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Lidl Food Store
Botwell Lane
Hayes
Middlesex

Noise & Acoustic Report for BREEAM 2011

Reference: 6085/BL/pw **October 2015**

Lidl Food Store, Botwell Lane, Hayes
Noise and Acoustic Report for BREEAM 2011

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1.0 INTRODUCTION

Lidl appointed Acoustic Consultants Limited to provide noise and acoustic advice for the proposed Lidl Food Store at Botwell Lane, Hayes.

The proposal is to build a new Lidl Food Store on the site. The store will consist of a retail area, warehouse, welfare area and office.

The report provides noise and acoustic advice which aims to achieve the requirements of the BREEAM 2011 credits Hea 05 and Pol 05. This report addresses the following elements:

A) External Noise Control
B) Internal Room Acoustics
C) Plant Noise

The advice in this report is provided on the basis that there are no "acoustically sensitive rooms".

The author of this report is a Full Member of the Institute of Acoustics (MIOA) with a recognised acoustic qualification and over eight years' experience within the field of noise and acoustics and as such meets the BREEAM definition of a suitably qualified acoustic consultant.

The requirements of the BREEAM 2011 credits Hea 05 and Pol 05 are as follows:

1.1 BREEAM 2011

For a retail building the development would be classed as an 'Other' building type. For a building of this type there are three credits available two in Hea 05 and one in Pol 05. The credits are outlined below:

1.1.1 Hea 5

First Credit

The requirements of Hea 5 Credit 1 are as follows:

Room Function:	All room functions
Criteria:	Indoor ambient noise levels comply with the "good practice" criteria levels of BS8233:1999, Tables 5 & 6 (see additional information section) unless otherwise stated within this table. See also additional criteria below for sound insulation. Where the room types below are present, the appropriate requirements for sound insulation must also be achieved.
Credits:	1
Testing Requirement:	A suitably qualified acoustician carries out pre-completion acoustic testing to ensure that the relevant spaces (as built) achieve the required performance standards. Where testing identifies that spaces do not meet the standards, remedial works are carried out prior to handover and occupation.
Notes:	For the purposes of acoustic measurement and calculation these spaces should be considered unoccupied. Typical, appropriate noise levels are given in the table below (additional information section); the list is not intended to be exhaustive.

Second Credit

The requirements of Hea 5 Credit 2 are as follows:

Room Function:	Rooms/areas used for speech or performance, including public speaking
Criteria:	Achieve reverberation times compliant with Table 8 of BS8233 1999. In addition, or alternatively, if relevant to assessed building; classrooms, seminar rooms and lecture theatres achieve reverberation times compliant with Table 1.5 of Building Bulletin 93
Credits:	1
Testing Requirement:	As above
Notes:	Where the reverberation time required by the relevant standard is not appropriate for the type of space/building assessed, the acoustician must confirm why this is the case. In addition the acoustician must set alternative appropriate reverberation times and provide these to demonstrate compliance.

1.1.2 Pol 5

There is one credit available within Pol 5 and the credit refers to noise from a development affecting sensitive receivers around a site. The following outlines the requirements of Pol 05 of BREEAM 2011.

1. The credit can be awarded by default where there are or will be no noise-sensitive areas or buildings within 800m radius of the assessed development.

2. Where there are or will be noise-sensitive areas or buildings within 800m radius of the assessed development a noise impact assessment in compliance with British Standard 7445:199120 has been carried out and the following noise levels measured/determined:

    a. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.
    b. The rating noise level resulting from the new noise-source (see also Compliance note: Compliance at the design stage).

3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see relevant definitions in the Additional Information section).

4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (0700hrs to 2300hrs) and +3dB at night (2300hrs to 0700hrs) compared to the back-ground noise level.

5. Where the noise source(s) from the proposed site/building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion 4.

2.0 NOISE MEASUREMENTS

2.1 Monitoring Equipment

A noise survey was undertaken following the methodology of British Standard 4142:1997 in October 2013. Since that date a new British Standard 4142:2014 has been replaced. The former survey methodology is similar to the survey methodology of the new standard. We consider the former noise data to be robust enough to undertake a British Standard 4142:2014 assessment.

Sound Pressure Levels were measured using a CEL 593 Sound Level Meter with half-inch condenser microphones using the "fast" setting.

