



e3p

Noise Impact Assessment

Riverpark Road, Manchester

Reference: 51-086-R1-10

Date: June 2025



NOISE IMPACT ASSESSMENT

Riverpark Road, Manchester

Prepared for:

Kellen Homes and Great Places Housing Group

Report Ref: 51-086-R1-10

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EXECUTIVE SUMMARY

BACKGROUND

Site Address	Riverpark Road, Manchester, Greater Manchester, England, M40 2XP
National Grid Reference	E 387309, N 399470
Proposed Development	Full Planning application for the erection of 5 no. apartment blocks of 4 and 6 storeys comprising 279 apartments and erection of 221 no. two and three storey dwellinghouses (Class C3) together with new vehicle accesses from Riverpark Road and associated works.
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 to provide a robust assessment.

ASSESSMENT

Surveys Completed	Full 24-hour road traffic sound surveys have been conducted for Riverpark Road and Briscoe Lane. A full 24-hour rail noise survey has been undertaken. Attended source noise measurements have been undertaken for the potential surrounding commercial sources. An unattended background and ambient sound survey has been conducted at a location considered representative of the nearest proposed noise sensitive receptors.
Assessments	A 3D noise model has been constructed to assess commercial, road traffic and rail sound impact across the site and incident upon all facades and floors and in any external amenity areas. The operational noise from commercial premises has been assessed in accordance with BS 4142:2014+A1:2019. Road traffic and rail sound has been assessed in accordance with the criterion set out in BS 8233:2014.
Mitigation Requirements	The assessment determined that certain facades require higher specification to control internal noise levels across the development. A decentralised Mechanical Extract Ventilation system is to be installed across the site as per Approved Document F. A full overheating assessment in accordance with the guidelines indicated in Part O is required. Furthermore, 2.1 and 2.2 m high barriers are required for certain rear gardens.

CONCLUSIONS

With mitigation measures in place, this assessment has shown that no adverse impact is predicted day or night at the receptors due to commercial and road and rail traffic sound.



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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Kellen Homes and Great Places Housing Group to undertake a Noise Impact Assessment for the proposed residential development on land at Riverpark Road, Manchester, 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

Kellen Homes intend to submit a Full Planning application for the erection of 5 no. apartment blocks of 4 and 6 storeys comprising 277 apartments and erection of 221 no. two and three storey dwellinghouses (Class C3) together with new vehicle accesses from Riverpark Road and associated works.

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

-  Detailed Site Layout dated 3rd February 2025.

The key sources of sound impacting upon the Site is road traffic sound associated with Riverpark Road, Briscoe Lane, the railway line to the north and surrounding commercial premises.

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 at the time.

E3P will endeavour to capture all existing and proposed sources of sound and vibration at the time of the surveys and/or assessments. However, should new sources of sound be introduced, existing sources modified/changed, or characteristics of the sound be altered following completion of such, E3P cannot be held accountable for this.

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, for either absolute levels or frequency content.



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

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ✿ Sound from industrial and manufacturing processes.
- ✿ Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- ✿ Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
- ✿ Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.

There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

- ✿ +2 dB: where the tonality is just perceptible.
- ✿ +4 dB: where the tonality is clearly perceptible; and
- ✿ +6 dB: where the tonality is highly perceptible.

Impulsivity

- ✿ +3 dB: where the impulsivity is just perceptible.
- ✿ +6 dB: where the impulsivity is clearly perceptible; and
- ✿ +9 dB: where the impulsivity is highly perceptible.

Intermittency

- ✿ +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.



Assessment of the rating level relative to the background sound level can yield the following commentary:

- ✿ Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact.
- ✿ A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- ✿ A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- ✿ The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have 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.

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

2.6.1. NOISE CRITERIA LIMITS

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:

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



2.7. 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 $L_{Aeq,8hr}$ or an external level of 45 dB $L_{Aeq,8hr}$. 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. SOUND CLIMATE

Prior to the surveys and during, E3P undertook a site walkover across the Site to determine the existing sound climate and associated sources.

It was noted that the main source of sound was road traffic sound associated with Riverpark Road and Briscoe Lane along with rail noise from the north. As such, E3P carried out unattended road traffic measurements and an unattended rail noise measurement.

3.2. ROAD TRAFFIC MEASUREMENT – RIVERPARK ROAD

E3P has conducted an unattended road traffic sound measurement in accordance with the measurement procedure given in Calculation of Road Traffic Noise (CRTN). The survey was carried out over the following periods:

- 📍 11:00 Wednesday 17th January 2024 until 11:00 Thursday 18th January 2024.

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

- 📍 Noise Measurement Position 1 (NMP1): Located along the southern boundary of site approximately 6 m from the nearside edge of Riverpark Road. The microphone was located at a height of 1.5 m above ground level and in facade conditions. A correction of 3dB has been applied to the levels for the assessment to account for the façade conditions.

A summary of the measured sound pressure levels from the Road Traffic Noise Survey is presented in Table 3.1. The $L_{Amax,fast}$ is expressed as a 10th highest 1-minute maximum noise level during the night-time period.

TABLE 3.1 SUMMARY OF MEASURED NOISE LEVELS FOR NMP1 – RIVERPARK ROAD

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,1hr}$	$L_{Amax,fast}$	$L_{A10,1hr}$	$L_{A90,1hr}$
17/01/2024 11:00	64.9	N/A	68.3	41.3
17/01/2024 12:00	65.8		69.0	41.6
17/01/2024 13:00	66.4		70.1	46.4
17/01/2024 14:00	67.0		69.5	44.5
17/01/2024 15:00	66.9		70.8	46.7
17/01/2024 16:00	68.0		73.1	44.3
17/01/2024 17:00	66.9		71.3	42.5
17/01/2024 18:00	65.6		68.4	42.3
17/01/2024 19:00	62.6		61.1	42.9



MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	L _{Aeq,1hr}	L _{Amax,fast}	L _{A10,1hr}	L _{A90,1hr}
17/01/2024 20:00	61.0		55.8	42.3
17/01/2024 21:00	59.3		53.6	41.4
17/01/2024 22:00	55.8		48.7	41.4
17/01/2024 23:00	54.8	81.7	43.5	39.9
18/01/2024 00:00	53.5		43.9	39.8
18/01/2024 01:00	49.8		42.7	38.8
18/01/2024 02:00	48.4		42.2	38.1
18/01/2024 03:00	49.1		40.6	37.0
18/01/2024 04:00	56.4		43.1	38.4
18/01/2024 05:00	58.4		50.3	41.0
18/01/2024 06:00	62.4		60.7	43.4
18/01/2024 07:00	66.3	N/A	70.0	47.4
18/01/2024 08:00	68.5		73.2	50.3
18/01/2024 09:00	66.3		69.9	46.4
18/01/2024 10:00	67.2		70.3	50.1
18/01/2024 11:00	64.9		68.3	41.3
Daytime Average Noise Level, L _{Aeq,16hr}				65.8
Night-time Average Noise Level, L _{Aeq,8hr}				56.6

3.3. ROAD TRAFFIC MEASUREMENT – BRISCOE LANE

E3P has conducted an unattended road traffic sound measurement in accordance with the measurement procedure given in Calculation of Road Traffic Noise (CRTN). The survey was carried out over the following periods:

- 📅 13:00 Wednesday 17th January 2024 until 13:00 Thursday 18th January 2024.

