Noise Impact Assessment

Hogshaw Farm, Buxton

Reference: 50-697-R1-6

Date: June 2024

NOISE IMPACT ASSESSMENT

Hogshaw Farm,
Buxton

Prepared for:

Barratt Homes Manchester

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EXECUTIVE SUMMARY

BACKGROUND

Site Address	Hogshaw Farm, Buxton, SK17 7BW
National Grid Reference	E 406591, N 374420
Proposed Development	Proposed residential development comprising 99 residential units consisting of detached, semi-detached and attached dwellings along with access and landscaping.
Report Objectives	The objectives of this report are to: • Identify, measure and assess the potential impact of any existing noise sources in the immediate vicinity of the Site upon proposed residential receptors. The report follows current and relevant British Standards in order to provide a robust assessment.

ASSESSMENT

Surveys Completed	A full 24-hour rail traffic noise survey has been undertaken along the western boundary during a typical weekday period. This provided the daytime and night-time average noise levels. Source measurements of idling trains on the railway sidings have been taken and extracted from the 24 hour survey. This gives consideration to the consented Buxton Sidings. Attended and unattended road traffic sound measurements have been undertaken for the A6 during a typical weekday period in accordance with Calculation of Road Traffic Noise.
Assessments	A 3D noise model has been constructed to assess rail and road traffic noise impact at ground and first floor levels as well as within private amenity gardens. Road and rail traffic sound is assessed in accordance with the criterion, for day and night, given in BS 8233:2014+A1:2019 for gardens and internal habitable rooms.
Mitigation Requirements	Given the outcome of the assessment, no mitigation measures are required assuming a Part F compliant whole dwelling ventilation system is installed. Standard glazing is sufficient across the site.

CONCLUSIONS

This assessment has shown that no adverse impact is predicted day or night at the receptors due to existing sound sources.

As such, noise need not be a material consideration in the granting of planning permission if the recommendations of this report are followed and included within the design stage.

TABLE OF CONTENTS

1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Barratt Homes Manchester to undertake a Noise Impact Assessment for a proposed residential development at Hogshaw Farm, Buxton, to be referred to hereafter as '*the site*'.

This assessment looks to determine the key noise sources in the immediate vicinity of the site and to assess their impact, if any, upon proposed residential receptors and to specify mitigation measures, where required.

1.2. PROPOSED DEVELOPMENT

The developer intends to develop the site for residential use with 99 residential units consisting of detached, semi-detached and attached dwellings along with access and associated landscaping.

The key sources of sound impacting upon the site are rail traffic sound associated with the railway line along the western boundary and road traffic sound associated with the A6 to the east.

This assessment has been undertaken in accordance with the following supplied drawings:

- Planning Layout (H8797-BAH-XX-XX-DR-UD-203001 Rev 2).

The layout is shown in Figure 1 of Appendix II.

1.3. LIMITATIONS

Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment.

Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance.

2. ASSESSMENT METHODOLOGY

2.1. NATIONAL PLANNING POLICY FRAMEWORK

Planning policies and decisions should 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:

- Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

2.2. NATIONAL PLANNING PRACTICE GUIDANCE

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or is likely to occur.
- Whether or not an adverse effect is occurring or is likely to occur.
- Whether or not a good standard of amenity can be achieved.

In line with the explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase, where applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The "observed effect levels" are as follows:

- **Significant observed adverse effect level:** This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- **Lowest observed adverse effect level:** This is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- **No observed effect level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

TABLE 2.1 NOISE EXPOSURE HIERARCHY

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVEL	ACTION
Not Noticeable	No effect.	No observed effect	No specific measures required
Noticeable and Not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television, speaking more loudly, or having to close windows for some of the time because of the noise where there is no alternative ventilation. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. 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.	Significant observed effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant/medically definable harm (auditory and non-auditory).	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any situation.

These factors include the following:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day. The adverse effect can also be greater simply because there is less background noise at night.
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise can be important.
- The spectral content of the noise and the general character of the noise. The local topology and topography should also be considered along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be considered along with the extent to which the source of noise is intermittent and of limited duration.
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases, a suitable alternative means of ventilation is likely to be necessary.
- If external amenity spaces are an intrinsic part of the overall design, then the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.3. BUILDING REGULATIONS: APPROVED DOCUMENT F - VOLUME 1: DWELLINGS (JUNE 2022)

Approved document F Volume 1: Dwellings (ADF) provides guidance set by the Department for Levelling Up, Housing and Communities, that relates to means of ventilation within dwellings. The ventilation strategy specified within the ADF are as follows.

