NOISE HARVEST

Environmental Noise Report

Project: Bushloe House, Wigston

Client: MACC Group

Revision:	D	Date:	16/11/2023
Job Number:	2023-06-26 AS0117	Written by:	CJB

NOISE HARVEST

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Revision	Date of issue	Purpose of issue
D	16/11/2023	Updates to latest drawing
C	30/10/2023	Updates to latest drawing
B	15/08/2023	Updates requested by Macc
A	11/08/2023	Updates requested by Macc
-	12/07/2023	First issue

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1. Introduction

1.1 Project overview

1.1.1 Noise Harvest has been commissioned by MACC Group to carry out an environmental noise survey in relation to the proposed care home and apartments at the following address:

Bushloe House
Station Road,
Wigston
LE18 2DR.

1.1.2 The scope for the noise surveys has been agreed with Jon Wells of Oadby and Wigston Borough Council[1].

1.1.3 The location and layout of the proposed care home and apartments are shown below:

Figure 1 - Proposed care home and apartments

[1] Telephone call 5 July 2023

2. Assessment Criteria

2.1. Local Authority requirements

2.1.1 The following scope of works was agreed to Jon Wells Oadby and Wigston Borough Council[2]:

- A 24-hour survey will be carried out at the approximate location shown below.

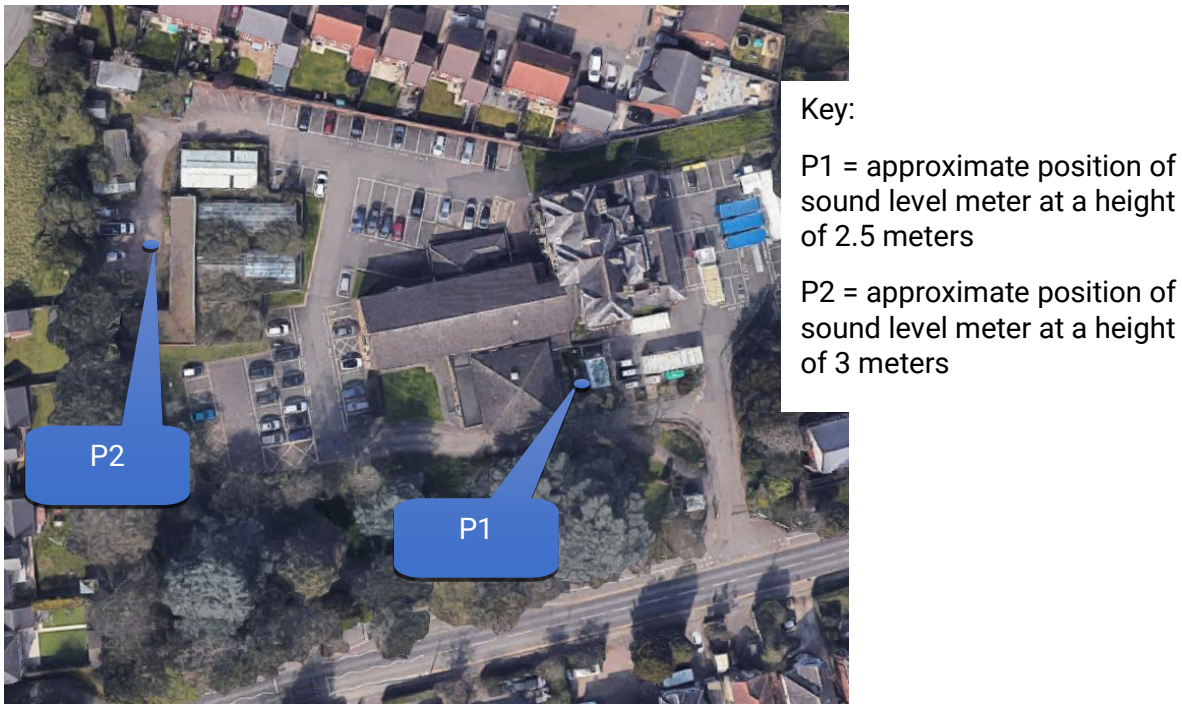


Figure 2 - Proposed survey location

- The microphone of the sound level meter was mounted on a 2.5 meter pole for position 1 representative of the most exposed façade to the nearest noise source and a 3 metre pole for position 2 representative of the most exposed façade to the nearest noise source and the nearest noise sensitive receptor.
- The measured data from glazing and ventilation will be specified in line with BS 8233:2014
- External amenity spaces, will be assessed against WHO guidelines.
- Any fixed items of plant will be assessed against the typical background, using BS 4142. If there are air source heat pumps they will be assessed against the Institute of Acoustics 'Heat Pumps Professional Advice Note'.
- Carparking movements will be assessed against the typical background.

2.2. BS8233:2014

2.2.1 British Standard 8233: 2014 provides guidance on internal ambient noise levels in residential spaces. The following table summarises this guidance, it should be noted

[2] Telephone call 5 July 2023

that hours of daytime are from 7:00 to 23:00 hours and night-time is from 23:00 to 07:00 hours:

Location	Daytime $L_{Aeq,16\ hour}$ dB	Night time $L_{Aeq,8\ hour}$ dB
Living Room	≤ 35	-
Dining room	≤ 40	-
Bedroom	≤ 35	≤ 30
Note: these values are the upper limits for daytime 16-hour dB L_{eq} and night-time 8-hour dB L_{eq}. BS 8233:2014 recognises that the levels assume normal diurnal functions in external noise. The levels are also based on annual average data and should exclude occasional events such as fireworks		

Table 1 - BS 8233:2014 target values

2.2.2 BS 8233 also states that it is desirable that the steady noise level in external amenity areas (such as gardens or outdoor living areas) does not exceed 50 dB LAeq,T, with 55 dB LAeq,T being acceptable in noisier environments. This is in line with recommendations given in the WHO Guidelines for Community Noise.

2.2.3 However, in the period since the original issue of the WHO guidelines, the Government has set all English Local Planning Authorities specific five-year housing supply targets. This has placed greater emphasis on making efficient use of land resource earmarked for residential development. BS 8233:2014 recognises this, and states that it should be accepted that these values are not achievable in all circumstances where development would be otherwise desirable. The document goes on to suggest that in areas such as city centres, or urban areas adjoining the transport network, a compromise (between elevated external noise levels and ensuring development needs) is warranted.

2.2.4 On this basis, levels lower than 50 dBA will be considered the NOEL, with a level of 55 dBA considered the LOAEL. Levels significantly greater than this would be considered the SOAEL, but would be addressed on a case-by-case basis, and should not necessarily be considered a barrier to development.

2.3. World Health Organisation guidelines

2.3.1 Night-time exceedances for sleep disturbance of the World Health Organisation should be included in the assessment of the proposed residential dwelling. The WHO guidelines – 3 Adverse Health Effects of Noise states the following:

'For good sleep it is believed that indoor sound pressure levels should not approximately exceed 45 dB L_{Afmax} more than 10-15 times a night.'

2.4. Approved Document Part O

2.4.1 Approved Document Part O is the building regulations document which gives regulations for the requirement to mitigate overheating. The following extract is the area that concerns acoustics.

'In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am).

Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants'

Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.'

2.4.2 The Association of Noise Consultants (ANC) has published the 'Acoustics Ventilation and Overheating' which is a guide to provide a method of assessment for overheating.

2.5. AVO Guide

2.5.1 The AVO Guide is intended for the consideration of new residential development that will be exposed predominantly to airborne sound from transport sources, and to sound from mechanical services that are serving the dwelling in question. Other sources of noise, such as noise from industrial, commercial or entertainment premises, and ground-borne noise and vibration, are outside the scope of the AVO Guide.