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

- 📍 Noise Measurement Position 2 (NMP2): Located along the western boundary of site approximately 4.5 m from the nearside edge of Briscoe Lane. The microphone was located at a height of 1.5 m above ground level and in facade conditions. A correction of 3dB has been applied to the levels for the assessment to account for the façade conditions.

A summary of the measured sound pressure levels from the Road Traffic Noise Survey is presented in Table 3.2. The L_{Amax,fast} is expressed as a 10th highest 1-minute maximum noise level during the night-time period.



TABLE 3.2 SUMMARY OF MEASURED NOISE LEVELS FOR NMP1 – BRISCOE LANE

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	L _{Aeq,1hr}	L _{Amax,fast}	L _{A10,1hr}	L _{A90,1hr}
17/01/2024 13:00	72.3	N/A	76.2	58.3
17/01/2024 14:00	72.8		76.4	60.3
17/01/2024 15:00	73.4		77.0	62.0
17/01/2024 16:00	73.2		76.6	60.2
17/01/2024 17:00	73.0		76.3	62.6
17/01/2024 18:00	72.7		76.2	60.0
17/01/2024 19:00	71.0		75.1	57.7
17/01/2024 20:00	70.3		74.8	55.5
17/01/2024 21:00	70.1		74.7	53.1
17/01/2024 22:00	68.5		73.6	48.4
17/01/2024 23:00	67.9	82.8	72.8	46.1
18/01/2024 00:00	65.8		68.6	43.3
18/01/2024 01:00	63.3		63.7	44.1
18/01/2024 02:00	61.9		61.7	44.1
18/01/2024 03:00	61.2		59.3	43.7
18/01/2024 04:00	64.3		65.5	43.9
18/01/2024 05:00	69.0		74.1	47.4
18/01/2024 06:00	72.4		76.9	56.8
18/01/2024 07:00	73.9	N/A	77.4	61.7
18/01/2024 08:00	74.7		78.2	63.4
18/01/2024 09:00	73.5		77.4	60.3
18/01/2024 10:00	72.7		76.8	58.3
18/01/2024 11:00	72.8		76.7	57.5
18/01/2024 12:00	72.9		76.6	59.6
18/01/2024 13:00	72.3		76.2	58.3
Daytime Average Noise Level, L _{Aeq,16hr}				71.9
Night-time Average Noise Level, L _{Aeq,8hr}				67.3

3.4. 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):



 11:00 Thursday 18th January 2024 until 11:00 Friday 19th January 2024

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

 Noise Measurement Position 3 (NMP3): Located approximately 20m from the nearside rail, on the northern boundary of the Site. The microphone was located at a height of 1.5 m above ground level and in free-field conditions.

A summary of the measured sound pressure levels from the Rail Traffic Noise Survey are presented in Table 3.3.

TABLE 3.3 SUMMARY OF MEASURED NOISE LEVELS FOR NMP3 – RAILWAY LINE

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)	
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$
11:00 – 12:00	57.7	N/A
12:00 – 13:00	63.4	
13:00 – 14:00	56.7	
14:00 – 15:00	57.3	
15:00 – 16:00	56.9	
16:00 – 17:00	56.4	
17:00 – 18:00	56.2	
18:00 – 19:00	57.8	
19:00 – 20:00	56.4	
20:00 – 21:00	56.4	
21:00 – 22:00	54.7	
22:00 – 23:00	53.7	
23:00 – 00:00	51.9	80.5
00:00 – 01:00	49.8	
01:00 – 02:00	50.1	
02:00 – 03:00	50.3	
03:00 – 04:00	49.1	
04:00 – 05:00	49.7	
05:00 – 06:00	53.3	
06:00 – 07:00	55.5	
07:00 – 08:00	56.7	N/A
08:00 – 09:00	57.3	
09:00 – 10:00	56.3	



MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)	
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$
10:00 – 11:00	59.2	
Average Daytime $L_{Aeq,16\text{ hour}}$		57.7
Average Night-time $L_{Aeq,8\text{ hour}}$		51.8

3.5. UNATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

E3P have undertaken an unattended background and ambient sound survey in a position considered representative of the proposed receptors.

The survey was carried out over the following time period:

- 13:00 Wednesday 17th January to 10:00 Monday 22nd January 2024.

The following noise measurement position was chosen for the Background Sound Survey:

- Noise Measurement Position 4 (NMP4): Located in the northern area of the site representative of the noise sensitive receptors. The microphone of the sound level meter was set at a height of 1.5 m above ground level and in free-field conditions. Sound sources consisted of road traffic on the local road network and rail traffic.

Table 3.4 details the measured background sound levels. The daytime levels correspond to the $L_{A90,1hr}$ and the night-time levels to the $L_{A90,15mins}$. The full data set is available upon request. Monitoring was carried out over the above times to capture both worst-case daytime and night-time periods.

TABLE 3.4 MEDIAN AND RANGE OF MEASURED BACKGROUND SOUND PRESSURE LEVELS

DATE	TIME PERIOD	RANGE OF MEASURED BACKGROUND SOUND PRESSURE LEVELS, $L_{A90,T}$ (dB)	MEDIAN MEASURED BACKGROUND SOUND PRESSURE LEVELS, $L_{A90,T}$ (dB)
Wednesday 17th January 2024	13:00–23:00	46.3 - 51.3	49.6
	23:00–07:00	42.3 - 52.3	43.6
Thursday 18th January 2024	07:00–23:00	48.5 - 54.4	52.5
	23:00–07:00	42.5 - 53.6	45.3
Friday 19th January 2024	11:00–23:00	48.3 - 54.5	52.7
	23:00–07:00	42.0 - 50.0	44.6
Saturday 20th January 2024	07:00–23:00	48.6 - 52.2	50.8
	23:00–07:00	42.3 - 50.1	45.2
Sunday 21st January 2024	07:00–23:00	46.6 - 55.2	53.2
	23:00–07:00	41.9 - 52.7	46.8



The data has been analysed in accordance with the procedure given in MCC's Planning & Noise document, specifically in Appendix A. Here the following is noted:

- 🔊 MCC Daytime – Min = 49.3 dB, max = 52.8 dB and average = 51.8 dB.
- 🔊 MCC Night-time – Min = 42.9 dB, max = 50.3 dB and average = 45.7 dB.

The minimum values of 49.3 and 42.9 dB are to be used and correspond closely (within 0.7 dB) to the lowest measured median values in Table 3.4.

3.6. COMMERCIAL MEASUREMENTS

E3P has undertaken a site walkover to determine the sources of sound associated with the surrounding existing commercial properties. The surveyor checked on commercial sources potentially from the north and west during the installation and collection of the above meters as well as during the below dedicated periods:

- 🔊 Wednesday 17th January 2024 between 12:00 and 13:00.
- 🔊 Tuesday 30th January 2024 between 08:40-11:40 and 13:10-15:10 Tuesday 14th November 2023 between 18:15 and 18:25.

At all periods, no commercial sound was audible, or any notable plant items/machinery was observed. However, NMP4 has been used to ascertain whether any commercial sound exists at night when road traffic sound levels are low. As can be seen in the 15-minute data, no variance is noted with noise levels displaying a typical variance due to road traffic noise levels, day and night. As such, commercial sound from the north and west is not considered further. It is also worth noting that the 24-hour noise survey results for Briscoe Lane and the Railway will potentially include full operational noise from any of the units of which are obviously masked by the dominant sources of noise.

E3P are aware of a proposed Class B8 storage unit that is to be build along the eastern boundary of the proposed residential development. As such, this proposed storage unit will be included within the commercial sound impact assessment.

