



BEROL QUARTER

Noise and Vibration Assessment

WSP
BEROL QUARTER LIMITED

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Berol Quarter Ltd

BEROL QUARTER

NOISE IMPACT ASSESSMENT

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QUALITY CONTROL

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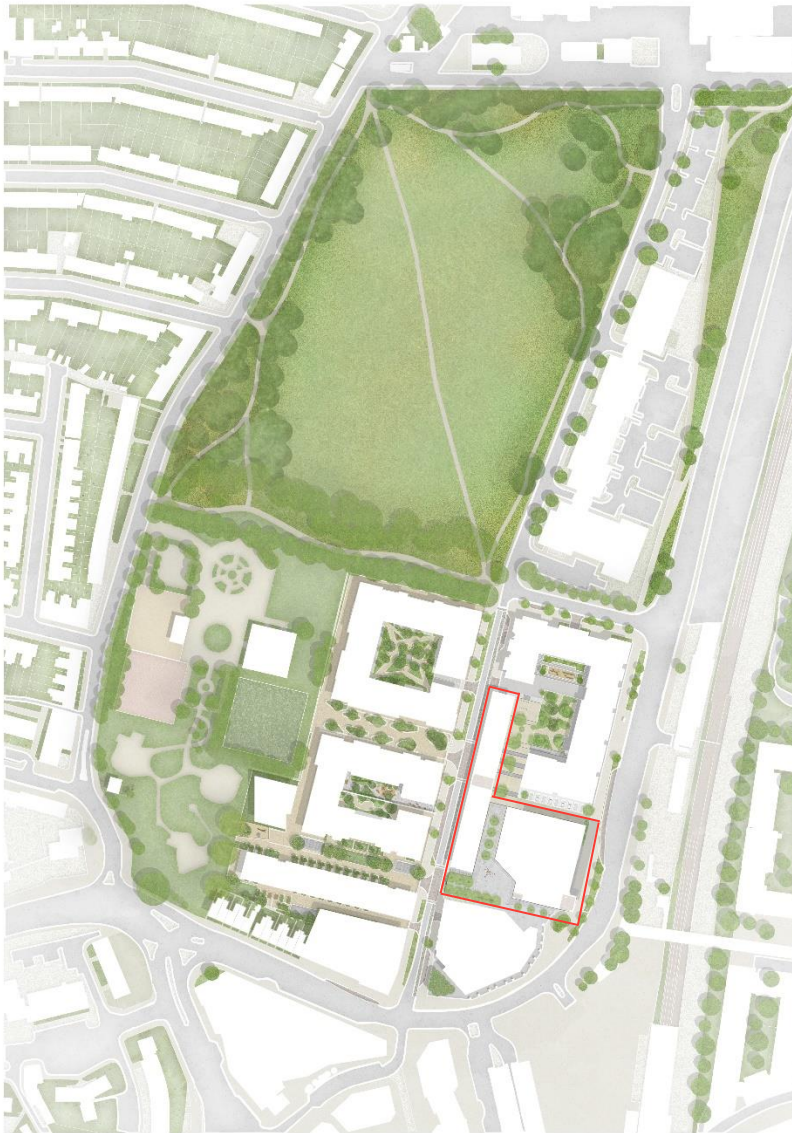
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ACOUSTICS GLOSSARY

1 INTRODUCTION

- 1.1.1. WSP has been commissioned by Berol Quarter Ltd (the 'Applicant') to carry out a noise survey and assessment for the proposed mixed-use development at Berol Quarter, Ashley Road, Tottenham Hale. The site falls under the jurisdiction of the London Borough of Haringey (LBH).
- 1.1.2. The site is bounded by Watermead Way to the east with the Greater Anglia railway line approximately 55m from the site boundary, a newly constructed residential building called The Gessner to the north-east, Cannon Factory to the north which has planning permission for new homes, Ashley Road to the west, and a construction site for the Tottenham Hale Centre development to the south. The nearest existing and future sensitive receptors to the site include The Gessner to the north-east, the Cannon Factory to the north, and the development plots of Ashley Gardens, Ashley House and Ashley Park to the west on the opposite side of Ashley Road. The location of the site is illustrated on Figure 1-1.