> *1.9 The ventilation strategy in this approved document relies on a combination of all of the following.*
>
> *a. Extract ventilation from rooms where water vapour or pollutants are likely to be released (e.g. bathrooms and kitchens), to minimise their spread to the rest of the building. Ventilation fans may be either intermittent operation or continuous operation.*
>
> *b. Whole dwelling ventilation to provide fresh air to the building and to dilute, disperse and remove water vapour and pollutants not removed by extract ventilation.*
>
> *c. Purge ventilation to remove high concentrations of pollutants and water vapour. Purge ventilation is used intermittently and required only for pollutants produced by occasional activities (e.g. fumes from painting).*
>
> *1.10 Ventilation may be delivered through natural ventilation, mechanical ventilation or a combination of both.*

1.11 The ventilation systems in this approved document are examples of systems that comply with Part F of the Building Regulations. Other ventilation systems may be acceptable if they can be shown to meet an equal level of performance.

Within the ADF there are three system specific ventilation systems that can be utilised to provide sufficient ventilation. These methods are as follow.

1. ***Natural ventilation with background ventilators and intermittent extract fans*** *(guidance suitable only for less airtight dwellings) - Ventilation provided by thermal, wind or diffusion effects through doors, windows or other intentional openings without the use of mechanically driven equipment. For the purposes of this approved document, natural ventilation refers to a ventilation strategy using background ventilators and intermittent extract ventilation.*

2. ***Continuous mechanical extract ventilation*** *- Mechanically driven ventilation that continuously extracts indoor air and discharges it to the outside.*

3. ***Mechanical ventilation with heat recovery -*** *A mechanically driven ventilation system that both continuously supplies outdoor air to the inside of the dwelling and continuously extracts indoor air and discharges it to the outside. For the purposes of this approved document, the guidance for mechanical ventilation with heat recovery applies to centralised or decentralised supply and extract systems, with or without heat recovery.*

2.4. BUILDING REGULATIONS: APPROVED DOCUMENT O – OVERHEATING (JUNE 2022)

Approved document O - Overheating (ADO) provides guidance set by the Department for Levelling Up, Housing and Communities, that relates to the mitigation of overheating. In relation to noise the ADO provides the following guidance.

3.2 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).

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

a. 40dB $L_{Aeq,T,}$ averaged over 8 hours (between 11pm and 7am).
b. 55dB $L_{AFmax,}$ more than 10 times a night (between 11pm and 7am).

3.4 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.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020)

2.5. BRITISH STANDARD BS 8233:2014 – GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

NOISE CRITERIA LIMITS

2.5.1. The scope of this standard is the provision of recommendations for the control of noise in and around buildings including residential dwellings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 2.2.

TABLE 2.2 BS 8233:2014 RECOMMENDED INTERNAL NOISE LEVELS

CRITERION	TYPICAL SITUATION	DESIGN CRITERION, $L_{Aeq,T}$ (dB)
Suitable Resting and Sleeping Conditions	Living Room	35
	Bedroom	30

BS 8233 goes on to recommend noise levels for gardens:

> *It is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised 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 might be warranted.*

BS 8233 goes on to say:

2.5.2. > *In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.*

VENTILATION REQUIREMENTS

Where a partially open window cannot be relied upon to provide an adequate level of façade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS 8233 states:

> *The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.*
>
> *Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.*

Section 7.7.2 states:

> *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 façade insulation or the resulting noise level.*

2.6. WORLD HEALTH ORGANISATION (WHO) – GUIDELINES FOR COMMUNITY NOISE

The WHO gives guidance on desirable levels of environmental noise. The levels presented in the WHO Community Guidelines are those at which adverse effects become measurable. The 1980 WHO document suggested that *"general daytime outdoor noise levels of less than 55 dB(A) $L_{eq,16hr}$ are desirable to prevent any significant community annoyance."* This level is an external free-field noise level. The 1980 document also stated in relation to internal levels, *"that night-time noise levels of 35 dB(A) $L_{eq,8hr}$ or less will not interfere with the restorative process of sleep"*.

