

Furniss Way Business Centre
Furniss Way
Hayling Island
PO11 0FG

**Planning Noise
Assessment Report**

On behalf of

Hayling Island Builders Limited

Project Reference: 91925 | Revision: - | Date: 14th November 2023

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Executive Summary

Noise Solutions Limited has been commissioned to provide an assessment of likely noise impacts resulting from the operations of two new units at the Furniss Way Business Centre in Hayling Island.

Outline assessments of plant noise levels have been made. Plant noise limits have been set for the proposed units. The local authority is likely to require a noise impact assessment when plant selections and locations have been finalised.

An initial assessment of noise break-out from the proposed employment units has been made, based on typical internal sound levels and nominal sound insulation values for the external building envelope. Predicted noise levels are below the existing background sound levels and are therefore not expected to result in an adverse noise impact.

The assessment of noise from deliveries to the new units indicates that there is likely to be no worse than a negligible noise impact on the nearest houses.

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned to undertake a noise assessment relating to operations of two new business units proposed for the extension of Furniss Way Business Centre in Hayling Island.
- 1.2. This report presents the results of an environmental noise survey, the applicable policies and guidance, and a noise impact assessment to support a planning application.
- 1.3. Assessments have been made of the potential noise impacts due to plant and operations on the site.
- 1.4. To assist with the understanding of this report a brief glossary of acoustic terms can be found in **Appendix A**. A more in-depth glossary of acoustic terms can be assessed at the following web address <http://www.acoustic-glossary.co.uk/>.

2.0 Details of development proposals

- 2.1. It is proposed to extend the building at the existing Furniss Way Business Centre to provide two new units. These will be located at the southern end of the building. No changes are proposed to access layouts or any of the existing units. The extension lies completely within the existing site boundary.
- 2.2. A plan of the development is shown in **Appendix C**.

3.0 Nearest noise sensitive receptors

- 3.1. The area to the south and east of the site is residential. It is understood that these houses were built at the same time as the existing business centre.
- 3.2. The nearest houses to the new units are to the east (Receptor R1), approximately 15m from the rear of the new building, and to the south (Receptor R2), approximately 13m from the south end of the building and approximately 10m from the nearest parking bay.
- 3.3. **Appendix B** contains an aerial photograph showing the site and surrounding area, with the site overlaid.

4.0 Noise policy

Noise Policy Statement for England

- 4.1. The Noise Policy Statement for England (NPSE¹), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are: *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
- *avoid significant adverse effects on health and quality of life;*
 - *mitigate and minimise adverse effects on health and quality of life; and*
 - *where possible, contribute to the improvement of health and quality of life."*
- 4.2. The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and quality of life occur.
- 4.3. The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the NPSE). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case: *"...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."*
- 4.4. Importantly, the NPSE goes on to state that: "This does not mean that such adverse effects cannot occur."
- 4.5. The NPSE does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that: *"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*
- 4.6. It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

¹ Noise Policy Statement for England, Defra, March 2010

National Planning Policy Framework

- 4.7. A new edition of NPPF was published in September 2023 and came into effect immediately. The original National Planning Policy Framework (NPPF²) was published in March 2012, with subsequent revisions made periodically - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2023 revised edition contains no new directions or guidance with respect to noise. The paragraph references quoted below relate to the September 2023 edition.
- 4.8. Paragraph 174 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land instability."*
- 4.9. The NPPF goes on to state in Paragraph 185:
- "planning policies and decisions 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 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 ...*
- 4.10. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE³).
- 4.11. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise."*
- 4.12. Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed"*.
- 4.13. Paragraph 119 states that *"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out*

² National Planning Policy Framework, DCLG, March 2012

³ Noise Policy Statement for England, DEFRA, March 2010

a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land".

