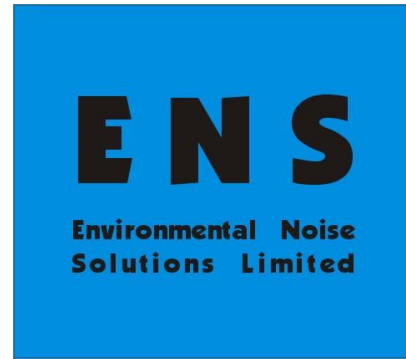




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Proposed / Existing Commercial Development Devour at the Dyehouse, Holmfirth

Noise Impact Assessment

For:
Devour at the Dyehouse

30 March 2020

Ref: NIA/9041/20/9050/v2/Devour, Holmfirth
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1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Devour at the Dyehouse to undertake a noise impact assessment for the following at the existing restaurant located at the Dyehouse, Luke Lane, Thongsbridge, Holmfirth, HD9 7TB (hereafter referred to as ‘the site’):

- Existing extraction plant
- New plant
- A proposed outdoor dining area (pergola)

This report details:

- The methodology and results of a noise survey conducted in the vicinity of the site
- The impact assessment of the existing external plant upon neighbouring noise sensitive receptors
- The impact assessment of the new external plant and proposed pergola upon neighbouring noise sensitive receptors

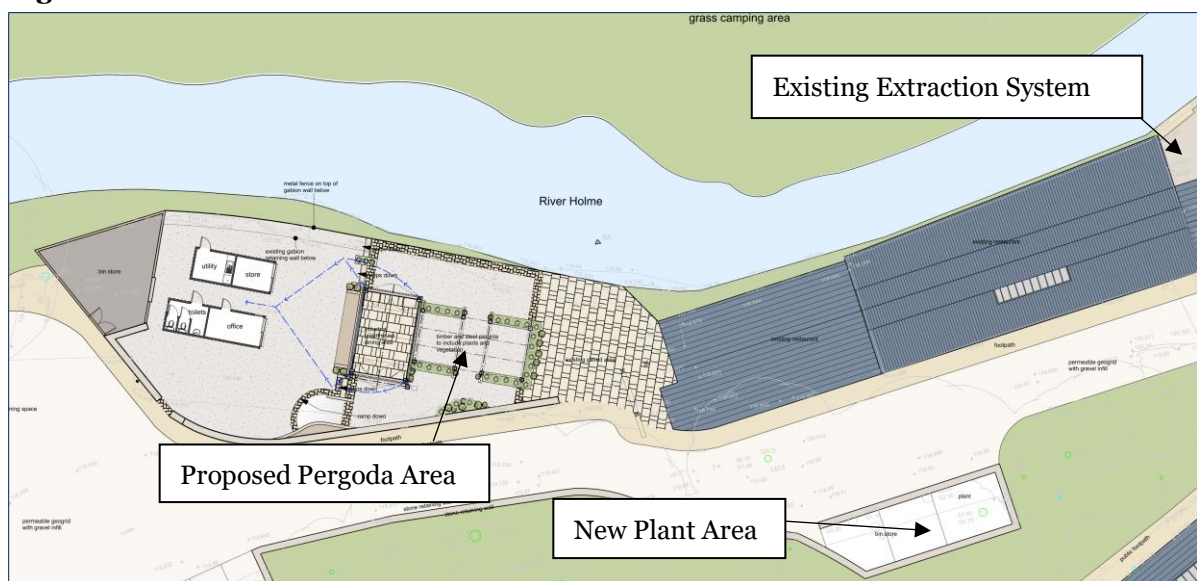
The report has been prepared for Devour at the Dyehouse for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Devour at the Dyehouse and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix A.

1.2 Site Description

The site is located to the south of the River Holme in Holmfirth, as shown in Figure 1.1.

Figure 1.1: Site Location



The existing extract ductwork is located to the east of the restaurant building. The new plant area is to the south of the existing restaurant building and the proposed pergola is to the west of the restaurant building. It is understood that the proposals include for the installation of a low-level background music system in the proposed pergola area.

