Prologis UK Limited

EMI DAWLEY ROAD, HAYES

Noise Assessment

70096637
JULY 2022

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1 INTRODUCTION

1.1 INSTRUCTION

1.1.1. WSP has been instructed by Prologis UK Limited to undertake an assessment of the potential noise impacts that could result from the operation of a proposed commercial redevelopment of the former EMI music archives at Vinyl Place in Hayes, London.

1.2 DEVELOPMENT SITE

1.2.1. The development site is part of the existing Prologis Dawley Road Business Park in Hayes which is in the London Borough of Hillingdon (LBH). It is irregular in shape and of around 0.89 ha in area. It is set back from Dawley Road, which is to the west, by about 40 m. The development site is bounded by the Grand Union Canal immediately to the north, Vinyl Place to the west and by other commercial uses to the east and south.

1.2.2. Lake Farm Country Park is beyond the Grand Union Canal to the north with the Woolpack Pub/club to the northwest.

1.2.3. The closest residential receptors are 1 – 6 UK Cottages which are set back on Dawley Road, around 85 m to the south-west of the development site. These are well screened from the development site and surrounded by other commercial premises. The next most sensitive residential receptors are at Rostrevor Gardens which are around 330 m to the north-east.

1.2.4. The development site and its surrounds are shown in the aerial photograph at Figure 1-1.

1.3 PROPOSED DEVELOPMENT

1.3.1. It is proposed that the existing music archive use (which is to be relocated) will be replaced with a general logistics facility.

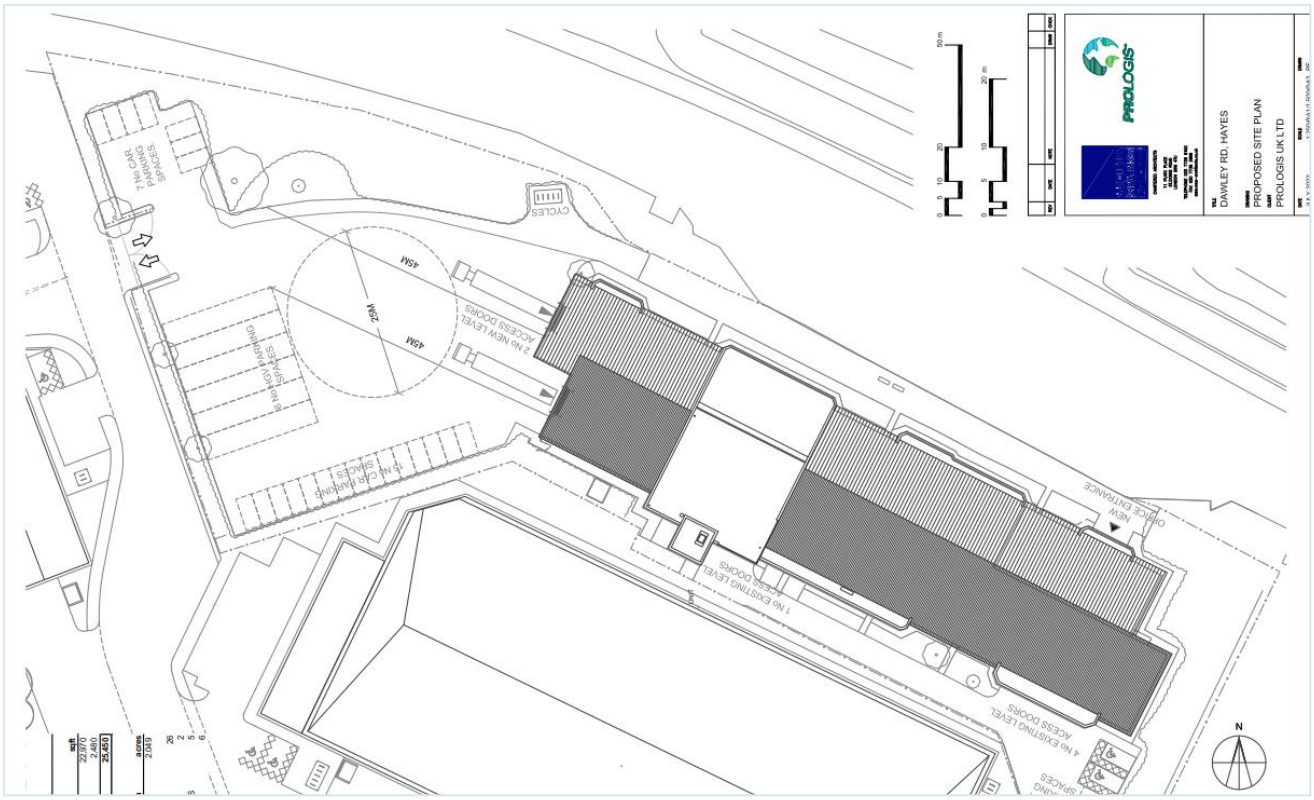
1.3.2. The proposed development comprises demolition of the small single storey building on the west of the site to make way for a service yard which will serve the larger building on the east of the site. Alterations will be made to the larger building which will include the creation of two loading bays on its western end.

1.3.3. The proposed development layout is shown in Figure 1-2.

1.3.4. This report is necessarily technical in nature. A glossary of commonly used acoustic terms is provided at **Appendix A** for the benefit of the reader.

Figure 1-1 - The Development Site and its Surrounds

Figure 1-2 - The Proposed Development Layout



2 POLICY, GUIDANCE AND STANDARDS

2.1 OVERVIEW

2.1.1. This section considers the national and local planning policies and national and international guidance and standards which have the most relevance to the assessment.