Planning Practice Guidance – Noise

- 4.14. An updated Planning Practice Guidance (PPG⁴) for noise was published on 22 July 2019 and provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:
- 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.
- 4.15. This guidance introduced the concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). NOAEL differs from NOEL in that it represents a situation where the acoustic character of an area can be slightly affected (but not such that there is a perceived change in the quality of life). UAEL represents a situation where noise is 'very disruptive' and should be 'prevented' (as opposed to SOAEL, which represents a situation where noise is 'disruptive', and should be 'avoided').
- 4.16. As exposure increases above the LOAEL, the noise begins 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. As the noise exposure increases, it will then at some point cross the SOAEL boundary.
- 4.17. The LOAEL is described in PPG⁵ as the level above which *"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"*.
- 4.18. PPG identifies the SOAEL as the level above which *"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."*

⁴ Planning Practice Guidance – Noise, <https://www.gov.uk/guidance/noise--2>, 22 July 2019

⁵ Paragraph: 005 Reference ID: 30-005-20190722

- 4.19. In line with the Explanatory Note of the NPSE, the PPG goes on to reference 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 PPG⁶ 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."*
- 4.20. The relevant guidance in the PPG in relation to the adverse effect levels is summarized below:

Table 1 PPG Noise effects table

Response	Examples of Outcomes	Increasing Effect Level	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 or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

⁶ Paragraph: 006 Reference ID: 30-006-20190722

Response	Examples of Outcomes	Increasing Effect Level	Action
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

4.21. The Planning Practice Guidance⁷ states the following in relation to mitigation measures:

"For noise sensitive developments, mitigation measures can include avoiding noisy locations in the first place; designing the development to reduce the impact of noise from adjoining activities or the local environment; incorporating noise barriers; and optimising the sound insulation provided by the building envelope."

4.22. In addition, the Guide notes that it may also be relevant to consider⁸:

"... whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations".

⁷ Paragraph: 010 Reference ID: 30-010-20190722

⁸ Paragraph: 006 Reference ID: 30-006-20190722

Local Policy

- 4.23. The NPPF is very clear in that local authorities must update their local plans (one year from publication of the NPPF) and that if the local plan contains policies which do not closely align with the aims of the NPPF, then a decision must be made based on an assessment which shows compliance with the NPPF. Therefore, it is of paramount importance that local authorities have updated local plans which closely align with the aims in the NPPF.

5.0 Acoustic Standards and Guidance

Havant Borough Council

- 5.1. In response to the ongoing planning application⁹, Havant Borough Council's Pollution Team has advised:

[In order] for the Pollution Team to consider this application further, a noise impact assessment must be carried to determine the likely impact of the proposed scheme upon the immediate noise sensitive receptors. The assessment should be robust and based on the principle given by BS4142:2014 A:2019 and WHO community noise. Where necessary, appropriate noise mitigation measures should be implemented to preserve the peace and tranquillity of the neighbouring properties.

- 5.2. Condition 19 in the Decision Notice for the existing development¹⁰ states:

No externally visible or audible plant, machinery or structures required for ventilation or filtration purposes shall be installed on the east elevations of the light industrial buildings hereby approved until and unless details of the external appearance and acoustic performance of the same, including a report showing that the existing/current background levels will not be increased as per the requirements of BS4142:2014 and as indicated in Section 5.6 of the Acoustics 24 Noise Impact Assessment dated 30 October 2015, have been submitted to and approved in writing by the Local Planning Authority.

Reason: To safeguard the amenities of the locality and/or occupiers of neighbouring property and having due regard to policies CS16 and DM10 of the Havant Borough Local Plan (Core Strategy) 2011 and the National Planning Policy Framework 2012.

- 5.3. Section 5.6 of the noise impact assessment report referenced states:

⁹ APP/23/00486

¹⁰ APP/15/00919, approved 23 December 2015

... noise levels [from B1 commercial units] should not exceed the prevailing background noise levels during the day and should ensure a noise level internally at the nearest residential property no greater than 20 dB $L_{Aeq, 15 \text{ min}}$ at night when windows are open

BS 4142:2014 + A1:2019 Methods for Rating and Measuring Industrial and Commercial Sound

- 5.4. BS 4142:2014+A1:2019 describes a method for rating and assessing sound of an industrial or commercial nature, which includes:
- 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.
- 5.5. Therefore, for the first time in the UK, noise associated with store deliveries (i.e. sound from loading and unloading of goods) has a recognised and approved assessment methodology as this type of noise was not included in the scope of previous versions of BS 4142.
- 5.6. The industrial or commercial sound is assessed outside a dwelling or premises used for residential purposes, upon which sound is incident.
- 5.7. The procedure contained in BS 4142:2014 + A1:2019 is to quantify 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 and a 15-minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.
- 5.8. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.
- 5.9. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: "Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible."

