

Environmental sound report

South Shields Outline Masterplan

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1. Revision register

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A	First Issue	RAH	9/6/16
B	Title, client, para. 3.1 revised	RAH	30/6/16
C	Client address removed	RAH	30/6/16

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3. Summary

- 3.1 This report has been prepared for Muse Developments and South Tyneside Council in support of a Planning Application for the Outline Masterplan of South Shields centre.
- 3.2 The measured ambient and maximum sound levels may be used to inform building façade and ventilation design for proposed developments.
- 3.3 Background sound levels at locations around the proposed development site have been measured. Plant details are not available at this stage.
- 3.4 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.
- 3.5 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 Development and regeneration of some areas of central South Shields has been proposed.
- 4.2 The proposed site boundary is taken from architects' drawings, Reference 1, and is shown in Figure 1.
- 4.3 Apex Acoustics has been commissioned to carry out a series of baseline sound surveys and compile subsequent data for the proposed South Shields Regeneration development.
- 4.4 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.
- 4.5 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 2.
- 4.6 A brief description of BS 4142 is given in Appendix 1.

5. Planning validation criterion

- 5.1 The NSSL have not been identified at this point in the development stage.
- 5.2 NSSL are usually defined as residential dwellings; it is not understood if the regeneration development will include new residential dwellings.
- 5.3 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.
- 5.4 As details of the proposed developments are not understood at this time, potential operational hours are also unknown.
- 5.5 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.
- 5.6 It is proposed that, when assessed according to the methodology in BS 4142, sound from mechanical services be limited to a rating level no greater than 5 dB above the existing background sound level.

6. Baseline sound survey

- 6.1 The existing sound environment was measured on 17th, 18th, 19th, 20th, 21st March 2015 and 7th April 2015.
- 6.2 The measurement positions are shown in Figure 1 and described in Table 2.
- 6.3 A series of measurements were undertaken at eight different locations throughout the daytime and night time periods.
- 6.4 Photographs of measurements in progress are shown in Figure 2 to Figure 9 inclusive.
- 6.5 Measurements were carried out in accordance with the requirements of BS 7445, Reference 3 and BS 4142, Reference 2.
- 6.6 Data was recorded in octave bands at 1 second intervals throughout each measurement period.
- 6.7 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.
- 6.8 All measurement positions were away from other reflecting surfaces, such that the measurements are considered free-field.
- 6.9 Measured A-weighted broadband and octave band sound levels along with weather conditions and a summary of sound sources affecting the measurements are shown in Table 3 to Table 19 inclusive.
- 6.10 The meter was calibrated before and after each measurement without any significant deviation in sensitivity.
- 6.11 Calculated single event levels (L_{AE}) for Metro passes measured at position F2 are shown in Table 20.
- 6.12 Sound level meters, calibrators and filters have current UKAS calibration certificates traceable to national standards.
- 6.13 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	Coronation Street	54° 59' 47.79" N 1° 26'08.86"W
B	Church Way/Chapter Row	54° 59' 49.96" N 1° 26'10.25"W
C	King Street, West	54° 59' 51.90" N 1° 26'11.57"W
D	Smithy Street	54° 59' 52.77" N 1° 26'02.47"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
G	Charlotte Street	54° 59' 43.44" N 1° 25'50.38"W
H	Crossgate	54° 59' 40.06" N 1° 25'51.01"W

