



Imperial Retail Park, Gravesend

Noise assessment for proposed change of the ground floor to food store in addition to existing non-food retail use and installation of plant

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1.0 Introduction

- 1.1 Sharps Acoustics LLP (SAL) has been instructed by Box+III Gravesend Limited to carry out a noise assessment for proposals at Unit C, Imperial Retail Park, Thames Way, Gravesend DA11 0DQ for the following development:

Change of the ground floor to food store in addition to existing non-food retail use and installation of plant

- 1.2 An aerial view showing the site location and nearby noise sensitive receptors is provided in Figure A1 in Appendix A.
- 1.3 A planning application for this proposal has been submitted to Gravesham Council (reference number 20231078) and the Council's EHO has requested that noise from plant machinery and additional deliveries as a result of the food use be assessed. This report sets out details of a noise assessment carried out in response to that request.
- 1.4 This report provides details of relevant policy and guidance of this assessment; details of noise survey work carried out and details of the assessment; recommended noise mitigation measures and conclusions.

2.0 Assessment Methodology and Criteria

National Planning Policy Framework (NPPF) (2019)

- 2.1 Government planning policy in relation to noise is contained in the National Planning Policy Framework (NPPF). The relevant paragraph from this (paragraph 185) states:

"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;

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 ..."

- 2.2 The requirement to avoid significant impacts and to mitigate and reduce to a minimum other adverse effects was originally recommended in the Noise Policy Statement for England (NPSE).

Noise Policy Statement for England (NPSE)

2.3 The 2010 DEFRA publication '*Noise Policy Statement for England*' (NPSE) sets out policy advice applicable to the assessment and management of noise, including environmental noise. The NPSE states three policy aims, which are:

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

2.4 All three of these aims are to be considered in the context of Government policy on sustainable development.

2.5 The first two aims require that no significant adverse impact should occur and, where noise falls between the lowest observable adverse effect level (LOAEL) and the significant observed adverse effect level (SOAEL), then according to the NPSE:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

2.6 The NPSE notes that, "It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times".

2.7 The NPSE describes the Government's "guiding principles of sustainable development", listing the following as underpinning their sustainable development strategy:

- ensuring a strong, healthy and just society;
- using sound science responsibly;
- living within environmental limits;
- achieving a sustainable economy; and
- promoting good governance.

2.8 Thus, noise should not be considered in isolation; the economic and social benefit of a proposed development should be considered alongside the potential adverse effects from noise.

Planning Practice Guidance on Noise (PPG: Noise)

2.9 The Government first published their Planning Practice Guidance on noise (PPG) in March 2014, with the most recent version issued in July 2019. The PPG provides guidance on the interpretation and implementation of planning policy, as contained in the NPPF and the NPSE.

- 2.10 The use of the lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL) for the assessment of noise impacts is reinforced in the PPG, which seeks to define human perception at these effect levels.
- 2.11 The PPG describes the LOAEL as the level at which *"noise can be heard and causes small changes in behaviour, attitude or other physiological response"* and it is *"present and intrusive"*. Below this level, the PPG describes the NOAEL, or No Observed Adverse Effect Level, which it notes *"can be heard but does not cause any change in behaviour, attitude or other physiological response"* as the noise is *"present but not intrusive"*. The NOAEL is not included in the NPSE and is introduced in the PPG. Below the NOAEL, the PPG describes the NOEL, or No Observed Effect Level, where noise is *"not present"* and has *"no effect"*.
- 2.12 The PPG describes the LOAEL as the:
- "... boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)."*
- 2.13 Significant observable adverse effects, i.e. those occurring at or above the SOAEL, are described as *"present and disruptive"* and the PPG states that above the SOAEL:
- "... the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused."*

Derivation of suitable assessment methodology and criteria

- 2.14 It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:
- i. The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:2014 and a number of published documents such as the World Health Organisation's (WHO) *"Guidelines for Community Noise"* contain such guidelines.
 - ii. Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it is capable of

predicting impact to all properties adjacent to a road link irrespective of their distance from the road.

- iii. Another method is described within British Standard BS 4142, the current version of which is BS 4142: 2014+A1: 2019, 'Methods for rating and assessing industrial and commercial sound', to determine the significance of sound impact from sources of industrial and/or commercial nature. The sources that the standard is intended to assess are sounds from industrial and manufacturing processes, sound from fixed plant installations, sound from loading and unloading of goods at industrial and/or commercial premises and the sound from mobile plant and vehicles, such as forklift, train or ship movements.

- 2.15 In order to assess noise from the proposed redevelopment of the site, the approach set out in BS4142 is most appropriate, as the noise sources present would be similar to those listed within the scope of that standard. Paragraphs 2.16 to 2.22 below explain the key features of this standard in more detail.