2.2 NATIONAL PLANNING POLICY

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

2.2.1. The original NPPF was published by central government in 2012 with the latest revision 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 life[65];*
>
> *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)'*

2.2.3. Paragraph 187 of the NPPF provides additional policy information applicable where new development is proposed close to existing commercial noise sources and is reproduced below.

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

THE NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

2.2.4. This provides more detail than the NPPF setting out the long-term vision of Government noise policy and applying 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.

2.2.5. The NPSE also stresses that noise should not be considered in isolation from other related factors. At paragraph 2.7 for example it 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.'*

2.2.6. The NPSE introduces and describes 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.

2.2.7. 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.

2.3 THE LONDON PLAN

2.3.1. The London Plan 2021 references noise in the following policies:

- *Policy D3 Optimising site capacity through the design-led approach – which states that '…proposals should…help prevent or mitigate the impacts of noise…';*
- *Policy D8 Public realm – which requires plans and proposals to include designs that reduce the impact of traffic noise;*
- *Policy D9 Tall buildings – which advises that 'noise created by air movements around the building(s), servicing machinery, or building uses should not detract from the comfort and enjoyment of open spaces around the building';*
- *Policy D13 Agent of Change – which requires Boroughs to ensure that the Agent of Change principle is taken into account in planning decisions; and*
- *Policy D14 Noise – which summarises national policy objectives for noise, the requirements of the specific policies set out above and adds that noise should be managed by 'promoting new technologies and improved practices to reduce noise…'.*

2.4 LOCAL POLICY

2.4.1. The current LBH development management policies are set out in the LBH Local Plan Part 2 – Development Management Policies, adopted January 2020.

2.4.2. Two potentially relevant policies have been identified, those being Policy DMT 2: *Highways Impacts* and Policy DMT 7: *Freight*.

2.4.3. DMT 2 requires development proposals to ensure that *'they do not contribute to the deterioration of air quality, noise or local amenity or safety of all road users and residents'*.

2.4.4. DMT 7 requires development proposals relating to logistics to demonstrate that *'there is no deleterious impact on residential areas, local air quality levels, local amenity or the highway network'*.

2.4.5. Neither of the local policies are very specific with respect to how deterioration or impacts should be assessed, so national and regional policies take precedence in that regard.

2.4.6. A copy of the email correspondence with LBH with regards to the noise assessment is presented at **Appendix B**.

2.5 GUIDANCE AND STANDARDS

PLANNING PRACTICE GUIDANCE (PPG)

2.5.1. The Government launched the PPG web-based resource in March 2014 and refreshed it in July 2019. The section on noise provides tabulated descriptions of example outcomes of the categories introduced in the NPSE based on the likely average response. It also adds a fourth category termed Unacceptable Adverse Effect (UAE). The tabulated descriptions are summarised in Table 2-1 below.

2.5.2. The PPG recognises that there is not a simple relationship between measured or predicted noise levels and the resultant impact and that this will depend on how various factors combine. The factors thought to be most relevant in this assessment are:

- The source and absolute level of the noise together with the time of day it occurs;
- For non-continuous sources of noise, the number of noise events and the frequency and pattern of occurrence of the noise;
- The spectral content and general character of the noise i.e. tonal or with other particular features;
- The local topology and topography; and
- The existing or, where appropriate, planned character of the area.

Table 2-1 – Outcome Descriptors for Noise Effect Levels

Perception	Examples of outcomes	Increasing effect levels	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. 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			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. 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 Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

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

2.5.3. This Standard provides an assessment method for noise arising from commercial noise sources, including external plant and on-site vehicle movements and unloading, at residential receptors. It is a relative assessment approach whereby the predicted commercial sound level (suitably penalised for potentially annoying characteristics if appropriate) is compared with the prevailing background noise level. A summary of the BS 4142 approach is set out below.

- Establish the specific sound level of the source(s);
- Measure the representative background sound level;
- Correct the specific sound level for on-time and any noise contributions from unrelated sources if necessary;
- Rate the specific sound level to account for distinguishing characteristics;
- Estimate the initial impact by subtracting the background sound level from the rating level; and
- Consider the initial impact estimation in the context of the noise and its environs.

2.5.4. Where the sound source is not yet present, the specific sound level is established by calculation. The representative background sound level is established by measurement at the receptor location.

2.5.5. The specific sound level can be upwardly adjusted, by adding feature corrections for one or more distinctive characteristics, to derive the sound rating level. The feature corrections are summarised below:

- Tonality up to 6 dB
- Impulsivity up to 9 dB
- Other sound characteristics up to 3 dB
- Intermittency 3 dB

2.5.6. An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level as described in section 11 of BS 4142. The results of this comparison are assessed on the basis of the following guidance:

- Typically, the greater the difference, the greater the magnitude of the 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 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.

2.5.7. All pertinent contextual considerations should be taken into account including the following:

- The absolute level of the sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

2.5.8. The reporting requirements for the Standard include details of how assessment uncertainties were considered and minimised (**Appendix C**), and the qualifications and experience of the assessor (**Appendix D**).

2.6 DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)

2.6.1. Noise from road traffic can be assessed using the DMRB[1]. This provides the recognised method for determining the likelihood of significant effects, based on the short term magnitude of change and contextual circumstances. In undertaking a DMRB assessment, the methodology contained within the Calculation of Road Traffic Noise[2] (CRTN) document should be used to calculate road traffic noise levels.