The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards. This equipment was checked and calibrated as noted below and the certificates are available for inspection. The table below provides the equipment and calibration status:

Table 1: Monitoring Equipment

Equipment Description / Manufacturer / Type	Serial number	Date of calibration	Calibration Certification Number
Real Time Analyser, CEL, Type 593	0271040	09/09/13	K043915
Pre-Amplifier, CEL, Type 527	3/0221937	09/09/13	K043915
Microphone, CEL, Type 250	4951	09/09/13	K043915
Calibrator, CEL, Type 284/2	3/02716829	09/09/13	K043916

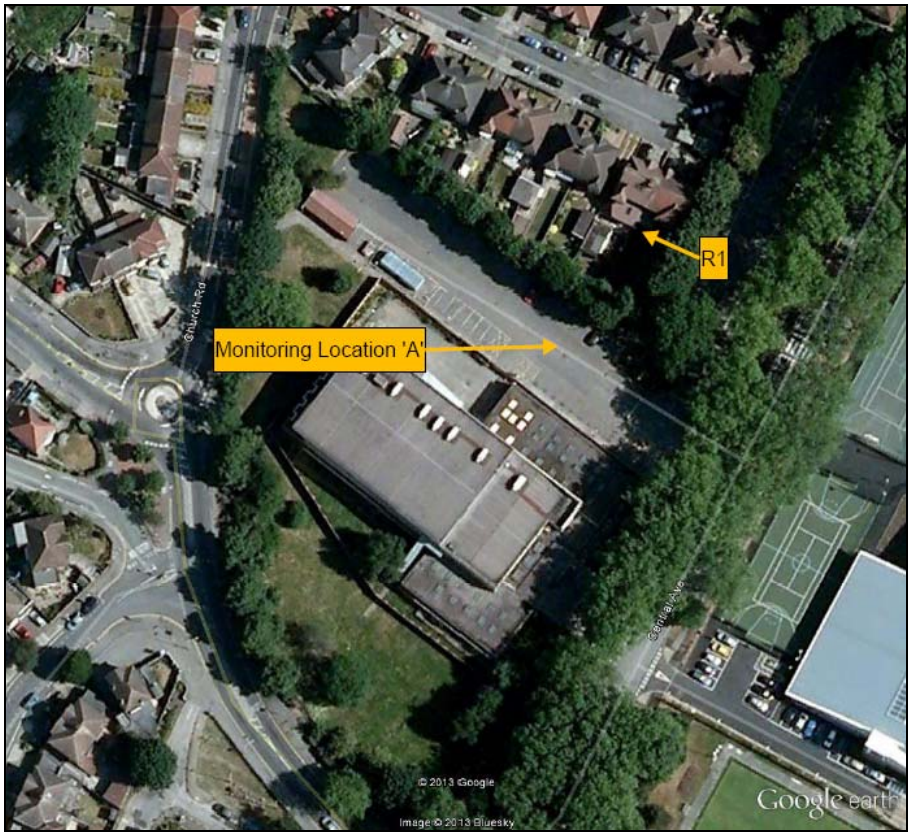
The measuring systems were checked for calibration before and after the tests and no significant drift was detected.

The monitoring was carried out in overcast conditions with a daytime air temperature of about 14 degrees Centigrade with little or no wind. These conditions are not expected to have a significant adverse effect on the measured levels. During the night time there were occasional rain showers, these have been omitted from the noise assessments.

2.2 Monitoring Procedure

Noise monitoring was undertaken for a twenty four hour period commencing at 10:30 hours on 31st October 2013. The monitoring location was at ground level in a free field position to the north of the site. The monitoring location was partially shielded from the main roads around the site by the site hoarding and considered representative of the sensitive receivers in the vicinity.

Figure 1: Monitoring Location & Existing Noise Sensitive Receiver Location



The measured baseline noise levels were determined by road traffic on the surrounding highway network and aircraft overhead.

2.3 Measured Data

The relevant measured data consists of the Equivalent Noise Level ($L_{Aeq\ (5minute)}$) and Background Sound Level ($L_{A90\ (5minute)}$) in dB (A). The results are provided in Appendix 1/6085 for 5-minute measurement time intervals and are free field levels.

The lowest measured daytime background sound level (between 07:00 and 23:00 hours) is 45 dB $L_{A90(1\ hour)}$ (free field level) and the night-time background sound level is 39 dB $L_{A90(5\ minutes)}$ (free field level).

It is appropriate to assess the noise impact of the external noise climate on the development over a one hour period. Appendix 2/6085 provides the one hour equivalent noise level ($L_{Aeq(1hr)}$) over the daytime period.