2.5.2 New apartments, flats and houses are the most common type of new residential development. The approach may also be used for other types of residential development such as residential institutions, care homes etc, although it needs to be remembered that some of the occupants of these types of premises can be more sensitive to indoor environmental conditions.

2.5.3 The AVO guide is based on a two-level assessment shown in the image below taken from Figure 3.1 of the AVO Guide.

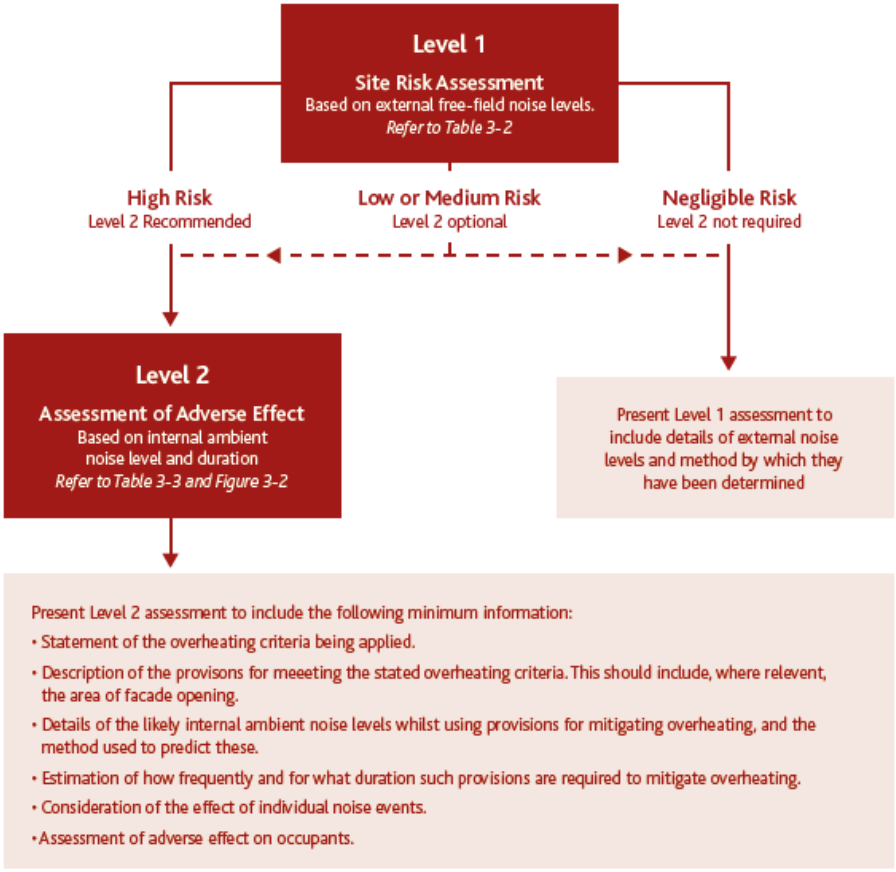


Figure 3 - Figure 3.1 AVO guide process

2.5.4 The level one assessment is based on the free field measured data of the noise survey. The measured data is then compared to Figure 3.2 of the AVO guide and this prescribes if a Level 3 assessment is required.

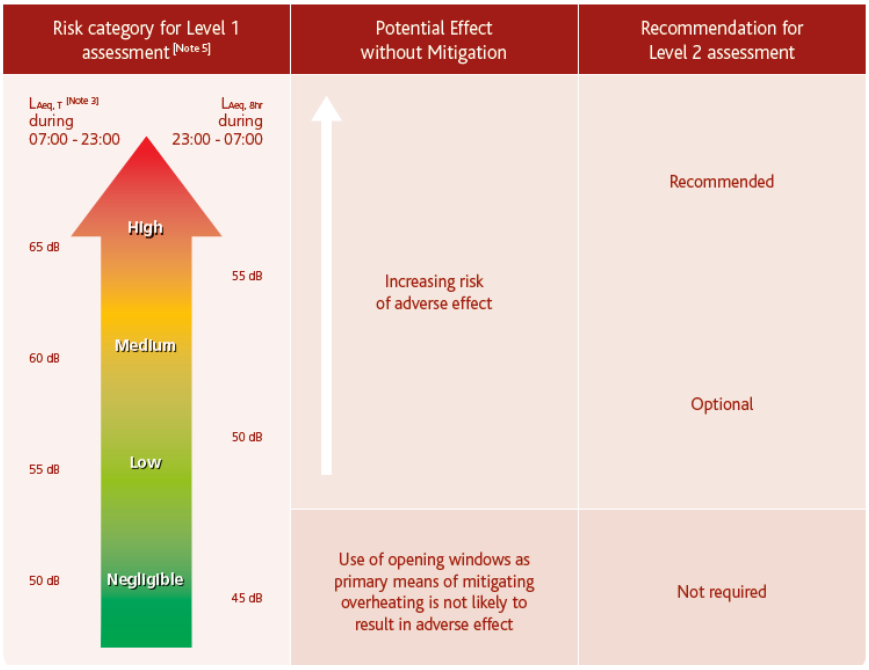


Figure 4 - Figure 3.2 AVO assessment for level 1 and 2

2.5.5 If a level 2 assessment is required Figure 3.3 of the AVO guide provides guidance for Level 2 assessment of noise from transport noise sources relating to overheating condition. The figure below shows the extract for the level 2 guidance.

Internal ambient noise level [Note 2]			Examples of Outcomes [Note 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{Af,max}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
Increasing noise level			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. [Note 8]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{Af,max}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response [Note 9]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

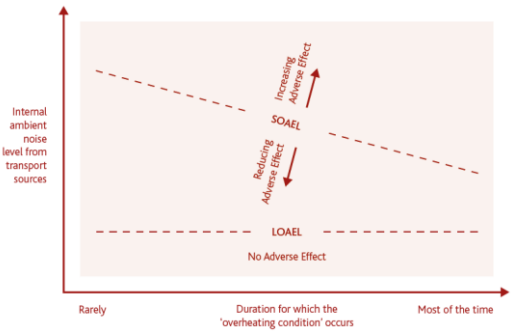


Figure 5 - AVO level 2 criteria

3. Site description

3.1. General

3.1.1 The proposed site is on the existing council offices for Oadby and Wigston borough council.

3.1.2 The existing Bushloe House which was used as Council offices is Grade II Listed and is to be retained, extended and converted into apartments. The remaining buildings to the west of the site will be demolished and a new three storey care home erected.

3.1.3 The site is bound by houses to the north, the east and to the West with a small gap at the northwest. To the South is Station Road which is understood to be the main noise source. Abington Close is located to the West and is separated from the site by residential dwellings apart from a small section to the northwest. This road is understood to be relatively quiet due to it being a close.

3.1.4 The location of the site (highlighted in red) is shown in the image below:

Figure 6 - Proposed location of dwellings

4. Noise survey

4.1 Survey dates

4.1.1 Unattended noise surveys were carried out due to the location of the proposed positions being secure. The surveys were carried out on the following dates:

Position	Date	Approximate	
		Approximate start	Approximate end
Unattended			
1	29th to 30th July 2023	13:00	midday
2	29th to 30th July 2023	13:00	midday

Table 2 - Survey times

4.1.2 The engineer who carried out the survey was C J Biggs, who is a full member of the Institute of Acoustics and holds the Institute of Acoustics diploma and a master's in applied acoustics. He has fifteen years of experience in acoustics.

4.2 Equipment and measurement locations

4.2.1 Two 24 hour measurement position was chosen for the noise survey to measure the main noise sources and the background noise. The positions were at a height of 2.5 & 3 metres from the ground generally in accordance with the guidance given in BS 7445: 1993. The sound level meter was field-calibrated before and after use with no significant drift witnessed. Laboratory calibration certificates for all measurement equipment used are available upon request. The approximate survey locations are indicated below.