A report was submitted to the WHO in 1995 for consideration as a revision to the 1980 document and revised community guidelines were issued in 2000. In the 2000 guidelines, it is considered that the sleep disturbance criteria should be taken as an internal noise level of 30 dB $L_{Aeq,8\ hr}$ or an external level of 45 dB $L_{Aeq,8\ hr}$. It also recommends that internal L_{Amax} levels of 45 dB and external L_{Amax} levels of 60 dB should be limited where possible.

3. SURVEY RESULTS

The measurement positions are detailed in Figure 1 of Appendix II.

3.1. RAIL TRAFFIC SOUND MEASUREMENT

E3P has conducted a Rail Traffic Noise Survey to measure the level of noise generated by locomotives along the railway line. The survey was carried out over the following time periods in accordance with Calculation of Rail Noise (CRN):

- 13:00 Wednesday 14th September to 13:00 Thursday 15th September 2022.

The following noise measurement position was chosen for the Rail Traffic Noise Survey:

- Noise Measurement Position 1 (NMP1): Located approximately 50m from the nearside rail of the main line and 3m from the nearside rail of the railway sidings, on the western boundary of the Site. The microphone was located at a height of 1.5 m above ground level and in free-field conditions. The sound climate was dominated by occasional rail traffic from the main line and also idling trains using the railway sidings.

A summary of the measured sound pressure levels from the Rail Traffic Noise Survey are presented in Table 3.1.

TABLE 3.1 SUMMARY OF MEASURED NOISE LEVELS FOR NMP1 – RAILWAY LINE

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)	
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$
13:00 – 14:00	56.6	N/A
14:00 – 15:00	51.0	
15:00 – 16:00	48.3	
16:00 – 17:00	56.8	
17:00 – 18:00	45.1	
18:00 – 19:00	55.2	
19:00 – 20:00	47.6	
20:00 – 21:00	61.5	
21:00 – 22:00	57.1	
22:00 – 23:00	44.3	
23:00 – 00:00	47.0	73.9
00:00 – 01:00	52.8	
01:00 – 02:00	30.3	
02:00 – 03:00	56.0	
03:00 – 04:00	53.4	
04:00 – 05:00	53.4	
05:00 – 06:00	37.6	
06:00 – 07:00	51.7	
07:00 – 08:00	48.5	N/A
08:00 – 09:00	45.6	
09:00 – 10:00	41.9	
10:00 – 11:00	51.8	
11:00 – 12:00	42.9	
12:00 – 13:00	48.7	
Average Daytime $L_{Aeq,16\ hour}$		**54.0**
Average Night-time $L_{Aeq,8\ hour}$		**51.9**

Source measurements of the railway sidings during operation have been extracted from the 24-hour railway sound survey. Worst case measurement levels can be seen below:

- Source measurement of train arrival, idling engine and train departure. The worst-case measurement was captured between 20:39 and 20:49 at 5 m distance and had a level of 68.9 dB $L_{Aeq,10\text{-}min}$.

3.2. ROAD TRAFFIC SOUND MEASUREMENT – A6

E3P have undertaken a road traffic sound survey over a full 24-hour period in accordance with procedure given in Calculation of Road Traffic Noise (CRTN) during a typical weekday period. The survey was undertaken during the following period:

- 12:00 Wednesday 14th September to 12:00 Thursday 15th September 2022.

The following noise measurement position was chosen for the Road Traffic Noise Survey:

- Noise Measurement Position 2 (NMP2): Located along the eastern boundary of the site approximately 156 m from the roadside edge. The microphone was located at a height of 1.5 m above ground level and in free-field conditions. Sound sources consisted of road traffic along the A6.

Due to cattle on the site, the microphone of the sound level meter was disturbed at 8am on the 15th of September and therefore only the 8-hour night-time levels have been used in conjunction with an accompanying attended road traffic sound survey.

TABLE 3.2 UNATTENDED NIGHT-TIME ROAD TRAFFIC SOUND LEVELS – A6

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)	
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$
23:00 – 00:00	42.8	64.6
00:00 – 01:00	43.5	
01:00 – 02:00	40.2	
02:00 – 03:00	42.4	
03:00 – 04:00	41.2	
04:00 – 05:00	43.0	
05:00 – 06:00	49.7	
06:00 – 07:00	49.5	
Average Night-time $L_{Aeq,8\ hour}$		**45.5**

E3P have undertaken a road traffic sound survey in accordance with the shortened measurement procedure given in CRTN during a typical weekday period, to capture daytime noise levels. The survey was undertaken during the following period:

- 13:44-16:44 Thursday 15th September 2022.