Weather conditions during the surveys were conducive to the measurement of environmental noise. Table 3.5 below details the equipment used for the noise surveys.

TABLE 3.5 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE
NMP1, NMP3 and NMP4	Sound Level Meter	01dB Fusion	12039	28th July 2025
	Pre-amplifier	01dB Pre22	1805124	
	Microphone	GRAS 40CD	330832	
	Calibrator	Cirrus CR515	87281	19th January 2025
NMP2	Sound Level Meter	Cirrus CR:171A G303884	G303884	19th September 2025
	Pre-amplifier	Cirrus MV:200F	12731F	
	Microphone	Cirrus MK:224	215899D	
	Calibrator	Cirrus CR515	99403	



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



4. COMMERCIAL SOUND IMPACT ASSESSMENT

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2024 MR1, to determine the impact of noise from commercial sound.

The following inputs have been included in the model:

- ✳ Detailed Site Layout.
- ✳ Proposed Storage Unit Site Layout – Dated April 2022.
- ✳ Site elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) and 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.
- ✳ The daytime period has been assessed between the hours of 07:00 to 23:00. For the assessment, BS 4142 has been used to determine the likelihood of adverse impact within the external amenity areas over a reference period of 1 hour.
- ✳ The night-time period has been assessed between the hours of 23:00 and 07:00 for a reference time period of 15 minutes.
- ✳ A reflection order of 2 has been used in all calculations.
- ✳ Ground absorption of 0.5 has been assumed due to the mixed landscape surrounding the site.
- ✳ Noise levels generated using ISO 9613-1 and ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors” as incorporated into CadnaA software.

The only source of commercial sound that has potential to impact the site would be the proposed storage unit to the east. As such assumptions have been made to the sources of sound present. The following assumptions have been made.

- ✳ Noise breakout from the façades of the proposed storage unit has been input into the model as vertical area sources. As the end use of this space is currently unknown worst-case assumptions of 80 dB inside the unit have been assumed. Given that a minimum sound reduction of 31 dB is expected for a typical commercial building façade, external noise levels at the façades are expected to be, at most, 43 dB radiating from the façade itself.
- ✳ Deliveries to the storage unit have been assumed during both the daytime and night-time periods. E3P have used previously measured data taken from similar operations at similar sites. These have been used to inform the assessment. Typically, there will be no more than one delivery per hour. A sound power level of 77 dB for delivery unloading and loading operations and the refrigeration unit associated with the HGV has been derived from previously measured data.
- ✳ Car & HGV parking sound associated with the site, both the staff and visitor’s car parks, has been inputted as an area source with daytime levels generated based on the car park being 100% full during the day and 25% full during the night-time to inform a worst-case assessment. The proposed storage building has been assumed to receive 4 HGVs deliveries during a 1-hour period during the day and 1 HGV deliver during a 15-minute period during the night-time. This can be considered worst case.



For the BS 4142:2014 assessments, penalties are applied to the specific sound level in order to provide the rating level. These penalties relate to the acoustic features of the sound source. Accordingly, the following subjective features have been accounted for in the assessment, in accordance with the subjective method detailed in BS 4142:2014, for the units as a whole operation.

TABLE 4.1 ACOUSTIC PENALTIES – COMMERCIAL SOUND

SOURCE	CHARACTERISTIC	ATTRIBUTABLE PENALTY	COMMENT
HGV Deliveries	Tonality	+2 dB	Tonality is expected to be just perceptible at the proposed receptors due to reverse alarms
	Impulsivity	-	No impulsivity is expected
	Intermittency	+3 dB	Deliveries are intermittent by nature
	Other Sound Characteristics	-	No other penalties apply

Figures 2 and 3 determine the noise levels across the Site during the daytime and night-time periods due to commercial sound.

4.1. DAYTIME ASSESSMENT

Table 4.2 details the rating level at the closest proposed garden edge, output from the model. The grid noise map can be seen in Figure 2 of Appendix II.

The derived minimum MCC background sound levels during the daytime periods have been used for each corresponding receptor. This informs a worst-case assessment.

TABLE 4.2 CALCULATION OF RATING LEVEL AND COMPARISON WITH BACKGROUND SOUND LEVEL - DAYTIME

PLOT	PREDICTED SPECIFIC NOISE LEVEL (L _{Aeq})	CALCULATED RATING LEVEL, L _{A,r} (dB)	LOWEST MEASURED BACKGROUND SOUND LEVEL, L _{A90,1hr} (dB)	CRITERION, L _{A90} = L _{A,r} (dB)	DIFFERENCE +/- (dB)
133 and 134	34	39	49	49	-10
135 and 136	36	41			-8
137 and 138	39	44			-5
139 and 140	37	42			-7

Table 4.2 indicates that the predicted rating falls below the existing typical background sound level during daytime periods for the worst affected plots.

When considering internal noise levels with windows open, assuming 13 dB of attenuation for a partially open window, internal noise levels at the worst affected plot are 26 dB. This is 9 dB below the daytime internal noise level criterion of 35 dB stipulated in BS 8233. As such, this is a good indication that adverse impact is not likely.



4.2. NIGHT-TIME ASSESSMENT

Table 4.3 details the rating level at the closest facade, output from the model. The grid noise map can be seen in Figure 3 of Appendix II.

The MCC minimum background sound levels during the night-time periods have been used for each corresponding receptor. This informs a worst-case assessment.

TABLE 4.3 CALCULATION OF RATING LEVEL AND COMPARISON WITH BACKGROUND SOUND LEVEL – NIGHT-TIME

PLOT	PREDICTED SPECIFIC NOISE LEVEL (L_{Aeq})	CALCULATED RATING LEVEL, $L_{A,r}$ (dB)	LOWEST MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A90} = L_{A,r}$ (dB)	DIFFERENCE +/- (dB)
133 and 134	31	36	43	43	-7
135 and 136	31	36			-7
137 and 138	31	36			-7
139 and 140	31	36			-7

Table 4.3 indicates that the predicted rating falls below the existing typical background sound level during night-time periods for the worst affected plots.

When considering internal noise levels with windows open, assuming 13 dB of attenuation for a partially open window, internal noise levels at the worst affected plot are 18 dB. This is 12 dB below the daytime internal noise level criterion of 30 dB stipulated in BS 8233. As such this a good indication that adverse impact is not likely.



5. ROAD AND RAIL TRAFFIC SOUND IMPACT ASSESSMENT

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2024 MR1, to determine the impact of noise from road traffic sound.

The following inputs have been included in the model:

- ✳ Riverpark Road is calibrated using NMP1.
- ✳ Briscoe Lane is calibrated using NMP2.
- ✳ The railway line to the north is calibrated using NMP3.
- ✳ 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 License v3.0.
- ✳ Existing buildings are included.
- ✳ 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 4 and 5 determine the noise levels across the Site during the daytime and night-time periods, respectively, due to road traffic sound.

5.1. EXTERNAL AMENITY AREA NOISE LEVEL ASSESSMENT

The noise model has been used to predict noise levels in the shared amenity spaces which are to be used for relaxation. The predicted levels range from 45 dB and up to 63 dB in the worst affected external amenity areas. Therefore, noise levels within certain external amenity areas exceed the upper criterion of 55 dB.

As such, it is predicted that some areas will have the lowest observed adverse effect level, which has the following commentary:

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.

