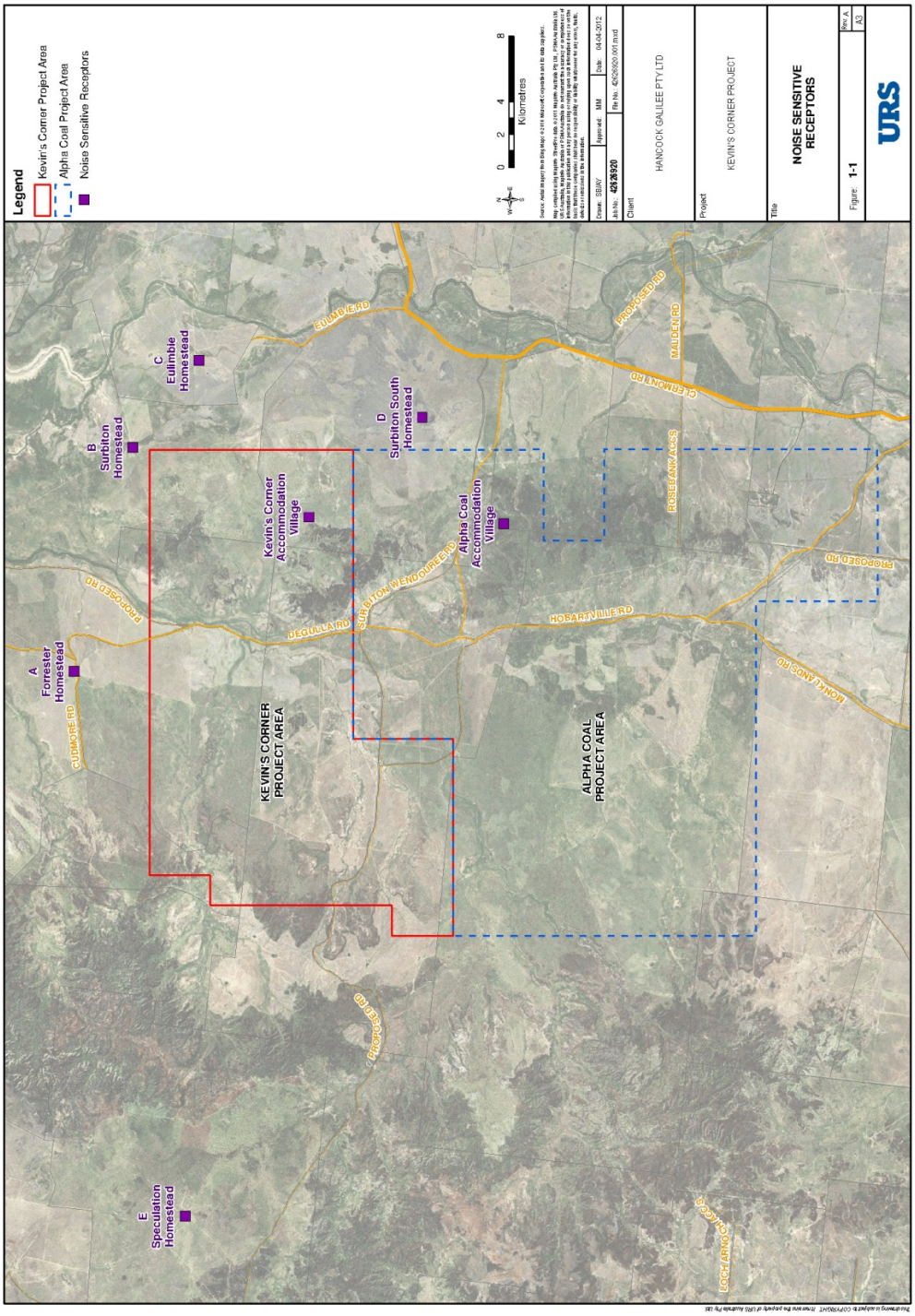
These receptor locations are indicated on the site location plan shown in **Figure 1-1** in addition to the mines' accommodation villages. **Figure 1-2** shows the proposed site layout, indicating the proposed locations of the key mine infrastructure and the proposed rail spur re-alignment.

Table 1-1 Noise Sensitive Receptors

Receptor	Address	Approx. Distance from MLA70425 Mining Lease Boundary (km)	Approx. Distance from Open Cut Pit Area Boundary (km)
A	Forrester Homestead	4	7
B	Surbiton Homestead	1	10
C	Eulimbie Homestead	5	15
D	Surbiton South Station	4	12
E	Speculation Homestead	19	31