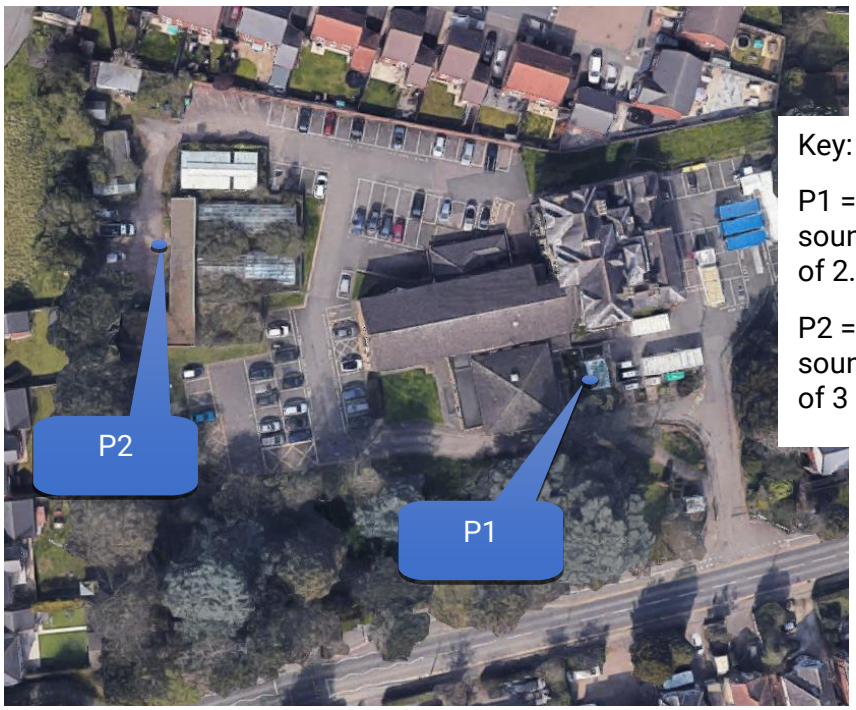


Figure 7 - Approximate survey locations

4.2.2 The Table below summarises the equipment used and the picture of the equipment.

Position	Make and model	Image
P1 sound level meter	NTi XL2-TA (s/n: A2A-19463-E0)	
P2 sound level meter	Cirrus CR171B (s/n: G056352)	

Table 3 - List of equipment used

4.2.3 At the start and end of the survey, the engineer noted the following subjective impressions:

Position 1: The dominant noise source was road traffic noise from Station Road;

Position 2: The dominant noise source was distant road traffic from Station Road and occasional road noise from Heatherley Grove.

4.3 Weather conditions

4.3.1 The Table below shows the highest and lowest temperatures and if there was precipitation.

Day	Date	Temp (°C)		Precipitation
		Low	High	
Thursday	29/06/2023	13	20	None
Friday	30/06/2023	11	17	None

Table 4 - Recorded weather

4.3.2 As can be seen in the Table above there was no precipitation. It is anticipated that wind did not exceed 5 m/s in the position of the metre. Further details of the weather can be found in the appendix.

5 Survey results

5.1 Noise survey

5.1.1 The Table below shows a summary of the daytime and night-time ambient noise levels. The values are the logarithmically averaged $L_{Aeq,}$ the maximum $L_{AF,max}$ and the typical L_{A90} All figures have been rounded to the nearest integer value (as fractions of a decibel are imperceptible).

Period (date)	L_{Aeq} (dB)	L_{AFmax} (dB)	L_{A90} (dB)
Position 1			
Daytime 07:00-23:00 hours (29/06/2023 to 30/06/2023)	59	91	52
Night-time 23:00 – 07:00 (29/06/2023 to 29/06/2023)	53	78	40
Position 2			
Daytime 07:00-23:00 hours (29/06/2023 to 30/06/2023)	49	77	44
Night-time 23:00 – 07:00 (29/06/2023 to 29/06/2023)	44	77	37

Table 5 - Summary of measured noise levels

As can be seen noise climate is moderate.

6 3D Model for glazing and ventilation

6.1.1 A 3D noise model has been created and calibrated to the measured noise levels using the ISO 9613 calculation method.

6.1.2 Acoustic modelling provides a better understanding of how sound would propagate around buildings and the potential changes in noise levels due to changes in heights and barrier effects etc. There is a degree of uncertainty within the modelling and this is taken into consideration in the glazing and ventilation sections of this report.

6.1.3 The following figure shows the location of the proposed building and the predicted noise impact on the facades at the different levels:

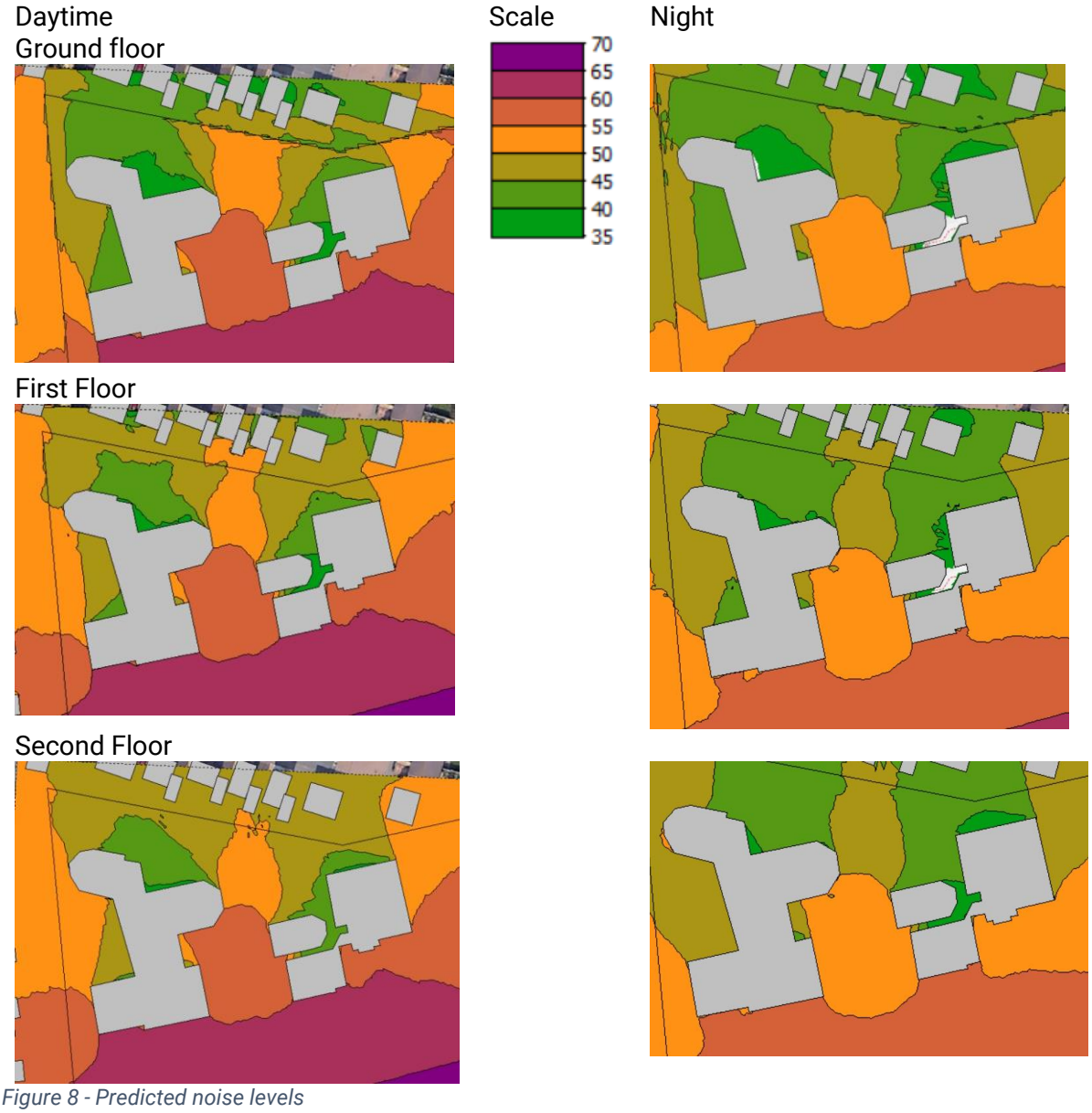


Figure 8 - Predicted noise levels

7 Glazing and ventilation Strategy

7.1 BS8233 Calculation

7.1.1 Based on guidance given in BS 8233:2014, it is proposed that the external building fabric for residential dwellings be designed such that a maximum steady-state internal night-time noise level of $L_{Aeq,T}$ 30 dBA and a daytime level of $L_{Aeq,T}$ 35 dBA can be achieved within habitable rooms.

7.1.2 For a reasonable standard in bedrooms, BS 8233:2014 also recommends that individual noise events should not disturb sleep patterns. The WHO guidelines interpret this as an internal level of $L_{AF,max}$ 45 dB being exceeded no more than 15 times per night.

7.1.3 It is generally accepted that glazing and ventilation openings within external façades will be the weakest elements acoustically.

7.1.4 It is considered that suitable glazing and ventilation attenuation can be provided to habitable rooms for the proposed dwelling, such that internal average noise levels would be within acceptable limits, as per BS 8233.

7.1.5 Calculation procedures to determine a suitable building envelope specification for the most affected façades have been undertaken following the "more rigorous calculation method" outlined in BS 8233: 2014, based on the following equation[3] :

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{ne}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

Equation 1 - BS 8233:2014 equation

7.1.6 The following bullet points summarise data used in calculations:

- Room volume, façade elements areas etc: taken from the area and volume from the calculation within BS 8233:2014
- Reverberation time within dwelling: 0.5 seconds;
- Noise levels incident on the façade are the representative, 1 hour during the daytime hours $L_{Aeq,1hour}$ and 15 minutes during the night time, 15-minute $L_{Aeq,15mins}$ values recorded.
- Day time levels were taken from the highest predicted noise on each façade to calculate a worst case scenario
- Night-time levels were taken from the highest predicted noise on each façade for both L_{Aeq} and $L_{AFmax,15mins}$.
- It is understood the rooms will be either naturally ventilated.

7.2 Proposed Glazing and ventilation

7.2.1 The following image shows the colour coordinated façade and should be read in conjunction with the Table which shows the proposed glazing and ventilation for the dwellings:

[3] Ref: Equation G.1, Section G.2.1, BS 8233: 2014.

Façade Colour	Proposed glazing (Rw)	Proposed glazing for Grade II listed building(Rw)	Proposed Ventilation $D_{n,e,w}$
	4 mm pane 16 mm air gap 4 mm pane (≥ 29 dB R_w)	6.2 mm Pilkington Spacia or secondary glazing (≥ 29 dB R_w)	Acoustic trickle vent 35 dB $D_{n,e,w}$
	4 mm pane 16 mm air gap 4 mm pane (≥ 29 dB R_w)	6.2 mm Pilkington Spacia or secondary glazing (≥ 29 dB R_w)	Non Acoustic trickle vent

Figure 9 - Proposed glazing and ventilation

7.2.2 By using the above glazing and ventilation for habitable rooms within the dwellings the target values in BS 8233:2014 will be met. This will also meet the requirements prescribed by WHO guidelines for sleep disturbance.

Glazing within grade II listed building

7.2.3 Within the Grade II listed building, either secondary glazing capable of achieving a minimum of 29 dB R_W or the glazing can be replaced with 6.2 mm Pilkington Spacia which is capable of achieving 35 dB R_w.

7.3 Ventilation

7.3.1 The following vent is capable of achieving 35 dB $D_{n,e,w}$ in the open position.

- SF Canopy / 25mm spacer - 11mm + SF3300 Vent

7.3.2 It is recommended that openable windows are used for purge ventilation.

7.4 General glazing notes

7.4.1 All windows should be well sealed when closed. It is imperative that the frame does not compromise the performance of the glazing. It is therefore recommended that the frames be of uPVC, hardwood or aluminium constructions and be well sealed into the apertures. No gaps should be visible around the frame from the exterior.

7.4.2 Softwood windows could also be used, providing guarantees are given by the manufacturer that acoustic properties will be maintained for the life of the windows.

7.4.3 All glazing should meet with minimum requirements under Part L of Building Regulations.

7.5 General ventilation notes

7.5.1 Trickle vents should be capable of providing the background ventilation rates given in Part F of the Building Regulations. Calculations have been based upon providing no more than one vents per habitable room. Should there be a requirement for an increased number of ventilators per room, the specification of the glazing and ventilation may need to be uplifted accordingly.

7.5.2 Although opening windows should not be necessary to provide background ventilation it is recommended that the windows can still be openable for purge ventilation as defined in Part F (for example following painting or accidental burning of food) or at the occupant's choice.

7.5.3 In this instance, internal ambient noise levels may exceed the guidance limits, however this would be considered acceptable due to the short duration and infrequent occurrence of this situation, where the requirement to purge airborne toxins temporarily takes precedence over low internal ambient noise levels.

7.6 Building envelope

7.6.1 The building envelope should provide an attenuation of at least 15 dB over the required glazing performance. This requirement should be easily achieved by most common building constructions.

8 Overheating

8.1 AVO Guide

8.1.1 The measured data of the L_{Aeq} for daytime and night time shown in the section above was compared to Figure 3.2 of the AVO guide. As can be seen in the figure below the measured levels at position 1 fall into the medium area for overheating during daytime and night time respectively.

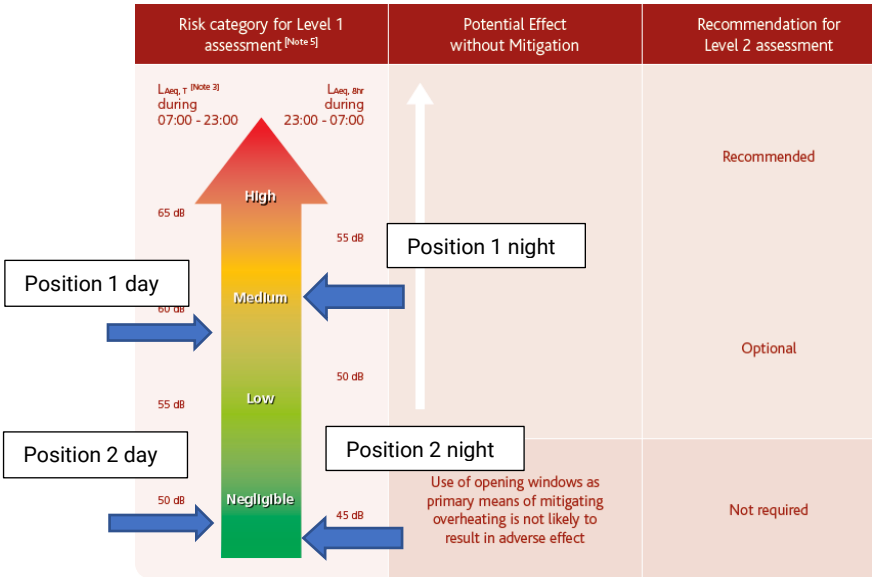
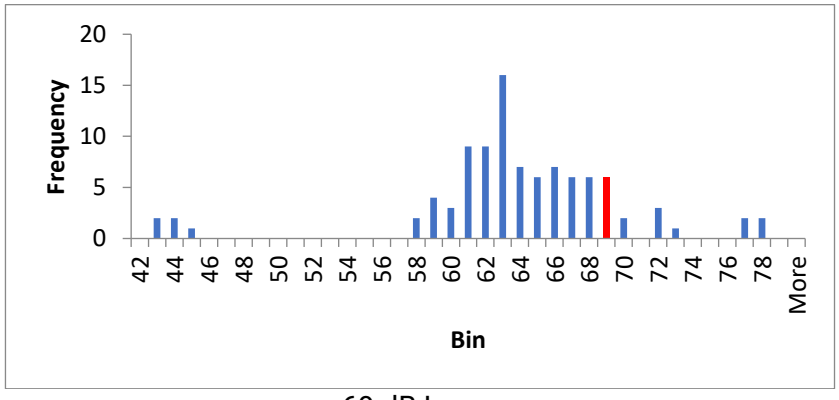


