ACOUSTICS AND AIR

BULGA VILLAGE MINE NOISE

10 DAY NOISE AUDIT

REPORT NO. 15084
VERSION B

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PREPARED FOR

NSW DEPARTMENT OF PLANNING & ENVIRONMENT
23 - 33 BRIDGE STREET
SYDNEY NSW 2000

WILKINSON MURRAY

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

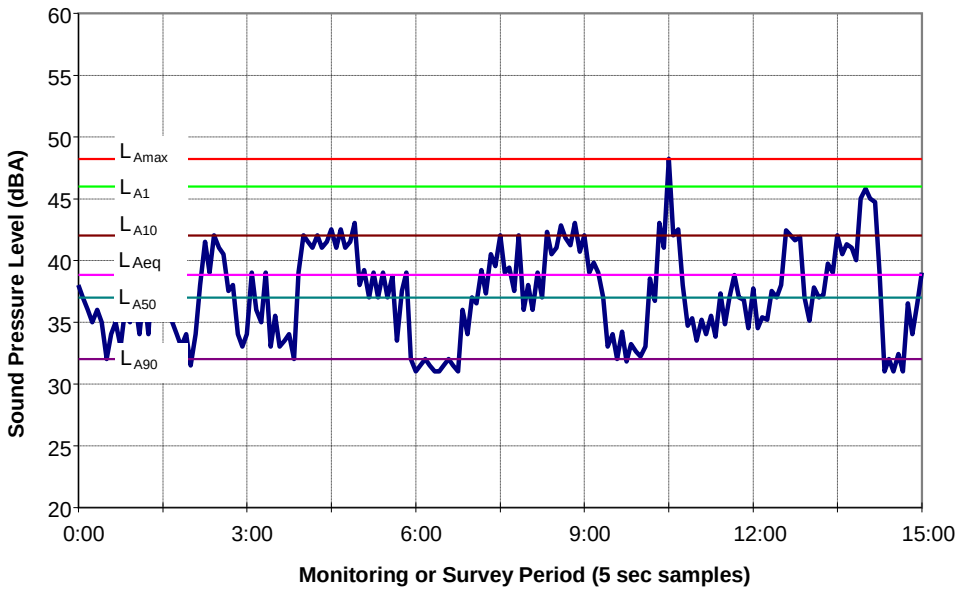
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



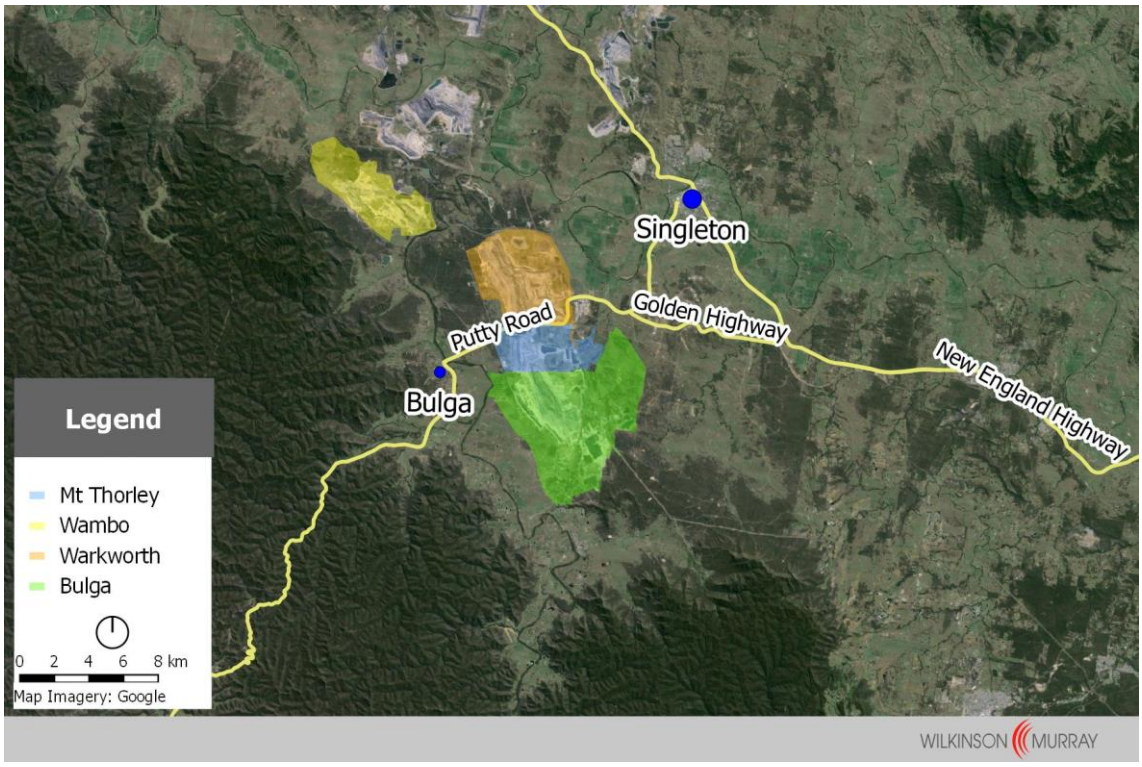
1 INTRODUCTION

Bulga Village is a small settlement located approximately 18 kilometres south west of Singleton, in the NSW Hunter Valley. A number of coal mines are located to the north and east of Bulga Village, including:

- Wambo coal mine;
- Warkworth coal mine;
- Mt Thorley coal mine; and,
- Bulga coal mine.

Figure 1-1 shows the location of Bulga Village and the nearby coal mines.

Figure 1-1 Bulga Village and nearby coal mines



Wilkinson Murray Pty Ltd (WM) has been commissioned by the NSW Department of Planning & Environment (the Department) to conduct an independent audit of noise from nearby coal mines at a number of locations in and around Bulga.

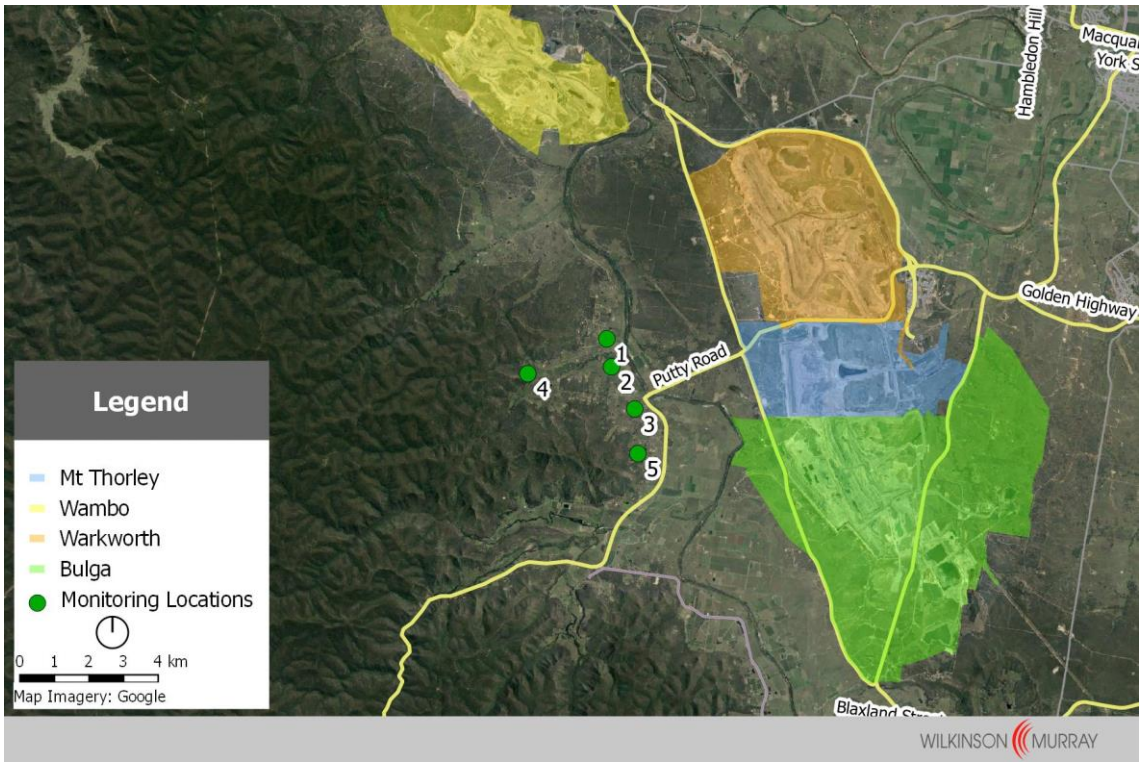
2 NOISE MONITORING LOCATIONS

Noise monitoring was conducted at 5 locations, identified by the Department. The locations are presented in Table 2-1 and Figure 2-1.

Table 2-1 Noise monitoring locations

Monitoring location	Land Owner	Address
1	Bailey	218 Wambo Road
2	Hanson	129 Wambo Road
3	Mitchell	29 The Inlet Road
4	Leslie	339 The Inlet Road
5	Krey	98 Wollemi Peak Road

Figure 2-1 Noise monitoring locations



Specific details of each monitoring location are discussed further in Section 5.

3 NOISE CRITERIA

Operational noise criteria applicable at each of the monitoring locations have been taken from the consolidated consent for the Warkworth (S02/02198) and Mount Thorley (N91/00310/004) coal mines, respectively. The criteria set acceptable limits on $L_{Aeq,\ 15min}$ noise levels at residences and are summarised in Table 3-1.

Table 3-1 Operational noise criteria

Monitoring Location / Land Owner	$L_{Aeq,\ 15min}$ Noise Criteria (dBA)*	
	Warkworth	Mt Thorley
1 – Bailey	38	40
2 – Hanson	38	40
3 – Mitchell	38	40
4 – Leslie	35	35
5 – Krey	35	38

* Applicable during daytime (7:00am – 6:00pm), evening (6:00pm – 10:00pm) and night time (10:00pm – 7:00am)

The consents for both Warkworth and Mount Thorley identify the following meteorological conditions under which the above noise criteria do not apply:

- During all periods of rain or hail;
- Average wind speed at microphone height exceeds 5 m/s;
- Wind speeds greater than 3 m/s measured at 10 m above ground level; or,
- Temperature inversion greater than 3°C/100 m.

4 METHODOLOGY

The following section describes the methodology used for conducting the audit.

4.1 Attended Measurements

Noise levels at each location were determined through attended measurements. This involved the use of a handheld sound level meter, mounted on a tripod.

The measurements were typically over periods of between 15 and 20 minutes. The sound level meter was paused during periods influenced by extraneous broadband noises sources such as traffic, aircraft, dogs and birds. The measurement was concluded once a period of 15 minutes had elapsed which was unaffected by extraneous noise, or 20 minutes after the beginning of the measurement – whichever occurred sooner. On several occasions, during high levels of ambient noise when mine noise was not audible, measurements were stopped after a period of 5 minutes.

During each measurement, observations were made regarding the nature and origin(s) of mine noise. A magnetic compass was used to record magnetic bearings from the measurement location to the apparent source(s) of mine noise.

In the event where the estimated $L_{Aeq,\ 15min}$ noise levels from either Warkworth or Mount Thorley mines exceeded the criteria at a particular location, a repeat measurement was conducted within 75 minutes. The purpose of the repeat measurement was to identify instances of sustained noise levels from mines in excess of the criteria.

4.2 Measurement Equipment

Noise measurements were conducted using a Bruel and Kjaer Model 2260 sound level meter. This sound level meter conforms to Australian Standard 1259 *Acoustics – Sound Level Meters* as a Type 1 precision sound level meter which has an accuracy suitable for field and laboratory use. The A-weighting filter of the meter was applied to all broadband noise descriptors and the time response of the meter was set to "Fast".

The calibration of the meter was checked before and after the measurements with a Bruel and Kjaer Model 4231 calibrator and no significant drift was noted.

The Model 2260 sound level meter and Model 4231 calibrator have been NATA laboratory calibrated within the previous two years in accordance with Wilkinson Murray's Quality Assurance procedures.

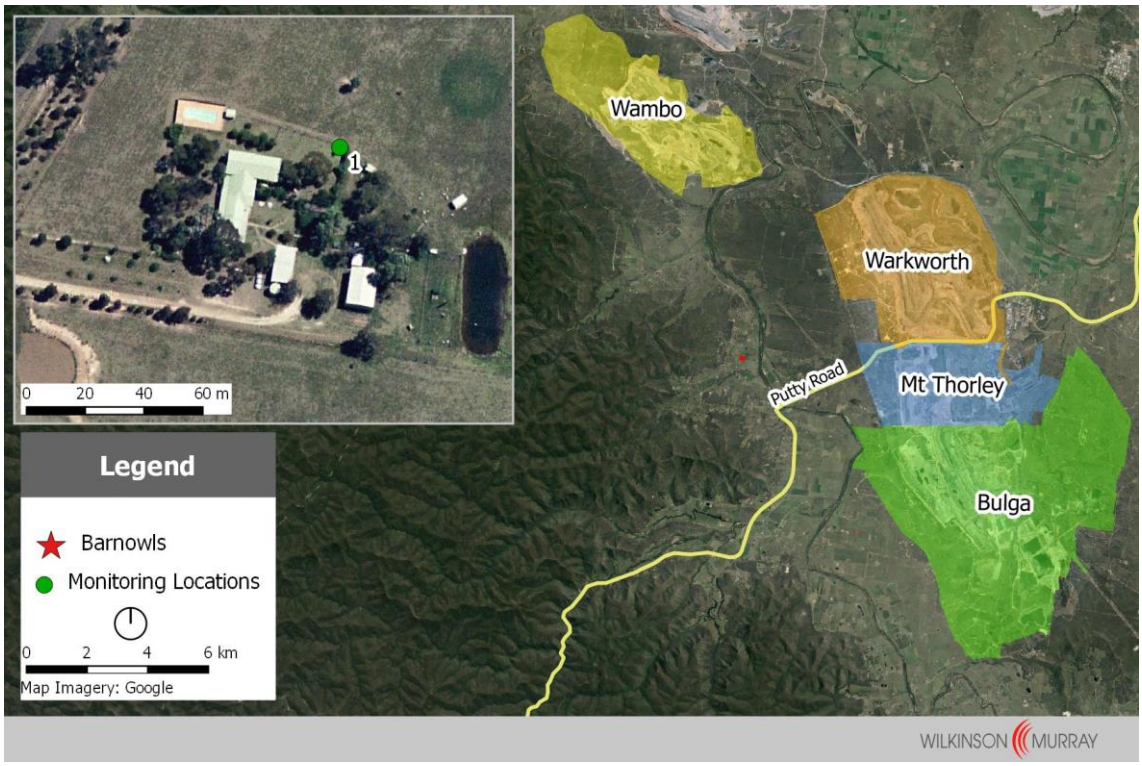
5 RESULTS

The following Section presents the monitoring results at each of the 5 locations. In addition to the measured levels of noise from coal mines, this Section also describes each of the measurement locations in detail, including a discussion of the ambient noise environment at each location. Tables of all measurement results are included in Appendix A.

5.1 Monitoring Location 1 – Bailey

Location 1 is located at 218 Wambo Road, and is the northern most location at which monitoring was undertaken during this study. Measurements were undertaken in the north eastern corner of the property, approximately 20 metres from the dwelling. Location 1 is presented in Figure 5-1.

Figure 5-1 Monitoring Location 1

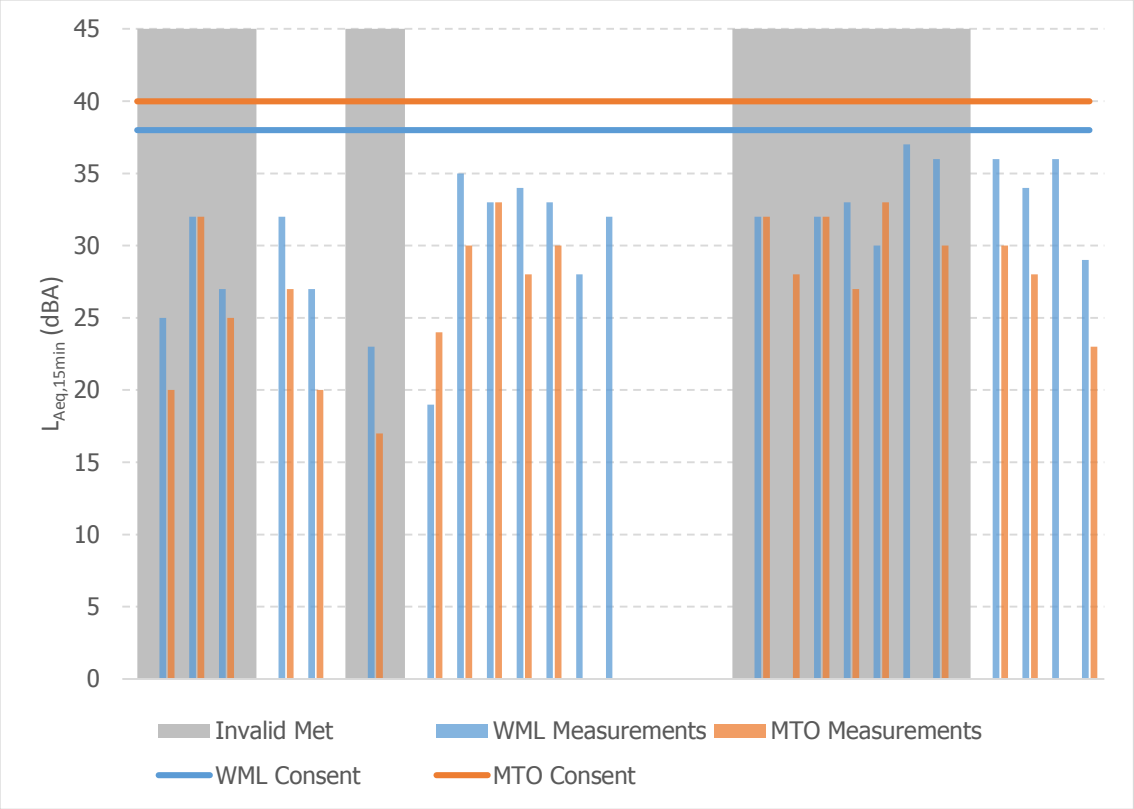


The ambient acoustic environment at location 1 included significant noise levels from insects, frogs, birds and bats. At times, noise from insects, frogs, birds and bats exceeded noise levels from mines. During the evening, commercial aircraft were often heard overhead, with aircraft noise levels often exceeding mine noise levels. Traffic noise at location 1 was sporadic, and rarely interfered with noise measurements. On one occasion, a pool pump was found to be operating at location 1, with a noise level of 25 dBA at the measurement position.