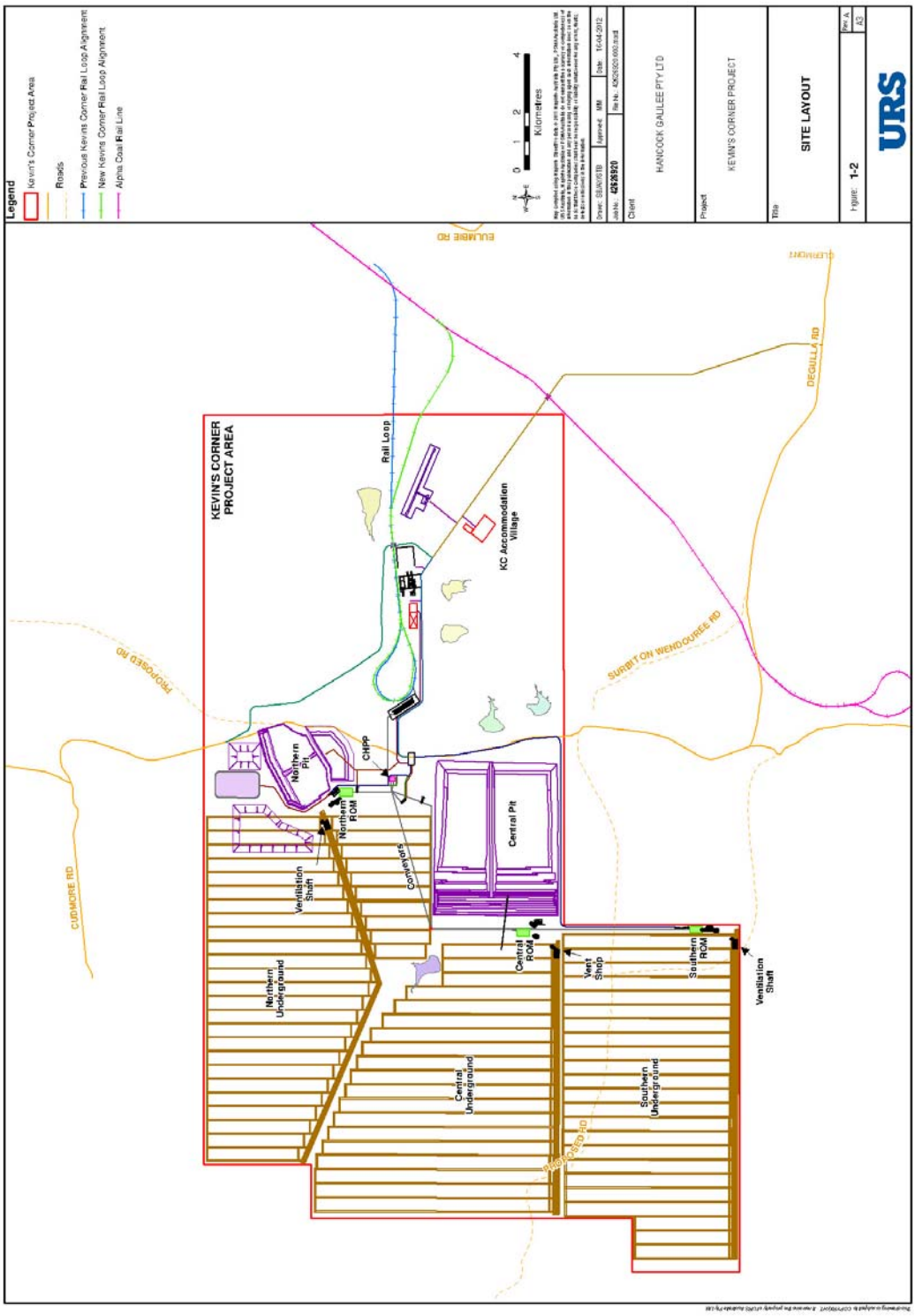
1 Background

Figure 1-1 Noise Sensitive Receptors



1 Background

Figure 1-2 Kevin's Corner Mine Layout – Indicating Rail Spur Re-Alignment



1.2 Noise Criteria

The following sections present the noise criteria considered in the EIS.

1.2.1 Operational Noise Criteria

Table 1-2 presents a summary of the operational noise criteria derived for all noise sensitive receptors. The same noise levels were applied to all sensitive receptors based on baseline noise measurements undertaken at representative locations.

Table 1-2 Summary of EIS Operational Noise Criteria

Receptor	Daytime Criteria		Evening Criteria		Night-time Criteria	
	$L_{A90,1hour}$ dB(A)	$L_{Aeq,1hour}$ dB(A)	$L_{A90,1hour}$ dB(A)	$L_{Aeq,1hour}$ dB(A)	$L_{A90,1hour}$ dB(A)	$L_{Aeq,1hour}$ dB(A)
A - E	30	33	28	31	25	28

The original NVIA conservatively included the accommodation villages as sensitive receptors and the noise limits from **Table 1-2** were applied; however, the SEIS would not consider these premises as sensitive receptors after discussion with DERM.

It is noted that DERM is in the process of finalising noise monitoring compliance limits for the adjacent project Alpha Coal. The noise criteria being established for Alpha Coal is numerically equal to the L_{Aeq} criteria presented in **Table 1-2**, with a different assessment period of 15 minutes, which is commonly used for monitoring. This report considers the 1-hour assessment criteria in accordance with the Ecoaccess guidelines; however, 15-minute predictions are presented in **Section 2** for comparison purposes.

1.2.2 Sleep disturbance

The more stringent noise criterion between the World Health Organisation (WHO)'s guidelines and the EPP (Noise) was adopted. The WHO guidelines suggest a noise limit inside bedrooms of 45 dB(A) L_{Amax} and 30 dB(A) L_{Aeq}, whiles the EPP (Noise) recommends that internal noise levels do not exceed 40 dB(A) $L_{A1,1hour}$.

A 50 dB(A) L_{A1} (external level) sleep protection criterion was considered in the EIS assessment, taking into account a 10 dB outdoor/indoor difference which is commonly assumed for standard dwelling construction materials.

1.2.3 Rail Noise

The Queensland Rail's Code of Practice (CoP) for Rail Noise Management (Ver. 2, 2007) criteria was adopted in the EIS assessment. **Table 1-3** summarises the CoP noise criteria.

Table 1-3 EIS Rail Noise Criteria

Activity	Rail Noise Level $L_{Aeq(24hour)}$ dB(A)	Rail Noise Level L_{Amax} dB(A)
Existing Residences	65	87

1.2.4 Blasting

Table 1-4 lists the conditions imposed for blasting overpressure.

Table 1-4 Airblast Overpressure Limit

Location	Airblast Overpressure Measured
Nuisance Sensitive Place	• 115 dB (Linear peak) for 4 out of 5 consecutive blasts initiated; and • Not greater than 120 dB (Linear peak) at any time.

1.3 Scope of Supplementary Assessment

The supplementary assessment includes:

- A review of the updated project description;
- Noise modelling calculations, implementing any changes, to generate new noise predictions, focused on the issues raised within the EIS submissions;
- Noise mitigation measures in case of exceedances of the established noise criteria; and
- Discussion of required updates to the Project Environmental Management Plan (EM Plan) and commitments required by HGPL with respect to the control of noise and vibration.

It should be noted that the SEIS noise assessment is aimed to responding appropriately the EIS submissions and implementing the project description changes specifically indicated by HGPL. Any other components of the noise assessment, where no changes have been noted since the issue of the EIS, could be read from the original EIS noise assessment.

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Revised Rail Noise Assessment

2.1 Methodology

For the purpose of the EIS NVIA, noise levels due to the proposed construction and the operation of the site at the identified noise sensitive receptor locations were predicted using an acoustics computer model created in SoundPLAN Version 7.1. This program is used internationally and recognised by regulators and authorities throughout Australia.

Based largely on the Project's pre-feasibility study (PFS) and design details provided by HGPL, the noise model was constructed to allow the prediction of cumulative noise levels from the site including the contribution of each noise source. The noise model took into account:

- sound power levels of each identified source;
- receptor locations;
- screening effects due to topography;
- meteorological effects and attenuation due to distance; and
- ground and atmospheric absorption.

The updated rail alignment was considered in the revised noise predictions and cumulative effects from Kevin's Corner and Alpha Coal Rail lines were accounted for appropriately. The industrial noise sources included in the modelling were those representing the worst case scenario of the EIS NVIA in addition to rail movements within the mining lease. There have been no changes in the schedule of equipment and therefore the EIS conditions, in terms of operational equipment, were maintained.