The following noise measurement position was chosen for the Road Traffic Noise Survey:

- Noise Measurement Position 3 (NMP3): Located along the A6 to the east of the site approximately 10 m from the roadside edge. The microphone was located at a height of 1.5 m above ground level and in free-field conditions. Sound sources consisted of road traffic along the A6.

Table 3.3 details the measured sound pressure levels.

TABLE 3.3 ATTENDED DAYTIME ROAD TRAFFIC SOUND LEVELS – A6

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$	$L_{A90,T}$	$L_{A10,T}$
13:44	68.0	79.8	55.5	71.3
14:44	66.8		54.5	70.1
15:44	67.2		56.2	70.8
Derived Daytime Noise Level, $L_{Aeq,16hr}$				**67.7**

Derived daytime noise levels are higher for the daytime period when compared to the average measured noise levels during the daytime period captured at NMP2. As such this can be considered worst case and will be used for the assessment.

During the survey, conditions remained dry and wind speeds rarely exceeded 5 m/s.

TABLE 3.4 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE AT TIME OF SURVEY
NMP2	Sound Level Meter	01dB Fusion	14616	29/06/2024
	Pre-amplifier	01dB Pre22	20951	
	Microphone	GRAS 40CD	494264	
	Calibrator	Cirrus CR 515	99206	29/06/2023
NMP1 & NMP3	Sound Level Meter	01dB Fusion	14226	01/12/2023
	Pre-amplifier	01dB Pre22	2135072	
	Microphone	GRAS 40CD	470570	
	Calibrator	Cirrus CR 515	99204	01/12/2022

The sound level meters were field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. No significant drift was witnessed as noted above. Calibration certificates are available upon request.

4. NOISE IMPACT ASSESSMENT

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2023 MR1, to determine the impact of noise from rail and road traffic.

The following inputs have been included in the model:

- Planning Layout Rev 2.
- NMP1, NMP2 and NMP3 have been used to calibrate the baseline noise model.
- Noise from the railway sidings has been inputted as two point sources emitting worst case measured levels, representing two locomotives with idling engines simultaneously. This will inform a worst-case assessment.
- Site elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government Licence v3.0.
- Existing buildings that provide shielding from any of the noise sources have been included in the model.
- A reflection order of 2 has been used in all calculations.
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "*Acoustics – Attenuation of sound during propagation outdoors*" as incorporated into CadnaA software.

Figures 2 and 3 determine the noise levels across the Site during the daytime and night-time periods, respectively, due to rail and road traffic.

4.1. EXTERNAL AMENITY AREA NOISE LEVEL ASSESSMENT

The noise model has been used to predict noise levels in rear gardens which are to be used for relaxation. The predicted levels range from below 35 dB and up to 48 dB in the worst affected garden areas.

As such, it is predicted that the No Observed Adverse Effect Level (NOAEL) is achieved in all private gardens with the following commentary:

> *"Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life."*

Accordingly, no action is required.

4.2. INTERNAL NOISE LEVEL ASSESSMENT

With regards internal noise levels, E3P has assumed a standard glazing specification of 4 mm glass/20 mm air space/4 mm glass which affords a sound insulation performance in the order of 29 dB R_W (C_t: 1; $C_{t,r}$ -4). The primary noise impact here is road traffic and occasional rail traffic movements, with road traffic sound likely dominant sources at most facades and, as such, the $C_{t,r}$ correction is applied which accounts for road traffic sound. Where rail traffic is dominant the application of the $C_{t,r}$ correction is considered worst case. The AVO Guide suggests an open window would afford a reduction of 13 dB.

The model has been used to predict façade noise levels at all floor levels and orientations. To determine any requirements for mitigation, E3P has added the reduction provided by the glazing (25 dB) to the relevant criterion for day (35 dB) and for night (30 dB). As such, any facades subject to noise levels higher than 60 dB during the day and/or 55 dB during the night will require higher specification glazing. The highest predicted day and night façade levels here are 50 dB and 48 dB respectively. As such, standard thermal double glazing will be sufficient across the site.