Figure 10 - AVO Level one assessment

8.2 Approved Document Part O

8.2.1 Whilst meeting the requirements of Approved Document Part O is not required for planning approval it will however affect the design of the façade and therefore its impact should be considered at the early part of the design stage. In order to assess the impact of noise on overheating the measured L_{Aeq} has been used together with the measured night time $L_{Aeq,8hour}$ and 10_{th} highest LAmax based on the histogram shown below.

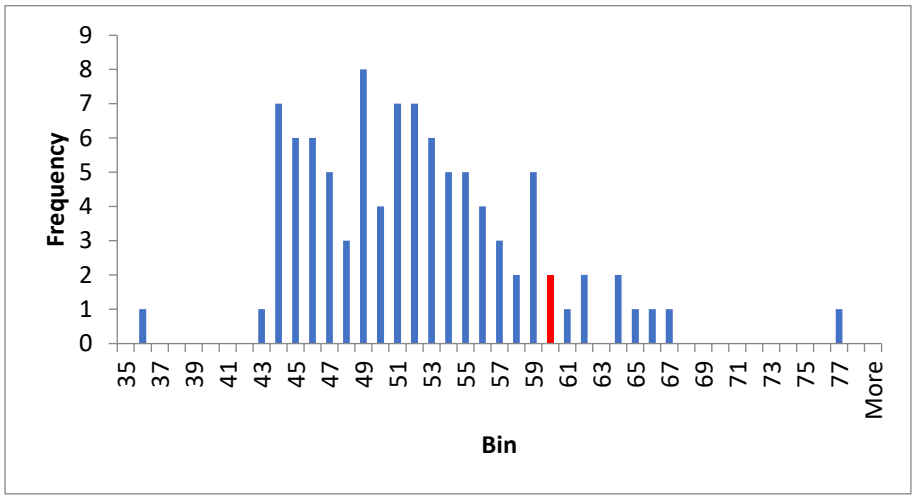
Position 1



69 dB L_{AFmax}

Figure 11 - 10th Highest L_{AFmax} Position 1

Position 2



60 dB L_{AFmax}

Figure 12 - 10th Highest L_{AFmax} Position 2

8.2.2 It is understood that a partially open window can attenuate the noise up to 14 dB.

8.2.3 The table below shows the measured position, the L_{Aeq}, the 10th highest L_{AFmax}, the anticipated attenuation and their respective attenuation.

Position	Before attenuation		Attenuation	After attenuation	
	$L_{Aeq,8hour}$	L_{AFmax}		$L_{Aeq,8hour}$	L_{AFmax}
1	53	69	14	39	55
2	44	60	14	30	46

Table 6 - Predicted noise for overheating with an open window

8.2.4 As can be seen from the Table above the predicted noise after the attenuation of a partially open window the noise levels at position 1 and 2 meet the targets prescribed in Approved Document O.

8.2.5 During times of overheating, opening windows could be used to meet the acoustic requirements for Approved Part O for habitable rooms and therefore can be achieved by opening windows:

8.2.6 By using either of the above overheating strategies the noise limits should meet.

9 Outdoor amenity spaces

9.1.1 As detailed in Section 2, guidance given in BS 8233:2014 states that the steady noise level in external amenity areas (such as gardens or outdoor living areas) shouldn't exceed 50 dB $L_{Aeq,T}$, with 55 dB $L_{Aeq,T}$ being acceptable in noisier environments.