As such, mitigation in the form of acoustic barriers is required to reduce noise levels in these areas.

It is noted that acoustic fencing is proposed and shown on the proposed boundary treatment plans.



5.2. 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 $R_w(C_{tr}-1;C_{tr}-4)$. The primary noise impact here is road traffic sound, as such, the C_{tr} correction is applied. Railway sound is present but not dominate over road traffic sound, the application of the C_{tr} correction is considered worst case.

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 70 dB and 66 dB respectively. As such, plots fronting the roads will require higher specification glazing. The exact specifications of this will be given in section 6.

It is also important to consider the maximum noise levels during the night-time period. Figure 6 has been produced using the 10th Highest maximum noise levels for each road and the railway line. Here an external limit of 74 dB applies (45 dB internal criterion + 29 dB reduction for glazing). As can be seen on Figure 6 many plots with line of sight to the roads and railway line will require higher specification glazing. Further details will be given in Section 6.

With regards 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.

5.2.1. VENTILATION CONDITION

The client has confirmed that all apartments will have a Vent Axia centralised MEV system, Lo-Carbon Sentinel, along with iHp electric water tanks with four Ryton wall grill ventilator units above windows in lounge areas will be installed. The Vent Axia MEV uses a single unit within the roof space, minimising any potential noise ingress to habitable rooms. It has a quoted operational noise level of 37.8 dB at 3 m at 100% speed. Considering this and the sound reduction achieved by the ceiling, etc a level of 30 dB and below is achieved in the living space above which the unit is located. At 60% speed, the sound level is reduced to 26.9 dB at 3 m.

For the traditional dwellings, it is assumed that the developer would be installing a ventilation system in accordance with Part F of the Building Regulations as it is assumed Natural Ventilation is not appropriate for these 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 5.0.

It is noted that a whole dwelling ventilation system is proposed and shown on plans.

5.2.2. 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 50 dB during the night-time ($L_{Aeq,8hr}$) and 65 dB more than 10 times a night ($L_{Af,max}$).

As can be seen from Figure 6, all plots along the roads exceed the above criterion. As such, a full overheating assessment in accordance with the guidelines indicated in Part O is required for certain plots. A full overheating assessment should be carried out by a suitable qualified consultant.



6. MITIGATION

6.1. EXTERNAL AMENITY AREA

As shown in Section 5.1, certain plots would experience an exceedance of the 55 dB criterion in rear garden areas. As such, an additional noise model has been run to determine the required barrier height needed to achieve levels of 55 dB and below.

As shown in Figure 7, the following barriers are required to achieve this criterion:

- ✿ 2.4 m high barrier at Plots 1 and 2.
- ✿ 2.2 m high barrier at Plots 29 and 30.
- ✿ 2.4 m high barrier at Plot 74.
- ✿ 2.4 m high barrier at Plot 93.
- ✿ 2.4 m high barrier at Plot 100.
- ✿ 1.8 m high barrier at Plot 120.
- ✿ 2.4 m high barrier at Plots 133 and 134.

The barriers can be of wooden fence or brick wall construction but must be free from holes, be sealed at the base and have a minimum mass of 10kg/m².

E3P note that the recommended mitigation has been included with the scheme proposals.

6.2. FAÇADE INSULATION AND VENTILATION

The previous section determined that any facades fronting the roads will require higher specification glazing. As such, the following Table is produced detailing the required glazing with floors included for the apartments.

Where elevations are not noted, standard glazing is sufficient for those.

TABLE 6.1 GLAZING REQUIREMENTS

PLOT	ELEVATION	FLOOR	MINIMUM GLAZING PERFORMANCE, $R_w + C_{t,r}$ (dB)	EXAMPLE CONFIGURATION (glass / air space / glass) (mm)
1 and 2	All	All	31	10 / 16 / 6
3 to 28	All	All	Standard	4 / 20 / 4
29 and 30	All	All	31	10 / 16 / 6
31 to 45	South	All	32	10 / 16 / 6
46 to 55	All	All	30	8 / 16 / 6
56 to 73	All	All	Standard	4 / 20 / 4



PLOT	ELEVATION	FLOOR	MINIMUM GLAZING PERFORMANCE, $R_w + C_{t,r}$ (dB)	EXAMPLE CONFIGURATION (glass / air space / glass) (mm)
74 and 75	All	All	30	10 / 16 / 4
76 to 91	All	All	Standard	4 / 20 / 4
92 and 93	All	All	29	8 / 16 / 6
94 to 99	South	All	32	10 / 16 / 6
100 and 101	All	All	30	8 / 16 / 6
102 to 119	All	All	Standard	4 / 20 / 4
120 to 132	South	All	31	10 / 16 / 6
133 and 134	All	All	30	8 / 16 / 6
135 to 221	All	All	Standard	4 / 20 / 4
Block A	NE	All Floors	30	8 / 16 / 6
	SW	All Floors	29	8 / 16 / 6
	West	All Floors	34	6 / 16 / 6.8
	NW	All Floors	36	
	Remaining	All	Standard	4 / 20 / 4
Block B	East	All Floors	26	
	South	All Floors	31	10 / 16 / 6
	West	All Floors	26	
	North	All	Standard	4 / 20 / 4
Block C	South	All Floors	29	8 / 16 / 6
	Remaining	All	Standard	4 / 20 / 4
Block D	NE	All Floors	31	10 / 16 / 6
	SE	All	Standard	4 / 20 / 4
	SW	All Floors	31	10 / 16 / 6
	NW	All Floors	36	
Block E	North	All Floors	31	10 / 16 / 6
	E, S, SE and SW	All	Standard	4 / 20 / 4
	North west	All Floors	31	10 / 16 / 6

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 these dwellings.

It is assumed that this would be continuous mechanical extract ventilation as the dwellings are not likely to be suitable for natural ventilation. This will consist of either a central extract system, individual room extract fans or a combination of both.



In order to achieve the required internal ambient noise levels, any background ventilators must achieve at least that quoted for the glazing in $D_{n,e,w} + C_{t,r}$ plus 3 dB in the open position. The number of background ventilators per room will be dependent on the requirements given in Building Regulations Part F.

E3P note that the recommended mitigation has been included with the scheme proposals.



7. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Kellen Homes and Great Places Housing Group to undertake a Noise Impact Assessment for a proposed residential development at Riverpark Road, Manchester.

Full 24-hour road traffic sound surveys have been conducted for Riverpark Road and Briscoe Lane. A full 24-hour rail noise survey has been undertaken for the railway line to the north. Attended source noise measurements have been undertaken for the potential surrounding commercial sources.

An unattended background and ambient sound survey has been conducted at a location considered representative of the nearest existing and proposed noise sensitive receptors.

A 3D noise model has been constructed to assess commercial sound, road traffic and rail sound impact across the site and incident upon all facades and floors and in any external amenity areas.

The operational noise from commercial premises has been assessed in accordance with BS 4142:2014+A1:2019. Road traffic and rail sound has been assessed in accordance with the criterion set out in BS 8233:2014.

The assessment determined that certain facades require higher specification glazing to control internal noise levels across the development. A whole dwelling ventilation system is assumed to be installed across the site as per approved document F. A full overheating assessment in accordance with the guidelines indicated in Part O is required. Furthermore, 1.8 to 2.4 m high barriers are required for certain plots.

E3P note that the recommended mitigation has been included with the scheme proposals.

With mitigation measures in place, this assessment has shown that no adverse impact is predicted day or night at the receptors due to commercial and road and rail traffic sound.

