



ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

Specsavers, Prescott

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Client:

 Specsavers

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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Specsavers appointed Acoustic Consultants Limited to undertake a noise impact assessment for the proposed plant serving the Specsavers store to be located Cables Retail Park, Steley Way, Prescot L34 5NQ.

This report provides a noise impact assessment of the proposed store plant at the nearest existing noise sensitive receivers (NSRs).

The noise impact assessment is based on the results of an on-site noise survey and noise level predictions using manufacturer's plant data.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014+A1:2019 (BS4142) and British Standard 8233:2014 (BS8233).

2. The Site

The proposed site is to be located at Cables Retail Park, Steley Way, Prescott L34 5NQ. It is proposed to fit out the unit as for operation as a Specsavers store. The store is proposed to be served by 15 condenser units, all to be located on the flat roof at the rear of the proposed store. It is understood the plant will only operate during store opening hours.

Noise from the condenser plants has the potential to affect residential dwellings nearby. The nearest residential receiver is a house on the northern boundary of the site.

The figures below show the site location, floor plans and the locations of the proposed plant.

Figure 1: Site location



Figure 2: Proposed rear elevation and plant locations

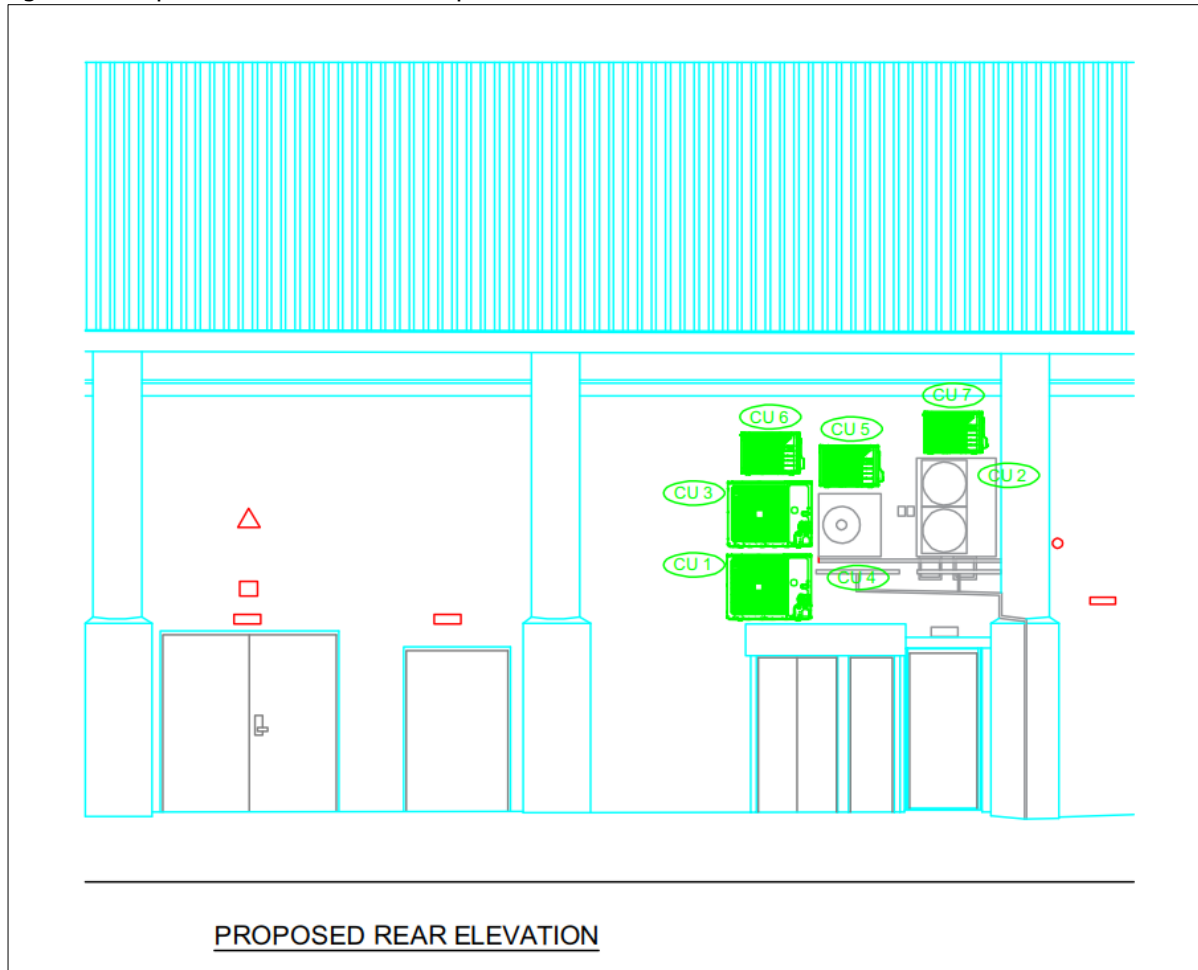
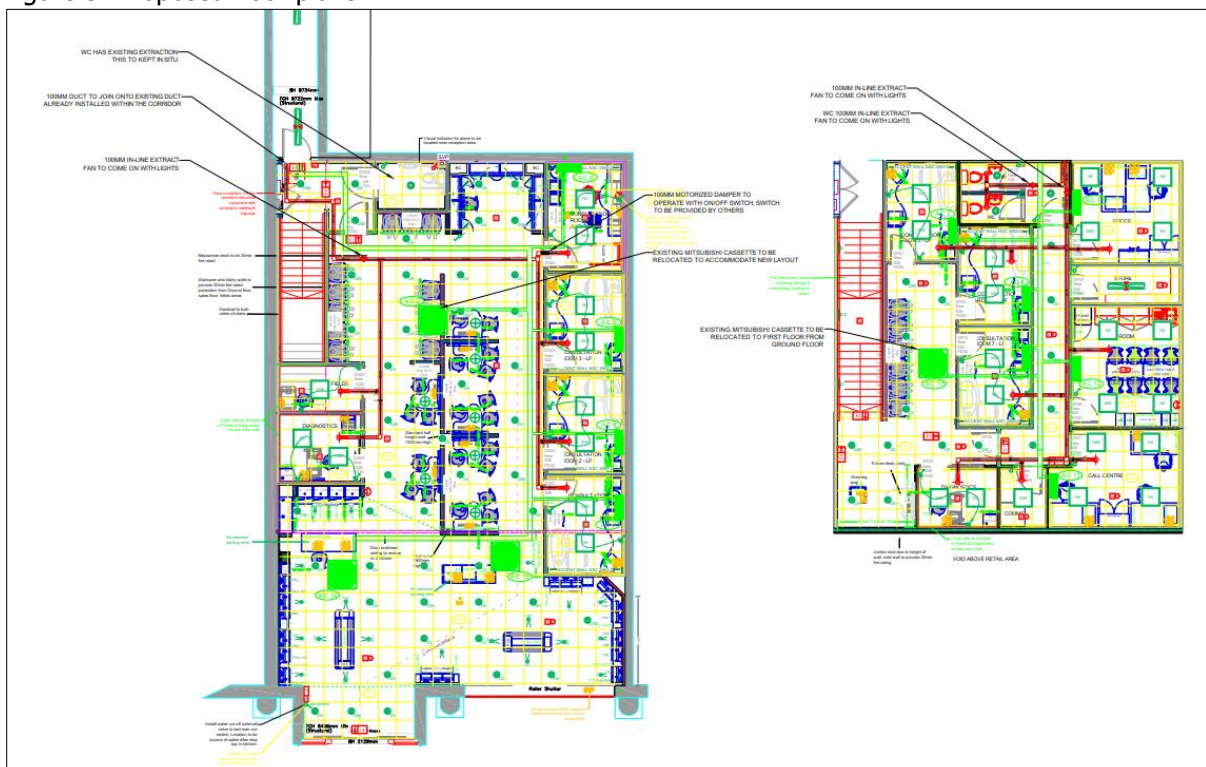


Figure 3: Proposed floor plans



3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in September 2023. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 174 states:

"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability..."

Paragraph 185 states:

"185. 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; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *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."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

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.

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits. The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects

which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. National Planning Practice Guidance, Noise

The National Planning Practice Guidance (NPPG) on noise referred to here is based on the current version (January 2015) as provided on the Planning Guidance Website. It states that *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the NPPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: NPPG Noise – Perception of Effect Levels

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.	Observed Adverse Effect	Mitigate and reduce to a minimum

Perception	Examples of Outcomes	Increasing Effect Level	Action
	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.		
		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

The table does not provide any objective assessment which equates to the noted effect levels however the NPPG identifies that where noise is audible it is not necessarily intrusive. The effect and impact on people is based primarily on the level of noise.

4. Assessment Methodology

British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound' use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes. The principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'.

The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours).

Section 9 entitled 'Rating Level' states: *"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location.

