

Environmental sound report

Transport Interchange & Retail Units

South Shields 365 Regeneration

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1. Revision register

Version	Changes from previous version	Issued by	Date
A	First issue	RAH	9/06/15
B	Para.s 4.1, 4.3, 7.2, 7.4, 7.6, Title revised. Section 5, 6 para. 4.2 added. Para.s 4.3, 4.4, 4.5, 4.6, 4.7 removed	RAH	18/6/15
C	Client, para. 3.1 revised	RAH	30/6/15
D	Client address removed	RAH	30/6/15

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3. Summary

- 3.1 This report has been prepared for Muse Developments, Nexus and South Tyneside Council, in support of a Planning Application for the development of a Transport Interchange at South Shields centre.
- 3.2 The measured ambient and maximum sound levels may be used to inform building façade and ventilation design for the proposed development.
- 3.3 The measured ambient noise levels and calculated Metro L_{AE} may be used to inform an assessment of Metro train noise impact.
- 3.4 Background sound levels at locations around the proposed development site have been measured. Plant details are not available at this stage.
- 3.5 It is proposed that sound escape and impact from any plant associated with the development is limited to a level no greater than the background sound level plus 5 dB at any identified sound sensitive receptor.
- 3.6 When plant is specified and operations associated with the proposed development understood, the impact may be calculated and any attenuating features specified if required.

4. Introduction

- 4.1 A Transport Interchange and 2 no. Retail Units independent from the Transport Interchange building has been proposed in South Shields.
- 4.2 It is understood that the Transport Interchange and Retail Units will fall within the same planning application.
- 4.3 The proposed Transport Interchange and Retail Units site boundary is taken from architects' drawings, Reference 1, and is shown in Figure 1.

5. Transport Interchange

- 5.1 Apex Acoustics has been commissioned to carry out a series of baseline sound surveys and compile subsequent data for the proposed Transport Interchange at South Shields.
- 5.2 The measured ambient and maximum sound levels may be used to inform the design of building façades and ventilation strategies to meet required internal sound levels.
- 5.3 The measured ambient noise levels and calculated Metro L_{AE} may be used to inform an assessment of Metro train noise impact and determine whether properties qualify for sound insulation measures based on the criteria given in The Noise Insulation (Railway and Other Guided Transport Systems) Regulations, Reference 2.
- 5.4 The purpose of the background sound surveys is to identify the specification for sound escape and impact from the development on the nearby sound sensitive locations (NSSL), which may be calculated and rated according to BS 4142, Reference 4.
- 5.5 A brief description of BS 4142 is given in Appendix 1.

6. Retail Units

- 6.1 The Transport Interchange includes retail spaces within its building envelope, the Retail Units referred to in this report are located to the north-east corner of the site boundary and are separate from the Transport Interchange building.
- 6.2 The measured ambient and maximum sound levels may be used to inform the design of building façades and ventilation strategies to meet required internal sound levels.
- 6.3 The purpose of the background sound surveys is to identify the specification for sound escape and impact from the Retail Units on the NSSL, which may be calculated and rated according to BS 4142.

7. Planning validation criterion

- 7.1 The NSSL have not been identified at this point in the development stage.
- 7.2 NSSL are usually defined as residential dwellings; it is understood that the regeneration development will not include new residential dwellings.
- 7.3 The range of sound survey locations are intended to provide representative background sound levels for any existing or proposed dwellings which have the potential to be affected by sound associated with other aspects of the development.
- 7.4 Details of the proposed developments potential operational hours are not understood at this time.
- 7.5 However it is understood that there is the potential for operations associated with the development and running of mechanical services to occur during the day, evening and night-time periods.
- 7.6 It is proposed that, when assessed according to the scope and methodology in BS 4142, cumulative sound from mechanical services or operations associated with the proposed Transport Interchange and Retail Units be limited to a rating level no greater than 5 dB above the existing background sound level.