2.6.2. Although the DMRB methodology is typically applied to new road schemes, the principles of the approach contained within the document can also be applied to the assessment of noise from road traffic in general. As such, it can be used to assess the magnitude of impact that would result from increased road traffic noise levels at existing receptors resulting from development generated traffic.

2.6.3. The DMRB assessment suggests that the magnitude of noise changes from a project should be classified into levels of impact. LA111 (2020) gives detailed consideration as to how impact magnitude will be affected by whether a noise level change occurs in the short term (e.g. immediately on opening of a scheme), or whether the noise level change would occur in the long term (e.g. gradually over time, such as that associated with natural traffic growth).

2.6.4. The classification scale for short-term change, which would be most applicable for the assessment of noise from development generated traffic, is reproduced in Table 2-2 below.

Table 2-2 – Classification of Magnitude of Noise Changes in the Short Term

Noise Change, $L_{A10,18hr}$, dB	Magnitude of Impact
5.0+	Major
3.0 to 4.9	Moderate
1.0 to 2.9	Minor
0.1 to 0.9	Negligible

[1] Design Manual for Roads and Bridges (DMRB) Volume 11 (Environmental Assessment), Section 3 (Environmental Assessment Techniques), LA111 (Noise and Vibration).
[2] Calculation of Road Traffic Noise. Department of Transport Welsh Office. 1988. ISBN 0 11 550847 3.

3 NOISE ASSESSMENT APPROACH

3.1.1. As agreed with LBH, an exhaustive noise assessment is not necessary given the location of the site, within an established commercial area, and the lack of vulnerable noise sensitive receptors.

3.1.2. In view of the above, it is only necessary to undertake assessments of the main sources of noise to the extent that LBH can be confident that there will be no significant adverse noise impacts and that the development can be approved without noise conditions being necessary.

3.1.3. The two noise sources considered in this report are:

1) Noise from the service yard proposed to the west of the main building, which will include HGV arrivals and departures and some ancillary activity around the loading bays such as forklift truck (FLT) movements.

2) Noise from development generated road traffic on the highway network.

3.1.4. Noise from the service yard has been considered, primarily with reference to BS 4142, whilst the assessment of noise from development traffic on the highway network has relied on LA111.

3.1.5. It is usual practice to undertake a baseline survey at the closest or most exposed residential receptors to underpin the assessment of noise from the development site. On this occasion it was agreed that a baseline survey was not necessary to quantify the baseline, given the strong likelihood that the noise levels predicted at receptor locations would be negligible.

3.1.6. Notwithstanding the agreed position, that a baseline survey was not necessary, background sound level measurements were made at the closest noise sensitive receptors (UK Cottages, Dawley Road) over a period of around a week, although, as explained in the following section, the traffic restrictions in place on Dawley Road during that survey may have resulted in lower levels being captured than are normally the case.

3.1.7. Assessment outcomes are presented for two assessment locations (ALs).

- AL1 The front (east facing) gardens of UK Cottages; and
- AL2 The rear (south facing) gardens of Rostrevor Gardens.

4 NOISE SURVEY

4.1.1. The noise survey was undertaken between Tuesday 14 June 2022 and Wednesday 22 June 2022.

4.1.2. Measurements were made from the front boundary wall of no. 4 UK Cottages around 4 m back from the kerb of Dawley Road.

4.1.3. The measurements were made using a Class 1 integrating sound level meter with the microphone mounted just above the top of the boundary wall, at a height of around 2.2m relative to the pavement.

4.1.4. It was noted that there were some road works taking place at the roundabout on Dawley Road and it was thought that these would result in lower than typical background sound levels due to the reduced traffic speed through the signalised section of road adjacent to the sound level meter.

4.1.5. The monitoring location is shown as a red star in Figure 4-1 below.

Figure 4-1 - Monitoring Location

4.1.6. A time history of the noise monitoring data is shown graphically in Figure 4-2. The cumulative distribution of background sound levels logged during the survey are presented in Figures 4-3a (daytime) and 4-3b (night-time). The summarised data are presented in Table 4-1.