Figure 1-1 – Site location plan



- 1.1.3. This acoustics report is intended to support the full planning application to LBH for the refurbishment and extension of Berol House to include Use Class E floorspace and the redevelopment of 2 Berol Yard to provide new residential homes, Use Class E floorspace and associated landscaping, public realm improvements, car and cycle parking and other associated works.
- 1.1.4. This report presents the results of the baseline noise survey undertaken to establish the existing noise climate at the site. The results have been used to assess the suitability of the site for the proposed residential use within 2 Berol Yard in accordance with the relevant criteria. Mitigation measures have been identified with the aim of providing a suitable internal and external noise environment for future occupants.
- 1.1.5. The report also assesses the potential effect the proposed development might have on nearby existing sensitive receptors in terms of any future external fixed plant items associated with the Berol Quarter development.
- 1.1.6. A glossary of terms used in this report is provided in Appendix A.

2 POLICY, GUIDANCE AND STANDARDS

2.1 OVERVIEW

- 2.1.1. This section considers relevant national and local planning policies and national and international guidance and standards.

2.2 NATIONAL PLANNING POLICY

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

- 2.2.1. The original NPPF was published by central government in 2012 with a revised version published in July 2021. It replaces previous noise policy contained in Planning Policy Guidance Note 24. It does not replace the Noise Policy Statement for England 2010 to which it refers.
- 2.2.2. The NPPF is a concise document that provides its position on noise primarily in paragraph 185, which is reproduced below:

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

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁵;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Footnote 65 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).'

THE NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

- 2.2.3. The NPSE sets out the long-term vision of Government noise policy which applies to all forms of noise excluding occupational noise. The NPSE repeatedly refers to the management and control of noise within the context of Government Policy on sustainable development.
- 2.2.4. The NPSE also stresses that noise should not be considered in isolation from other related factors. For example, paragraph 2.7 states:
- '...the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications.'*
- 2.2.5. The NPSE introduces three categories, or levels, describing the presence or absence of noise effects, but does not quantify those categories, stating that the corresponding objective levels are likely to be different for different noise sources, receptors and times of the day or night. These categories are:

- NOEL – No Observed Effect Level – This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected
- SOAEL – Significant Observed Adverse Effect Level – This is the level above which significant adverse effects on health and quality of life occur.

2.2.6. The NPSE recognised that, at the time of publication, further research was needed into how these categories might be quantified for different scenarios. There is still no robust, universally accepted method of deriving suitable values and a variety of approaches are adopted in different circumstances.

2.2.7. The three aims of the NPSE are in alignment with the categories described in paragraph 2.2.5 above. These aims are:

- 1 *Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*
- 2 *Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*
- 3 *Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*

2.3 LOCAL POLICY

2.3.1. The London Borough of Haringey's local development plan sets out the strategic vision and objectives that the council will seek to achieve through its planning decisions through to 2026. The local development plan is essentially made up of Strategic Policies (adopted in 2013) and Development Management Policies (adopted in 2017).

2.3.2. The Development Management Policies document includes the following policies which reference noise:

- Policy DM1: Delivering High Quality Design. This policy requires that “development proposals must ensure a high standard of privacy and amenity for the development’s users and neighbours. The Council will support proposals that... address issues of vibration, noise, fumes, odour, light pollution and microclimatic conditions likely to arise from the use and activities of the development”.
- Policy DM23: Environmental Protection. This policy states that “the council will seek to ensure that new noise sensitive development is located away from existing or planned sources of noise pollution. Proposals for potentially noisy development must suitably demonstrate that measures will be implemented to mitigate its impact” and that a “noise assessment will be required to be submitted if the proposed development is a noise sensitive development, or an activity with the potential to generate noise”.