The noise calculations were carried out using the L_{Aeq} and L_{Amax} descriptors to assess the operational and rail noise impacts.

Predictions were assessed against the one-hour criteria in accordance with the Ecoaccess Guidelines adopted in the EIS, as recommended by the Terms of Reference (ToR).. A different compliance assessment period (15-minute) was introduced by DERM in regards to industrial noise for the Alpha Coal Mine Project. For comparison purposes, fifteen-minute assessment periods are additionally presented in the results.

The noise prediction algorithms used to predict noise levels from the Project were Concawe, which was used to calculate noise levels from all the industrial noise sources, and the Nordic Prediction algorithm (Kilde 130/1984) was used for rail noise predictions.

2.2 Noise Modelling

2.2.1 Assumptions

The noise modelling carried out included mining noise sources and rail noise. The noise modelling considered the following assumptions:

- Industrial Noise: All the mining noise sources included in the EIS NVIA Scenario 4 (worst case scenario) were replicated, in addition to the expected train movements within the mining lease, to determine the cumulative industrial noise emissions from the Kevin's Corner Mine. The detailed list of equipment can be from Appendix C of the EIS NVIA (Kevin's Corner Project EIS Volume 2, Appendix P).
- Rail Noise: Rail movement details were confirmed with HGPL as being unchanged since the EIS NVIA. The noise model, which considered the Kevin's Corner rail spur, was revised to incorporate

the detailed design of the alignment. The Nordic Rail Traffic Noise Prediction Method, Kilde 130 (1984), algorithm was implemented in the SoundPLAN noise model.
The following assumptions for the Nordic (Kilde 130) rail assessment were used:

- Train total length of 4 km;
- The Kevin's Corner and Alpha Coal rail spurs would share a 50% each of the total rail traffic. That is, the train movements in a 24 hour period was set as follows:
  a) Kevin's Corner Rail Spur: 7 trains in total, Up and Down track;
  b) Alpha Coal Rail Spur: 7 trains in total, Up and Down track;
  c) Kevin's Corner and Alpha Coal combined: 7 on the Up track and 7 on the Down track (total of 14 trains in 24 hours).
- Nominal speed outside the mining leases: 80 km/h;
- Speed within mining lease: 40 km/h;
- Noise emissions from locomotives and wagons were calibrated in the model based on information from the 'Alpha Rail Project Noise Assessment' Report Revision 0 (August 2010, GHD Brisbane). The input parameters in the noise model were adjusted to calibrate with two receptors located at 113 m and 260 m away from the long straight rail alignment. The calculated $L_{Aeq24hr}$ and L_{Amax} were compared with the results at the two sensitive receptors identified by GHD (Receiver 1 and 2). The $L_{Aeq24hr}$ and L_{Amax} levels calibrated well with discrepancies of +/- 0.1 dB(A) at the two receptors.

Generic model parameters:

- A general ground absorption coefficient of 0.5;
- Atmospheric conditions of 10 °C and 50 % humidity; and
- Adverse and neutral meteorological conditions consistent with the EIS NVIA.

2.2.2 Modelling Scenarios

The modelling scenarios were defined by the following requirements:

- Predict rail noise outside the mining lease at sensitive receptors nearby the Project study area;
- Consider rail movements contained within the mining lease as an industrial noise source;
- Assess the cumulative noise impact from the Alpha Coal and Kevin's Corner rail spurs/lines; and
- Consider two assessment periods for operational industrial noise: 1-hour and 15-minute periods.

Table 2-1 summarises the noise modelling scenarios.

Table 2-1 Noise Modelling Scenarios

Scenario	Noise Source Type	Noise Descriptors	Description
1	Rail	$L_{Aeq,24hour}$ / L_{Amax}	Cumulative Kevin's Corner and Alpha Coal rail noise impact. This scenario considers both, the Kevin's Corner and Alpha Coal rail spurs.
2	Rail	$L_{Aeq,24hour}$ / L_{Amax}	Kevin's Corner rail noise impact. This scenario considers the Kevin's Corner rail spur.
3	Industrial	$L_{Aeq,1hour}$ / L_{Amax}	All the mining noise sources for a fully operational mine (year 2017-2018), and one train movement at 40 km/h, along the KC rail spur within the mining lease in a 1-hour

2 Revised Rail Noise Assessment

Scenario	Noise Source Type	Noise Descriptors	Description
			period.
4	Industrial	$L_{Aeq,15minute}$ / L_{Amax}	All the mining noise sources for a fully operational mine (year 2017-2018), and one train movement at 40 km/h, along the KC rail spur within the mining lease in a 15-minute period.

2.2.3 Results

The noise modelling showed that the predicted noise levels would achieve the nominated QR CoP rail noise criteria at all the noise sensitive receptors. **Table 2-2** summarises the noise predictions.

Table 2-2 Rail Noise Predictions

Receptor	$L_{Aeq,24hr}$ [dB(A)]			L_{Amax} [dB(A)]			
	KC + ACP (Scenario 1)	KC (Scenario 2)	QR CoP Rail Noise Criterion	KC + ACP (Scenario 1)	KC (Scenario 2)	QR CoP Rail Noise Criterion	WHO Noise Criterion* (External)
A	27	26	65	40	40	87	55
B	44	33		53	51		
C	54	38		68	55		
D	46	31		59	50		
E	< 20	< 20		< 20	< 20		
Notes:	KC: Kevin's Corner ACP: Alpha Coal Project *This criterion is not a specific rail noise criterion. It was included in this table to address a Queensland Health EIS Submission regarding sleep disturbance.						

It is noted that predicted L_{Amax} rail noise levels would comply with the QR CoP criterion of 87 dB(A) and the WHO sleeping disturbance criterion of 55 dB(A). However, the cumulative rail noise effect may not achieve the WHO noise criterion at receptor C and D (Eulimbie and Surbiton South), as exceedances of 13 dB and 4 dB are predicted respectively.

Table 2-3 presents the industrial noise modelling predictions for neutral and adverse meteorological conditions. It is noted that the meteorological conditions would only affect the propagation calculations based on the Concawe algorithm as the Nordic (Kilde 130) method does not consider weather effects in its algorithm. Therefore, rail noise predictions would not be affected by changes in meteorological conditions. L_{Amax} was calculated by the embedded Nordic method algorithm considering one train pass by.

The two scenarios presented in **Table 2-3** compare two different assessment periods, 15-minute and 1-hour periods. In the case of rail noise, the 15-minute assessment period would present higher noise levels since sound averaging over a shorter period, for the same noise source, means a higher averaged level. It should be noted that the 15-minute assessment period was included for comparison with compliance noise limits imposed to the Alpha Coal Project by DERM. Yet the original 1-hour assessment period was used to assess noise criteria compliance as per the 'Planning for noise Control' Ecoaccess Guidelines.