Figure 4-2 - Noise Monitoring Time History, dB

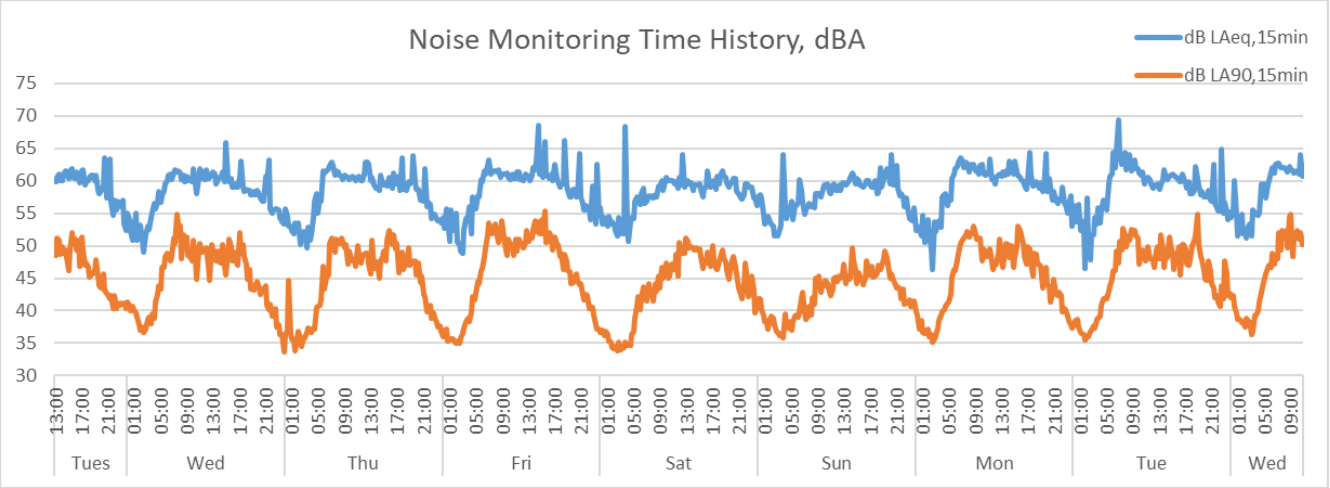
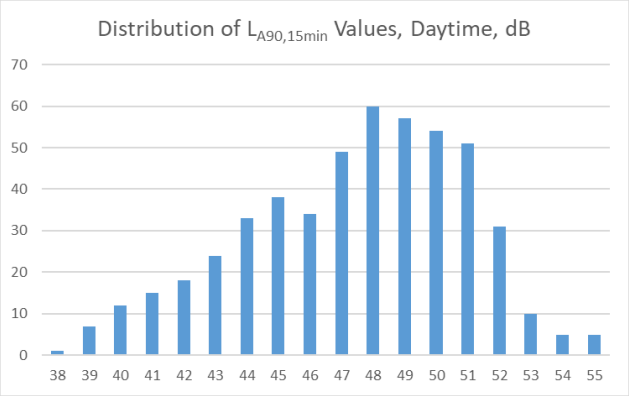


Figure 4-3 - Cumulative Distribution of Background Sound Levels, dB

(a) Daytime



(b) Night-time

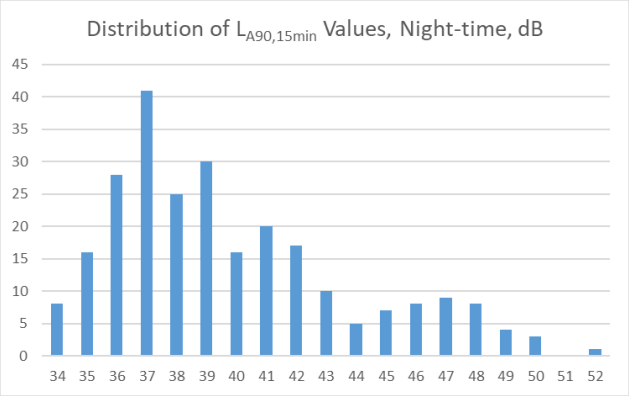


Table 4-1 – Summary Noise Monitoring Data

	Ambient dB $L_{Aeq,T}$	Background dB $L_{A90,T}$ Mean	Background dB $L_{A90,T}$ Mode	Background dB $L_{A90,T}$ Adopted
Daytime (07:00-23:00)	60	47	48	47
Night-time (23:00-07:00)	57	40	37	37

4.1.7. The lowest of the mean and mode background sound level values for the respective periods have been adopted for the assessment. This underpins a precautionary assessment approach.