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.
L₁₀ and L₉₀	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

MEASURED SOUND PRESSURE LEVELS

TABLE A1 MEASURED AMBIENT AND BACKGROUND HOURLY NOISE LEVELS AT NMP4

MEASUREMENT START TIME	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
17/01/2024 13:00	56.7	51.1
17/01/2024 14:00	58.1	51.3
17/01/2024 15:00	56.2	51.0
17/01/2024 16:00	54.3	49.4
17/01/2024 17:00	54.9	50.5
17/01/2024 18:00	54.7	49.8
17/01/2024 19:00	54.9	49.3
17/01/2024 20:00	58.1	48.5
17/01/2024 21:00	54.2	47.8
17/01/2024 22:00	52.0	46.3
17/01/2024 23:00	49.7	44.5
18/01/2024 00:00	47.7	43.3
18/01/2024 01:00	47.0	42.7
18/01/2024 02:00	53.7	42.7
18/01/2024 03:00	45.4	42.5
18/01/2024 04:00	51.4	43.1
18/01/2024 05:00	51.8	46.1
18/01/2024 06:00	54.4	49.9
18/01/2024 07:00	56.1	52.8
18/01/2024 08:00	61.0	54.4
18/01/2024 09:00	58.7	52.9
18/01/2024 10:00	54.8	50.9
18/01/2024 11:00	57.7	51.5
18/01/2024 12:00	63.4	52.4
18/01/2024 13:00	56.7	51.7
18/01/2024 14:00	57.3	52.5
18/01/2024 15:00	56.9	52.6
18/01/2024 16:00	56.4	53.4
18/01/2024 17:00	56.2	53.0
18/01/2024 18:00	57.8	53.4
18/01/2024 19:00	56.4	52.4
18/01/2024 20:00	56.4	51.0
18/01/2024 21:00	54.7	48.6



MEASUREMENT START TIME	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
18/01/2024 22:00	53.7	48.5
18/01/2024 23:00	51.9	46.9
19/01/2024 00:00	49.8	44.8
19/01/2024 01:00	50.1	43.8
19/01/2024 02:00	50.3	43.1
19/01/2024 03:00	49.1	42.9
19/01/2024 04:00	49.7	43.1
19/01/2024 05:00	53.3	47.4
19/01/2024 06:00	55.5	51.6
19/01/2024 07:00	56.7	54.2
19/01/2024 08:00	57.3	54.5
19/01/2024 09:00	56.3	53.3
19/01/2024 10:00	59.2	53.2
19/01/2024 11:00	55.4	52.5
19/01/2024 12:00	55.8	52.8
19/01/2024 13:00	56.9	53.4
19/01/2024 14:00	56.9	53.1
19/01/2024 15:00	57.0	52.8
19/01/2024 16:00	55.4	52.5
19/01/2024 17:00	55.7	52.1
19/01/2024 18:00	55.3	51.8
19/01/2024 19:00	55.8	51.4
19/01/2024 20:00	54.8	50.3
19/01/2024 21:00	54.2	49.7
19/01/2024 22:00	53.4	48.3
19/01/2024 23:00	51.8	47.4
20/01/2024 00:00	51.1	45.0
20/01/2024 01:00	50.5	44.9
20/01/2024 02:00	49.6	43.2
20/01/2024 03:00	48.9	42.7
20/01/2024 04:00	50.0	43.1
20/01/2024 05:00	49.9	44.5
20/01/2024 06:00	52.3	46.6
20/01/2024 07:00	54.8	48.6



MEASUREMENT START TIME	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
20/01/2024 08:00	54.8	49.9
20/01/2024 09:00	55.2	50.8
20/01/2024 10:00	55.2	51.1
20/01/2024 11:00	55.6	52.2
20/01/2024 12:00	55.4	52.1
20/01/2024 13:00	55.4	52.2
20/01/2024 14:00	55.2	51.5
20/01/2024 15:00	55.2	51.4
20/01/2024 16:00	54.6	51.1
20/01/2024 17:00	54.7	50.8
20/01/2024 18:00	54.6	50.6
20/01/2024 19:00	54.7	50.1
20/01/2024 20:00	54.2	49.7
20/01/2024 21:00	53.7	49.5
20/01/2024 22:00	54.5	49.2
20/01/2024 23:00	57.8	48.9
21/01/2024 00:00	51.9	47.3
21/01/2024 01:00	51.5	46.4
21/01/2024 02:00	50.5	45.2
21/01/2024 03:00	49.6	43.9
21/01/2024 04:00	47.8	42.7
21/01/2024 05:00	48.3	43.6
21/01/2024 06:00	49.9	44.9
21/01/2024 07:00	50.9	46.6
21/01/2024 08:00	53.5	48.2
21/01/2024 09:00	54.0	49.9
21/01/2024 10:00	54.5	50.9
21/01/2024 11:00	54.8	51.3
21/01/2024 12:00	56.8	53.1
21/01/2024 13:00	56.7	52.2
21/01/2024 14:00	57.8	53.3
21/01/2024 15:00	58.1	53.6
21/01/2024 16:00	58.9	54.2
21/01/2024 17:00	58.5	53.8



MEASUREMENT START TIME	MEASURED AMBIENT NOISE LEVEL, $L_{Aeq,1hr}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
21/01/2024 18:00	58.9	53.5
21/01/2024 19:00	59.5	53.8
21/01/2024 20:00	60.9	55.2
21/01/2024 21:00	62.4	55.2
21/01/2024 22:00	57.3	51.1
21/01/2024 23:00	58.1	49.8
22/01/2024 00:00	59.3	50.2
22/01/2024 01:00	56.8	46.6
22/01/2024 02:00	52.3	42.6
22/01/2024 03:00	50.1	44.2
22/01/2024 04:00	52.3	43.6
22/01/2024 05:00	51.9	45.8
22/01/2024 06:00	55.3	50.5
22/01/2024 07:00	56.6	52.9
22/01/2024 08:00	57.6	53.7
22/01/2024 09:00	57.9	54.1