The proposed store opening hours are between 07:00 hours and 22:00 hours. From the measurement data the typical one hour equivalent noise level during this period is 52 dB $L_{Aeq\ (1\ hour)}$ (free field level) at the monitoring location.

3.0 HEA 05 FIRST CREDIT - INTERNAL NOISE LEVELS

3.1 Criteria

To achieve the first credit of BREEAM 2011 Hea 05 all rooms of the development need to achieve internal ambient noise levels that comply with the "good practice" criteria levels of British Standard 8233:1999, Tables 5 & 6. The relevant criteria derived from Tables 5 and 6 of British Standard 8233:1999 are provided below:

Table 2: Maximum Indoor Ambient Noise Levels

Type of Room	Criteria L_{AeqT}
Shop Floor	50-55 dB
Toilets	45-55 dB
Staff Room	35-45 dB
Office	40-50 dB

This is in respect to noise from external sources outside (such as road traffic) and building services. The main source of noise at present affecting the site is road traffic noise from the local road network.

3.2 Predicted Façade Noise Levels

Monitoring location A was within the centre of the site approximately 90 metres from the edge of the carriageway of Botwell Lane/Church Road.

The nearest façade of the Lidl Store to the road is 20 metres away, distance correction using the formulas for the line noise propagation of a line source gives an increase in noise levels of +10 dB to the Lidl Store façade from the levels measured at Location A.

The site was hoarded with a 2.5 metre high light weight timber fence along the site boundary, this barrier is expected to have attenuated the measured noise levels by about 3 dB. Therefore the measured levels at Location 'A' should be increased by 3 dB.

As such from the measured data and taking into account the above corrections the following free-field octave band design equivalent noise levels have been determined:

Table 3: Design Equivalent Noise Level ($L_{eq\ (1\ hour)}$)

Parameter	63	125	250	500	1k	2k	4k	8k	dBA
$L_{eq\ (1\ hour)}$ dB	73	66	65	66	55	54	41	47	65

3.3 Building Façade Design

The building fabric construction and ventilation provisions should be designed such that the internal noise levels do not exceed the British Standard 8233 criteria in Table 3 above within all spaces of the development.

The following sections assess the sound insulation of the proposed building and provide advice on the construction of the buildings to control external noise based on the noise modelling results. It is proposed that the following building construction elements be incorporated into the design of all external façades and roof unless otherwise stated.

3.3.1 External Walls

The external walls comprise of 365 millimetre Fire Clay Insulated Building Blocks (Poroton cellular block). The walls are either to be rendered with a 20 millimetre render or alternatively clad in a metal rain screen cladding.

With all joints and cavities in the block fully filled with mortar we would expect this construction to achieve the following minimum sound reduction indices:

Table 4: Expected Sound Reduction Indices of External Walls

Frequency (Hz)	63	125	250	500	1k	2k	4k
SRI (dB)	40	40	42	45	56	66	73

3.3.2 Roof Construction

The roof is of a lightweight construction comprising of a single ply membrane. This construction is expected to achieve the following minimum sound reduction index.

Table 1: Expected Sound Reduction Index of Roof

Octave Band Centre Frequency (Hz)	63	125	250	500	1k	2k	4k
SRI (dB)	24	24	29	31	32	30	35

Within the first floor rooms there will be a plasterboard ceiling above the rooms.

3.3.3 Windows & Glazed Doors

There are glazed external windows to the Shop Floor and Staff Room only.

Shop Floor

The proposed glazing to the shop floor comprises of a double glazed unit. The glazing will need to achieve the following minimum sound reduction indices:

Table 6: Minimum Sound Reduction Indices of Shop Floor Glazing

Frequency (Hz)	63	125	250	500	1k	2k	4k
SRI (dB)	16	21	20	31	39	37	47

The above sound reduction indices are achievable with the proposed double glazed unit of 6.4 millimetre laminate glass a 16 millimetre cavity and a final layer of 6.4 millimetre laminated glazing.

The manufacturer should confirm that the above sound reduction indices are achievable when tested in accordance with British Standard EN ISO 140-3.

Staff Room & Office

The proposed glazing to the staff room and office comprises of a double glazed unit. The glazing will need to achieve the following minimum sound reduction indices:

Table 7: Minimum Sound Reduction Indices of Staff Room Glazing

Frequency (Hz)	63	125	250	500	1k	2k	4k
SRI (dB)	21	26	27	34	40	38	45

This could be achieved with a double glazed unit of 10 millimetre glass a 12 millimetre cavity and a final layer of 6 millimetre glazing.

