

The Common, Barwell

Outline planning noise assessment in relation to a proposed residential development

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Issued to

Redrow Homes Ltd (Harrow Estates Division)

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1. INTRODUCTION

Redrow Homes Ltd (Harrow Estates Division) are involved in a proposed residential development at a site off The Common, Barwell and intend to submit an outline application for the development.

Spectrum Acoustic Consultants has been instructed to carry out a noise assessment for the development to support the planning application.

2. SITE DESCRIPTION AND PROPOSALS

The proposed development site is located off The Common, Barwell and extends to 10.92ha, although only 2.88ha would be developed for residential use, with the rest remaining as open space. The site is currently used for horses.

The site is bounded to the north by Dawson's Lane and variably to the west (from north to south) by an industrial area, residential dwellings, and The Common. Bounding the site to the east are allotments with open space beyond and Inglenook Farm Antiques and Salvage. To the south is open space and the A47.

The proposal is to construct up to 95 residential dwellings within the north western plots at the site, near to existing residential dwellings, with the remaining plots to the south and east to be meadow grassland with public access.

The proposed site boundary plan is presented in Appendix A alongside an illustrative site layout.

3. RELEVANT GUIDANCE

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework (NPPF) was first published in March 2012 and revised in July 2018 and again in February 2019¹. It sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

NPPF requires (170) that *"planning policies and decisions should contribute to and enhance the natural and local environment by: (.....) preventing new and existing development from contribution to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of (.....) noise pollution.*

In relation to noise (180) *'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life²;*

¹ National Planning Policy Framework, MHCLG, February 2019

² See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24, DEFRA, 15 March 2010).



b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'

Planning policies and decisions should also (182) *'ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed'.*

Throughout the NPPF reference is made to other policies, such as the Noise Policy Statement for England (NPSE), which should also be applied as appropriate.

3.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The Noise Policy Statement for England (NPSE)³ sets out the long term vision of government noise policy which is to *'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The aims of the NPSE are to (2.23-2.25):

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life

These aims are developed by reference (2.20-2.21) to the concepts of:

- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
- LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL (Significant Observed Adverse Effect Level). This is the level above which significant adverse effects on health and quality of life occur.

It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).

Situations of significant adverse effect (SOAEL) should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.

³ Noise Policy Statement for England (NPSE), DEFRA, 15 March 2010



3.3 PLANNING PRACTICE GUIDANCE

In March, 2014, Planning Practice Guidance on Noise⁴ (PPG-N) was released. This provides advice on *'how planning can manage potential noise impacts in new development'*.

It confirms that neither the NPSE⁵ nor the NPPF⁶ *'expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development'* (002).

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE⁷. The noise exposure categories are summarised below.

- No Observed Adverse Effect: noise can be heard but does not cause any change in behaviour or attitude.
- Observed Adverse Effect: noise can be heard and causes small changes in behaviour and/or attitude.
- Significant Observed Adverse Effect: noise causes a material change in behaviour and/or attitude.
- Unacceptable Adverse Effect: extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or psychological effects.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment; where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects; where there is significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

In establishing values for LOAELs and SOAELs which represent the onset levels of adverse effects and significant adverse effects respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- *'The source, its absolute level and the time of day.*
- *For intermittent sources, the number and duration of events;*
- *The spectral frequency content of the noise*

And also other factors will need to be considered in many cases, which are more fully described and detailed within the full PPG guidance, but include matters such as:

- *The cumulative impacts with other sources*
- *Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)*

⁴ PPG - Noise, MHCLG, 6 March 2014

⁵ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24, DEFRA, 15 March 2010)

⁶ National Planning Policy Framework, MHCLG, July 2018

⁷ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.19 and 2.20, DEFRA, 15 March 2010)



- *Whether existing noise sensitive locations already experience high noise levels,*
- *Where Noise Action Plans, and, in particular Important Areas are identified nearby.*
- *The effect on fauna/wildlife especially on nationally designated sites.*
- *The use of external amenity spaces intrinsic to an overall design and including private gardens.*
- *The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.*
- *Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquility.'*

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. Reference is generally therefore made to existing British Standards where possible and also to scientific exposure-response studies or reviews relating to noise and its health and other effects on human and, where appropriate, animal populations. In such circumstances, some justification may be necessary when using this information.

3.4 GUIDELINES FOR COMMUNITY NOISE - WORLD HEALTH ORGANIZATION (WHO), 1999

Guidelines for Community Noise (GCN) was published in 1999 with the aim of informing legislation and guidance produced at the national and regional levels for the purposes of minimising any potential adverse health effects resulting from noise in the community. It presents guideline noise level criteria for the avoidance of adverse effects such as sleep disturbance and annoyance in a range of specific environments. The preface to WHO states that community noise includes road, rail and air traffic, industries, construction and public work, and the neighbourhood.

New guidance from WHO titled Environmental Noise Guidelines for the European Region (ENG) was published in 2018. The document takes a very different approach to guidance set out in the previous document (GCN) by identifying separate thresholds for specific sources rather than for community noise as a whole. Consequently, much of the earlier guidance set out in GCN is now absent from ENG. While ENG was intended to supersede GCN, it recognises this absence and states that *'indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.'*

It is recommended that all WHO guidance should be noted but that it should not be relied upon in assessments without reference to other relevant detailed guidance, especially that in British Standards. These may align better with Planning Practice Guidance⁸ in England.

3.5 BS 8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

BS 8233:2014⁹ *'provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use'. 'The Standard is not'¹⁰ intended to be used routinely where noise sources are brought to existing noise sensitive buildings'.*

⁸ PPG - Noise, MHCLG, 6 March 2014

⁹ BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

¹⁰ The word 'not' is omitted from the text in the Standard. The Institute of Acoustics advised 'not' to be added following a meeting of their London Branch in March 2015.



For residential use dwellings (7.7.1), *‘the main considerations, for bedrooms, are the acoustic effect on sleep; and for other rooms, the acoustic effect on resting, listening and communicating’* (7.7.1).

Internal noise criteria are advised relating to sources of external noise *‘without a specific character, previously termed “anonymous noise”. (...) For simplicity, only noise without character is considered. Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate’*. (7.7.1)

‘For steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values’, which are set out in Table 1.

Activity	Location	07:00-23:00	23:00-07:00
Resting	Living room	35 dB $L_{Aeq,16\text{ hour}}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hour}}$	30 dB $L_{Aeq,8\text{ hour}}$

Table 1: Indoor ambient noise levels for dwellings

There are a number of notes to the table. These include:

Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.

BS 8233 does not give guidance on what might constitute a guideline value. However, as the standard does cross reference WHO, we suggest that the guideline value of L_{AFmax} 45dB, inside bedrooms, should not be exceeded during the night more than 10-15 times, which reflects the WHO position.

‘Note 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the facade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment’.

‘Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved’.

3.6 BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

The principle of BS 4142¹¹ is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that *‘a difference of around +10 dB or more is likely*

¹¹ BS 4142:2014 Methods for rating and assessing industrial and commercial sound



to be an indication of a significant adverse impact [...]. A difference of around +5 dB is likely to be an indication of an adverse impact [...]. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.'

However, BS 4142 also advises that 'when making assessments and arriving at decisions [...] it is essential to place the sound in context' so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example it advises 'Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.' It also indicates that impacts estimated during 'the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.'

4. NOISE MEASUREMENT SURVEY

4.1 METHODOLOGY

To inform the noise assessment, noise measurements were carried out over a single day and night period, at locations representative of the sensitive facades, in order to establish the incident noise levels emanating from surrounding activity.

Measurements were carried out from Tuesday 17 to Wednesday 18 August 2021.

The measurement locations are shown in Appendix B and summarised below.

NML 1:	South of site by The Common and near A47.
NML 2:	North of site by Dawson's Lane.
NML 3-7:	Various locations around industrial site.
NML 8:	Western boundary at northern end of site, 55m from industrial area.
NML 9:	Western boundary in middle of site adjacent to existing dwellings.
NML 10:	Unattended monitoring location near southeast corner of industrial area.

Attended night time measurements were carried out offsite due to site access restrictions relating to livestock. Attended daytime measurements, however, were carried out within the proposed site boundary.

Noise measurements were recorded in both 5-minute and 15-minute periods.

Noise measurement parameters consisted of equivalent continuous (L_{Aeq}) noise levels and maximum (L_{AFmax}) noise levels as well as statistical noise levels (termed L'_n , where n is the percentage of time the level is exceeded during the measurement period). Of the statistical parameters, the L_{A90} is typically used to describe the Background Sound Level (defined as the level exceeded for 90% of a period, in the absence of noise from the proposed development). Both overall and 1/1 octave band measurements were stored for later analysis.

The following equipment was used:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3010857
- Bruel & Kjaer Type 4189 Microphone s/n 3060877
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 2291483

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3023840
- Bruel & Kjaer Type 4189 Microphone s/n 3130623
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3020229

Before and after the survey, the sound level meter was field-calibrated in accordance with the manufacturer's guidelines, and no significant drift was observed. The meter, microphone and field calibrator are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards.

4.2 RESULTS

The results of the measurements are presented in Appendix B. Table 2 summarises the results of measurements made around the proposed development site (excluding measurements made within the industrial area).