APPENDIX III

FIGURES

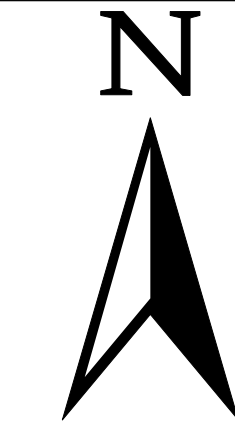
Figure 1 - Noise Measurement Positions



Project:
Riverpark Road,
Manchester

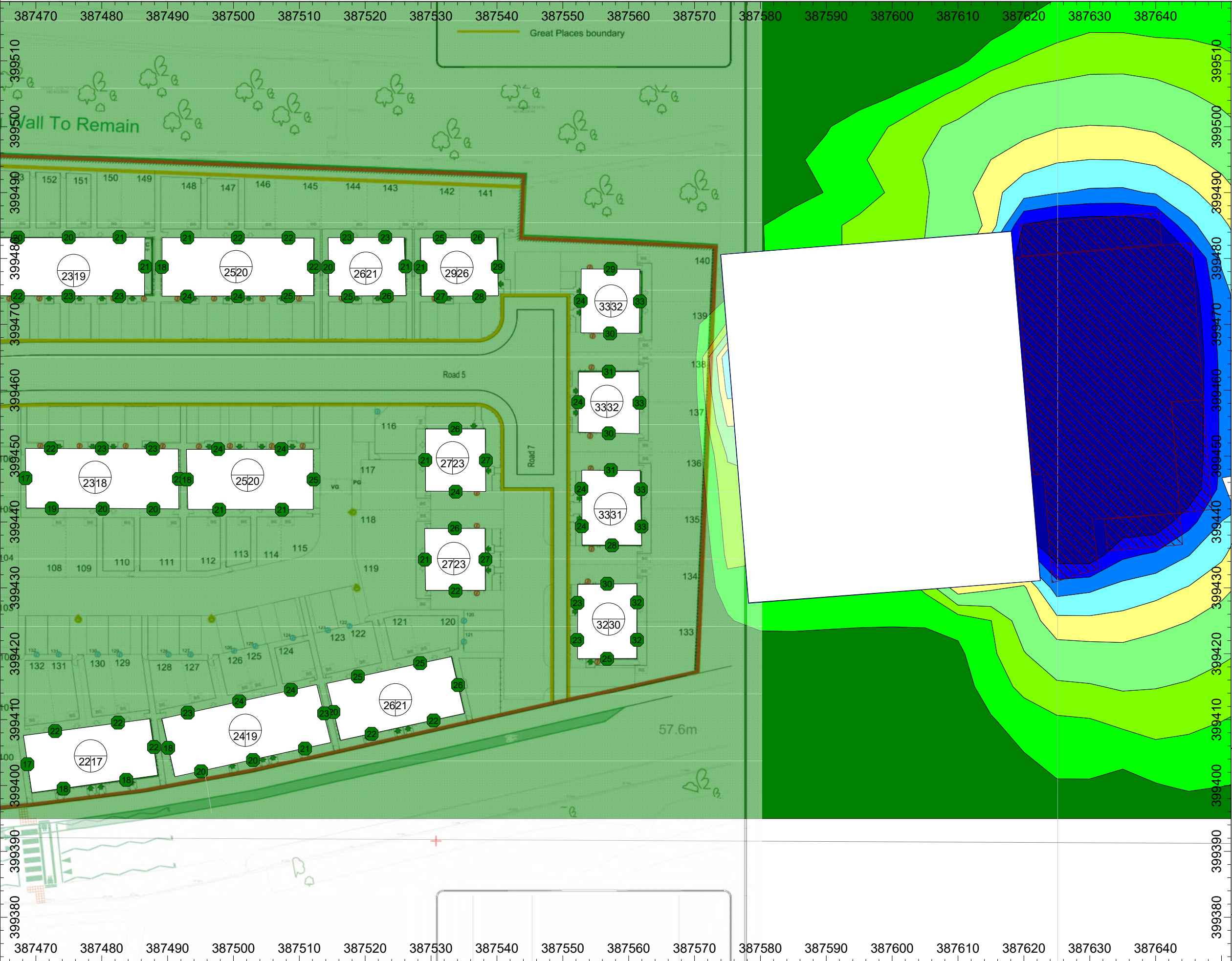
Project-No:
51-086

Client:
Kellen Homes Ltd



Project Engineer: L Faulkner
Date: 07/04/2025

Figure 2 - Daytime Grid Noise Map (BS 4142) - Calculation at 1.5 m above ground level



Project:
Riverpark Road,
Manchester

Project-No:
51-086

Client:
Kellen Homes Ltd

**Daytime Noise Level,
LAr (dB)**

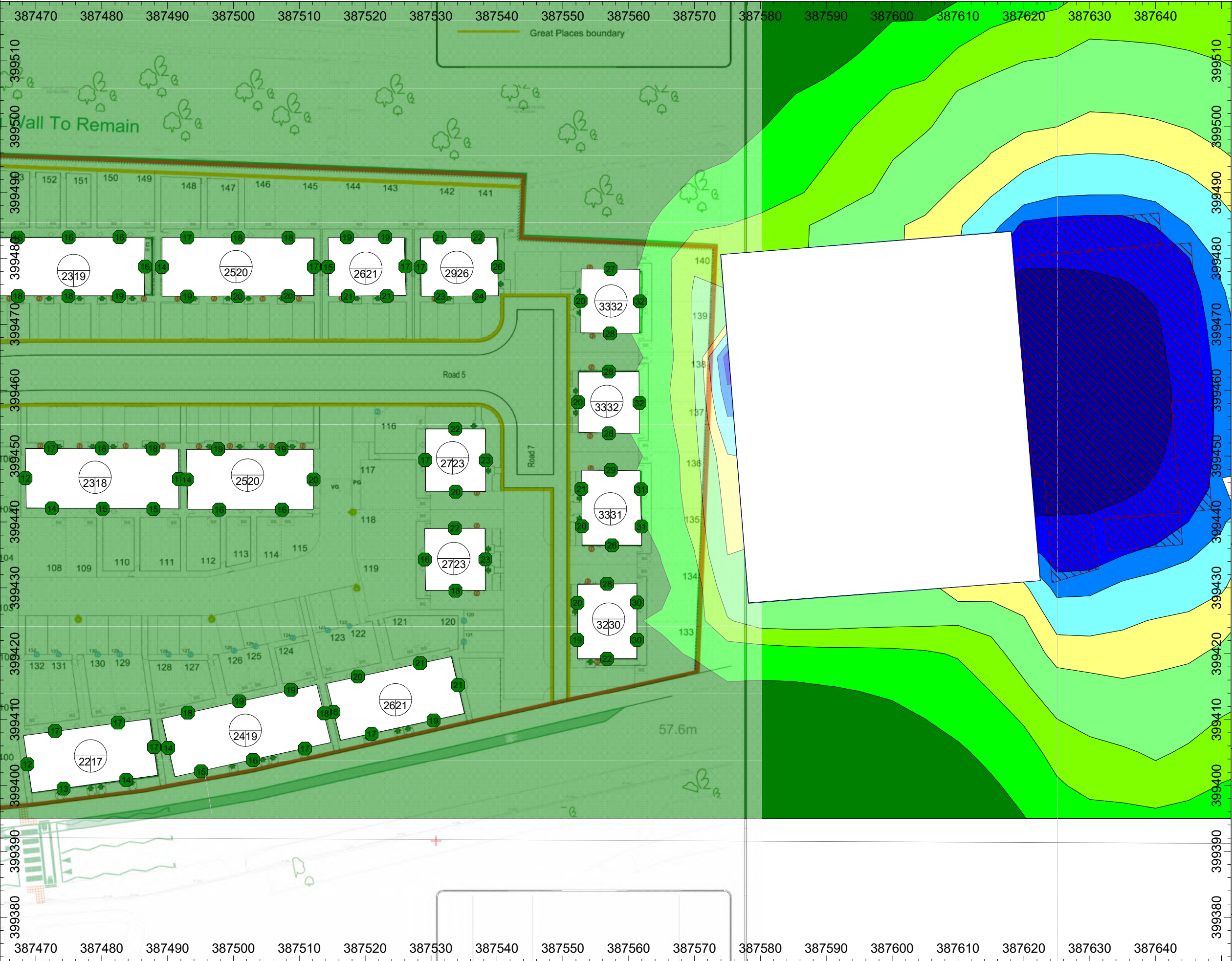
Dark Green	... ≤ 38
Light Green	38 < ... ≤ 40
Yellow-Green	40 < ... ≤ 42
Light Yellow	42 < ... ≤ 45
Yellow	45 < ... ≤ 48
Light Blue	48 < ... ≤ 50
Blue	50 < ... ≤ 52
Dark Blue	52 < ... ≤ 55
Very Dark Blue	55 < ...