At location 1, mine noise ranged from inaudible to clearly audible and was most often contributed to by Warkworth and Mount Thorley mines. During approximately one third of measurements, noise from Wambo mine was detected. On one occasion, noise was detected from Bulga mine.

Noise levels from Warkworth (WML) and Mount Thorley (MTO) mines at location 1 during the audit are presented in Figure 5-2.

Figure 5-2 Measurement results at Monitoring Location 1

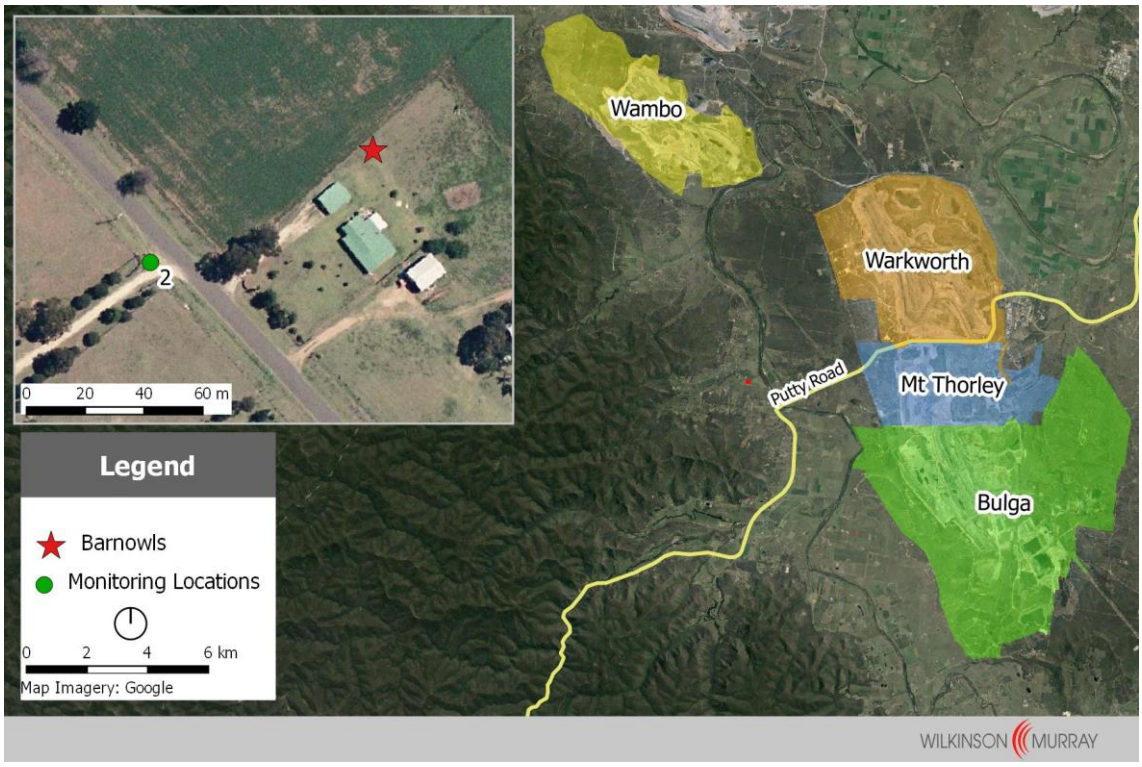


A total of 26 measurements were conducted at location 1 with no detected exceedances of noise criteria.

5.2 Monitoring Location 2 – Hanson

Location 2 is located at 129 Wambo Road, as presented in Figure 5-3. Measurements at location 2 were conducted at the end of the driveway, as access to the property could not be arranged. One of Rio Tinto's Barnowl noise monitors is located approximately 85 metres to the north east of location 2.

Figure 5-3 Monitoring Location 2

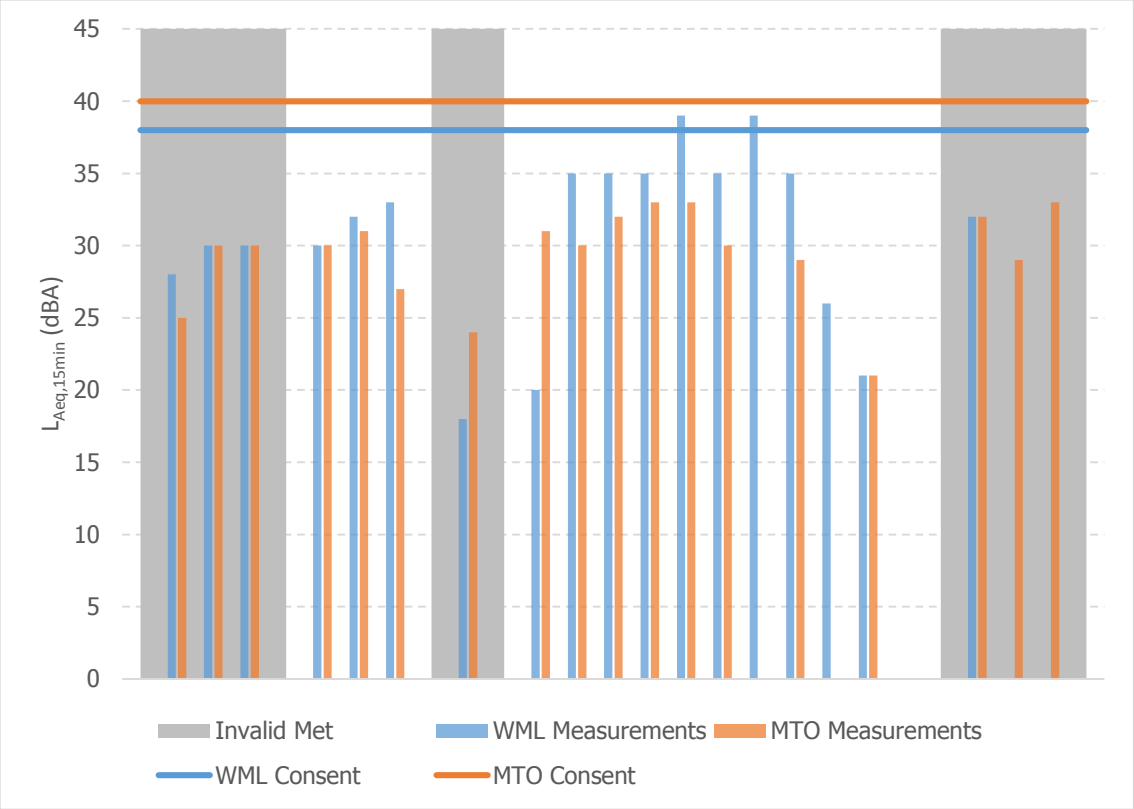


The ambient acoustic environment at location 2 included significant noise levels from insects and frogs. Noise from insects and frogs at location 2 were lower than at location 1 and rarely exceeded the levels of mine noise. During the evening, commercial aircraft were often heard overhead, with aircraft noise levels often exceeding mine noise levels. Traffic noise from some vehicles on Putty Road could be heard at location 2, and occasionally interfered with noise measurements. On a number of occasions, noise from irrigation sprinklers was audible at location 2, and resulted in a number of measurements being abandoned. During the final three days of the audit, irrigation sprinklers were running continuously in the vicinity of location 2, resulting in no measurements being completed over this period for location 2.

At location 2, mine noise ranged from inaudible to clearly audible and was most often contributed to by Warkworth and Mount Thorley mines. During approximately one quarter of measurements, noise from Wambo mine was detected. On one occasion, noise was detected from Bulga mine.

Noise levels from Warkworth (WML) and Mount Thorley (MTO) mines at location 2 during the audit are presented in Figure 5-4.

Figure 5-4 Measurement results at Monitoring Location 2

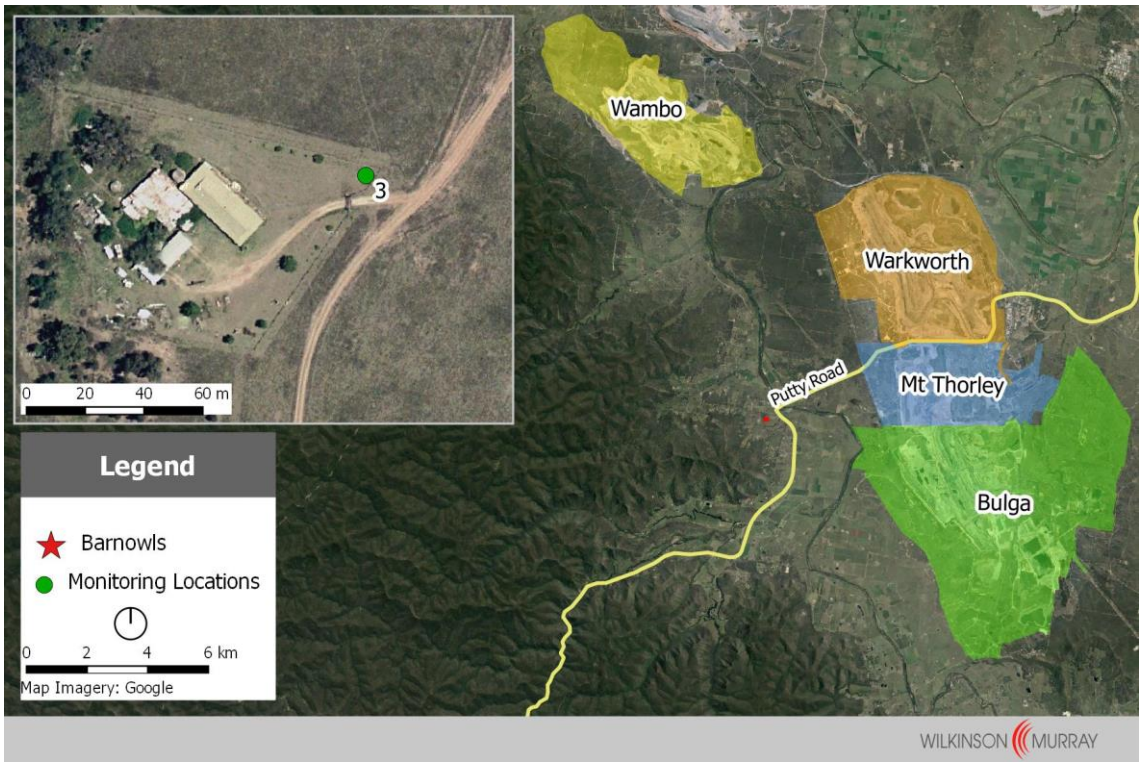


A total of 20 measurements were conducted at location 2 with two detected exceedances of noise criteria. On both occasions, noise levels from Warkworth mine were estimated to be in exceedance of the applicable criterion by 1 dBA; and on both occasions, repeat measurements conducted approximately one hour later indicated that noise levels from Warkworth mine had reduced by almost 5 dBA.

5.3 Monitoring Location 3 – Mitchell

Location 3 is located at 29 The Inlet Road, and is considered representative of the majority of the Bulga Village settlement. Attended noise measurements at location 3 were conducted in the north eastern corner of the property, approximately 38 metres from the dwelling. Location 3 is presented in Figure 5-5.

Figure 5-5 Monitoring Location 3

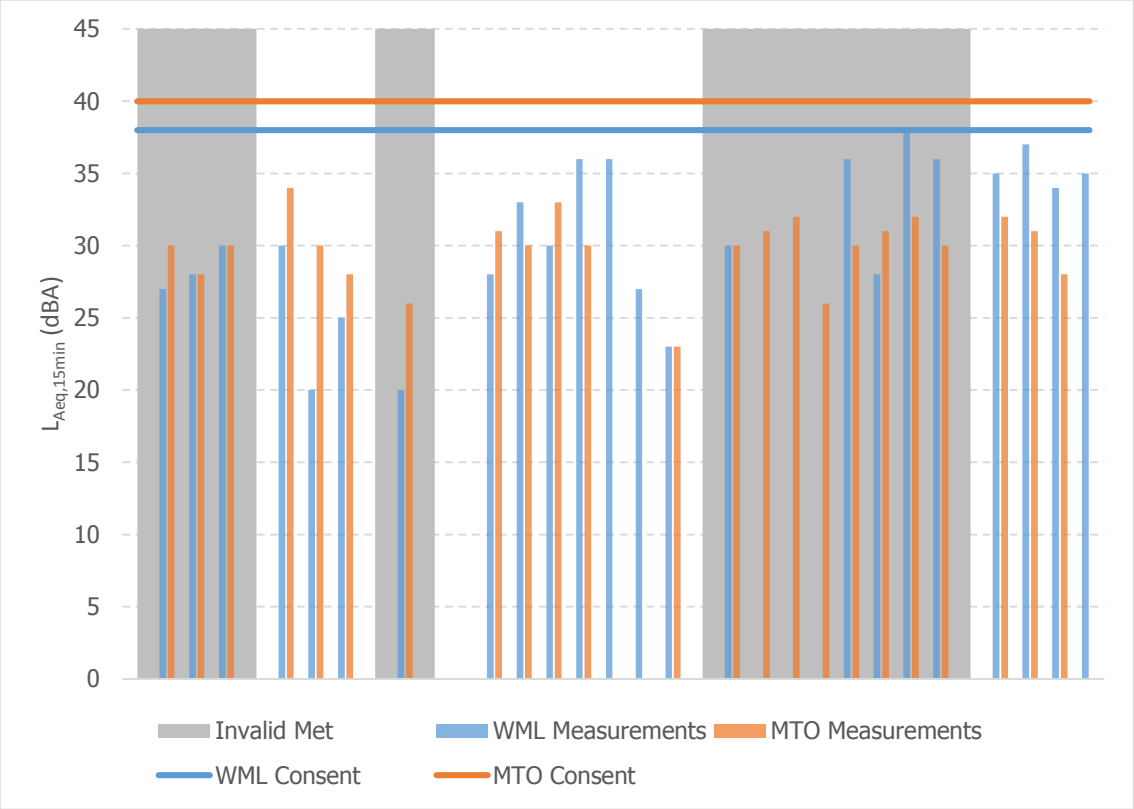


The ambient acoustic environment at location 3 included significant noise levels from insects and bats. Noise from insects and bats at location 3 occasionally exceeded levels of mine noise. During the evening and early morning, traffic noise from vehicles on Putty Road was often heard at location 3, and interfered with a number of noise measurements. Also, significant noise from dogs and roosters was heard during the early morning, making measurements during these times very difficult.

At location 3, mine noise ranged from inaudible to clearly audible and was most often contributed to by Warkworth and Mount Thorley mines. During approximately 40% of measurements, noise from Bulga mine was detected. On three occasions, noise was detected from Wambo mine.

Noise levels from Warkworth (WML) and Mount Thorley (MTO) mines at location 3 during the audit are presented in Figure 5-6.

Figure 5-6 Measurement results at Monitoring Location 3

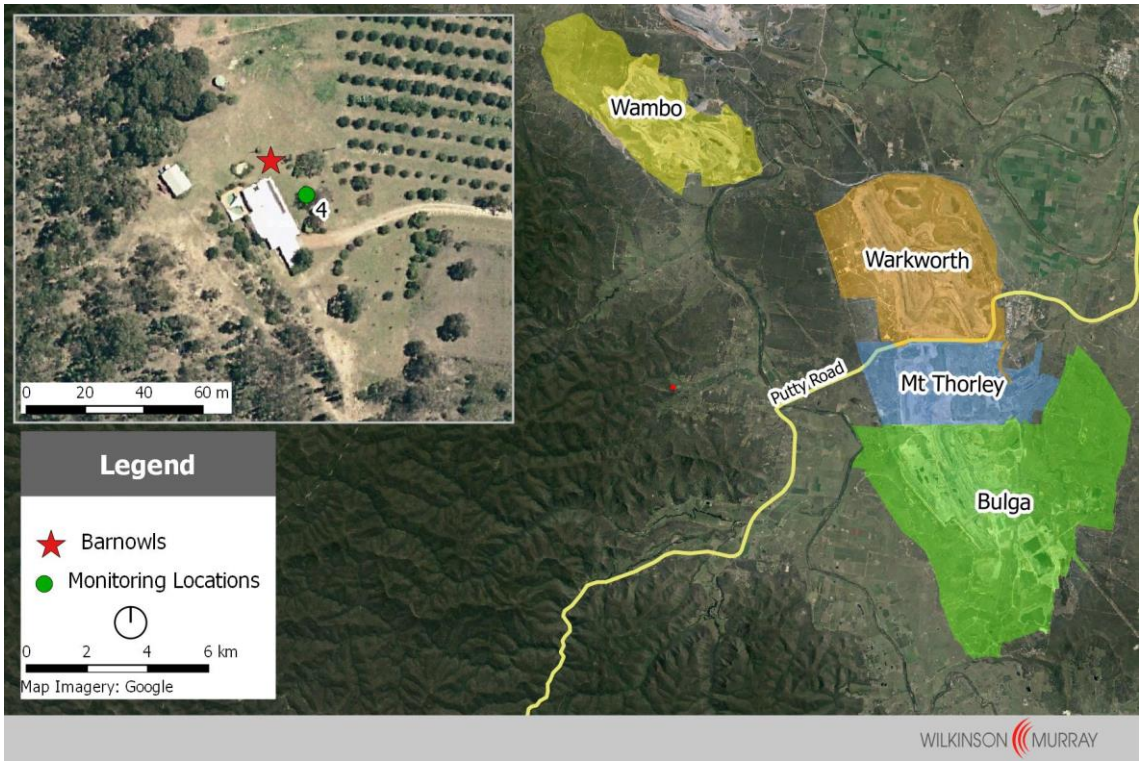


27 measurements were conducted at Location 3, with no detected exceedances of noise criteria.

5.4 Monitoring Location 4 – Leslie

Location 4 is located at 339 The Inlet Road and is the western most measurement location in this study. A Rio Tinto Barnowl unit is located at this property. As shown in Figure 5-7, the measurement location was approximately 8 metres to the east of the dwelling. Noise measurements would typically be conducted further from a dwelling, however the block slopes significantly to the east, and moving further away from the dwelling would result in the measurement location being significantly lower than the dwelling. It was originally intended to conduct the measurements adjacent to the Barnowl unit, however it was noted that a septic system is in continual operation and would have interfered with the attended measurements. The septic tank is located approximately 15 metres to the north west of the Barnowl unit, and contributes a sound pressure level of approximately 31 dBA at the location of the Barnowl.