The nearest noise sensitive receptors (NSRs) are considered to be:

- Apartments at Luke Lane, approximately 28 metres to the south-east of the existing extract plant, approximately 85 metres to the east of the proposed pergola area and approximately 39 metres to the east of the new plant area (NSR1)
- Dwellings on Woodlands Avenue, approximately 106 metres to the south-west of the existing extract plant, approximately 60 metres to the south of the proposed pergola area and approximately 74 metres to the south-west of the new plant area (NSR2)

2 Planning Policy and Assessment Guidance

2.1 Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹ was updated in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 170 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of.....noise pollution'.

Paragraph 180 advises that:

'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.....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'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

Noise Policy Statement for England

The Noise Policy Statement for England² (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life

The NPSE describes the following levels at which noise impacts may be identified:

- 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

According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

¹ National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2019)

² Noise Policy Statement for England. Government Department for Environment, Food and Rural Affairs (2010)

‘...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.’

Planning Practice Guidance on Noise

In July 2019, Planning Practice Guidance³ (PPG) was updated online to provide additional guidance and elaboration on the NPPF. It advises that:

‘Plan making and decision making need to take into account the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.’*

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

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

Table 2.1 summarises the PPG noise exposure hierarchy.

Table 2.1: PPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

³ Planning Practice Guidance on Noise (<http://planningguidance.planningportal.gov.uk/blog/guidance/noise/>). Ministry of Housing, Communities and Local Government (2019)

With regard to planning policies and noise standards, the PPG advises that:

‘Plans may include specific standards to apply to various forms of proposed development and locations in their area. Care should be taken, however, to avoid these being applied as rigid thresholds, as specific circumstances may justify some variation being allowed.’

2.2 Assessment Guidance

British Standard 4142

BS 4142⁴ presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors. The foreword states that:

‘response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood. This edition of the standard recognizes the importance of the context in which a sound occurs’

Section 11 of BS 4142 introduces the concept of ‘context’ to the process of identifying noise impact and explains that:

‘The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs (my emphasis). An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.’

A rating penalty can be applied to account for the character of the noise, namely tonality, impulsivity and intermittency. All of these corrections can be added together in linear fashion where appropriate.

Tonality can be determined objectively (using adjacent third octave band analysis / the Joint Nordic method) or subjectively as listed below:

- +2 dB penalty: Just perceptible
- +4 dB penalty: Clearly perceptible
- +6 dB penalty: Highly perceptible

Impulsivity (the rapidity of the change in sound level) can be determined objectively (using Fast Fourier Transform analysis) or subjectively as listed below:

- +3 dB penalty: Just perceptible
- +6 dB penalty: Clearly perceptible
- +9 dB penalty: Highly perceptible

Where intermittency is present (i.e. when the specific noise has identifiable on/off conditions) a +3 dB penalty can be applied.

Where the specific sound feature characteristics are neither tonal nor impulsive, but are clearly distinguishable against the residual noise, a +3 dB penalty can be applied.

⁴ British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. British Standards Institution (2019)

In order to assess the impact, the 'Rating level' of the new noise source is compared with the existing 'Background level' and the following analysis made:

- Typically, the greater this 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
- 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

BS 4142 requires separate analysis for day and night time periods, evaluating the Rating level over an appropriate reference time interval (T_r) of:

- 1 hr during the day (between 07:00 - 23:00 hrs)
- 15 min during the night (between 23:00 - 07:00 hrs)

3 Noise Survey and Results

3.1 Overview

Noise monitoring was carried on Thursday 19th March 2020 to determine prevailing ambient and background noise levels in the vicinity of the site, along with the specific noise level of the existing extraction plant and new plant.

