



Planning Noise Assessment Harvester Way, Crowland

Report ref.

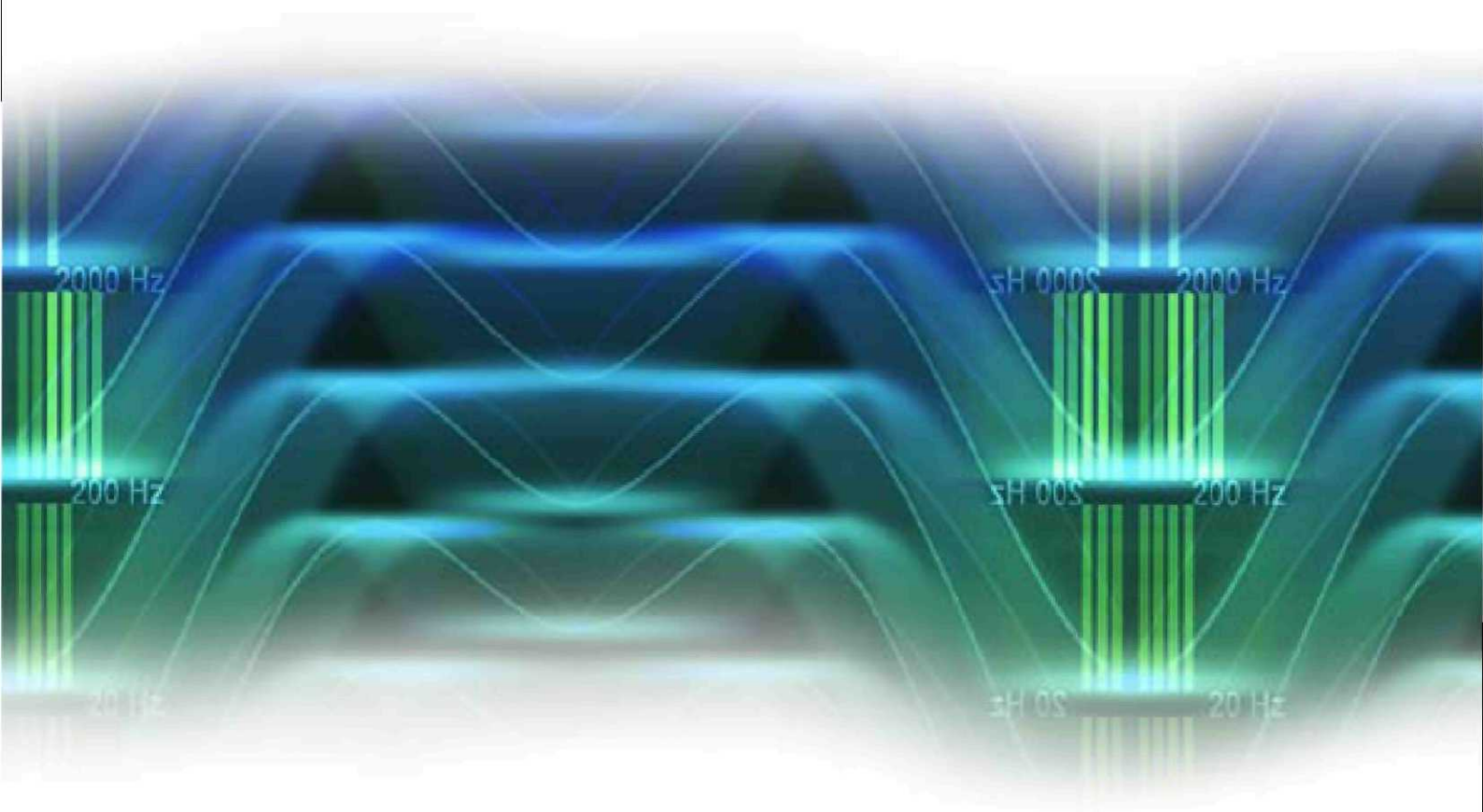
MWH1401/15168

Date

June 2015

Issued to

Wheatley Homes



Issued by

Martin Hamilton BA MEng
Principal Consultant

Spectrum
ACOUSTIC CONSULTANTS



SECTION	TITLE	PAGE
1.	INTRODUCTION	1
2.	SITE AND ACTIVITY DESCRIPTION.....	1
3.	PURPOSE AND CRITERIA FOR ACCEPTABILITY	1
4.	NOISE MEASUREMENT SURVEY	1
4.1	OBSERVATIONS	2
4.2	RESULTS	3
5.	ASSESSMENT METHODOLOGY	4
6.	ASSESSMENT	5
7.	DISCUSSION	6
8.	CONCLUSION	6

Appendix A: Site Location Plan and Site Plan

Appendix B: Site Images

Appendix C: Measurement Results

Appendix D: Assessment Calculation



1. INTRODUCTION

Spectrum have been asked by Wheatley Homes Ltd to carry out a noise survey and impact assessment for industrial noise affecting a proposed residential development at Harvester Way, Crowland. This report provides details of the survey undertaken, measurements made and the assessment calculations carried out to provide the impact assessment and conclusions.

2. SITE AND ACTIVITY DESCRIPTION

The site and the arrangement of buildings are shown on the site location plan and site plans in Appendix A. The site plan shows that the proposed housing is on a plot to the west of existing housing off Harvester Way and to the east of an existing industrial development on an area occupied by Crowland Cranes, The Stone Library and other businesses to the rear. The proposed housing nearest the industrial area is set back from the edge of the site.

Prior to the survey the Crowland Cranes site was identified as the main source of noise that could have an impact on the proposed housing. The Crowland Cranes site includes office, workshop and parking space. The workshop activities include service, repair and re-finishing. As part of the re-finishing there is a shot-blasting facility. Hours of operation on the Crowland Cranes site are understood to be 07:00 to 18:00 Monday to Saturday. The Stone Library operates out of a unit next to Crowland Cranes and carries out stone cutting and preparation for kitchen worktops.

3. PURPOSE AND CRITERIA FOR ACCEPTABILITY