Figure 5-7 Monitoring Location 4

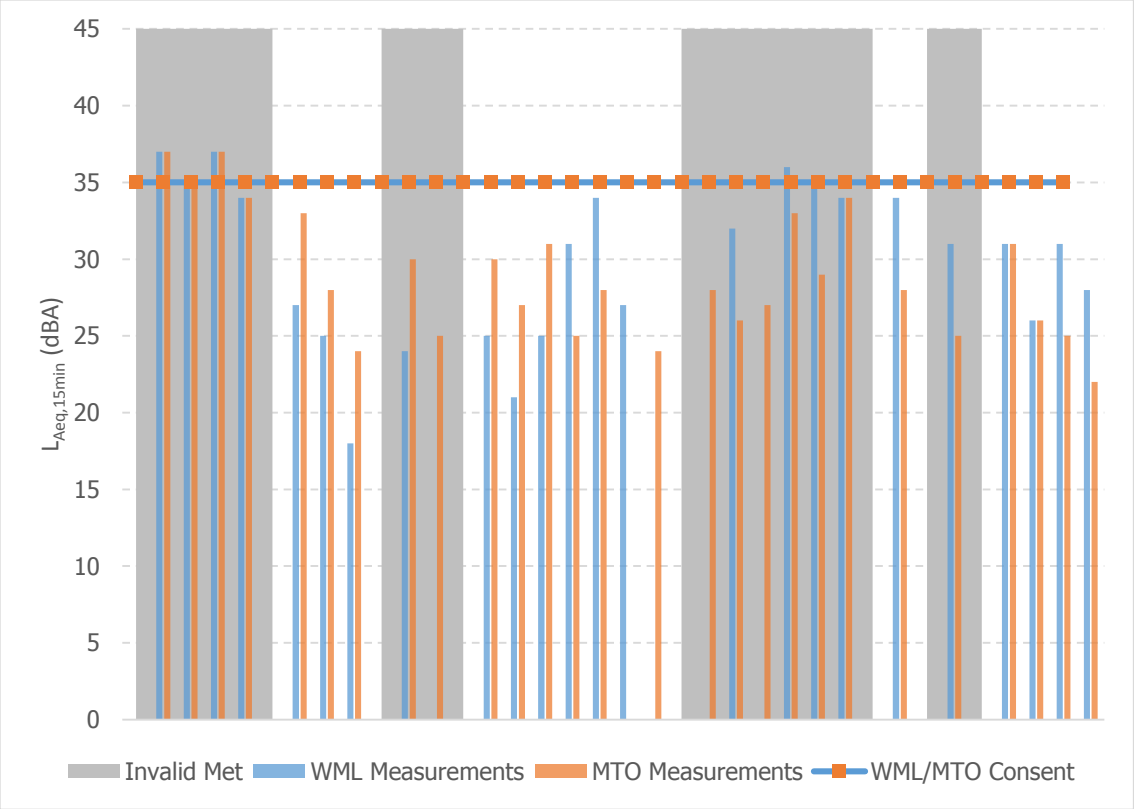


The ambient acoustic environment at location 4 included significant noise levels from insects and birds. Noise from insects and birds at location 4 rarely exceeded levels of mine noise. Traffic noise at location 4, from vehicles on The Inlet Road, was sporadic and rarely interfered with measurements. During the early morning, significant noise was heard from birds, dogs and roosters, making measurements during these times difficult.

At location 4, mine noise ranged from inaudible to clearly audible and was most often contributed to by Warkworth and Mount Thorley mines. During less than 10% of measurements, noise from Bulga mine was detected. Noise was not detected from Wambo mine on any occasion.

Noise levels from Warkworth (WML) and Mount Thorley (MTO) mines at location 2 during the audit are presented in Figure 5-8.

Figure 5-8 Measurement results at Monitoring Location 4

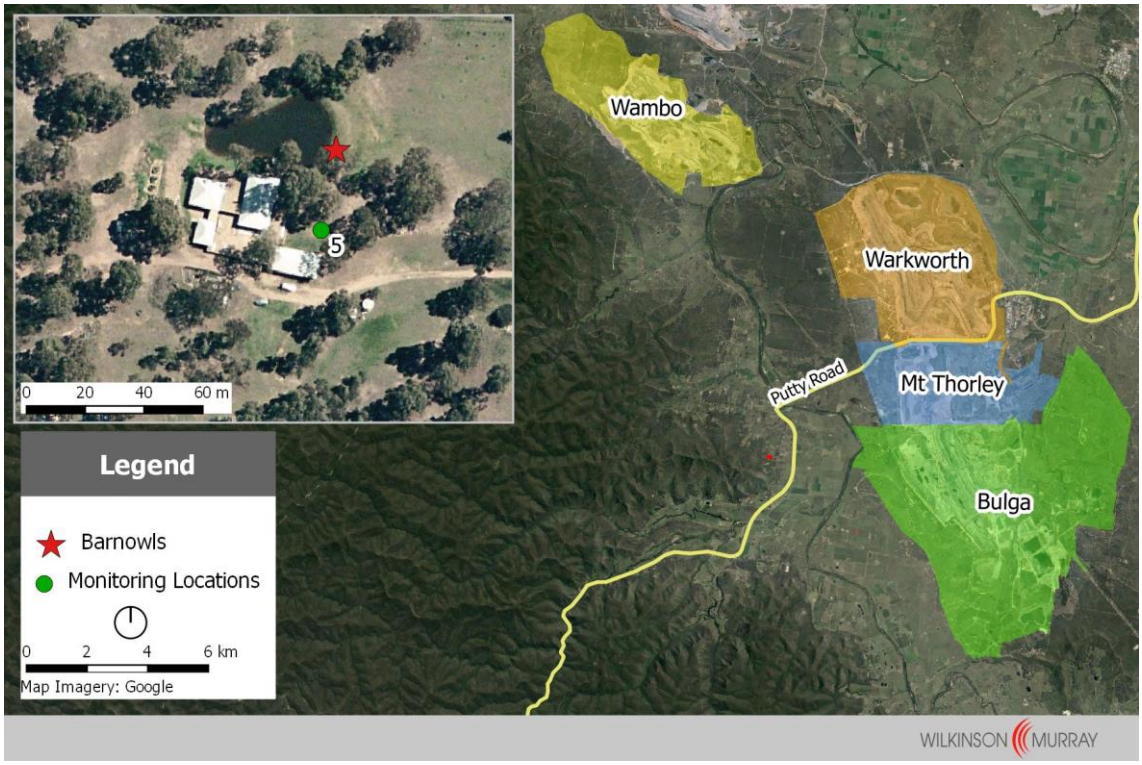


28 attended measurements were conducted at location 4. On 3 occasions, noise levels from mines were estimated to exceed the applicable criteria, however on each of these occasions, the prevailing meteorological conditions were such that the noise criteria do not apply, in accordance with the consent conditions for Warkworth and Mount Thorley mines.

5.5 Monitoring Location 5 – Krey

Location 5 is located at 89 Wollemi Peak Road, and is the southern most monitoring location in this study. A Rio Tinto Barnowl unit is located at this property, as shown in Figure 5-9. The measurement location is approximately 18 metres to the east of the main dwelling. It was originally intended to conduct measurements adjacent to the Barnowl, however this location could not be accessed without alerting a large dog on the neighbouring property, which would bark continuously upon being disturbed.

Figure 5-9 Monitoring Location 5

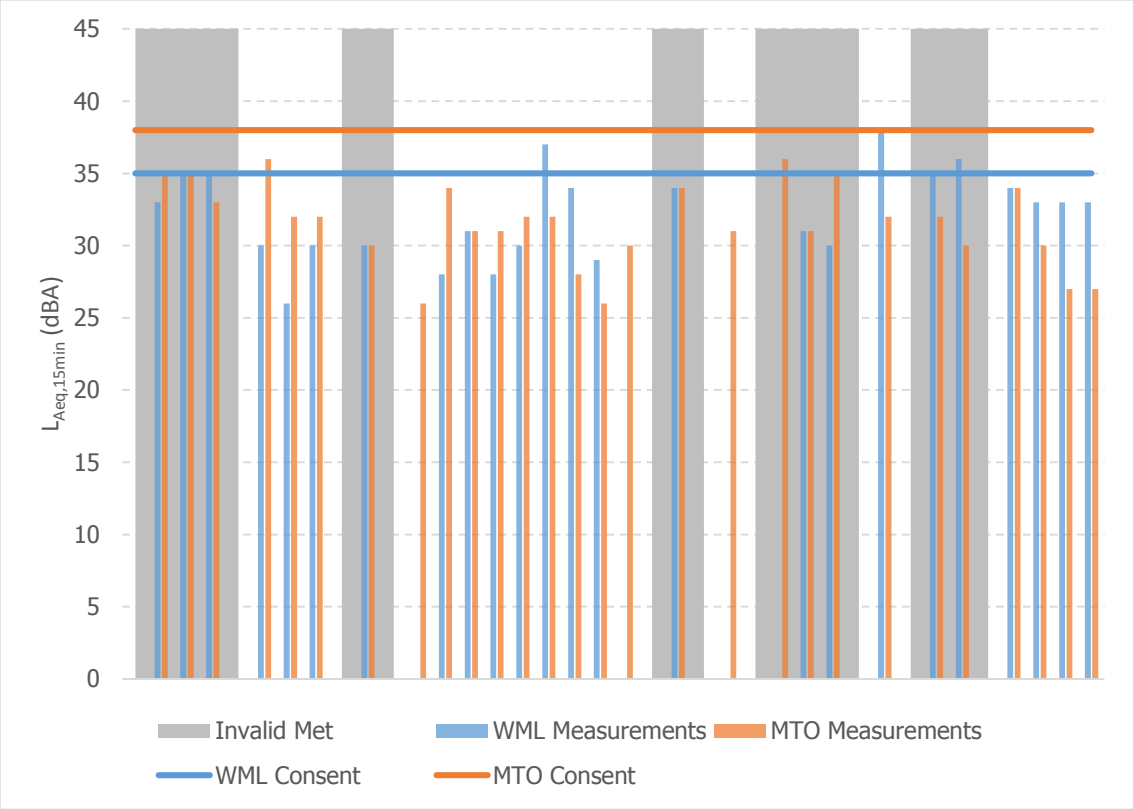


The ambient acoustic environment at location 5 included significant noise levels from insects, birds and a neighbouring dog. Noise from insects and birds at location 4 rarely exceeded levels of mine noise. During the evening and early morning, traffic noise from vehicles on Putty Road was often heard at location 5, and interfered with a number of noise measurements. Also, significant noise from dogs, birds and roosters was heard during the early morning, making measurements during these times very difficult.

At location 5, mine noise ranged from inaudible to clearly audible and was most often contributed to by Warkworth and Mount Thorley mines. During approximately 65% of measurements, noise from Bulga mine was detected. Noise was not detected from Wambo mine on any occasion.

Noise levels from Warkworth (WML) and Mount Thorley (MTO) mines at location 2 during the audit are presented in Figure 5-8.

Figure 5-10 Measurement results at Monitoring Location 5



A total of 28 measurements were conducted at location 5 during the audit. On a three occasions, mine noise from the Warkworth mine was estimated to exceed the relevant criterion. On one of these occasions, the prevailing meteorological conditions were such that the noise criteria do not apply, in accordance with the consent conditions for Warkworth and Mount Thorley mines. The remaining two occasions represented estimated exceedances of 2 dBA and 3 dBA. On all occasions where mine noise from Warkworth was estimated to exceed noise criteria, repeat measurements approximately one hour later indicated that noise levels from Warkworth had reduced by approximately 5 dBA and were below the criterion.

6 DISCUSSION

6.1 Summary of Measurement Results

During the 10 day audit, a total of 129 attended measurements were conducted across 5 locations in and around Bulga Village.

On four occasions, the estimated contribution of mine noise from the Warkworth coal mine exceeded the $L_{Aeq, 15min}$ criteria at sensitive receivers during valid meteorological conditions. These exceedances ranged from 1 to 3 dBA and in every case, subsequent measurements conducted approximately one hour later indicated that noise levels from Warkworth coal mine had reduced to a level below the criteria.

During periods of prevailing meteorological conditions under which the noise criteria do not apply, noise from individual coal mines were estimated to exceed criteria on four occasions.

Table 6-1 presents a summary of the measurements conducted during the 10 day audit.

Table 6-1 Summary of measurement results

Location	Measurements	Exceedances	
		Warkworth	Mount Thorley
1 – Bailey	26	0	0
2 – Hanson	20	2 (17/03, 10:00pm, 1 dBA) (18/03, 4:00am, 1 dBA)	0
3 – Mitchell	27	0	0
4 – Leslie	28	0	0
5 – Krey	28	2 (18/03, 12:00am, 2 dBA) (22/03, 8:30pm, 3 dBA)	
Total	**129**	**4**	**0**

6.2 Noise Modifying Factors

Chapter 4 of the INP outlines 'modifying factor' adjustments to account for potential greater annoyance of a noise source due to certain characteristics, such as:

- Tonality;
- Impulsiveness;
- Intermittency;
- Irregularity; or
- Dominant low frequency content.

From the results of the noise measurements it was deemed that there is potential for low frequency noise content requiring further assessment.

6.2.1 Low Frequency Noise

The NSW Industrial Noise Policy (INP) (EPA, 2000) recommends that noise sources containing dominant low-frequency content be subject to a 'modifying factor' adjustment of +5dB to account for the greater annoyance of such noise sources compared with other sources at the same noise level. This 'modifying factor' is only applicable to $L_{Aeq,\ 15min}$ levels and not $L_{A1,\ 1min}$ levels.

The INP also outlines a methodology to assess low-frequency content which is based on the difference between the A-weighted and C-weighted levels, the latter being more responsive to low-frequency noise.

Table 6-2 below reproduces the provisions for low frequency noise in Table 4.1 in the INP.

Table 6-2 Modifying factor corrections – Low Frequency Noise *(from NSW-INP, 2000, Table 4.1)*

Factor	Assessment / measurement	When to apply	Correction	Comments
Low frequency noise	Measurement of C-weighted and A-weighted level	Measure/assess C- and A- weighted levels over same time period. Correction to be applied if the difference between the two levels is 15 dB or more.	5 dB	C-weighting is designed to be more responsive to low-frequency noise.

The INP was released by the NSW EPA in 2000. The policy at that time was considered world best practice and was based on best available scientific evidence at the time. Even though it was intended that the INP be reviewed every 5 years no in-depth review has been conducted for the last 15 years.

The assessment of low frequency noise has been a contentious issue for the last 7 to 8 years in NSW particularly for large industries in rural settings. This is primarily due to greater attenuation of mid and high frequencies (greater than 500Hz) at large distance. This results in a disproportionally large difference in the dBC-dBA level which therefore attracts the INP penalty for low frequency when such a penality is not commensurate with the impact because the low frequencies may be below or near threshold of hearing levels. (A review of Published Research on Low Frequency Noise and its Effects, Report for Department for Environment, Food and Rural Affairs (UK) by Dr Geoff Leventhall, 2003).

As such the current research suggests that (dBC-dBA) difference should not be used as an annoyance predictor, but as a simple indicator of whether further investigation may be necessary (Low Frequency Noise and Annoyance, Noise & Health 2004, 6:23, 59-72).

6.3 Methods for Assessment of Low Frequency Noise

It is Wilkinson Murray's understanding that the INP is being reviewed, particularly the low frequency noise component. As the INP low frequency noise criteria does not appear to be an appropriate measure for low frequency noise impact this report also presents two other low frequency noise assessment methodologies, namely:

- Broner Method (Dr Norm Broner (2011; A Simple Outdoor Criterion for Assessment of Low Frequency Noise Emissions, Acoustics Australia, Vol.39), and
- Department of Environment Food and Rural Affairs (DEFRA) UK (Dr Moorehouse (2005); Proposed Criteria for the assessment of low frequency noise.

6.3.1 Broner Method

The Broner method for the assessment of low frequency noise provides absolute levels criteria for low frequency noise. The externoise criteria at residences are:

- For daytime or when sources operate intermittently (1-2 hours);
  - Desirable 65 dBC Leq;
  - Maximum 70 dBC Leq.
- For night time or when operates continuously;
  - Desirable 60 dBC Leq;
  - Maximum 65 dBC Leq.

6.3.2 DEFRA Method

The UK Department for Environment, Food and Rural Affairs (DEFRA) has developed a new procedure to assess low frequency noise.

A measurement of L_{Aeq}, L_{10} and L_{90} is taken in third octave bands between 10Hz and 160Hz. If the L_{Aeq} taken over a time when the noise is said to be present exceeds the reference curve in Table 6-3, it may indicate a source of low frequency noise that could cause disturbance.

Table 6-3 DEFRA Reference Curve

Frequency	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, L_{eq}	92	87	83	74	64	56	49	43	42	40	38	36	34

If the noise occurs only during the day then a 5dB relaxation may be applied to all third octave bands. If the noise is steady then a 5dB relaxation may be applied to all third octave bands. A noise is considered steady if either of the conditions below is met:

- $L_{10} - L_{90} < 5dB$; and
- The rate of change of sound pressure level (fast time weighting) is less than 10dB per second.

The criterion curve applies to internal measured levels. As no internal noise levels were measured corrections to reflect external assessment locations have been included in the reference curve being:

- +0dB at 10Hz;
- +4dB for 12.5Hz to 40Hz; and
- +10dB for 50 to 160Hz.

These corrections are based on transmission loss data for a simple weatherboard house with 4mm glass windows. The corrections are considered conservative.

Table 6-4 shows the criterion curved used for the assessment of low frequency noise assuming steady state low frequency noise and corrected for external assessment (Modified DEFRA Curve).

Table 6-4 Reference Curve corrected for steady state low frequency noise and external usage (Modified DEFRA Curve).

Hz	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB, L_{eq}	97	96	82	83	73	65	58	58	57	55	53	51	49

The measured levels are compared with the reference curve. An exceedance of the reference curve suggests there is potential for a low frequency noise impact.

6.4 Assessment of Low Frequency Noise during Mine Noise Audit

6.4.1 Low Frequency Noise Assessments for the Bailey Residence

The valid measured noise data for the Bailey residence presented in Appendix A has been reviewed and the total L_{Aeq}, L_{Ceq} and the difference between the L_{Ceq} and the L_{Aeq} are presented in Table 6-5.