Noise Map Objects

- + Point Source
- vert. Area Source
- ▨ Parking Lot
- ▭ Building
- Embankment
- ▭ Bridge
- ⊕ Building Evaluation
- ▭ Calculation Area

Project Engineer: Lee Faulkner
Date: 07/04/2025

Figure 3 - Night-time Grid Noise Map (BS 4142) - Calculation at 4.5 m above ground level



Project:
Riverpark Road,
Manchester

Project-No:
51-086

Client:
Kellen Homes Ltd

**Night-time Noise Level,
LAr (dB)**

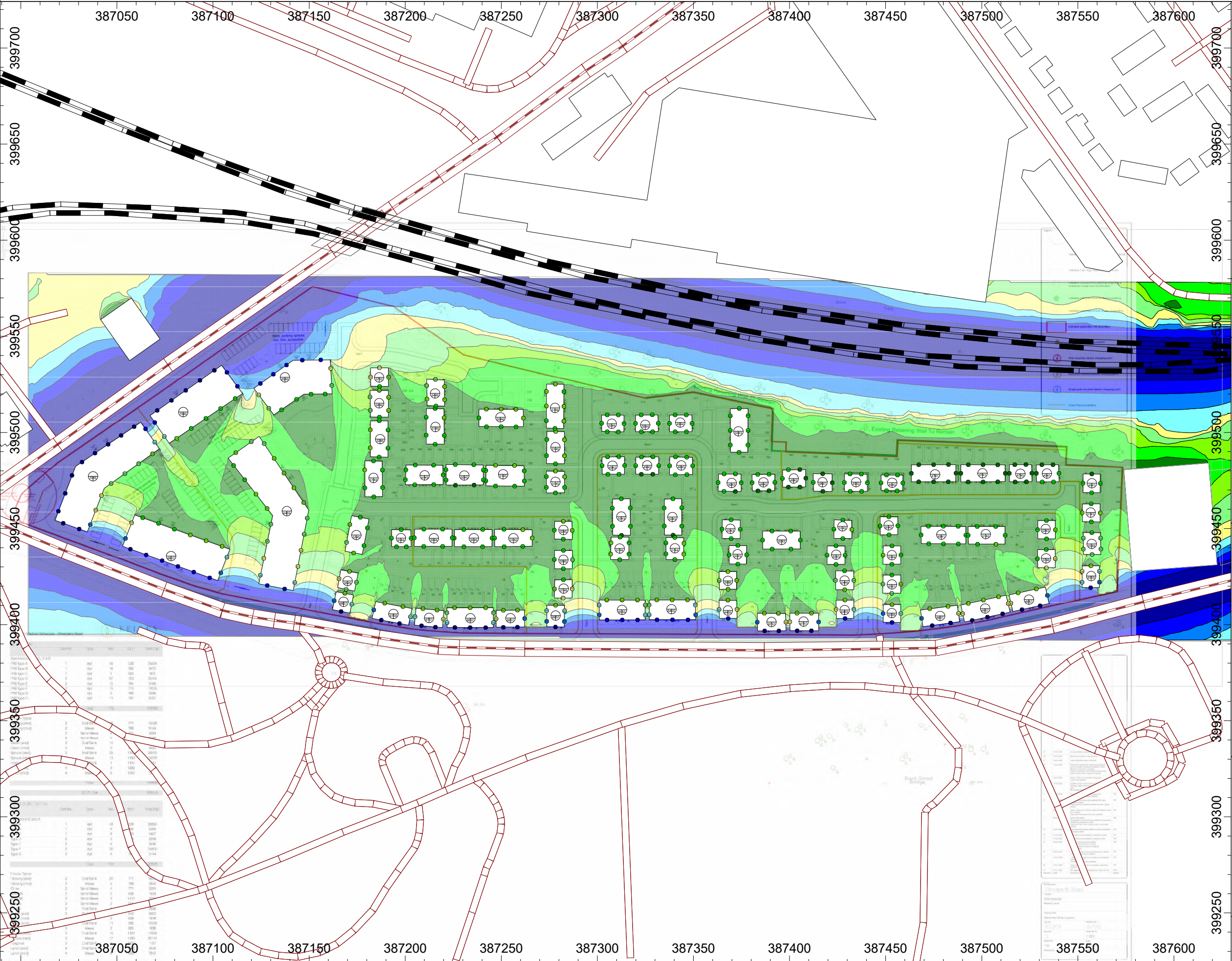
...	<= 32
32 < ...	<= 35
35 < ...	<= 38
38 < ...	<= 40
40 < ...	<= 42
42 < ...	<= 45
45 < ...	<= 48
48 < ...	<= 50
50 < ...	

Noise Map Objects

- + Point Source
- vert. Area Source
- ▨ Parking Lot
- ▭ Building
- Embankment
- ▭ Bridge
- ⊕ Building Evaluation
- ▭ Calculation Area

Project Engineer: Lee Faulkner
Date: 07/04/2025

Figure 4 - Daytime Grid Noise Map (BS 8233) - Calculation at 1.5 m above ground level



Project:
Riverpark Road,
Manchester

Project-No:
51-086

Client:
Kellen Homes Ltd

**Daytime Noise Level,
LAeq, 16 hour (dB)**

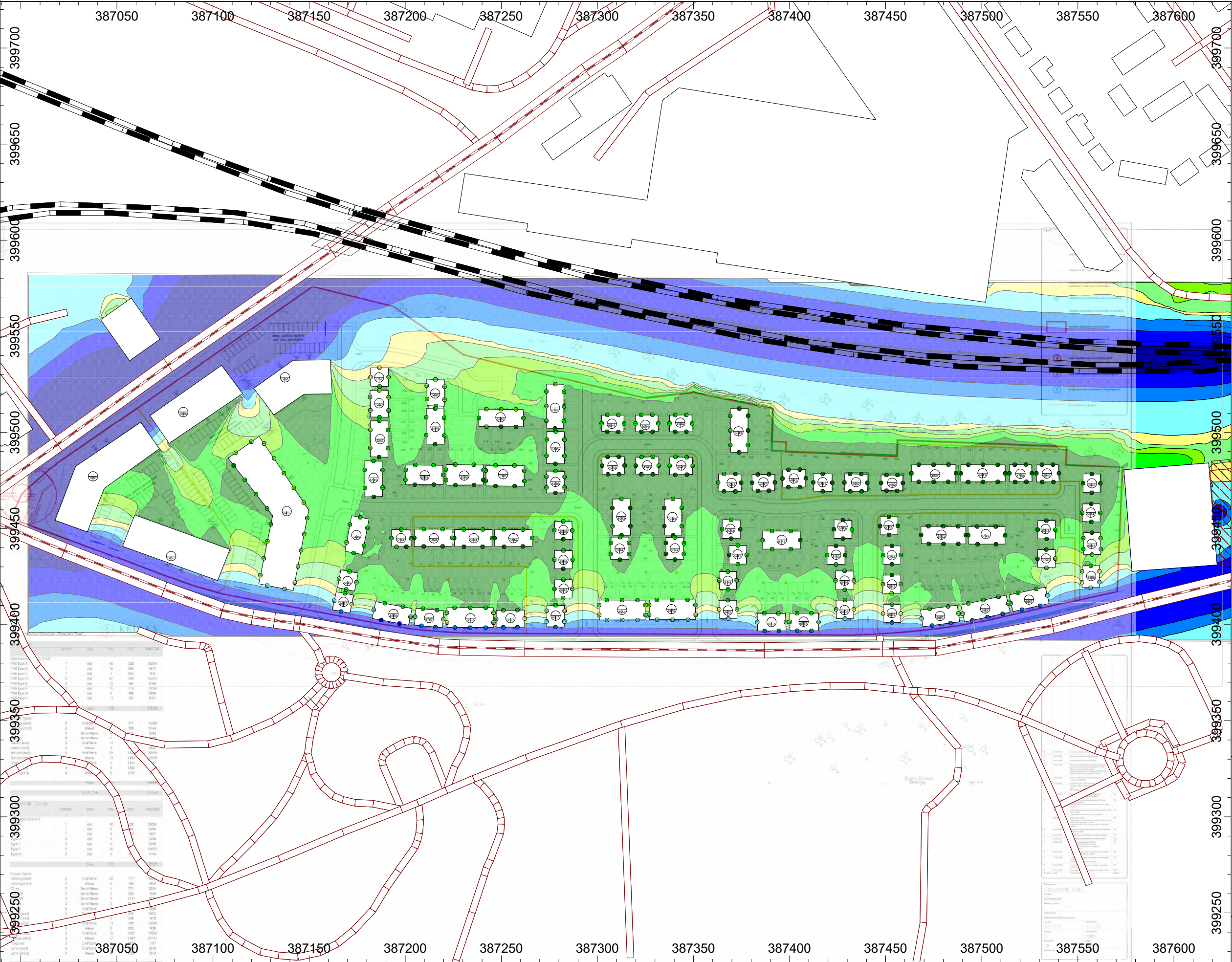
- ... ≤ 48
- 48 < ... ≤ 50
- 50 < ... ≤ 52
- 52 < ... ≤ 56
- 56 < ... ≤ 58
- 58 < ... ≤ 60
- 60 < ... ≤ 62
- 62 < ... ≤ 65
- 65 < ...