In Section 11 of the Standard, entitled 'Assessment of the Impacts', it states: *"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9) and consider the following."*

- *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."*

In all instances the context needs to be considered when determining the overall impact. In terms of context BS 4142:2014 states: *"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following."*

- 1) *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*
- 2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

- 3) *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, such as:*
 - i) *façade 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*
 - iii) *acoustic screening."*

In terms of good internal acoustic conditions, the most relevant criteria and methodology is provided in BS8233:2014. This is in accordance with a March 2020 Technical published by the ANC Working Group, which provided comments and guidance to clear any ambiguity in BS414:2014+A1:2019.

The March 2020 Technical Note later states:

"Whilst BS 4142 can be used to assist in the determination of the likelihood of an adverse or significant adverse impact, guidance on internal design criteria and mitigation is provided elsewhere. BS 8233:2014, for example, provides guidance on indoor ambient noise levels."

5. Baseline Noise Monitoring

A noise survey was undertaken between 11:45 – 14:00 on the 30th October 2023. This was to determine the existing background noise climate at the site, representative on the nearest noise sensitive receivers.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 2: Equipment used and calibration dates

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
Norsonic 1255	125525651	03/05/2023	06226/1
Pre-Amp, Norsonic, 1209	13493	04/05/2023	06226/1
Microphone, Norsonic, 1225	A16151	04/05/2023	06226/1
Calibrator, Norsonic, 1255	125525651	04/05/2023	06226/1

5.2. Weather Conditions

The weather conditions during the survey are given in the table below.

Table 3: Weather conditions at the monitoring location over the survey period

Date	Wind Speed (m/s)	Prevailing wind Direction	Temperature (°C)	Precipitation Time (hrs)	Cloud Cover (%)
30/10/2023 13:22 – 15:32	≤4-5	NE	9-11	0	-

These weather conditions are not expected to have an adverse effect on the collected noise data.

5.3. Monitoring Procedure

A noise survey was carried out in accordance with British Standard 4142:2014 between 11:45 – 14:00 on the 30th October 2023. This was to determine background noise levels at the site representative of the nearest NSR. The microphone was positioned on a tripod at 1.8m height. The measurement was taken in the free field position.

The primary noise source at the site was Distant Road traffic and some plant noise from the nearby 'Next' store.

The monitoring location is given in the figures below:

Figure 4: Monitoring location



5.4. Measured Noise Levels

Below is a chart detailing the equivalent noise level ($L_{Aeq,15min}$) and background noise level ($L_{A90,15min}$) in dB(A) over the time of the survey.

The measured data for the baseline noise survey consists of the equivalent noise level ($L_{Aeq,15min}$) and background noise level ($L_{A90,15min}$) in dB(A). These results are displayed in the table below.

Table 4: Measured values of the equivalent and background in decibels

Period	$L_{A90,15min}$	$L_{Aeq,15min}$
30/10/2023 11:45– 12:00	48	51
30/10/2023 12:00– 12:15	48	51
30/10/2023 12:15– 12:30	49	55
30/10/2023 12:45– 13:00	50	54
30/10/2023 13:00– 13:15	51	57
30/10/2023 13:15– 13:30	49	53
30/10/2023 13:30– 13:45	49	53
30/10/2023 13:45– 14:00	49	55

6. Plant Noise Predictions

6.1. Proposed Plant

The proposal is to install plant units on the rear facade of the building as shown in Figure 1. The proposed plant details are below and are taken from drawing in Section 2 above.

Table 5: Proposed plant model and the manufacturers sound power level (dBA)

Unit Number	Proposed Plant Model	Quantity	Unit Sound Power Level (dB L _w)
C/U – 5-7	DAIKIN RZAG 35A	3	67
C/U – 1	RZASG 100M	1	64
C/U – 3	RXYSCQ 5T	1	69

It is understood the plant will only operate during store opening hours. It should be noted that any changes to the schedule, location or layout of the plant will affect the predicted levels at the receiver points around the site and, as such, will need reassessing.

6.2. Distance Attenuation

The nearest residential receiver is 30 metres away from the plant, so the attenuation of sound over distance also needs to be calculated.

Outdoor noise propagation from a point source, with an allowance for one reflective plane, is calculated using the following formula:

$$L_p = L_w - 20 \log(R) - 5$$

Where 'L_w' and 'r' are respectively the known sound power level and the distance from the receiver; 'L_p' is the level at the noted distance.

