Austar Coal Mine

Noise and Vibration Management Plan

Prepared for

Austar Coal Mine Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

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Austar Coal Mine

Noise and Vibration Management Plan

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INTRODUCTION

1.1 Background

Global Acoustics was engaged by Austar Coal Mine (Austar) to prepare a Noise and Vibration Management Plan (NVMP) for the Austar Mine Complex.

Austar is an underground coal mine located approximately 10km south west of Cessnock in the Newcastle Coalfields of New South Wales. The mine has a long history in the area and is an aggregate of the former Ellalong, Pelton, Cessnock No. 1 (Kalingo) and Bellbird South Collieries. Underground mining is currently undertaken in Quorrobolong, NSW. These operations, including coal extraction, processing and transport collectively form the Austar Mine Complex (see Figure 1).

Yancoal Australia Pty Limited purchased the mine in December 2004 and renamed it Austar Coal Mine. Austar commenced mining operations in the Stage 1 mining area in April 2005 and introduced the Longwall Top Coal Caving (LTCC) technology in September 2006. Longwall mining in the Stage 2 area using LTCC technology commenced in February 2009 and concluded in February 2013.

In September 2009, Project Approval PA08_0111 was granted by the Minister for Planning, which approved longwall mining using LTCC technology in the Stage 3 area. A modification to PA08_0111 was granted in March 2012 to reorient the Stage 3 longwall panels. The Stage 3 Project (as modified) includes longwall panels A7 to A19, and construction of a Surface Infrastructure Site with associated services to the south of Kitchener. Longwall mining in the Stage 3 area using LTCC technology is due to commence in June 2013.

Underground mining of the final Stage 2 longwall panel A5a was completed in February 2013. Austar will commence the first Stage 3 longwall panel A7 in June 2013.
1.2 **Scope**

The NVMP supports the objectives outlined in the Environmental Management Strategy (EMS) for the site. The aim of this plan is to manage noise and vibration impacts associated with construction and operational phases of the Austar Mine Complex. This plan has been prepared in accordance with the requirements of:

- Development Consent DA29/95 (MOD5) Condition 15 of Schedule 2;
- Project Approval PA08_0111 (MOD2) Condition 3 of Schedule 4; and
- Environment Protection Licence 416 (EPL 416).

The above development consent, project approval and licence are referred to collectively in this NVMP as the Approvals.

This NVMP has been prepared in consultation with the NSW Environment Protection Authority (EPA) in accordance with the requirements of PA08_0111.

Specific noise and vibration related requirements of the Approvals, including where the specific requirements are addressed in the NVMP are detailed in Appendix A.

1.3 **Objectives**

The objectives of this management plan are to:

- ensure that construction and operational noise and vibration from Austar are managed;
- maintain compliance with conditions of the Approvals and legislation relating to noise and vibration;
- provide a protocol for monitoring and evaluation of noise impacts on surrounding private residences and sensitive receivers;
- manage project specific noise and vibration impacts associated with the construction and operations; and
- communicate with the local community and regulators regarding Austar activities.
2 EXISTING ENVIRONMENT

2.1 Noise

With the exception of agricultural activities (poultry farms, vineyards) and construction activities associated with new developments (e.g. the Cessnock Civic Precinct, Cessnock), there are few other industrial noise sources near to Austar’s surface infrastructure. A description of the noise environment in the area of each of the major surface infrastructure areas is provided below.

2.1.1 Pelton CHPP

A mixture of limited rural-residential landholdings to the north and west, Pelton Village to the south, and the suburb of Bellbird to the northeast and east surround the CHPP. Pelton Colliery has operated in this area since 1916, and the Pelton CHPP has operated in this area since approximately 1960. As such, the CHPP operations may be considered a feature of the acoustic environment. Measured noise levels are routinely in the order of EPL noise limits ($L_{A90}$ 37 to 43 dB). Despite higher noise levels in the area surrounding the CHPP, there are few complaints.

Austar is engaged in a continuous improvement program by entering into a voluntary noise Pollution Reduction Program (PRP) in consultation with the EPA in an effort to minimise noise impacts. Further information on the PRP is included in Chapter 6.

2.1.2 Austar Pit Top and No. 1 Shaft

The current Austar Pit Top and No. 1 Shaft were developed in the 1970’s. The Pit Top is located within Paxton, just north of the village of Ellalong. The village of Paxton is located to the west of the Pit Top, and No. 1 shaft is located on the northwestern edge of the village of Ellalong.

2.1.3 Kitchener SIS

The Kitchener SIS is surrounded by the Werakata State Conservation Area (SCA) in all directions, with no private dwellings to the west. Beyond the boundary of the Werakata SCA to the south and east there are private rural properties, including a poultry farm. Background data collected during the EA indicated that levels in the vicinity of the SIS were generally less than 30 dB. To the north of the site, in Kitchener village, daytime background levels were 33 dB. To the south and east of the site, evening background levels were 32 dB. This data has been used to develop construction noise management levels based on guidance provided in the Interim Construction Noise Guide (ICNG) (EPA, 2009).

Construction at the Kitchener SIS commenced in November 2009 and has been audible during construction at the nearest receptors, however have generally been within the construction noise management levels.
**2.1.4 Kalingo Infrastructure Area (No. 3 and 4 Shafts)**

The Kalingo Infrastructure Area (KIA) is surrounded by native forest to the north and west, and rural allotments to the east and south. The acoustic environment in the area of the KIA is considered to be typical of a rural area, with background levels (in the absence of KIA infrastructure) less than 30 dB. There have been no recorded exceedances of noise levels at the KIA in recent years.

**2.2 Vibration**

The Werakata SCA and private rural landholdings, including private residences, overlie the Austar Stage 3 underground mining area. Vibration sources from the existing environment are described below.

**2.2.1 Underground Mining**

Vibration monitoring results from mining previous longwall panels LWA1 to LWA5a have shown vibration events occur coincidental with longwall mining operations, and cease soon after completion of longwall extraction. Vibration events are brief (typically less than 1 second) and there may be one or no events on a particular day, several days or a week between events, or on occasion there may be several events in one day.

Vibration events have typically been measured at less than 5mm/s, with occasional events recorded at greater than 10 mm/sec. The maximum vibration event since August 2009 recorded vibration at 15.9 mm/sec, which is the only event greater than 15 mm/sec. Vibrations of this magnitude, whilst at levels that will be noticeable for humans, are typically less than any potential building damage criteria, however have at times exceeded the non-mandatory EPA vibration criteria due in part to the potential for events to occur at any time during longwall mining.

The Stage 3 Modification Environmental Assessment (Umwelt, 2011) notes that vibration events from the Ellalong Mine were recorded between 1993 and 1994 typically at less than 8 mm/sec, with a several greater than 8 mm/sec and two greater than 20 mm/sec.

Vibration events are anticipated from the Stage 3 Mining Area at similar levels to that measured from other longwall mining in the area.
2.2.2 Other Vibration Sources

The Environmental Systems & Services (ES&S) Seismology Research Centre monitor seismic events in NSW. In a report from 2009 there were approximately 60 seismic events recorded in NSW by ES&S (Seismic Network Report, 2009), which may be unrelated to mining.