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Table 2-3 Industrial Noise Predictions

Receptor	$L_{Aeq,1hour}$ [dB(A)] (Scenario 3)		$L_{Aeq,15minute}$ [dB(A)] (Scenario 4)		L_{Amax} (Scenarios 3 & 4) [dB(A)]
	Neutral Met	Adverse Met	Neutral Met	Adverse Met	
A	30	32	35	35	35
B	30	31	36	36	40
C	36	36	41	42	45
D	25	27	30	31	32
E	< 20	< 20	< 20	< 20	< 20

The meteorological conditions do not have impact on rail noise calculations based on the algorithm used, which is the reason why at some sensitive receptors noise levels for neutral or adverse meteorological conditions are similar. This means that modelled rail noise within the mining lease is much louder than typical mining noise sources such as excavators, haul trucks, among others.

Following the predicted industrial noise levels in **Table 2-3**, **Table 2-4** presents the assessment against the operational noise criteria. Night-time criterion is considered since it is the most stringent one.

Table 2-4 Industrial Noise Assessment

Receptor	$L_{Aeq,1hour}$ [dB(A)] (Scenario 3)			L_{Amax} [dB(A)] (Scenarios 3)	
	Night-time Criterion	Exceedance Neutral Met	Exceedance Adverse Met	EPP (Noise) Criterion*	Exceedance
A	28	2	4	50	-
B		2	3		-
C		8	8		-
D		-	-		-
E		-	-		-
Notes:	*The EPP (Noise) criterion considers internal L_{A1} not greater than 40 dB(A). It was discussed in the EIS that for assessment purposes the terms L_{Amax} and L_{A1} may be considered approximately interchangeable				

Noise contours are presented in **Appendix A**.

3

Discussion

3.1 Rail Noise

3.1.1 Kevin's Corner Rail Spur Noise

Compliance with the QR CoP rail noise criterion has been determined by the noise modelling.

The predicted L_{Amax} noise levels would comply with the QR criterion of 87 dB(A), as well as with the WHO noise criterion which sets a 45 dB(A) internal noise level (approximated to 55 dB(A) external).

3.1.2 Cumulative Impact of Kevin's Corner Rail Spur and Alpha Rail Line

The cumulative effect of Kevin's Corner and Alpha Rail Line would generate potential exceedances of up to 13 dB of the WHO sleep disturbance criterion at receptor C (Eulimbie), and marginal exceedance of 4 dB at receptor D (Surbiton South). It is noted that the exceedances are due to proximity of the receptors to the Alpha Rail Line; and as a consequence, rail noise from this alignment is dominant at receptors C and D (partial noise contribution from Kevin's Corner is 9 to 13 dB below noise contribution from Alpha Coal Rail Line).

Reducing the train speed within the Kevin's Corner rail spur to lower than 40 km/h would result in lower noise levels, however, by reducing the speeds considerably would not necessarily reduce the exceedance by much since the controlling noise source is the Alpha Rail Line.

In lieu of achieving sufficient noise reduction by reducing train speed, further noise mitigation measures and community consultation could be considered during the detailed design of the railway in order to achieve agreeable noise levels between the proponent and the sensitive receptors.

Rail noise reduction could be achieved through a combination of measures including:

- applying effective track and track/wheel engineering techniques to reduce noise i.e. vibration isolated track sections; continuously welded rail wherever feasible; track friction reduction devices (rubber or electronic grease dispensers);
- use of barriers in some sections of the alignment where sensitive receptors are in proximity; and
- treating sensitive receptors' dwellings to reduce external noise intrusion.

3.2 Industrial Noise

The noise predictions established potential exceedances of the industrial noise limits considered at four sensitive receptors (Forrester, Surbiton, Eulimbie and Surbiton South). The exceedances at those receptors were basically due to the inclusion of rail noise within the MLA as industrial noise. Noise produced by mining sources does not exceed any noise criteria, including more stringent 15-minute averaging period criteria.

It would be expected that by implementing noise controls such as the ones mentioned in the previous section, noise levels could be reduced to acceptable or agreeable noise levels.

At Eulimbie, 8 dB(A) noise reduction in rail noise may be achievable, yet further consideration must be given to community consultation to seek reasonable agreement.

At other receptors, up to 4 dB(A) may also be achievable, however further assessment would be required in order to incorporate the detailed mechanical design of the rail and train.

3 Discussion

3.3 Blasting

Blasting would not be expected to occur outside the bounds of the open-cut areas. Table 4-1 sets out minimum receptor setback distances from the open-cut areas, and identifies Receptor A (Forrester) as the closest (and potentially most affected) receptor at a setback of 7 km. With consideration to this minimum setback distance, calculations indicate that that the overpressure criteria will be readily achieved.

Table 3-1 Table 2-1 of the Noise and Vibration Appendix Report EIS

Receptor	Address	Approx. Distance from MLA70425 Mining Lease Boundary (km)	Approx. Distance from Open Cut Pit Area Boundary (km)
A	Forrester Homestead	4	7
B	Surbiton Homestead	1	10
C	Eulimbie Homestead	5	15
D	Surbiton South Station	4	12
E	Speculation Homestead	19	31
F	KC Accommodation Village	n/a	8
G	ACP Accommodation Village	9	12

3.4 Climatic Conditions

It is noted that with consideration to the methods set out by ISO 9613, temperature and relative humidity values of 10 degrees C and 70% RH generally yield the lowest attenuation (greatest noise levels), whilst other combinations of temperature and humidity yield lower noise levels due to increased atmospheric absorption.

When considering the influence of atmospheric conditions in the calculation of environmental noise levels, ISO-9613 recommends average values are used, determined by the range of ambient weather relevant to the locality. Values of 10 degrees C and 50% relative humidity applied in our modelling assessment are considered to be relatively conservative based on the climate details set out in the EIS. The charts below are from Volume 1, Section 3 of the EIS.