Table 6-5 Bailey Residence - Monitoring Data – Overall L_{Aeq}, L_{Ceq} and L_{Ceq} - L_{Aeq}

Measurement #	Location	L_{Aeq}	L_{Ceq}	L_{Ceq} - L_{Aeq}	INP Criterion	Broner Criterion, L_{Ceq}
21	Bailey	36.4	55.4	19	15	60-65
26	Bailey	30.9	52.3	21.4	15	60-65
39	Bailey	30.8	51.8	21	15	60-65
43	Bailey	38.9	55.4	16.5	15	60-65
48	Bailey	37	58.1	21.1	15	60-65
53	Bailey	35.7	56.2	20.5	15	60-65
57	Bailey	41.8	57.3	15.5	15	60-65
64	Bailey	38.5	54.1	15.6	15	60-65
69	Bailey	38.4	56.9	18.5	15	60-65
75	Bailey	43	44.6	1.6	15	60-65
116	Bailey	37.7	58.2	20.5	15	60-65
120	Bailey	42.1	56.2	14.1	15	60-65
123	Bailey	40	57.3	17.3	15	60-65
128	Bailey	33.9	53	19.1	15	60-65

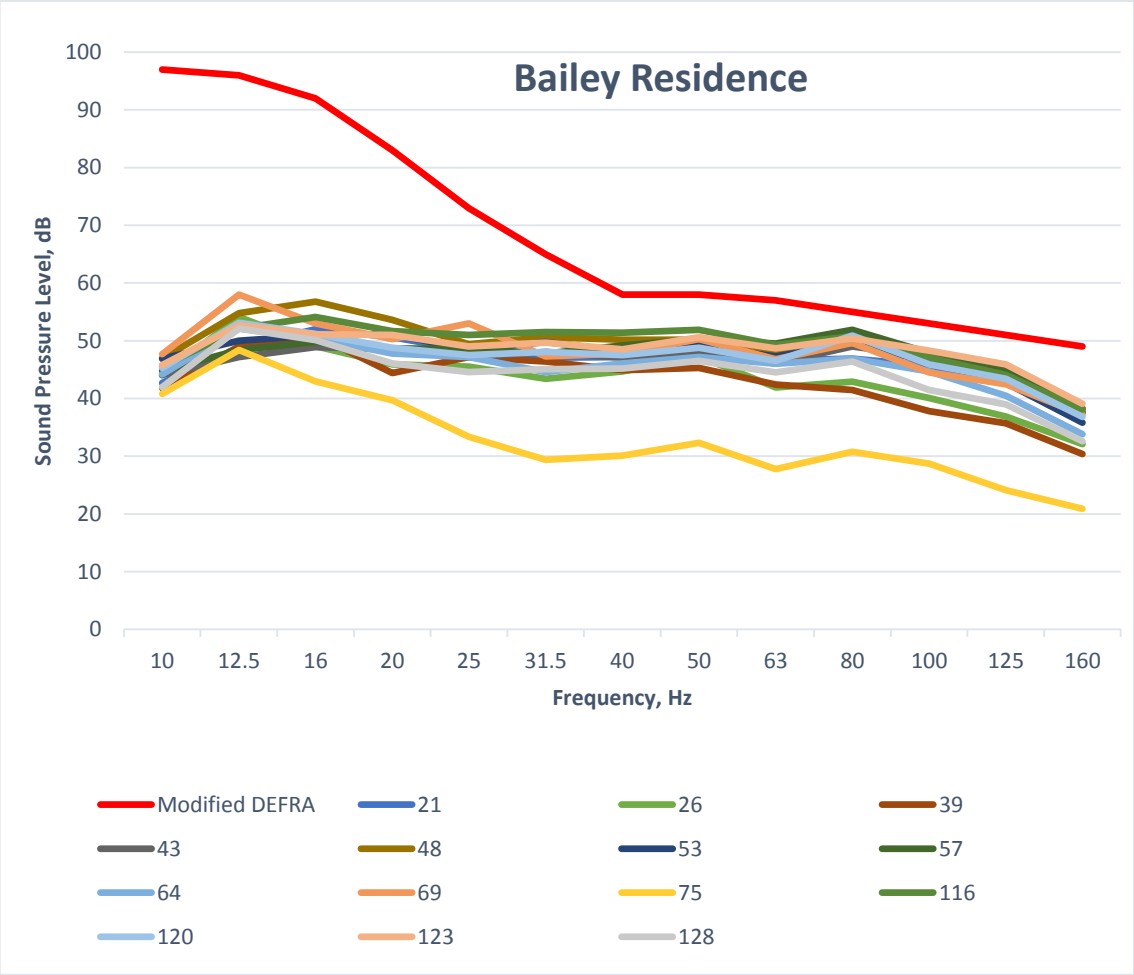
At the Bailey Residence the INP low frequency noise assessment criterion is exceeded for the majority of the noise measurements indicating the presence of low frequency noise and as such indicating further investigation is necessary.

It should be noted the assessment for low frequency has been based on overall measured noise levels as this is what would be perceived on site. Each mine would contribute a level less than that presented above. The noise contribution from any one mine would be at lease between 2 and 5 dB below the total level in dBC or the individual 1/3 octave band levels.

No exceedance of the Broner desirable criterion was found therefore indicating that low frequency noise is not at a level that would cause greater annoyance as compared to the L_{Aeq} level.

The results of the overall spectra noise monitoring from Appendix A for the Bailey Residence has been plotted against the modified DEFRA curve (Figure 6-1). The chart only includes valid monitoring data and it is observed the spectra has low frequency noise content however all measured levels are below the DEFRA low frequency modified noise curve.

Figure 6-1 Bailey Residence – measured low frequency noise spectra compared to DEFRA modified curve.



6.4.2 Low Frequency Noise Assessment for the Hanson Residence

The valid measured noise data for the Hanson Residence presented in Append A has been reviewed and the total L_{Aeq} , L_{Ceq} and the difference between the L_{Ceq} and the L_{Aeq} are presented in Table 6-6.

Table 6-6 Hanson Residence - Monitoring Data – Overall L_{Aeq}, L_{Ceq} and L_{Ceq} - L_{Aeq}

Measurement #	Location	L_{Aeq}	L_{Ceq}	L_{Ceq} - L_{Aeq}	INP Criterion	Broner Criterion, L_{Ceq}
17	Hanson	39.8	54.9	15.1	15	60-65
22	Hanson	38.1	57.4	19.3	15	60-65
27	Hanson	35.1	53.5	18.4	15	60-65
40	Hanson	34.9	55.3	20.4	15	60-65
44	Hanson	36.2	56.2	20	15	60-65
49	Hanson	37.4	57.7	20.3	15	60-65
54	Hanson	37.3	56.7	19.4	15	60-65
58	Hanson	42.6	60.3	17.7	15	60-65
60	Hanson	37.6	57.2	19.6	15	60-65
65	Hanson	39.6	59.4	19.8	15	60-65
67	Hanson	36.8	56.9	20.1	15	60-65
71	Hanson	36.3	55.6	19.3	15	60-65
76	Hanson	33.2	47.9	14.7	15	60-65

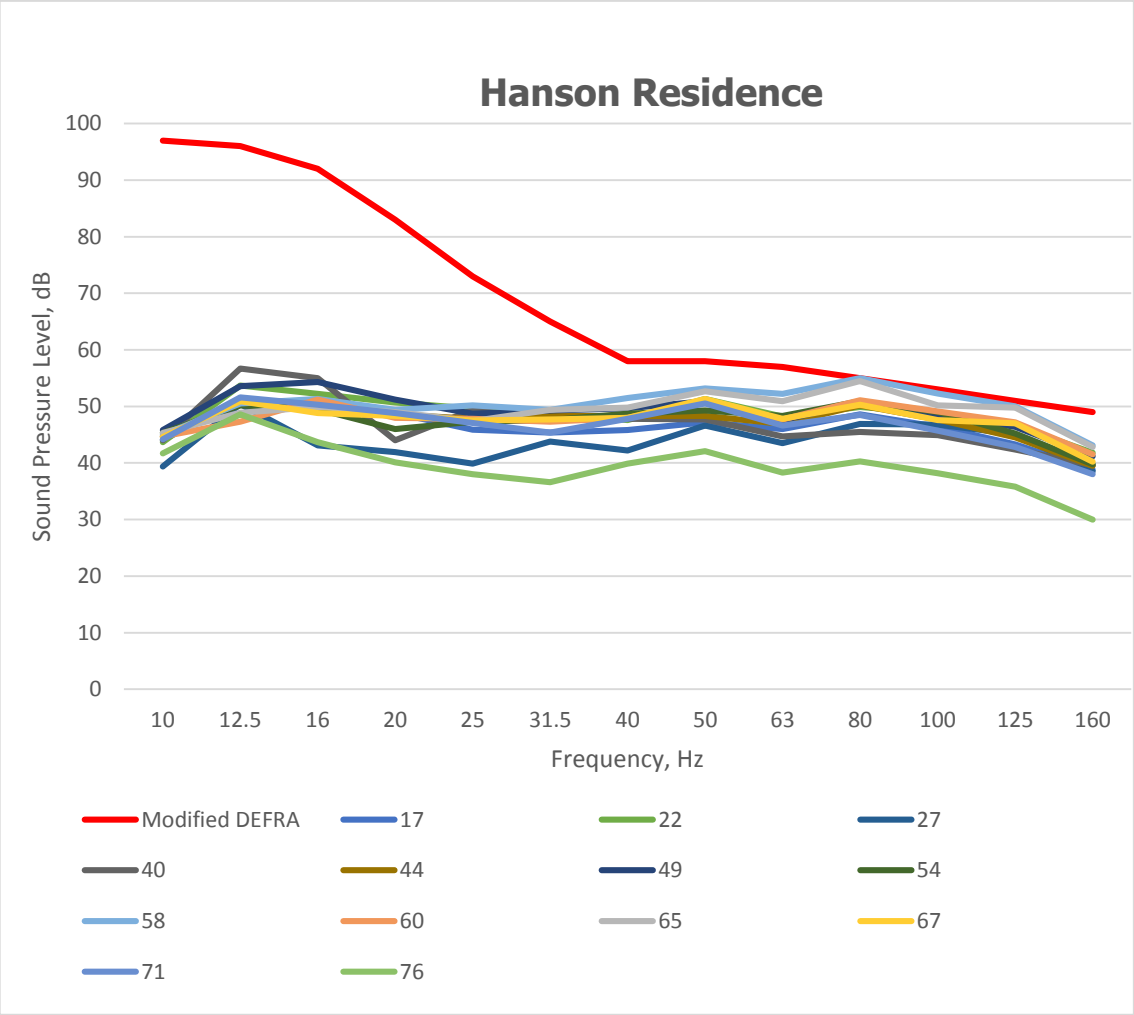
At the Hanson Residence the INP low frequency noise assessment criterion is exceeded for the majority of the noise measurements indicating the presence of low frequency noise and as such indicating further investigation is necessary.

It should be noted the assessment for low frequency has been based on overall measured noise levels as this is what would be perceived on site. Each mine would contribute a level less than that presented above. The noise contribution from any one mine would be at lease between 2 and 5 dB below the total level in dBC or the individual 1/3 octave band levels.

A single 0.3 dB exceedance of the Broner desirable criterion was found which is considered very minor. Overall the measurements indicate that low frequency noise is not at a level that would cause greater annoyance as compared to the L_{Aeq} level.

The results of the overall spectra noise monitoring from Appendix A for the Hanson Residence has been plotted against the modified DEFRA curve (Figure 6-2). The chart only includes valid monitoring data and it is observed the spectra has low frequency noise content however all measured levels are below the DEFRA low frequency modified noise curve.

Figure 6-2 Hanson Residence – measured low frequency noise spectra compared to DEFRA modified curve.



6.4.3 Low Frequency Noise Assessment for the Mitchell Residence

The valid measured noise data for the Mitchell Residence presented in Appendix A has been reviewed and the total L_{Aeq}, L_{Ceq} and the difference between the L_{Ceq} and the L_{Aeq} are presented in Table 6-7.

Table 6-7 Mitchell Residence - Monitoring Data – Overall L_{Aeq}, L_{Ceq} and L_{Ceq} - L_{Aeq}

Measurement #	Location	L_{Aeq}	L_{Ceq}	L_{Ceq} - L_{Aeq}	INP Criterion	Broner Criterion, L_{Ceq}
18	Mitchell	36.6	57.6	21	15	60-65
23	Mitchell	32.1	54.1	22	15	60-65
28	Mitchell	31.4	50.5	19.1	15	60-65
36	Mitchell	26.3	45.9	19.6	15	60-65
45	Mitchell	33.8	55.5	21.7	15	60-65
50	Mitchell	36.3	56.4	20.1	15	60-65
55	Mitchell	36.1	55.5	19.4	15	60-65
59	Mitchell	44.4	58.2	13.8	15	60-65
66	Mitchell	36.2	56.4	20.2	15	60-65
72	Mitchell	46.9	51	4.1	15	60-65
77	Mitchell	29	48.9	19.9	15	60-65
115	Mitchell	37.3	58.6	21.3	15	60-65
121	Mitchell	46.1	60	13.9	15	60-65
124	Mitchell	36.3	58	21.7	15	60-65
129	Mitchell	35.1	56.8	21.7	15	60-65

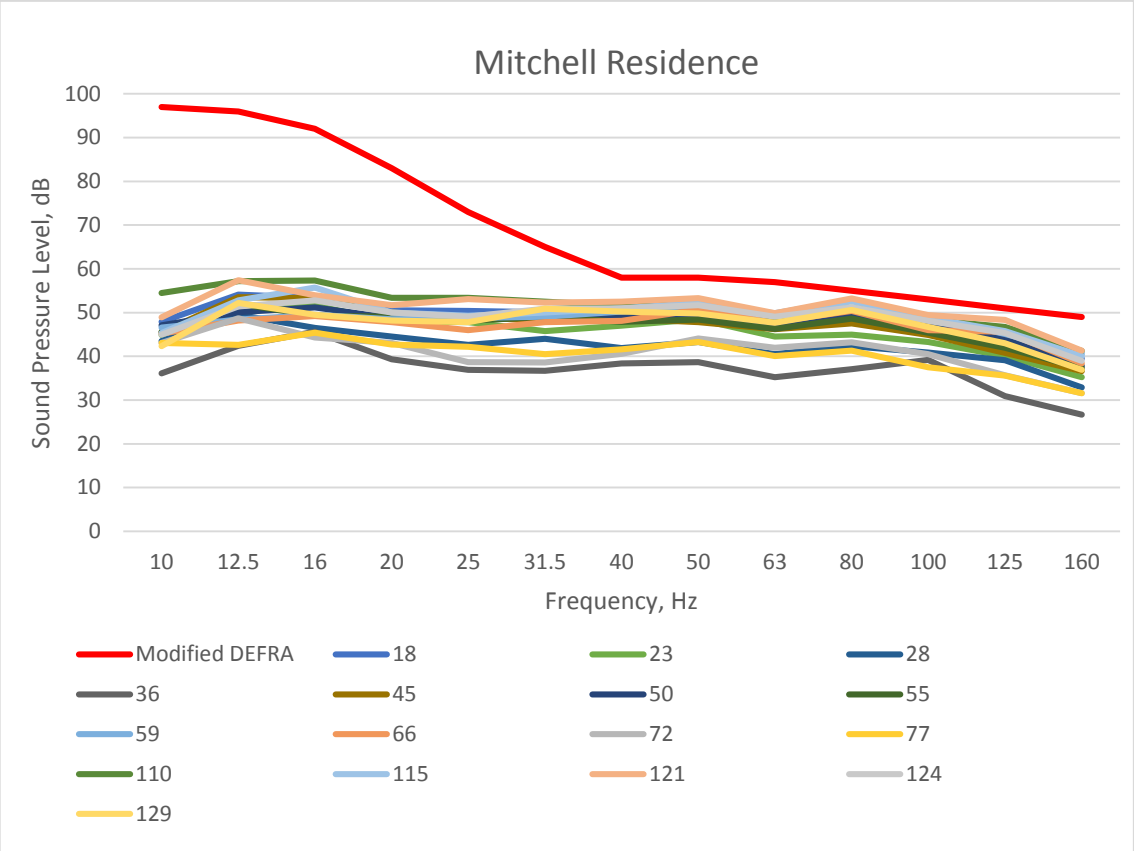
At the Mitchell Residence the INP low frequency noise assessment criterion is exceeded for the majority of the noise measurements indicating the presence of low frequency noise and as such indicating further investigation is necessary.

It should be noted the assessment for low frequency has been based on overall measured noise levels as this is what would be perceived on site. Each mine would contribute a level less than that presented above. The noise contribution from any one mine would be at lease between 2 and 5 dB below the total level in dBC or the individual 1/3 octave band levels.

No exceedance of the Broner desirable criterion was found therefore indicating that low frequency noise is not at a level that would cause greater annoyance as compared to the L_{Aeq} level.

The results of the overall spectra noise monitoring from Appendix A for the Mitchell Residence has been plotted against the modified DEFRA curve (Figure 6-3). The chart only includes valid monitoring data and it is observed the spectra has low frequency noise content however all measured levels are below the DEFRA low frequency modified noise curve.

Figure 6-3 Mitchell Residence – measured low frequency noise spectra compared to DEFRA modified curve.



6.4.4 Low Frequency Noise Assessment for the Leslie Residence

The valid measured noise data for the Leslie Residence presented in Appendix A has been reviewed and the total L_{Aeq}, L_{Ceq} and the difference between the L_{Ceq} and the L_{Aeq} are presented in Table 6-8.