Measurement position	Ambient noise level L_{Aeq} (dB)		Background sound level L_{A90} (dB)		Night typical L_{Amax} (dB)
	Day	Night			
NML 1: South of site by The Common and near A47	56	50*	49	30	74*
NML 2: North of site by Dawson's Lane	47	35	44	29	55
NML 8: Western boundary at northern end of site, 55m from industrial area	47	-	45	-	-
NML 9: Western boundary in middle of site adjacent to existing dwellings	44	-	41	-	-
NML 10: Unattended monitoring location near southeast corner of industrial area	46	40	43	29	60

Table 2: Summary of noise measurement results

* Night time measurements were 3.5m from The Common, compared to 17m during the day, due to site access restrictions at night during the survey. The summarised results include a distance correction applied to the night time L_{Aeq} and L_{AFmax} measurements for consistency. The night time L_{A90} results have not been corrected as it is considered they are less affected by distance at night when there are limited traffic movements.

The summarised L_{Aeq} values are the log average of all the 15-minute measurements for the day and night periods, respectively. For the attended sampled measurement locations, the highest L_{AFmax} levels and the mean L_{A90} levels are given. For the unattended continuous monitoring location, the 10th highest 5-minute night time L_{AFmax} level has been assumed as the typical value, in accordance with WHO guidance, and the modal L_{A90} value is given.

Noise levels affecting the site are predominantly controlled by road traffic and commercial aircraft movements. At the north-western end of the development site some yard activities from the industrial site are also occasionally audible. Additionally, a cooling fan is audible in this area throughout the daytime period.



5. ASSESSMENT

5.1 NOISE IMPACT FROM INDUSTRIAL AREA

During the survey, measurements were carried out within the industrial area close to noise generating activities as they arose between 10:30 and 12:00 on 18th August 2021. Where noise levels varied over a particular measurement period, as activities changed, the relative contributions of each source were noted. The sound power levels of each of the main noise sources at the industrial site have been calculated from these measurements such that noise from these activities can be calculated at various more distant locations within the proposed residential development site.

The particular prediction model that has been used for this analysis is SoftNoise's Type 7810 'Predictor' software. This acoustic model implements the procedures set out in ISO 9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation to determine noise levels", and is Quality Assured to all parts of ISO 17534:2015 "Acoustics – Software for the calculation of sound outdoors". The Predictor model takes account of the following features in its calculation procedure:

- Source sound power level (for point, line and area sources)
- Reflection from nearby structures and source directivity
- Distance from noise source (geometric spreading)
- Atmospheric absorption
- Acoustic screening of intervening structures and topography
- Ground absorption
- Ground effects (which includes the height of ground relative to the noise source)

The illustrative site layout presented in Appendix A, and included in the noise model, has been developed using good acoustic design principles to control the noise impact from industrial activities. In particular, a residential barrier block has been incorporated along the western boundary of the site with the industrial area. The barrier block comprises flats over garages with internal layouts arranged such that there are no noise sensitive rooms (bedrooms/living rooms) with windows overlooking the industrial site. 1.8m high garden screening has also been included in some areas to ensure a low industrial noise impact in gardens, as shown in Figure 1, below. These could either be closed boarded timber fences with a minimum mass per unit area of 10kg/m², or a brick wall.

The results of the noise model are presented in Appendix C in the form of a noise contour plot and tabled results.

The results of the model indicate that industrial noise levels at proposed habitable room windows are up to L_{Aeq} 43dB at first floor level of the nearest house, to the southeast corner of the industrial yard.

At habitable room windows on the barrier block (all at first floor level), industrial noise levels range from L_{Aeq} 29-42dB.

At ground floor level habitable room windows, industrial noise levels are up to L_{Aeq} 37dB.

Industrial noise levels in gardens are up to L_{Aeq} 38dB.



Figure 1: Illustrative barrier block and garden screening

The results of the noise model are summarised in Table 3 alongside a BS 4142 assessment establishing the initial estimate of impact. The rating level includes a +3dB character correction, applied to the specific sound level, to account for the sound being readily distinctive against the residual acoustic environment. The background sound level has been taken from the measurements at NML 9, which are considered representative of sound levels at the receptor locations in absence of noise from the industrial site.

Most noise exposed NSRs	Specific sound level, L_{Aeq}	Rating level, $L_{Ar,Tr}$	Background sound level, L_{A90}	Rating minus background
Flat: 1F LKD/Bedroom	42	45	41	+4
House: 1F Bedroom	43	46	41	+5
House: GF Lounge	37	40	41	-1
Garden	38	41	41	0

Table 3: BS 4142 initial estimate of impact

The results indicate that the rating level exceeds the background sound level by up to +5dB during the day, outside the bedroom window of the nearest house, and by up to +4dB during the day, outside living room and bedroom windows in the northern-most barrier block flat. At other plots, rating levels will be lower, and at ground floor level, rating levels do not exceed the background sound level at any location.

BS 4142 advises that where the rating level does not exceed the background sound level, this indicates a low impact, and where the rating level exceeds the background sound level by around +5dB, this is an indication of adverse impact (but not significant), subject to context.

In relation to context, BS 4142 advises that *'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including'*:



1. The absolute level of sound.
2. The character and level of the residual sound compared the character and level of the specific sound.
3. The sensitivity of the receptor (factors include façade insulation, ventilation, and acoustic screening).

In relation to the absolute level of sound, specific sound levels are relatively low. At first floor level, they are at least 8dB below the WHO community noise guideline level of L_{Aeq} 50dB, in the worst case. At ground floor level, they are at least 12dB below the guideline level. WHO defines community noise as noise from all sources, including *'road, rail and air traffic, industries, construction and public work, and the neighbourhood'*.

Noise levels inside habitable rooms will also be relatively low. With partially open windows, incident noise levels from industrial activity would be reduced by around 13dB. With windows closed, noise levels would be reduced by around 25dB, assuming standard double glazing is installed. Therefore, at first floor level, internal noise levels will be up to around L_{Aeq} 30dB during the day with windows open and up to around L_{Aeq} 18dB with windows closed. This is 5dB below the BS 8233 desirable guideline level with windows open and 17dB below with windows closed.

Specific sound levels in gardens will also be low and rating levels in these areas will not exceed the background sound level at any location.

Further context at this site is that the industrial activity occurs during the daytime only, typically up to around 5pm. During the evening and nighttime periods, there will be no impact at all.

Given the relatively low absolute sound levels in this case, which are the result of good acoustic design principles, as evidenced in the illustrative masterplan, it is considered that the noise impact will be acceptably low.

The above analysis demonstrates that the proposed development can be designed to achieve an acceptably low impact in relation to industrial sound.

5.2 NOISE INGRESS FROM EXTERNAL SOURCES

Except for the measurements taken at NML 1, at the southern end of the site near The Common, the results of the survey indicate that noise levels across the majority of the site do not exceed L_{Aeq} 47dB during the day and L_{Aeq} 40dB during the night, with typical night time L_{AFmax} levels up to 60dB.

Allowing for a 13dB level difference across a partially open window, internal ambient noise levels would be L_{Aeq} 34dB during the day and L_{Aeq} 27dB during the night. This is below the desirable criteria set out in BS 8233 for resting and sleeping conditions. Typical L_{AFmax} levels would be up to 47dB inside. This is 2dB above the WHO criteria for sleep disturbance.

Assuming standard thermal double glazing, a level difference of at least 25dB may be expected with windows closed and suitable trickle ventilators in the open position. In this case, internal ambient noise levels would be L_{Aeq} 22dB during the day and L_{Aeq} 15dB during the night, with typical L_{AFmax} levels up to 35dB. These are well below the desirable criteria for resting and sleeping.



At NML 1, 17m from The Common, noise levels are L_{Aeq} 56dB during the day and L_{Aeq} 50dB during the night, with typical L_{AFmax} levels of 74dB. Daytime measurements at NML 1 comprised a mixture of noise from The Common and the A47. During the night, the measured levels were dominated by The Common.

The illustrative masterplan indicates that at the southwestern most corner of the proposed residential area, the closest proposed dwelling to the Common and the A47, is set back 12m from The Common and is 200m from the A47. By taking account of the likely contributions from each road source the measured levels have been extrapolated to this location. It is estimated that noise levels would be up to L_{Aeq} 56dB during the day and up to L_{Aeq} 52dB during the night, with typical L_{AFmax} levels up to 77dB.

Note that at these levels, any required overheating mitigation strategy would need to assume closed bedroom windows for Building Regulation Approved Document O compliance. A more detailed review of noise in relation to overheating is beyond the scope of this report but should be carried out later at detailed design stage.

Assuming a nominal 25dB reduction provided by standard double glazing and trickle vents, internal ambient noise levels at this location would be L_{Aeq} 31dB during the day and L_{Aeq} 27dB during the night, with L_{AFmax} levels up to 52dB. The day and nighttime L_{Aeq} levels are below the BS 8233 desirable guideline levels of L_{Aeq} 35dB and L_{Aeq} 30dB, respectively. However, the nighttime L_{AFmax} level is above the guideline level of 45dB, indicating that a higher acoustic performance will be required for bedroom facades near The Common, within around 30m.

As the proposed development is in outline at this stage, details of plot types and orientations have not been finalised. However, calculations of noise ingress have been carried out for a typical bedroom, assuming typical floor and glazing areas and two trickle vents. The example calculations are presented in Appendix D.

The results of the calculations indicate the following acoustic façade specification would be required to achieve the BS 8233 guideline criteria for resting and sleeping in bedrooms.