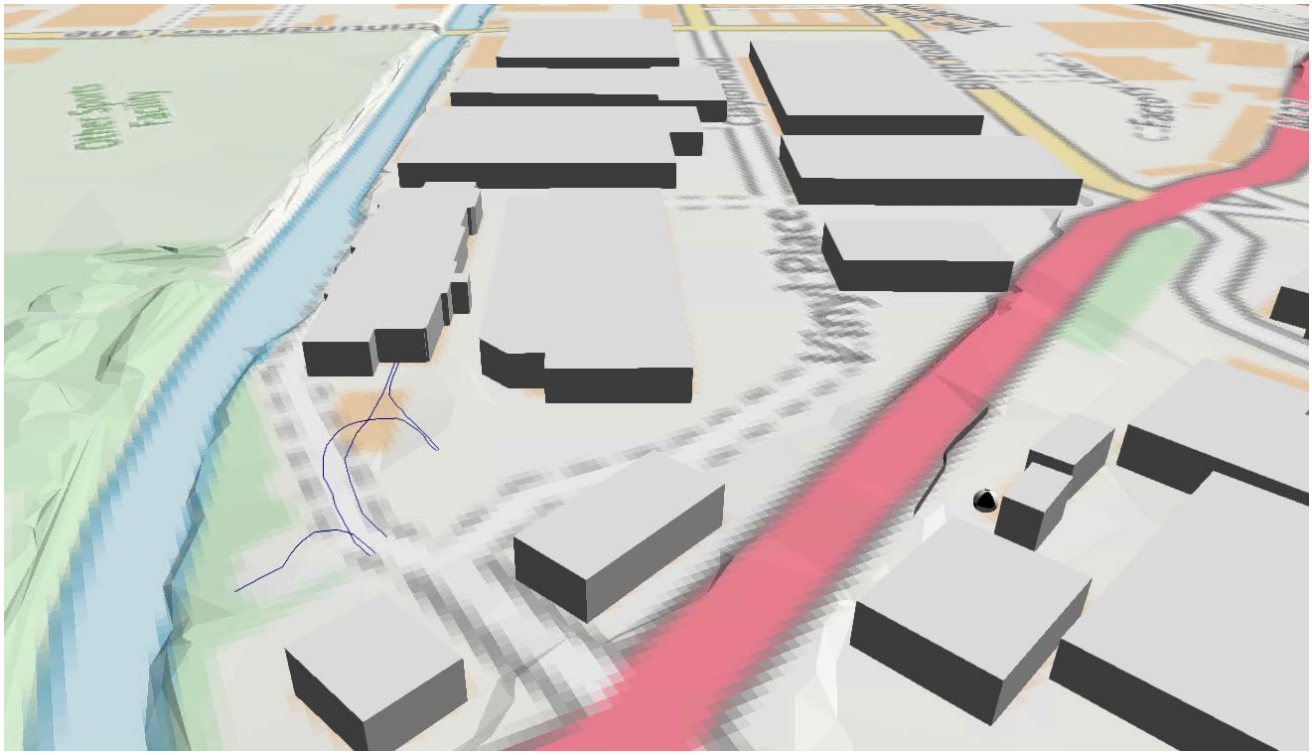
5 NOISE PREDICTIONS

5.1 OVERVIEW

5.1.1. A three-dimensional noise model of the development site has been constructed in the CadnaA® noise model. The topographic data were sourced from the .GOV.UK website and originate from the Environment Agency. The assumed ground conditions for the discrete areas of the model were based on the aerial photography and site reconnaissance.

5.1.2. A three-dimensional screenshot of the model, incorporating the proposed development, is presented at Figure 5-1.

Figure 5-1 – Three-dimensional View of the Noise Model from the West



5.2 COMMERICAL NOISE SOURCE MODELLING

5.2.1. The noisy activities associated with the proposed development have been modelled so that the resulting noise levels can be predicted at the existing residential receptors (the assessment locations) to the south-west and north-east.

5.2.2. No fixed plant are proposed as part of the 'base build specification' to which the planning application relates. However, the background sound levels derived from the noise survey do provide a basis for the derivation of design related noise criteria for any fixed plant, and for noise conditions should any be considered necessary (although WSP considers that none would be required).

5.2.3. In the absence of fixed plant, the primary noise sources comprise commercial vehicle deliveries, staff and visitor arrivals and departures and service yard activities.

5.2.4. Loading and unloading activities will be focused in the service yard around the two roller doors on the west elevation. The majority of unloading activity is expected to take place immediately adjacent to the roller doors, with the majority of fork lift truck (FLT) activity taking place within the building. For the purposes of the assessment, however, it has been assumed that FLT activity does also occur within the service yard on a precautionary basis.

5.2.5. Vehicle arrival, manoeuvring and departures have been modelled as line sources, which have been aligned with the expected vehicle pathways from the site access to the service yard (for HGVs) or the car park (for cars). Worst-case conditions have been adopted based on the peak hour HGV flows predicted during the daytime periods. On a precautionary basis, this daytime peak flow has also been used to predict noise levels during the night time period. FLT activity has been modelled as a point source within the service yard area.

5.2.6. It has been assumed that all HGVs arriving and departing from the development site have tonal reversing alarms. These are precautionary assumptions, which may not occur in reality, and ensure a robust assessment of potential noise impact.

5.2.7. The vehicle movements adopted in the assessment are those predicted for the AM peak hour based on a B2 land use, which represents the worst-case from the transport assessment. These movements are presented in Table 5-1.

Table 5-1 – Worst-case Hourly On-site Vehicle Movements

Period	Cars/light vans	HGV
Daytime	16	4

5.2.8. The sound power levels adopted for the individual sources associated with on-site vehicle movements are presented in Table 5-2. These sound power levels have been adjusted in the model to take into account the on-time (the proportion of the assessment period for which they are active). These on-times are based on HGVs manoeuvring on-site at 6 kph and cars at 20 kph.

Table 5-2 – Adopted Sound Power Levels

Source	Sound power level dB(A)
HGV slow speed manoeuvring	94
HGV reversing alarm	107
Air brakes	97
Door slam	95
Car slow speed manoeuvring	84
FLT (combined operations)	93

5.2.9. The $L_{Aeq,1h}$ noise levels were plotted at a grid height of 1.5 m above ground level at the two assessment locations with the predictions adopted as the specific levels for the BS 4142 assessment. The noise model plot showing the noise levels predicted from the proposed development during the worst-case one hour period during the day is presented at Figure 5-2.

5.2.10. The specific levels adopted in this assessment are 27 dB $L_{Aeq,1h}$ at AL1 and 8 dB $L_{Aeq,1h}$ at AL2.

Figure 5-2 - Noise Model Output Plot, dB $L_{Aeq,T}$

5.2.11. In terms of the potential change in noise levels from development generated road traffic, the development generated flows would add just 0.5% to the total existing traffic flows on Dawley Road (2% based on HGV flows only) which would result in an increase of around 0.1 dB.

6 NOISE ASSESSMENT

6.1 BS 4142 INITIAL IMPACT ESTIMATION

6.1.1. The assessment of noise from the development site itself can be considered in accordance with the approach set out in BS 4142. In accordance with that Standard, assessment uncertainties have been considered from the outset and have been minimised as far as reasonably practicable. A summary of the uncertainty considerations is provided at **Appendix C**.

6.1.2. The specific sound levels, predicted at the assessment locations, are 27 dB $L_{Aeq,1h}$ at AL1 and 8 dB $L_{Aeq,1h}$ at AL2.

6.1.3. The potential addition of feature corrections needs be considered in the context of how distinguishable those features might be at the assessment location. In this case, the specific levels are so low that features, such as reversing alarms, would not be expected to be distinctive at the assessment locations so no feature corrections would be justified.