3 Discussion

Chart 3-1 Emerald Airport air temperature statistics (1992 to 2010)

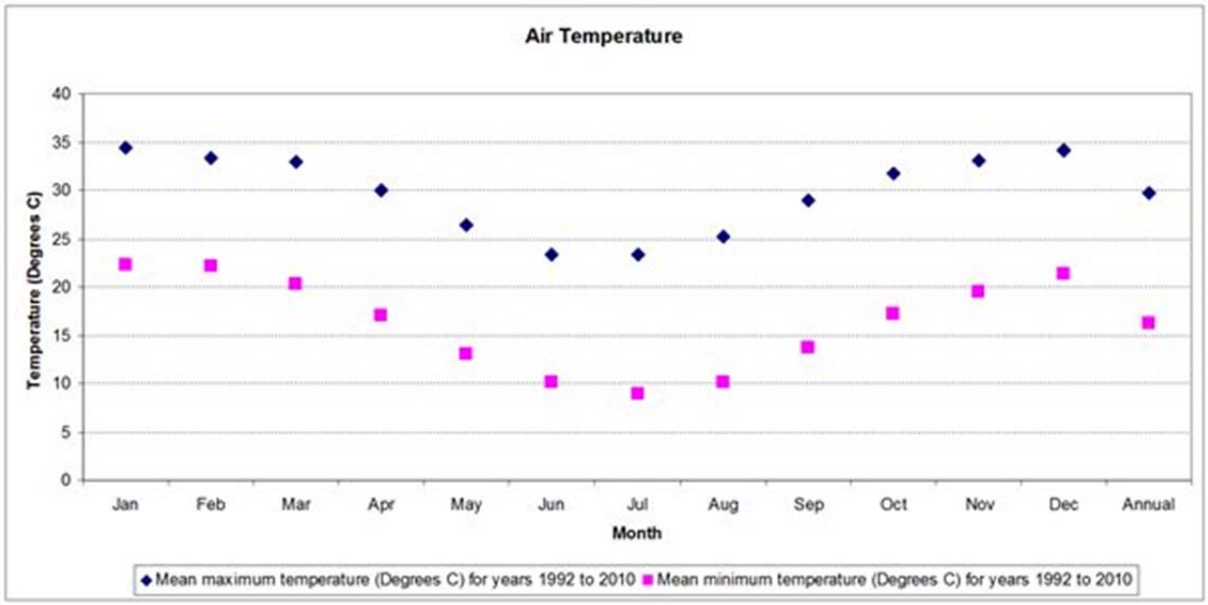
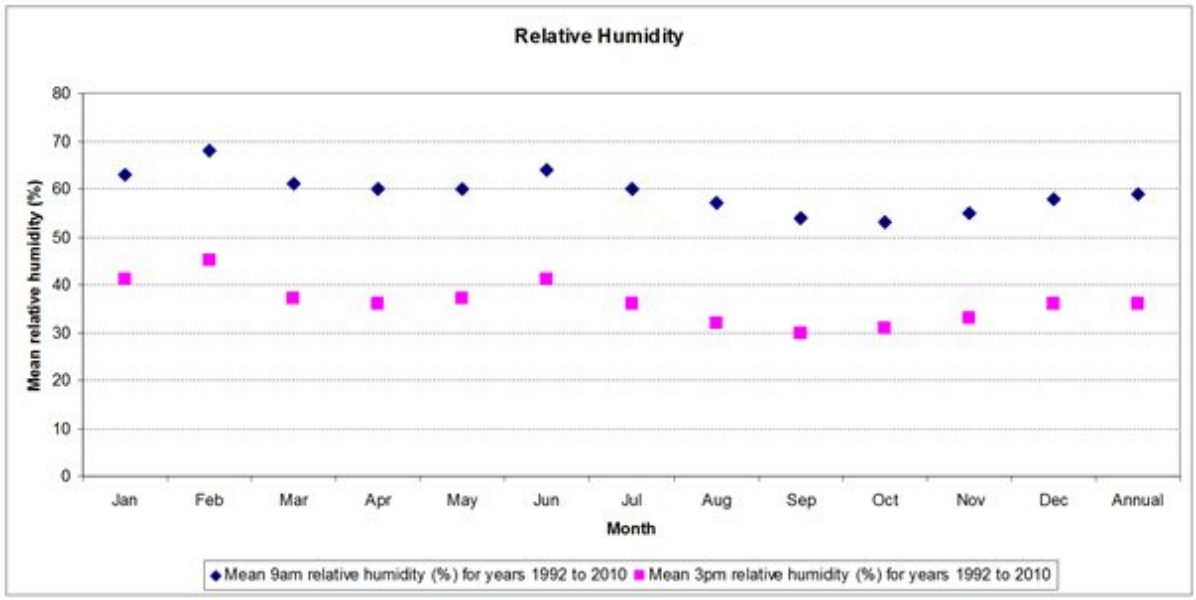


Chart 3-2 Emerald Airport relative humidity statistics (1992 to 2010)



4

Conclusions

URS has been commissioned by HGPL to undertake noise assessment for the Kevin's Corner Project, supplementary to the noise assessments previously carried out during the EIS stage.

The supplementary modelling has been undertaken to address five submissions to the EIS and evaluate the potential noise impacts on the identified sensitive receptors considering 'worst-case' mining operations and rail movements constrained to within the boundary of mining lease against the established operational noise criteria for the Project. A minor change of the rail alignment has been introduced in the detailed design and impact has been determined from noise modelling predictions.

Whilst compliance of the nominated QR CoP rail noise criteria is predicted at all receptors, exceedances of the operational industrial noise criteria are predicted at three receptors (Surbiton, Eulimbie and Surbiton South) when including the Kevin's Corner rail spur as an industrial noise source. Being Eulimbie the most affected receptor with 8 dB exceedance of the 28 dB night-time operational noise criterion. Consideration must be given to community consultation to seek reasonable agreement.

At Surbiton and Surbiton South, exceedances of up to 4 dB of the night-time operational industrial noise criterion may be reduced; however, further assessment would be required in order to incorporate the detailed mechanical design of the rail and train.

Cumulative effect of the Kevin's Corner rail spur and the Alpha Rail Line would generate potential for exceedances of 13 dB and 4 dB at Eulimbie and Surbiton South, respectively. The exceedances are controlled by the Alpha Rail Line.

Satisfactory noise levels could be achieved through a combination of measures including:

- Appling train speed controls within the mining lease;
- Applying effective track and track/wheel engineering techniques to reduce noise;
- Use of barriers in sensitive sections of the alignment; and
- Treating sensitive receptors' dwellings to reduce external noise intrusion.

5

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Hancock Galilee Pty Ltd and only those third parties who have been authorised in writing by URS to rely on this Report.