Other potential vibration sources unrelated to Austar’s activities include live fire exercises conducted at the Singleton Army Range. Austar has previously received community enquiries when heavy artillery or aerial bombardment exercises are conducted at the Range.
3 APPROVED NOISE AND VIBRATION EMISSIONS

3.1 Noise Sources

The Austar Mine Complex operates 24 hours per day, seven days per week. Operational equipment on the Austar Mine Complex for which specific noise criteria are specified include:

- Kitchener Surface Infrastructure Site (SIS) – currently under construction. Will include access road, upcast and downcast ventilation shafts, main ventilation fans, bathhouse, workshop, electricity substation and distribution line, service boreholes, offices and store. The SIS will also be used to provide ventilation to the mine and to provide access to the Stage 3 underground workings for men and materials.

- Kalingo Infrastructure Area (KIA) - nitrogen plant, compressors and ventilation fans;

- Pelton CHPP and associated plant (mobile plant including dozers, coal transport load points, water treatment plant, reject emplacement and conveyors).

Other noise sources at the Austar Mine Complex include the Austar Pit Top, No. 1 Shaft, remote reject emplacement areas (Aberdare Extended Reject Emplacement Area), and train movements. While there are no noise criteria for these sources, they have a history of few complaints.

3.2 Vibration Sources

3.2.1 Construction – Kitchener SIS

Although an approved method under PA08_0111, shaft construction techniques undertaken to date have not required the use of blasting, therefore there have not been any associated blasting impacts (overpressure and vibration) at neighbouring residences. However, in the event that blasting is required during future men and materials shaft construction at the SIS it will be managed in accordance with criteria detailed Section 4.2.1.

3.2.2 Operation – Underground Mining Area

As detailed previously, vibration events are anticipated for the Stage 3 Mining Area. The nature of vibration generated from underground mining is generally considered to be event based in nature, where strata failures from material overlying the mining area subside, possibly generating seismic activity at the surface.

As the underground mining equipment may operate 24 hours per day, seven days per week, vibration generating activities may occur at any time.


4 NOISE AND VIBRATION CRITERIA

4.1 Background

Austar Mine Complex includes the CHPP, KIA and Kitchener SIS. Noise impacts at Austar are addressed in documents detailed in Table 4.1.

<table>
<thead>
<tr>
<th>Austar Mine Complex Area</th>
<th>Approval</th>
<th>Applicable Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austar mine and CHPP</td>
<td>EPL No. 416</td>
<td>Mine and CHPP</td>
</tr>
<tr>
<td>Kalingo Infrastructure Area (KIA)</td>
<td>DA 29/95 MOD5</td>
<td>KIA</td>
</tr>
<tr>
<td>Surface Infrastructure Site (SIS)</td>
<td>PA08_0111 MOD2</td>
<td>Kitchener SIS</td>
</tr>
</tbody>
</table>

Noise impacts must be assessed separately against each of the above Approvals. The relevant sections of each Approval are reproduced in Appendix A.

4.2 Noise Criteria

4.2.1 Construction

Noise monitoring locations (as shown in Figure 2) and construction noise management levels for the Kitchener SIS construction are detailed in Table 4.2. These levels are based on background noise monitoring undertaken as part of the Environmental Assessment for Stage 3 (Umwelt, 2008) and the Interim Construction Noise Guideline (EPA, 2009), and apply to all construction activities at the SIS.

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
<th>(L_{Aeq,15\text{minute}}) (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Recommended Standard Hours</td>
</tr>
<tr>
<td>NM K1</td>
<td>Pelton Road, Quorrobolong</td>
<td>40</td>
</tr>
<tr>
<td>NM K2</td>
<td>Coney Creek Lane, Quorrobolong</td>
<td>40</td>
</tr>
<tr>
<td>NM K3</td>
<td>Richmond Street, Kitchener</td>
<td>43</td>
</tr>
</tbody>
</table>

Note: 1. ‘Recommended Standard Hours’ are Monday to Friday, 7.00 am to 6.00 pm and Saturday, 8:00 am to 1:00 pm. All other times, including Sundays and Public Holidays are considered to be ‘Outside Recommended Standard Hours’.
4.2.2 Operation

Monitoring locations (as shown in Figure 2) and relevant limits for each consent area are detailed below.

Noise limits for monitoring locations near the Austar CHPP are detailed in Table 4.3.

<table>
<thead>
<tr>
<th>Table 4.3 NOISE IMPACT ASSESSMENT CRITERIA – CHPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptor</td>
</tr>
<tr>
<td>L(_{A90,15 \text{ minute}}) (dB)</td>
</tr>
<tr>
<td>NM C1</td>
</tr>
<tr>
<td>NM C2</td>
</tr>
<tr>
<td>NM C3</td>
</tr>
<tr>
<td>NM C4(^1)</td>
</tr>
<tr>
<td>NM C5(^1)</td>
</tr>
</tbody>
</table>

Notes 1. Criteria for Location C used in the absence of specific criteria; and 2. Day is 7:00am to 6:00pm, evening is 6:00pm to 10:00pm, and night is 10:00pm to 7:00am.

Criteria for the Kitchener SIS are detailed in Table 4.4.

<table>
<thead>
<tr>
<th>Table 4.4 NOISE IMPACT ASSESSMENT CRITERIA - KITCHENER SIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptor</td>
</tr>
<tr>
<td>L(_{Aeq,15 \text{ minute}}) (dB)</td>
</tr>
<tr>
<td>NM K1</td>
</tr>
<tr>
<td>NM K2</td>
</tr>
<tr>
<td>NM K3</td>
</tr>
</tbody>
</table>

Notes 1. Criteria apply for all privately owned residences; and 2. Day is 7:00am to 6:00pm, evening is 6:00pm to 10:00pm, and night is 10:00pm to 7:00am.

Criteria for the KIA are detailed in Table 4.5.

<table>
<thead>
<tr>
<th>Table 4.5 NOISE IMPACT ASSESSMENT CRITERIA – KIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptor</td>
</tr>
<tr>
<td>L(_{Aeq,15 \text{ minute}}) (dB)</td>
</tr>
<tr>
<td>NM K4</td>
</tr>
</tbody>
</table>
4.2.3 **INP Modifying Factors**

Attended noise monitoring and reporting is carried out generally in accordance with Environment Protection Authority (EPA) ‘Industrial Noise Policy’ (INP). Chapter 4 of the INP deals specifically with modifying factors that may apply to industrial noise.

As detailed in the notes below condition 2, Schedule 3 of PA08_0111:

*The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied where applicable.*

The most common modifying factors are addressed in detail below.

**Tonality, Intermittent and Impulsive Noise**

As defined in the Industrial Noise Policy:

*Tonal noise contains a prominent frequency and is characterised by a definite pitch.*

*Impulsive noise has high peaks of short duration or a sequence of such peaks.*

*Intermittent noise is characterised by the level suddenly dropping to the background noise levels several times during a measurement, with a noticeable change in noise level of at least 5 dB. Intermittent noise applies to night-time only.*

Years of monitoring have indicated that noise levels from mining operations, particularly those levels measured at significant distances from the source are relatively continuous. Given this, noise levels from Austar at the monitoring locations are unlikely to be intermittent. In addition, there is no equipment on site that is likely to generate tonal or impulsive noise as defined in the INP.