9.1.2 The area outlined in red in the image below shows the area for outdoor amenity space.

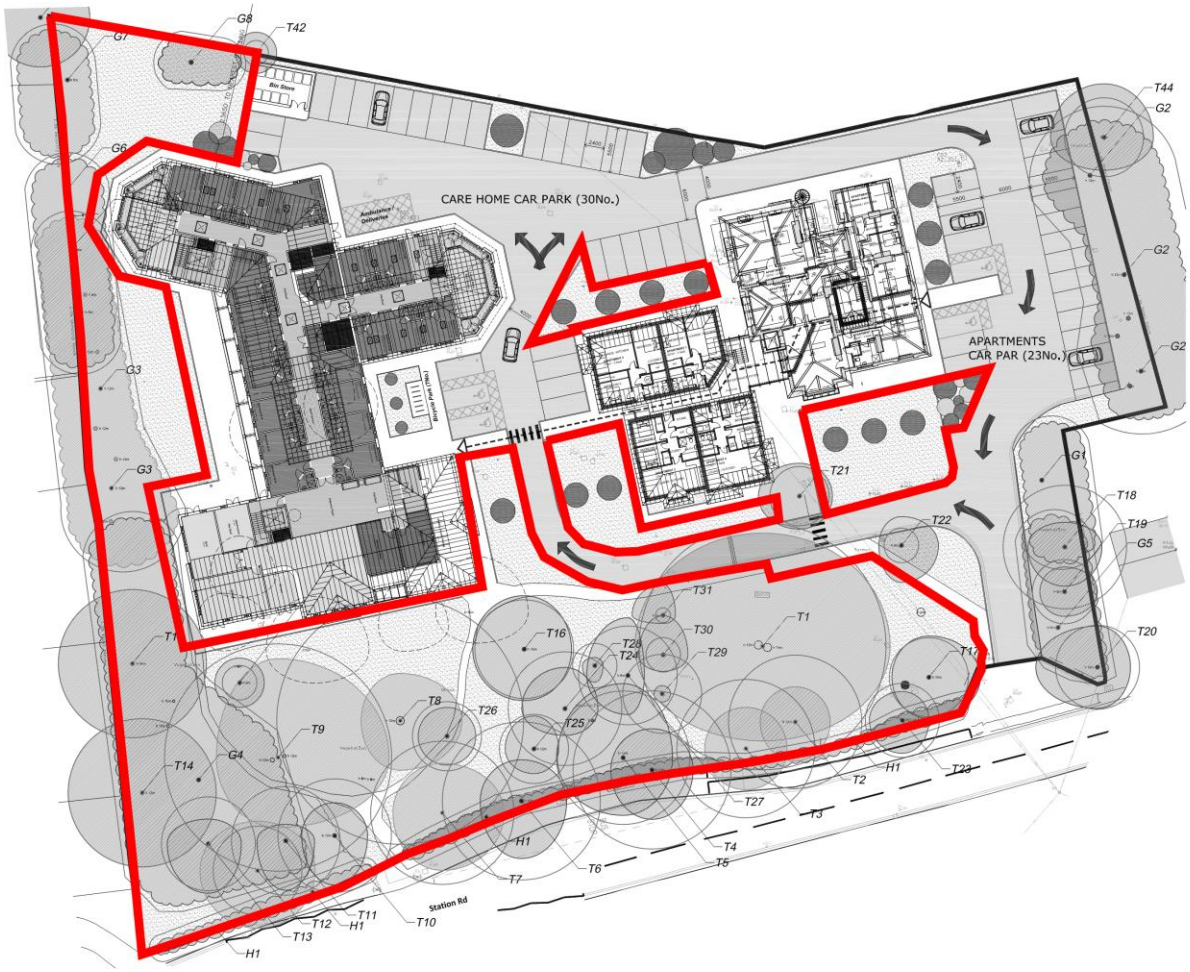


Figure 13 - Assumed location of amenity space

9.1.3 The image below shows the predicted noise levels from the 3D computer model in these spaces.

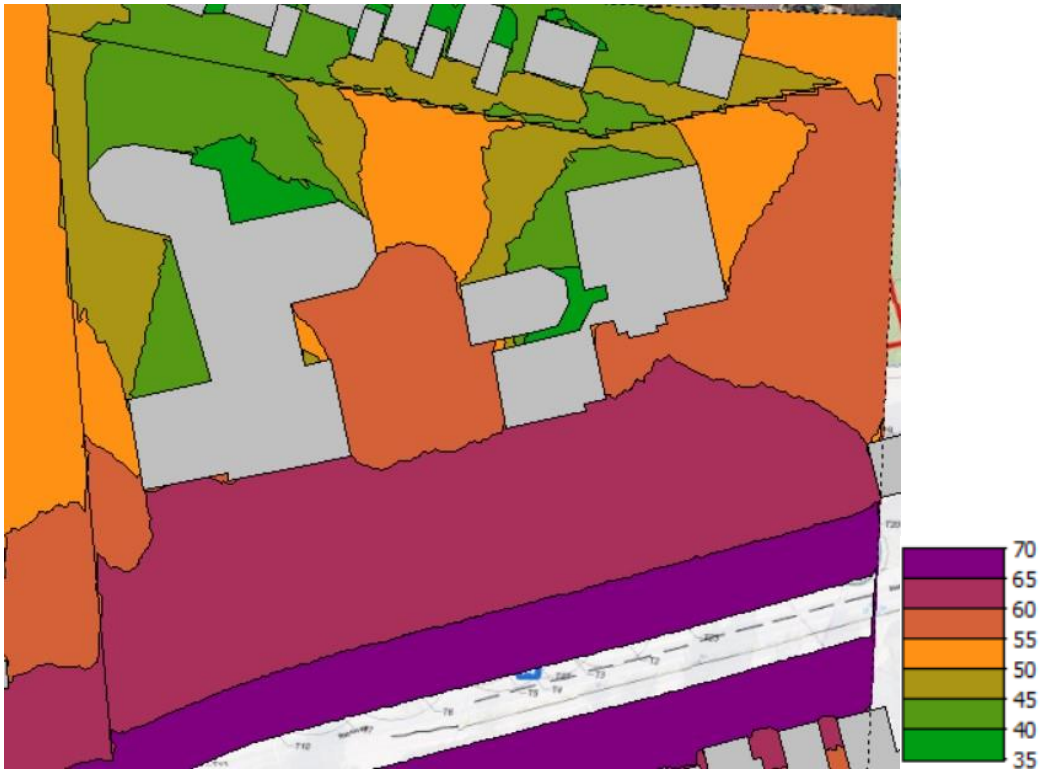


Figure 14 - Predicted noise levels in amenity space

9.1.4 The predicted noise level is between 35 and 64 dB LAeq,1hour during daytime hours. This meets the upper limit prescribed in the WHO's guidance in some of the areas, but the areas closer to Station road may still be exceeded. Given the extensive amenity areas proposed, residents will have the option of utilising the quieter areas if they do not desire to be closer to Station Road. It should also be noted that BS 8233:2014 states the following:

'However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.'

10 Noise emission limits – building services plant

10.1.1 At the time of writing, the details of fixed items of plant are not known and therefore noise emission limits targets have been set.

10.1.2 Based on Oadby and Wigston Borough Councils' requirement for fixed items of plant to achieve equal to the typical measured background, the following table summarises the maximum rating level (when penalties such as tonality and impulsiveness are applied) for all new items of fixed services plant associated with the proposed development when assessed at 1 m from the nearest noise-sensitive receptor:

Period	Typical back-ground noise level dB $L_{A90,10\ mins}$	Maximum sound pressure level for items of plant
Daytime 07:00 – 23:00 hours	44 $L_{A90,1\ hour}$	44 $L_{Ar,Tr}$
Night time 23:00 to 07:00 hours	37 $L_{A90,15\ mins}$	37 $L_{Ar,Tr}$

Table 7 - Summary of limiting noise levels

10.1.3 The above limit applies to all new items of services plant, running simultaneously at the appropriate design duty.

10.1.4 If air source heat pumps are to be installed these will be assessed against the Institute of Acoustics guidance on heat pumps, ' Heat Pumps Professional Advice Note'.

11 Car park noise assessment

11.1.1 It has been requested by Oadby and Wigston Borough Council that an assessment of the car park activities be assessed against the typical measured background.

11.1.2 The nearest noise sensitive receivers shown in green and blue are at the rear of the property as the flow of traffic will pass by at the rear of the property as shown in the image below with the traffic direction highlighted in red. For the assessment, the 1.8 metre high wall at the northern boundary is being retained.

Figure 17 - Traffic flow of car park

11.1.3 The submitted Transport Statement (prepared by Hub Transport) predicts the following vehicles trips for the care home and apartments.

Office			
Period	Vehicles in	Vehicles out	Total
AM	28	3	31
PM	2	26	28

Table 8 - Traffic movements for office in the care home

Care home			
Period	Vehicles in	Vehicles out	Total
AM	6	4	10

PM	3	6	9

Table 9 - Traffic movements for the care home

Assisted living			
Period	Vehicles in	Vehicles out	Total
AM	1	1	2
PM	1	1	2

Table 10 - Traffic movements for the assisted living

11.1.4 The total of both the AM and PM of all of the vehicle trips were inputted into the 3D model in the direction of the car park. A speed of no greater than 10 mph was assumed for the assessment.

11.1.5 It is not anticipated that any car movements will happen in the night time (23:00 hours to 07:00 hours) and because of this, a night time assessment has not been carried out.

11.1.6 The table below shows the predicted noise level at 1.5 metres from the nearest façade of the nearest noise sensitive receptor, the typical measured background noise level and the difference between them.

Location	Predicted noise level dB $L_{Aeq,16hour}$	Typical background dB L_{A90}	Difference
Heatherley Grove, Green	35	44	-9
Heatherley Grove, Blue	38	44	-6

Table 11 - Predicted noise levels in car park

11.1.7 As can be seen from the Table above the predicted noise levels are below the typical background for the daytime.

11.1.8 To further ensure that noise from the car park is reduced to a minimum it is advised that management install signs requesting to be respectful of the neighbours.

12 Uncertainty

12.1.1 The following subsections focus on the potential uncertainty of the measurements and calculation.

12.2 Measurements

12.2.1 The measurement position potentially may differ due to changes in traffic levels.

12.2.2 One measurement position was selected due to the security of the site.

12.3 Calculations

12.3.1 Unknown errors in the software may adversely influence the predicted noise levels.

12.3.2 Meteorological conditions such as wind diffraction or temperature inversions have not been taken into account.

13 Conclusion

13.1.1 Noise Harvest has been commissioned by Macc Group to carry out an assessment of noise levels affecting the proposed care home and apartments at Bushloe House Wigston.