2.4 GUIDANCE AND STANDARDS

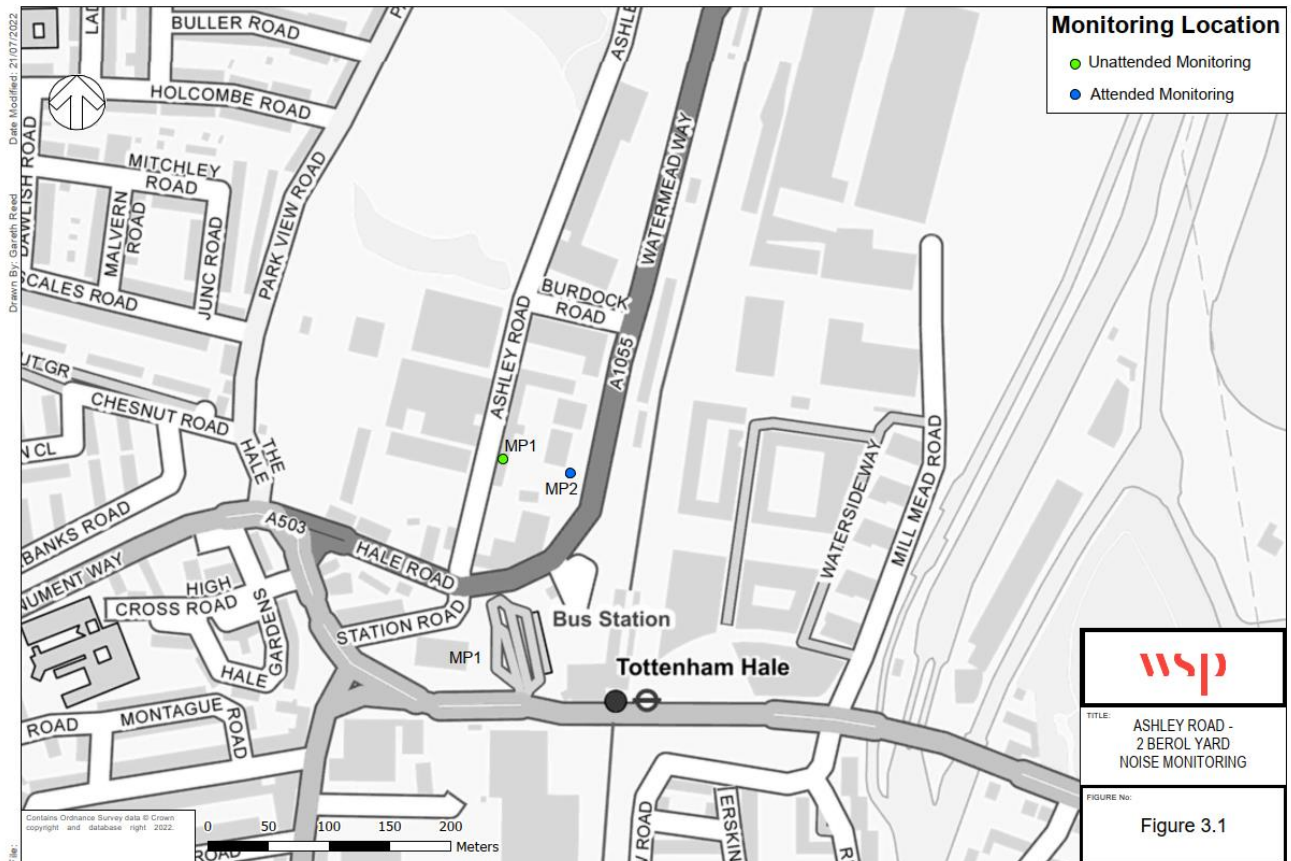
- 2.4.1. The following technical guidance documents are relevant to the assessment of noise generated by the proposed development on neighbouring residential properties as well as the assessment of the suitability of the site for the proposed residential uses. Further details are included in Appendix B.
- 2.4.2. For the determination of external fixed building services plant noise emission limits associated with the proposed development, the following guidance has been used:
- British Standard (BS) 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*
- 2.4.3. To assess the suitability of the site for residential use, the following guidance has been used:
- BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings*;
 - World Health Organization (WHO) (1999) *Guidelines for Community Noise*; and
 - Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health (2017) *Professional Practice Guidance on Planning & Noise* (ProPG: Planning & Noise) *New Residential Development*.

3 NOISE SURVEY

3.1 NOISE SURVEY METHODOLOGY

3.1.1. Noise measurements were undertaken at two positions on the site to establish the existing noise climate. A map showing the measurement positions can be found in Figure 3-1, with further details below.

Figure 3-1 – Noise measurement positions



■ Measurement Position 1

- This façade measurement position was located out of a third floor window of Berol House overlooking Ashley Road. The microphone was mounted on a pole approximately 1.5m from the façade and 15m above the ground.
- The key noise sources affecting this position include traffic on Ashley Road and some noise associated with the construction site to the south.
- Measurements were undertaken between Friday 15th July 2022 at 12:00 hours and Thursday 21st July 2022 at 10:00 hours.
- The data from this position have been analysed to derive the typical background sound level, in line with BS 4142, to set appropriate noise emission limits for any future external plant items associated with the proposed development – see Section 4.

