



Acoustic Survey and Assessment for Proposed Class E Commercial/ Industrial Units on land off Chapel Hill, Longridge, PR3 3JY.

Prepared for:

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1. Introduction

- 1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic survey and assessment to support a planning condition for commercial/industrial units, class E, on land off Chapel Hill, Langridge PR3 3JY.

Site Location and Context

- 1.2. The development site is situated to the west of Chapel Hill, accessed via an existing industrial estate. To the west of the site are the playing fields associated with Longridge High School, to the south and east the existing industrial estate, with residential properties beyond to the east. To the north along the northern boundary residential properties along Little Lane back onto the site.
- 1.3. An aerial Photograph is enclosed in Figure 1.
- 1.4. Concern has been raised over the potential impact of the proposed development on the neighbouring properties and hence the commissioning of this report.



2. Policy and Guidance

- 2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals, or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).
- 2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in February 2019, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution.
- 2.3. The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.
- 2.4. The NPSE introduces the following terms, although no sound levels are given to represent these, many authorities have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:
- NOEL – No Observed Effect Level (<30dB(A) inside <50dB(A) outside, 10dB below background)
- LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
- SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)
- 2.5. The sound levels within the brackets of the previous paragraph are those determined as appropriate levels to indicate the relevant effect levels represented by the NPSE.



- 2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.
- 2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance' or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.
- 2.8. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night-time period.
- 2.9. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.
- 2.10. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.
- 2.11. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night-time a level of 30dB $L_{Aeq,8hr}$ is recommended. Criteria for external areas mirrors that within the WHO guidance.
- 2.12. Another commonly used standard is British Standard 4142:2014 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels.
- 2.13. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.



- 2.14. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".
- 2.15. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact. In addition, the published 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.
- 2.16. In addition, the 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.
- 2.17. The first stage consists of an initial noise risk assessment, based on indicative day and night-time *noise* levels. Simply put, the higher the ambient noise in an area the greater the impact. The levels given are shown below although it should be noted that these are in excess of both the Lancashire guidance, WHO and BS 8233: 2014.

Noise Risk Category*	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq,16hr} < 50dB$ $L_{Aeq,8hr} < 40dB$	May be noticeable but no adverse effect on health and quality of life	In this category the development is likely to be acceptable from a noise perspective, nevertheless a good acoustic design process is encouraged to improve the existing environment and/or safeguard against possible future deterioration and to protect any designated tranquil areas. A noise assessment may be requested to demonstrate no adverse impact from noise. Application need not normally be delayed on noise grounds.
1 – Low $L_{Aeq,16hr} 50-63dB$ $L_{Aeq,8hr} 40-55dB$	Adverse effect on health and quality of life	In this category the development may be refused unless a good acoustic design process is followed and is demonstrated via a Level 1 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised and that a significant adverse impact will not arise in the finished development. Planning conditions and other measures to control noise may be required.
2 – Medium $L_{Aeq,16hr} 63-69dB$ $L_{Aeq,8hr} 55-60dB$ $L_{AFmax} > 80dB^{**}$	Significant adverse effect on health and quality of life	In this category the development is likely to be refused unless good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised, and clearly demonstrates that a significant adverse noise impact will not arise in the finished development. Planning conditions and other measures to control noise will normally be required.
3 – High $L_{Aeq,16hr} > 69dB$ $L_{Aeq,8hr} > 60dB$ $L_{AFmax} > 80dB^{**}$	Unacceptable adverse effect of health and quality of life	In this category the development is very likely to be refused on noise grounds, even if a good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement. Applicants are advised to seek expert advice on possible mitigation measures. Advice on the circumstances when the refusal of a new housing on noise grounds should normally be anticipated is included in the ProPG.

2.18. Stage 2, consists of a full assessment of the prevailing ambient noise and requires 4 elements to be considered:

- I. Element 1 – Good Acoustic Design
- II. Element 2 – Internal Noise Level Guidelines
- III. Element 3 – External Amenity Area Noise Assessment
- IV. Element 4 – Assessment of Other Relevant Issues

2.19. A good acoustic design is implicit in meeting the requirements of the NPPF and can help to resolve many potential acoustic issues.

2.20. Details of the criteria considered suitable are provided above for both internal and external sound levels. Element 4 includes such issues as local and national policy, likely occupants, wider planning objectives.