The adopted off-site noise monitoring positions (shown in Appendix B) were as follows:

- Position 1 – NSR1 (apartments on Luke Lane) at 1 metre from the façade of the building, at a height of 4 metres above ground
- Position 2 – NSR2 (dwelling on Woodlands Avenue) at 1 metre from the façade of the building, at a height of 4 metres above ground

It is understood that both sets of plant (existing extraction and new plant) were operating at typical duty when switched on during the survey. It is also understood that the extraction plant would normally operate continuously when the restaurant operates. However, for the purpose of assessment, the plant was switched on and off at regular intervals so that the survey engineer could acquire residual and background noise measurements in the absence of contributions from the plant.

As a separate exercise, a loudspeaker was set up at the location of the proposed pergola area. Measurements were made at 5 metres distance from the sound source to determine pergola music noise levels. The volume of this music source was incrementally lowered and corresponding noise measurements were taken at the pergola and at nearby noise sensitive receptors along with noted observations regarding audibility.

Noise measurements were undertaken using Bruel & Kjaer 2250 Type 1 integrating sound level meters. Each meter was connected to a windshield covered microphone.

The calibration of each measurement system was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted.

Measurements consisted of A-weighted broadband parameters including L_{Aeq} and L_{A90} together with linear octave and third octave band data.

During the survey the noted weather conditions were calm and dry with wind speeds < 5 m/s. Weather conditions were therefore considered appropriate for noise monitoring.

3.2 Results

Tables 3.1 and 3.2 presents noise data for each measurement session, at each position, rounded to the nearest decibel.

Table 3.1: Summary of Music Noise Measurement Data – 19/03/2020

Position	Time (hh:mm)	L _{Aeq} (dB)	L _{A90} (dB)	Comment
1	18:49 – 18:54	49	47	Music from pergola clearly audible; corresponding source measurement was 80 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river
	19:07 – 19:08	45	45	Music from pergola audible; corresponding source measurement was 75 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river; passing cars excluded from analysis; moving water from neighbouring river
	19:23 – 19:25	45	45	Music from pergola just audible; corresponding source measurement was 70 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river
	19:41 – 19:43	46	45	Music from pergola inaudible; corresponding source measurement was 65 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river
2	18:57 – 18:58	45	44	Music from pergola clearly audible; corresponding source measurement was 80 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river
	19:11 – 19:12	42	41	Music from pergola audible; corresponding source measurement was 75 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river
	19:27 – 19:29	41	40	Music from pergola just audible; corresponding source measurement was 70 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river
	19:44 – 19:48	44	42	Music from pergola inaudible; corresponding source measurement was 65 dB(A) at 5m; passing cars excluded from analysis; moving water from neighbouring river

Table 3.2: Summary of Plant Noise Measurement Data – 19/03/2020

Position	Time (hh:mm)	L _{Aeq} (dB)	L _{A90} (dB)	Comment
1	20:33 – 20:43	60	44	All plant off; noise from passing vehicles and pedestrians; continuous river noise
	21:01 – 21:06	57	44	New plant on and faintly audible; noise from passing vehicles and pedestrians; continuous river noise
	21:24 – 21:30	59	44	Existing extract on and inaudible; noise from passing vehicles; continuous river noise
2	20:44 – 20:55	52	38	All plant off; noise from vehicles on local roads; continuous river noise
	21:08 – 21:14	43	38	New plant on and inaudible; noise from vehicles on local roads; continuous river noise
	21:44 – 21:49	42	39	Existing extract on and inaudible; noise from vehicles on local roads; continuous river noise

In addition to the above, the following additional measurements were taken adjacent to operational plant:

- 48 dB L_{Aeq,T} was measured at a distance of 5 metres from the existing extract plant
- 63 dB L_{Aeq,T} was measured at a distance of 1 metre from the new plant

4 Plant Noise Assessment

4.1 Specific Noise Level

Existing Extract System

The noise measurement data summarised in Section 3 shows that:

- The background noise levels at the nearest NSR (NSR1) did not increase when the plant was switched on. Therefore, the plant noise level at the NSR was at least 10 dB below the background noise level (otherwise the effect of the additional continuous plant noise contribution would result in a cumulative increase in background noise level). It follows that the plant noise level was < 34 dB $L_{Aeq,T}$ at NSR1
- A noise level of 48 dB $L_{Aeq,T}$ was measured at a distance of 5 metres from the plant during operation

Using the above information, along with a basic distance attenuation correction, the calculated specific noise levels at the NSRs are:

- 33 dB $L_{Aeq,T}$ at NSR1
- 21 dB $L_{Aeq,T}$ at NSR2

New Plant

The noise measurement data summarised in Section 3 shows that:

- The background noise levels at the nearest NSRs did not increase when the plant was switched on. Therefore, the plant noise level at the nearest NSR was at least 10 dB below the background noise level (otherwise the effect of the additional continuous plant noise contribution would result in a cumulative increase in background noise level). It follows that the plant noise level was < 34 dB $L_{Aeq,T}$ at NSR1 and < 28 dB $L_{Aeq,T}$ at NSR2
- A noise level of 63 dB $L_{Aeq,T}$ was measured at a distance of 1 metre from the plant during operation

Using the above information, along with a basic distance attenuation correction, the calculated specific noise levels at the NSRs are:

- 31 dB $L_{Aeq,T}$ at NSR1
- 26 dB $L_{Aeq,T}$ at NSR2

4.2 Impact Assessment

The existing and proposed plant is understood to operate between 09:00 – 23:00 hrs therefore no night-time assessment is necessary.

With regard to potential ‘acoustic feature’ corrections, the following has been considered:

- It is understood that the plant is normally expected to operate continuously therefore no acoustic feature correction for intermittent operation would be appropriate
- Noise from extraction plant does not tend to be impulsive in nature, nor was any impulsivity subjectively observed during the survey
- Plant noise was generally inaudible (with the exception of the new plant, which was noted to be faintly audible at NSR1 when switched on) with no obvious acoustic characteristics deemed clearly distinguishable against the residual soundscape

Based on the above it is not considered appropriate to apply an 'acoustic feature' correction in this instance.

The calculated plant noise levels have been assessed in accordance with BS 4142. The results of the BS 4142 assessment are presented in Tables 4.1 and 4.2.

Table 4.1: BS4142 Assessment – Existing Extraction Plant

Parameter	NSR1	NSR2
Typical background sound level (Measured at NSR when plant was switched off)	44 dB $L_{A90,T}$	38 dB $L_{A90,T}$
Specific noise level (Plant assumed to operate for 100% of assessment period)	33 dB $L_{Aeq,1hr}$	21 dB $L_{Aeq,1hr}$
Rating level	33 dB $L_{Ar,Tr}$	21 dB $L_{Ar,Tr}$
Excess of rating over background sound level	-11 dB	-17 dB
Assessment (depending on the context)	Low impact	Low impact

Table 4.2: BS4142 Assessment – New Plant

Parameter	NSR1	NSR2
Typical background sound level (Measured at NSR when plant was switched off)	44 dB $L_{A90,T}$	38 dB $L_{A90,T}$
Specific noise level (Plant assumed to operate for 100% of assessment period)	31 dB $L_{Aeq,1hr}$	26 dB $L_{Aeq,1hr}$
Rating level	31 dB $L_{Ar,Tr}$	26 dB $L_{Ar,Tr}$
Excess of rating over background sound level	-13 dB	-12 dB
Assessment (depending on the context)	Low impact	Low impact

At both NSRs, the calculated rating levels are significantly lower than the prevailing background noise level, resulting in a low impact.