■ Measurement Position 2

- This free-field measurement position was located approximately 3m from the carriageway edge of Watermead Way. The microphone was mounted on a tripod approximately 1m above the ground.
- The key noise sources affecting this position include traffic on Watermead Way and the occasional train travelling along the Greater Anglia railway line.
- Measurements were undertaken over a three-hour period between 12:00 hours and 15:00 hours on Thursday 30th June 2022 in line with the shortened measurement procedure in the Calculation of Road Traffic Noise¹. A short-term attended measurement was undertaken at this location as there was nowhere secure to leave the sound level meter unattended overnight.
- The data from this position have been used to inform the 3D noise model and subsequent assessment of the suitability of the site for residential use – see Section 5.

3.1.2. At each measurement position, the microphone was protected with a windshield throughout the measurement period. The sound level meters were calibrated before and after measurements with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being carried out, with the exception of the calibrator which had been calibrated not more than one year prior to the measurements being taken.

3.2 NOISE SURVEY RESULTS

Measurement Position 1

3.2.1. The adopted typical background sound levels from Measurement Position 1 have been determined by selecting the lowest most commonly occurring value, derived from 15-minute measurements taken over the full survey period. Figures 3-2 and 3-3 present a histogram of the range of measured $L_{A90,15\text{minute}}$ values over the daytime and night-time period respectively. The adopted typical background sound level is 51 dB $L_{A90,T}$ during the day and 47 dB $L_{A90,T}$ during the night.

¹ Department of Transport and Welsh Office (1988), *Calculation of Road Traffic Noise*

Figure 3-2 – Histogram of measured $L_{A90,15min}$ values during the day

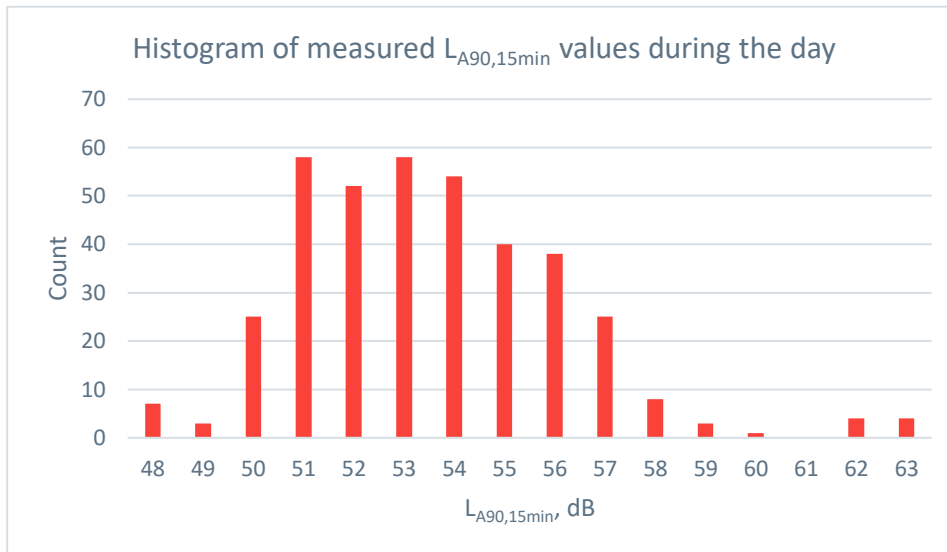
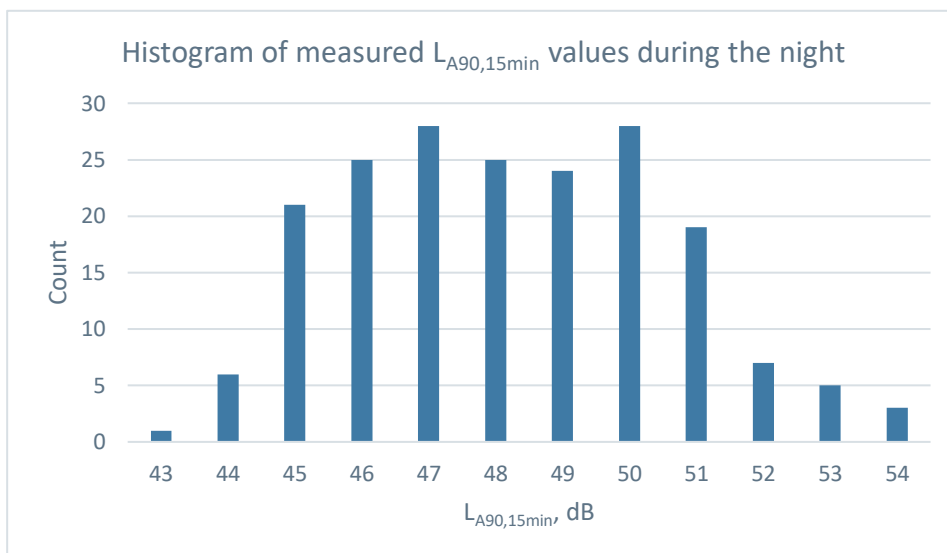