**Low Frequency Noise Criteria**

As defined in the Industrial Noise Policy:

*Low frequency noise contains major components within the low frequency range (20 Hz to 250 Hz) of the frequency spectrum.*

As detailed in Chapter 4 of the INP, low frequency noise should be assessed by measuring the C-weighted and A-weighted level over the same time period. The correction/penalty of 5 dB is to be applied if the difference between the two levels is 15 dB or more.

Low frequency noise can also be assessed against criteria specified in the paper ‘A Simple Method for Low Frequency Noise Emission Assessment’ (Broner, 2010. JLFNV Vol 29-1 pp. 1 to 14).
Low frequency assessment details are provided in Table 4.6.

**Table 4.6 LOW FREQUENCY ASSESSMENT (dBC)**

<table>
<thead>
<tr>
<th>Method</th>
<th>Calculation Method/Assessment</th>
<th>Night Criterion</th>
<th>Day Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broner, 2010</td>
<td>( L_{Ceq} ) to 250 Hz</td>
<td>60</td>
<td>65</td>
</tr>
<tr>
<td>INP</td>
<td>Total ( L_{Ceq} ) minus ( L_{Aeq} )</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

The EPA is currently undertaking a review of the assessment of low frequency noise. While a practice note is not yet available, low frequency noise results from Austar will be compared to both methods presented above.

### 4.3 Vibration Criteria

#### 4.3.1 Construction Blasting

The shaft construction techniques proposed are not anticipated to require the use of blasting, therefore there are not anticipated to be any associated blasting impacts (overpressure and vibration) at neighbouring residences. However, in the event that blasting is required during shaft construction at the SIS, the following constraints will apply to blasting:

- Maximum instantaneous charge (MIC) up to 8 kg;
- Air blast overpressure less than 115 dBL at nearest residences (ANZECC limit);
- Vibration less than 5 mm/s at nearest residences (ANZECC limit); and
- Blasting may only occur Monday to Friday 9am to 5pm and on Saturday 9am to 1pm. No blasting on Sundays or public holidays.

#### 4.3.2 Stage 3 Underground Mining Vibration

There are no operational vibration criteria provided in PA08_0111 for the Stage 3 underground mining area, therefore vibration monitoring results will be compared against published data on human response and structural damage as detailed below.

**Human Response**

Assessing Vibration: a Technical Guideline (EPA, February 2006) provides preferred and maximum vibration values for different receiver types such as residences, offices, workshops, and critical work areas (hospital operating theatres, precision laboratories). Vibration criteria are presented in terms of acceleration, vibration dose value, and peak particle velocity. The guideline indicates that the criteria are non-mandatory and are goals that should be sought to be achieved through the application of all feasible and reasonable mitigation measures. In the case of longwall mining, there is limited scope for mitigation measures.
The table below is reproduced from Appendix C of Assessing Vibration: A Technical Guide and shows vibration criteria.

<table>
<thead>
<tr>
<th></th>
<th>Assessment criteria</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1ms acceleration (m/s²)</td>
<td>2rms velocity (mm/s)</td>
<td>2Peak velocity (mm/s)</td>
</tr>
<tr>
<td></td>
<td>Preferred</td>
<td>Maximum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(dB re 10⁻⁶ m²/s²)</td>
<td>dB re 10⁻⁶ mm/s</td>
<td>dB re 10⁻⁶ mm/s</td>
<td></td>
</tr>
<tr>
<td>Continuous vibration</td>
<td>Day- or night-time</td>
<td>0.0050 (74 dB)</td>
<td>0.010 (80 dB)</td>
<td>0.10 (100 dB)</td>
<td>0.20 (106 dB)</td>
</tr>
<tr>
<td></td>
<td>Residences</td>
<td>0.013 (80 dB)</td>
<td>0.020 (86 dB)</td>
<td>0.20 (106 dB)</td>
<td>0.40 (112 dB)</td>
</tr>
<tr>
<td></td>
<td>Night-time</td>
<td>0.0070 (77 dB)</td>
<td>0.014 (83 dB)</td>
<td>0.14 (103 dB)</td>
<td>0.28 (109 dB)</td>
</tr>
<tr>
<td>Offices</td>
<td>Day- or night-time</td>
<td>0.020 (88 dB)</td>
<td>0.040 (92 dB)</td>
<td>0.40 (112 dB)</td>
<td>0.80 (118 dB)</td>
</tr>
<tr>
<td>Workshops</td>
<td>Day- or night-time</td>
<td>0.040 (92 dB)</td>
<td>0.080 (98 dB)</td>
<td>0.80 (118 dB)</td>
<td>1.6 (124 dB)</td>
</tr>
<tr>
<td></td>
<td>(Impulsive vibration)</td>
<td>0.0050 (74 dB)</td>
<td>0.010 (80 dB)</td>
<td>0.10 (100 dB)</td>
<td>0.20 (106 dB)</td>
</tr>
<tr>
<td></td>
<td>Residences</td>
<td>0.30 (110 dB)</td>
<td>0.60 (113 dB)</td>
<td>6.0 (139 dB)</td>
<td>12.0 (142 dB)</td>
</tr>
<tr>
<td></td>
<td>Night-time</td>
<td>0.10 (100 dB)</td>
<td>0.20 (106 dB)</td>
<td>2.0 (126 dB)</td>
<td>4.0 (132 dB)</td>
</tr>
<tr>
<td>Offices</td>
<td>Day- or night-time</td>
<td>0.94 (115 dB)</td>
<td>1.28 (122 dB)</td>
<td>13.0 (142 dB)</td>
<td>28.0 (148 dB)</td>
</tr>
<tr>
<td>Workshops</td>
<td>Day- or night-time</td>
<td>0.94 (115 dB)</td>
<td>1.28 (122 dB)</td>
<td>13.0 (142 dB)</td>
<td>28.0 (148 dB)</td>
</tr>
</tbody>
</table>

1 Values derived from z-axis critical frequency range 4–8 Hz. Where required, a more detailed analysis can be conducted as per DS 6472–1992.
2 Values given for the most critical frequency range >8 Hz assuming sinusoidal motion. Where required, a more detailed analysis can be conducted as per AS 2670.2–1991. Sufficient justification should accompany the use of a peak velocity approach if used in an assessment.
3 Specific values depend on social and cultural factors, psychological attitudes and expected degree of intrusion.

The nature of vibration generated from underground mining is considered to be event based in nature, where strata failures from material overlying the mining area subside, possibly generating seismic activity at the surface. As such the impulsive criteria are most appropriate for comparison of monitoring data.

Residences will be the most sensitive receptor type in the Stage 3 mining area. As such, the preferred and maximum criteria for impulsive vibration at residences will be used for comparison with monitoring data.
Structural Damage

For building damage, Australian Standard AS 2187: Part 2-2006 ‘Explosives - Storage and Use - Part 2: Use of Explosives’ recommends the frequency dependant guideline values and assessment methods given in BS 7385 Part 2-1993 ‘Evaluation and Measurement for Vibration in Buildings Part’ as they are “applicable to Australian conditions”.