6.1.4. As shown in Table 4-1 above, the background sound levels adopted in this assessment are 47 dB L_{A90} during the day and 37 dB L_{A90} during the night. It is recognised that these levels are based on measurements from AL1 and that the corresponding levels may be lower at AL2 but this is not material to the assessment because of the extremely low specific sound level predicted at AL2. The initial impact estimations, based on BS 4142, are presented in Table 6-1 below.

Table 6-1 – BS 4142 Initial Impact Estimation

	Period	A - Background sound level, dB	B - Specific sound level, dB	C - Feature correction, dB	D - Rating sound level, dB	D - A	Initial impact estimation
AL1	Day	47	27	0	27	-20	Low
	Night	37	27	0	27	-10	Low
AL2	Day	47	8	0	8	-39	Low
	Night	37	8	0	8	-29	Low

6.2 BS 4142 CONTEXTUAL MODIFICATIONS

6.2.1. The initial impact estimations set out in Table 6-1 may be modified based on all pertinent contextual factors. The following contextual factors are considered most relevant in this case.

1 The absolute level of sound.

2 The character and level of the residual sound compared to the character and level of the specific sound.

3 The sensitivity of the receptor.

6.2.2. The absolute level of the specific sound is low. The character of the residual sound is similar to, if not the same as, the specific sound as it comprises road traffic and commercial operations including

service yard activities. Both of these factors indicate that a downward modification of the initial impact estimation would be justified.

6.2.3. In terms of the sensitivity of the receptors; given their location in an industrial area and the reasonable expectation of residents, the dwellings at AL1 are considered less sensitive than typically would be the case for residential receptors. Conversely, the dwellings at AL2 are considered more sensitive than typical, given their exposed gardens current overlook a Country Park, such that residents will be accustomed to relative tranquillity.

6.3 BS 4142 ASSESSMENT RESULT

6.3.1. Taking into account the initial impact estimations set out in Table 6-1 and the contextual modifications, the assessment indicates that the development would result in a low (or no) adverse impact at noise sensitive locations.

7 CONCLUSIONS

7.1.1. The development proposals entail relatively minor changes to an existing commercial building in an established industrial/commercial area.

7.1.2. Noise from the increased service yard activities will not result in any adverse impact at noise sensitive receptors. Increases in road traffic flows are so small that the corresponding increase in road traffic noise would be imperceptible and insignificant.

7.1.3. There will be no adverse noise impact from the development proposal and noise does not need to be considered in the determination of the application.

Appendix A

ACOUSTIC GLOSSARY

ACOUSTIC GLOSSARY

- Acoustic environment: Sound from all sound sources as modified by the environment. Can be actual or simulated, outdoor or indoor, as experienced or in memory. Modifications by the environment includes: effects on sound propagation, resulting, for example, from meteorological conditions; absorption; diffraction; reverberation; and reflection.
- Airborne sound: Sound that reaches the point of interest by propagation through air.
- Ambient sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
- 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.
- Background sound: Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location.
- Broadband sound/ noise: Sound whose energy is distributed over a wide section of the audible range.
- Calibration: The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short term measurements, and periodically for longer term monitoring.
- Class 1: The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard IEC 60651 referred to the grade as "Type", whereas the new standard IEC 61672 refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however WSP use Class 1 (or Type 1) meters by default, as required by BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'*, for example.
- Context: The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood. When considering context, pertinent factors include: the absolute level of sound; the character and level of the residual sound compared to the character and level of the specific sound; evidence on human response to the sound; and the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.
- Decibel (dB): A scale for comparing the ratios of two quantities, including sound pressure and sound power. 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 Pa.
- Dwelling: A building used for living purposes. A mobile home used for permanent living should be included in an assessment. If calculations are being conducted for compensation purposes, then some mobile homes are dealt with under the Highways Noise Payments and Moveable Homes Regulations.

- Façade/ façade level: At a distance of 1 m in front of a large sound reflecting object such as a building façade. According to BS 8233:2014, "*Façade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the façade*." The Calculation of Road Traffic Noise (1988) uses 2.5 dB, whilst BS 5228-1:2009+A1:2014 recommends 3 dB. Owing to the latter examples, together with other historical documents, it is more usual to apply 3 dB.
- Fast time-weighting (F): Averaging time used in sound level meters. Defined in BS EN 61676-2:2013+A1:2017 Electroacoustics. Sound level meters. Pattern evaluation tests.
- Free-field/ free-field Level: Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
- Heavy goods vehicle (HGV): See Heavy vehicles.
- Heavy vehicles: According to the Calculation of Road Traffic Noise (1988), 'heavy vehicles' are vehicles with unladen weight greater than 1.525 tonnes. Those vehicles with an unladen weight between 1.525 and 3.5 tonnes should be treated as light vehicles. Note: heavy duty vehicle (HDV) and heavy goods vehicle (HGV) are typically used interchangeably, as if describing all heavy vehicles matching the adopted weight threshold.
- Hertz (Hz): The unit of Frequency or Pitch of a sound. One hertz equals one cycle per second. 1 kHz = 1000 Hz, 2 kHz = 2000 Hz, etc.
- $L_{AF90,T}$: The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time fast time-weighting (F). Generally used to describe the 'background' sound conditions.
- L_{AFmax}: The maximum A-weighted sound pressure level during a given time period. L_{max} is sometimes used for the assessment of occasional loud sounds, which may have little effect on the overall L_{eq} noise level, but could still affect the sound environment. Unless described otherwise, it is measured using the fast time-weighting (F).
- $L_{eq,T}$: A sound level index called the equivalent continuous sound 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. Where the value is A-weighted, will be presented '$L_{Aeq,T}$' or 'dBA $L_{eq,T}$', otherwise it should be an un-weighted (or linear) value.
- Line source: A sound source composed of many point sources in a defined line, such as a train, flow of traffic on a motorway, or constant aircraft take-offs and landings. Sound levels measured from line sources decrease at a rate of 3 dB per doubling of distance.
- L_p: See Sound pressure level.
- L_W: See Sound power level.
- Noise-sensitive receptor (NSR): A term representing any premises used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in sound level.
- Octave/ octave band: Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit. For example, the 1000 Hz (1 kHz) octave band contains noise energy at all frequencies from 707 to 1414 Hz.