Figure 3-3 – Histogram of measured $L_{A90,15min}$ values during the night



Measurement Position 2

- 3.2.2. Noise levels were measured over a three-hour period at Measurement Position 2. In order to derive the daytime and night-time levels over a time period relevant to the internal noise criteria (16 hours during the day and 8 hours at night), the measured noise levels at Measurement Position 2 need to be corrected. The guidance within CRTN provides a methodology for estimating the 18-hour L_{A10} value by subtracting 1 dB from the 3-hour L_{A10} measured value.
- 3.2.3. From this $L_{A10,18h}$ value, the equations within the Transport Research Laboratory (TRL) *Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping* provide a methodology for estimating the daytime $L_{Aeq,16h}$ and night-time $L_{Aeq,8h}$ values for motorway and non-motorway roads. As the roads are particularly busy in this area, even during the night, and noise levels do not fluctuate as significantly over the 24-hour period as they would do in a more rural or suburban area, the motorway equations have cautiously been used as this more accurately reflects the actual traffic

patterns. Table 3-1 below presents the derived daytime and night-time noise levels following the above process.

- 3.2.4. The typical L_{AFmax} level has been derived by adopted the 10th highest $L_{AFmax,2min}$ value. It is considered that, given the busy and continuous nature of this road, this daytime level would also be applicable to the night-time period. This value is also presented in Table 3-1.

Table 3-1 – Derivation of free-field daytime and night-time noise levels at MP2

Process/Calculation	Noise level, dB
Measured $L_{A10,3h}$ value	78 dB
Calculated $L_{A10,18h}$ value	77 dB
Calculated $L_{Aeq,16h}$ value	75 dB
Calculated $L_{Aeq,8h}$ value	71 dB
Adopted typical L_{AFmax}	85 dB

4 FIXED PLANT NOISE ASSESSMENT

- 4.1.1. The proposed development is likely to include externally mounted fixed building services plant items. However, at this stage, final details of the type or location of plant have not yet been confirmed. Therefore, plant noise emission limits have been set in accordance with BS 4142:2014+A1:2019 and based on the results of the noise survey.
- 4.1.2. The typical background noise level has been derived by determining the lowest most commonly occurring $L_{A90,15min}$ value during the day and night-time periods at Measurement Position 1, as presented in Section 3.
- 4.1.3. Data from Measurement Position 1 are considered representative of the background noise climate experienced at the nearest sensitive receptors surrounding the site.
- 4.1.4. BS 4142 states that, “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 or a significant 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, depending on the context.”
- 4.1.5. Therefore, the free-field rating level of any proposed plant should equal the background noise level at 1m from the façade of the sensitive receptor. The rating level should include any corrections for acoustic character, for example tonality, impulsivity or intermittency.

Table 4-1 – Plant noise emission limits, dB

Receptors	Background noise level, $L_{A90,15min}$		Noise Emission limit - Rating level, $L_{Ar,Ti}$ *	
	Daytime	Night-time	Daytime	Night-time
Existing and future sensitive receptors nearby	51 dB	47 dB	51 dB	47 dB
* Applicable 1m from the façade of the nearest sensitive receptor, and subject to any corrections for acoustic character as per BS 4142:2014+A1:2019.				

- 4.1.6. Ultimately, it will be necessary to design, select, locate and/or attenuate collectively all building services plant on the site such that the noise emission limits, set above, are achieved and to avoid any significant impacts. The plant noise emission limits apply to all plant, and so individual plant items may need to be designed to achieve a lower level such that the overall noise emission limits are achieved.