The British Standard sets guideline values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated.

These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented in Table 4.7.

Table 4.7 TRANSIENT VIBRATION GUIDE VALUES – MINIMAL RISK OF COSMETIC DAMAGE

<table>
<thead>
<tr>
<th>Type of Building</th>
<th>Peak Component Particle Velocity in Frequency Range of Predominant Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforced or framed structures</td>
<td>50 mm/s at 4 Hz and above</td>
</tr>
<tr>
<td>Industrial and heavy commercial buildings</td>
<td>-</td>
</tr>
<tr>
<td>Unreinforced or light framed structures</td>
<td>15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz</td>
</tr>
<tr>
<td>Residential or light commercial type buildings</td>
<td>20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above</td>
</tr>
</tbody>
</table>

The Standard states that the guide values in Table 4.7 relate predominantly to transient vibration, which does not give rise to resonant responses in structures and low-rise buildings. Any measurable vibration generated as the longwalls are mined and the strata subsides is considered to be transient in nature, so the values of Table 4.7 will be used for comparison as structural damage criteria.
5 MONITORING AND MEASUREMENT

5.1 Attended Noise Monitoring

Attended monitoring is the methodology for determining compliance with prescribed limits; since it allows an accurate determination of the contribution by activities associated with the Austar Mine Complex, if any, to measured noise levels. The limits relevant to this management plan cover construction and operational noise from site activities.

5.1.1 Frequency – Construction

Monitoring of noise during shaft and ancillary services construction is detailed in the Shaft Construction Environmental Management Plan (SCEMP, June 2012). The SCEMP indicates that construction noise monitoring for the SIS will be undertaken on a monthly basis once during the “recommended standard hours” period, and once during the “outside recommended standard hours” period. The “outside recommended hours” monitoring event will occur during the INP night period (10pm to 7am). During months where works are not occurring in the night period, monitoring will only occur during the “recommended standard hours” period.

Shaft construction activities managed by the SCEMP are due to be completed during 2013, with operation of the No. 5 shaft ventilation fans due to commence in June 2013. Where construction activities for new shafts, buildings or other infrastructure recommence, construction noise will be monitored using this NVMP. The frequency for ongoing construction monitoring will be undertaken on a monthly basis once during the “recommended standard hours” period, and once during the “outside recommended standard hours”. This construction monitoring may be undertaken in conjunction with the operational noise monitoring program.

5.1.2 Frequency – Operation

Operational noise impacts are potentially greatest at night when background levels are typically low and the allowable levels are correspondingly low, and, this is the period when noise propagation enhancement is most likely.

Background data indicates that the Austar Mine Complex is typically inaudible during the day period when meteorological conditions are not enhancing and other activities make it difficult to measure the source of interest.

Evening is a transitional period from day to night, from the hours 6pm to 10pm. In suburban areas, traffic flows will be greater during the evening, potentially making it difficult to measure the source of interest.
Therefore, it is proposed to conduct monitoring at each location three nights per quarter, nominally once per month (pending weather and operational constraints), with results compared to criteria for all periods (i.e. day, evening and night). Atmospheric conditions and noise propagation are usually the same on the evening/night and night/day period boundaries. As such monitoring during the night period only is considered appropriate.

Any exceedance of a noise criterion recorded during regular attended noise monitoring is to be investigated. The acoustic consultant undertaking the attended monitoring is to contact the Environmental Manager as soon as practicable to advise of the recorded results.

All relevant information pertaining to the time of potential exceedance is to be gathered as follows:

- locations and quantities of mining plant operational;
- meteorological conditions at the time of monitoring; and
- noise monitoring data from nearest real-time noise monitor (if relevant).

Using the above data an assessment is to be made as to the validity of the exceedance.

Should the noise exceedance be confirmed, the site must determine if the impacts are systemic or sustained. In order to determine this, follow up monitoring will be undertaken at that specific location (not all locations). The regular monitoring frequency will be resumed if no further exceedances are measured. However, if a further exceedance is measured during the follow up period (fortnight), then a comprehensive survey will be undertaken to determine if these impacts are regular (systemic/sustained).

### 5.1.3 Locations

Noise monitoring locations, as shown in Figure 2 and detailed in Table 5.1 to Table 5.3, have been selected as representative of residential receivers that are predicted to be potentially impacted by the Austar Mine Complex, and with consideration given to the privacy of residents (e.g. not monitoring immediately adjacent the dwelling). Locations have been selected to ensure coverage in terms of demonstrating compliance with the noise criteria within the Approvals. It should be noted that this figure shows the actual monitoring position, not the location of residences.
Table 5.1 details the monitoring locations in proximity to the Austar CHPP.

Table 5.1  ATTENDED NOISE MONITORING LOCATIONS – CHPP

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM C1</td>
<td>South of Bimbadeen Road, Mt View</td>
</tr>
<tr>
<td>NM C2</td>
<td>Pelton Village</td>
</tr>
<tr>
<td>NM C3</td>
<td>Bimbadeen Road, Mt View</td>
</tr>
<tr>
<td>NM C4</td>
<td>84 Bimbadeen Road, Mt View</td>
</tr>
<tr>
<td>NM C5</td>
<td>43 Doyle Street, Mt View</td>
</tr>
</tbody>
</table>

Table 5.2 details the monitoring locations in proximity to the Austar SIS.

Table 5.2  ATTENDED NOISE MONITORING LOCATIONS - SIS

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM K1</td>
<td>Pelton Road, Quorrobolong</td>
</tr>
<tr>
<td>NM K2</td>
<td>Coney Creek Lane, Quorrobolong</td>
</tr>
<tr>
<td>NM K3</td>
<td>Richmond Street, Kitchener</td>
</tr>
</tbody>
</table>

Table 5.3 details the monitoring locations in proximity to the Austar KIA.

Table 5.3  ATTENDED NOISE MONITORING LOCATIONS - KIA

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM K4</td>
<td>Nash Lane, Quorrobolong</td>
</tr>
</tbody>
</table>

Noise monitoring locations will be reviewed and where necessary modified as a result of monitoring results, changes to the mining operations or, changes in land ownership. Any review would be undertaken in consultation with relevant government agencies.

5.1.4 Methodology

Attended noise monitoring will be conducted in accordance with the INP and Australian Standard AS 1055 ‘Acoustics, Description and Measurement of Environmental Noise’. The duration of each measurement is to be 15 minutes.

As indicated in the notes below Table 2, Schedule 3, Condition 13 of the consent and Table 2, Schedule 4, Condition 2 of PA08_0111, ‘Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy’. In accordance with Chapter 9 of the INP and Condition U1.4 of the EPL, noise criteria will apply during all meteorological conditions except:

- rain;
- wind speed greater than three metres per second (at 10 metres height); and
- atmospheric stability class G.
The procedures referred to above include the assessment of modifying factors from Section 4 of the INP. Years of noise monitoring have indicated that noise levels from mining operations, particularly those levels measured at significant distances from the source are relatively continuous. Given this, noise levels at the monitoring locations are unlikely to be intermittent or impulsive. However, tonality and low frequency are to be assessed by analysis of the measured $L_{Aeq}$ and/or $L_{Ceq}$ spectrum.