- Percentile level: The sound pressure level exceeded for N% of a specified time interval, see $L_{AF90,T}$ etc.
- Point source: A sound source whose dimensions are small compared to the propagation distances involved. Due to the Inverse Square Law, the sound level pressure level decreases by 6 dB every time the distance between the measurement point and the source is doubled.
- Rating level, $L_{Ar,Tr}$: The equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$, see also Specific sound level) of the sound, plus any adjustment for the characteristic features of the sound.
- Reference time interval, Tr: Specified interval over which the specific sound level is determined. This is 1 hour during the day from 07:00 to 23:00 hours and 15 minutes at night from 23:00 to 07:00 hours.
- Residual sound: ambient sound remaining at the assessment location when the specific sound source is suppressed (or absent) to such a degree that it does not contribute to the ambient sound.
- Residual sound level, $L_r = L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
- Sound level metrics, indices or parameters: Sound levels usually fluctuate over time, so it is often necessary to consider an average or statistical sound level. This can be done in several ways, so a number of different metrics have been defined, according to how the averaging or statistics are carried out.
- Sound power level, L_W: Sound power measured on a decibel scale, relative to a reference value of 10^{-12} W.
- Sound power: The sound energy radiated per unit time by a sound source. Measured in Watts (W).
- Sound pressure level (sound level), L_p: The sound level is the sound pressure relative to a standard reference pressure of 20 Pa ($20x10^{-6}$ Pascals) on a decibel scale.
- Sound pressure: Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
- Specific sound level, $L_S = L_{Aeq,Tr}$: Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
- Specific sound source: Sound source being assessed.
- Type 1: See Class 1 above.

Appendix B

EMAIL EXCHANGE WITH ENVIRONMENTAL HEALTH OFFICER

From: Phillip Brewer <PBrewer@hillingdon.gov.uk>
Sent: 17 June 2022 16:41
To: Lewis, Toby <Toby.Lewis@wsp.com>
Cc: Val Beale <VBeale@hillingdon.gov.uk>
Subject: RE: Dawley Road Site noise assessment

Hi Toby,

I have had a look at the location of the site in relation to residential receptors, the closest seem to be those c 150m away and screened to the south. I agree that a baseline survey would probably confirm that local and more distant road traffic characterises the existing noise environment and that day and night values could be estimated sufficiently reliably for the purposes of assessing the impact.

I must admit I have not seen the attachments but based on your description I am happy with your approach. The Council generally will focus its resources on residential and community facilities allowing the developer/contractor to deal with any commercial receptors that may be affected, particularly during demo/construction.

I trust this assists, but please contact me if necessary

Regards

Phil

07828 537871

Philip Brewer PhD MIOA

Noise Specialist

London Borough of Hillingdon

I have flexible working arrangements and my usual non-working day is Tuesday. If you do not hear from me within a timescale specified by the Council please feel free to enquire via text

From: Val Beale <VBeale@hillingdon.gov.uk>
Sent: 08 June 2022 12:26
To: Lewis, Toby <Toby.Lewis@wsp.com>; Phillip Brewer <PBrewer@hillingdon.gov.uk>
Subject: Re: Dawley Road Site noise assessment

Hi Toby

I have copied in my colleague Phil Brewer who should be able to help you with the noise queries,

kind regards

Val

From: Lewis, Toby <Toby.Lewis@wsp.com>
Sent: Wednesday, June 8, 2022 12:00 PM
To: Val Beale <VBeale@hillingdon.gov.uk>
Subject: Dawley Road Site noise assessment

> You don't often get email from toby.lewis@wsp.com. Learn why this is important

I hope you're well?

My colleague Fiona has recently enquired about the AQ assessment for the above site with you. Do you also deal with noise? Or is that a colleague?

I'm hoping to agree the noise assessment approach and, given the absence of any close by receptors, was intending a very light touch.

The proposal will involve the demolition on one small commercial building and relatively minor alterations to another to improve loading facilities on the west elevation. You can see the existing and proposed layouts on the attached and the existing site on googlemaps at UB3 1HH.

The predicted changes to development traffic are negligible compared to the existing situation, so I thought we'd demonstrate the change to road traffic noise from the development (which will be negligible) and predict site generated noise levels at receptors (which will also be negligible). I don't see a need for a background/residual noise survey. As you can see on google, the receptors at Dawley Road are exposed to noise from the road and from existing sources but will be screened from the development site. The receptors over the canal to the north are circa 400m away. So I don't see any benefit in quantifying the baseline.

Could I ask you to agree to our proposed approach and to confirm that no baseline survey would be necessary please?