- 5.10. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible."
- 5.11. The background sound level should be established in terms of the L_{A90} noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. This should not normally be less than 15-minute intervals. The standard states that: "A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."
- 5.12. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:

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.

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."

The standard goes on to note that: "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."

- 5.13. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"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.”

- 5.14. BS 4142:2014 + A1:2019 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.

- 5.15. This Standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999¹¹).
- 5.16. The guideline noise levels for dwellings are shown in Table 2 below:

Table 2 BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB L _{Aeq,16h}	-
Dining	Dining room/area	40 dB L _{Aeq,16h}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,16h}	30 dB L _{Aeq,8h}

- 5.17. Section 7 in the Standard also provides advice on intrusive noise, ambient noise, sound insulation and acoustic absorption for a range of uses.

6.0 Existing noise climate

- 6.1. An environmental noise survey was undertaken to establish the typical environmental sound levels at the houses nearest to the development site.
- 6.2. The results of the environmental sound survey are summarised in Table 3 below. The full set of measurement results and details of the survey methodology are presented in [Appendix C](#).

Table 3 Summary of survey results

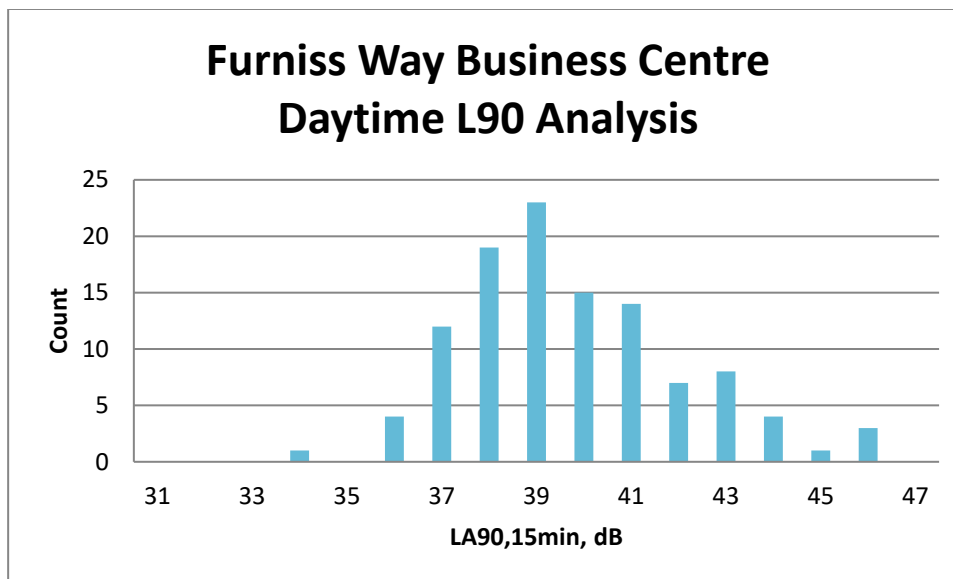
Measurement period	Range of recorded sound pressure levels (dB)			
	L _{Aeq} (15mins)	L _{Amax} (15mins)	L _{A10} (15mins)	L _{A90} (15mins)
Daytime (07.00 – 23.00 hours)	39-65	53-92	41-64	34-46
Night-time (23.00 – 07.00 hours)	34-47	41-68	35-50	32-42

¹¹ World Health Organisation Guidelines for Community Noise, 1999

Measurement period	Range of recorded sound pressure levels (dB)			
	L _{Aeq} (15mins)	L _{Amax} (15mins)	L _{A10} (15mins)	L _{A90} (15mins)
Normal working hours (08.00-18.00 hours Monday to Friday, 08.00-14.00 hours Saturday)	45-65	61-92	47-64	39-46