5.2 Continuous Unattended Noise Monitoring

Continuous unattended noise monitoring is required by PA08_0111. Results from real time monitoring cannot be used to determine compliance, since the noise levels recorded do not represent only noise from the mine. The recorded noise levels represent noise from all sources.

5.2.1 Locations

A mobile continuous noise monitor will be used to monitor and manage noise to assist with the CHPP PRP. The mobile monitor may be moved around periodically between locations shown in Table 5.4 and Figure 2, subject to landholder agreement.

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM C1</td>
<td>South of Bimbadeen Road, Mt View</td>
</tr>
<tr>
<td>NM C2</td>
<td>Pelton Village</td>
</tr>
<tr>
<td>NM C3</td>
<td>Bimbadeen Road, Mt View</td>
</tr>
</tbody>
</table>

Any unattended data will be collected and stored to allow a data trend analysis to be completed as required.

5.2.2 Methodology

The unattended continuous noise monitor record the following information:

- the date and time;
- the $L_{Aeq}$, $L_{Ceq}$ and $L_{AeqLF(20-630 Hz)}$ for each 15 minute interval;
- the $L_{Amin}$, $L_{Amax}$, $L_{Apeak}$, $L_1$ to $L_{90}$, one third (1/3) octave spectrum for each measurement interval;
- Real time band pass frequency breakdown in the form of $L_{AeLF(20-630 Hz)}$;
- the $L_{Aeq,period}$ (where period = day, evening and night) for each 24 hour interval;
- the maximum $L_{A1,1minute}$ noise level recorded over a randomised 15 minute night
• continuous weather data monitoring for wind direction, speed, temperature, relative humidity and rainfall as 15 minute averages; and

• Live streaming of audio and continuous MP3 recording for subsequent playback.

5.3 **Vibration Monitoring**

Vibration monitoring will be conducted in accordance with Assessing Vibration: A Technical Guideline (EPA, 2006).

5.3.1 **Locations**

Vibration monitoring locations are detailed in Table 5.5 and shown on Figure 2. These locations will be used during extraction of Stage 3 Longwalls A7 to A10 to measure long term monitoring at a variety of distances from the active longwall area.

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>V7</td>
<td>345 Quorrobolong Road, Quorrobolong</td>
</tr>
<tr>
<td>V8</td>
<td>159 Coney Creek Lane, Quorrobolong</td>
</tr>
</tbody>
</table>

The monitor at V8 would be moved to be over the mining area as Stage 3 is developed (where access is granted). The monitor at V7 is intended to remain in place for long-term data collection.

5.3.2 **Methodology**

Instantel Minimate Plus vibration monitors with external triaxial geophones (or similar) shall be used. The external transducers may be either directly attached to concrete pads buried in the ground, or spiked into the ground using ground spikes.

The external transducers have a 2 to 300Hz frequency response and measure transverse, vertical and longitudinal ground vibrations. Both units shall be set to monitor vibrations, continuously storing the relevant peaks for each five-minute interval. The monitor is able to generate and store a vibration waveform if vibration levels exceed a trigger level. The trigger level to record a waveform of both monitors is set at 1 mm/s.

The data shall be downloaded on a monthly basis as a minimum and regular checks made to ensure the monitors are functioning correctly.
5.4 **Blast Monitoring**

Blast monitoring may be required in the case that blasting is required as part of shaft or other construction at the SIS to confirm compliance with blast criteria.

5.4.1 **Locations**

Table 5.6 and Figure 2 details the possible blast monitoring locations in proximity to the Kitchener SIS.

**Table 5.6** **BLAST MONITORING LOCATIONS – KITCHENER SIS**

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Monitoring Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM K1</td>
<td>Pelton Road, Quorrobolong</td>
</tr>
<tr>
<td>NM K2</td>
<td>Coney Creek Lane, Quorrobolong</td>
</tr>
<tr>
<td>NM K3</td>
<td>Richmond Street, Kitchener</td>
</tr>
</tbody>
</table>

5.4.2 **Methodology**

Instantel Minimate Plus vibration monitors (or similar) with external triaxial geophones and overpressure microphone shall be used. The external transducers shall be either directly attached to concrete pads buried in the ground or ground spiked.
6 CONTINUAL IMPROVEMENT

6.1 Voluntary Noise Pollution Reduction Program - CHPP

As part of the Stage 3 Environmental Assessment, and detailed in the Statement of Commitments (Condition 1.15.4 of Appendix 3, PA08_0111), Austar entered into a voluntary Noise Pollution Reduction Program (PRP) at the Pelton CHPP in consultation with the EPA. The PRP includes a program to investigate and implement ways to continually improve performance over time.

The PRP commenced with a noise impact assessment titled Austar Coal CHPP Assessment of Noise Impacts (Global Acoustics, September 2008; the Noise Report). The Noise Report was prepared in accordance with Section 10 of the Industrial Noise Policy, which provides guidance on the application of the INP to existing premises, such as the Austar CHPP.

After receipt of the Noise Report, the EPA attached condition U1 to EPL 416 indicating specific noise controls and studies with timeframes for completion, some of which have been completed.

As part of the PRP, an upgrade to acoustic performance of the CHPP walls and roof, and closure of openings has been completed.

A considerable reduction to noise emissions from the CHPP building was effected by the upgrade program to the CHPP walls and roof. A reduction of between 3 to 9 dB has been previously measured at specific wall noise measurement reference locations in close proximity to the CHPP. The reduction has been achieved by both reducing the amount of openings in the CHPP building (e.g. windows, doors, loose sheeting), and improving the transmission loss characteristics of the walls and roof.

Based on the measured results at greater distance to the northwest of the CHPP building prior to and after CHPP wall and roof upgrade, a reduction in the order of 5 dB from overall CHPP building noise may have been achieved. In sound power terms, this equates to a reduction of approximately 70% of the noise energy being emitted from the CHPP building, which is a significant result.

A reduction of this order should result in a noticeable and measurable reduction in the continuous noise from the CHPP received by neighbours during operation.

Other noise controlling works to date include:

- Construction of a noise bund to the west of the CHPP to provide barrier effect to residences to the west;
- Purchase of two new mobile plant items, which will operate near the CHPP. These are a Komatsu 475A dozer and Komatsu WA500 front-end loader. The Komatsu 475A
dozer was selected over the Caterpillar style dozer as it has a different track arrangement and less discernible noise characteristics; and

- Operational control of the dozers such that they operate in first gear on the coal stockpiles.

Off site monitoring is used to monitor improvements in noise emissions realised by the noise reduction program. Due to different operating conditions at the CHPP and variations in weather conditions during monitoring it has proved difficult to determine off site improvements as a result of the noise measures installed to date.

To date, attended monitoring results have shown some evidence of reduction in noise levels from the CHPP during the day and evening period. Reduction is unclear during the night period with variability recorded in these measurements.

The continuous noise monitor, required by PA08_0111, will be used as further input into the PRP. The monitor allows recording of audio, as well as noise level. It is intended that the continuous monitor be used to assist identification of noise sources of concern to focus the efforts of the PRP.