The purpose of this report is to assess the industrial noise impact on the outline proposed residential development at Harvester Way, Crowland against the relevant guidance and where practical make recommendations for mitigation which will result in an acceptable noise impact when assessed in this way. In this section we consider the available guidance which has a bearing on the assessment.

The ambient noise levels at the site are low enough not to require any specific considerations with regard to noise levels other than industrial and commercial noise. Therefore the relevant guidance is contained in BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*.

The Local Planning Authority (LPA), South Holland District Council, was approached on a non-site specific basis to discuss their general criteria for use of BS4142 when considering residential properties being introduced to an environment with existing industrial/commercial operations.

They stated that while they need to consider sites individually, their general approach is to require a Rating Level as described in BS4142 of less than +5 dBA compared to the relevant Background Sound Level at the façade of the residential properties.

4. NOISE MEASUREMENT SURVEY

The measurement survey was carried out on Friday 1st May 2015 between 10:30 and 14:30. Weather conditions were good with an average wind speed of 3.6 m/s from the North East. Whilst the ambient noise measurements of traffic noise from the A16 will be affected by wind direction, this direction is



regarded as neutral for the assessment in that it will give typical results. The cloud cover varied between 30% and 80% during the survey and the temperature was 8 deg C.

The time of the survey was chosen to be representative of typical conditions for both ambient noise and the industrial noise which was the subject of the survey.

The locations are described as follows and are shown on the plan in Appendix A.

Location	Description
1 (NNSL)	At a point representative of the Nearest Noise Sensitive Location (NNSL) for the proposed residential development to the sources of noise at the Crowland Cranes site.
2 (CCSB)	At the Crowland Cranes Site Boundary (CCSB), being the closest available measurement point for the industrial noise from that site.