Background sound levels

Figure 1 Histogram of daytime L_{A90} background sound pressure levels



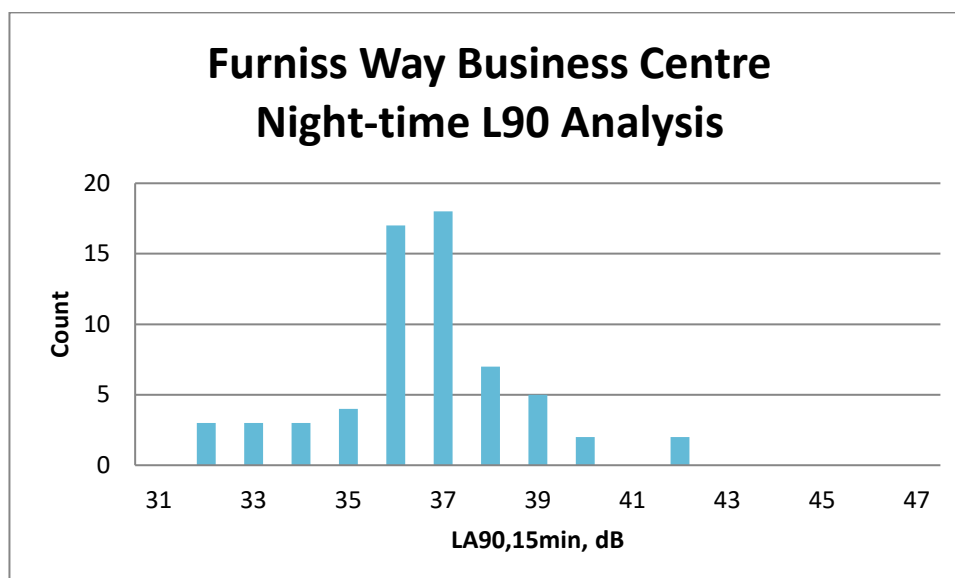
- 6.3. Additional statistical analysis has been undertaken. As shown in Table 4, the mean, median, and modal values have been calculated:

Table 4 Statistical analysis of L_{A90,15min} levels during the daytime period

dB, L _{A90} daytime period	
Mean	40
Mode	39
Median	39

- 6.4. From reviewing the above histogram, 37dB has been selected to be representative of the daytime background sound level in this area.

Figure 2 Histogram of night-time L_{A90} background sound pressure levels



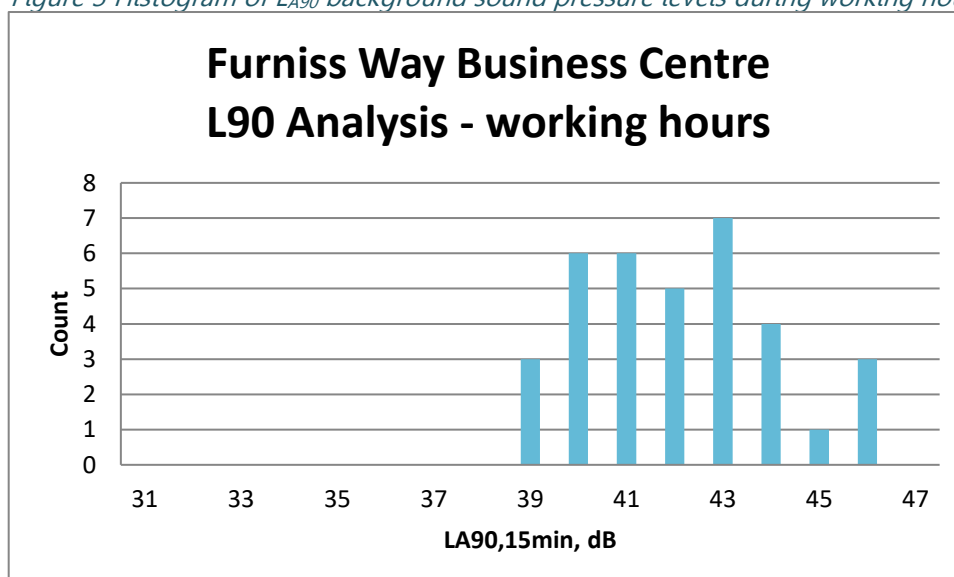
- 6.5. Additional statistical analysis has been undertaken. As shown in Table 5, the mean, median, and modal values have been calculated:

Table 5 Statistical analysis of $L_{A90,15min}$ levels during the night-time period

dB, L_{A90} night-time period	
Mean	37
Mode	37
Median	37

- 6.6. From reviewing the above histogram, 34dB has been selected to be representative of the night-time background sound level in this area.