13.1.2 The purpose of this assessment is to evaluate the calculated prevailing noise levels affecting the site, based on survey data, and identify to achieve a comfortable internal acoustic environment, in line with relevant British Standards and World Health Organisation.

13.1.3 The scope of the assessment is based on an agreed scope of works with Oadby and Wigston Borough Council.

13.2 Proposed care home and apartments

13.2.1 An assessment has shown that appropriate internal noise levels within habitable rooms could be achieved by specifying appropriate glazing and ventilation systems.

13.2.2 By providing appropriate glazing and ventilation constructions to the proposed habitable façades, calculations indicate that internal ambient noise levels within proposed habitable rooms would be less than 35 dBA during the daytime and 30 dBA at night-time.

13.2.3 The proposed glazing and ventilation will also achieve the requirements to meet Approved Document Part O and the WHO guidelines for sleep disturbance.

13.2.4 Noise to outdoor amenity spaces is predicted to meet the upper limit of 55 dB $L_{Aeq,T}$ in areas.

13.2.5 The noise from the car park is predicted not to be greater than the typical measured background.

14 Appendix

14.1 Environmental noise survey data.

Date and Time	L_{Aeq}	L_{AfMax}	L_{A90}
Position 1			
29/06/2023 12:45	58.8	69.3	53.2
29/06/2023 13:00	58.8	68.8	53.3
29/06/2023 13:15	57.9	69.5	51.1
29/06/2023 13:30	58.3	72.8	51.6
29/06/2023 13:45	58.8	68.7	52.7
29/06/2023 14:00	58.5	75.6	51.5
29/06/2023 14:15	58.2	66.0	52.2
29/06/2023 14:30	58.3	69.9	53.1
29/06/2023 14:45	57.3	68.7	50.7
29/06/2023 15:00	57.0	73.4	51.0
29/06/2023 15:15	57.7	69.1	51.2
29/06/2023 15:30	59.0	83.7	53.6
29/06/2023 15:45	58.0	71.2	51.3
29/06/2023 16:00	60.4	78.9	50.5
29/06/2023 16:15	58.3	68.0	51.8
29/06/2023 16:30	57.4	66.9	51.6
29/06/2023 16:45	58.8	78.2	52.6
29/06/2023 17:00	58.9	72.3	53.3
29/06/2023 17:15	58.4	66.9	51.9
29/06/2023 17:30	58.2	69.2	51.5
29/06/2023 17:45	58.8	76.0	53.2
29/06/2023 18:00	59.2	76.7	53.0
29/06/2023 18:15	58.9	73.8	51.9
29/06/2023 18:30	58.0	66.7	48.7
29/06/2023 18:45	58.2	72.7	50.1
29/06/2023 19:00	59.2	80.8	49.9
29/06/2023 19:15	58.3	69.8	50.3
29/06/2023 19:30	59.0	78.6	51.2
29/06/2023 19:45	57.7	80.5	46.8
29/06/2023 20:00	57.9	70.6	45.9
29/06/2023 20:15	57.0	66.0	47.2
29/06/2023 20:30	58.5	82.8	46.4
29/06/2023 20:45	58.1	77.8	45.9
29/06/2023 21:00	63.1	91.4	47.6
29/06/2023 21:15	56.6	69.0	44.6
29/06/2023 21:30	56.9	71.6	42.3
29/06/2023 21:45	56.9	71.9	43.8
29/06/2023 22:00	56.1	66.5	44.0
29/06/2023 22:15	55.9	74.8	41.8
29/06/2023 22:30	56.6	84.6	41.2
29/06/2023 22:45	54.4	65.2	41.2
29/06/2023 23:00	54.3	65.2	41.3
29/06/2023 23:15	51.9	64.0	40.7
29/06/2023 23:30	52.2	65.3	40.9

Date and Time	L_{Aeq}	L_{AfMax}	L_{A90}
29/06/2023 23:45	51.8	66.1	40.9
30/06/2023 00:00	51.8	68.1	41.1
30/06/2023 00:15	49.7	63.3	40.5
30/06/2023 00:30	50.5	65.8	40.1
30/06/2023 00:45	45.0	61.5	40.0
30/06/2023 01:00	48.2	64.2	40.1
30/06/2023 01:15	46.7	61.1	39.6
30/06/2023 01:30	46.4	63.8	39.4
30/06/2023 01:45	44.3	61.8	39.4
30/06/2023 02:00	50.5	71.8	39.2
30/06/2023 02:15	45.0	62.8	39.0
30/06/2023 02:30	47.2	62.8	39.0
30/06/2023 02:45	47.4	64.3	39.3
30/06/2023 03:00	44.6	61.0	39.3
30/06/2023 03:15	47.3	66.5	39.6
30/06/2023 03:30	45.8	61.5	39.6
30/06/2023 03:45	50.6	71.6	40.0
30/06/2023 04:00	52.4	71.5	41.0
30/06/2023 04:15	50.2	69.4	40.1
30/06/2023 04:30	51.6	68.8	40.2
30/06/2023 04:45	52.6	67.5	40.7
30/06/2023 05:00	53.6	67.2	40.6
30/06/2023 05:15	53.8	65.9	40.4
30/06/2023 05:30	55.9	67.6	41.6
30/06/2023 05:45	56.0	72.7	41.3
30/06/2023 06:00	57.2	68.2	41.8
30/06/2023 06:15	58.0	69.4	42.9
30/06/2023 06:30	59.4	78.2	44.9
30/06/2023 06:45	59.6	77.9	46.2
30/06/2023 07:00	59.7	71.1	48.0
30/06/2023 07:15	60.0	70.4	49.8
30/06/2023 07:30	60.1	71.5	50.5
30/06/2023 07:45	60.1	72.3	51.7
30/06/2023 08:00	59.1	66.7	51.2
30/06/2023 08:15	57.4	66.6	50.7
30/06/2023 08:30	59.1	67.3	53.2
30/06/2023 08:45	59.5	66.8	54.2
30/06/2023 09:00	59.8	69.3	53.7
30/06/2023 09:15	60.1	67.5	53.6
30/06/2023 09:30	60.5	77.7	53.6
30/06/2023 09:45	60.1	79.0	54.4
30/06/2023 10:00	59.8	77.1	53.1
30/06/2023 10:15	59.9	68.5	55.5
30/06/2023 10:30	60.1	70.9	54.8
30/06/2023 10:45	60.1	74.2	54.5
30/06/2023 11:00	59.9	70.4	55.3
30/06/2023 11:15	59.4	72.0	54.6
30/06/2023 11:30	60.2	69.4	54.8