Table 1: Measurement locations

The following meter kits were used during the survey:

Location 1 at NNSL:

- Bruel & Kjaer Type 2260 Sound Level Meter s/n 2290597
- Bruel & Kjaer Type 4189 Microphone s/n 2919738
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2291483

Location 2 at CCSB:

- Bruel & Kjaer Type 2260 Sound Level Meter s/n 2311704
- Bruel & Kjaer Type 4189 Microphone s/n 2733049
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2688672

Prior to the surveys, the noise meters were calibrated in accordance with the manufacturer's guidelines. The meter, microphone and calibrator are calibrated biannually using equipment referenced to the British Calibration Service and the National Physical Laboratory.

For both meter kits the drift of calibration determined by comparing before and after was less than 0.03 dB and therefore acceptable.

4.1 OBSERVATIONS

The general noise environment affecting the site was observed during the survey.

At the Nearest Noise Sensitive Location (NNSL), the main noise source was observed to be traffic on local roads and particularly from the A16 which runs approximately 500 m to the south east of the site centre as can be seen on the site location plan in Appendix A. Other extraneous noise sources at the time of the survey were periodic explosive noises from a bird scarer located at the south western perimeter of the site and building noise (timber cutting and nail gun) at the south eastern perimeter which was associated with an extension being built on the existing housing.



Industrial noise from the Crowland Cranes site was audible at the NNSL and comprised at different times the following sounds.

Faint hum from main workshop
 Clattering from main workshop
 Grinding/Cutting from main workshop
 Broadband air noise from shot-blasting workshop
 Broadband shot-blasting noise from shot-blasting workshop
 Thumping from behind shot-blasting workshop
 Industrial noise from "The Stone Library" (TSL) site was not distinguishable at the NNSL.

However, when measuring at the Crowland Cranes Site Boundary (CCSB) which was also close to the TSL site boundary, the following noises could be distinguished coming from the open workshop doors.

Cutting from workshop (doors open) faintly discernible
 Radio from workshop (doors open)

The survey confirmed that the main noise sources that could have an impact on the site were from Crowland Cranes.

4.2 RESULTS

4.2.1 Location 1 - NNSL

Measurements at the NNSL were taken in 15 minute intervals and are detailed in Appendix B. The results are summarised for 1 hour periods in table 2 and show that the noise environment was very stable.

Location	Period	Start Time	Duration hh:mm	LA90 dB	L _{Aeq} dB
NNSL	01-05-2015	10:35	01:00	43.1	46.8
NNSL	01-05-2015	11:35	01:00	43.0	46.5
NNSL	01-05-2015	12:35	01:00	42.6	46.3
NNSL	01-05-2015	13:35	00:45	42.5	46.1

Table 2: Summary of measured noise levels at Location 1 (NNSL)

From this table the following values are used for the assessment.

- Ambient sound level at NNSL = 46.4 $L_{Aeq,1h}$
- Background sound level at NNSL = 43 $L_{A90,1h}$



4.2.2 Location 2 - CCSB

Short period measurements were taken at the CCSB to characterise the most significant episodes of industrial noise during the survey.

Location	Period	Start Time	Duration hh:mm	LA90 dB	LAeq dB
CCSB	01-05-2015	10:40	00:15	44.8	49.3
CCSB	01-05-2015	11:47	00:08	45.0	47.1
CCSB	01-05-2015	13:01	00:15	45.4	48.7

Table 3: Summary of measured noise levels at Location 2 (CCSB)

From this table the following values are used for the assessment.

- Ambient sound level at CCSB = 48.7 L_{Aeq}
- Background sound level at CCSB = 45 L_{A90}

5. ASSESSMENT METHODOLOGY

The assessment methodology follows the guidance contained in BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*.

The measurements at the NNSL and the CCSB provide the basis for the assessment but it was not possible to exclude the industrial and commercial sound from the Ambient Sound Level at the subject site by turning off the noise sources as no control could be exercised over the activities on site. Therefore calculation was used to determine the Residual Sound Level at the NNSL by subtracting the effect of the Specific Sound Level of the industrial noise from the Ambient Sound Level.