3. The Assessment

The Development

- 3.1 The development is to consist of two buildings, the one to the north is to be subdivided into three units and backs onto the residential properties along Little Lane. The second is to be located near to the entrance of the site backing on to the school playing field.
- 3.2 The development is for Class E commercial / industrial units. The new class E developments encompasses the previous Class A, B1 and D1 planning uses, ie retail, offices, health services, and activities which can be undertaken in a residential area without detriment to its amenity.
- 3.3 The proposed use by definition should not have any adverse impact on the nearby residential properties.
- 3.4 No time restrictions on the use of the site are currently confirmed, as such the assessment will assume a 24-hour operation to ensure that a worse-case scenario is considered.

Current Prevailing Sound levels

- 3.5 In order to obtain details on the current representative prevailing background sound level on site sound monitoring has been undertaken.
- 3.6 This was undertaken on the 25-26th September 2021. This covered a Saturday and Sunday period, as these times are typically much quieter than during the working week when the adjacent industrial sites will be operating.
- 3.7 The sound level meter, a Cirrus Optimus Green, was set up towards the northern boundary of the site, at a height of approx. 1.3m above the ground level. at the time of the survey the ground level was elevated above the surrounding land.
- 3.8 The sound level meter was field calibrated at the start and end of the measurement period with no significant deviation shown. Full Factory calibration details are available on request.



3.9 The weather at the time of the monitoring was dry and warm, with little to no wind present.

3.10 The Full results are attached in Appendix A, with a summary in the table below.

Start Time	End Time	Duration	LAeq	LA90	LAMax
25/09/2021 11:00	25/09/2021 23:00	11:59:59	40.8	33.7	68.1
25/09/2021 23:00	26/09/2021 07:00	08:00:00	33.9	24.9	58.9
26/09/2021 07:00	26/09/2021 20:00	13:00:00	44.0	38.1	79.2

3.11 The regularly exceeded night-time maximum sound level recorded on site was 53.5dB(A).

Impact on Neighbouring Properties

3.12 Second 2 of the report has identified that BS4142: 2014 would be an appropriate methodology to assess the impact of the development on the nearby residential properties. Unfortunately, the final use of the units is unknown and this prevents a full BS4142:204 assessment form being undertaken.

3.13 Instead, given the definition of a Class E development and the Control of Noise at work Regulations limits an internal sound level of 85dB(A) has been assumed. This is highly unlikely to be achieved within the units, however offers a robust basis for any assessment.

3.14 Based on the above information the level of attenuation required to the building can be identified.

3.15 Given a 15dB attenuation¹ for an open window, in order to achieve the recommended sound levels with BS8233:2014 and from the World Health Organisation a reduction of 8.2dB is required from the building structure during the daytime and 6.2dB at night.

3.16 The 8.2dB will ensure the guideline value of 50dB(A) is achieved in the garden areas, while the 4.2dB at night ensures the average 30dB(A) internally is not exceeded.

¹ BS8233: 2014; Guidance on sound insulation and noise reduction for buildings



$$Dist\ att = 20\log\left(\frac{r}{R}\right)$$

$$Dist\ att = 20\log\left(\frac{1}{11}\right)$$

$$Dist\ att = -20.8dB\ (to\ garden\ boundary)$$

$$Dist\ att = 20\log\left(\frac{1}{31}\right)$$

$$Dist\ att = -29.8dB\ (to\ house\ facade)$$

$$SPL_{ext} = SPR_{int} - attenuation\ (R_w) - 6$$

$$attenuation\ (R_w) = SPL_{ext} + 6 + dist\ att - SPR_{int}$$

$$attenuation\ (R_w) = 50 + 6 + 20.8 - SPR_{int}$$

$$attenuation\ (R_w) = 8.2dB$$

$$attenuation\ (R_w) = SPL_{ext} + 6 + dist\ att - SPR_{int}$$

$$attenuation\ (R_w) = (30 + 15) + 6 + 29.8 - SPR_{int}$$

$$attenuation\ (R_w) = 4.2dB$$

3.17 However, when considering BS4142:2014 reference must be made to the typical background sound levels as identified on site. From the monitoring undertaken the median daily background $L_{A90,1hr}$ sound level has been identified as 37.8dB(A), and night-time $L_{90,15min}$ background at 27.8dB(A). It is therefore these values that should be utilised as the SPL_{ext} sound level identified in the equation above.