Table 6-8 Leslie Residence - Monitoring Data – Overall L_{Aeq}, L_{Ceq} and L_{Ceq} - L_{Aeq}

Measurement #	Location	L_{Aeq}	L_{Ceq}	L_{Ceq} - L_{Aeq}	INP Criterion	Broner Criterion, L_{Ceq}
19	Leslie	34.2	54	19.8	15	60-65
24	Leslie	30.1	50.4	20.3	15	60-65
29	Leslie	25.8	45.3	19.5	15	60-65
37	Leslie	28.8	52.2	23.4	15	60-65
41	Leslie	33.3	53.4	20.1	15	60-65
46	Leslie	29.9	51.3	21.4	15	60-65
51	Leslie	32.6	53.9	21.3	15	60-65
61	Leslie	32.9	51.9	19	15	60-65
68	Leslie	35.2	55.6	20.4	15	60-65
73	Leslie	32	48.5	16.5	15	60-65
78	Leslie	27.2	48.6	21.4	15	60-65
108	Leslie	35.2	55.5	20.3	15	60-65
117	Leslie	34.3	54.9	20.6	15	60-65
118	Leslie	33.3	49.4	16.1	15	60-65
122	Leslie	33.1	52.3	19.2	15	60-65
126	Leslie	30.1	50.4	20.3	15	60-65

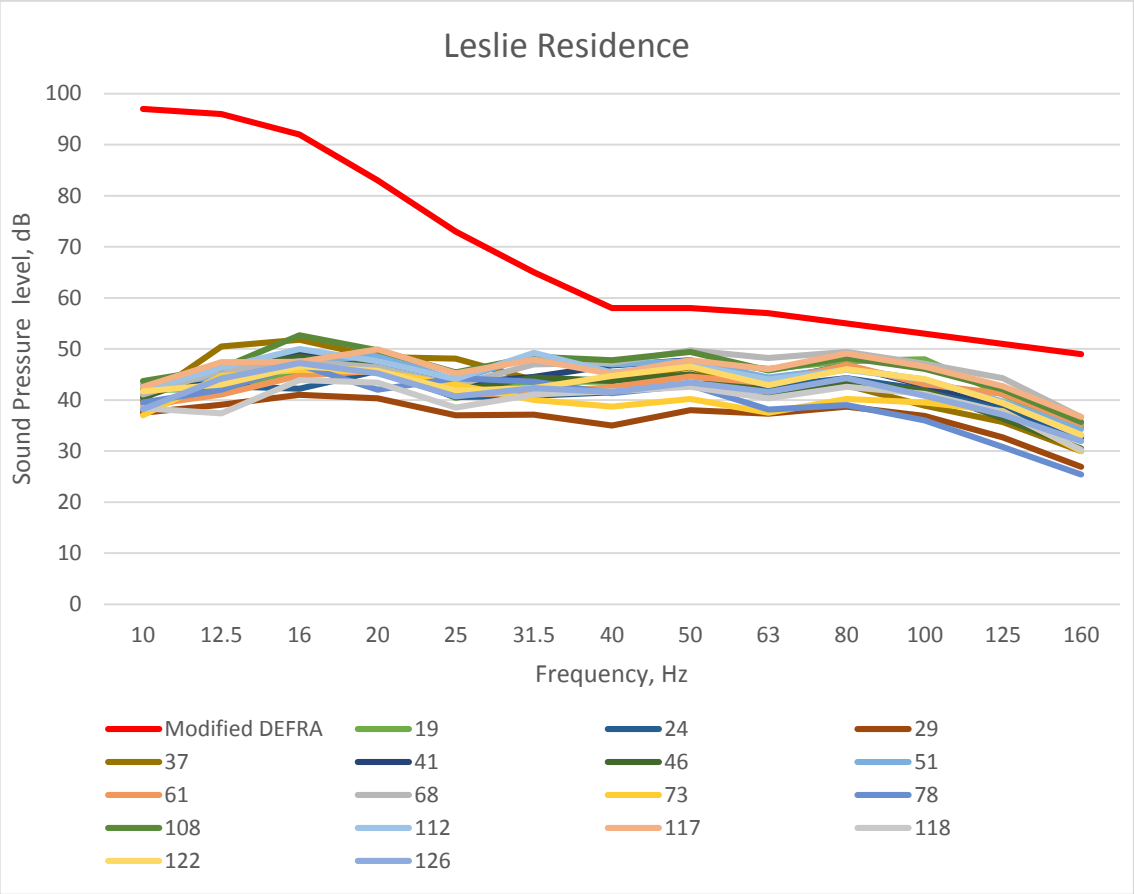
At the Leslie Residence the INP low frequency noise assessment criterion is exceeded for the majority of the noise measurements indicating the presence of low frequency noise and as such indicating further investigation is necessary.

It should be noted the assessment for low frequency has been based on overall measured noise levels as this is what would be perceived on site. Each mine would contribute a level less than that presented above. The noise contribution from any one mine would be at lease between 2 and 5 dB below the total level in dBC or the individual 1/3 octave band levels.

No exceedance of the Broner desirable criterion was found therefore indicating that low frequency noise is not at a level that would cause greater annoyance as compared to the L_{Aeq} level.

The results of the overall spectra noise monitoring from Appendix A for the Leslie Residence has been plotted against the modified DEFRA curve (Figure 6-4). The chart only includes valid monitoring data and it is observed the spectra has low frequency noise content however all measured levels are below the DEFRA low frequency modified noise curve.

Figure 6-4 Leslie Residence – measured low frequency noise spectra compared to DEFRA modified curve.



6.4.5 Low Frequency Noise Assessment for the Krey Residence

The valid measured noise data for the Krey Residence presented in Appendix A has been reviewed and the total L_{Aeq}, L_{Ceq} and the difference between the L_{Ceq} and the L_{Aeq} are presented in Table 6-9.

Table 6-9 Krey Residence - Monitoring Data – Overall L_{Aeq}, L_{Ceq} and L_{Ceq} - L_{Aeq}

Measurement #	Location	L_{Aeq}	L_{Ceq}	L_{Ceq} - L_{Aeq}	INP Criterion	Broner Criterion, L_{Ceq}
20	Krey	37.7	59	21.3	15	60-65
25	Krey	34.6	55.6	21	15	60-65
30	Krey	35.6	54.6	19	15	60-65
38	Krey	29.9	55	25.1	15	60-65
42	Krey	36.2	56.5	20.3	15	60-65
47	Krey	35.4	55.5	20.1	15	60-65
52	Krey	34.3	54.9	20.6	15	60-65
56	Krey	36.5	56.9	20.4	15	60-65
62	Krey	37.8	59.6	21.8	15	60-65
63	Krey	35.3	57.1	21.8	15	60-65
74	Krey	34.1	54.1	20	15	60-65
79	Krey	33.2	52.1	18.9	15	60-65
88	Krey	35.1	51.8	16.7	15	60-65
105	Krey	39.1	60.3	21.2	15	60-65
114	Krey	38.2	57.9	19.7	15	60-65
119	Krey	37.4	56.1	18.7	15	60-65
125	Krey	34.9	55.5	20.6	15	60-65
127	Krey	34.7	55.6	20.9	15	60-65

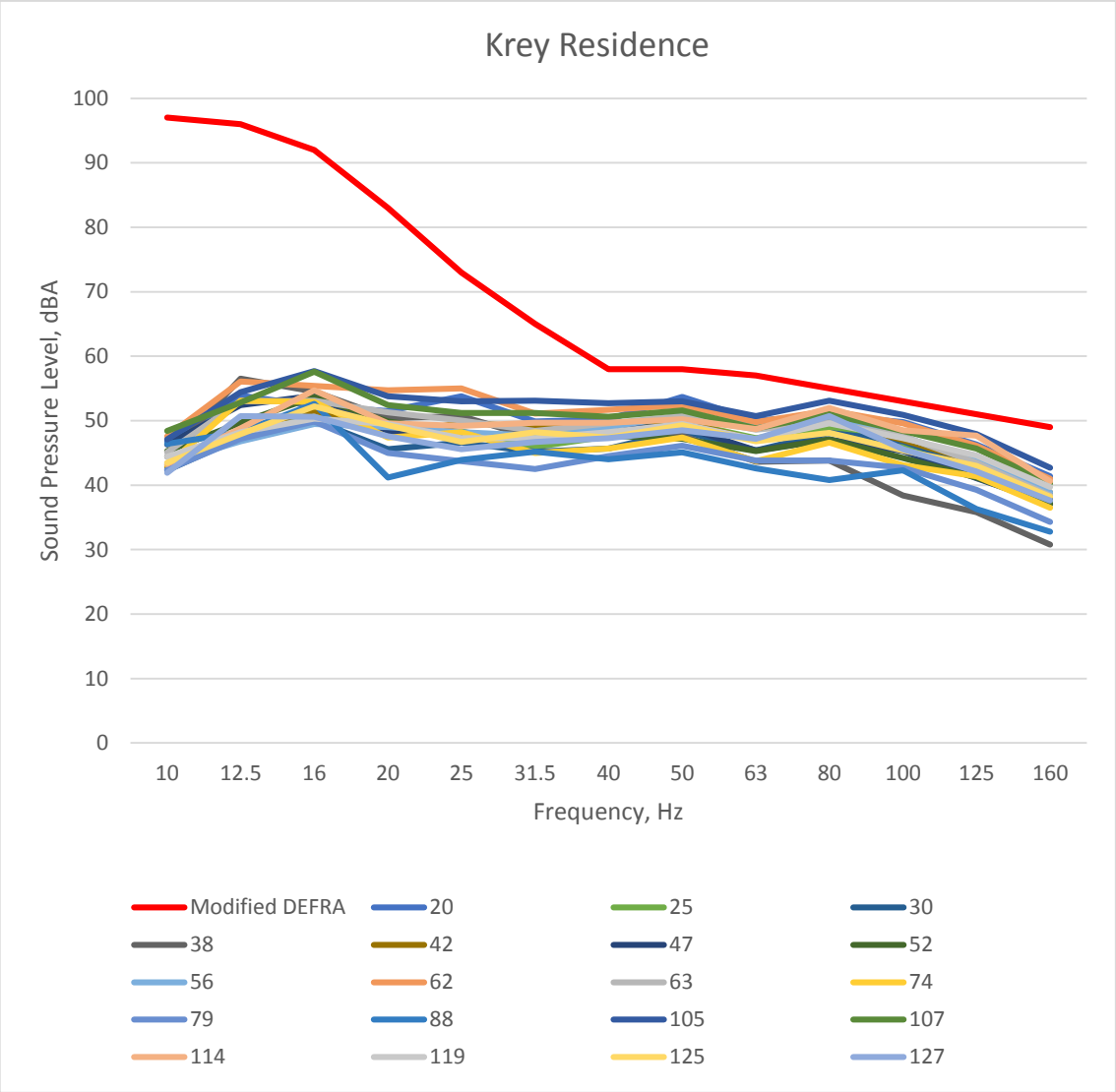
At the Krey Residence the INP low frequency noise assessment criterion is exceeded for the majority of the noise measurements indicating the presence of low frequency noise and as such indicating further investigation is necessary.

It should be noted the assessment for low frequency has been based on overall measured noise levels as this is what would be perceived on site. Each mine would contribute a level less than that presented above. The noise contribution from any one mine would be at lease between 2 and 5 dB below the total level in dBC or the individual 1/3 octave band levels.

A single 0.3 dB exceedance of the Broner desirable criterion was found which is considered very minor. Overall the measurements indicate that low frequency noise is not at a level that would cause greater annoyance as compared to the L_{Aeq} level.

The results of the overall spectra noise monitoring from Appendix A for the Krey Residence has been plotted against the modified DEFRA curve (Figure 6-5). The chart only includes valid monitoring data and it is observed the spectra has low frequency noise content however all measured levels are below the DEFRA low frequency modified noise curve.

Figure 6-5 Krey Residence – measured low frequency noise spectra compared to DEFRA modified curve.



7 CONCLUSION

Wilkinson Murray has conducted a 10 day audit of mine noise at a number of locations in and around Bulga Village. The focus of the audit was to determine noise levels at sensitive receivers from the Warkworth and Mount Thorley coal mines, owned by Rio Tinto.

During the audit, a total of 129 attended noise measurements were conducted. On four occasions, the estimated contribution from Warkworth mine exceeded the criteria at sensitive receivers. On each of these occasions, repeat measurements conducted approximately one hour afterwards indicated that noise levels from Warkworth mine had reduced to below the criteria.

It was found for all five residences the INP criterion for L_{Ceq} - L_{Aeq} is exceeded for the majority of the noise measurements indicating the presence of low frequency noise and as such indicating further investigation is necessary.

Two very minor exceedances of up to 0.3dB were measured of the Broner desirable criterion.

The results of the overall spectra noise monitoring from Appendix A for all five residences have been plotted against the modified DEFRA curve. It has been observed the spectra have low frequency noise content however all measured levels were below the DEFRA low frequency modified noise curve.

The results indicate that low frequency noise is a feature of the area, however the levels are below the Broner and DEFRA assessment criteria that would indicate a low frequency impact.

APPENDIX A

NOISE MEASUREMENT RESULTS

Table A-7-1 Measurement Results - Broadband

Meas. No.	Date	Time	Location	Wind Speed (m/s)	Wind Direction	Rain (mm)	Total Noise Levels			Mine Noise Levels (L_{Aeq})				
							L_{Aeq}	L_{Ceq}	L_{Aeq} - L_{Ceq}	All	Wambo	WML*	MTO*	Bulga
1	13/03/2015	8:25pm	1 - Bailey	3.3	175.6	0	46	53	7	26	-	25	20	-
2	13/03/2015	9:00pm	2 - Hanson	3.8	174.3	0	32	54	22	30	-	28	25	-
3	13/03/2015	9:30pm	3 - Mitchell	4.5	173.7	0	38	58	20	32	-	27	30	-
4	13/03/2015	10:30pm	4 - Leslie	3.8	175.2	0	40	62	22	40	-	37	37	-
5	13/03/2015	11:15pm	5 - Krey	3.9	174.8	0	40	59	19	37	-	33	35	-
6	14/03/2015	12:00am	1 - Bailey	4	173.1	0	38	58	20	35	-	32	32	-
7	14/03/2015	12.30am	2 - Hanson	4.5	173.9	0	35	56	21	33	-	30	30	-
8	14/03/2015	1:00am	3 - Mitchell	4.4	175.4	0	36	57	21	33	-	28	28	28
9	14/03/2015	1:30am	4 - Leslie	3.8	173.8	0	38	60	21	38	-	35	35	-
10	14/03/2015	2:00am	5 - Krey	3.6	181.3	0	43	61	19	40	-	35	35	29
11	14/03/2015	2:45am	4 - Leslie	3.7	184.2	0	41	62	21	40	-	37	37	-
12	14/03/2015	4:15am	1 - Bailey	3.2	190.2	0	36	55	19	29	-	27	25	-
13	14/03/2015	4:45am	2 - Hanson	3.3	185.8	0	34	55	22	33	-	30	30	-
14	14/03/2015	5:10am	3 - Mitchell	3.2	191.4	0	35	57	22	34	-	30	30	27
15	14/03/2015	5:45am	4 - Leslie	3.7	195.5	0	37	59	22	37	-	34	34	-
16	14/03/2015	6:15am	5 - Krey	3.5	195	0	40	61	21	38	-	35	33	30
17	14/03/2015	8:15pm	2 - Hanson	3	93.2	0	40	55	15	34	27	30	30	-
18	14/03/2015	8:45pm	3 - Mitchell	2.7	100.3	0	37	58	21	36	-	30	34	27
19	14/03/2015	9:15pm	4 - Leslie	1.9	152.8	0	34	54	20	34	-	27	33	-
20	14/03/2015	10:00pm	5 - Krey	1.5	167.4	0	38	59	21	38	-	30	36	31
21	14/03/2015	11:05pm	1 - Bailey	1.7	206.7	0	36	55	19	34	26	32	27	-
22	15/03/2015	12:00am	2 - Hanson	1.6	181.7	0	38	57	19	36	31	32	31	-
23	15/03/2015	12:30am	3 - Mitchell	0.9	171.2	0	32	54	22	31	24	20	30	-

24	15/03/2015	1:00am	4 - Leslie	0.3	338.2	0	30	50	20	30	-	25	28	-
25	15/03/2015	1:30am	5 - Krey	0.9	273.5	0	35	56	21	34	-	26	32	26
26	15/03/2015	2:30am	1 - Bailey	1.8	295.5	0	31	52	21	29	24	27	20	-
27	15/03/2015	4:30am	2 - Hanson	1	213.8	0	35	54	18	34	-	33	27	-
28	15/03/2015	5:00am	3 - Mitchell	1.4	190	0	31	51	19	30	-	25	28	-
29	15/03/2015	5:30am	4 - Leslie	1.4	229	0	26	45	20	25	-	18	24	-
30	15/03/2015	6:15am	5 - Krey	1.1	222.8	0	36	55	19	35	-	30	32	27
31	15/03/2015	8:22pm	3 - Mitchell	5	149.3	0	43	52	9	27	-	20	26	-
32	15/03/2015	8:45pm	4 - Leslie	5.1	172.2	0	38	51	13	31	-	24	30	-
33	15/03/2015	9:45pm	5 - Krey	3.6	167.4	0	40	55	15	35	-	30	30	30
34	15/03/2015	10:25pm	1 - Bailey	3.2	154.6	0	37	45	8	24	-	23	17	-
35	15/03/2015	10:45pm	2 - Hanson	3.4	167	0	31	46	15	25	-	18	24	-
36	16/03/2015	3:28am	3 - Mitchell	2.8	173	0	26	46	20	24	-	-	-	24
37	16/03/2015	4:00am	4 - Leslie	3.3	172.5	0	29	52	23	28	-	-	25	25
38	16/03/2015	4:30am	5 - Krey	1.8	177	0	30	55	25	29	-	-	26	26
39	16/03/2015	5:30am	1 - Bailey	2.3	168.1	0	31	52	21	29	-	19	24	27
40	16/03/2015	6:00am	2 - Hanson	2.5	171	0	35	55	20	34	-	20	31	31
41	16/03/2015	8:15pm	4 - Leslie	2.8	125.7	0	33	53	20	32	-	25	30	24
42	16/03/2015	8:45pm	5 - Krey	2.4	119	0	36	57	20	36	-	28	34	29
43	16/03/2015	10:25pm	1 - Bailey	1.7	135.3	0	39	55	17	36	-	35	30	-
44	16/03/2015	11:00pm	2 - Hanson	2.2	123.3	0	36	56	20	36	-	35	30	-
45	16/03/2015	11:30pm	3 - Mitchell	2	134.9	0	34	56	22	33	-	28	31	-
46	17/03/2015	12:00am	4 - Leslie	1.9	149.8	0	30	51	21	29	-	21	27	21
47	17/03/2015	12:45am	5 - Krey	1.7	188.1	0	35	56	20	35	-	31	31	28
48	17/03/2015	1:45am	1 - Bailey	2.4	201.7	0	37	58	21	37	30	33	33	-
49	17/03/2015	2:15am	2 - Hanson	2.4	185	0	37	58	20	37	-	35	32	-
50	17/03/2015	2:40am	3 - Mitchell	2.7	192.6	0	36	56	20	36	-	33	30	30