8. Baseline sound survey

- 8.1 The existing sound environment was measured on 17th, 18th, 19th, 20th, 21st March 2015 and 7th April 2015.
- 8.2 The measurement positions are shown in Figure 1, and described in Table 2.
- 8.3 A series of measurements were undertaken at six different locations throughout the daytime and night time periods
- 8.4 Photographs of measurements in progress are shown in Figure 2 to Figure 7 inclusive.
- 8.5 Measurements were carried out in accordance with the requirements of BS 7445, Reference 3 and BS 4142, Reference 4.
- 8.6 Data was recorded in octave bands at 1 second intervals throughout each measurement period.
- 8.7 The microphone was located between 1.5 metres and 1.8 metres above ground level, except at position F2 where the microphone was positioned 4 metres above ground level to take direct measurements of Metro train passes.
- 8.8 All measurement positions were away from other reflecting surfaces, such that the measurements are considered free-field.
- 8.9 Measured A-weighted broadband and octave band noise levels along with weather conditions and a summary of noise sources affecting the measurements are shown in Table 3 to Table 16 inclusive.
- 8.10 The meter was calibrated before and after each measurement without any significant deviation in sensitivity.
- 8.11 Calculated single event levels (L_{AE}) for Metro passes measured at position F2 are shown in Table 16.
- 8.12 Sound level meters, calibrators and filters have current UKAS calibration certificates traceable to national standards.
- 8.13 The equipment used is listed in Table 1.

Equipment	Model	Serial no.
Sound Level Meter	Norsonics 140	1403423
Calibrator	Norsonics 1251	32198
Sound Level Meter	Norsonics 118	31697
Calibrator	Norsonics 1251	31286
Sound Level Meter	Norsonics 118	30515
Calibrator	Norsonics 1251	31714

Table 1: Equipment used

Position	Location	Latitude, Longitude
A	Smithy Street	54° 59' 52.77" N 1° 26'02.47"W
B	King Street	54° 59' 54.22" N 1° 26'02.83"W
C	Fowler Street	54° 59' 54.27" N 1° 25'54.42"W
D	Prince George Square	54° 59' 51.50" N 1° 25'51.23"W
E	Burrow Street	54° 59' 49.17" N 1° 25'55.47"W
F1 & F2	Garden Lane	54° 59' 44.55" N 1° 25'57.26"W