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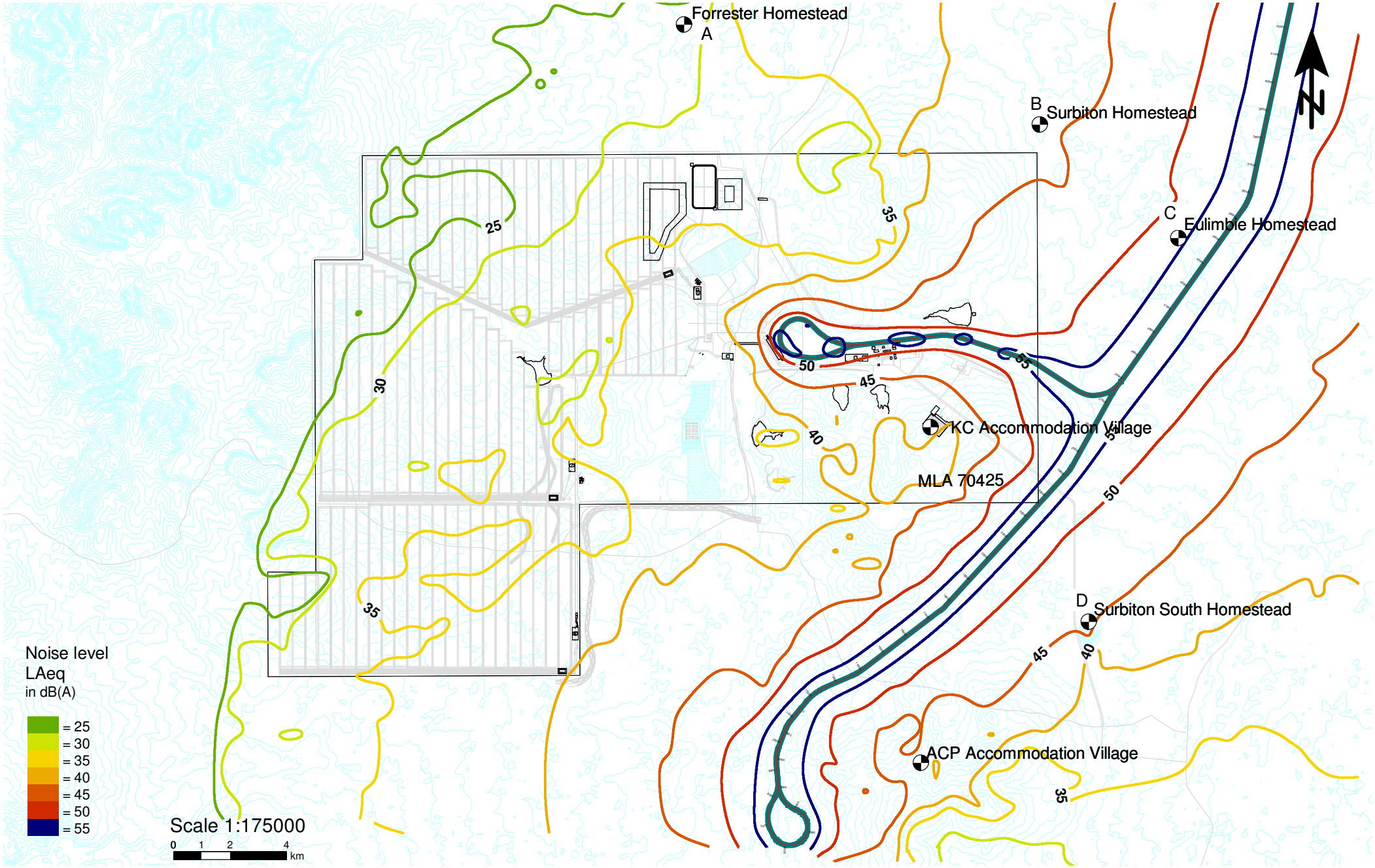
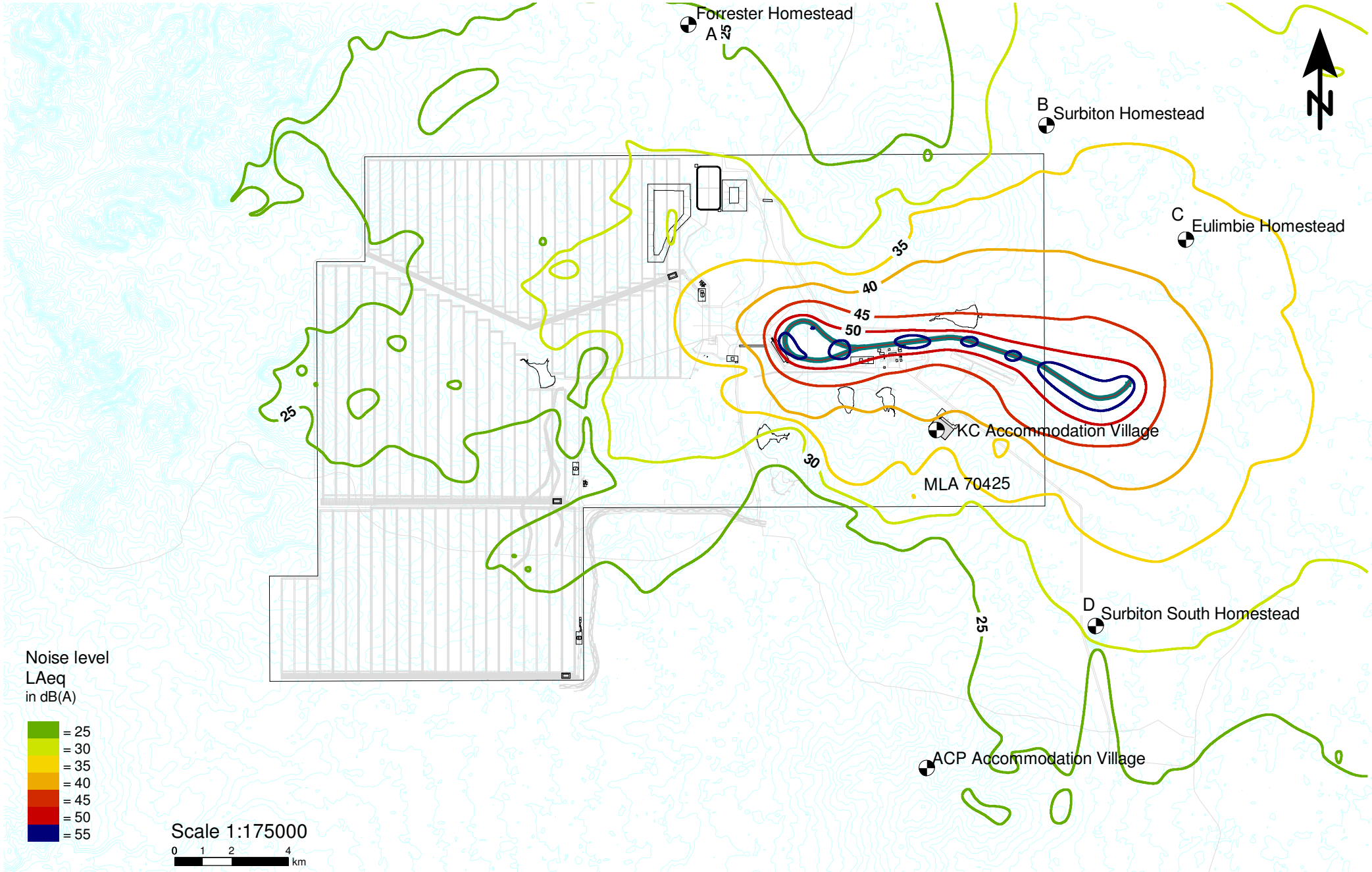
A