Figure 3 Histogram of L_{A90} background sound pressure levels during working hours



- 6.7. Additional statistical analysis has been undertaken. As shown in Table 6, the mean, median, and modal values have been calculated:

Table 6 Statistical analysis of $L_{A90,15min}$ levels during normal working hours

dB, L_{A90} night-time period	
Mean	42
Mode	43
Median	42

- 6.8. From reviewing the above histogram, 39dB has been selected to be representative of the night-time background sound level in this area.
- 6.9. Therefore, the following values are considered as representative of the existing background sound pressure levels at nearby noise sensitive premises:
- 37dB L_{A90} during the daytime period;
 - 34dB L_{A90} during the night-time period;
 - 39dB L_{A90} during normal working hours.

7.0 Plant noise guidance

Noise Criteria

- 7.1. For consistency with the criteria referenced in the planning condition for the existing units it is proposed that the rating level of new plant does not exceed the existing representative background sound levels during the daytime. In addition, the noise level of any plant operating at night should not exceed 20dBA inside the nearest houses, with windows open; a limit of 30dBA outside has been applied in accordance with the previous units.

Table 7 Proposed plant noise emissions level limits at noise sensitive residential receptors

Period	Cumulative plant sound level, dBA
Daytime (07.00 – 23.00 hours)	37 Rating level
Night-time (23.00 – 07.00 hours)	30 Specific level
Working hours only	39 Rating level

Plant noise budget for employment units

- 7.2. Plant requirements, selections and locations will depend on the final use of each employment unit. For example, a joinery workshop or paint spraying booth would require extensive extract fan systems, whereas offices and warehouses may only require air conditioning condensers.
- 7.3. For the purposes of this initial assessment it is assumed that both new units will have similar requirements in terms of servicing, and therefore that plant may be selected and attenuated to meet the same noise limits for each. A penalty of 3dB as described in BS 4142:2014 has been applied for the possible presence of "...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment...".
- 7.4. Taking account of the distance between the plant and the nearest receptors, and assuming the worst-case location for plant in each case, noise levels from the proposed plant should not exceed the limits in Table 8. Higher plant noise levels may be acceptable depending on location and orientation.

Table 8 Guidance on indicative maximum plant noise emission levels (employment units)

Plant	Plant Operating Period	Maximum plant noise emission level (L _{Aeq})
Services plant (total for each unit)	Daytime (07.00 – 23.00 hours)	53dB at 1m
	Night-time (23.00 – 07.00 hours)	49dB at 1m
	Normal working hours only*	55dB at 1m

**see Table 3*

- 7.5. The above limits are likely to be achievable with plant typical of that used for small commercial units; in the event that noisier plant is used, attenuation could be provided to reduce noise levels to the indicative limits shown.

8.0 Noise break-out

- 8.1. Noise levels within the Units, and therefore resulting sound levels at the nearest houses, will depend on the activities within the units. As a worst-case it is assumed that internal noise levels may be up to 70 dB L_{Aeq, 1hour}. This would be consistent with typical light manufacturing activities and significantly higher than would be expected for office use, warehousing and similar operations.
- 8.2. The proposed design of the two new units matches the existing and comprises insulated composite metal cladding to the walls and roof, with translucent GRP rooflights and overhead opening sectional doors, fixed double-glazed windows and metal personnel access doors to the front (west) elevation.

- 8.3. The airborne sound insulation of these building elements will depend on the precise products used, but would typically be around R_w 35dB for the cladding and rooflights, R_w 30dB for the windows and personnel doors and R_w 25 dB for the sectional doors. These values are at the low-end of the range of likely performance values.
- 8.4. The predicted noise levels at the nearest receptors have been calculated in [Appendix F](#) and are summarised in Table 9. It should be noted that these are pessimistic values based on both the new units producing high noise levels simultaneously.