Table 2: Measurement position locations

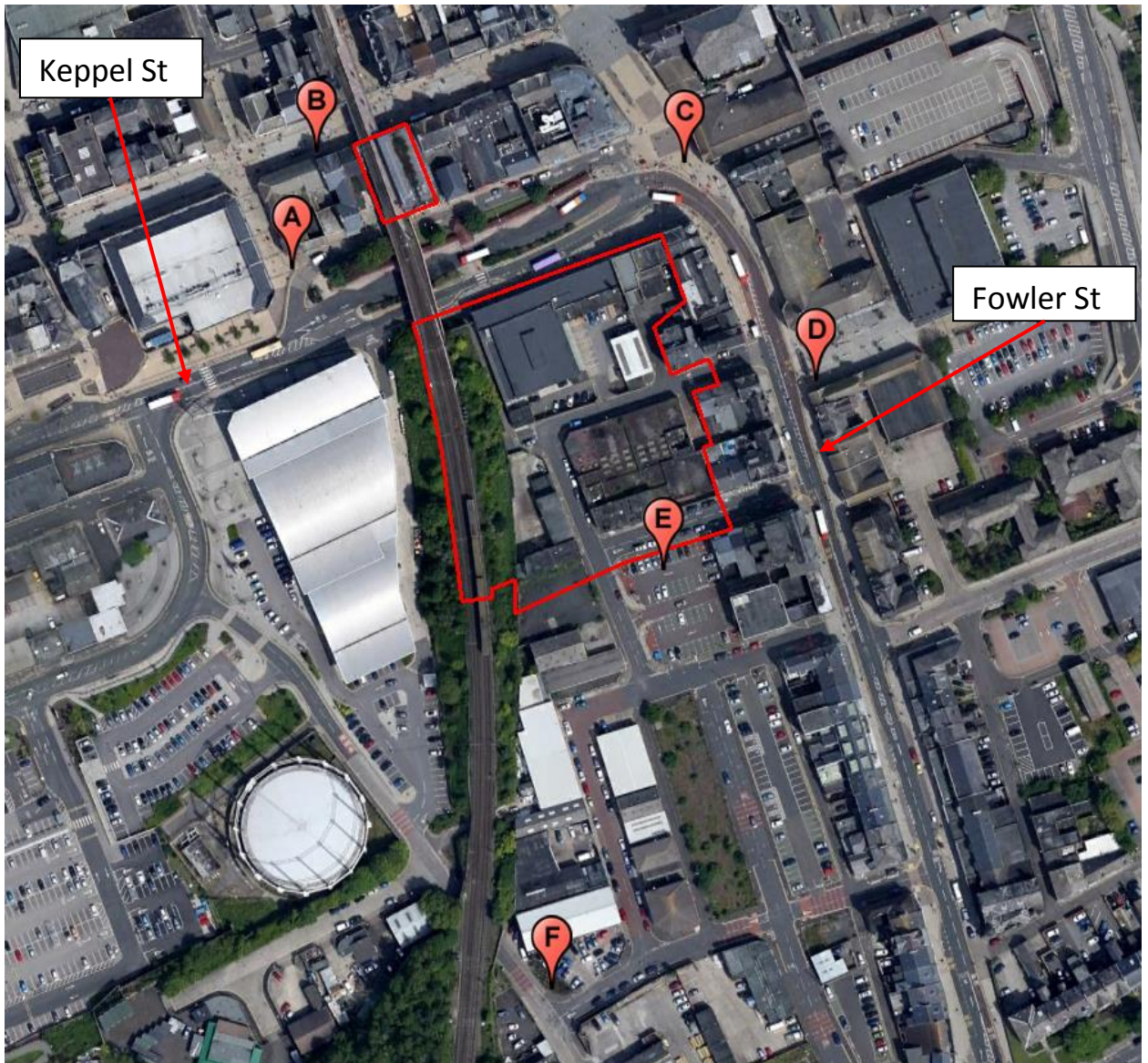


Figure 1: Site boundary and measurement positions

9. Method of plant sound design compliance

- 9.1 It is proposed to assess each potential source of sound from the proposed development, which may include mechanical services and external plant.
- 9.2 The combined impact from all plant operating simultaneously, as a worst case condition, should not exceed the performance standard required.

10. Conclusion

- 10.1 The measurements were successfully conducted in accordance with BS 7445:1991 and BS 4142:2014, and the results have been presented in the appropriate format.
- 10.2 The measured background levels provide benchmarks against which potential noise impact may be assessed.
- 10.3 Potential noise from each source may be assessed as plant is specified.
- 10.4 Where the calculated noise impact exceeds the performance specification at nearby sound sensitive locations, remedial measures may be proposed.
- 10.5 Remedial measures may include attenuator specifications, acoustic enclosures or barriers, and attenuated louvre specifications.
- 10.6 The measured ambient and maximum noise levels may be used to inform building façade and ventilation design development to meet required internal ambient noise levels.
- 10.7 The measured ambient noise levels and calculated Metro L_{AE} may be used to inform an assessment of Metro train noise impact.

11. References

1. Architect's drawings, South Shields 365 Regeneration MASTERPLAN, South Shields Town Centre, Detailed Application Red Line Plan, 12569B_1001, The Harris Partnership
2. The Noise Insulation (Railways and Other Guided Transport Systems) Regulations, 1996.
3. BS 7445:1991, Description and measurement of environmental noise.
4. BS 4142: 2014, Methods for rating and assessing industrial and commercial sound.