British Standard BS 4142: 2014 + A1:2019

- 2.16 British Standard (BS) 4142: 2014+A1: 2019 '*Methods for rating and assessing industrial and commercial sound*' (BS 4142) describes a method for rating and assessing sound of an industrial or commercial nature, which includes, in Section 1.1 of the standard:

"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 premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site."

- 2.17 The industrial or commercial sound is assessed outside an existing or proposed dwelling or premises used for residential purposes. BS 4142 does not consider internal spaces in terms of its numerical assessment.
- 2.18 The procedure contained in BS 4142 begins by quantifying the "specific sound level", which is the measured or predicted level of sound from the source in question over a one-hour period for the daytime or a 15-minute period for the night-time. Daytime and night-time are not defined in BS 4142, but the standard notes that they are typically taken to be 0700 to 2300 hours for daytime, and 2300 to 0700 hours for night-time.
- 2.19 BS 4142 sets out a number of methods of determining the specific sound level including, for situations where the specific sound source does not yet exist, the ability to estimate it, stating, at Section 7.3.6:

"Determine the specific sound level by calculation alone if measurement is not practicable, for example if the source is not yet in operation. In such cases, report the method of calculation in detail and give the reason for using it."

2.20 The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for potentially tonal, impulsive or intermittent elements. The standard sets out subjective and objective methods for determining the presence of tones or impulsive elements, but notes that the objective methods should be used where the subjective method is not sufficient. For situations where the specific sound source does not yet exist, the objective methods cannot be used.

2.21 The assessment outcome results from a comparison of the rating level with the background sound level (which is determined by the assessment of typical background noise levels by survey). The standard states, in Section 11:

- "a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) 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.*

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

2.22 Finally, BS 4142 requires that the level difference is considered in the context in which it is found. Contextual considerations include:

- Absolute level of sound. If the existing level is particularly high or low, then this can affect the significance of a particular difference (assessed as described in 2.21 above).
- The character and level of the residual sound compared to the character and level of the specific sound.
- Sensitivity of 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 such as:
 - i) facade insulation treatment;

- ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
- ii) acoustic screening.

3.0 Noise Survey

- 3.1 Imperial Retail Park is located on Thames Way in Gravesend. The vacant unit (formerly occupied by Benson Beds) is sited in the north-east corner of the retail park with a service yard to the rear. The yard is accessed from Clifton Marine Parade which also serves the nearest noise sensitive receptors; three six-storey residential apartment blocks (known as Baltic Wharf).
- 3.2 The site and wider area comprise retail, commercial and industrial uses including shipping and dock activities on the opposite riverbank along the Thames and in particular Tilbury Docks 1.5km to the Northwest.
- 3.3 An environmental noise survey was carried out with measurements made continuously between 17th and 23rd October 2023 at the location shown in Figure A1 in Appendix A. Levels were logged every 15 minutes.
- 3.4 A Norsonic 140 fully integrating sound level meter was used and a calibration check was carried out before and after the survey, with no drift noted. The microphone was attached to a pole and elevated to a height of approximately 3.5m in free field conditions. Meteorological conditions were generally suitable for the measurement of environmental sound, although there were some periods of elevated wind speeds and some rain. On examination of the survey data, these periods do not appear to have had any significant effect on measured levels.
- 3.5 For information purposes it can be noted:
- Measurements of sound level were all made with the A-weighting, which is a filter applied to the sound level meter to simulate the frequency response of the human ear, which is more sensitive to high frequency sound than low.
 - L_{Aeq} is the equivalent continuous noise level which is a method of averaging the varying noise level over the time period into a single figure value. The L_{Aeq} has the same sound energy as the fluctuating level over that period. The L_{Aeq} is also known as the "ambient level" and in BS4142 the L_{Aeq} in the absence of the proposed development sound is known as the "residual level".
 - L_{Amax} is the highest level within the measurement period.
 - L_{A90} is the noise level exceeded for 90% of the time and is referred to as the background noise level.
- 3.6 During the setting up of survey equipment (from 0630 hours onwards, it was noted that the ambient noise levels were dominated by distant road traffic on Thames Way and on occasion, vessels passing along the river. Dock activity (loading/unloading of ships) could also be discerned when road traffic

noise was absent. From 0730 hours onwards noise from B&Q moving materials around the yard by a manual handpump pallet truck and motor vehicles starting their engines and leaving Clifton Marine Parade were noted. Occasionally, commercial jet aircraft noise was discernible.

- 3.7 When collecting the equipment, a similar noise climate was noted, although on this occasion materials were being moved using an electric forklift truck.
- 3.8 Survey results are shown graphically in Figure B1 of Appendix B. Results are summarised in Table 3.1 below.

Table 3.1: Summary of noise survey results

Measured Parameter	Day 0700-2300 hours	Night 2300-0700 hours
$L_{Aeq,T}$, dB	57	51
Typical / representative L_{A90} , dB	50	43

- 3.9 Between the period 0700 to 2000 hours, when servicing is proposed, the ambient noise level was 58dB, $L_{Aeq,T}$ and background noise level was typically 51dB, L_{A90} .