- Standard thermal double glazing with an acoustic performance specification of R_w+C_{tr} 25dB (e.g. Pilkington 4/6-16/4mm). This is the same standard specification assumed for all other plots in the discussion above.
- Trickle vents with an acoustic performance specification of $D_{n,e,w}+C_{tr}$ 40dB (e.g. Greenwood 2500EAW.AC1 (Acoustic trickle)). This is an enhanced acoustic performance above that provided by a standard trickle vent.

The results of the above analysis demonstrate that acceptable internal ambient noise levels can be achieved at this site, in accordance with the guidelines set out by WHO and in BS 8233.

Once the proposed development has been further developed, at detailed design stage, the above calculations should be reviewed to ensure the appropriate acoustic specification for windows and vents is incorporated into the design.



5.3 NOISE IN EXTERNAL AMENITY AREAS

As set out in Section 3.5, BS 8233 suggests guidelines for noise levels in external spaces that are used for amenity, such as gardens and patios. *'It is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline of 55 dB $L_{Aeq,T}$, which would be acceptable in noisier environments.'*

Noise levels incident on the site in areas proposed for residential development are up to L_{Aeq} 56dB during the day, as described in Section 5.2, above. With 1.8m high closed boarded fences (min. 10kg/m²) installed around the perimeter of gardens with line of site to roads, noise levels in gardens would be reduced to below L_{Aeq} 50dB.

Therefore, acceptably low noise levels can be achieved in external amenity spaces at this site, in accordance with the guidance set out in BS 8233.

6. CONCLUSIONS

A noise assessment has been carried out to establish the impact of noise affecting the proposed residential development at The Common, Barwell.

The assessment has demonstrated that acceptable internal ambient noise levels can be achieved at the site, as per the guidance and standards set out by WHO and in BS 8233. Acceptable internal ambient noise levels can be achieved across most of the site with standard thermal double glazing and trickle ventilation. At some dwellings, those within around 30m of The Common, bedrooms would need trickle vents with a higher acoustic performance specification, as described in Section 5.2, to control L_{AFmax} events at night.

Noise in external amenity spaces has been assessed and mitigation recommended such that the WHO guideline levels can be achieved across the site.

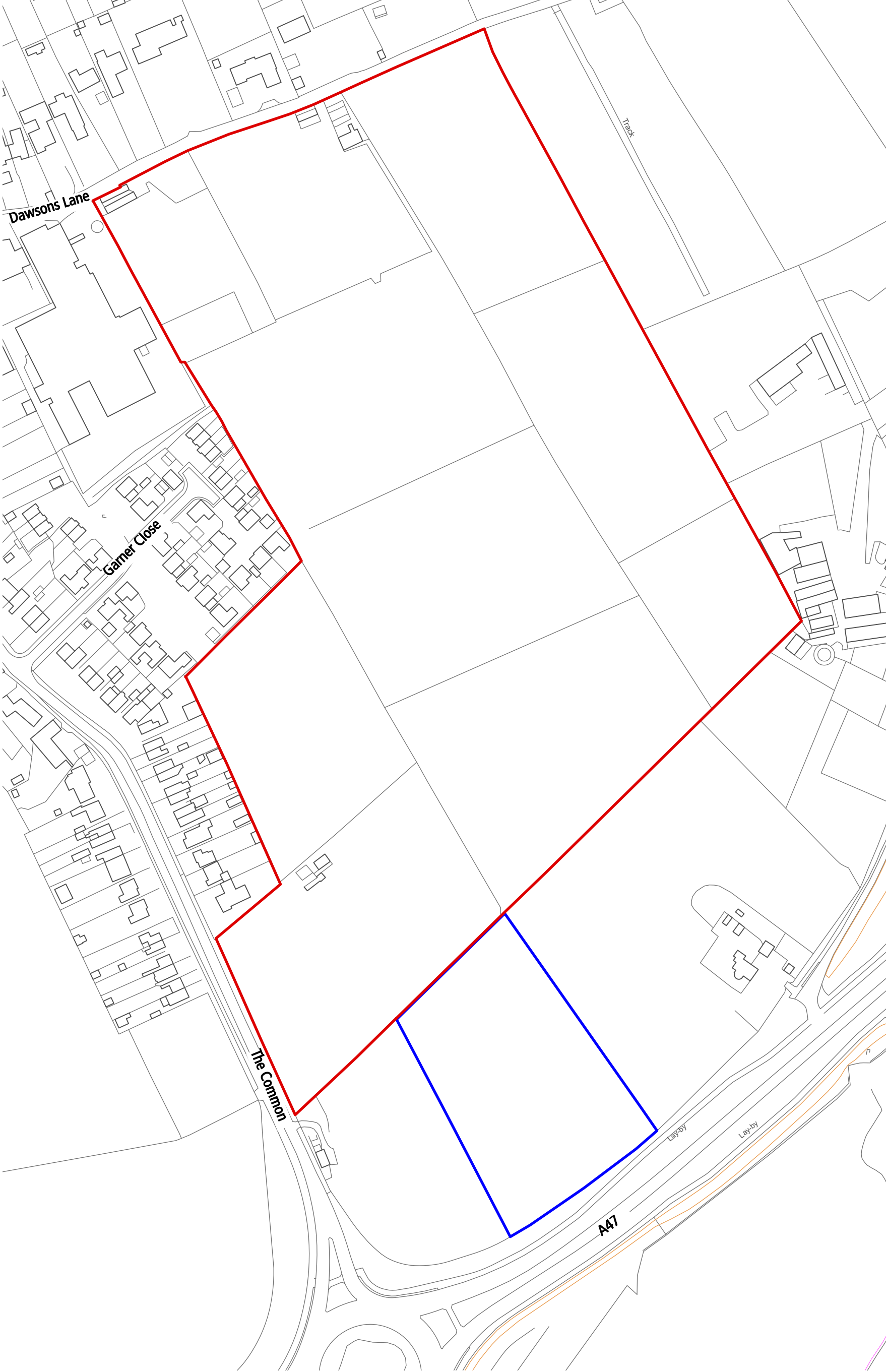
A noise impact assessment has been carried out in relation to activities at the existing industrial site adjacent to the proposed development. With careful consideration given to site layout and screening, which would be the subject of detailed design, it is considered that the proposed development can be designed to achieve an acceptably low impact in relation to industrial sound. This has been demonstrated by the assessment of the illustrative masterplan described in Section 5.1.

APPENDIX A

Proposed scheme

Site boundary

Land outside the application
within control of the applicant



client:
Harrow Estates

project:
Land East of The Common, Barwell

drawing title:
Site Boundary Plan

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date:
November 2023

drawing number:
1001B

drawn
AJ

status:
Preliminary

n

1:2000

0100m

Urban Design Box

U

D

B

- Site boundary
- Land also under the control of the applicant
- Proposed all modes access
- Proposed pedestrian and cycle access
- Proposed pedestrian access
- Proposed pedestrian route
- Proposed shared pedestrian and cycle route
- Residential development
- Self build development
- Proposed main street and pathway
- Proposed shared surface
- Public open space
- Meadow grassland with mown paths
- Maintenance area
- Attenuation area / swales
- Existing hedges / trees / planting
- Proposed trees
- Proposed woodland
- Proposed hedges / strategic planting infrastructure
- Play area
- Outdoor recreation
- Walking routes
- Offsite proposed permissive pedestrian route



client:
Harrow Estates

project:
Land East of The Common, Barwell

drawing title:
Illustrative Masterplan

urbandesignbox.co.uk

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job number:
HAR102

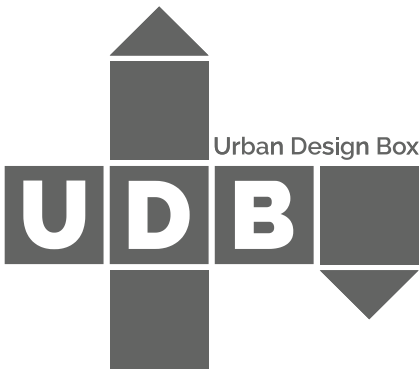
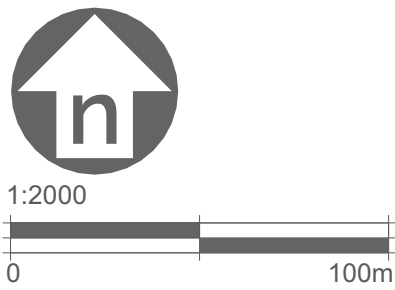
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date:
December 2023