3.18 Furthermore, BS4142:2014 allows for corrections to be made to the specific sound source under consideration to account for tonal and other noise characteristics. As it is currently unknown what the units will be used for a correction of 2dB has been applied for a slight tone, 3dB for impulsivity that is just perceptible and 3dB for intermittency, resulting in an increase of the source sound by 8dB to 93dB(A).

3.19 In line with the above calculations using the identified background sound levels on site the building needs to be designed with an attenuation level of 28.4dB R_w during the



daytime and 29.4dB R_w at night in order to achieve the identified background sound levels on site.

- 3.20 The building is to be constructed from a steel frame with metal composite cladding. A standard composite panel construction built around a 32/1000 perforated liner, 180mm, 15Kg/m³ glass mineral wool, 32/1000 outer panel will provide an attenuation of 37dB R_w .
- 3.21 The above level of attenuation will ensure that any noise emissions from the building will be below the existing background sound levels identified and will not result in any adverse impact on the residents.

Traffic movements

- 3.22 The last thing to consider is that of deliveries and staff arriving and departing from the site. Deliveries and staff will arrive to the front of the buildings, and therefore the building itself will act as a barrier to any noise produced. At a height of 6.1m the building will provide a minimum of 20dB attenuation to the first-floor level and 23dB(A) to the ground floor.
- 3.23 Previous monitoring by Martin Environmental Solutions has identified a car door slamming at 62dB $L_{Aeq,5mins}$ at 5m distance, a vehicle pulling up and reversing into place and then driving off at 59dB $L_{Aeq,5mins}$ at 5m and an HGV arriving and manoeuvring at 75dB $L_{Aeq,5mins}$ at 3m with a total 1 hr delivery having a combined 69.8dB $L_{Aeq,1hr}$ at 3m.
- 3.24 Over the separation distance of 25m to the rear boundary of the nearest property sound levels from cars arriving /departing and car doors will be no higher than 25dB(A) at the boundary and 28dB(A) at first floor façade.
- 3.25 HGV movements will only occur during the daytime and will be no more than 32.6dB(A) at the boundary and 27.2dB(A) at the facade of the nearest house.
- 3.26 The impact on vehicles arriving and leaving the site, including car movements at night will result in sound levels below both the recommended average daily sound level and the prevailing background sound level identified on site.



4 Conclusion

- 4.1 On-site monitoring has identified existing background sound levels in the area and these have been used in conjunction with the recommended sound levels within BS8233:2014 and from the World Health Organisation, in line with the assessment methodology in BS4142:2014 to determine the minimum level of attenuation from the proposed buildings to ensure no adverse impact is experienced from the surrounding existing properties.
- 4.2 A minimum specification has been detailed for the construction of the building fabric, which will provide additional attenuation to that required.
- 4.3 An assessment of vehicle movements associated with the proposed development has also been undertaken and it has been shown that these movements will not result in any adverse impact, even at night.
- 4.4 Inclusion of the minimum design specifications within the proposed buildings will ensure that the internal and external sound levels at the nearby noise sensitive properties are acceptable and will result in a No Observe Effect on the future residents in line with the Noise Policy Statement for England.
- 4.5 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Figure 1 – Aerial Photograph