5 SITE SUITABILITY ASSESSMENT

5.1 INTERNAL AND EXTERNAL NOISE CRITERIA

- 5.1.1. This section provides an assessment of the suitability of the site for residential use with respect to noise. The internal and external noise criteria, in line with the guidance set out in BS 8233, are outlined in Table 5-1².

Table 5-1 – Internal and external noise criteria for residential development

	Daytime	Night-time	
	$L_{Aeq,16h}$	$L_{Aeq,8h}$	Typical L_{AFmax}
Internal noise levels (in habitable rooms)	35 dB	30 dB	45 dB
External noise levels (in gardens)	55 dB	-	

5.2 EXTERNAL BUILDING FABRIC ASSESSMENT

- 5.2.1. This section presents specifications for the sound insulation of the building façade and recommendations for the ventilation requirements necessary to achieve the internal noise criteria as outlined in Table 5-1.

3D NOISE MODEL

- 5.2.2. A 3D noise model was created using the software CadnaA (Datakustik, 2021 MR2) to evaluate the predicted environmental noise levels across the proposed development.
- 5.2.3. Existing building and road information was sourced from open data (OS OpenMap - Local) made available by Ordnance Survey. Existing buildings were included at a height determined using aerial photography. Future buildings were included at a height determined using the current design for the proposed development itself and from drawings including within the planning applications for Tottenham Hale Centre and the development plots of Ashley Gardens, Ashley House and Ashley Park. Reflectivity was set to 3 orders of reflection and default ground absorption set to 0 (i.e. acoustically reflective).
- 5.2.4. Where assessment locations within the model are placed at buildings, they are positioned 0.05m from the façade and do not account for the noise sensitive receptor building reflection within the results. The noise model predictions are, therefore, free-field specific sound levels, consistent with the survey measured sound levels at MP2.

² The internal daytime and night-time $L_{Aeq,T}$ noise level criteria have been adopted in line with guidance set out in BS 8233. The typical L_{AFmax} criterion has been adopted based on the guidance in the WHO guidelines which sets a value of 45 dB L_{AFmax} and the ProPG suggests this value should not be exceeded more than 10 times a night. The external daytime criterion has been adopted in line with the guidance set out in BS 8233; the higher of the two criteria set out in this Standard has been adopted based on the urban nature of this development.

- 5.2.5. The noise model has been calibrated to the measured noise levels on site. The predicted noise levels fall within 1 dB of the daytime and night-time measured/derived noise levels at MP1 and MP2, and therefore are considered to accurately represent the existing noise levels across the site.

PREDICTED INCIDENT NOISE LEVELS

- 5.2.6. The daytime and night-time noise levels have been predicted at the façade of 2 Berol Yard using the 3D noise model. The noise contour maps for the day are shown in Figure 5-1 and 5-2, and Figure 5-3 and 5-4 for the night-time.