Table 9 Predicted noise levels – breakout from employment units (combined)

Receptor	Predicted noise levels at closest receptor
	$L_{Aeq,T,r}$ dB
R1 – façade	32
R1 – garden	36
R2 – façade	31
R2 – garden	31

- 8.5. Table 10 below presents the initial assessment of the likely noise impact due to noisy operations in accordance with the BS 4142:2014 methodology. Rating levels are inclusive of a 6 dB feature correction for impulsive noise (e.g. bangs and clatters) that may be perceptible at the receptors.

Table 10 BS 4142:2014 noise impact assessment - commercial unit noise breakout – normal working hours

Receptor	Predicted rating level at receptor, $L_{A,r,Tr}$ (dB)	Representative background sound level, L_{A90} (dB)	Excess of rating over background (dB)	Likely impact (BS 4142:2014)
R1	38	39	-1	Low
R2	37	39	-2	Low

- 8.6. This assessment shows that, assuming a worst-case situation with the noisiest likely noise levels within both new units simultaneously, the BS 4142:2014 rating level at the receptors is no higher than the existing representative background sound level and is therefore expected to result in no worse than a “low impact”.
- 8.7. Predicted noise levels within the gardens are below the existing measured ambient sound levels in the area, during normal working hours and therefore below the “No Observed Adverse Effect Level” as described in Table 1.

9.0 Receipts and despatches

- 9.1. NSL has previously measured the sound pressure levels associated with lorry movements at a number of sites. The measurements included all aspects of the delivery including, but not limited to, the arrival, unloading and the departure of the lorry. The sound pressure levels were normalised to a distance of 10m from the vehicle and have been converted to Sound Exposure Levels (SEL) for ease of comparison/calculation. Typical L_{Amax} levels were also established.
- 9.2. Table 11 details typical source noise levels, used within the assessment, with the data presented in terms of SEL and maximum individual noise event levels (L_{AFmax}).

Table 11 Reference noise data for receipt and despatch activities (at 10m)

Noise Source	SEL, dB(A)	L_{AFmax} , dB(A)	Applicable BS4142:2014 acoustic feature
Vehicle arrival / pass-by	66	68	+3 intermittency
Manoeuvring	65	58	+3 intermittency
Door open/close	60	68	+6 impulsivity
Materials handling	51	59	+6 impulsivity
Engine starts and departs	66	68	+3 intermittency

- 9.3. The information contained in Table 11 was used to model source noise levels based on the number of activity events over the required assessment period using the following equation.

$$L_{Aeq,T} = SEL + 10 \cdot \log(1/T) + 10 \cdot \log(N)$$

Where:

SEL is the L_{Aeq} over a one second period, and represents the noise energy from an event (e.g. materials handling) compressed into one second;

T is the reference time period in seconds; and

N is the number of movements in the time period, T.

- 9.4. It is assumed that there will be no more than one delivery to/despatch from any Unit in any one hour, with each comprising the arrival of a lorry, unloading/unloading and departure. Any receipt or despatch by HGV would typically take 30-45 minutes.
- 9.5. The noise level at each of the identified receptors due to vehicle movements and related activities has been predicted. The 1-hour noise levels assume simultaneous receipts at / despatches from each unit in each case. Full calculations are shown in [Appendix G](#) and are summarised in Table 12.

Table 12 Predicted noise levels due to vehicle movements and materials handling

Receptor	Predicted rating level at nearest noise-sensitive receptors	Daytime $L_{Aeq\ 16hr}$, dB, based on 20 receipts/deliveries in a day to each unit
	Highest daytime $L_{Ar,1hr}$, dB	
R1 façade	19	-
R1 garden	-	21
R2 façade	35	-
R2 garden	-	35

- 9.6. Table 13 below presents the initial assessment of the likely noise impact due to deliveries in accordance with the BS 4142:2014 methodology. Rating levels are inclusive of the BS 4142 feature corrections noted in Table 11.