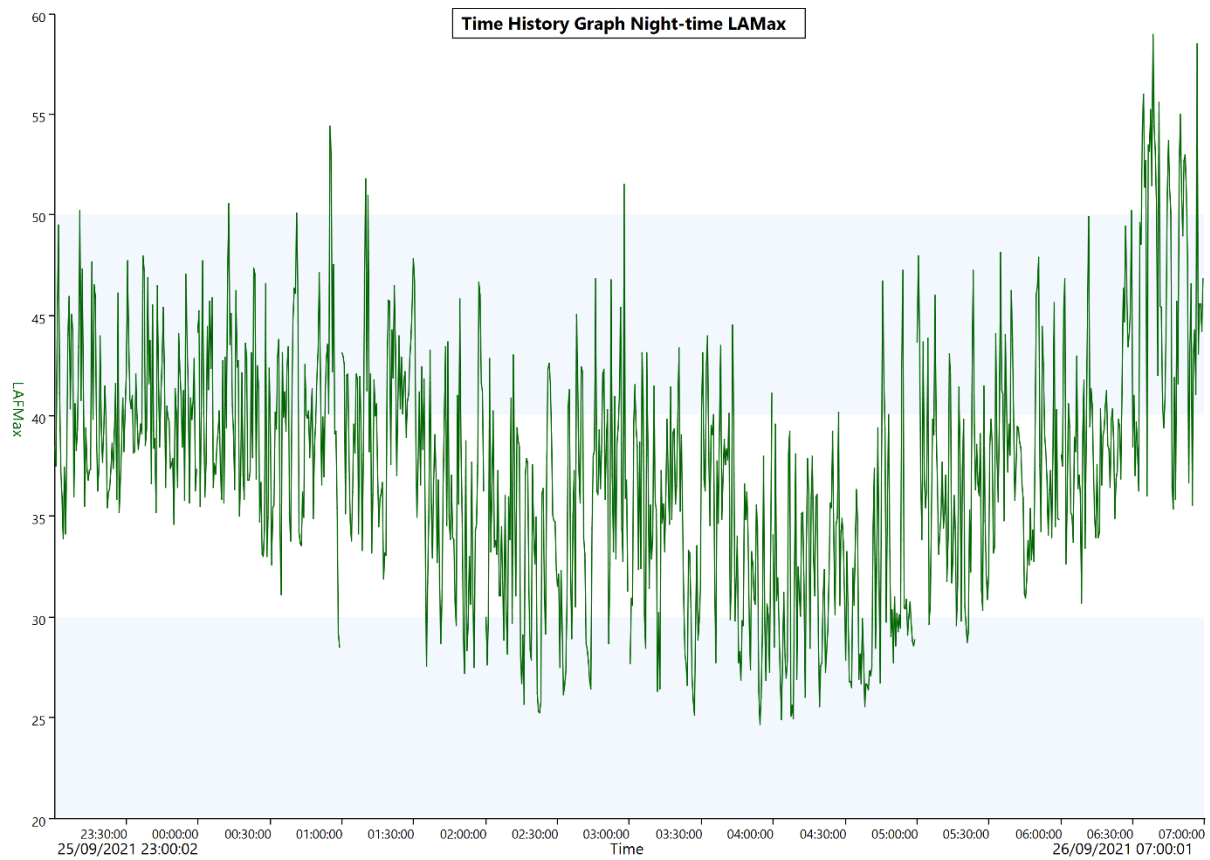


Appendix A – Full Monitoring Results

Time	L _{Aeq} (dB)	L _{AMax} (dB)	L _{A90} (dB)
25/09/2021 11:00	42.8	67.9	37.9
25/09/2021 12:00	43.4	57.4	38.0
25/09/2021 13:00	43.3	68.1	37.9
25/09/2021 14:00	40.6	56.4	35.1
25/09/2021 15:00	40.2	63.0	34.2
25/09/2021 16:00	40.3	60.5	31.9
25/09/2021 17:00	40.3	58.5	33.2
25/09/2021 18:00	41.2	60.9	35.6
25/09/2021 19:00	38.5	57.1	34.4
25/09/2021 20:00	37.5	57.1	32.6
25/09/2021 21:00	38.1	52.7	33.1
25/09/2021 22:00	36.9	60.6	31.0
25/09/2021 23:00	35.5	50.2	31.0
26/09/2021 00:00	35.9	54.4	29.2
26/09/2021 01:00	33.6	51.8	25.4
26/09/2021 02:00	30.7	51.5	24.4
26/09/2021 03:00	30.4	44.5	24.1
26/09/2021 04:00	28.4	47.3	23.7
26/09/2021 05:00	33.2	48.1	28.1
26/09/2021 06:00	36.9	58.9	30.0
26/09/2021 07:00	39.7	64.0	33.3
26/09/2021 08:00	42.3	68.7	36.8
26/09/2021 09:00	43.4	65.9	39.2
26/09/2021 10:00	48.0	74.2	39.0
26/09/2021 11:00	44.8	63.7	39.7
26/09/2021 12:00	45.2	79.2	38.3
26/09/2021 13:00	43.7	64.6	39.2
26/09/2021 14:00	44.2	65.7	40.0
26/09/2021 15:00	43.9	62.6	40.2
26/09/2021 16:00	42.8	64.0	39.0
26/09/2021 17:00	44.0	63.1	38.4
26/09/2021 18:00	41.9	57.5	37.8
26/09/2021 19:00	41.5	58.2	37.8