51	17/03/2015	4:00am	4 - Leslie	2.9	180.7	0	33	54	21	32	-	25	31	-
52	17/03/2015	4:30am	5 - Krey	2.6	189.3	0	34	55	21	34	-	28	31	27
53	17/03/2015	5:00am	1 - Bailey	2.7	184.5	0	36	56	21	35	-	34	28	-
54	17/03/2015	5:45am	2 - Hanson	2.6	190.5	0	37	57	19	37	-	35	33	-
55	17/03/2015	6:10am	3 - Mitchell	2.5	188.2	0	36	56	19	35	-	30	33	-
56	17/03/2015	8:15pm	5 - Krey	2.2	116.8	0	37	57	20	35	-	30	32	27
57	17/03/2015	8:50pm	1 - Bailey	1.7	135.5	0	42	57	16	36	30	33	30	-
58	17/03/2015	9:45pm	2 - Hanson	1.4	134.4	0	43	60	18	40	-	39	33	-
59	17/03/2015	10:25:pm	3 - Mitchell	1.5	141	0	44	58	14	37	-	36	30	-
60	17/03/2015	11:00pm	2 - Hanson	1.4	121.6	0	38	57	20	37	29	35	30	-
61	17/03/2015	11:30pm	4 - Leslie	1.5	169.6	0	33	52	19	32	-	31	25	-
62	18/03/2015	12:00am	5 - Krey	1.5	179.7	0	38	60	22	38	-	37	32	-
63	18/03/2015	1:15am	5 - Krey	1.6	110.3	0	35	57	22	35	-	34	28	-
64	18/03/2015	1:50am	1 - Bailey	0.3	249.3	0	39	54	16	31	28	28	-	-
65	18/03/2015	3:45am	2 - Hanson	1.2	212.7	0	40	59	20	39	-	39	-	-
66	18/03/2015	4:15am	3 - Mitchell	0.9	13.2	0	36	56	20	36	-	36	-	-
67	18/03/2015	5:00am	2 - Hanson	1.4	195	0	37	57	20	36	-	35	29	-
68	18/03/2015	5:30am	4 - Leslie	1	176.1	0	35	56	20	35	-	34	28	-
69	18/03/2015	6:05am	1 - Bailey	0.7	212	0	38	57	19	34	29	32	-	-
70	18/03/2015	8:18pm	1 - Bailey	3.6	333.9	0	42	53	11	30	30	-	-	-
71	18/03/2015	9:15pm	2 - Hanson	1.4	300.5	0	36	56	19	33	32	26	-	-
72	18/03/2015	9:50pm	3 - Mitchell	1.2	212	0	47	51	4	28	20	27	-	-
73	18/03/2015	10:30pm	4 - Leslie	2.3	185.4	0	32	49	17	27	-	27	-	-
74	18/03/2015	11:30pm	5 - Krey	2.7	190.7	0	34	54	20	32	-	29	26	25
75	19/03/2015	1:35am	1 - Bailey	3	175.6	0	43	45	2	16	-	-	-	-
76	19/03/2015	2:45am	2 - Hanson	2.6	173.6	0	33	48	15	26	21	21	21	-
77	19/03/2015	3:45am	3 - Mitchell	2.5	208	0	29	49	20	27	-	23	23	20

78	19/03/2015	5:15am	4 - Leslie	1	271.7	0	27	49	21	24	-	-	24	-
79	19/03/2015	6:00am	5 - Krey	0.6	38.3	0	33	52	19	32	-	-	30	27
80	20/03/2015	8:15pm	2 - Hanson	5.3	161.1	0	48	54	5	35	-	32	32	-
81	20/03/2015	8:30pm	3 - Mitchell	5.4	162.8	0	43	60	17	33	-	30	30	-
82	20/03/2015	8:45pm	4 - Leslie	4.7	155.3	0	38	48	10	31	-	-	28	28
83	20/03/2015	9:30pm	5 - Krey	4.9	159	0	42	50	8	37	-	34	34	-
84	20/03/2015	10:25pm	1 - Bailey	6.7	170.1	0	43	50	7	35	-	32	32	-
85	21/03/2015	2:15am	2 - Hanson	4.6	172.9	0	35	50	15	30	-	-	29	23
86	21/03/2015	2:45am	3 - Mitchell	3.5	173.7	0	39	55	16	31	-	-	31	-
87	21/03/2015	3:15am	4 - Leslie	3.5	172.5	0	34	54	20	33	-	32	26	-
88	21/03/2015	4:00am	5 - Krey	2.8	164.8	0	35	52	17	31	-	-	31	-
89	21/03/2015	4:30am	1 - Bailey	3.6	171.1	0	38	51	13	28	-	-	28	-
90	21/03/2015	5:30am	2 - Hanson	3.1	168.4	0	35	53	18	33	-	-	33	-
91	21/03/2015	6:00am	3 - Mitchell	3.3	163.7	0	34	55	21	32	-	-	32	-
92	21/03/2015	8:15pm	3 - Mitchell	3.8	162.5	0	43	51	9	27	-	-	26	20
93	21/03/2015	8:45pm	4 - Leslie	3.5	160.4	0	31	49	18	27	-	-	27	-
94	21/03/2015	9:30pm	5 - Krey	4.7	163.7	0	39	59	19	36	-	-	36	-
95	21/03/2015	10:00pm	1 - Bailey	3.7	160.9	0	38	57	19	35	-	32	32	-
96	21/03/2015	11:00pm	3 - Mitchell	3.3	177.1	0	43	60	17	38	-	36	30	30
97	21/03/2015	11:30pm	4 - Leslie	3.7	175.3	0	38	59	22	38	-	36	33	-
98	22/03/2015	12:00am	5 - Krey	4	174.2	0	36	59	23	35	-	31	31	28
99	22/03/2015	12:45am	4 - Leslie	3.9	173.8	0	36	58	21	36	-	35	29	-
100	22/03/2015	1:15am	1 - Bailey	3.6	171.9	0	39	57	19	34	-	33	27	-
101	22/03/2015	3:50am	3 - Mitchell	5	173.6	0	40	58	18	35	-	28	31	31
102	22/03/2015	4:30am	4 - Leslie	4.3	175.2	0	38	59	21	37	-	34	34	-
103	22/03/2015	5:00am	5 - Krey	4.7	179.2	0	40	59	19	38	-	30	35	33
104	22/03/2015	5:40am	1 - Bailey	4.2	176.4	0	39	57	18	35	-	30	33	-

105	22/03/2015	8:30pm	5 - Krey	2.7	153.7	0	39	60	21	39	-	38	32	-
106	22/03/2015	9:05pm	1 - Bailey	3.8	144.2	0	41	57	17	37	-	37	-	-
107	22/03/2015	9:45pm	5 - Krey	3.4	134.4	0	37	59	21	37	-	35	32	28
108	22/03/2015	10:15pm	4 - Leslie	2.6	146.6	0	35	56	20	35	-	34	28	-
109	22/03/2015	10:50pm	3 - Mitchell	3.2	141.1	0	42	61	19	40	-	38	32	32
110	23/03/2015	12:00am	3 - Mitchell	3.5	124	0	42	60	18	37	-	36	30	-
111	23/03/2015	12:35am	1 - Bailey	3.2	119.6	0	38	58	19	37	-	36	30	-
112	23/03/2015	1:15am	4 - Leslie	3.2	118.9	0	32	54	21	32	-	31	25	-
113	23/03/2015	1:45am	5 - Krey	3.1	129.4	0	38	59	21	38	-	36	30	30
114	23/03/2015	3:00am	5 - Krey	1.5	125.8	0	38	58	20	38	-	34	34	30
115	23/03/2015	3:35am	3 - Mitchell	1.3	101	0	37	59	21	37	-	35	32	-
116	23/03/2015	4:05am	1 - Bailey	1.1	202.6	0	38	58	21	37	-	36	30	-
117	23/03/2015	4:45am	4 - Leslie	0.3	155.9	0	34	55	21	34	-	31	31	-
118	23/03/2015	8:00pm	4 - Leslie	2.2	52	0	33	49	16	29	-	26	26	-
119	23/03/2015	8:30pm	5 - Krey	1.8	124.3	0	37	56	19	35	-	33	30	-
120	23/03/2015	9:05pm	1 - Bailey	1.4	148.4	0	42	56	14	35	-	34	28	-
121	23/03/2015	9:35pm	3 - Mitchell	1	155.8	0	46	60	14	38	-	37	31	-
122	23/03/2015	11:00pm	4 - Leslie	1.9	151.3	0	33	52	19	32	-	31	25	-
123	23/03/2015	11:55pm	1 - Bailey	0.7	125.7	0	40	57	17	37	30	36	-	-
124	24/03/2015	12:30am	3 - Mitchell	1.8	160.8	0	36	58	22	36	25	34	28	28
125	24/03/2015	1:00am	5 - Krey	1.5	133.1	0	35	56	21	34	-	33	27	-
126	24/03/2015	3:30am	4 - Leslie	1.2	263.9	0	30	50	20	29	-	28	22	-
127	24/03/2015	4:15am	5 - Krey	1.3	340.3	0	35	56	21	34	-	33	27	-
128	24/03/2015	4:45am	1 - Bailey	1.1	271.6	0	34	53	19	31	22	29	23	-
129	24/03/2015	5:20am	3 - Mitchell	0.6	299.4	0	35	57	22	35	-	35	-	-

Table A-7-2 Measurement Results – 1/3 Octaves

Meas. No.	Date	Time	Location	L_{Leq} (at 1/3 octave band centre frequencies)																																		L_{Aeq}
				6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k	
1	13/03/2015	8:25pm	1 - Bailey	42.4	40.2	42.1	51	53.8	43.6	49	48.5	45.6	44.5	39.8	40	37.8	34.7	30.5	26.4	24.3	22.7	0	0	0	0	0	0	0	0	0	40.6	43.1	0	0	0	0	0	0	0	46.4
2	13/03/2015	9:00pm	2 - Hanson	43.1	40.7	40.4	51.5	56.5	43.1	49.1	46.9	46.5	46.3	42.4	43.2	41.5	39.6	35.3	30.8	27.4	24	0	0	0	0	0	0	0	0	0	0	21.2	0	0	0	0	0	0	0	32.3
3	13/03/2015	9:30pm	3 - Mitchell	60.7	58	55.6	57.3	59.3	47.5	54	51.6	49.8	49.8	46.4	46	43.6	40.8	37.2	30.7	27.6	24.3	0	0	0	0	0	0	0	0	30.8	31.7	21.2	0	0	0	0	0	0	0	37.7
4	13/03/2015	10:30pm	4 - Leslie	45.6	42.9	46.5	55.3	56.5	53.9	53.3	56.3	53.7	55.5	51.8	53	53.4	48.8	41.9	37.2	37.5	35.7	30.2	26.8	22.2	0	0	0	0	0	0	0	22.3	0	0	0	0	0	0	0	40.1
5	13/03/2015	11:15pm	5 - Krey	60.3	58.2	55.8	59	60.8	50.6	54.8	51.7	52.5	50.9	48.2	48.3	47.4	44.1	39.6	33.9	32	31.9	31.2	30.1	29.5	28.8	28	26.9	26.1	25.6	25.9	26.5	26.9	25.2	24.2	21.9	0	23.9	22.5	0	40.1
6	14/03/2015	12:00am	1 - Bailey	56.3	54	52	55.3	55.8	51	51.9	50.5	50.7	50	47.1	47.4	47.4	43.4	37.3	32.7	32.3	30.2	27.5	27.2	23.4	0	0	0	0	0	0	23.6	26.2	0	0	0	0	33.3	36.1	30.7	38
7	14/03/2015	12.30am	2 - Hanson	45.7	42.8	43.7	52.2	58.3	46.1	49.9	49	46.8	46.9	43.2	45.3	43.5	43.5	39	34	29.9	26.7	23.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21.5	0	0	34.6
8	14/03/2015	1:00am	3 - Mitchell	54.1	51.7	50	56.1	59.8	46.6	50.6	50.1	48.2	48.8	45.1	46.3	44.3	41.9	38.2	31.3	29	25.4	22.9	22	19.5	17.1	15	13.6	12.4	13.7	30.6	21.4	22.4	13.9	0	0	0	11.6	13.9	36
9	14/03/2015	1:30am	4 - Leslie	47	43.2	45.7	52.4	55.8	53.6	51	53.2	51	54.8	49.8	51.4	48.9	47.1	40.4	35.6	34.1	32.8	28.7	26.3	22.8	21.7	20.8	20.1	19.9	19.6	20.2	20.4	21.2	17.1	15.1	12.3	0	0	0	0	38.3
10	14/03/2015	2:00am	5 - Krey	60.5	58.5	56.2	59.8	60.3	53.1	55.5	53.3	54.1	54.4	50.7	51.8	49.3	47	41.8	37.2	36.4	35.6	33.8	33.1	32.1	31.1	30.2	29.3	28.4	27.9	28	28.6	28.7	27.9	27	25.5	23.4	24.3	21.8	13.5	42.6
11	14/03/2015	2:45am	4 - Leslie	44.6	42.3	45.4	56	57.7	54.9	52.2	55.3	52.7	55.5	51.7	54	53.5	50.7	43.3	36.7	35.8	35.4	30.4	26.5	22.1	20	18.3	17.6	17.1	16.7	18	18.5	19.6	12.6	0	0	0	0	0	0	40.5
12	14/03/2015	4:15am	1 - Bailey	40.8	39.7	43.4	52.7	54.9	52.6	49.6	48.5	47.7	47.2	42.3	42.8	38.8	35.7	30.4	25.1	24.9	24.1	21.1	20.6	17.7	14.8	0	0	0	0	0	29.3	31.4	0	0	0	0	0	0	0	35.8
13	14/03/2015	4:45am	2 - Hanson	47.8	44.3	44.7	54	57	48.1	50.2	48.2	47.2	47.9	43.4	45.7	42.9	42.4	37.7	34.6	31.6	27.8	23	21	18.5	16.7	14.1	12	14.5	19.3	13.9	18.3	18.9	0	0	0	0	0	0	0	33.9
14	14/03/2015	5:10am	3 - Mitchell	54.2	50.9	49.9	54.9	55.7	46.6	53	49.9	50.1	49.6	46.3	47.9	46.3	44	38.9	32.2	31	27.2	24	22.7	20.2	17.9	15.6	14.3	15	14	15.2	14.2	14.1	0	0	0	13.2	11.9	0	0	34.8
15	14/03/2015	5:45am	4 - Leslie	44.7	41.8	46	54.5	57.2	54.4	52.4	53.3	51.1	51.5	49.2	50.6	48.9	45.7	40.7	34.5	32.6	33.2	29.3	24.4	19.5	15.8	13.7	12	12.6	11.9	12	16.2	15.6	0	0	0	0	0	0	0	37
16	14/03/2015	6:15am	5 - Krey	54.9	53.3	51.4	59.6	63.9	52.1	55.4	53.6	53.2	53.6	49.9	51.2	49.5	45.8	40.8	35.7	33.9	33.4	31.9	30.1	29	27.7	26.7	25.8	25	24.6	24.5	25.6	25.8	23.7	22.4	0	0	0	0	0	40.2
17	14/03/2015	8:15pm	2 - Hanson	40.8	40.2	44.1	51.1	50.3	48.8	45.9	45.4	45.8	47.2	46	48.6	46.4	43.3	38.8	34.2	29.5	25.5	23.6	24.2	21.9	20	16.8	16.2	20.7	26.2	18.1	23	28.3	19.9	14.6	29.2	37.9	33.2	17	0	39.8
18	14/03/2015	8:45pm	3 - Mitchell	44.7	43.6	47.9	54.1	53.4	50.5	50.4	50.1	50.4	51.5	48.5	49.9	47	45	39.5	33	29.7	28.1	26.7	27.2	24	20	16.4	14	12.3	0	24.1	17.5	25.2	12.7	0	0	11.6	0	0	0	36.6
19	14/03/2015	9:15pm	4 - Leslie	40.9	37.4	42	42.1	45.8	47	40.4	43.6	43.6	47.6	46.1	47.6	48	41.1	34.8	30.3	29.1	29.1	25.6	20.5	16	14.8	11.7	0	0	0	0	20	22.5	0	0	0	0	0	0	0	34.2
20	14/03/2015	10:00pm	5 - Krey	45.9	43.1	46.8	53.9	52.3	51.5	53.8	49.9	50.2	53.7	50	50.8	49.8	46.3	41.4	36.2	33.3	31.4	27	27.9	24.9	19.7	14.8	11.5	0	0	0	19.5	21.5	0	16.2	0	0	0	0	0	37.7
21	14/03/2015	11:05pm	1 - Bailey	40	40.4	42.7	48.8	52	50.6	48.3	47.1	47.2	49.4	46.6	46.9	45.7	42.6	37.6	32.5	28.3	27.2	25.3	25.5	23.5	19.9	16.7	14.1	11.4	11.7	12.7	26.7	29.3	0	0	0	0	15.5	18.3	0	36.4
22	15/03/2015	12:00am	2 - Hanson	40.5	39.7	43.7	53.7	52.2	50.7	49.6	48.7	47.6	51.3	48.2	49.9	48.8	46.6	41.8	34.7	30.1	27.6	25.5	23.9	21.8	19.4	17.6	17	22.8	29.8	22.1	19.3	19.6	11.1	0	0	0	0	0	0	38.1
23	15/03/2015	12:30am	3 - Mitchell	41.8	39.9	44.9	51.7	51.6	48	47.8	45.8	47	48.5	44.5	45	43.3	40.1	35.2	28.6	25.5	24.5	22.9	23.3	20.1	15.9	12.2	0	0	0	0	0	17.9	0	0	0	0	0	0	0	32.1
24	15/03/2015	1:00am	4 - Leslie	38.9	35.8	38	42.7	42.2	45.7	40.6	40.8	41.5	43.3	42.6	44.3	42	38.5	32.6	26.6	23.9	24.9	22.2	16.8	0	0	0	0	0	0	0	14.4	15.2	0	0	0	0	0	0	0	30.1
25	15/03/2015	1:30am	5 - Krey	42.9	40.8	43.1	48	50.6	47.8	48.3	45.9	47.6	49.8	47.3	48.9	46.2	43	37.5	31.9	29.6	26.6	25.1	25.6	22.9	17.8	13.1	0	0	0	0	16	16	0	14.3	0	0	0	0	0	34.6
26	15/03/2015	2:30am	1 - Bailey	38.2	39.1	44	54.1	49.1	45.9	45.5	43.4	44.7	47.3	41.9	42.9	40.1	36.9	32.1	26.5	24.2	24.2	22.9	22.6	19.8	16.8	15.1	0	0	14	0	18.2	19	0	0	0	0	0	0	0	30.9
27	15/03/2015	4:30am	2 - Hanson	36.8	36.9	39.4	50.4	43.1	41.9	39.9	43.8	42.2	46.6	43.5	46.9	46.8	45.1	38.5	29.8	26.5	24.1	21.3	21.4	19.1	16.2	14.7	14.4	18	25.2	17.6	15.5	13.4	0	0	0	20.9	14.2	0	0	35.1
28	15/03/2015	5:00am	3 - Mitchell	38.9	39.1	43.5	49.5	46.5	44.5	42.6	44	41.9	43.3	40.5	42.3	40.9	39.1	32.9	28	25.9	23.1	22.2	22.2	23.3	21.2	17.1	14.2	14.6	12.6	0	0	0	0	0	0	19.4	13.5	0	0	31.4
29	15/03/2015	5:30am	4 - Leslie	36.4	34.4	37.5	39.1	41	40.3	37	37.1	35	38	37.3	38.7	36.9	32.7	26.9	19.3	19.2	21	20.5	13.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.8
30	15/03/2015	6:15am	5 - Krey	42.1	41.1	42.3	47.4	50	45.6	46.6	45.2	45.7	48.4	45.4	48.1	46.8	42.9	37.8	32.9	32.2	28.7	24.6	26.1	24	22.8	20.9	20.2	17.7	15.7	17.6	19.5	19.3	13.1	0	0	0	0	0	0	35.6
31	15/03/2015	8:22pm	3 - Mitchell	58.3	56.6	52.2	50.3	51	47.8	45.5	41.8	43	42.2	40.1	39.7	37.7	36	31	23.5	22.7	20.5	18.4	20.7	19.9	19.3	19.1	17.8	16.1	15.8	35.9	39.4	20.5	15.1	16.2	0	0	13	14.6	18.1	42.7
32	15/03/2015	8:45pm	4 - Leslie	58	56	53.6	50.8	49.2	46.8	44.6	42.6	42.4	40.5	37.1	37.3	35.2	32.7	29.8	27.7	27.1	28.4	28.7	28.3	27.6	27.1	26.2	25.8	25.2	24.8	25.5	27.7	26.5	24.1	23.2	22.1	0	0	0	0	37.9
33	15/03/2015	9:45pm	5 - Krey	63.3	60.4	58	55.4	54.6	49.2	47.1	45.3	47	46.5	43.1	41.7	40.1	38.4	35	32.2	31.1	31.9	31.7	31.6	31.3	30.3	29.3	28.4	27.5	27	27.4	28.5	27.9	26.6	25.4	23	0	0	0	0	40.4
34	15/03/2015	10:25pm	1 - Bailey	49.3	47.1	45.7	43	43	41	37.7	36.7	36.2	35.9	32.8	33.2	30.5	28.2	25	22.8	0	0	0	21.4	22.1	21.4	0	0	0	0	0	29.3	30.6	0	0	0	29.5	27.3	27.2	0	36.8
35	15/03/2015	10:45pm	2 - Hanson	51.2	48.4	47.2	45.1	45.6	41.3	38.7	37	35.5	36.9	34	36.7	33.9	33.7	31.8	25.9	20.8	19.5	17.8	16.4	16.8	17.2	15.8	15.1	17.6	22.1	20.8	20.2	20	12.1	11.1	0	11.2	12.2	0	13.9	30.9
36	16/03/2015	3:28am	3 - Mitchell	41.8	36.6	36.1	42.4	45.6	39.3	36.9	36.7	38.4	38.7	35.2	37.1	39.2	30.9	26.7	21.9	16.5	17.2	15.5	14	12.6	0	0	0	0	12.2	0	0	15	0	0	0	0	12.4	0	0	26.3
37	16/03/2015	4:00am	4 - Leslie	45.6	41	39.9	50.5	51.8	48.4	48.1	43.9	43.8	46.4	41.2	42.9	38.9	35.7	30	24.5	23.4	23.9	21.3	17.3	14	11.6	0	0	0	0	0	12.4	13.1	0	0	0	0	0	0	0	28.8