Table 2: Measurement position locations

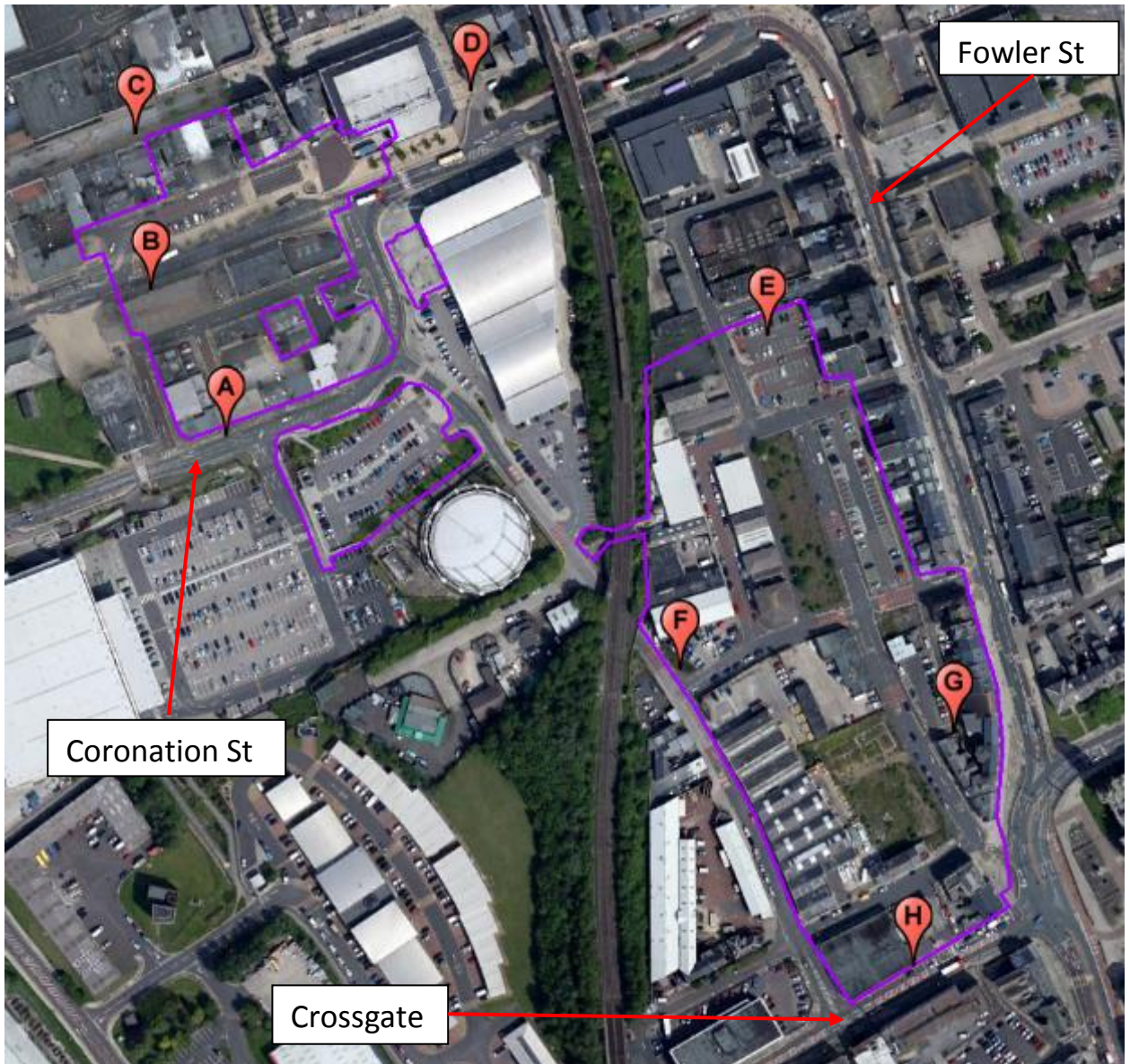


Figure 1: Site boundary and measurement positions

7. Method of plant sound design compliance

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

8. Conclusion

- 8.1 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.
- 8.2 The measured background levels provide benchmarks against which potential noise impact may be assessed.
- 8.3 Potential noise from each source may be assessed as plant is specified.
- 8.4 Where the calculated noise impact exceeds the performance specification at nearby sound sensitive locations, remedial measures may be proposed.
- 8.5 Remedial measures may include attenuator specifications, acoustic enclosures or barriers, and attenuated louvre specifications.
- 8.6 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.

9. References

- 1. Architect's drawings, South Shields 365 Regeneration MASTERPLAN, South Shields Town Centre, Outline Application Red Line Plan, 12569M_1001, The Harris Partnership.
- 2. BS 4142: 2014, Methods for rating and assessing industrial and commercial sound.
- 3. BS 7445:1991, Description and measurement of environmental noise.

10. Figures – sound surveys in progress



Figure 2: Position A – Coronation Street



Figure 3: Position B – Church Way / Chapter Row



Figure 4: Position C – King Street



Figure 5: Position D – Smithy Street



Figure 6: Position E – Burrow Street



Figure 7: Position F1 and F2 – Garden Lane



Figure 8: Position G – Charlotte Street



Figure 9: Position H – Crossgate

11. 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	13:48	8	< 1	100	L _{Aeq} , 15 min	67	44	49	55	58	64	60	53
						L _{AFmax}	80	58	64	68	72	78	75	75
						L _{A90} , 15 mins	57	38	41	46	48	53	50	42
A	18/03/15	15:07	7	< 2	75	L _{Aeq} , 15 min	67	44	49	56	59	64	59	52
						L _{AFmax}	84	63	64	73	77	82	75	71
						L _{A90} , 15 mins	56	36	39	45	48	52	49	39
A	19/03/15	22:31	2	< 1	100	L _{Aeq} , 15 min	62	41	44	49	54	60	54	46
						L _{AFmax}	82	63	64	68	75	81	74	67
						L _{A90} , 15 mins	42	30	32	33	34	37	32	21
A	20/03/15	02:45	2	< 1	100	L _{Aeq} , 15 min	52	28	33	39	43	49	46	40
						L _{AFmax}	77	48	55	65	70	75	72	62
						L _{A90} , 15 mins	39	25	30	33	31	31	26	20