In terms of context, the following is considered:

- The operation of the plant is limited to daytime hours only
- As the existing plant was not noticeable at either receptor, with reference to Table 3.1 (and the PPG noise exposure hierarchy) there is 'No Observed Effect' with 'no specific measures required'
- As the new plant noise was considered to be 'just' noticeable at one receptor (NSR1) and not intrusive, with reference to Table 3.1 (and the PPG noise exposure hierarchy) there is 'No Observed Adverse Effect' with 'no specific measures required'

5 Pergola Noise Assessment

5.1 Overview

It is understood that the proposed outdoor dining area (pergola) will only be used between 09:00 - 23:00 hrs. Therefore, the assessment of noise from the space has been performed for daytime hours only.

5.2 Patron Noise Level

Measurements undertaken by ENS at a similar environment (public house beer garden) suggest that a noise level of circa 63 dB $L_{Aeq,T}$ at 4 metres distance is representative of patron noise for an outdoor area used by 15 no. patrons conversing in a relaxed, social environment.

Using a basic distance attenuation correction, the calculated patron noise levels at the NSRs are:

- 36 dB $L_{Aeq,T}$ at NSR1
- 39 dB $L_{Aeq,T}$ at NSR2

With reference to the baseline noise data presented in Section 3, it can be seen that predicted patron noise levels would be below prevailing ambient noise levels (L_{Aeq}). However, since the patron noise levels are not expected to be at least 10 dB below the prevailing background noise level (L_{A90}), noise may be audible though not intrusive at times (i.e. in lulls of masking noises such as passing vehicles or pedestrians).

Cumulative daytime noise levels (determined by logarithmically summing existing ambient noise levels to additional L_{Aeq} levels from the proposals) are expected to increase by 2 dB due to the additional contribution of patron noise at NSR2. This is not a significant increase and is therefore considered to be acceptable, particularly as there would be no contributions at night (i.e. between 23:00 – 07:00 hrs) to cause potential sleep disturbance.

With reference to Table 3.1 (and the PPG noise exposure hierarchy) there would be ‘No Observed Adverse Effect’ with ‘no specific measures required’.

5.3 Music Noise Level

The noise measurement data summarised in Section 3 shows that music noise was inaudible at both receptors when the music noise level in the proposed pergola area was 65 dB $L_{Aeq,T}$ at a distance of 5 metres from the loudspeaker. An obvious starting point would therefore be a music noise limit of 65 dB $L_{Aeq,T}$ at 5 metres for any proposed outdoor loudspeakers in order avoid an adverse effect at the nearest NSRs. At such as level, with reference to Table 3.1 (and the PPG noise exposure hierarchy) there would be ‘No Observed Effect’ with ‘no specific measures required’.

However, based on the findings of the patron noise level assessment (detailed in the foregoing Section 5.1) it is recommended that the music noise level is set to at least 5 dB below that of conversing patrons so that patrons are not encouraged to raise voices above the music.

Based on the above, it is recommended that the music noise level is limited to ≤ 60 dB $L_{Aeq,T}$ at 5 metres distance. At this level music would be audible at low level to the patrons, adding ambience without being overbearing. This would avoid a situation whereby patrons would feel the need to raise voices to levels higher than would normally be expected in a relaxed, social environment.

6 Summary and Conclusions

A noise survey and assessment has been performed for proposed commercial development at an existing restaurant located at the Dyehouse, Luke Lane, Thongsbridge, Holmfirth, HD9 7TB.

Noise monitoring was carried on Thursday 19th March 2020 to determine prevailing ambient and background noise levels in the vicinity of the site, along with the specific noise level of existing extraction plant and new plant installed at the site.

Section 4 considers plant noise impact to nearby noise sensitive receptors (NSRs) assessed using BS 4142 guidance. The assessment has determined that plant noise would be a low impact.

Section 5 considers noise from the proposed pergola (outdoor dining area). Recommended music noise limits have been determined such that music would be inaudible at the nearest NSRs. Whilst patron noise may be audible (at times) it is not anticipated to be significantly higher than the prevailing ambient noise level and would not be intrusive. With reference to PPG noise exposure hierarchy there would be 'No Observed Adverse Effect' with 'no specific measures required'.

Appendix A – Abbreviations and Definitions

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix B – Noise Measurement Positions