Table 13 Delivery noise impact assessment – vehicles and materials handling – normal working hours

Receptor	Predicted rating level at receptor, $L_{Ar,Tr}$ (dB)	Representative background sound level	Excess of rating over background (dB)	Likely impact (BS 4142:2014)
R1	19	39	-20	None
R2	35	39	-4	Negligible

- 9.7. This assessment shows that the BS 4142:2014 rating level at all receptors is below the existing representative background sound level and is therefore expected to result in no adverse impact.
- 9.8. The predicted noise level in the worst-affected garden, due to vehicle movements and materials handling at the front of the proposed new units and assuming 20 such sets of activities at each unit in each day, is 35dB $L_{Aeq\ 16\ hr}$. This is significantly lower than the guidance value in BS 8233:2014 for outdoor amenity spaces and is also below the existing daytime ambient sound level. Predicted noise levels within the gardens are therefore below the “No Observed Adverse Effect Level” as described in Table 1.

10.0 Discussion of results

Context

- 10.1. As BS 4142:2014 advises, the impact must be considered within the context of the site and the surrounding acoustic environment.
- 10.2. The two units form an extension to the existing business centre and activities of the type likely within and around the new units are already an established part of the noise environment. The noise impact of the new units is therefore likely to be lower in practice than is suggested by consideration of the sound levels alone.

Uncertainties

- 10.3. Where possible uncertainty in the above assessments has been minimised by taking the following steps:
- The meter and calibrator used have a traceable laboratory calibration and were field calibrated before and after the measurements.
 - Uncertainty in the calculated impacts has been reduced by the use of well-established calculation methods.
 - Care was taken to ensure that the measurement position and survey data used in the assessment were representative of the noise climate outside the nearby residential dwellings and not in positions where higher noise levels were present.

Plant noise

- 10.4. Indicative plant noise calculations, using limiting plant sound levels for the new employment units, demonstrate that plant noise will meet the proposed criteria and should therefore be acceptable to the local authority. The local authority is likely to require a plant noise impact for each unit, when plant has been selected.

Noise breakout

- 10.5. Based on a typical sound level of 70dBA within the new units during normal working hours, and typical external envelope materials similar to those of the existing units, noise breakout sound levels at the nearest houses will be below the existing background sound levels.

Deliveries

- 10.6. The BS 4142 assessment indicates that noise from deliveries to the new units will result in no worse than a negligible impact.

11.0 Summary

- 11.1. Noise Solutions Ltd (NSL) has been commissioned to provide an assessment of the likely noise impact of operations at two new proposed units on the existing Furniss Way Business Centre in Hayling Island.
- 11.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels in the area and at the nearest noise sensitive receptors.
- 11.3. Plant noise limits have been given such the rating level at the nearest residential façades will be no higher than the existing background sound level during the day and the specific noise level will be no higher 30dBA at night at the same locations.

-
- 11.4. Noise breakout from activities within the new units will be below the level at which a low impact is expected, as assessed using the methodology in BS 4142:2014+A1:2019. Noise levels in the gardens due to noise breakout will be below the No Observed Adverse Effect Level described in PPG Noise.
- 11.5. Noise from deliveries is predicted to have no worse than a negligible impact at the nearest noise-sensitive receptors.