38	16/03/2015	4:30am	5 - Krey	46.9	44	44.4	56.5	54.5	50.4	50.7	47.3	49.5	47.7	43.6	43.8	38.4	35.8	30.8	26	24.4	22.2	20	18.7	15.6	13	0	0	0	0	0	16.9	17.6	0	13.4	0	0	0	0	0	29.9
39	16/03/2015	5:30am	1 - Bailey	40.8	39.2	41.8	49	51	44.4	47.2	46.4	44.9	45.3	42.4	41.5	37.8	35.7	30.4	25.5	25.9	25.3	22.3	22.5	19.6	18.3	14.8	0	0	0	0	19.7	20.9	0	0	0	0	13.4	0	0	30.8
40	16/03/2015	6:00am	2 - Hanson	43.4	43.3	44	56.7	55	44	49.4	47.6	47.8	47.7	44.7	45.5	44.9	42.4	39.6	34.2	30.5	28.8	27.3	25.2	22.3	21.1	19.5	18.1	16.4	18.2	13.7	17	17.3	11.6	0	0	0	0	0	0	34.9
41	16/03/2015	8:15pm	4 - Leslie	43.5	40.8	41.9	44	49.5	47.7	43.2	44.5	46.8	47.8	43.8	46.8	42.8	39.4	33	28.6	29.7	29	24.3	19.9	15.3	14	12.6	0	12	16.9	17.7	20.7	23	0	0	0	0	0	0	33.3
42	16/03/2015	8:45pm	5 - Krey	45.2	40.5	42.8	48.5	51.6	47.7	49.7	49	49.2	49.8	47	50.1	47	43.6	38.9	34.3	33.3	30.9	27.5	28	22.8	19.1	15.5	0	0	12.8	11.6	17.4	22.1	12	16.1	0	0	0	0	0	36.2
43	16/03/2015	10:25pm	1 - Bailey	39.2	39.9	44.1	47.2	48.9	48.5	47.2	48.1	47.1	48	46.1	49	47.2	43.5	38.3	32.5	31.6	33.2	31.2	30	25.8	19.3	16.1	12.8	10.2	10	10.9	30.1	32.8	10.8	10.7	10.3	10.7	12.9	9.2	9	38.9
44	16/03/2015	11:00pm	2 - Hanson	40.4	40.3	44.7	50.5	50.6	48.6	47.8	48.3	48.3	48.3	46.9	50.2	47.7	44.5	39.5	32.7	30	28.8	27.5	26.9	23.8	18	14.9	13.1	16.6	20.9	12.2	18.9	20.9	0	0	0	13.5	0	0	0	36.2
45	16/03/2015	11:30pm	3 - Mitchell	46	42.9	45.5	53.5	53.3	50	48.9	48.2	48.6	47.8	46.2	47.5	44.9	40.8	36.6	29.8	25.8	27.4	27.4	25.4	24.5	18.8	16	12.9	0	0	0	0	15.6	0	0	0	15.2	15.7	0	0	33.8
46	17/03/2015	12:00am	4 - Leslie	43.1	38.9	40.5	45.7	48.5	46.5	41.8	44.4	43.8	45	41.5	43.4	41.9	36.4	30.5	27.6	27.4	26.9	21.9	16.9	12	0	0	0	0	0	0	12.3	14.1	0	0	0	0	0	0	0	29.9
47	17/03/2015	12:45am	5 - Krey	46.7	44.6	46.3	52.4	53.9	48.2	48.1	47.5	48.8	49.1	45.4	47.1	45.3	41.1	37.1	32.1	29.9	31.3	30.3	29.6	23.9	20	17.6	16	15.5	17	17.1	17.1	16.3	15.3	14.4	0	0	0	0	0	35.4
48	17/03/2015	1:45am	1 - Bailey	45.2	44.3	46.9	54.8	56.8	53.6	49.4	50.6	50.2	50.2	48.3	51.1	47.7	44.6	38.2	32.7	30.9	31.2	30.7	30.4	26.6	22.6	19.6	15.8	14.4	13.3	12.9	18.6	19.6	11.9	0	0	0	0	0	0	37
49	17/03/2015	2:15am	2 - Hanson	41	41.8	45.8	53.6	54.3	51.2	48.7	49.3	49.7	50.9	47.6	50.7	48.5	46.4	41.2	36	31.7	28.3	26.6	27.4	25.1	20.2	17.5	16	20.4	25.3	15.7	15.5	17.2	0	0	0	0	0	0	0	37.4
50	17/03/2015	2:40am	3 - Mitchell	43.8	43	47.1	50.1	51.2	48.8	49	50.3	49.2	48.7	47.3	49.5	46.8	43.9	37.8	31.5	30.8	31.6	30.4	31.1	27	21.4	18.8	15.4	0	0	0	0	0	0	0	0	0	0	0	0	36.3
51	17/03/2015	4:00am	4 - Leslie	42.5	38.2	43	44.6	47.2	48.8	43.9	48.7	47	47.6	44.4	46.3	43.9	39.7	34.3	30.6	30.6	30	26	20.3	17	13.6	11.4	0	0	0	0	0	0	0	0	0	0	0	0	0	32.6
52	17/03/2015	4:30am	5 - Krey	46.4	44	45.3	49.7	53.7	49.9	48.2	47.2	47.7	47.2	45.3	47.1	44.2	41.2	37.1	33	32.6	28.5	27.7	27.3	24	19	15.6	12.2	0	0	0	13.2	13.2	0	11.2	0	0	0	0	0	34.3
53	17/03/2015	5:00am	1 - Bailey	42.8	42.1	46.9	50	50.9	51.2	48.4	49.8	48.2	49.1	47.3	49.6	46.3	42.7	35.8	30.1	30	32	29.5	29.4	25.3	20.6	18	15	0	0	0	16.6	19.8	0	0	0	0	0	0	0	35.7
54	17/03/2015	5:45am	2 - Hanson	41.8	41.6	45.3	50.2	49.5	46	47.3	47.6	48.7	49.3	48.3	50.9	49	45.2	39.8	33.6	30.9	29.6	27.1	28.2	27.7	25.2	23.3	20.3	18	18.8	12	15.6	15.9	0	0	0	0	16.5	0	0	37.3
55	17/03/2015	6:10am	3 - Mitchell	45.4	43.3	45.6	52	49.3	49.1	48.1	49.1	47.9	48.4	46.3	48.6	45.4	42	37.3	30.2	27.9	29.9	28.8	30.5	26.8	24.8	21.7	20.2	18.5	18.1	18	19	15.9	13.6	12.3	0	12.8	0	0	0	36.1
56	17/03/2015	8:15pm	5 - Krey	44.2	41.4	43.4	46.8	49.5	49	48.2	47.7	49	50.8	49.5	50.6	47.5	43.9	38.9	33.7	29.9	26.3	22.5	23.4	19.2	15.6	11.8	0	0	0	0	25.6	24.9	14.7	18.5	21.3	23.6	17.7	0	0	36.5
57	17/03/2015	8:50pm	1 - Bailey	42.3	41.9	44.8	48.4	49.8	48.7	48.6	47.8	49.2	50.3	49.5	51.9	47.9	44.9	37.6	31.5	28	27	24.4	22.8	19.8	16	12.2	0	15	0	13.7	34.9	33.9	13.5	0	27.1	36	36	33.4	18.7	41.8
58	17/03/2015	9:45pm	2 - Hanson	41.1	41.5	45	50.5	51.3	49.4	50.2	49.4	51.5	53.2	52.2	55	52.3	50	43.1	37.6	35.8	29.8	24.7	25.1	21.3	18.5	16.1	12.7	12.1	14.5	15.7	24.4	21.5	0	14.4	34.4	40.4	32.5	17	13.4	42.6
59	17/03/2015	10:25:pm	3 - Mitchell	43.3	42.2	46.6	48.4	49.5	48.5	48.8	49.1	50.2	51.5	49.9	52.8	49.1	45.1	40.6	35.1	31	28.2	26	26	23.3	18.8	15.8	11.7	11.5	12.6	27.7	42.3	21.2	15.5	11.7	0	15.8	15.1	14	18	44.4
60	17/03/2015	11:00pm	2 - Hanson	41.1	41.3	44.7	47.3	51.2	48	47.8	47.3	48	50.7	47.7	51.1	49.1	47.2	41.5	34.4	33	28.8	24.1	22.4	19.4	15.9	14	13.5	15.7	19.9	15.5	20.7	22.5	0	0	22.9	26.1	22.1	12.5	0	37.6
61	17/03/2015	11:30pm	4 - Leslie	40.5	36.9	38.9	41.1	44.8	45.7	41	41.4	42.5	44.6	43.3	46.9	43.1	41.2	35.3	29.3	27.5	28.3	23.3	19	11.5	0	0	0	0	0	0	18.9	21.5	19.9	0	0	0	0	0	0	32.9
62	18/03/2015	12:00am	5 - Krey	43.6	42.2	47.6	56.1	55.4	54.7	55	51.1	51.7	52.4	49.8	51.6	49.6	46.1	41	36.6	35.7	31.7	26.5	25.9	23	20.1	16.1	11.3	0	0	14.1	23.1	17.9	0	15.7	0	0	0	0	0	37.8
63	18/03/2015	1:15am	5 - Krey	42.6	41.6	45.1	53	53.1	51.3	50	48.4	49.6	50.7	48.6	49.7	47.6	43.5	38.4	32.7	31.7	27.7	23.2	21.6	18.1	13.9	0	0	0	0	14.6	22.6	16.1	0	16.7	0	0	11.7	0	0	35.3
64	18/03/2015	1:50am	1 - Bailey	39.9	40.1	44.2	52.1	50.4	47.8	47.2	44.6	46.1	47.2	46	46.9	44.7	40.5	33.8	27.4	24	22.9	21	18.7	15.2	12.8	12	0	0	12.7	12.5	29.4	35.4	12.8	12.2	0	0	0	0	0	38.5
65	18/03/2015	3:45am	2 - Hanson	40	41	45.3	48.9	49.9	49	47.4	49.4	49.8	52.7	50.9	54.5	50.2	49.8	42.8	38	35	32.4	28.5	27.9	24.2	21.6	20.3	17.2	16.5	19	15.6	20.6	20.7	13	12.5	11.3	12.2	0	0	0	39.6
66	18/03/2015	4:15am	3 - Mitchell	40.6	41.6	45.2	48.2	49.2	47.8	46	47.8	48.1	50.7	47.9	50.4	46	45.6	38.4	32.7	30.8	30.5	28.1	27.4	26.6	21	17	14.4	13.9	0	0	12.2	13.8	0	0	0	18.8	21	0	0	36.2
67	18/03/2015	5:00am	2 - Hanson	40.9	40.7	44.6	50.9	48.8	48.3	47.5	47.7	48	51.3	47.8	50.3	47.6	47	40.2	34.6	31.3	28.5	25.6	24.8	22.5	20.3	16.9	15.7	16.8	19.4	15.5	19.2	20.5	12.2	12.1	0	12.9	0	0	0	36.8
68	18/03/2015	5:30am	4 - Leslie	40.4	38.6	41.1	45.7	47.6	46.4	42.9	47	47.3	49.7	48.2	49.4	47.1	44.3	36.6	30.9	32.5	31.8	26.1	20.4	16.2	14.9	13.5	11.7	11.5	0	0	16	15.9	0	0	0	0	0	0	0	35.2
69	18/03/2015	6:05am	1 - Bailey	42.1	42.7	47.7	58	53	50.3	53	47.3	47.8	50.3	46.8	49.6	44.5	42.5	37.2	31.6	29	29.3	27.9	26.1	23.7	22.2	20.6	19.5	16.9	16.5	15.9	29.2	32.7	15.2	12	0	0	0	0	0	38.4
70	18/03/2015	8:18pm	1 - Bailey	38.5	38.4	40.4	49.9	44.7	42.5	43.9	42.4	44.8	47.2	44.4	46.6	42.5	38.8	32.8	28.2	25.1	23.5	19.4	16.3	17.2	14	12.3	12.8	23.5	21.5	13	27.6	38.2	19	13.3	23.6	29.6	37.6	38.5	27.4	41.7
71	18/03/2015	9:15pm	2 - Hanson	40	40.2	44.2	51.6	50.3	48.8	47.1	45.4	47.8	50.5	46.6	48.5	45.7	42.8	38	32	23.6	21	18.4	15.1	13.6	12.6	0	11.3	20.1	19.6	12.2	21.8	28.7	14	0	26.7	29.3	18.8	12.4	0	36.3
72	18/03/2015	9:50pm	3 - Mitchell	38.5	38.5	43.1	48.7	44.3	43.1	38.7	38.6	40.6	44.1	42	43.2	40.5	35.7	31.6	25.9	22.3	19.9	17.5	17.5	16.1	12.7	0	0	12	13.2	16.8	43.3	41.2	15.7	0	13.6	18.6	17	16.7	20.1	46.9
73	18/03/2015	10:30pm	4 - Leslie	36.8	35.4	37	44.7	45.9	45.5	43	40	38.7	40.2	37.5	40.2	39.5	37.8	30	25.3	20.9	21.4	18.3	0	0	0	0	0	0	0	0	26	25.5	0	0	0	0	0	0	0	32
74	18/03/2015	11:30pm	5 - Krey	43.5	42.6	43.1	53.1	52.9	47.4	48.2	45	45.7	47.4	43.7	46.6	43.1	41.4	36.5	32.1	29	24.5	20.7	20.7	20.1	17.2	14.1	12	12.1	11.3	0	23.2	21.6	14.3	17.7	22.6	24.7	18	0	0	34.1
75	19/03/2015	1:35am	1 - Bailey	36.1	36.5	40.8	48.4	43	39.7	33.4	29.4	30.1	32.3	27.8	30.8	28.7	24.1	20.9	15.2	13.6	13.5	0	0	0	0	0	0	0	0	0	33.4	41.4	16.5	12.4	14.3	0	0	0	0	43
76	19/03/2015	2:45am	2 - Hanson	41	39.7	41.7	48.6	43.7	40.1	38	36.6	39.9	42.1	38.3	40.3	38.2	35.8	30	25.2	19.6	16.4	13.7	0	0	15.5	13.5	15.4	20.7	25.2	16.9	23.5	26.9	0	0	0	0	0	0	0	33.2
77	19/03/2015	3:45am	3 - Mitchell	43.7	40.4	43.1	42.6	45.4	42.7	42.2	40.5	41.6	43.3	40.1	41.3	37.5	35.6	31.6	25.5	23.6	20.2	19	19.4	16.8	13.9	11.8	0	11.2	0	0	15	16.6	0	0	0	0	0	0	0	29
78	19/03/2015	5:15am	4 - Leslie	45	38.6	39.5	42	46.9	42	44.3	43.6	41.3	42.9	38.1	39	36	30.8	25.4	20.4	18.5	19.7	17.5	12.6	0	12.1	0	0	0	0	0	17.2	17.2	0	0	0	0	0	0	0	27.2