The manufacturer should confirm that the above sound reduction indices are achievable when tested in accordance with BS EN ISO 140-3.

3.3.4 Ventilation

External Noise Control

All spaces of the development are to be mechanically ventilated. The ventilation system will need to be suitably attenuated to ensure external noise is controlled.

To control external noise we would advise that the ventilation system achieves a sound level difference of at least 30 dB(A) outside to inside. The M&E installer/supplier should confirm the above sound reduction is achievable.

Building services Noise Levels

In addition the ventilation and air conditioning system will need to be designed to ensure building services noise does not impact on the overall noise levels within the spaces of the development.

To ensure the BREEAM limits are not exceeded we would advise that the noise from all building services plant should not exceed the following plant noise limits within the sensitive spaces of the development:

Table 8: Maximum Building Services Noise Levels

Type of Room	Criteria $L_{Aeq(T)}$
Shop Floor	45 dB
Toilets	45 dB
Staff Room	35 dB
Office	40 dB

The M&E installer/supplier should confirm the above plant noise limits are achievable.

3.4 Compliance with BREEAM

With the proposed external building façade constructions, ventilation provisions detailed above the predicted internal noise levels are within the criteria of British Standard 8233:1999 and as such the criteria in the First Credit of BREEAM Hea 5 is achieved.

4.0 HEA 05 SECOND CREDIT – REVERBERATION TIME

The second Hea 5 credit applies to the control of reverberation in areas used for "speech or performance".

In terms of a food store typically the only rooms which would be considered to be used for "speech or performance" are meeting rooms or boardrooms. The proposed development has no rooms of this type. Note CN2 of Hea 5 states:

"Building types without areas "used for speech" Where a building type (other than education, healthcare, multi-residential types) does not have areas "used for speech", it does not need to comply with the relevant reverberation criteria. In these instances, the two available credits can be awarded where the building complies with the indoor ambient noise level and, if relevant, sound insulation criteria."

Therefore the above credit can be awarded by default as long as the internal ambient noise level requirements (Hea 5, credit 1) are achieved.

5.0 POL 05 - PLANT NOISE

The BREEAM credit POL 05 requires noise emitted from the site to be controlled. The main noise emitting elements consist of the building services plant.

5.1 Proposed Scheme

The Lidl Food Store is to be located on the former site of a public swimming baths which have now been demolished leaving a vacant site. The site is on the corner of Botwell Lane and Central Avenue.

The proposal is for a new build two storey Lidl Food Store on the site. The store will have the retail area/warehouse at ground level with offices/welfare spaces on the upper floor. The Lidl Food Store will have a number of refrigeration and air handling plant. The Lidl plant will be located on the northern elevations of the building adjacent to the delivery bay.

The most sensitive residential properties, in terms of plant noise are the existing dwellings along Holmbury Gardens (Location R1) to the north approximately 65 metres to the north of the proposed plant and delivery bay location.

The proposed opening hours of the store are between 07:00 and 22:00 hours Monday to Saturday and 10:00 to 18:00 hours Sundays and Bank Holidays.

5.2 Plant Noise Criteria

To be within the BREEAM criteria the rating noise level of the plant should be no more than +5 dB above background noise level during the daytime and +3 dB during the night-time period.

The local authority apply a more stringent criteria of a plant rating sound level at least -5 dB below the background sound level. This is more onerous than the BREEAM Pol 5 requirements and as such the criteria we have worked to.

Therefore to achieve both BREEAM Pol 5 and the planning requirements plant rating noise level should not exceed the following:

- Daytime - 40 dB $L_{Ar\ (1\ hour)}$ (free field level)
- Night-time - 34 dB $L_{Ar\ (5\ minutes)}$ (free field level)

5.3 Proposed Plant

The plant is to be located on the northern elevation of the store adjacent to the delivery bay. The following table provides a schedule of the proposed plant along with the individual unit sound pressure level at a given distance in a free-hemispherical field. The noise data is taken directly from the manufacturer's noise data as supplied by Lidl.