drawing number:
4001G

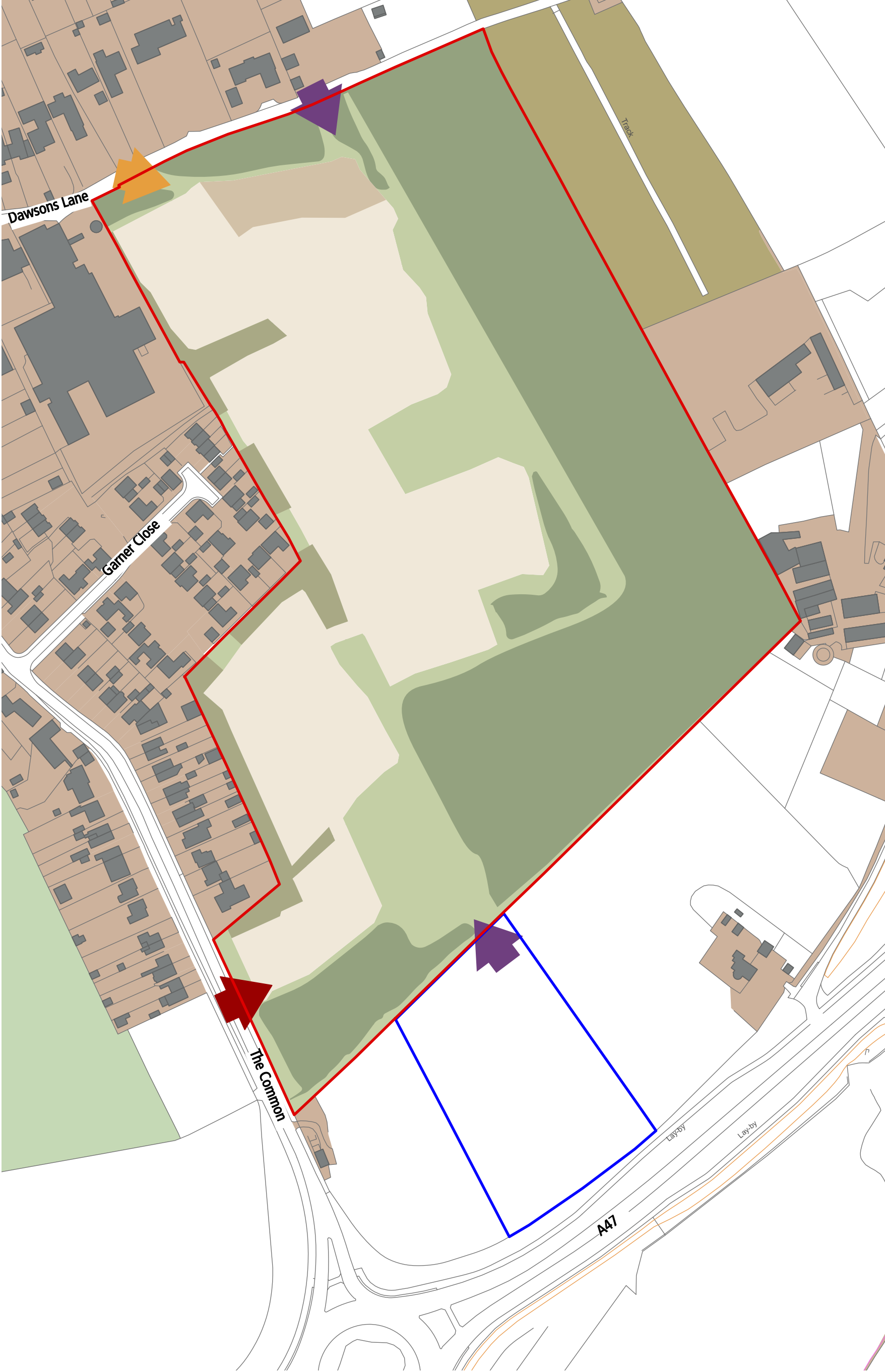
drawn
AJ

status:
Preliminary



- Site boundary
- Land also under the control of the applicant
- Proposed all modes access
- Proposed pedestrian and cycle access
- Proposed pedestrian access
- Residential development and access roads
- Self build development and access roads
- Public open space
- Meadow grassland with mown paths and attenuation area
- Maintenance area

NOTE
A limited deviation of +/- 5m should be allowed to area boundaries to give flexibility of the detailed street design at Reserved Matters stage, whist balancing the overall quantum.



client:

Harrow Estates

project:

Land East of The Common, Barwell

drawing title:

Parameter Plan

job number:

HAR102

drawing number:

3501C

scale

1:2000 @ A3

drawn

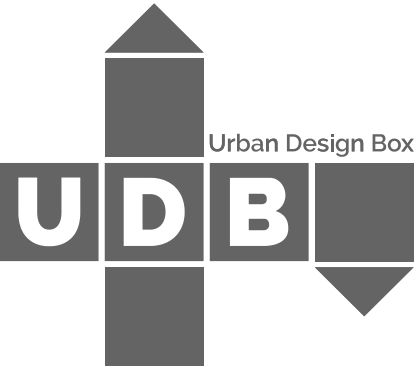
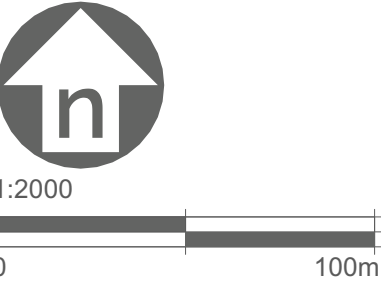
AJ

date:

December 2023

status:

Preliminary





A P P E N D I X B

Noise measurement locations and results



Google Earth

Imagery date: 6/16...

100 m

Camera: 1,180 m 52°33'53"N 1°...

Environmental Noise Record Sheet



Project:	The Common, Barwell
Project number:	21247
Date:	02/09/2021

Noise monitoring location:	1: South of site by The Common and near A47
Plant operating condition:	
Instrumentation:	B&K 2250/6
Calibration times:	17/08/21 23:10, 01:05; 18/08/21 10:15, 16:00. No significant drift.

Date/time			Weather			Noise Level (dB)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	LAF10.0	LAF50.0	LAF90.0	LAFmax	LAFmin	LAeq	
17/08/21	23:17	15:00	<1	S	100	52	38	31	77	25	56	3.5m from The Common. Distant road traffic (~40dB), local road traffic, jet plane.
18/08/21	00:01	15:00	<1	S	100	46	38	31	83	25	55	3.5m from The Common. Distant road traffic (~38dB), local road traffic.
18/08/21	00:42	15:00	<1	W	100	43	34	28	79	25	51	3.5m from The Common. Distant road traffic, faint plant.
18/08/21	13:28	15:00	1-2	W	100	59	52	47	64	44	55	17m from The Common. Road traffic, cockerels.
18/08/21	15:37	15:00	1-2	NW	100	60	55	50	71	46	57	17m from The Common. Road traffic, cockerels, vegetation.

Date/time			Weather			Leq Octave Band Pressure Level (dB)										Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	31.5	63	125	250	500	1k	2k	4k	8k	dB(A)	
17/08/21	23:17	15:00	<1	S	100	51	51	51	52	49	54	49	39	29	56	3.5m from The Common. Distant road traffic (~40dB), local road traffic, jet plane.
18/08/21	00:01	15:00	<1	S	100	51	54	48	50	50	53	46	37	29	55	3.5m from The Common. Distant road traffic (~38dB), local road traffic.
18/08/21	00:42	15:00	<1	W	100	50	52	45	46	46	49	42	33	26	51	3.5m from The Common. Distant road traffic, faint plant.
18/08/21	13:28	15:00	1-2	W	100	60	63	54	49	48	53	47	38	30	55	17m from The Common. Road traffic, cockerels.
18/08/21	15:37	15:00	1-2	NW	100	61	63	60	51	51	54	49	39	33	57	17m from The Common. Road traffic, cockerels, vegetation.

Environmental Noise Record Sheet



Project:	The Common, Barwell
Project number:	21247
Date:	02/09/2021

Noise monitoring location:	2: North of site by Dawson's Lane
Plant operating condition:	
Instrumentation:	B&K 2250/6
Calibration times:	17/08/21 23:10, 01:05; 18/08/21 10:15, 16:00. No significant drift.

Date/time			Weather			Noise Level (dB)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	LAF10.0	LAF50.0	LAF90.0	LAFmax	LAFmin	LAeq	
17/08/21	23:39	15:00	<1	S	100	36	31	29	55	27	36	Distant road traffic, jet plane.
18/08/21	00:21	15:00	<1	W	100	36	31	29	49	27	34	Distant road traffic, underground water pump at 15m.
18/08/21	12:15	15:00	1-2	NW	100	48	46	45	64	43	47	Cooling fan, road traffic, vegetation.
18/08/21	14:01	15:00	1-2	W	100	46	44	43	70	40	47	Cooling fan, road traffic, loud distant sports car, people talking.

Date/time			Weather			Leq Octave Band Pressure Level (dB)										Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	31.5	63	125	250	500	1k	2k	4k	8k	dB(A)	
17/08/21	23:39	15:00	<1	S	100	48	52	40	40	33	28	23	19	16	36	Distant road traffic, jet plane.
18/08/21	00:21	15:00	<1	W	100	44	52	36	33	30	28	25	22	18	34	Distant road traffic, underground water pump at 15m.
18/08/21	12:15	15:00	1-2	NW	100	56	57	54	39	41	43	37	34	33	47	Cooling fan, road traffic, vegetation.
18/08/21	14:01	15:00	1-2	W	100	53	56	54	40	44	44	37	30	24	47	Cooling fan, road traffic, loud distant sports car, people talking.

Environmental Noise Record Sheet



Project:	The Common, Barwell
Project number:	21247
Date:	02/09/2021

Noise monitoring location:	Industrial site: See comments
Plant operating condition:	
Instrumentation:	B&K 2250/6
Calibration times:	17/08/21 23:10, 01:05; 18/08/21 10:15, 16:00. No significant drift.