Austar will continue to address noise levels as part of the PRP, including the following:

- Further onsite noise surveys will be carried out and assessed to determine areas where the program may focus efforts most cost effectively;
- Annual analysis of existing attended monitoring data to see where improvements can be made and identify new measures that can be implemented;
- Assess identified measures against a reasonable and feasible test; and
- A monthly review of data from the continuous noise monitor to identify potential areas where the PRP efforts may be directed.

The PRP requires that Status Reports on progress be provided to the EPA. The first report was submitted in July 2009, and Austar will continue to provide Status Reports every 6 months during the course of the Noise Pollution Reduction Program. This will continue until Section 10 of the INP is satisfied, in consultation with the EPA.
6.2 Other Noise Sources

Other examples of where Austar has incorporated noise considerations into the design of existing and proposed plant are detailed below.

6.2.1 Kitchener SIS

As part of the approval process, Austar have committed to:

- building an acoustic bund to a height of 3.5 metres along the northern boundary of the site adjacent to the car park and bathhouse. This will take place in conjunction with construction of the car park and bathhouse;
- directing the ventilation fan outlets to the west away from residences. This was completed during May/June 2013; and
- enclosing the man and materials winder and second egress winder motors will take place during construction of these works.

6.2.2 KIA

Noise control works at the KIA include:

- silencers fitted to existing ventilation fan evase;
- ventilation fans face away from residences (fans are directed to the north and west); and
- the nitrogen plant and compressors are located within a Hebel acoustic compound.

Any other opportunities for noise control of existing plant at Austar will be assessed as they are identified on the basis of monitoring results. Where they meet the reasonable and feasible test, controls will be implemented. Any additional works would be reported in the Annual Environmental Report/Annual Review.
7 COMPLAINT MANAGEMENT

Austar has implemented a Community Response Procedure as described in the Austar Coal Mine Environmental Management Strategy (May, 2012). The procedure provides details on how to receive, respond to, record and action any community complaints received in relation to the operation. All actions and operational details are to be logged and reported to the Environment and Community Manager and remedial actions are initiated as required.

Austar will keep a legible record of specific details relating to any community complaint including:

- the date and time of the complaint;
- the nature of the complaint;
- the method by which the complaint was made, e.g. telephone;
- the personal details of the complainant. If none are supplied, then a note to that effect;
- review of any relevant monitoring data, including meteorological conditions at the time of the incident;
- site investigation outcomes and specific data as detailed above;
- site activity and activity changes as discussed with operational personnel if required; and
- any necessary actions assigned.

Using the above information, an assessment is to be made as to the validity of the noise complaint.

Records of complaints will be maintained in the complaints register database and kept on file for at least four years after the complaint was made.

Austar maintains a 24-hour complaints hotline (1800 701 986) to respond to any complaints from neighbouring residents or interested stakeholders. The complaints hotline is available on the Austar Coal Mine website.

Complainants will be contacted to gather additional information or to provide feedback on investigation outcomes.
8 CONTINGENCY PLAN FOR UNPREDICTED IMPACTS

8.1 Noise

In the event of Austar becoming aware of unpredicted noise impacts, not already addressed in this NVMP, Austar will conduct an investigation using a similar process to that used for complaint management.

If the results of the investigation indicate an exceedance of relevant impact assessment criteria, Austar will follow the process for managing an exceedance in Chapter 9.

8.2 Vibration

In the unlikely event that vibration impacts from underground mining result in impacts to structures, the Mine Subsidence Board (MSB) will be informed in accordance with management measures in the current Austar Stage 3 Extraction Plan. Austar will assist the landholder by providing information to assist any claim to the MSB to rectify such damage, including monitoring results.

Vibration monitoring data from Stage 1 and Stage 2 shows that levels will be noticeable for humans, but are less than building damage criteria.

Ditton Geotechnical Services (DGS) conducted a review of adequacy of the Stage 2 Vibration Monitoring Program as part of the Independent Environmental Audit Austar Coal Mine November 2011 (Trevor Brown and Associates, April 2012). DGS noted:

“The only issue of concern from this audit period is whether the frequency of vibration events is becoming a significant issue with local residents. It is noted that the magnitude of the vibrations do not exceed minimum limits for cosmetic damage and it is not practical to impose operational constraints on the mine to reduce the frequency of the vibration events from occurring.”

As noted in the DGS comment, it is not practical to impose operational constraints on the mine to reduce vibration events. To manage vibration, Austar will continue to provide adequate community access to vibration monitoring information. Austar has done this for the completed Stage 2 mining area, and will continue to provide regular underground mine status reports to landholders over the active Stage 3 mining area. These status reports include vibration monitoring and mining status information to affected residents.
9 REPORTING AND REVIEW

9.1 Reporting

9.1.1 Periodic Reporting

Attended noise monitoring reports will include a comparison of measured noise levels to the relevant criteria detailed in the Approvals. All attended measurement result analysis should consider criteria applicability (for project specific criteria) with regard to wind speed and vertical temperature gradient.

The community directly over the active mining area are provided with regular updates on longwall location, subsidence monitoring, vibration monitoring, and other environmental monitoring results through letter updates. Austar will continue this reporting practice to these members of the community, which accords with the recommendation of the Independent Environmental Audit 2011.

9.1.2 Scheduled Reporting

Austar’s environmental noise and vibration performance is reported a number of ways. External reporting includes:

- an Annual Environmental Management Report (AEMR) / Annual Review;
- quarterly updates of monitoring results on the Austar Coal Mine website; and
- Community Consultative Committee (CCC) meetings.

A copy of the AEMR/Annual Review will be forwarded to relevant stakeholders including, but not limited to the NSW Department of Planning & Infrastructure (DP&I), EPA, Cessnock City Council and members of the CCC. The AEMR/Annual Review will also be placed on the Austar Coal Mine website.

9.1.3 Exceedance Reporting

In the event it is determined that an exceedance of noise criterion has occurred, at the earliest opportunity (as soon as practicable) Austar will notify to NSW DP&I, EPA and other relevant agencies.

In accordance with Schedule 7, Condition 6 of PA08_0111, Austar will, within 7 days of exceedance date, provide a detailed report on the exceedance to the DP&I and other relevant agencies.

If the results of the investigation indicate an exceedance of relevant impact assessment criteria, Austar will, within 2 weeks of obtaining the monitoring results, notify DP&I, the affected landowners and tenants (including tenants of mine owned properties) accordingly.
Austar will provide quarterly monitoring results to each of these parties until the results show that the project is complying with the criteria in this NVMP.

9.2 NVMP Review

In accordance with PA08_0111 Schedule 7 Condition 4, this NVMP will be reviewed and if necessary revised within 3 months of submission of an independent environmental audit, an Annual Review, or a noise/vibration incident report. Revisions to the NVMP will be submitted to DP&I to the satisfaction of the Director-General.
10 ROLES AND RESPONSIBILITIES

The roles and responsibilities of staff at Austar in respect of this NVMP are presented below in Table 10.1.