Table 3: Measured A-weighted sound levels at Position A – Coronation Street

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

Table 4: Summary of sound sources at Position A – Coronation 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	14:35	8	< 1	100	L _{Aeq} , 15 min	69	49	53	60	62	64	61	58
						L _{AFmax}	88	72	78	82	85	81	79	80
						L _{A90} , 15 mins	57	38	42	46	48	53	50	43
B	18/03/15	14:49	7	< 2	75	L _{Aeq} , 15 min	68	50	53	58	60	63	61	56
						L _{AFmax}	83	69	71	74	75	78	79	76
						L _{A90} , 15 mins	58	42	45	48	52	53	49	43
B	20/03/15	01:10	2	< 1	100	L _{Aeq} , 15 min	42	29	33	34	34	37	33	26
						L _{AFmax}	59	48	47	51	53	57	51	49
						L _{A90} , 15 mins	38	25	30	31	31	30	29	22
B	07/04/15	20:42	13	< 2	100	L _{Aeq} , 15 min	63	48	49	55	55	58	55	51
						L _{AFmax}	79	71	67	74	72	75	73	70
						L _{A90} , 15 mins	48	28	34	39	42	43	39	29

Table 5: Measured A-weighted sound levels at Position B – Church Way / Chapter Row

Period	Summary of sound sources
Daytime	Road traffic including buses, pedestrians talking / walking, seagulls, clock chimes
Evening	Road traffic including busses, Metro trains, pedestrians talking / walking, clock chimes, seagulls
Night-time	Infrequent road traffic, clock chimes, seagulls

Table 6: Summary of sound sources at Position B – Church Way / Chapter Row

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	14:35	8	< 1	100	L _{Aeq} , 15 min	60	35	40	47	52	56	53	48
						L _{AFmax}	82	55	58	63	77	79	73	72
						L _{A90} , 15 mins	52	27	35	42	45	46	43	38
C	18/03/15	14:25	7	< 2	75	L _{Aeq} , 15 min	61	34	39	46	52	58	54	50
						L _{AFmax}	81	48	49	64	72	80	76	71
						L _{A90} , 15 mins	52	30	36	43	46	46	43	38
C	20/03/15	01:28	2	< 1	100	L _{Aeq} , 15 min	46	29	39	39	41	41	34	24
						L _{AFmax}	66	42	64	62	61	60	54	51
						L _{A90} , 15 mins	38	23	27	32	32	32	26	19
C	07/04/15	20:59	13	< 2	100	L _{Aeq} , 15 min	50	36	41	44	43	45	40	34
						L _{AFmax}	66	54	59	60	61	64	59	61
						L _{A90} , 15 mins	43	28	33	35	35	39	33	23

Table 7: Measured A-weighted sound levels at Position C – King Street

Period	Summary of sound sources
Daytime	Pedestrians walking / talking, seagulls
Evening	Distant road traffic, pedestrians walking / talking, seagulls
Night-time	Seagulls, clock chimes, infrequent aircraft

Table 8: Summary of sound sources at Position C – 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
D	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
D	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
D	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
D	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 9: Measured A-weighted sound levels at Position D – Smithy Street

Period	Summary of sound 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 10: Summary of sound sources at Position D – 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
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 sound levels at Position E – Burrow Street

Period	Summary of sound 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 sound 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} , 15 min	66	45	50	54	57	63	59	51
						L _{AFmax}	81	63	74	72	75	79	79	70
						L _{A90} , 15 mins	54	33	37	42	45	50	46	38
F1	18/03/15	16:12	7	< 2	75	L _{Aeq} , 15 min	68	46	50	55	59	65	61	52
						L _{AFmax}	82	69	70	74	76	79	74	67
						L _{A90} , 15 mins	52	31	35	41	44	49	45	34
F1	19/03/15	23:21	2	< 1	100	L _{Aeq} , 15 min	61	39	44	49	53	59	53	43
						L _{AFmax}	81	64	66	72	75	79	74	66
						L _{A90} , 15 mins	38	23	25	30	32	34	25	13