Table 9: Proposed Plant

Plant Type	Manufacturer	Model Number	Quantity	Height Above Ground (metres)	Individual Unit Sound Pressure Level $L_{Aeq(T)}$
Refrigeration	Guntner	GFW 090.1/3-E(J)-F4/04/6P	1	2	37 dB at 10 metres
Bakery	Rivacold Deutschland	THCL145Z-ZF13-EVI	1	1	41 dB at 10 metres
Air conditioning	Mitsubishi	FDC200VS	1	3	57 dB at 1 metre
Air conditioning	Mitsubishi	FDC250VS	2	3	58 dB at 1 metre
Air conditioning	Mitsubishi	FDC112KXEN6	1	3	54 dB at 1 metre

Any alternative plant should have an equal or lower noise emission level (dB) in a hemispherical free-field.

All plant will be operational 24 hours a day according to demand. There will be a lower demand during the night-time period as the plant will only operate when the ambient temperature is very high.

5.4 Predicted Noise Level

Plant noise levels at the nearby residential properties have been predicted based on the plant noise levels and distance correction of a point source.

The most sensitive residential properties are the dwellings along Holmbury Gardens 65 metres to the north of the site.

The noise sources will include reflections off the building which will increase the noise emission level by about 3 dB.

The following tables provide the corrections to the stated manufacturer's noise levels to determine plant noise levels at the nearby residential properties.

Table 10: Predicted noise levels at R1

Unit	Manufacturers Sound Pressure Level $L_{Aeq(T)}$	Distance Correction To R1	Reflection	Barrier Correction	Predicted Level at R1 $L_{Aeq\ (15\ minutes)}$
Refrigeration Plant	37 dB(A) @ 10m	-16 dB	+3 dB	0 dB	24 dB(A)
FDC200VS	57 dB(A) @ 1m	-36 dB	+3 dB	0 dB	24 dB(A)
FDC250VS	58 dB(A) @ 1m	-36 dB	+3 dB	0 dB	25 dB(A)
FDC250VS	58 dB(A) @ 1m	-36 dB	+3 dB	0 dB	25 dB(A)
FDC112KXEN6	54 dB(A) @ 1m	-36 dB	+3 dB	0 dB	21 dB(A)
Bakery Plant	41 dB(A) @ 10m	-16 dB	+3 dB	0 dB	28 dB(A)

This results in a predicted cumulative free-field specific noise level of 33 dB $L_{Aeq\ (15\ minutes)}$ at R1 which is very low.

5.5 Plant Noise Assessment

The plant will operate on a 24-hour basis according to demand. A night-time assessment has been undertaken at the sensitive receivers around the site. This is the worse case time.

Based on the measured baseline noise levels the cumulative plant free-field rating noise level should not exceed 34 dB $L_{Ar(5\ minutes)}$ (free-field level) during the night to achieve the BREEAM criteria.

The predicted specific noise level is lower than the background noise level and as such we would expect any tonality, intermittency of the plant will not be distinguishable at the sensitive receivers and an acoustic feature correction is not applicable in this case. The Pol 5 plant assessment is as follows:

Table 11: Pol 5 Assessment at R1

	Location R1
Specific Noise Level, $L_{Aeq(5minutes)}$	33 dB
Acoustic Feature Correction	+0 dB
Rating Level, $L_{Ar(5\ minutes)}$	33 dB
Within Criteria of 34 dB $L_{Ar(5\ minutes)}$	Yes

This means that the plant noise level will be at least -1 dB below the planning criteria and at least -10 dB below the less onerous Pol 5 criteria at the worse case time.

All other residential dwellings are either at a further distance away from the plant or shielded from the noise by the store and as such will experience lower levels of noise from the proposed plant.

5.6 Compliance with BREEAM

With the proposed plant the predicted rating noise levels are within the BREEAM Pol 5 criteria and the credit can be achieved.

6.0 LIMITATIONS

The report limits itself to addressing solely on the noise control and acoustic aspects as included in this report. We provide advice only in relation to noise and acoustics. The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

7.0 SUMMARY AND CONCLUSIONS

Lidl appointed Acoustic Consultants Limited to provide noise and acoustic advice for the proposed Lidl Food Store at Botwell Lane, Hayes.

The proposal is to build a new Lidl Food Store on the site. The store will consist of a retail area, warehouse, welfare area and office.

The report provides noise and acoustic advice which aims to achieve the requirements of the BREEAM 2011 credits Hea 05 and Pol 05.

The brief was to advise on the internal ambient noise levels and also plant noise calculations to determine compliance with BREEAM 2011 credits Hea 5 and Pol 5.