Date/time			Weather			Noise Level (dB)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	LAF10.0	LAF50.0	LAF90.0	LAFmax	LAFmin	LAeq	
18/08/21	10:29	00:48	1-2	N	100	64	63	63	67	62	64	NML 3, 16m from cooling fan at north end of industrial/commercial site: fan dominant. NML 4, Southern industrial yard area by Atlantic Fabrications: gas forklift; hiss, clang and motor noise breakout from warehouse open shutters; loading of truck; van manoeuvres in yard.
18/08/21	10:44	15:00	1-2	N	100	60	52	45	80	41	57	
18/08/21	11:01	15:00	1-2	N	100	51	47	43	69	40	50	NML 4, Southern industrial yard area by Atlantic Fabrications: warehouse breakout and faint plant, car and van manoeuvres in yard, road traffic noise and vegetation.
18/08/21	11:18	10:30	1-2	N	100	53	49	46	67	44	51	NML 5, Southeast corner of industrial/commercial site: breakout from Atlantic Fabrications; whine/hiss/drone from unit to north; cooling fans to north; van manoeuvres in yard.
18/08/21	11:30	15:00	1-2	N	100	53	51	50	86	49	57	NML 6, 6m south of Aggregate Grinding Centre open doors: continuous breakout from open doors, slightly tonal, occasional hiss; cooling fan to north; lorry enters and leaves yard.
18/08/21	11:49	15:00	1-2	N	100	59	53	52	83	51	57	NML 7, 5m east of Deason Joinery open doors: Mostly cooling fan to north; occasional clang and tooling noise breakout.

Date/time			Weather			Leq Octave Band Pressure Level (dB)										Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	31.5	63	125	250	500	1k	2k	4k	8k	dB(A)	
18/08/21	10:29	00:48	1-2	N	100	55	73	75	66	59	56	53	48	39	64	NML 3, 16m from cooling fan at north end of industrial/commercial site: fan dominant. NML 4, Southern industrial yard area by Atlantic Fabrications: gas forklift; hiss, clang and motor noise breakout from warehouse open shutters; loading of truck; van manoeuvres in yard.
18/08/21	10:44	15:00	1-2	N	100	62	60	56	53	53	52	51	47	42	57	
18/08/21	11:01	15:00	1-2	N	100	58	55	51	46	46	45	43	41	37	50	NML 4, Southern industrial yard area by Atlantic Fabrications: warehouse breakout and faint plant, car and van manoeuvres in yard, road traffic noise and vegetation.
18/08/21	11:18	10:30	1-2	N	100	60	58	57	47	46	46	44	42	37	51	NML 5, Southeast corner of industrial/commercial site: breakout from Atlantic Fabrications; whine/hiss/drone from unit to north; cooling fans to north; van manoeuvres in yard.
18/08/21	11:30	15:00	1-2	N	100	65	63	57	55	53	52	51	46	41	57	NML 6, 6m south of Aggregate Grinding Centre open doors: continuous breakout from open doors, slightly tonal, occasional hiss; cooling fan to north; lorry enters and leaves yard.
18/08/21	11:49	15:00	1-2	N	100	61	61	61	57	52	51	50	48	46	57	NML 7, 5m east of Deason Joinery open doors: Mostly cooling fan to north; occasional clang and tooling noise breakout.

Environmental Noise Record Sheet



Project:	The Common, Barwell
Project number:	21247
Date:	02/09/2021

Noise monitoring location:	8: Western boundary at northern end of site, 55m from industrial area
Plant operating condition:	
Instrumentation:	B&K 2250/6
Calibration times:	17/08/21 23:10, 01:05; 18/08/21 10:15, 16:00. No significant drift.

Date/time			Weather			Noise Level (dB)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	LAF10.0	LAF50.0	LAF90.0	LAFmax	LAFmin	LAeq	
18/08/21	12:33	15:00	1-2	W	100	48	46	45	57	43	46	Cooling fan, road traffic, vegetation.
18/08/21	14:24	15:00	3-4	W	100	48	46	45	64	43	47	Cooling fan, road traffic, occasional whine to north, jet plane

Date/time			Weather			Leq Octave Band Pressure Level (dB)										Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	31.5	63	125	250	500	1k	2k	4k	8k	dB(A)	
18/08/21	12:33	15:00	1-2	W	100	63	58	57	41	42	42	37	33	31	46	Cooling fan, road traffic, vegetation.
18/08/21	14:24	15:00	3-4	W	100	60	58	56	42	42	42	39	33	27	47	Cooling fan, road traffic, occasional whine to north, jet plane

Environmental Noise Record Sheet



Project:	The Common, Barwell
Project number:	21247
Date:	02/09/2021

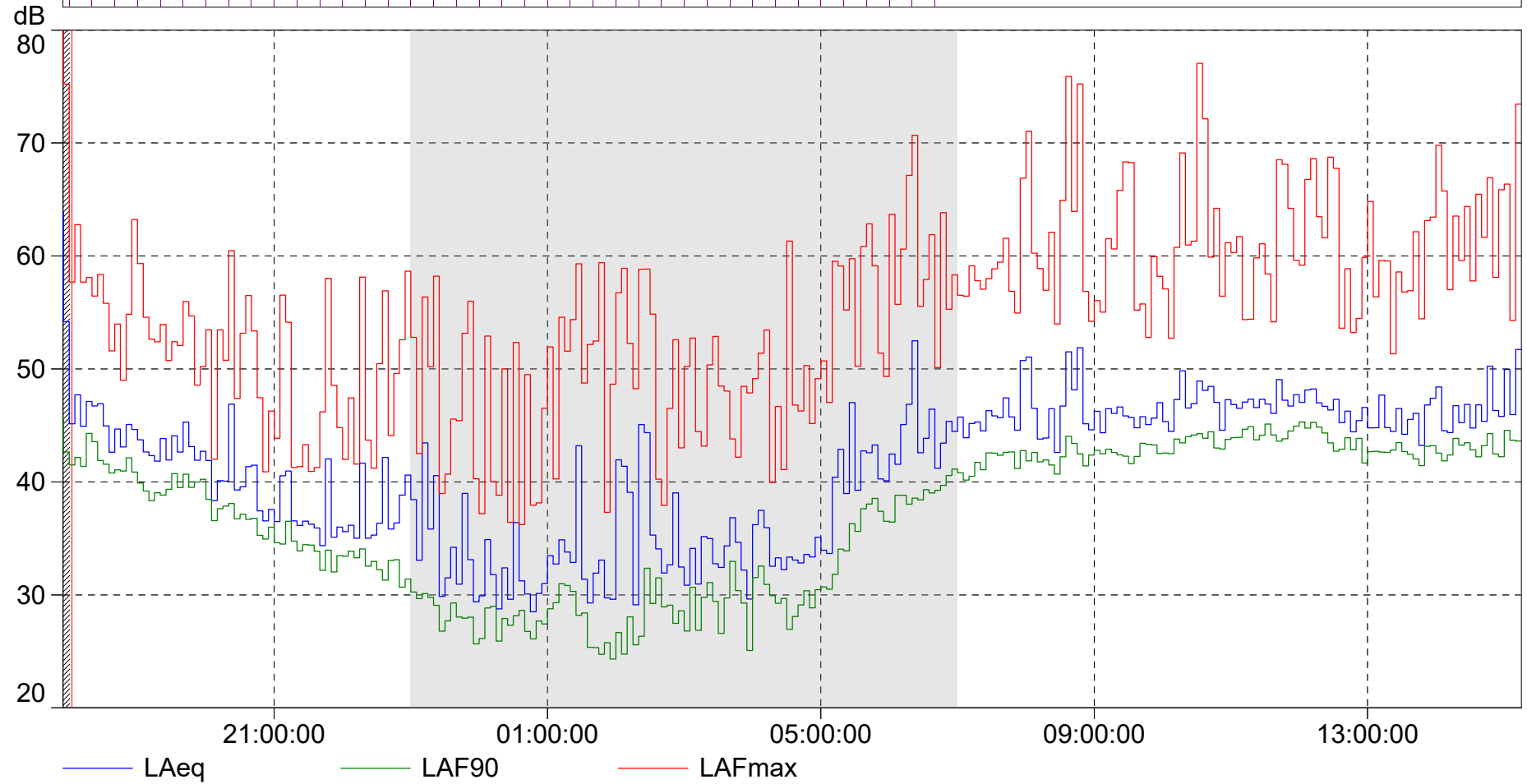
Noise monitoring location:	9: Western boundary in middle of site adjacent to existing dwellings
Plant operating condition:	
Instrumentation:	B&K 2250/6
Calibration times:	17/08/21 23:10, 01:05; 18/08/21 10:15, 16:00. No significant drift.

Date/time			Weather			Noise Level (dB)						Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	LAF10.0	LAF50.0	LAF90.0	LAFmax	LAFmin	LAeq	
18/08/21	12:58	15:00	1-2	W	100	45	43	41	52	38	43	Road traffic, vegetation.
18/08/21	14:45	15:00	1-2	W	100	46	43	41	59	39	45	Road traffic, vegetation, very faint reversing alarm, jet plane, loud sports car.

Date/time			Weather			Leq Octave Band Pressure Level (dB)										Comments (Including description of noise (eg whine, hiss, rumble, impact, vehicle rain, vegetation, or animal noise))
Date	Start time	Duration (min:sec)	Wind speed (m/s)	Wind direction	Cloud (%)	31.5	63	125	250	500	1k	2k	4k	8k	dB(A)	
18/08/21	12:58	15:00	1-2	W	100	51	51	43	36	39	41	32	26	23	43	Road traffic, vegetation.
18/08/21	14:45	15:00	1-2	W	100	54	53	47	44	42	41	33	29	27	45	Road traffic, vegetation, very faint reversing alarm, jet plane, loud sports car.