Table 13: Measured A-weighted sound 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} , 15 min	65	41	46	52	56	62	58	50
						L _{AFmax}	82	57	68	70	75	80	71	71
						L _{A90} , 15 mins	55	31	36	43	46	51	48	38
F2	18/03/15	10:37	8	< 2	75	L _{Aeq} , 15 min	72	53	61	65	67	67	63	57
						L _{AFmax}	100	78	89	92	95	95	93	90
						L _{A90} , 15 mins	63	39	46	52	56	58	54	47
F2	19/03/15	20:30	2	< 1	100	L _{Aeq} , 15 min	70	46	52	60	65	66	63	58
						L _{AFmax}	104	74	84	96	99	100	97	94
						L _{A90} , 15 mins	43	28	30	34	37	40	32	17

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

Period	Summary of sound 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 sound sources at Position F1 / 2 – 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
G	17/03/15	15:11	8	< 1	100	L _{Aeq} , 15 min	57	36	41	46	49	54	49	40
						L _{AFmax}	75	56	63	65	66	73	70	60
						L _{A90} , 15 mins	46	29	33	36	38	41	36	26
G	18/03/15	11:47	7	< 2	75	L _{Aeq} , 15 min	59	39	44	50	52	55	51	42
						L _{AFmax}	76	58	65	74	71	73	72	65
						L _{A90} , 15 mins	47	31	34	38	39	42	37	28
G	19/03/15	21:06	2	< 1	100	L _{Aeq} , 15 min	54	33	38	43	49	51	46	40
						L _{AFmax}	73	50	59	62	71	72	60	58
						L _{A90} , 15 mins	46	29	33	37	39	42	35	21
G	19/03/15	23:55	2	< 1	100	L _{Aeq} , 15 min	54	32	38	41	46	51	47	36
						L _{AFmax}	75	52	62	56	65	72	70	59
						L _{A90} , 15 mins	42	26	31	33	35	38	30	17

Table 16: Measured A-weighted sound levels at Position G – Charlotte Street

Period	Summary of sound sources
Daytime	Road traffic, pedestrians walking / talking, seagulls, clock chimes
Evening	Road traffic, clock chimes, pedestrians talking, seagulls, aircraft overhead, intermittent extractor fan audible
Night-time	Metro train passes, seagulls, infrequent road traffic, intermittent extractor fan audible, clock chimes

Table 17: Summary of sound sources at Position G – Charlotte 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
H	17/03/15	16:05	8	< 1	100	L _{Aeq} , 15 min	72	49	53	59	63	70	65	57
						L _{AFmax}	92	66	67	73	84	91	86	75
						L _{A90} , 15 mins	64	40	45	51	55	61	57	48
H	18/03/15	12:08	7	< 2	75	L _{Aeq} , 15 min	68	50	54	57	60	64	61	56
						L _{AFmax}	83	68	74	72	75	78	80	80
						L _{A90} , 15 mins	61	41	46	50	53	57	54	45
H	19/03/15	21:24	2	< 1	100	L _{Aeq} , 15 min	65	48	53	54	57	61	58	50
						L _{AFmax}	81	68	78	75	71	80	76	70
						L _{A90} , 15 mins	57	34	39	44	48	54	50	38
H	20/03/15	00:13	2	< 1	100	L _{Aeq} , 15 min	60	40	42	48	52	57	55	45
						L _{AFmax}	78	61	62	66	70	76	74	67
						L _{A90} , 15 mins	45	26	31	35	38	41	36	25

Table 18: Measured A-weighted sound levels at Position H – Crossgate

Period	Summary of sound sources
Daytime	Road traffic, pedestrians talking, clock chimes, seagulls
Evening	Metro train passes, pedestrians talking, road traffic, clock chimes
Night-time	Road traffic, infrequent pedestrians talking / shouting, clock chimes, seagulls

Table 19: Summary of sound sources at Position H – Crossgate

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 20: 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

12. Appendix 1: Assessment guidance of BS 4142

- 12.1 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.
- 12.2 The difference between the rating level and background level at the NSSL is calculated. According to BS 4142:
- 12.3 *Typically, the greater this difference, the greater the magnitude of the impact.*
- 12.4 *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- 12.5 *A difference of around + 5dB is likely to be an indication of an adverse impact, depending on the context.*
- 12.6 *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.*
- 12.7 *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.*
- 12.8 It may be considered that for broadband sound sources, a level of 10 dB below the background is generally indiscernible above the background sound.
- 12.9 BS 4142 required a rating level to be calculated based on the character of the specific sound.

12.10 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

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

12.12 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.

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