With the proposed external building façade constructions, ventilation provisions detailed above the predicted internal noise levels are within the criteria of British Standard 8233:1999 and as such the First Credit of BREEAM Hea 5 is achieved.

The second Hea 5 credit applies to the control of reverberation in areas used for “speech or performance”. The development has no areas used for “speech and performance” and as such the credit can be awarded by default as long as the internal ambient noise level requirements (Hea 5, credit 1) are achieved.

With the proposed plant the predicted rating noise levels are within the BREEAM Pol 5 criteria and the credit can be achieved.

Appendix 1/6085 Measured Noise Levels at Monitoring Location 'A'

Date and Time	$L_{Aeq(5\ minutes)}$ dB	$L_{A90(5\ minutes)}$ dB
31/10/2013 10:30	55.6	45
31/10/2013 10:35	54.5	45
31/10/2013 10:40	45.9	44
31/10/2013 10:45	46.3	44
31/10/2013 10:50	46.8	45
31/10/2013 10:55	46.6	45
31/10/2013 11:00	47.5	44
31/10/2013 11:05	47.4	45
31/10/2013 11:10	47.6	45
31/10/2013 11:15	49.2	47
31/10/2013 11:20	47.3	45
31/10/2013 11:25	46.9	45
31/10/2013 11:30	47.4	45
31/10/2013 11:35	46.7	45
31/10/2013 11:40	47.2	45
31/10/2013 11:45	48.2	45
31/10/2013 11:50	47	45
31/10/2013 11:55	48.7	46
31/10/2013 12:00	54.5	47
31/10/2013 12:05	49.3	46
31/10/2013 12:10	48.3	46
31/10/2013 12:15	49.6	47
31/10/2013 12:20	47.6	46
31/10/2013 12:25	47.4	46
31/10/2013 12:30	48.2	46
31/10/2013 12:35	47.2	45
31/10/2013 12:40	49.4	46
31/10/2013 12:45	48.4	46
31/10/2013 12:50	47.6	46
31/10/2013 12:55	47.9	46
31/10/2013 13:00	50	46
31/10/2013 13:05	49.1	47
31/10/2013 13:10	49.2	46
31/10/2013 13:15	48.6	47
31/10/2013 13:20	48.7	47
31/10/2013 13:25	48.4	46
31/10/2013 13:30	49.2	46
31/10/2013 13:35	55.8	47
31/10/2013 13:40	54.7	47
31/10/2013 13:45	49	47
31/10/2013 13:50	48.3	46
31/10/2013 13:55	49.8	47

31/10/2013 14:00	51	47
31/10/2013 14:05	51.5	46
31/10/2013 14:10	53.7	47
31/10/2013 14:15	52.2	47
31/10/2013 14:20	49.4	47
31/10/2013 14:25	51	48
31/10/2013 14:30	54	47
31/10/2013 14:35	50.7	48
31/10/2013 14:40	51.1	48
31/10/2013 14:45	50	47
31/10/2013 14:50	51.5	47
31/10/2013 14:55	50	48
31/10/2013 15:00	53.2	47
31/10/2013 15:05	48.6	47
31/10/2013 15:10	49.5	48
31/10/2013 15:15	49.8	47
31/10/2013 15:20	53.3	47
31/10/2013 15:25	56.7	48
31/10/2013 15:30	50.6	48
31/10/2013 15:35	54.6	48
31/10/2013 15:40	50.1	48
31/10/2013 15:45	51.9	48
31/10/2013 15:50	50.5	47
31/10/2013 15:55	50.4	48
31/10/2013 16:00	51.1	47
31/10/2013 16:05	55.8	48
31/10/2013 16:10	51.2	48
31/10/2013 16:15	52.7	48
31/10/2013 16:20	51.2	48
31/10/2013 16:25	50	47
31/10/2013 16:30	52.3	48
31/10/2013 16:35	54.2	48
31/10/2013 16:40	50.6	48
31/10/2013 16:45	49.7	48
31/10/2013 16:50	52.6	47
31/10/2013 16:55	52.2	48
31/10/2013 17:00	53	48
31/10/2013 17:05	52.3	48
31/10/2013 17:10	56	49
31/10/2013 17:15	50.5	48
31/10/2013 17:20	50.8	48
31/10/2013 17:25	51.2	48
31/10/2013 17:30	50.6	49
31/10/2013 17:35	51.2	48
31/10/2013 17:40	51.7	49