4.0 Assessment

Noise from mechanical services

- 4.1 The exact location of the plant to be installed is yet to be determined, so it would be appropriate to impose a planning condition to control its noise. Accordingly, the following condition is recommended:

"The rating level of noise emitted by all fixed plant on the site shall not exceed 50dB at any noise sensitive premises between 07:00 and 23:00 and 43dB between 23:00 and 07:00 hours. The measurement and assessment shall be made according to BS 4142:2014+A1:2019."

- 4.2 It is understood that the plant to be installed and sound pressure level from the units concerned would be as shown in Table 4.1 below.

Table 4.1: Proposed plant details

Plant item	$L_{Aeq,T}$ at 1m, dB	Number of units
J & E Hall Fusion JEHR-0150-B2-M-1	56	2
Mitsubishi PUZ-ZM140VKA	52	6

- 4.3 If all of these units were to be placed against the eastern wall of the unit and were all to operate at capacity (the levels shown in Table 4.1), the resultant noise level accounting for distance attenuation and considering reflections at the closest noise sensitive windows (which would be 30m from the units) would be 36dB.
- 4.4 Given the existing ambient and background noise levels, it is unlikely that there would need to be any character correction and so rating levels from plant would be the same as the predicted levels in Table 4.1. These levels would be considerably below the target levels set out in 4.1 above. The target noise levels would therefore be achievable.

Noise from servicing

- 4.5 It is understood that the proposed user, Farmfoods generally service shops once daily from their own distribution depot using a 16.5m HGV. There is also a second daily delivery of bread directly from their supplier, usually using a rigid HGV.
- 4.6 Although refrigerated goods would be delivered, it is proposed that, as a noise mitigation measure, the vehicle's on board refrigeration unit would be switched off prior to arrival at the site. The sound power level from a single delivery from a tailgate would be 94dB, L_{WA} . A typical delivery has been assumed to last 45 minutes.
- 4.7 Correcting for distance and time, the resultant noise level at the closest residential windows would be 55dB, $L_{Aeq,1h}$. Deliveries would take place only between 0700 and 2000 hours.

Rating Level

- 4.8 To convert this specific level to a rating level, a character penalty may be added, where applicable. Character corrections (also known as penalties) may be added if the specific sound has distinctive characteristics which might increase the significance of impact over that expected from a sound with the same level but an anonymous character or which is masked by the residual sounds present.
- 4.9 To do this, the assessor must consider subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which any acoustically distinguishing characteristics might attract attention. Corrections can be added where there is tonality, impulsivity, intermittency present or, if none of these occur but the sound contains some other characteristic which is distinctive against the residual acoustic environment.
- 4.10 In this case, character of the residual sound is a complex mixture of road traffic, noise from other nearby existing service yard activities and noise from activities at the docks. This character is not dissimilar to the sounds which would occur at the site; movements of vehicles and loading / unloading. Given the existing level of the existing ambient and background noise level, 58dB, $L_{Aeq,T}$ and 51dB, L_{A90} , respectively for the period of interest, and character of other sounds present, no penalty is considered necessary in this instance.

Differences Between Rating and Background Levels

- 4.11 The rating level, background level and predicted difference between these at those receptors adjacent to the site which are predicted to experience the highest levels of sound from servicing would therefore be:

Rating level:	55dB, $L_{Ar,1h}$
Background level:	51dB, L_{A90}
Level difference:	4dB.

Context

- 4.12 As discussed in 2.21 above, in general, 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 and a difference of around +5dB is likely to be an indication of an adverse impact. However, these values depend on the context in which they occur. Context must be considered, as set out in guidance in Clause 11 of BS4142.
- 4.13 The site and surroundings currently experience ambient noise levels which are neither particularly high nor particularly low, and the sound character is a mixture of commercial, industrial and other sounds. No change is required to the initial assessment as a result of this contextual consideration.
- 4.14 The predicted rating noise levels at all noise sensitive receptors would be 4dB above background. According to BS4142, this is below a level which would indicate an adverse effect.

Conclusions

- 4.15 An assessment has been carried out of the potential impact of noise from proposed activities on site, assuming worst case patterns of use which could occur. The following noise mitigation measures are proposed:
- Switch off vehicle on board refrigeration prior to arrival.
 - Servicing only to occur between 0700 and 2000 hours.
 - Plant noise will need to be sited to ensure that it does not exceed the noise levels shown in 4.1 above.
- 4.16 With the proposed noise mitigation in place, noise levels would be below the adverse effect level during both day and at night. This is an indicator that the predicted levels would be below the LOAEL at all times. No further noise mitigation measures are required and there would be, by definition, no observed adverse noise effects resulting from the proposed operations at the site.

Appendix A: Figures

Figure A1: Aerial view of site and surroundings with noise monitoring location shown



Appendix B: Noise Survey Results

Figure B1: Graph of noise survey results