Appendix A Noise Contours

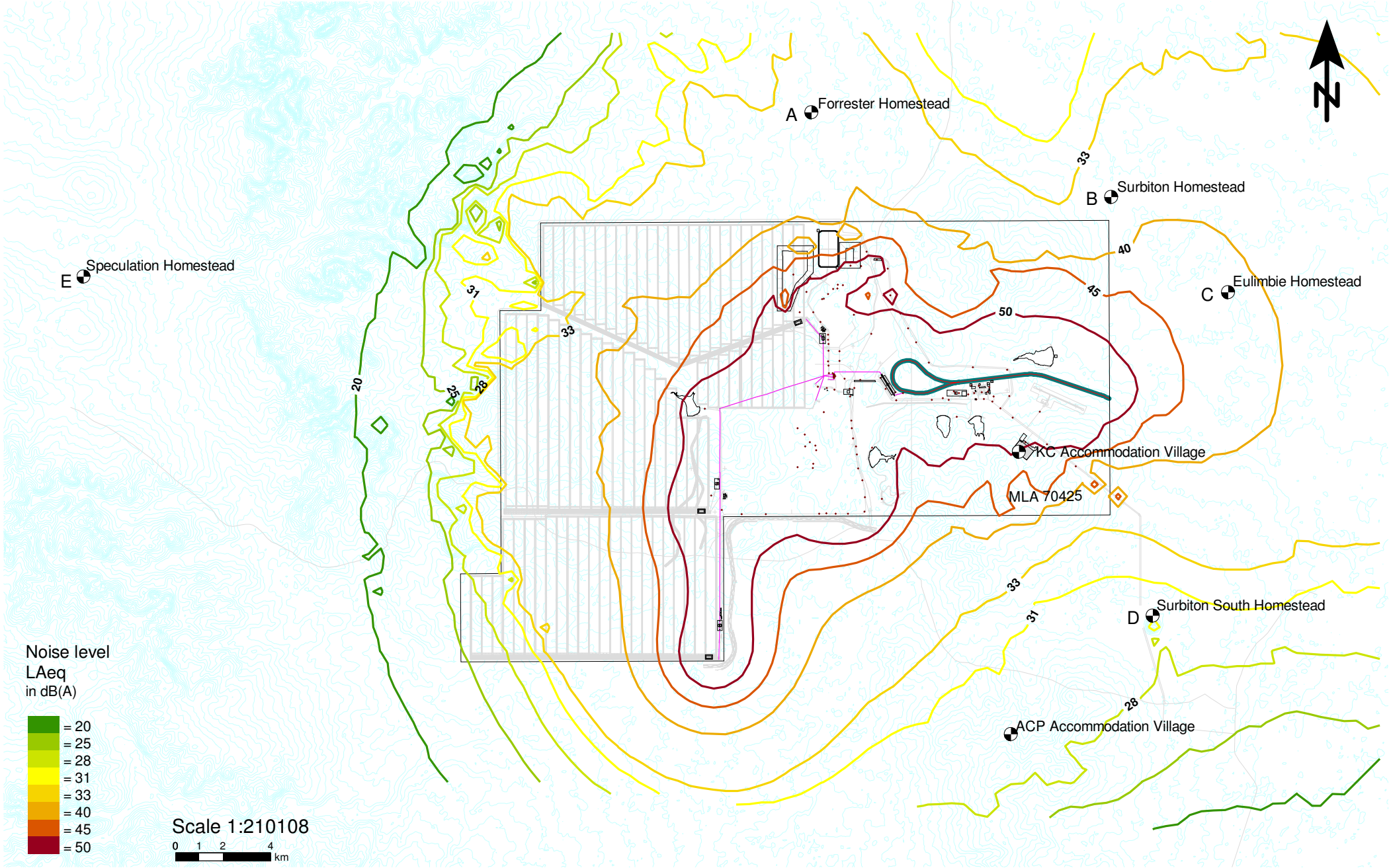
Kevin's Corner SEIS - Rail Noise Contours $L_{Aeq,24hour}$
Scenario 1: Kevin's Corner and Alpha Coal Cumulative Rail Noise