31/10/2013 17:45	51.1	48
31/10/2013 17:50	51.7	48
31/10/2013 17:55	53.7	49
31/10/2013 18:00	54.3	49
31/10/2013 18:05	50.1	48
31/10/2013 18:10	51.8	48
31/10/2013 18:15	54.6	48
31/10/2013 18:20	54.8	49
31/10/2013 18:25	52.5	48
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31/10/2013 18:35	51.7	48
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31/10/2013 18:45	51.8	48
31/10/2013 18:50	52.5	48
31/10/2013 18:55	50.8	48
31/10/2013 19:00	54.2	48
31/10/2013 19:05	51.8	48
31/10/2013 19:10	52.3	47
31/10/2013 19:15	50.6	48
31/10/2013 19:20	50.7	48
31/10/2013 19:25	51	47
31/10/2013 19:30	51.2	48
31/10/2013 19:35	53.1	49
31/10/2013 19:40	49.8	47
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31/10/2013 20:20	53.1	48
31/10/2013 20:25	50.2	48
31/10/2013 20:30	51	47
31/10/2013 20:35	52	48
31/10/2013 20:40	51.6	49
31/10/2013 20:45	52	48
31/10/2013 20:50	52.6	48
31/10/2013 20:55	57.4	47
31/10/2013 21:00	55.1	48
31/10/2013 21:05	52.1	47
31/10/2013 21:10	51.5	47
31/10/2013 21:15	53.6	47
31/10/2013 21:20	54	47
31/10/2013 21:25	54	48

31/10/2013 21:30	52.3	48
31/10/2013 21:35	50.9	47
31/10/2013 21:40	50.3	47
31/10/2013 21:45	53.4	47
31/10/2013 21:50	51.7	48
31/10/2013 21:55	50.3	47
31/10/2013 22:00	51.5	47
31/10/2013 22:05	50	47
31/10/2013 22:10	50.5	46
31/10/2013 22:15	52.4	47
31/10/2013 22:20	47.9	46
31/10/2013 22:25	50.7	46
31/10/2013 22:30	48.8	46
31/10/2013 22:35	52.3	47
31/10/2013 22:40	52.8	47
31/10/2013 22:45	50.2	46
31/10/2013 22:50	51.5	46
31/10/2013 22:55	46.9	44
31/10/2013 23:00	50.9	44
31/10/2013 23:05	47.5	45
31/10/2013 23:10	46.6	44
31/10/2013 23:15	48.8	44
31/10/2013 23:20	47.6	45
31/10/2013 23:25	45.9	44
31/10/2013 23:30	47.2	44
31/10/2013 23:35	50.2	45
31/10/2013 23:40	45.8	44
31/10/2013 23:45	44.7	44
31/10/2013 23:50	44.5	43
31/10/2013 23:55	45.6	43
01/11/2013 00:00	44.9	43
01/11/2013 00:05	44.2	43
01/11/2013 00:10	44.1	43
01/11/2013 00:15	50.1	43
01/11/2013 00:20	49.6	44
01/11/2013 00:25	44.5	42
01/11/2013 00:30	43.4	42
01/11/2013 00:35	44.2	42
01/11/2013 00:40	46.1	42
01/11/2013 00:45	51.1	42
01/11/2013 00:50	53.6	41
01/11/2013 00:55	54.4	41
01/11/2013 01:00	45.3	41
01/11/2013 01:05	44.4	42
01/11/2013 01:10	48.3	42

01/11/2013 01:15	42.3	41
01/11/2013 01:20	43.2	41
01/11/2013 01:25	45.5	41
01/11/2013 01:30	45.1	42
01/11/2013 01:35	49	41
01/11/2013 01:40	45.5	42
01/11/2013 01:45	44.8	41
01/11/2013 01:50	44.7	41
01/11/2013 01:55	44.3	41
01/11/2013 02:00	46.3	41
01/11/2013 02:05	52	42
01/11/2013 02:10	49.9	42
01/11/2013 02:15	52.7	42
01/11/2013 02:20	49.7	41
01/11/2013 02:25	50.1	41
01/11/2013 02:30	49.2	40
01/11/2013 02:35	49.8	41
01/11/2013 02:40	51	41
01/11/2013 02:45	54.6	41
01/11/2013 02:50	42.9	39
01/11/2013 02:55	42.1	39
01/11/2013 03:00	49.4	39
01/11/2013 03:05	49.8	40
01/11/2013 03:10	45.2	40
01/11/2013 03:15	46.8	39
01/11/2013 03:20	47.9	39
01/11/2013 03:25	43.7	40
01/11/2013 03:30	50.5	40
01/11/2013 03:35	46.8	39
01/11/2013 03:40	47.1	39
01/11/2013 03:45	56.2	41
01/11/2013 03:50	59.8	44
01/11/2013 03:55	54.6	40
01/11/2013 04:00	51.1	39
01/11/2013 04:05	49.8	39
01/11/2013 04:10	43	39
01/11/2013 04:15	53.1	39
01/11/2013 04:20	46.4	40
01/11/2013 04:25	45.3	39
01/11/2013 04:30	43.6	40
01/11/2013 04:35	43.7	40
01/11/2013 04:40	51	40
01/11/2013 04:45	42.7	39
01/11/2013 04:50	47.8	39
01/11/2013 04:55	47.5	41