12. Figures – sound surveys in progress



Figure 2: Position A – Smithy Street



Figure 3: Position B – King Street



Figure 4: Position C – Fowler Street



Figure 5: Position D – Prince George Square



Figure 6: Position E – Burrow Street

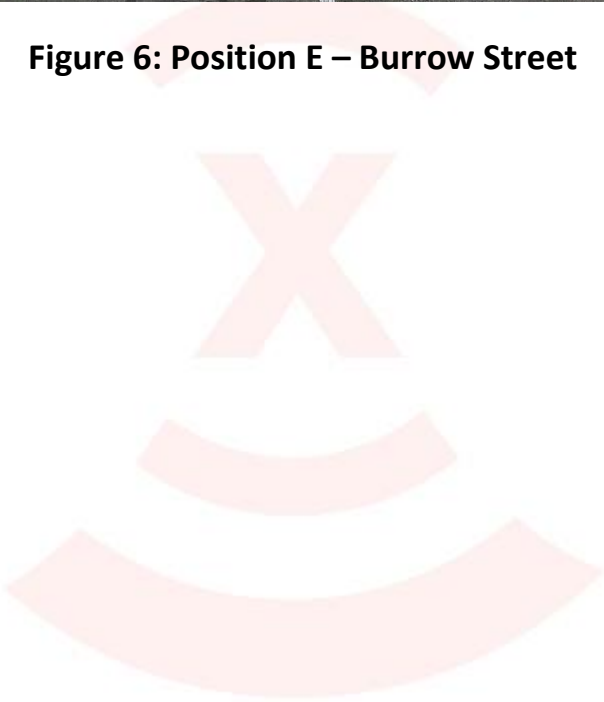




Figure 7: Position F1 and F2 – Garden Lane

13. Measured sound levels

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
A	17/03/15	14:46	8	< 1	100	L _{Aeq} , 15 min	60	45	48	52	54	56	52	46
						L _{AFmax}	74	59	63	67	67	72	69	62
						L _{A90} , 15 mins	52	32	36	42	46	47	43	37
A	18/03/15	13:49	7	< 2	75	L _{Aeq} , 15 min	60	44	48	51	54	56	52	46
						L _{AFmax}	74	60	65	65	68	72	72	67
						L _{A90} , 15 mins	54	34	39	44	48	49	45	40
A	20/03/15	02:21	2	< 1	100	L _{Aeq} , 15 min	45	23	28	34	37	43	37	28
						L _{AFmax}	66	41	45	53	58	65	56	47
						L _{A90} , 15 mins	36	19	25	29	29	29	24	17
A	07/04/15	20:03	13	< 2	100	L _{Aeq} , 15 min	62	41	47	50	52	58	55	53
						L _{AFmax}	75	62	65	64	68	74	72	73
						L _{A90} , 15 mins	49	28	36	38	40	45	41	34

Table 3: Measured A-weighted noise levels at Position A – Smithy Street

Period	Summary of noise sources
Daytime	Metro train passes, road traffic including buses, pedestrians talking / walking, seagulls
Evening	Metro train passes, road traffic including buses, pedestrians talking / walking, seagulls
Night-time	Seagulls, clock chimes, pedestrians talking

Table 4: Summary of noise sources at Position A – Smithy Street

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
B	17/03/15	15:00	8	< 1	100	L _{Aeq} , 15 min	64	41	48	55	58	59	56	53
						L _{AFmax}	79	63	64	72	74	75	78	73
						L _{A90} , 15 mins	55	29	39	45	49	49	46	41
B	18/03/15	14:05	7	< 2	75	L _{Aeq} , 15 min	60	36	41	49	55	56	52	46
						L _{AFmax}	79	53	57	73	77	73	71	65
						L _{A90} , 15 mins	54	29	37	44	49	49	46	41
B	20/03/15	01:46	2	< 1	100	L _{Aeq} , 15 min	48	23	30	36	42	45	38	33
						L _{AFmax}	68	33	41	52	59	66	59	58
						L _{A90} , 15 mins	39	20	25	30	32	33	27	18
B	07/04/15	19:46	13	< 2	100	L _{Aeq} , 15 min	57	38	40	43	48	54	51	46
						L _{AFmax}	77	60	59	61	69	75	73	72
						L _{A90} , 15 mins	46	23	28	34	40	42	37	30

Table 5: Measured A-weighted noise levels at Position B – King Street

Period	Summary of noise sources
Daytime	Metro train passes, road traffic including buses, pedestrians talking / walking, seagulls
Evening	Metro station tannoy, road traffic, pedestrians talking / walking, seagulls
Night-time	Music audible from nightclub, clock chimes, pedestrians talking / walking, seagulls