**Table 10.1 ROLES AND RESPONSIBILITIES**

<table>
<thead>
<tr>
<th>Role or Responsibility</th>
<th>Person/People Responsible</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation and periodic review of management plan</td>
<td>Environment &amp; Community Manager</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Coordination of noise and vibration monitoring in this plan</td>
<td>Environment &amp; Community Coordinator</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Manage maintenance of unattended monitoring network</td>
<td>Environment &amp; Community Coordinator</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Data review</td>
<td>Environment &amp; Community Coordinator</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Respond to community complaint</td>
<td>Environment &amp; Community Manager</td>
<td>As required</td>
</tr>
<tr>
<td>Response to exceedances or other noise and vibration issues</td>
<td>Environment &amp; Community Manager</td>
<td>As required</td>
</tr>
<tr>
<td>Scheduled reporting</td>
<td>Environment &amp; Community Manager</td>
<td>Quarterly and annually</td>
</tr>
</tbody>
</table>
11 REFERENCES

- NSW Industrial Noise Policy (EPA, 2000);
- Assessing Vibration: A Technical Guideline (EPA, 2006);
- Interim Construction Noise Guideline (EPA, 2009);
- Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990);
- Austar Coal Mine Environmental Management Strategy ENV-001-02 (Austar Coal Mine, May 2012);
- Austar Coal Mine Stage 3 Modification Environmental Assessment (Umwelt, 2011);
- Seismic Network Report 2009 (Environmental Systems & Services Seismology Research Centre, 2009); and
Figure 1  Austar Mine Complex, Locality and Site Plan
Figure 2 Austar Mine Complex Monitoring Locations
Approval conditions and the sections that they are addressed in this document are shown in Table A.1.

### Table A.1 PERFORMANCE REQUIREMENTS FOR AUSTAR MINE

<table>
<thead>
<tr>
<th>Condition No.</th>
<th>Approval Condition</th>
<th>NVMP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DA29/95 (MOD5)</td>
<td>Chapter 4 and</td>
</tr>
<tr>
<td></td>
<td>Schedule 3 Specific</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Environmental</td>
<td></td>
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<tr>
<td></td>
<td>Conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Noise and Vibration</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Impact Assessment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Criteria</td>
<td></td>
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<tr>
<td></td>
<td>The Applicant Shall</td>
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<td></td>
<td>ensure that the</td>
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<td></td>
<td>noise generated by</td>
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<td>the Infrastructure</td>
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<td></td>
<td>Upgrade Area</td>
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<td>identified in</td>
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<td></td>
<td>Figure 1.3 of the</td>
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<td>April 2006 SEE</td>
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<td></td>
<td>does not exceed</td>
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<td>the noise</td>
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<tr>
<td></td>
<td>impact assessment</td>
<td></td>
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<td></td>
<td>criteria in Table</td>
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</tr>
<tr>
<td></td>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: Noise Impact Assessment Criteria dB(A)**

<table>
<thead>
<tr>
<th>Day/Evening/Night</th>
<th>Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_Aeq(15minute)</td>
<td>Land</td>
</tr>
<tr>
<td>35</td>
<td>All privately owned land</td>
</tr>
</tbody>
</table>

**Notes:**

a) Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the L_Aeq(15minute) noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the Department and the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

b) The noise emission limits identified in the above table apply under meteorological conditions of:

- Wind speeds of up to 3m/s at 10 metres above ground level; or
- Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2m/s at 10 metres above ground level.

However, if the Applicant has a written negotiated noise agreement with any landowner of the land listed in Table 2, and a copy of this agreement has been forwarded to the Department and the EPA, then the Applicant may exceed the noise limits in Table 2 in accordance with the negotiated noise agreement.

14 Continuous Improvement

The Applicant shall:

(a) implement all reasonable and feasible noise mitigation measures;
(b) investigate ways to reduce the noise generated by the development; and
(c) report on these investigations and the implementation and effectiveness of these measured in the AEMR, to the satisfaction of the Director-General.
Table A.1 PERFORMANCE REQUIREMENTS FOR AUSTAR MINE

<table>
<thead>
<tr>
<th>Condition No.</th>
<th>Approval Condition</th>
<th>NVMP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Noise Monitoring</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>The Applicant shall implement the approved Noise Monitoring Program for the development to the satisfaction of the Director-General. This program must include quarterly attended noise monitoring and a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria in this consent.</td>
<td></td>
</tr>
</tbody>
</table>

PA08_0111 (MOD2)

Schedule 4 Specific Environmental Conditions - General Noise

2 Noise Impact Assessment Criteria

The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in:

(a) Table 2, for noise generated by the Surface Infrastructure Site; and
(b) Any relevant EPL, for noise generated by all other components of the project.

<table>
<thead>
<tr>
<th>Day/Evening/Night</th>
<th>Night</th>
<th>Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_{Aeq}(15minute)</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All privately owned land</td>
</tr>
</tbody>
</table>

Notes:

- The location of the Surface Infrastructure Site is shown in the figures in Appendix 2.
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- The noise limits in Table 2 do not apply if the Proponent has an agreement with the relevant owner/s of these residences and to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.
- The noise limits in Table 2 do not apply to construction of the Surface Infrastructure Site. Noise generated during construction activities is to comply with the requirements of the Interim Construction Noise Guideline (DECCW 2009).
Table A.1  PERFORMANCE REQUIREMENTS FOR AUSTAR MINE

<table>
<thead>
<tr>
<th>Condition No.</th>
<th>Approval Condition</th>
<th>NVMP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Noise and Vibration Management</td>
<td>This document and SCEMP</td>
</tr>
<tr>
<td></td>
<td>The Proponent shall prepare and implement a Noise Management Plan for the mine complex, to the satisfaction of the Director-General. This plan must:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Be prepared in consultation with OEH, and be submitted to the Director-General for approval prior to the commencement of construction of the Surface Infrastructure Site (other than shaft construction referred to in condition 1 above);</td>
<td>Chapter 5, Section 8.2, Chapter 6</td>
</tr>
<tr>
<td></td>
<td>(b) Include, in addition to the standard requirements for management plans (see condition 2 of schedule 7):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A noise monitoring program providing for a combination of continuous and supplementary attended monitoring measures;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A vibration monitoring program that is capable of recording ground vibrations on the surface emanating from underground mining activities; and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A detailed continual improvement program for investigating, implementing and reporting on all reasonable and feasible measures to reduce noise levels and vibration impacts generated by the mine complex.</td>
<td></td>
</tr>
</tbody>
</table>

Schedule 7 Environmental Management, Reporting and Auditing

2 Management Plan Requirements

The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:

(a) detailed baseline data; | Chapter 2 |
(b) a description of: | Section 1.3 |
| the relevant statutory requirements (including any relevant approval, licence or lease conditions); | Chapter 4 |
| any relevant limits or performance measures/criteria; | Chapter 6 |
| the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation or, the project or any management measures; | |
| (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; | |
| (d) a program to monitor and report on the: | Chapter 5 and Chapter 9 |
| • impacts and environmental performance of the project; | |
| • effectiveness of any management measures (see (c) above); | Chapter 8 |
| (e) a contingency plan to manage any unpredicted impacts and their consequences; | |
| (f) a program to investigate and implement ways to continually improve the environmental performance of the project over time; | Chapter 6 |
Table A.1 PERFORMANCE REQUIREMENTS FOR AUSTAR MINE