Many thanks and regards
Toby

Toby Lewis ***MSc LLM CEnvH CSci FIOA MCIEH MIEnvSci MIAQM***
Technical Director, Acoustics
I have limited availability on Fridays

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Appendix C

BS 4142 UNCERTAINTY ASSESSMENT

WSP UNCERTAINTY ASSESSMENT MATRIX

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Measurement		
Only use in calibration Type/Class 1 equipment and check (and record) calibration level before and after measurements	✓	Yes
Take measurements using the time and frequency weighting specified by the relevant standard	✓	Yes
Make detailed notes, including details of the equipment, weather, survey positions (including approximate distances), contributing noise sources, presence of screening etc.	✓	Yes
Take photographs, and record survey locations	✓	Yes
Avoid standing waves/interference – listen for effects, take spatial average from several locations or conduct a sweep	✓	No tonal sources – just background noise
Take measurements at different distances to establish propagation	×	No
Take measurements at different heights where relevant	×	Only one height – but selected to obtain a clear line of sight to the dominant sources of background noise
Don't just measure at the "noisiest" parts of site, but establish how "quiet" it is, too, where relevant to the assessment	×	No
Measure under different operating conditions relevant to your assessment / adopt worst case if known	✓	Yes – multiple day/night cycles
Measure more than one cycle/ event (ideally at least three)	✓	Yes – multiple day/night cycles
Determine state of repair of any associated source, where relevant	×	NA
Use a windshield and avoid windy conditions (i.e. gusts regularly exceeding 5 m/s)	✓	Yes
Avoid wet conditions (particularly in terms of rain on the windshield/microphone and on neighbouring surfaces)	✓	Yes
Avoid electrical and electromagnetic interference (such as from power cables and radio transmitters)	✓	Yes
Avoid extreme temperatures – traffic conditions can be different in freezing conditions, whilst meters can overheat and fail in a case when in direct sunlight during the summer.	✓	Yes
Make measurements during different weather conditions (particularly relevant in terms of wind direction for sites affected by aircraft movements, but also for sites affected by other distant, but significant, sources of noise, in different directions	✓	Yes, some variety in wind speed and directions
Where only one source is dominant (such as a main road), as a minimum, measure during conditions favourable to propagation (i.e. when wind direction is within +/-45^{o} of the line between the source and receiver or during temperature inversion, such as on clear calm nights)	✓	Yes, south westerlies dominant during survey

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Avoid tree/leaf (movement) sound where possible – ideally take measurements at comparable distance to receptor locations	✓	Some foliage in proximity but very low wind speeds
Avoid dawn chorus sound where possible – ideally take measurements the same distance from trees and bushes as any receptors of interest	✓	Minimal birdsong noted, insignificant compared to road traffic noise
Measure outside the receptor in question where possible; however, it is worst case typically to measure under free-field conditions and apply +3 dB correction to convert to "façade" where applicable – for most planning (new residential development) assessments, free-field is preferable	✓	Yes, free-field
Where it is not possible to install a meter outside the receptor in question, install a meter elsewhere and undertake additional attended measurements, either outside the receptor or at a representative location (when not adequately covered by the installed meter)	✓	NA
Avoid atypical traffic conditions (such as during school holidays and road works – road traffic incidents can significantly affect flows, but such events can't be predicted, and their occurrence can't always be established after the survey – check the data for anomalies)	×	Road works were evident, and conditions may have been atypical but adjudged to result in lower background levels which contribute to a precautionary assessment
Avoid presence of you and/or the microphone resulting in atypical conditions.	✓	Yes
Data handling		
Download data immediately after survey and process promptly whilst details are fresh in your head	✓	Yes
Use digital transfer methods and double check data read-off manually	✓	Yes
Look at the time-history (in as fine a resolution as possible) for any unexpected events – preferably with active spectral data (i.e. in dBTRAIT)	✓	Yes
If removing any data (due to an atypical event, for example), 'save as' a new file and provide a note to the data.	✓	No data removed
Prediction		
Use measurement data at different distances to verify propagation	×	No, background levels only
Different height measurements to verify screening effects, if relevant	×	No
Use propagation calculation procedure relevant to source and distance	✓	Yes
Use detailed traffic flow data applicable to the methodology	✓	Yes, predictions based on on-site traffic flows

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Use detailed sound source data (including octave-band levels), accounting for size, height and directivity, where known	×	'A' weighted only available and proportionate to scale of assessment
Use detailed topographical data and base mapping	×	Yes
Identify different ground types	✓	Yes, variable ground types based on aerial photography
Apply an order of reflections of at least one	✓	One order applied
Use 3D view feature to check model accuracy of the model	✓	Yes
Produce contour plots as a further means of identifying any abnormalities or errors in the model	✓	Yes

Appendix D

THE ASSESSOR'S QUALIFICATIONS AND EXPERIENCE

THE ASSESSOR'S QUALIFICATIONS AND EXPERIENCE

This report and all associated work have been compiled and conducted by Toby Lewis, Technical Director Acoustics, who has the following qualifications and experience:

- 23 years in local government employ specialising in acoustics and air quality
- 12 years in part-time and full-time acoustic consultancy
- Chartered Environmental Health Practitioner
- Chartered Scientist
- Fellow of the Institute of Acoustics
- Member of the Chartered Institute of Environmental Health
- Member of the Institution of Environmental Sciences
- Member of the Institute of Air Quality Management
- Member of the ANC Good Practice Working Group for BS 4142:2014+A1:2019
- MSc Applied Acoustics
- MSc Environmental Health
- LLM Environmental Law
- MSc Pollution Control
- PgD Acoustics and Noise Control
- HNC Environmental Monitoring and Analysis

Appendix E

LIMITATIONS

LIMITATIONS

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of WSP UK Limited. WSP UK Limited accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned.

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The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations WSP UK Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly

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