Start Time	End Time	L _{Aeq}	L _{A90}
25/09/2021 23:00	25/09/2021 23:15	35.7	31.0
25/09/2021 23:15	25/09/2021 23:30	35.1	31.3
25/09/2021 23:30	25/09/2021 23:45	36.2	31.9
25/09/2021 23:45	26/09/2021 00:00	35.1	30.5
26/09/2021 00:00	26/09/2021 00:15	35.7	30.4
26/09/2021 00:15	26/09/2021 00:30	33.9	29.8
26/09/2021 00:30	26/09/2021 00:45	34.8	28.1
26/09/2021 00:45	26/09/2021 01:00	38.0	29.0
26/09/2021 01:00	26/09/2021 01:15	35.2	28.6
26/09/2021 01:15	26/09/2021 01:30	34.7	27.7
26/09/2021 01:30	26/09/2021 01:45	32.5	25.6
26/09/2021 01:45	26/09/2021 02:00	30.6	24.4
26/09/2021 02:00	26/09/2021 02:15	29.4	24.8
26/09/2021 02:15	26/09/2021 02:30	30.3	24.1
26/09/2021 02:30	26/09/2021 02:45	29.9	24.4
26/09/2021 02:45	26/09/2021 03:00	32.5	25.1
26/09/2021 03:00	26/09/2021 03:15	30.6	23.9
26/09/2021 03:15	26/09/2021 03:30	29.9	24.1
26/09/2021 03:30	26/09/2021 03:45	32.4	25.3
26/09/2021 03:45	26/09/2021 04:00	27.3	23.9
26/09/2021 04:00	26/09/2021 04:15	27.0	23.0
26/09/2021 04:15	26/09/2021 04:30	28.7	24.6
26/09/2021 04:30	26/09/2021 04:45	26.9	24.0
26/09/2021 04:45	26/09/2021 05:00	30.1	26.3
26/09/2021 05:00	26/09/2021 05:15	32.8	27.9
26/09/2021 05:15	26/09/2021 05:30	31.6	27.3
26/09/2021 05:30	26/09/2021 05:45	34.4	30.1
26/09/2021 05:45	26/09/2021 06:00	33.4	29.4
26/09/2021 06:00	26/09/2021 06:15	33.8	29.5
26/09/2021 06:15	26/09/2021 06:30	35.7	30.9
26/09/2021 06:30	26/09/2021 06:45	38.8	29.9
26/09/2021 06:45	26/09/2021 07:00	37.6	31.0





Appendix B – Sound level meter and calibration details

Type	Value
Instrument	G080402, CR:171C
Time History Rate	1 second
Last Factory Calibration	12/04/2021
Time	25/09/2021 10:34
Level	93.7 dB
Offset	-0.42 dB
Time	26/09/2021 20:25
Level	93.7 dB
Offset	-0.62 dB
Latitude	53° 49' 36.65" N
Longitude	2° 36' 9.84" W
Altitude	144.4m
Accuracy	Excellent



Appendix C – Vehicle arrivals and deliveries

Staff vehicles

Vehicle manoeuvring and parking 59dB $L_{Aeq,5mins}$ at 5m

Car door slamming 62dB $L_{Aeq,1s}$ at 5m

Distance attenuation to garden, 25m away = -14dB(A)

Distance attenuation to house, 48m away = -19.6(A)

Barrier attenuation to garden = -23dB(A)

Barrier attenuation to first floor façade = -20dB(A)

Therefore

Car

59-14-23 = 22dB $L_{Aeq,5mins}$ for vehicle at ground floor

59-14-20 = 25dB $L_{Aeq,5mins}$ for vehicle at first floor

Car door

62-14-23 = 25dB $L_{Aeq,5mins}$ for vehicle at ground floor

62-14-20 = 28dB $L_{Aeq,5mins}$ for vehicle at first floor.

HGV (daytime only)

Manoeuvring 75dB $L_{Aeq,3mins}$ at 3m

Delivery 69.8dB $L_{Aeq, 1hr}$ at 3m

Distance attenuation to garden, 28m away = -19.4dB(A)

Distance attenuation to house, 52m away = -24.8(A)

Barrier attenuation to garden = -23dB(A)

Therefore

Manoeuvring to garden

75-19.4-23 = 32.6dB $L_{Aeq,5mins}$ for vehicle at ground floor

Manoeuvring to house



$75 - 24.8 - 23 = 27.2\text{dB } L_{\text{Aeq},5\text{mins}}$, for vehicle at ground floor