Equally, it was not possible to determine the Specific Sound Level of the industrial sound in the absence of the road traffic noise as the road traffic noise could not be excluded and there was no access to the industrial sites to get closer to the noise sources. Therefore calculation was used to determine the Specific Sound Level at the NNSL after correcting for road traffic noise and distance.



6. ASSESSMENT

The table below summarises the key values in the assessment showing how the Specific Sound Level of the Industrial Sources and the Acoustic Feature Correction give the Rating Level at the NNSL which is then compared with the Background Sound Level at the NNSL. The full assessment calculation is detailed in Appendix D.

Result	Value at NNSL	Commentary
Calculated Specific Sound Level of Industrial Sources	$L_{Aeq,1h} = 39$ dB	Determined by measurement at site boundary and correcting for road traffic noise and distance
Acoustic feature correction	+7 dB	A penalty of + 7 dB has been applied for the industrial noises from the site. This includes allowance for both tonal and impulsive characteristics.
Rating Level	$(39 + 7)$ dB = 46 dB	
Calculated Background Sound Level	42 dB	Determined by measurement at the NNSL and reduction to allow for some contribution from the presence of the industrial sound.
Excess of Rating Level over Background Sound Level	$(46 - 42)$ dB = 4 dB	

Table 4: Summary of assessment at NNSL

In establishing the acoustic feature correction the subjective method in BS4142 requires the surveyor to “Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.”

The observations at the NNSL were that the sounds from the workshops (clattering, grinding, cutting, broadband air and shot blasting) had tonal and impulsive characteristics and that these were at the level of perceptible. BS4142 comments that highly perceptible tonality could be given a penalty of 6 dB and highly impulsive sounds could have a penalty of up to 9 dB. In this case there are a range of different sounds, none of which is at the top of the range in terms of attracting attention given the other ambient sound. An acoustic feature correction of 7 dB has been applied which is judged to be cautiously high to allow for the range of sounds present with some margin.

With this Acoustic Feature Correction applied, the assessment finds that the Rating Level is 4 dB above the Background Sound Level at the identified NNSL. This is within the general requirement of the LPA of an excess of less than 5 dB.



7. DISCUSSION

The observations during the survey were that the dominant noise source at the proposed housing was road traffic and that external ambient noise levels at about 46 dBA L_{Aeq} are low so there is no requirement to consider any general need for noise mitigation at the housing. The measurements of averaged ambient noise levels showed that even when measuring right up at the Crowland Cranes Site Boundary the ambient sound level only increased by just over 2 dB compared with the measurements at the NNSL for the proposed housing. Therefore the industrial site at the western boundary is not particularly noisy.

However, there are recognisable acoustic features to the sound from the industrial site and hence the method of BS4142 has been used to establish a Rating Level which incorporates a cautiously high Acoustic Feature Correction of 7 dB. The assessment based on this survey has demonstrated that the impact of industrial noise at the Nearest Noise Sensitive Location of the proposed housing is 1 dB within the range considered generally acceptable by the LPA in such situations. Housing further away from the industrial area will have additional margin due to distance and, in many cases, barrier effect from houses which are closer to the industrial area. Therefore, the arrangement should be acceptable to the LPA without additional mitigation.

In addition to this, the currently proposed arrangement of the housing includes 1½ storey chalet style houses at the western end of the development closest to Crowland Cranes. If these houses are arranged so that the windows of habitable rooms are facing away from industrial areas then that gives additional protection to those rooms.