NML 10 (near southeast corner of industrial site)

█ Exclude █ Day █ Night █ Sound

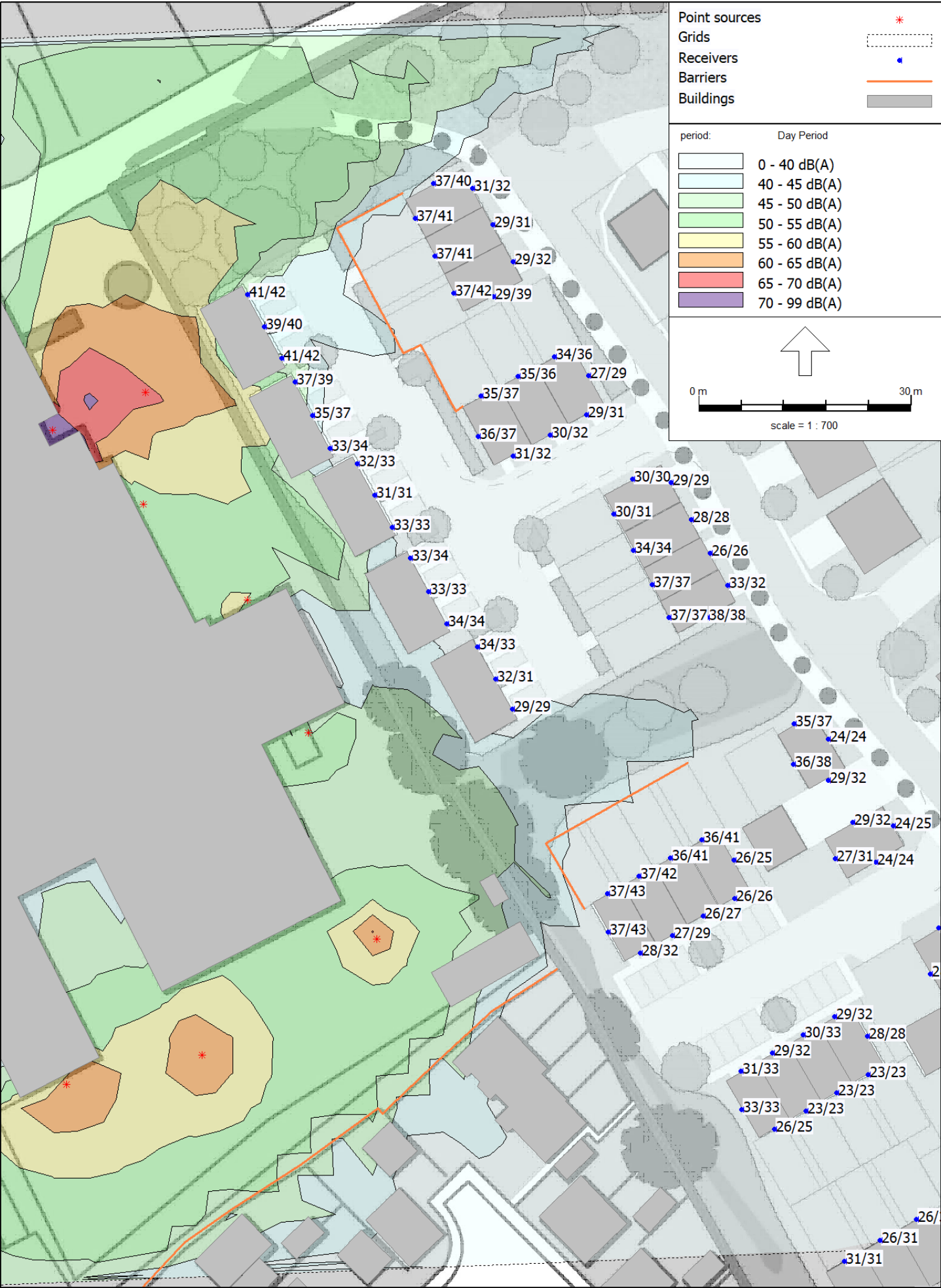


Cursor: 17/08/2021 18:00:00 - 18:05:00 LAeq=45.1 dB LAF90=41.5 dB LAFmax=57.7 dB



APPENDIX C

Noise model



The Common, Barwell

Daytime noise from industry

Report: Table of Results
 Model: Noise from industry - with screening Rev 1
 LAeq per octave: total results for receivers
 Group: (main group)
 Group Reduction: No

Name			Day									
Receiver	Description	Height	Total	31	63	125	250	500	1000	2000	4000	8000
P16_B	[1/3]	4.50	43	--	22	29	31	35	38	38	34	23
P16_B	[3/3]	4.50	43	--	21	28	29	34	37	38	33	23
P17_B	[1/2]	4.50	42	--	21	30	30	35	37	38	33	22
P8_B	[3/3]	4.50	42	--	29	40	36	31	29	24	16	1
P1_B	[1/4]	4.50	42	--	30	40	35	30	27	24	18	5
P1_B	[3/4]	4.50	42	--	30	40	34	29	27	24	18	6
P1_A	[1/4]	1.50	41	--	30	39	34	29	27	24	18	6
P6_B	[3/3]	4.50	41	--	28	39	35	29	26	21	14	-1
P1_A	[3/4]	1.50	41	--	29	39	34	29	27	25	19	7
P7_B	[2/2]	4.50	41	--	28	39	34	28	25	21	14	-1
P18_B	[1/2]	4.50	41	--	17	25	29	34	36	35	30	19
P19_B	[1/3]	4.50	41	--	17	24	29	34	36	35	30	18
P1_B	[2/4]	4.50	40	--	28	38	33	27	26	24	18	5
P6_B	[1/3]	4.50	40	--	26	37	34	30	28	24	16	0
P1_A	[2/4]	1.50	39	--	27	37	32	27	26	24	18	6
P2_B	[1/4]	4.50	39	--	26	37	32	27	25	23	17	5
P8_B	[2/3]	4.50	39	--	26	36	32	28	26	22	14	-1
P20_B	[4/4]	4.50	38	--	16	23	28	30	33	33	28	15
P15_A	[2/3]	1.50	38	--	16	23	26	31	33	33	27	14
P15_B	[2/3]	4.50	38	--	16	23	26	31	33	32	26	15
P16_A	[3/3]	1.50	37	--	20	26	28	31	32	31	25	13
P15_A	[3/3]	1.50	37	--	18	25	26	30	32	32	26	16
P16_A	[1/3]	1.50	37	--	17	24	26	31	32	31	26	13
P11_B	[2/3]	4.50	37	--	25	35	30	25	23	21	15	1
P2_A	[1/4]	1.50	37	--	24	35	30	26	25	23	18	5
P15_B	[3/3]	4.50	37	--	18	25	26	30	32	31	26	15
P6_A	[3/3]	1.50	37	--	24	35	30	25	22	19	13	-1
P17_A	[1/2]	1.50	37	--	17	24	26	30	32	31	26	14
P14_A	[2/2]	1.50	37	--	18	25	26	30	32	31	26	14
P11_B	[3/3]	4.50	37	--	25	35	30	25	23	19	13	-1
P20_B	[1/4]	4.50	37	--	15	23	25	30	31	32	27	14
P6_A	[1/3]	1.50	37	--	25	34	30	26	25	21	14	-1
P7_A	[2/2]	1.50	37	--	23	35	30	24	22	20	13	-1
P2_B	[2/4]	4.50	37	--	25	34	29	26	25	23	17	4
P14_B	[2/2]	4.50	37	--	18	25	26	29	31	31	26	14
P8_A	[3/3]	1.50	37	--	23	35	30	24	22	19	13	-2
P10_B	[2/2]	4.50	36	--	24	34	30	25	22	18	12	-2
P18_A	[1/2]	1.50	36	--	16	23	26	30	31	31	26	13
P19_A	[1/3]	1.50	36	--	16	23	25	30	31	30	26	13
P9_B	[3/3]	4.50	36	--	24	34	30	24	21	18	11	-4
P20_A	[4/4]	1.50	36	--	16	23	27	28	31	30	25	14
P26_B	[1/4]	4.50	36	--	12	19	23	28	31	30	26	12
P11_A	[2/3]	1.50	36	--	23	33	28	24	22	21	15	1
P2_A	[2/4]	1.50	35	--	23	33	28	25	25	23	17	5
P11_A	[3/3]	1.50	35	--	23	33	28	23	22	19	13	-1

All shown dB values are A-weighted

The Common, Barwell

Daytime noise from industry

Report: Table of Results
 Model: Noise from industry - with screening Rev 1
 LAeq per octave: total results for receivers
 Group: (main group)
 Group Reduction: No