Consideration must also be given to maximum noise levels generated by rail and road traffic. The 10th highest maximum noise level has been used and distance corrected to the closest façade for both the railway and the A6. The maximum noise level at the worst affected facades closest to the railway and road would be 64 dB and 54 dB respectively.

Internal maximum noise levels of 45 dB L_{Amax} should also not be exceeded. The sound insulation performance achieved by standard glazing (31 dB) has been added to the 45 dB maximum internal noise level limit. As, such facades subject to maximum noise levels above 76 dB will require higher specification glazing.

As shown, above no facades are subject to levels higher than 64 dB L_{Amax}. Therefore, standard glazing would be sufficient across the site to mitigate against maximum noise levels generated by road traffic from the A6 or rail traffic noise.

With regards to opening windows, there is a requirement to consider the need to open windows for ventilation and the mitigation of overheating. At this stage, the assessment assumes that ventilation would be provided by way of extract fans in kitchens and bathrooms and openable windows.

4.2.1. VENTILATION CONDITION

It is assumed that the developer would be installing a whole dwelling ventilation system in accordance with Part F of the Building Regulations as it is assumed Natural Ventilation is not appropriate for the dwellings.

Where background ventilators form part of the system, consideration is required to the sound reduction provided by these when in the open position and, as such, are discussed in Section 6.0.

4.2.2. OVERHEATING CONDITION

E3P has considered the potential impact of noise, internally, should windows be opened to mitigate overheating, as per the criteria stipulated in ADO. Any plots/facades that pass this test can open windows for this without resulting in unacceptable internal noise levels. Those that fail the test would be subject to a Part O Overheating Assessment by a suitably qualified consultant.

Part O only applies to bedrooms at night in relation to the average 8-hour noise level and 10th highest maximum noise level.

Given that the site is within a moderate risk location, as per guidance within Approved Document O the external noise limit threshold is 49 dB during the night-time ($L_{Aeq,8hr}$) and 64 dB more than 10 times a night ($L_{Af,max}$).

As can be seen above and in the figures, no plots will experience an exceedance of these threshold values. As such, the opening of windows to mitigate overheating would not result in unacceptable internal noise levels.

5. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Barratt Homes Manchester to undertake a Noise Impact Assessment for a proposed residential development at Hogshaw Farm, Buxton.

Unattended rail traffic sound measurements and source measurements of operational railway sidings have been undertaken along the western boundary during a typical 24-hour period and unattended and attended road sound measurements have been undertaken along the eastern boundary during a typical weekday period.

A 3D noise model has been constructed to assess potential road and rail sound upon the proposed receptors in accordance with the criterion, for day and night, given in BS 8233:2014+A1:2019.

The assessment determined that standard thermal double glazing would be sufficient for all plots and that acceptable external noise levels would be achieved at all plots.

Accordingly, this assessment has shown that no adverse impact is predicted day or night at the receptors.

As such, noise need not be a material consideration in the granting of planning permission as long as the recommendations of this report are followed and included within the design stage.

END OF REPORT

APPENDIX I
GLOSSARY OF ACOUSTIC TERMINOLOGY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE A1 TYPICAL SOUND PRESSURE LEVELS

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20–30	Quiet bedroom at night
30–40	Living room during the day
40–50	Typical office
50–60	Inside a car
60–70	Typical high street
70–90	Inside a factory
100–110	Burglar alarm at 1 m away
110–130	Jet aircraft on take off
140	Threshold of pain

ACOUSTIC TERMINOLOGY

TABLE A2 TERMINOLOGY

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L_{90} is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.

APPENDIX II
FIGURES

Figure 1 - Noise Survey Measurement Positions

Project:
Hogshaw Farm

Project-No:
50-697

Client:
Barratt Homes (Manchester)