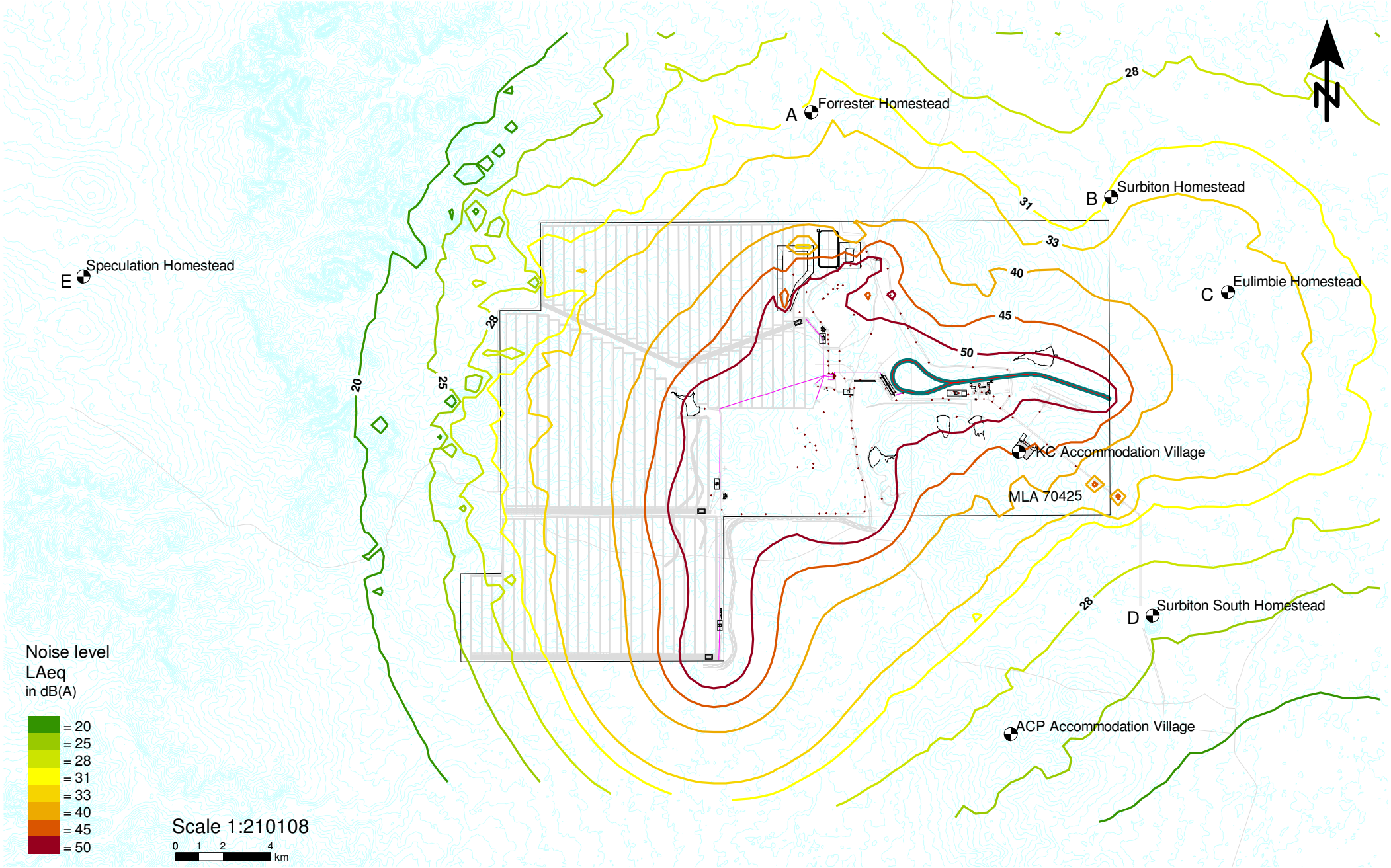
Kevin's Corner SEIS - Rail Noise Contours $L_{Aeq,24hour}$
Scenario 2: Kevin's Corner Rail Noise



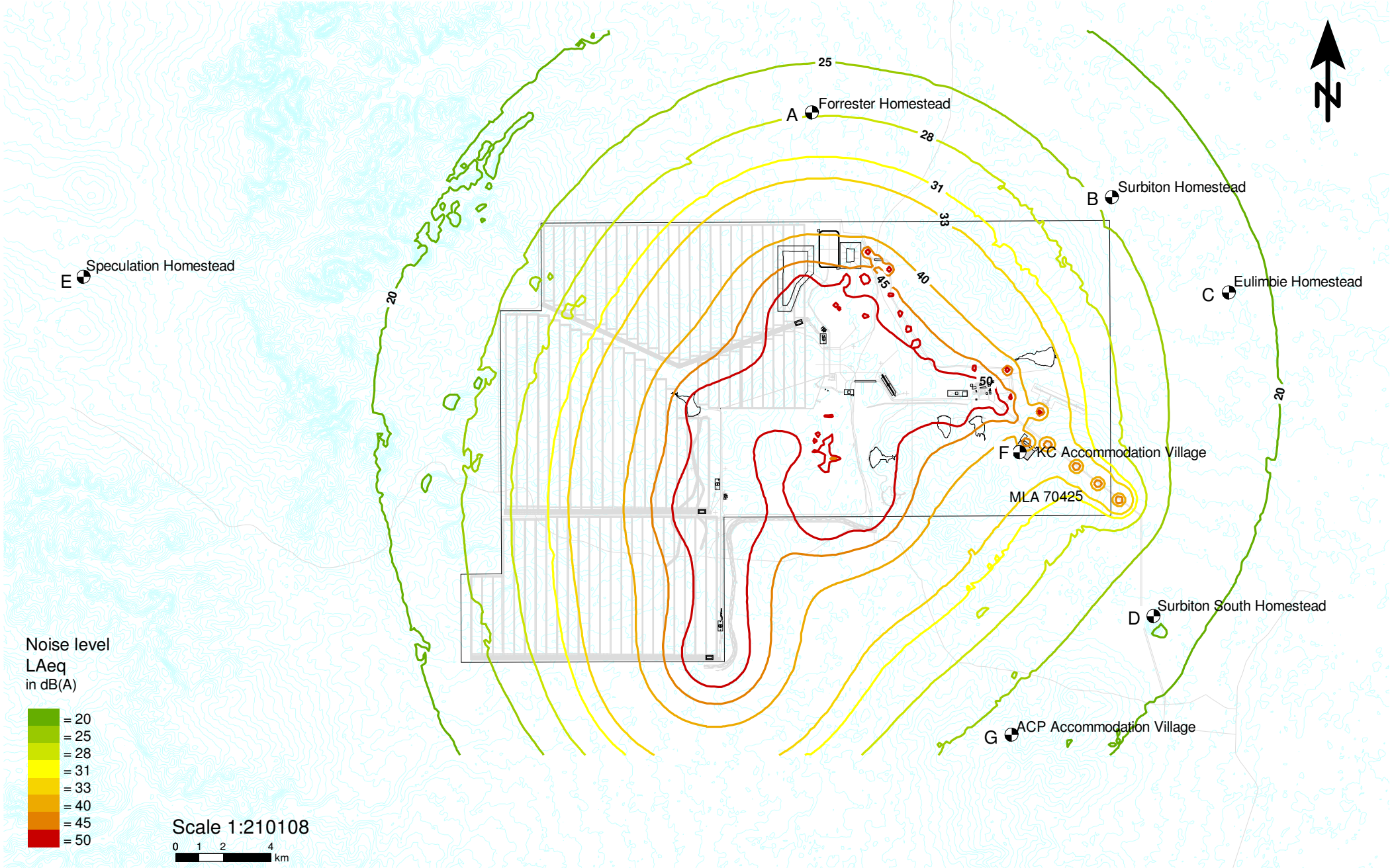
Kevin's Corner SEIS - Operational Noise Contours $L_{Aeq,15min}$
Scenario 3: Industrial Noise / Adverse Meteorological Conditions



Kevin's Corner SEIS - Operational Noise Contours $L_{Aeq,1hour}$
Scenario 4: Industrial Noise / Adverse Meteorological Conditions



Kevin's Corner Project - Operational Noise Contours $L_{Aeq,1hour/15min}$
EIS Scenario 4 (2017): Adverse Weather Conditions



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