Name			Day									
Receiver	Description	Height	Total	31	63	125	250	500	1000	2000	4000	8000
P20_A	[1/4]	1.50	35	--	16	23	24	28	29	30	25	13
P10_A	[2/2]	1.50	35	--	22	32	28	23	21	18	12	-2
P13_A	[2/2]	1.50	34	--	17	24	24	27	29	29	23	12
P13_B	[2/2]	4.50	34	--	17	24	24	27	29	28	23	12
P9_A	[3/3]	1.50	34	--	22	32	28	22	20	18	11	-3
P4_A	[3/4]	1.50	34	--	15	24	23	24	30	29	23	10
P4_B	[3/4]	4.50	34	--	16	25	24	24	29	28	22	9
P2_B	[3/4]	4.50	34	--	21	30	26	25	25	23	17	5
P4_B	[1/4]	4.50	34	--	18	25	29	26	27	25	19	6
P5_A	[1/4]	1.50	34	--	16	23	22	22	29	29	23	9
P26_A	[1/4]	1.50	33	--	12	19	22	26	28	28	24	10
P4_A	[1/4]	1.50	33	--	17	24	28	25	27	26	20	7
P2_A	[3/4]	1.50	33	--	20	29	26	25	25	23	18	5
P3_B	[3/4]	4.50	33	--	18	27	28	26	25	22	16	3
P22_B	[3/3]	4.50	33	--	17	25	23	26	27	27	21	7
P22_A	[3/3]	1.50	33	--	18	25	23	26	27	26	20	6
P5_B	[1/4]	4.50	33	--	16	24	23	22	28	28	22	9
P15_A	[1/3]	1.50	33	--	12	19	23	26	28	27	21	7
P22_B	[1/3]	4.50	33	--	15	21	22	26	27	27	21	9
P3_B	[1/4]	4.50	33	--	20	30	25	23	23	21	15	3
P3_A	[3/4]	1.50	33	--	17	26	27	25	25	22	17	3
P4_B	[2/4]	4.50	33	--	17	24	25	25	27	26	20	7
P4_A	[2/4]	1.50	33	--	16	23	23	24	27	26	21	8
P24_B	[1/2]	4.50	33	--	15	21	22	26	28	26	20	5
P16_B	[2/3]	4.50	32	--	17	23	23	26	27	24	18	5
P3_A	[1/4]	1.50	32	--	20	29	25	23	23	21	16	3
P20_B	[3/4]	4.50	32	--	14	22	22	25	27	26	20	6
P15_B	[1/3]	4.50	32	--	12	20	22	25	27	26	20	5
P6_B	[2/3]	4.50	32	--	20	29	24	21	21	19	13	-3
P23_B	[1/2]	4.50	32	--	15	21	22	26	27	25	19	6
P11_B	[1/3]	4.50	32	--	19	28	24	22	22	20	14	0
P5_A	[2/4]	1.50	32	--	14	21	20	20	27	27	21	7
P10_B	[1/2]	4.50	32	--	19	28	23	21	24	22	16	1
P21_B	[1/4]	4.50	32	--	14	20	25	25	26	24	18	5
P8_B	[1/3]	4.50	32	--	20	29	24	20	20	18	11	-3
P25_B	[1/3]	4.50	32	--	14	21	22	26	26	25	18	4
P5_B	[2/4]	4.50	31	--	15	22	21	21	27	26	20	6
P22_A	[1/3]	1.50	31	--	15	21	22	25	26	24	17	3
P21_B	[4/4]	4.50	31	--	15	21	25	24	25	24	17	4
P30_B	[1/3]	4.50	31	--	16	23	22	24	25	23	16	1
P7_B	[1/2]	4.50	31	--	19	28	23	19	19	17	11	-4
P3_B	[2/4]	4.50	31	--	19	26	24	22	22	21	15	2
P6_A	[2/3]	1.50	31	--	19	28	23	21	22	19	13	-2
P12_B	[3/3]	4.50	31	--	17	24	23	23	24	23	18	6
P26_B	[4/4]	4.50	31	--	14	21	21	25	25	23	16	0

All shown dB values are A-weighted

The Common, Barwell

Daytime noise from industry

Report: Table of Results
 Model: Noise from industry - with screening Rev 1
 LAeq per octave: total results for receivers
 Group: (main group)
 Group Reduction: No

Name			Day									
Receiver	Description	Height	Total	31	63	125	250	500	1000	2000	4000	8000
P30_A	[1/3]	1.50	31	--	16	24	22	23	24	23	16	0
P32_B	[1/3]	4.50	31	--	14	20	21	25	25	23	18	3
P11_A	[1/3]	1.50	31	--	17	26	23	22	22	20	14	0
P3_A	[2/4]	1.50	31	--	18	25	24	22	22	21	15	3
P31_B	[1/2]	4.50	31	--	14	20	21	25	25	23	16	0
P9_B	[2/3]	4.50	31	--	17	26	22	20	20	24	20	4
P12_A	[3/3]	1.50	30	--	16	23	22	23	24	23	16	5
P10_A	[1/2]	1.50	30	--	17	26	22	21	23	21	14	-1
P12_B	[1/3]	4.50	30	--	16	26	24	21	21	20	14	2
P30_A	[3/3]	1.50	30	--	16	23	21	23	24	22	15	-1
P12_A	[1/3]	1.50	30	--	16	25	23	21	21	21	14	2
P30_B	[3/3]	4.50	30	--	16	22	21	23	23	22	15	-1
P24_A	[1/2]	1.50	30	--	14	20	20	24	24	22	15	-1
P23_A	[1/2]	1.50	29	--	14	20	20	24	24	21	14	-1
P20_A	[3/4]	1.50	29	--	11	21	20	23	24	22	17	2
P17_B	[2/2]	4.50	29	--	15	21	21	23	23	21	14	1
P12_B	[2/3]	4.50	29	--	13	22	23	22	22	20	13	-1
P5_B	[3/4]	4.50	29	--	16	22	21	22	22	20	14	1
P25_A	[1/3]	1.50	29	--	14	20	20	23	23	21	13	-3
P8_A	[2/3]	1.50	29	--	16	26	21	19	20	18	12	-3
P7_A	[1/2]	1.50	29	--	16	26	21	19	19	18	11	-3
P5_A	[3/4]	1.50	29	--	15	21	21	22	22	20	14	2
P12_A	[2/3]	1.50	29	--	11	21	23	21	22	20	14	0
P9_B	[1/3]	4.50	29	--	17	26	21	18	18	17	10	-5
P21_A	[1/4]	1.50	29	--	13	20	24	22	21	18	10	-6
P9_A	[2/3]	1.50	29	--	15	24	20	20	20	21	16	1
P8_A	[1/3]	1.50	29	--	16	25	20	19	19	18	11	-3
P13_B	[1/2]	4.50	28	--	12	22	23	21	20	18	11	-4
P26_A	[4/4]	1.50	28	--	13	20	20	22	23	19	13	-4
P25_A	[2/3]	1.50	28	--	8	16	19	22	23	22	16	1
P13_A	[1/2]	1.50	28	--	11	21	23	21	20	19	12	-3
P25_B	[2/3]	4.50	28	--	9	16	18	22	23	22	16	3
P16_A	[2/3]	1.50	28	--	14	20	20	21	22	20	14	2
P21_A	[4/4]	1.50	27	--	13	20	23	20	20	17	10	-5
P9_A	[1/3]	1.50	27	--	14	23	19	18	18	17	10	-4
P18_B	[2/2]	4.50	27	--	14	20	19	19	20	19	13	0
P17_A	[2/2]	1.50	27	--	13	19	18	19	20	19	13	0
P31_A	[1/2]	1.50	26	--	13	19	19	20	20	16	8	-7
P14_B	[1/2]	4.50	26	--	12	22	19	19	18	17	10	-5
P14_A	[1/2]	1.50	26	--	11	21	19	19	19	17	11	-4
P19_B	[3/3]	4.50	26	--	13	19	17	17	20	19	13	-1
P18_A	[2/2]	1.50	26	--	12	18	17	18	20	19	13	-1
P19_A	[3/3]	1.50	26	--	11	18	17	16	21	20	13	0
P22_A	[2/3]	1.50	26	--	8	16	15	19	21	20	13	-3
P32_A	[1/3]	1.50	26	--	12	19	19	20	19	15	8	-8

All shown dB values are A-weighted

The Common, Barwell

Daytime noise from industry

Report: Table of Results
 Model: Noise from industry - with screening Rev 1
 LAeq per octave: total results for receivers
 Group: (main group)
 Group Reduction: No