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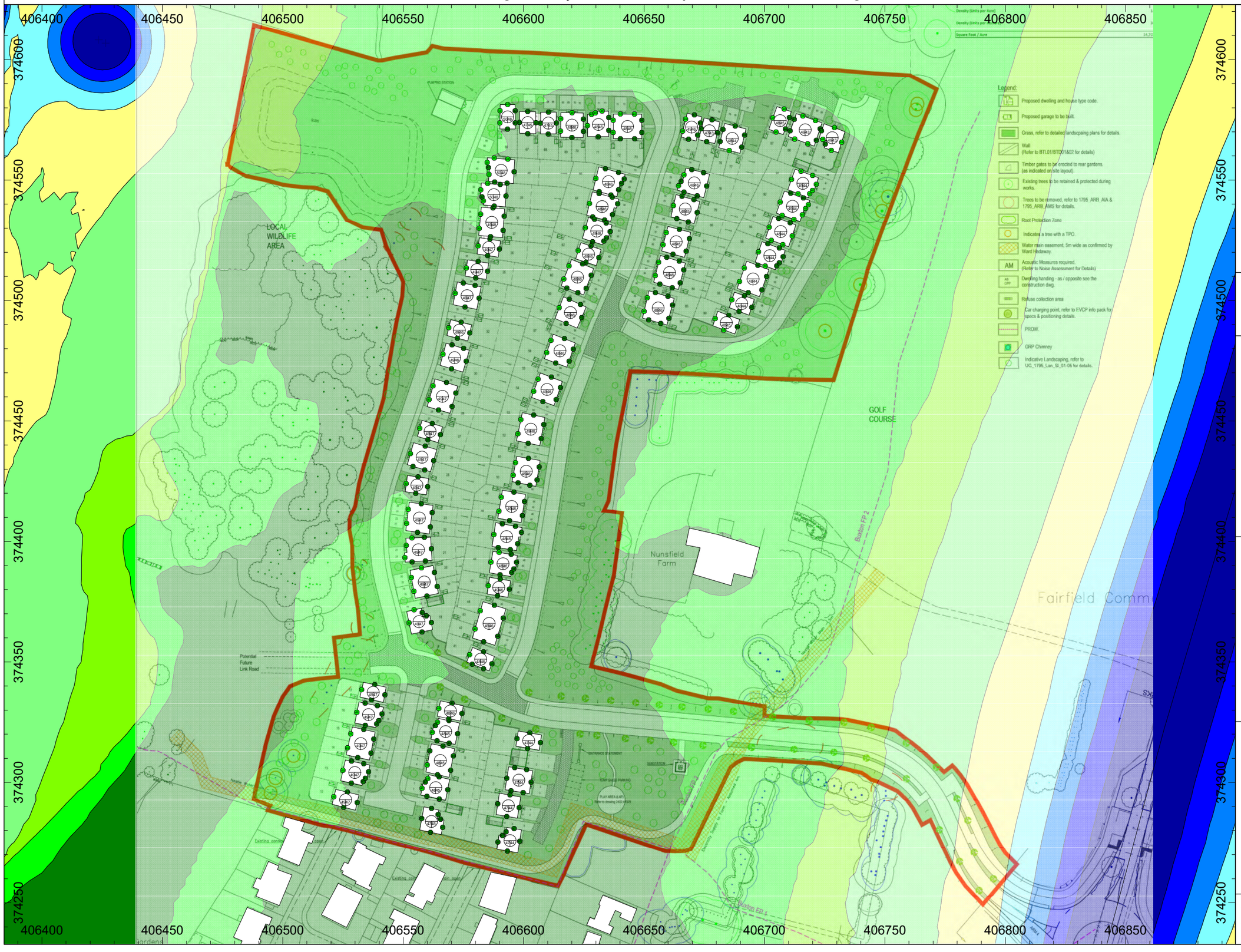
e3p

Project Engineer: L Faulkner
Date: 25/06/2024

Figure 2 - Daytime Grid Noise Map - Calculation at 1.5m above ground level



Project:
Hogshaw Farm, Buxton

Project-No:
50-697

Client:
Barratt Homes Manchester

Daytime Noise Level, LAeq,16hr (dB)

- ... <= 48
- 48 < ... <= 50
- 50 < ... <= 52
- 52 < ... <= 56
- 56 < ... <= 58
- 58 < ... <= 60
- 60 < ... <= 62
- 62 < ... <= 65
- 65 < ...