Figure 5-1 – Daytime noise contours – façades overlooking Watermead Way

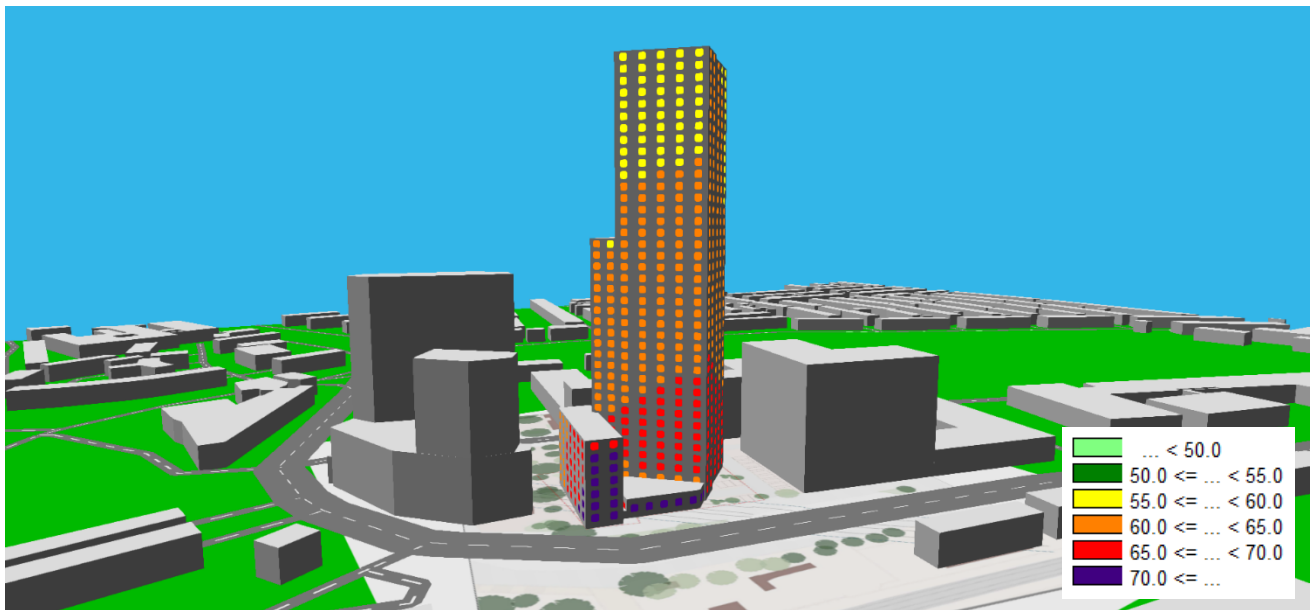


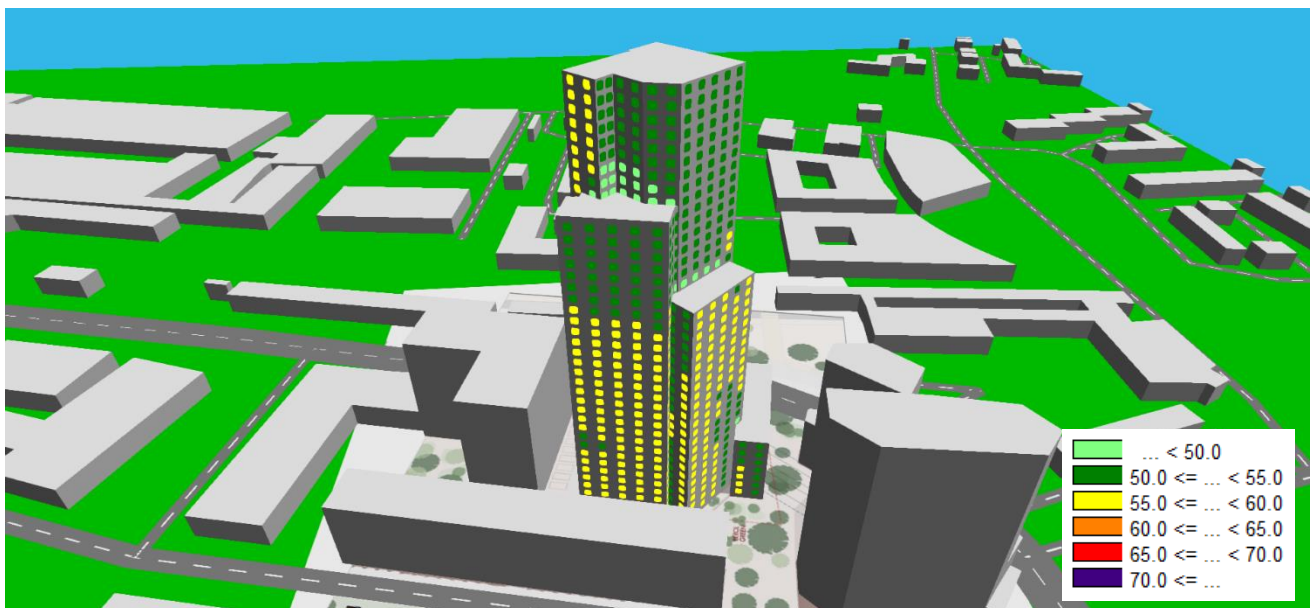
Figure 5-2 – Daytime Noise Contours – façades facing west



Figure 5-3 – Night-time noise contours – façades overlooking Watermead Way



Figure 5-4 – Night-time noise contours – façades facing west



- 5.2.7. In order to derive the sound insulation performance of the building façade, the highest predicted daytime and night-time noise level for the facades facing east (overlooking Watermead Way) and west (towards Ashley Road) have been adopted for the assessment (see Table 5-2 below).
- 5.2.8. The typical maximum noise level along the eastern boundary of the site closest to Watermead Way has been adopted from Measurement Position 2, and corrected for increased distance to the development build-line. A correction of -8 dB has been applied, as the measurement was undertaken at 3m from the carriageway edge and the build-line is approximately 12m from the carriageway edge. The maximum noise level is considered not to be a determining factor in the external building fabric assessment for the facades facing west, given they are shielded from Watermead Way by the building itself.