8. CONCLUSION

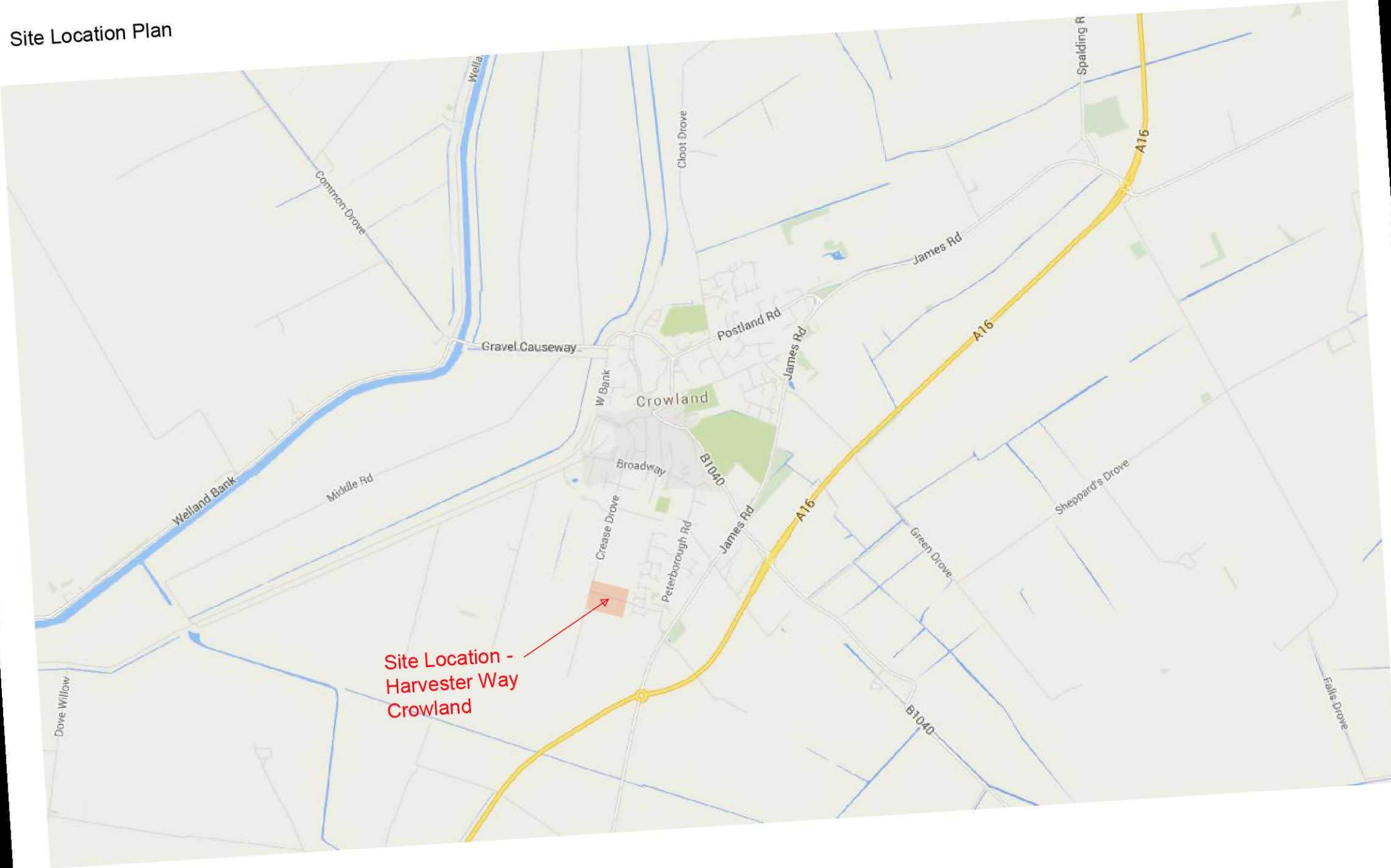
The proposed housing development at Harvester Way, Crowland is located between existing housing and an industrial area. The assessment based on this survey found that the dominant noise source at the proposed housing was road traffic. The assessment has demonstrated that the impact of industrial noise at the Nearest Noise Sensitive Location of the proposed housing is 1 dB within the range considered generally acceptable by the LPA in such situations. Additional margin will apply to housing located further away from the industrial area. Therefore, the arrangement should be acceptable to the LPA without additional mitigation. The currently proposed arrangement of the housing also includes 1½ storey chalet style houses at the western end of the development and if the windows of habitable rooms in these houses are facing away from industrial areas then that would provide an additional benefit for the proposed development in terms of noise impact.