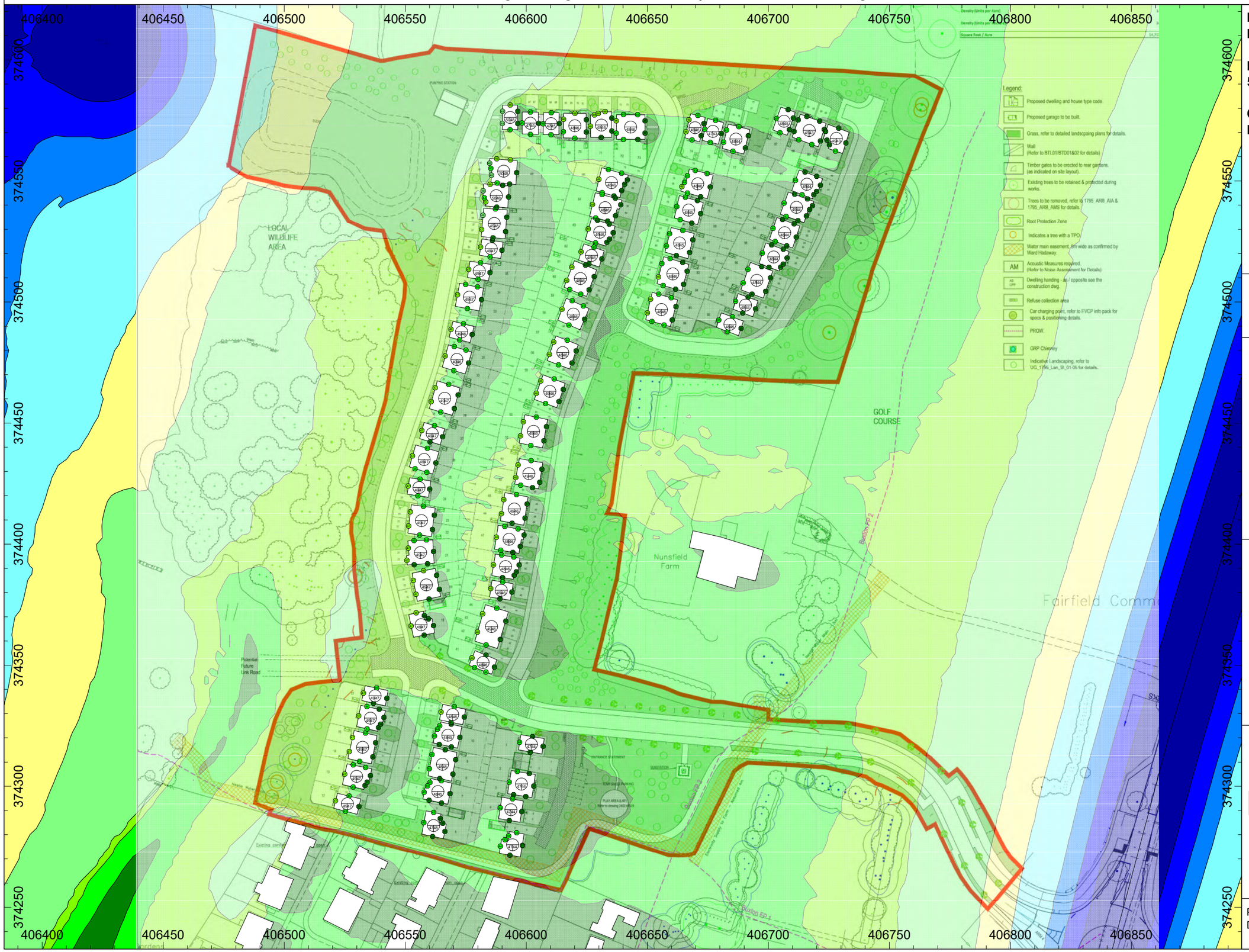
Noise Map Objects

- Point Source
- Road
- Parking Lot
- Railway
- Building
- Barrier
- Building Evaluation
- Calculation Area

e3p

Project Engineer: Melissa Bailey
Date: 25/06/2024

Figure 3 - Night-time Grid Noise Map - Calculation at 4m above ground level



Project:
Hogshaw Farm, Buxton

Project-No:
50-697

Client:
Barratt Homes Manchester

Night-time Noise Level, LAeq,8hr (dB)

- ... <= 42
- 42 < ... <= 45
- 45 < ... <= 47
- 47 < ... <= 50
- 50 < ... <= 52
- 52 < ... <= 55
- 55 < ... <= 57
- 57 < ... <= 60
- 60 < ...

Noise Map Objects

- Point Source
- Road
- Parking Lot
- Railway
- Building
- Barrier
- Building Evaluation
- Calculation Area

e3p

Project Engineer: Melissa Bailey
Date: 25/06/2024