Name			Day									
Receiver	Description	Height	Total	31	63	125	250	500	1000	2000	4000	8000
P19_A	[2/3]	1.50	26	--	11	18	17	17	20	19	13	0
P22_B	[2/3]	4.50	25	--	10	16	15	19	20	19	12	-4
P21_B	[2/4]	4.50	25	--	10	17	18	19	19	16	9	-7
P28_B	[4/4]	4.50	25	--	11	18	17	18	18	15	7	-10
P27_B	[1/4]	4.50	25	--	11	17	18	19	19	15	8	-9
P27_B	[4/4]	4.50	25	--	11	19	18	17	17	14	7	-10
P19_B	[2/3]	4.50	25	--	12	18	17	17	18	16	10	-4
P21_B	[3/4]	4.50	24	--	11	17	17	17	17	17	11	-5
P27_A	[4/4]	1.50	24	--	10	20	17	16	16	14	7	-9
P20_A	[2/4]	1.50	24	--	10	17	17	17	18	16	9	-7
P20_B	[2/4]	4.50	24	--	11	18	16	17	17	15	8	-7
P21_A	[2/4]	1.50	24	--	8	16	17	18	18	15	9	-7
P29_B	[4/4]	4.50	24	--	9	17	17	18	17	14	6	-12
P21_A	[3/4]	1.50	24	--	9	16	16	17	17	16	10	-5
P28_B	[1/4]	4.50	24	--	9	16	16	18	17	14	7	-11
P27_A	[1/4]	1.50	24	--	9	16	17	17	17	15	8	-9
P28_B	[3/4]	4.50	23	--	8	17	16	17	17	14	7	-10
P26_A	[3/4]	1.50	23	--	6	18	16	15	16	15	8	-9
P24_A	[2/2]	1.50	23	--	8	16	15	16	17	16	9	-6
P25_A	[3/3]	1.50	23	--	8	16	15	16	17	15	8	-7
P28_A	[3/4]	1.50	23	--	8	17	16	16	16	14	7	-10
P26_A	[2/4]	1.50	23	--	7	15	16	16	17	15	8	-8
P23_A	[2/2]	1.50	23	--	8	16	15	16	17	15	9	-6
P25_B	[3/3]	4.50	23	--	8	15	14	16	17	15	8	-7
P23_B	[2/2]	4.50	23	--	9	16	14	16	17	15	9	-6
P29_A	[4/4]	1.50	23	--	9	17	16	16	15	13	6	-11
P26_B	[2/4]	4.50	23	--	8	15	16	16	17	15	7	-10
P24_B	[2/2]	4.50	23	--	9	16	14	16	16	15	9	-6
P27_A	[3/4]	1.50	23	--	8	16	16	15	16	15	8	-9
P27_A	[2/4]	1.50	23	--	6	16	16	15	16	15	8	-9
P28_A	[4/4]	1.50	23	--	9	17	16	15	16	14	6	-10
P26_B	[3/4]	4.50	23	--	7	17	16	14	15	15	8	-9
P28_A	[1/4]	1.50	22	--	8	15	16	16	16	14	7	-10
P27_B	[2/4]	4.50	22	--	6	16	15	15	16	14	7	-10
P27_B	[3/4]	4.50	22	--	8	16	15	14	15	14	7	-10
P28_A	[2/4]	1.50	22	--	5	15	14	14	15	14	7	-10
P32_B	[2/3]	4.50	22	--	7	14	14	15	15	13	6	-10
P32_A	[2/3]	1.50	22	--	7	15	15	14	15	13	7	-9
P28_B	[2/4]	4.50	21	--	5	15	13	14	15	13	6	-11
P29_B	[1/4]	4.50	21	--	8	15	14	14	15	12	5	-12
P30_A	[2/3]	1.50	21	--	6	14	14	13	14	13	7	-9
P32_A	[3/3]	1.50	21	--	6	14	13	13	14	13	7	-9
P31_A	[2/2]	1.50	21	--	6	14	13	13	14	12	6	-9
P29_A	[1/4]	1.50	20	--	6	14	13	12	14	12	5	-12
P29_A	[2/4]	1.50	20	--	4	13	13	12	15	13	6	-12

All shown dB values are A-weighted

The Common, Barwell

Daytime noise from industry

Report: Table of Results
Model: Noise from industry - with screening Rev 1
LAeq per octave: total results for receivers
Group: (main group)
Group Reduction: No

Name			Day									
Receiver	Description	Height	Total	31	63	125	250	500	1000	2000	4000	8000
P29_B	[2/4]	4.50	20	--	5	13	12	11	16	13	5	-13
P30_B	[2/3]	4.50	20	--	7	14	13	12	13	12	6	-9
P32_B	[3/3]	4.50	20	--	6	14	13	12	13	12	6	-10
P31_B	[2/2]	4.50	20	--	7	14	13	12	13	11	5	-10
P29_A	[3/4]	1.50	20	--	4	13	12	12	13	12	5	-12
P29_B	[3/4]	4.50	19	--	5	13	12	11	12	11	4	-13

All shown dB values are A-weighted

APPENDIX D

Noise ingress calculations

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	The Commong, Barwell
Project number:	21247
Date:	29/11/2023

Plot:	Nearest to The Common, at 12m
Room:	Living Room

Daytime ($L_{Aeq,16hr}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{eq,1}$	64	55	50	49	54	48	39	31	$L_{Aeq,1}$ 56 dB		
Façade correction factor				C	0	0	0	0	0	0	0	0			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{eq,ff}$	64	55	50	49	54	48	39	31	$L_{Aeq,ff}$ 56 dB		
ROOM DATA															
Room description and reverberation time		Volume	36	Living Room	RT60	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	s	
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	3.6	Generic 4/6-16/4	Rw	20	21	17	25	35	37	31	36	Rw / Rw+Ctr 29 / 25 dB		
Wall	Area	15.6	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr 50 / 47 dB		
Vent	No. off.	4	Greenwood 4000 SBW (Hit and miss)	Dn,e	32	38	37	34	30	34	37	46	Dn,e,w / Dn,e,w+Ctr 33 / 32 dB		
None			--												
RESULTS															
Total calculated indoor noise level				$L_{eq,2}$	46	33	31	26	31	21	11	-	$L_{Aeq,2}$ 33 dB		

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	The Commong, Barwell
Project number:	21247
Date:	29/11/2023

Plot:	Nearest to The Common, at 12m
Room:	Bedroom

Daytime ($L_{Aeq,16hr}$)				Octave band centre frequency									Broadband term				
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k					
EXTERNAL NOISE LEVEL																	
External noise level			Façade 1	$L_{eq,1}$	64	55	50	49	54	48	39	31			$L_{Aeq,1}$	56 dB	
Façade correction factor				C	0	0	0	0	0	0	0	0					
INCIDENT FAÇADE NOISE LEVEL																	
Incident noise level			Façade 1	$L_{eq,ff}$	64	55	50	49	54	48	39	31			$L_{Aeq,ff}$	56 dB	
ROOM DATA																	
Room description and reverberation time		Volume	18	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3			0.2	s	
FAÇADE ELEMENTS (Façade 1)																	
Glazing	Area	1.2	Generic 4/6-16/4	Rw	20	21	17	25	35	37	31	36			Rw / Rw+Ctr	29 / 25 dB	
Wall	Area	12	Brick and block external wall	Rw	34	40	44	45	51	56	60	63			Rw / Rw+Ctr	50 / 47 dB	
Vent	No. off.	2	Greenwood 2500EAW.AC1 (Acoustic trickle)	Dn,e	32	41	39	36	43	44	45	44			Dn,e,w / Dn,e,w+Ctr	42 / 40 dB	
None			--														
RESULTS																	
Total calculated indoor noise level				$L_{eq,2}$	43	31	29	23	18	11	4	-			$L_{Aeq,2}$	26 dB	

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	The Commong, Barwell
Project number:	21247
Date:	29/11/2023

Plot:	Nearest to The Common, at 12m
Room:	Bedroom

Night time ($L_{Aeq,8hr}$)				Octave band centre frequency										Broadband term			
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k					
EXTERNAL NOISE LEVEL																	
External noise level			Façade 1	$L_{eq,1}$	53	46	47	47	50	43	34	27	$L_{Aeq,1}$			52 dB	
Façade correction factor				C	0	0	0	0	0	0	0	0					
INCIDENT FAÇADE NOISE LEVEL																	
Incident noise level			Façade 1	$L_{eq,ff}$	53	46	47	47	50	43	34	27	$L_{Aeq,ff}$			52 dB	
ROOM DATA																	
Room description and reverberation time	Volume	18	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2				s	
FAÇADE ELEMENTS (Façade 1)																	
Glazing	Area	1.2	Generic 4/6-16/4	Rw	20	21	17	25	35	37	31	36	Rw / Rw+Ctr			29 / 25 dB	
Wall	Area	12	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr			50 / 47 dB	
Vent	No. off.	2	Greenwood 2500EAW.AC1 (Acoustic trickle)	Dn,e	32	41	39	36	43	44	45	44	Dn,e,w / Dn,e,w+Ctr			42 / 40 dB	
None			--														
RESULTS																	
Total calculated indoor noise level				$L_{eq,2}$	32	22	25	21	15	6	-	-	$L_{Aeq,2}$			22 dB	

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)



Project:	The Commong, Barwell
Project number:	21247
Date:	29/11/2023

Plot:	Nearest to The Common, at 12m
Room:	Bedroom

Night time ($L_{A\text{Max}}$)				Octave band centre frequency											
	Unit	Value	Description	Term	63	125	250	500	1k	2k	4k	8k	Broadband term		
EXTERNAL NOISE LEVEL															
External noise level			Façade 1	$L_{\text{Max},1}$	72	68	70	70	75	66	57	49	$L_{A\text{Max},1}$	76 dB	
Façade correction factor				C	0	0	0	0	0	0	0	0			
INCIDENT FAÇADE NOISE LEVEL															
Incident noise level			Façade 1	$L_{\text{Max},\text{ff}}$	72	68	70	70	75	66	57	49	$L_{A\text{Max},\text{ff}}$	76 dB	
ROOM DATA															
Room description and reverberation time	Volume	18	Bedroom	RT60	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2	s		
FAÇADE ELEMENTS (Façade 1)															
Glazing	Area	1.2	Generic 4/6-16/4	Rw	20	21	17	25	35	37	31	36	Rw / Rw+Ctr	29 / 25 dB	
Wall	Area	12	Brick and block external wall	Rw	34	40	44	45	51	56	60	63	Rw / Rw+Ctr	50 / 47 dB	
Vent	No. off.	2	Greenwood 2500EAW.AC1 (Acoustic trickle)	Dn,e	32	41	39	36	43	44	45	44	Dn,e,w / Dn,e,w+Ctr	42 / 40 dB	
None			--												
RESULTS															
Total calculated indoor noise level				$L_{\text{Max},2}$	51	45	49	44	40	30	22	10	$L_{A\text{Max},2}$	45 dB	

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