APPENDIX A

Site Location Plan and Site Plan

Site Location Plan



Site Plan Showing Context and Measurement Locations





APPENDIX B

Site Images



Location 1
NNSL



Crowland Cranes viewed from north edge of site

Shot blasting
workshop

Location 2
CCSB

Main
workshop



Crowland Cranes site viewed from outside boundary



View towards housing at eastern edge of Site



View across to southern edge of Site



APPENDIX C

Measurement Results



ENVIRONMENTAL NOISE RECORD SHEET

Sheet 1 of 3
MWH1401/15168

Location: Location 1
Date: 01 May 2015
Calibration Times: 10:16 and 14:38
Project: Harvester Way, Crowland.
Instrumentation: B&K 2260
Plant Operating Condition:

Date	Time		Weather			Noise Level dB(A)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise)).
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	
01-05-15	10:35	15:00	3.3	NE	25	49	46	43	59	39	47	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	10:50	15:00				50	46	43	63	40	48	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:05	15:00	4.3	NE	25	48	45	43	62	40	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:20	15:00				48	45	43	61	40	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:35	15:00				49	46	44	63	41	47	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:50	15:00				49	46	43	64	37	47	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:05	15:00				48	45	42	66	39	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:20	15:00				48	45	43	59	40	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:35	15:00				48	45	43	59	38	47	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:50	15:00				48	45	42	58	38	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	13:05	15:00	2.8	NE	80	48	45	43	59	40	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	13:20	15:00				49	45	43	56	39	47	A16 and local roads. Intermittent noises from Crowland Cranes.

Date	Time	dB(A)	Octave Band Pressure Level								Comments	
			31	63	125	250	500	1k	2k	4k		8k
01-05-15	10:35	43	53	52	39	34	39	40	33	25	17	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	10:50	43	55	51	40	34	39	39	31	23	17	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:05	43	54	51	41	34	39	39	30	21	16	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:20	43	54	51	41	34	40	40	30	21	16	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:35	44	54	51	41	34	40	40	32	23	15	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	11:50	43	55	49	39	34	39	39	30	21	15	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:05	42	52	47	39	34	39	39	29	19	15	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:20	43	52	48	39	34	39	40	30	20	14	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:35	43	52	48	39	34	39	40	30	20	15	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	12:50	42	52	48	39	33	38	38	29	21	16	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	13:05	43	53	49	40	34	38	39	31	21	15	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	13:20	43	54	48	39	35	39	39	31	22	17	A16 and local roads. Intermittent noises from Crowland Cranes.



ENVIRONMENTAL NOISE RECORD SHEET

Sheet 2 of 3
MWH1401/15168

Location: Location 1
Date: 01 May 2015
Calibration Times: 10:16 and 14:38

Project: Harvester Way, Crowland.
Instrumentation: B&K 2260
Plant Operating Condition:

Date	Time		Weather			Noise Level dB(A)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise)).
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	
01-05-15	13:35	15:00	3.8	NE	30	48	45	43	59	40	47	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	13:50	15:00				48	45	43	63	40	46	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	14:05	15:00				47	44	42	59	40	46	A16 and local roads. Intermittent noises from Crowland Cranes.

Date	Time	L90 dB(A)	Octave Band Pressure Level								Comments	
			31	63	125	250	500	1k	2k	4k		8k
01-05-15	13:35	43	54	49	40	34	39	40	30	21	15	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	13:50	43	52	47	38	34	39	39	30	20	14	A16 and local roads. Intermittent noises from Crowland Cranes.
01-05-15	14:05	42	51	47	38	33	38	39	29	18	13	A16 and local roads. Intermittent noises from Crowland Cranes.
				</								



ENVIRONMENTAL NOISE RECORD SHEET

Sheet 3 of 3
MWH1401/15168

Location:	Location 2	Project:	Harvester Way, Crowland.
Date:	01 May 2015	Instrumentation:	B&K 2260
Calibration Times:	10:32 and 14:27	Plant Operating Condition:	See comments for noise from Crowland Cranes.