Noise Map Objects

- + Point Source
- vert. Area Source
- Road
- ▨ Parking Lot
- Railway
- Building
- Embankment
- Bridge
- ⊕ Building Evaluation
- Calculation Area

Project Engineer: Lee Faulkner
Date: 07/04/2025

Figure 5 - Night-time Grid Noise Map (BS 8233) - Calculation at 4 m above ground level



Project:
Riverpark Road,
Manchester

Project-No:
51-086

Client:
Kellen Homes Ltd

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

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

Noise Map Objects

- + Point Source
- vert. Area Source
- Road
- Parking Lot
- Railway
- Building
- Embankment
- Bridge
- Building Evaluation
- Calculation Area



Project Engineer: Lee Faulkner
Date: 07/04/2025

[illegible]

Client:
Kellen Homes Ltd

**Noise Level,
LAeq,T (dB)**

☐ ... <= 50.0
☒ 50.0 < ...

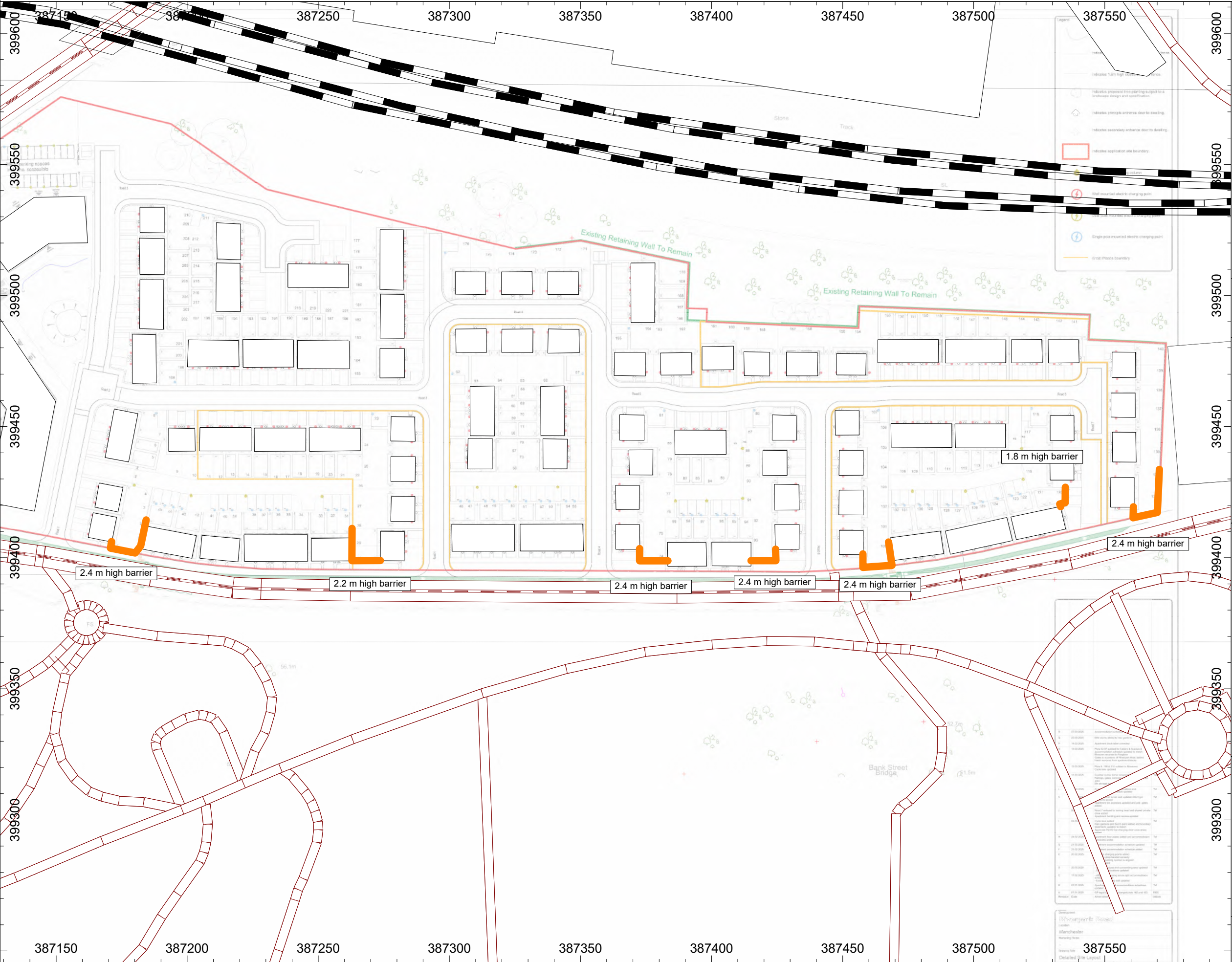
Noise Map Objects

-  Point Source
 vert. Area Source
 Road
 Parking Lot
 Railway
 Building
 Embankment
 Bridge
 Building Evaluation
 Calculation Area



Project Engineer: Lee Faulkner
Date: 07/04/2025

Figure 7 - Daytime Grid Noise Map Mitigation - Calculation at 1.5 m above ground level



Project:
Riverpark Road,
Manchester

Project-No:
51-086

Client:
Kellen Homes Ltd

**Day-time 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
- vert. Area Source
- Road
- Parking Lot
- Railway
- Building
- Barrier
- Embankment
- Bridge
- Calculation Area

e3p

Project Engineer: Lee Faulkner
Date: 07/04/2025