01/11/2013 05:00	44.5	41
01/11/2013 05:05	47	41
01/11/2013 05:10	53.3	41
01/11/2013 05:15	50.5	41
01/11/2013 05:20	45.8	42
01/11/2013 05:25	49.2	42
01/11/2013 05:30	47.4	42
01/11/2013 05:35	46.3	44
01/11/2013 05:40	48.2	43
01/11/2013 05:45	46.3	44
01/11/2013 05:50	45.1	44
01/11/2013 05:55	45.7	44
01/11/2013 06:00	48.1	44
01/11/2013 06:05	46.5	45
01/11/2013 06:10	47.6	46
01/11/2013 06:15	47.3	46
01/11/2013 06:20	46.9	46
01/11/2013 06:25	48.3	46
01/11/2013 06:30	47.7	46
01/11/2013 06:35	49.8	46
01/11/2013 06:40	50.7	47
01/11/2013 06:45	48.9	47
01/11/2013 06:50	50.1	47
01/11/2013 06:55	49.7	47
01/11/2013 07:00	50.3	47
01/11/2013 07:05	49.3	47
01/11/2013 07:10	49.8	47
01/11/2013 07:15	48.6	47
01/11/2013 07:20	49.4	47
01/11/2013 07:25	49.9	48
01/11/2013 07:30	48.3	46
01/11/2013 07:35	49.4	47
01/11/2013 07:40	48.8	47
01/11/2013 07:45	48.7	47
01/11/2013 07:50	49.6	48
01/11/2013 07:55	49.6	49
01/11/2013 08:00	50.8	48
01/11/2013 08:05	49.5	47
01/11/2013 08:10	51	49
01/11/2013 08:15	50.2	49
01/11/2013 08:20	51.7	48
01/11/2013 08:25	51.8	49
01/11/2013 08:30	49.6	48
01/11/2013 08:35	51.1	49
01/11/2013 08:40	50.1	48

01/11/2013 08:45	50.3	48
01/11/2013 08:50	50.3	48
01/11/2013 08:55	52.9	49
01/11/2013 09:00	51.9	49
01/11/2013 09:05	51.7	48
01/11/2013 09:10	50.3	48
01/11/2013 09:15	50.9	48
01/11/2013 09:20	52	48
01/11/2013 09:25	50.3	48
01/11/2013 09:30	50.2	48
01/11/2013 09:35	50.6	48
01/11/2013 09:40	49.9	48
01/11/2013 09:45	49.9	47
01/11/2013 09:50	50	48
01/11/2013 09:55	49	48
01/11/2013 10:00	52.3	48
01/11/2013 10:05	51.2	48
01/11/2013 10:10	49	46
01/11/2013 10:15	49.6	46
01/11/2013 10:20	51.6	47
01/11/2013 10:25	50.8	48

Appendix 2/6085 – Measured One Hour Daytime Equivalent Noise Levels

Date and Time	$L_{Aeq(1\ hour)}$ dB
31/10/2013 11:00	47.7
31/10/2013 12:00	49.3
31/10/2013 13:00	50.9
31/10/2013 14:00	51.6
31/10/2013 15:00	52.3
31/10/2013 16:00	52.3
31/10/2013 17:00	52.3
31/10/2013 18:00	52.6
31/10/2013 19:00	52.3
31/10/2013 20:00	53.4
31/10/2013 21:00	52.7
31/10/2013 22:00	50.8
01/11/2013 07:00	49.3
01/11/2013 08:00	50.9
01/11/2013 09:00	50.6