Date	Time		Weather			Noise Level dB(A)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise).
	Start	Dur'n (Min)	Wind Speed m/s	Wind Dir'n	Cloud (%)	L10	L50	L90	LMAX	LMIN	LAeq	
01-05-15	10:40	15:02	3.5 average	NE	25-80	52	47	45	61	43	49	Broadband shotblasting noise 7 min. Broadband air noise 15 min.
01-05-15	11:47	07:54	3.5 average	NE	25-80	48	47	45	57	42	47	Hum from main workshop. Broadband air noise.
01-05-15	13:01	15:08	3.5 average	NE	25-80	51	47	45	60	44	49	Clatter/Clang from main workshop. Repetitive bangs from within site.

Date	Time	LAeq dB(A)	Octave Band Pressure Level									Comments
			31	63	125	250	500	1k	2k	4k	8k	
01-05-15	10:40	49	66	62	53	47	44	45	42	38	30	Broadband shotblasting noise 7 min. Broadband air noise 15 min.
01-05-15	11:47	47	65	59	52	47	44	43	36	28	21	Hum from main workshop. Broadband air noise.
01-05-15	13:01	49	66	60	54	48	44	43	41	37	27	Clatter/Clang from main workshop. Repetitive bangs from within site.

Measurements at Location 1 (NNSL) - Laeq,15 min

Friday May 1st 2015



Measurements at Location 1 (NNSL) - La90, 15 min

Friday May 1st 2015





APPENDIX D

Assessment Calculation

Assessment Calculation for Rating Level of Industrial Sound from Crowland Cranes Site at the Nearest Noise Sensitive Location

Line	Location	Parameter	Descriptor	Value at NNSL dBA	Value at CCSB dBA	Note
1	NNSL	Ambient Sound Level	Laeq	46.4		Calculated as arithmetic average of measured 15 min Laeq values over 10:35 - 14:20
2	CCSB	Ambient Sound Level	Laeq		48.7	Calculated as logarithmic average of measured 2 x 15 min and 1 x 8 min period Laeq values over 10:40 - 13:20
3	CCSB	Calculated Specific Sound Level (1 st estimate)	Laeq, 1 hr		44.8	Subtract Line 1 from Line 2. 1 st estimate assumes residual sound level at CCSB is equal to ambient sound level at NNSL
4	NNSL	Calculated Specific Sound Level	Laeq, 1 hr	38.0		Hemispherical point source propagation from 50 m distance to 110 m distance. Subtract 6.8 dB from Line 3
5	NNSL	Calculated Residual Sound Level	Laeq, 1 hr	45.7		Subtract Line 4 from Line 1
6	CCSB	Calculated Specific Sound Level (2 nd estimate)	Laeq, 1 hr		45.7	Subtract Line 5 from Line 2. 2 nd estimate uses a calculated residual sound level.
7	NNSL	Calculated Specific Sound Level	Laeq, 1 hr	38.7		Hemispherical point source propagation from 50 m distance to 110 m distance. Subtract 6.8 dB from Line 6
8	NNSL	Acoustic Feature Correction		7		This includes allowance for both tonal and impulsive characteristics at the perceptible level but not highly perceptible
9	NNSL	Rating Level	Laeq, 1 hr	45.7		Add Line 8 to Line 7
10	NNSL		La90	43		Calculated as arithmetic average of measured 15 min La90 values over 10:35 - 14:20
11	CCSB		La90		45	Calculated as logarithmic average of measured 2 x 15 min and 1 x 8 min period La90 values over 10:40 - 13:20
12	NNSL	Estimated Background Sound Level	La90, 1hr	42		-1 dB correction to Line 10 to allow for the effect of Crowland Cranes site raising background sound level

www.spectrumacoustic.com

TELEPHONE: HEAD OFFICE: +44 (0)1767 318871 WIGAN: +44 (0)1257 473242