Date and Time	L_{Aeq}	L_{AfMax}	L_{A90}
30/06/2023 11:45	60.3	75.5	55.3
30/06/2023 12:00	60.2	75.3	53.5
Position 2			
29/06/2023 13:00	46.6	57.5	44.2
29/06/2023 13:15	46.0	62.2	43.2
29/06/2023 13:30	49.4	70.8	44.5
29/06/2023 13:45	49.3	67.7	43.5
29/06/2023 14:00	46.6	60.2	43.6
29/06/2023 14:15	48.8	72.2	43.9
29/06/2023 14:30	50.0	69.3	44.5
29/06/2023 14:45	46.6	61.4	43.0
29/06/2023 15:00	49.3	66.3	44.4
29/06/2023 15:15	52.1	62.1	45.3
29/06/2023 15:30	46.9	63.2	44.4
29/06/2023 15:45	47.2	57.7	44.0
29/06/2023 16:00	49.5	67.5	44.3
29/06/2023 16:15	47.4	58.8	43.3
29/06/2023 16:30	47.6	59.8	44.3
29/06/2023 16:45	47.8	59.9	44.4
29/06/2023 17:00	48.2	61.3	44.7
29/06/2023 17:15	47.1	57.4	44.0
29/06/2023 17:30	48.5	64.5	43.3
29/06/2023 17:45	46.2	56.2	43.2
29/06/2023 18:00	48.0	62.1	44.2
29/06/2023 18:15	50.8	71.0	43.8
29/06/2023 18:30	45.8	52.5	42.9
29/06/2023 18:45	46.6	61.7	43.3
29/06/2023 19:00	46.7	63.6	44.1
29/06/2023 19:15	49.3	69.7	43.5
29/06/2023 19:30	48.3	74.1	42.3
29/06/2023 19:45	46.3	64.2	41.8
29/06/2023 20:00	47.1	65.8	43.4
29/06/2023 20:15	45.6	60.9	41.8
29/06/2023 20:30	47.3	72.3	41.3
29/06/2023 20:45	44.1	57.0	40.3
29/06/2023 21:00	47.8	69.2	40.5
29/06/2023 21:15	45.8	65.1	39.2
29/06/2023 21:30	43.1	64.7	37.1
29/06/2023 21:45	45.1	65.7	37.5
29/06/2023 22:00	43.1	54.1	37.8
29/06/2023 22:15	42.5	57.5	37.2
29/06/2023 22:30	42.4	60.7	36.5
29/06/2023 22:45	42.4	56.6	37.1
29/06/2023 23:00	42.3	51.3	37.0
29/06/2023 23:15	40.4	49.9	36.0
29/06/2023 23:30	44.0	56.2	38.2
29/06/2023 23:45	45.2	56.8	39.1
30/06/2023 00:00	44.6	56.2	38.8

Date and Time	L_{Aeq}	L_{AfMax}	L_{A90}
30/06/2023 00:15	42.8	52.3	38.7
30/06/2023 00:30	42.6	56.3	38.7
30/06/2023 00:45	42.0	52.4	38.1
30/06/2023 01:00	40.8	50.2	36.5
30/06/2023 01:15	39.2	47.3	35.6
30/06/2023 01:30	36.5	46.9	32.6
30/06/2023 01:45	36.8	45.5	32.9
30/06/2023 02:00	44.3	60.0	31.9
30/06/2023 02:15	34.0	45.9	30.9
30/06/2023 02:30	35.2	45.9	31.0
30/06/2023 02:45	36.2	48.5	32.4
30/06/2023 03:00	37.1	45.2	34.0
30/06/2023 03:15	40.5	50.1	37.5
30/06/2023 03:30	37.3	49.8	33.7
30/06/2023 03:45	41.6	61.5	36.1
30/06/2023 04:00	43.4	59.2	37.4
30/06/2023 04:15	44.0	66.6	35.8
30/06/2023 04:30	43.2	64.3	36.5
30/06/2023 04:45	42.9	62.1	36.5
30/06/2023 05:00	43.0	61.0	37.2
30/06/2023 05:15	43.5	59.7	37.6
30/06/2023 05:30	45.5	65.3	39.1
30/06/2023 05:45	44.7	55.2	39.7
30/06/2023 06:00	45.0	54.8	39.6
30/06/2023 06:15	45.6	54.0	41.0
30/06/2023 06:30	48.5	66.0	41.9
30/06/2023 06:45	50.2	77.2	43.3
30/06/2023 07:00	51.0	68.1	44.1
30/06/2023 07:15	47.3	56.7	43.8
30/06/2023 07:30	48.5	61.4	45.3
30/06/2023 07:45	47.3	59.0	44.0
30/06/2023 08:00	47.1	56.4	44.8
30/06/2023 08:15	47.0	56.5	44.4
30/06/2023 08:30	47.6	56.2	45.2
30/06/2023 08:45	48.1	56.9	45.6
30/06/2023 09:00	47.7	58.9	45.0
30/06/2023 09:15	51.4	76.3	46.0
30/06/2023 09:30	48.1	58.9	45.7
30/06/2023 09:45	49.3	62.5	46.1
30/06/2023 10:00	48.0	60.9	45.5
30/06/2023 10:15	49.0	64.1	46.7
30/06/2023 10:30	49.9	63.9	47.4
30/06/2023 10:45	50.4	64.7	47.7
30/06/2023 11:00	51.1	62.5	47.9
30/06/2023 11:15	50.4	59.5	47.6
30/06/2023 11:30	51.2	62.3	47.7
30/06/2023 11:45	50.6	67.4	47.4
30/06/2023 12:00	56.5	77.3	47.0

14.2 Weather data

Time	Temp	Weather	Wind
29 June 2023			
00:20	14 °C	Passing clouds.	7 mph
01:50	14 °C	Passing clouds.	8 mph
02:20	14 °C	Passing clouds.	6 mph
03:20	14 °C	Partly cloudy.	6 mph
03:50	14 °C	Passing clouds.	7 mph
04:20	13 °C	Passing clouds.	6 mph
04:50	13 °C	Passing clouds.	7 mph
05:20	13 °C	Passing clouds.	7 mph
05:50	12 °C	Passing clouds.	5 mph
06:20	13 °C	Passing clouds.	6 mph
07:20	13 °C	Sunny.	7 mph
07:50	15 °C	Sunny.	6 mph
08:20	14 °C	Sunny.	8 mph
08:50	16 °C	Sunny.	8 mph
09:20	17 °C	Passing clouds.	10 mph
09:50	17 °C	Passing clouds.	10 mph
10:20	18 °C	Passing clouds.	9 mph
10:50	18 °C	Scattered clouds.	12 mph
11:20	18 °C	Partly sunny.	9 mph
11:50	18 °C	Partly sunny.	12 mph
12:20	17 °C	Partly sunny.	15 mph
12:50	19 °C	Partly sunny.	12 mph
13:20	18 °C	Scattered clouds.	13 mph
13:50	19 °C	Scattered clouds.	12 mph
14:20	20 °C	Scattered clouds.	16 mph
15:20	20 °C	Passing clouds.	13 mph
16:20	19 °C	Sunny.	12 mph
16:50	19 °C	Passing clouds.	9 mph
17:20	19 °C	Passing clouds.	13 mph
17:50	19 °C	Sunny.	14 mph
18:50	18 °C	Passing clouds.	12 mph
19:20	18 °C	Passing clouds.	14 mph
19:50	17 °C	Sunny.	12 mph
20:50	16 °C	Sunny.	8 mph
21:20	15 °C	Sunny.	8 mph

Time	Temp	Weather	Wind
22:20	12 °C	Clear.	5 mph
22:50	13 °C	Clear.	8 mph
23:50	13 °C	Clear.	6 mph
30 June 2023			
00:20	12 °C	Clear.	7 mph
01:50	12 °C	Passing clouds.	7 mph
02:20	11 °C	Clear.	6 mph
02:50	11 °C	Clear.	8 mph
03:20	11 °C	Clear.	6 mph
03:50	11 °C	Clear.	8 mph
04:20	11 °C	Clear.	9 mph
04:50	11 °C	Sunny.	8 mph
05:20	11 °C	Sunny.	8 mph
06:20	12 °C	Sunny.	9 mph
06:50	12 °C	Sunny.	9 mph
07:20	13 °C	Sunny.	10 mph
07:50	13 °C	Sunny.	10 mph
08:20	13 °C	Sunny.	12 mph
09:20	14 °C	Sunny.	12 mph
09:50	15 °C	Light rain. Passing clouds.	13 mph
10:20	16 °C	Scattered clouds.	18 mph
10:50	16 °C	Scattered clouds.	21 mph
11:20	16 °C	Scattered clouds.	20 mph