<table>
<thead>
<tr>
<th>Condition No.</th>
<th>Approval Condition</th>
<th>NVMP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>(g)</td>
<td>a protocol for managing and reporting any:</td>
<td>Chapter 9</td>
</tr>
<tr>
<td></td>
<td>• incidents;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• complaints;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• non-compliances with statutory requirements; and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• exceedances of the impact assessment criteria and/or performance criteria; and</td>
<td></td>
</tr>
<tr>
<td>(h)</td>
<td>a protocol for periodic review of the plan.</td>
<td></td>
</tr>
</tbody>
</table>

Appendix 3 Statement of Commitments

Statement of Commitments – Austar Coal Mine Stage 3 EA

As part of approval under Part 3A of the EP&A Act for the proposed Stage 3 Project, Austar Coal Mine will commit to the following controls:

1.8 Noise and Blasting

1.8.1 Unless otherwise agreed with the landowner, Austar Coal Mine will manage operations associated with the Stage 3 underground mining and Surface Infrastructure Site such that the noise emissions from these operations comply with the noise criteria included in Table 1.1 at surrounding residences for the range of meteorological conditions modelled in the EA.

Table 1.1 – Project Specific Noise Criteria

<table>
<thead>
<tr>
<th>Location</th>
<th>Period</th>
<th>Intrusiveness Criteria L&lt;sub&gt;Aeq&lt;/sub&gt;(15minute)</th>
<th>Amenity Criteria L&lt;sub&gt;Aeq&lt;/sub&gt;(15minute)</th>
<th>Project Specific Noise Criteria L&lt;sub&gt;Aeq&lt;/sub&gt;(15minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitchener Residences</td>
<td>Day</td>
<td>38 dBA</td>
<td>50 dBA</td>
<td>38 dBA</td>
</tr>
<tr>
<td></td>
<td>Evening</td>
<td>35 dBA</td>
<td>45 dBA</td>
<td>35 dBA</td>
</tr>
<tr>
<td></td>
<td>Night</td>
<td>35 dBA</td>
<td>40 dBA*</td>
<td>35 dBA</td>
</tr>
<tr>
<td>Serradilla Residence, Kauter Residence, Penney and Linton Property</td>
<td>Day</td>
<td>37 dBA</td>
<td>50 dBA</td>
<td>37 dBA</td>
</tr>
<tr>
<td></td>
<td>Evening</td>
<td>37 dBA</td>
<td>45 dBA</td>
<td>37 dBA</td>
</tr>
<tr>
<td></td>
<td>Night</td>
<td>35 dBA</td>
<td>40 dBA</td>
<td>35 dBA</td>
</tr>
</tbody>
</table>

1.8.2 Unless otherwise agreed with the landowner, Austar Coal Mine will manage the construction phase of the Surface Infrastructure Site in accordance with the requirements of DECCW’s Interim Construction Noise Guidelines (2009).

1.8.3 Acoustic bunding will be constructed to a height of 3.5 metres above ground level along the northern boundary adjacent to the car park and bathhouse.

1.8.4 The ventilation fan outlet will be directed to the west.

1.8.5 Man and materials winder and second egress winder motors will be enclosed.

1.8.6 Blasting will generally take place only once per day and will be undertaken between the hours of 9.00am to 5.00pm Monday to Saturday with no blasting on Sundays or Public Holidays.
Table A.1 PERFORMANCE REQUIREMENTS FOR AUSTAR MINE

<table>
<thead>
<tr>
<th>Condition No.</th>
<th>Approval Condition</th>
<th>NVMP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8.7</td>
<td>Airblast overpressure from blasting associated with shaft development at the Surface Infrastructure Site when measured at residences not associated with the development will not exceed a maximum of 120 dBL Linear Peak at any time and will not exceed 115 dBL for more than 5% of blasts over a 12 month period.</td>
<td>Section 4.3.1</td>
</tr>
<tr>
<td>1.8.8</td>
<td>Peak particle velocity from blasting associated with shaft development at the Surface Infrastructure Site when measured at residences not associated with the development will not exceed a maximum of 10 mm/s at any time and will not exceed 5 mm/s for more than 5% of blasts over a 12 month period.</td>
<td>Section 4.3.1</td>
</tr>
</tbody>
</table>

1.15 Continuous Improvement of Existing Operations

1.15.3 Austar Coal Mine will continue to implement the voluntary Noise Pollution Reduction Program for Pelton CHPP in consultation with OEH.  

1.15.4 Austar Coal Mine will commit to a Noise Management Plan that incorporates current noise monitoring, the voluntary Noise Pollution Reduction Program and associated noise management for Austar Mine Complex operations and will investigate reasonable and feasible noise mitigation strategies where appropriate.

EPL No. 416

8 Pollution Studies and Reduction Programs

U1 Coal Handling & Preparation Plant Noise Reduction

U1.1 The licensee must complete the following noise control options as identified in the report “Austar Coal CHPP Assessment of Noise Impacts” prepared by Global Acoustics Pty Ltd and dated 15 September 2008 (“the Report”).

(a) Upgrade the acoustic performance of the CHPP external walls and roof using one of the methods outlined in Section 4.4.1 of the Report. Where practical this includes closing all openings above ground level with either doors or otherwise sealing openings.

Date for Completion: 29 February 2012.

(b) Construct a noise bund around the CHPP as indicated in Figure 15 of the Report.

Date for Completion: 31 December 2012.

U1.2 The licensee must submit noise monitoring and verification reports to the EPA’s Regional Manager, Hunter after the completion of each stage of noise mitigation works. The reports must include, but need not be limited to the following:

(c) Results of noise monitoring conducted to verify the noise level predictions in the Report for noise emissions from the CHPP and associated activities following the completion of noise reduction works;

(d) A comparison of measured noise levels with the Project Specific Noise Levels identified in the Report;

(e) Identification of further noise reduction or mitigation strategies that could be implemented to address noise levels that exceed the Project Specific Noise Levels at any residential or other sensitive receiver;

Due dates for submission of reports: Every 6 months – with the first report due 31 July 2009.
### Table A.1 PERFORMANCE REQUIREMENTS FOR AUSTAR MINE

<table>
<thead>
<tr>
<th>Condition No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>U1.3</td>
<td>Noise generated from the premises must not exceed the noise limits presented below during the Coal Handling and Preparation Plant Noise Reduction Program: Receiver dB(A)L90 Pelton Village 43 Pyne Residence 40 O’Hearn Residence 37</td>
<td>Section 4.2.2</td>
</tr>
<tr>
<td>U1.4</td>
<td>The noise limits apply during day or night-time under winds up to 3 metres per second (measured at 10 metres above ground level) and Pasquill stability class from A to F.</td>
<td>Section 5.1.4</td>
</tr>
<tr>
<td>U1.5</td>
<td>Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise limits in Condition U1.3 unless otherwise stated. Where it can be demonstrated that direct measurement of noise from the premises is impractical the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy. The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.</td>
<td>Section 5.1.3</td>
</tr>
</tbody>
</table>