6.3. Predicted Specific Sound Level

The plant is 42m from the NSR and wall mounted with clear line of sight. Using the standard formulas for Noise propagation the following correction are applied to determine the specific sound level at the NSR.

Table 6: Predicted specific sound levels at NSR

Plant Unit	Number of units	Total dB L _{wA}	Distance from NSR (m)	Specific Sound Level (dB L _{Aeq,T} 1 hour)	Cumulative Level (dB L _{Aeq,T} 1 hour)
DAIKIN RZAG 35A	3	67	42	30	34 dB
RZASG 100M	1	64		27	
RXYSCQ 5T	1	69		32	

7. Noise Assessment

A British Standard 4142:2014 assessment has been undertaken at the sensitive receivers on the site.

7.1. Initial Estimate of Impact

7.1.1. Background Sound Level

From the measured data we have determined a typical background level of 49 $L_{A90(1hr)}$ during the day.

7.1.2. Predicted Specific Sound Level

The cumulative specific sound level at the NSR, is 34 dB $L_{Aeq(1hr)}$ (free-field level). This is the level determined at the noise sensitive receiver without any character corrections applied.

7.1.3. Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location. The corrections are as follows:

Tonality – Plant of this type is not normally tonal in our experience.

Intermittency – We have added a +3 dB increase for intermittency.

Impulsivity – Plant of this type is not normally impulsive in nature.

Other Sound Characteristics – We do not believe any correction is necessary for other sound characteristics.

7.1.4. Initial Estimate

Therefore, the British Standard 4142:2014 initial estimate at the most sensitive location is as follows:

Table 7: British Standard 4142:2014 initial estimate for NSR

Parameter	Daytime (07:00-23:00)
Background Level, $L_{A90, (T)}$	49 dB
Specific Sound Level, $L_{Aeq, (T)}$	34 dB
Character Correction	+3 dB
Rating Level, $L_{Ar(T)}$	37 dB
Excess of rating over background level	-12 dB

This means that the plant rating noise level at will be of a low impact when assessed to British Standard 4142:2014. However, the context of the site must also be considered.

7.2. Context

With regard to context, British Standard 4142:2014 states:

7.2.1. Absolute Levels

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

"1) Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014. Section 7.7.2 Table 4 of the British Standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character' and are based on existing guidelines issued by the World Health Organisation in 1999. We would advise the rating level is considered to allow for the character of the source. Internally to a dwelling during the day, the internal ambient noise levels should not exceed 35 dB $L_{Aeq(16hr)}$.

The internal level is approximately 15 dB quieter than the external free-field level (as stated by the BS8233:2014 and WHO 1999) allowing for the attenuation of a partially open window. Therefore, based on the predicted rating levels noted above, the internal absolute levels are as follows.

Table 8: Assessment of daytime impact against BS8233/WHO Internal Noise Criteria

Predicted External Rating Level dB $L_{Ar}(T)$	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within Criteria?
37	-15	22	Yes

As can be seen from the table above, the internal rating sound level is level the British Standard 8233:2014 equivalent noise level with the criteria for daytime rooms. We would therefore consider plant noise to be of No Observed Effect Level when absolute levels are considered.

7.2.2. Residual Sound Levels

British Standard 4142:2014 also states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

- 1) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

The daytime typical free-field residual sound level is 51 dB $L_{Aeq}(15min)$

The specific sound level is 34 dB $L_{Aeq}(T)$. This is 17 dB below with the residual sound level, and as such, the specific sound level is expected to be indistinguishable by comparison to the acoustic environment.

7.3. Summary of Assessment

We would consider the noise impact of the proposed condenser plant to fall within the Lowest Observed Adverse Effect Level (LOAEL) of the PPG. As such, this achieves the aims of the National Planning Policy Framework (NPPF).

8. Summary and Conclusions

Specsavers appointed Acoustic Consultants Limited to undertake a noise impact assessment for the proposed plant serving the Specsavers store to be located 23 The Thoroughfare, Woodbridge, Suffolk.

This report provides a noise impact assessment of the proposed store plant at the nearest existing noise sensitive receivers (NSRs).

The noise impact assessment is based on the results of an on-site noise survey and noise level predictions using manufacturer's plant data.

The predicted noise level of plant at the noise sensitive receptor is below the background at the nearest dwellings. With context considered, the impact of noise is low when assessed to BS4142. In turn, this will be a LOAEL or lower impact when assessed with the PPG and NPSE.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \lg_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2/p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ – 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 .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, L_{A,r,T_r} – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, $eVDV$ – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).



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