Table 6: Summary of noise sources at Position B – King Street

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
C	17/03/15	15:20	8	< 1	100	L _{Aeq} , 15 min	66	50	55	57	58	61	59	55
						L _{AFmax}	86	67	76	72	72	80	81	82
						L _{A90} , 15 mins	56	35	40	46	49	51	48	42
C	18/03/15	13:30	7	< 2	75	L _{Aeq} , 15 min	66	51	54	60	59	61	59	54
						L _{AFmax}	82	68	71	81	78	79	77	73
						L _{A90} , 15 mins	57	38	43	47	50	51	48	42
C	20/03/15	03:03	2	< 1	100	L _{Aeq} , 15 min	60	38	38	47	52	58	53	43
						L _{AFmax}	88	70	68	76	81	85	82	73
						L _{A90} , 15 mins	39	23	30	33	31	32	28	21
C	07/04/15	20:22	13	< 2	100	L _{Aeq} , 15 min	65	49	49	55	56	60	59	54
						L _{AFmax}	85	70	67	78	77	81	81	76
						L _{A90} , 15 mins	50	29	34	40	43	46	43	37

Table 7: Measured A-weighted noise levels at Position C – Fowler Street

Period	Summary of noise sources
Daytime	Bus passes, Metro train passes, pedestrians talking
Evening	Bus passes, Metro train passes, pedestrians talking, seagulls
Night-time	Seagulls, infrequent road traffic, infrequent pedestrians walking, bottle bin emptied

Table 8: Summary of noise sources at Position C – Fowler Street

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
D	17/03/15	15:35	8	< 1	100	L _{Aeq} , 15 min	65	46	51	55	57	61	60	56
						L _{AFmax}	87	66	69	70	76	84	86	81
						L _{A90} , 15 mins	53	30	40	44	47	48	44	37
D	18/03/15	13:11	7	< 2	75	L _{Aeq} , 15 min	64	46	50	54	55	60	56	51
						L _{AFmax}	81	64	68	69	75	79	74	70
						L _{A90} , 15 mins	52	31	38	43	46	47	43	37
D	19/03/15	22:10	2	< 1	100	L _{Aeq} , 15 min	60	43	47	54	55	54	51	43
						L _{AFmax}	78	66	67	73	74	73	69	63
						L _{A90} , 15 mins	49	30	36	42	44	42	38	28
D	20/03/15	00:52	2	< 1	100	L _{Aeq} , 15 min	55	40	45	46	50	50	47	38
						L _{AFmax}	69	58	59	62	66	67	66	58
						L _{A90} , 15 mins	48	29	36	40	41	39	34	25

Table 9: Measured A-weighted noise levels at Position D – Prince George Square

Period	Summary of noise sources
Daytime	Seagulls, bus passes, pedestrians talking, people talking at bus stops, music audible from public house when doors open, clock chimes
Evening	Bus passes, pedestrians talking, people talking at bus stops, music audible from public house when doors open
Night-time	Seagulls, bus passes, pedestrians talking, people talking at bus stops, people shouting in public house smoking area, music audible from public house when doors open, clock chimes

Table 10: Summary of noise sources at Position D – Prince George Square

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
E	17/03/15	15:42	8	< 1	100	L _{Aeq} , 15 min	56	38	41	47	48	53	48	41
						L _{AFmax}	71	53	55	62	64	69	64	56
						L _{A90} , 15 mins	48	31	37	43	39	41	38	30
E	18/03/15	12:29	7	< 2	75	L _{Aeq} , 15 min	62	42	45	51	53	58	56	50
						L _{AFmax}	77	60	64	69	71	73	73	73
						L _{A90} , 15 mins	48	33	37	42	40	43	39	31
E	19/03/15	21:47	2	< 1	100	L _{Aeq} , 15 min	53	35	36	42	45	50	44	38
						L _{AFmax}	71	53	51	61	64	70	64	64
						L _{A90} , 15 mins	43	28	31	35	37	39	32	22
E	20/03/15	00:34	2	< 1	100	L _{Aeq} , 15 min	49	30	34	37	39	46	42	34
						L _{AFmax}	70	48	56	60	60	69	64	57
						L _{A90} , 15 mins	39	25	29	30	34	35	27	16

Table 11: Measured A-weighted noise levels at Position E – Burrow Street

Period	Summary of noise sources
Daytime	Distant road traffic and occasional local road traffic, Metro train passes, clock chimes, seagulls, pedestrians talking
Evening	Local and distant road traffic, Metro train passes, clock chimes
Night-time	Seagulls, infrequent road traffic, clock chimes