- 5.2.9. For clarity, the free-field external noise levels used to determine the sound insulation performance of the façades are outlined in Table 5-2.

Table 5-2 – Noise levels for external building fabric assessment, dB

Facade	Daytime	Night-time	
	$L_{Aeq,16h}$	$L_{Aeq,8h}$	Typical L_{AFmax}
East facing (overlooking Watermead Way)	73	69	77
West facing (towards Ashley Road)	62	59	N/A

EXTERNAL BUILDING FABRIC ASSESSMENT

Vent

- 5.2.10. The proposed ventilation strategy for 2 Berol Yard is mechanical ventilation with heat recovery (MVHR).

Glazing

- 5.2.11. The detailed calculation methodology within BS 8233 sets out a procedure for determining the sound insulation performance of the façade based on the external noise levels and the internal noise criteria. The calculations have been based on the following assumptions:
- The room sizes and area of glazing has been taken from the most recent general arrangement and elevation drawings;
 - The non-glazed elements of the façade achieve a sound insulation performance of 49 dB R_w+C_{tr} ;
 - MVHR is adopted within all apartments; and
 - The reverberation time in habitable rooms has been assumed to be 0.5 seconds.
- 5.2.12. Based on the above assumptions, the minimum sound insulation performance for the glazing, as well as an indicative glazed unit, is set out in Table 5-3 below.

Table 5-3 – Sound insulation performance of glazing, dB

Facade	Glazing
East facing (overlooking Watermead Way)	38 dB R_w+C_{tr} (e.g. 8.4mm laminated glass/ 16mm airspace / 10.4mm laminated glass)
West facing (towards Ashley Road)	29 dB R_w+C_{tr} (e.g. 6mm glass/ 12mm airspace / 8mm glass)

5.3 EXTERNAL AMENITY SPACE ASSESSMENT

- 5.3.1. External noise levels on the balconies are unlikely to achieve the adopted criterion in BS 8233. However, the standard recognises that in higher noise areas, such as city centres and urban areas, a compromise between elevated noise levels and other factors might be warranted. It goes on to state:

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise

limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space"

- 5.3.2. The noise levels on balconies are considered acceptable, given the advice in BS 8233 above and the location of the site, which is in an urban area. Furthermore, the design has incorporated balconies with a solid parapet to minimise the noise levels within these spaces as far as possible.

6 CONCLUSIONS

- 6.1.1. WSP has been commissioned by Berol Quarter Ltd to undertake a noise survey and assessment for the proposed mixed-use development at Berol Quarter, Ashley Road, Tottenham Hale.
- 6.1.2. A baseline noise survey has been undertaken to establish the existing noise levels on the site. The results of the noise survey have been used to determine the proposed plant noise emission limits for any future external buildings services plant and in the assessment of ambient noise affecting the proposed development once built and occupied.
- 6.1.3. The proposed plant noise emission limits for any external buildings services plant associated with the development are presented in Table 4-1, based on the results from the noise survey and the guidance in BS 4142.
- 6.1.4. Appropriate acoustic performance requirements for the glazed elements of the façade have been identified, to achieve the adopted internal noise criteria for the proposed residential dwellings. Background ventilation will be provided by mechanical ventilation with heat recovery. The minimum sound insulation performance requirements for the glazed elements of the façade are:
 - Eastern façade overlooking Watermead Way: 38 dB R_W+C_{tr}
 - West facing façade towards Ashley Road: 29 dB R_W+C_{tr}
- 6.1.5. Indicative glazing specifications and a ventilation strategy have been determined in order to achieve the required sound insulation performance and meet the target internal noise criteria. On this basis the site is considered suitable for residential development and will meet the objectives set out in LBH's Development Management Policies.

Appendix A

ACOUSTICS GLOSSARY



ACOUSTIC TERMINOLOGY

Table A1: Acoustic Glossary

Terminology	Description
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-Weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, 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.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.



Fast/Slow Time Weighting	Averaging times used in sound level meters.
Fast/Slow Time Weighting	Averaging times used in sound level meters.



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