79	19/03/2015	6:00am	5 - Krey	46.2	42.3	42.4	47.2	49.9	45	43.7	42.5	44.5	46.1	43.8	43.8	42.7	39.3	34.3	29.3	28.1	25.7	25.2	27.1	20.9	17.4	13.6	12.8	13	11.6	0	18.8	24.2	11.3	14.9	0	0	0	0	0	33.2
80	20/03/2015	8:15pm	2 - Hanson	60.3	57.7	55.7	52.5	50.1	46.8	44.3	43.1	43.8	45	42.9	42.7	40	38.7	35.2	33.8	32.5	31.4	30.1	30	30.5	30.2	29.9	29.7	29	27.7	26.9	33.8	28.8	24.9	23.6	38.8	48.6	44	26	0	48.3
81	20/03/2015	8:30pm	3 - Mitchell	69.3	68.1	65.2	62.2	59.2	55.1	52	48.2	45.7	44.9	44.1	43.4	39.5	37.4	32.7	28.7	26.7	26.3	26.6	28.9	30.5	31.4	29.8	28.1	26.4	24.5	23.3	39.7	28	0	0	0	0	0	0	0	42.7
82	20/03/2015	8:45pm	4 - Leslie	55.6	53.5	50.2	47	44.7	41.7	38.5	36.7	36.1	37.8	35.9	36.1	35.3	33.1	29.6	27.5	26.7	28	28.3	27.8	27.1	26.2	25.3	24.8	24.2	24.2	24.5	28.9	26.3	24.3	23.2	21.5	0	0	0	0	37.6
83	20/03/2015	9:30pm	5 - Krey	53.3	49.8	48.7	46.8	45.5	42.2	41.8	41.2	41	42	40	38.9	38.4	36.3	34.4	32.4	31.6	32.6	33.6	33.7	34	33.1	31.9	30.8	29.6	28.5	27.9	29.2	27.9	26.7	25.6	23.9	21.3	18.8	14.1	0	41.8
84	20/03/2015	10:25pm	1 - Bailey	53.6	51	49.3	47.5	45.7	43.1	42.8	42.1	41.6	41.5	39.9	38.5	36.2	35.9	32.3	31.1	30.8	31.6	32.4	32.4	32.8	32.4	31.9	31.3	30.9	29.1	28.6	29.5	31.7	27.1	25.7	24.5	23.4	37.1	36.3	21.2	42.7
85	21/03/2015	2:15am	2 - Hanson	47.8	45.2	44.2	47.4	49.5	42.8	45	42.4	41.4	43.2	39.8	39.8	38.5	38.2	34.7	30.1	26.9	25.9	24.4	24.1	24.4	23.9	23.3	22.5	21.8	21.7	21.2	23	22.2	19.5	18.5	16.1	14.5	20.5	16.2	17.8	34.8
86	21/03/2015	2:45am	3 - Mitchell	61.6	59.1	56.9	55.1	53.8	49.9	49.9	46.1	45.1	45.6	43.7	43.5	41.1	39.5	34.8	28.8	27	25.1	23.1	23.7	23.7	22.5	19.9	18	16.7	15.9	25.3	36.5	17.1	13.2	12.4	0	0	12.7	16.1	21.4	39.1
87	21/03/2015	3:15am	4 - Leslie	45.6	43.5	44.3	49.1	50.7	50.5	47	47.2	46.1	47.1	44.1	45.6	44.7	40.7	35.1	29.9	28.1	28.6	26.4	23.8	21.9	20.6	19.9	18.6	17.7	16.5	17.4	22.3	19.2	13.3	11.5	0	0	0	0	0	34.2
88	21/03/2015	4:00am	5 - Krey	51.6	49.1	46.4	48.2	52.6	41.2	43.9	45.2	44	45.1	42.6	40.8	42.3	36.3	32.8	28.6	27	27.4	26.8	26.3	25.4	24.6	23	21.8	21.2	20.8	21	23	22.8	20.3	19.7	17.5	14.9	11.4	0	0	35.1
89	21/03/2015	4:30am	1 - Bailey	47.9	45.5	45.1	50.1	49.6	48.7	46	44.1	42.5	45	40.4	39.8	35.9	32.6	27.8	24.6	24.3	24.4	23.3	23.3	22.4	21.5	20.4	19.5	18.8	18.3	19.1	31.7	34	19.7	17.2	19.2	14.2	19.2	22.7	0	38.3
90	21/03/2015	5:30am	2 - Hanson	46.7	43.6	43.4	51.8	51.8	45	47	45.6	44.8	46.4	43.5	43.7	41.9	44.9	38.4	33.1	29.4	26.4	23.5	22	20.6	20.4	19	17.7	17.2	17.6	16.5	18.9	25.6	19.1	14.2	11.9	0	0	12.2	14.2	35
91	21/03/2015	6:00am	3 - Mitchell	59.6	57.4	54.7	55.7	54.3	47.1	48.4	45.6	45.9	47.6	44.6	43.9	42.2	41.7	35.5	29	27.6	25.7	22.8	23.4	21.5	18.8	16.7	15.2	15.1	14.1	18.9	25.7	14.9	0	0	0	0	0	0	0	33.7
92	21/03/2015	8:15pm	3 - Mitchell	57.9	55.9	52.8	49.9	49.7	44.6	44.2	43.4	42.1	43	39.9	39.5	37.6	34	28.8	23.1	21	19.1	18.4	20.3	20.9	19.6	18.1	16.9	15.8	15.5	29	41.3	19.1	13	14.4	0	13.1	12.7	15.5	20.4	42.8
93	21/03/2015	8:45pm	4 - Leslie	43.4	39.9	39.5	44.6	48.4	42	43.6	43.1	41	42.4	39.4	39.4	36.8	33.8	28.8	25.7	22.6	23.7	23.2	21.4	19.8	20.1	18.6	17.8	17.7	17.4	16.7	24	16.4	0	0	0	0	0	0	0	31.4
94	21/03/2015	9:30pm	5 - Krey	52.3	49	48.2	55.7	58.9	53.2	54.6	51.6	52.8	50.3	47.5	46.8	46.3	42.8	37.4	32.4	31.7	31.9	30.9	30	29.8	28.7	27.8	26.7	25.8	24.8	24.7	25.2	25	24.1	23.3	21.3	18.9	15.8	0	0	39.3
95	21/03/2015	10:00pm	1 - Bailey	43.4	43	44.7	52	55.2	51.9	51.5	50.6	49.8	49	46.6	47.5	44.9	41.8	37.4	31.9	31.1	32.1	29.2	27.5	23.9	19.5	16.4	14.4	18	18.2	16.4	25.3	27.8	12.9	11.4	0	19	35.5	36.1	20	38.2
96	21/03/2015	11:00pm	3 - Mitchell	53.5	50.7	49	55.6	57	53.9	53.5	52	53	52.1	50.2	52.2	50.4	48.6	42.3	35.7	33.9	31.9	28.7	27.9	24.9	20.5	16.7	14.1	11.6	12.4	32.3	38.3	14.4	0	0	0	0	13.1	16	20.6	42.6
97	21/03/2015	11:30pm	4 - Leslie	48	44.3	46.7	53.1	55.5	55.6	50.9	53.4	51.1	51.7	49.3	51.7	51	47.4	39.8	33.9	34.3	33.3	28.5	23.7	17.3	13.9	0	0	0	12.8	15.8	20	15.2	0	0	0	0	0	0	0	37.8
98	22/03/2015	12:00am	5 - Krey	51.3	49.1	49.1	58.3	61.7	50.5	54.9	51.5	51.7	51.6	48.1	48.3	46.5	42.5	37.8	32.1	31.1	30	28	26.5	25.1	23	21.5	20.4	19.8	19.9	20.5	21.4	20	18.4	18.2	15.1	12.7	13.4	0	0	36.4
99	22/03/2015	12:45am	4 - Leslie	47.1	44.4	46.1	50.3	53.3	51.9	49.8	51.5	49.5	51.9	47.6	49.4	47.7	45.8	40	32.5	31.4	31.2	26.9	22.3	18	15.4	14.1	12.9	12.4	12.3	15.5	20.1	14.8	0	0	0	0	0	0	0	36.2
100	22/03/2015	1:15am	1 - Bailey	51.1	49.6	47.8	53.8	56.1	51.7	52.3	52.3	49.2	49.1	46.6	46.5	44.3	40.7	36.1	31	31	30.9	29	28	26.2	24.6	23.4	22.4	21.2	20.5	21.8	26.4	24.9	20.3	18.6	17.1	19.4	35.2	36.6	21.1	38.5
101	22/03/2015	3:50am	3 - Mitchell	60.3	57.8	55.2	56	57.1	49.9	52.8	50.2	50	51.2	47.5	47.9	46.9	43.8	39.6	32.9	31	30.2	29	27.5	24.5	22.1	19.7	18	16.8	16.1	27	35.9	16.2	13.3	11.9	0	0	12.6	15.4	19.6	39.9
102	22/03/2015	4:30am	4 - Leslie	46.9	44.8	46.4	49.5	52.6	54.1	50.4	52.6	50.7	50.6	49.1	52	48.6	46	39.9	34.9	33.9	34.2	29.4	25.8	22.8	21.3	20.4	19.7	19.6	19.5	20	21.1	19.1	16.5	14.9	12.6	0	0	0	0	38
103	22/03/2015	5:00am	5 - Krey	56.4	54	51.3	57.4	57.1	50.6	53.5	50.6	52.4	53.6	49.8	50.2	48.5	46.9	41.4	35.7	35.1	34.2	31.9	31.4	29.6	28.3	27.1	26	25.1	24.5	24.4	25.9	25.2	23.8	23.1	21.2	19	17.9	13.3	0	40.4
104	22/03/2015	5:40am	1 - Bailey	54	50.8	48.9	51.6	54.6	51.3	50.3	50.7	49.3	49.8	47	47.8	44	42.5	37.2	31.8	31.8	31.8	29	28.1	25.8	24.1	22.7	21.5	20.4	20.1	20.3	30.4	30.7	19.2	18.3	20.1	17.7	30.1	30.7	13	38.9
105	22/03/2015	8:30pm	5 - Krey	47.5	44.3	47.1	54.4	57.7	53.8	53	53.1	52.7	53	50.7	53.1	50.9	47.9	42.7	37.7	36.5	33.6	29.3	28.1	22.4	18.8	17.2	13.6	15.3	17.3	17.2	20	17.6	0	15.7	0	0	0	0	0	39.1
106	22/03/2015	9:05pm	1 - Bailey	41.6	40.9	45.4	49.7	52.5	50.5	50.7	50.1	49.5	50.2	47	49.3	47.5	45.2	40.6	34.6	32.7	34.2	32.5	29.3	25.7	19.5	16.6	15.9	28.6	21.3	17	29.6	34.6	13.5	13.4	0	0	15.8	19.3	0	40.5
107	22/03/2015	9:45pm	5 - Krey	51.2	48.4	48.4	52.8	57.6	52.4	51.2	51.2	50.6	51.6	48.8	51	48.4	45.7	40.3	35.5	34.2	32.1	29.4	29.2	23.1	19.7	16.8	14.2	12.7	11.9	17.2	18.8	16.6	11.4	16.5	12.1	0	0	0	12.5	37.4
108	22/03/2015	10:15pm	4 - Leslie	44.1	41.3	43.7	46.2	52.7	49.7	45.4	48.5	47.8	49.4	45.8	48.3	46.1	42.1	35.7	33.5	34.7	33.7	26.9	20.2	16.3	12.9	0	0	0	0	0	19.8	21.1	0	0	0	0	0	0	0	35.2
109	22/03/2015	10:50pm	3 - Mitchell	51	48.7	49.5	54.9	55.4	54.5	53.6	53.6	53.3	54	51.1	54.7	51.7	49	43.6	37.1	35.2	35.1	32.4	31.1	26.5	20.2	16.3	14.1	12.4	14.8	32.6	35	14.7	0	0	0	0	11.5	15.1	19.3	42.3
110	23/03/2015	12:00am	3 - Mitchell	58.7	56.7	54.5	57.2	57.3	53.4	53.4	52.5	51.6	52.4	49	51.1	48.4	46.7	41.2	35.5	33	32	29.4	27.7	23.9	19.2	16	14.4	13.7	15.4	34.6	35.5	15	11.8	0	0	0	0	14.4	19.6	41.6
111	23/03/2015	12:35am	1 - Bailey	40.3	41.1	44.2	49.2	54.2	51.3	50.9	50.4	50.2	50.4	48.7	51.3	48	45.3	40.1	34	33.1	33	30	29.1	24.6	19.5	15.8	13.4	13.9	11.9	14.2	26.4	30.2	0	0	0	0	0	19.3	0	38.4
112	23/03/2015	1:15am	4 - Leslie	40.4	38.5	41.8	46.3	50	47.6	44.1	49.2	45.4	46.9	44	45.9	44	39.5	33	29.4	29.5	29.2	23.3	17.7	12.2	0	0	0	0	12.4	16.2	17.3	15.6	0	0	0	0	0	0	0	32.2
113	23/03/2015	1:45am	5 - Krey	46.6	43.2	45.4	51.8	56.2	53.2	52.4	50.9	52	52.3	49.4	50.9	48.4	47.3	41.2	37	36.2	32.3	29.6	29.9	22.5	17.4	14.2	11.4	0	0	11.9	13.3	14.6	0	14.5	0	12.1	16.4	0	0	37.9
114	23/03/2015	3:00am	5 - Krey	42	42.2	43.3	48.8	54.7	49.6	49.2	49.7	49.7	50.2	48.7	52	48.5	47.7	40.6	35.8	35.3	32.4	30.3	29.9	25.2	20.5	17.8	16.8	15.6	19.4	18	16.1	14.7	0	13.3	0	0	0	0	0	38.2
115	23/03/2015	3:35am	3 - Mitchell	47.1	43.7	45.3	52.8	55.7	50	49.3	50	51	52.2	49.4	52.6	48.8	45.8	40.1	33.6	32.4	31.9	28.6	28.5	24	19	15.8	13.7	14.7	14.7	0	0	11.3	0	0	0	16.4	13	0	0	37.3
116	23/03/2015	4:05am	1 - Bailey	43.9	41.8	45.5	52.1	54.1	51.7	51	51.5	51.4	51.9	49.3	50.8	47.1	44.1	38.1	33.7	33.4	33.3	29.4	29.3	25.2	21	17.9	15.9	13.7	13.1	13	26.5	26.1	11.2	0	0	0	17.1	18.7	0	37.7
117	23/03/2015	4:45am	4 - Leslie	44.4	39.8	42.6	47.4	47.5	49.9	45.2	47.9	45.1	47.8	46	49.1	46.5	42.7	36.7	31.2	30.6	30.6	26.4	20.9	17.2	13.6	12.6	0	0	0	0	14.2	13.7	0	0	0	0	0	0	0	34.3
118	23/03/2015	8:00pm	4 - Leslie	41.7	39.3	38.4	37.4	43.9	43.4	38.5	41.1	41.7	42.6	40.3	42.6	41.2	37.6	30.2	25.2	26.2	25.6	19.6	13.2	0	12.1	12.9	15.8	18.7	23.1	16.4	24.5	26.2	13.4	0	0	0	14.1	12.3	0	33.3
119	23/03/2015	8:30pm	5 - Krey	45.1	41.7	44.4	48.2	50.3	49.5	47.3	47.3	48.2	49.5	47.1	49.6	47.3	44.6	39.7	34.3	32.8	28.3	25.6	24.2	19.6	17.7	16	13.5	19.6	18.7	11.6	29	26.9	14.7	15.6	15.5	11.9	0	0	0	37.4

120	23/03/2015	9:05pm	1 - Bailey	40.7	40.6	45.3	53.1	51.2	48.8	47.5	48.1	47.5	48.8	46.5	50.9	45.9	43.4	36.8	31.6	30.2	31	28.5	25.1	21.3	19.1	15.5	16.3	30.6	22.7	14.1	30.2	37.3	16.3	0	12.2	20	37.3	38	19.8	42.1
121	23/03/2015	9:35pm	3 - Mitchell	45.6	44.2	48.9	57.4	54	51.7	53.1	52.3	52.5	53.3	49.9	53.2	49.4	48.3	41.3	34.6	32.3	31	29.1	27.1	21.9	17.2	14.5	13.2	16.2	16.3	28.9	44.1	24.5	11.7	17.8	0	14.8	13.7	15.4	20.9	46.1
122	23/03/2015	11:00pm	4 - Leslie	41.3	38.4	41.7	43	46.6	45.7	41.8	42.3	44.7	46.5	42.9	46	44.1	39.4	33.2	29.6	30	30	26.8	16.6	11.1	0	0	0	0	0	18.1	21	21.2	0	0	0	0	13	11.6	0	33.1
123	23/03/2015	11:55pm	1 - Bailey	41.1	41.5	45.8	52.7	51.1	51	49	49.7	48.5	50.6	48.7	50.4	48.3	45.9	39.1	34	34.1	33.8	30.2	29.6	23.4	17.6	14.3	13.1	16.8	0	0	29.7	34.4	13.6	0	0	0	0	0	0	40
124	24/03/2015	12:30am	3 - Mitchell	43	42.2	45	51.4	52.8	50	49.1	50.9	51	51.7	49.1	51.2	48.1	45.3	39	32.8	31.1	30.5	28.8	26.1	20.8	15.8	12.9	12.9	12.8	12.1	0	14.7	16	0	0	0	0	0	0	14.4	36.3
125	24/03/2015	1:00am	5 - Krey	43.7	41.1	43.5	47.9	52.2	49.3	46.7	48.2	47.4	49.3	46.8	48.1	45.4	43	38.2	34.2	29.3	26.3	26.7	23.5	19.6	15	12.8	12.5	12.4	11.2	15.6	21.9	21.4	12.1	0	0	0	0	0	0	34.9
126	24/03/2015	3:30am	4 - Leslie	40.3	36.3	38.2	44.2	47.2	45.2	40.7	42.3	41.6	43.4	41.6	44.3	40.8	37.1	31.9	26.6	26.5	25.9	21.6	16.2	12.3	11.8	0	0	0	0	0	15.1	15.2	0	0	0	0	11.9	0	0	30.1
127	24/03/2015	4:15am	5 - Krey	41.8	39.6	41.9	50.7	50.6	47.6	45.6	46.7	47.3	48.5	47.2	50.7	45.6	42.1	37.6	33.1	30.3	27	26	24.7	21.6	15.7	12.4	0	0	0	0	11.9	16.2	0	13.9	0	15.5	0	0	0	34.7
128	24/03/2015	4:45am	1 - Bailey	38.8	39.3	42	52.1	50.1	46.1	44.6	45.1	45.2	46.5	44.5	46.4	41.5	39	32.6	27	25.1	26.6	24	20.9	16.3	13.4	13	0	0	0	0	24.9	27.6	0	0	0	0	16.7	16.4	0	33.9
129	24/03/2015	5:20am	3 - Mitchell	40.6	41.1	42.3	52.2	49.5	48.2	47.8	50.9	50.2	49.8	47.7	50.6	46.7	43	36.9	29.2	28.9	30.9	27.4	25.5	20.9	18.7	15.7	15.1	14.7	0	0	11.1	13.2	0	0	0	0	0	0	0	35.1