Table 12: Summary of noise sources at Position E – Burrow Street

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
F1	18/03/15	10:33	7	< 2	75	L _{Aeq} , 30 min	66	45	50	54	57	63	59	51
						L _{AFmax}	81	63	74	72	75	79	79	70
						L _{A90} , 30 mins	54	33	37	42	45	50	46	38
F1	18/03/15	16:12	7	< 2	75	L _{Aeq} , 30 min	68	46	50	55	59	65	61	52
						L _{AFmax}	82	69	70	74	76	79	74	67
						L _{A90} , 30 mins	52	31	35	41	44	49	45	34
F1	19/03/15	23:21	2	< 1	100	L _{Aeq} , 30 min	61	39	44	49	53	59	53	43
						L _{AFmax}	81	64	66	72	75	79	74	66
						L _{A90} , 30 mins	38	23	25	30	32	34	25	13

Table 13: Measured A-weighted noise levels at Position F1 – Garden Lane

Position	Date	Start time hh:mm	Temp °C	Wind speed m/s	Cloud %	Parameter	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
F2	17/03/15	16:19	8	< 1	100	L _{Aeq} , 30 min	65	41	46	52	56	62	58	50
						L _{AFmax}	82	57	68	70	75	80	71	71
						L _{A90} , 30 mins	55	31	36	43	46	51	48	38
F2	18/03/15	10:37	8	< 2	75	L _{Aeq} , 30 min	71	52	60	65	65	65	61	54
						L _{AFmax}	90	72	76	81	83	84	87	78
						L _{A90} , 30 mins	63	40	46	52	56	59	55	47
F2	19/03/15	20:30	2	< 1	100	L _{Aeq} , 30 min	65	46	48	53	56	62	57	47
						L _{AFmax}	82	74	71	75	75	81	72	63
						L _{A90} , 30 mins	43	28	31	34	37	40	32	17

Table 14: Measured A-weighted noise levels at Position F2 – Garden Lane

Period	Summary of noise sources
Daytime	Metro train passes, clock chimes, pedestrians shouting, seagulls, emergency vehicle sirens,
Evening	Clock chimes, Metro train passes, occasional local road traffic
Night-time	Metro train passes, clock chimes, seagulls

Table 15: Summary of noise sources at Position F1 / 2 – Garden Lane

Position	Noise Source	Calculation Interval	L _{AE}	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
F2	Metro Train	17/03/2015 16:31:08 - 17/03/2015 16:31:27	86	58	70	74	80	84	76	67
F2	Metro Train	17/03/2015 16:43:11 - 17/03/2015 16:43:24	85	60	68	72	78	83	75	69
F2	Metro Train	18/03/2015 10:42:56 - 18/03/2015 10:43:11	87	63	72	77	80	85	78	71

Table 16: L_{AE} for Metro passes at Position F2, microphone at a height of 4m and approx. 26 m from the track edge, octave band levels A-weighted

14. Appendix 1: Assessment guidance of BS 4142

- 14.1 The principal guidance for the assessment of industrial and/or commercial sound impact is BS 4142, reference 1. This method involves the determination of a specific sound level due to the source in question at the Nearest Sound Sensitive Location (NSSL), thence a rating level.
- 14.2 The difference between the rating level and background level at the NSSL is calculated. According to BS 4142:
- 14.3 *Typically, the greater this difference, the greater the magnitude of the impact.*
- 14.4 *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- 14.5 *A difference of around + 5dB is likely to be an indication of an adverse impact, depending on the context.*
- 14.6 *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific source having a low impact, depending on the context.*
- 14.7 *Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*
- 14.8 It may be considered that for broadband sound sources, a level of 10 dB below the background is generally indiscernible above the background sound.
- 14.9 BS 4142 required a rating level to be calculated based on the character of the specific sound.

14.10 The rating level is calculated by adding a character correction to the specific sound. The character correction can be determined in three different ways:

- Subjective method
- Objective methods for tonality
- Reference method

14.11 Character corrections range between 3 dB and 9 dB depending on perceptibility.

14.12 The reference time periods according to BS 4142 during the night (23:00 - 07:00) is fifteen minutes; during the day (07:00 - 2300 hrs) it is one hour.

14.13 A short glossary is included at the end of this report. References quoted should be consulted for more extensive descriptions and definitions.