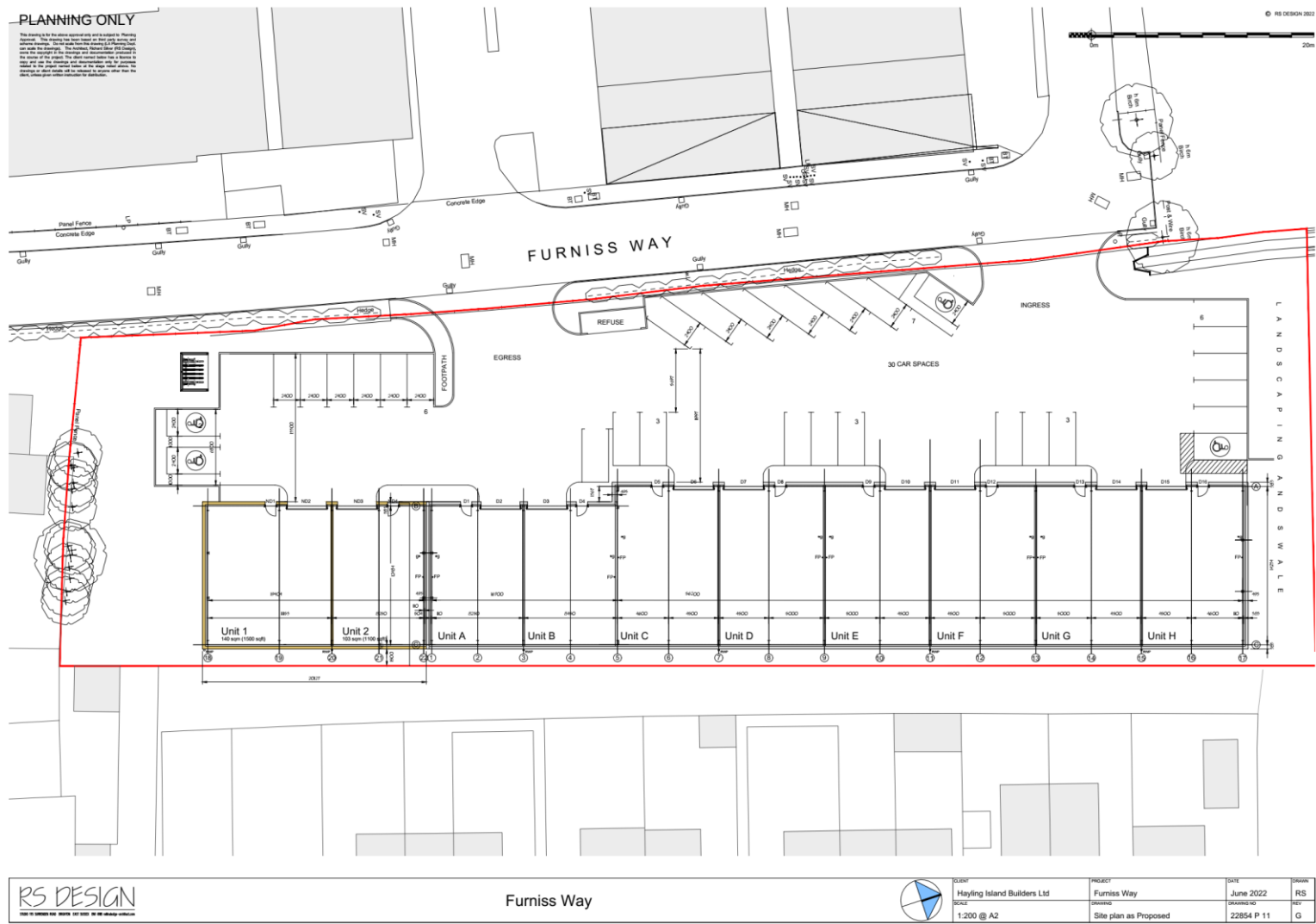
Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Photograph of site showing areas of interest



Appendix C Proposed development plan and elevation drawings



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Appendix D Environmental sound survey

Details of environmental sound survey

- D.1 Measurements of the existing environmental sound levels were undertaken between 15.30 hours on Friday 10th November and 11.15 hours on Sunday 12th November 2023.
- D.2 The sound level meter was programmed to record the A-weighted L_{eq} , L_{90} , L_{10} and L_{max} noise indices for consecutive fifteen-minute sample periods for the duration of the survey.

Measurement position

- D.3 The representative measurement position was located on a lamp post on Furniss Way (location indicated on the site plan in Appendix B). This location is approximately representative of the levels of environmental noise at the closest elevation of the nearest houses to the site. The microphone was positioned approximately 3m above ground level and removed from any reflecting surfaces.
- D.4 In accordance with BS 7445-2:21991 '*Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*', the measurements were undertaken under free-field conditions.

Equipment

- D.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change in the calibration level was noted.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 977D / 99070	11/05/2023	Factory conformation certificate
Condenser microphone	ACO Pacific 7052E / 81197		
Preamplifier	Svantek SV18A / 130661		
Calibrator	Rion NC-74 / 35094453	06/09/2023	1503192-1

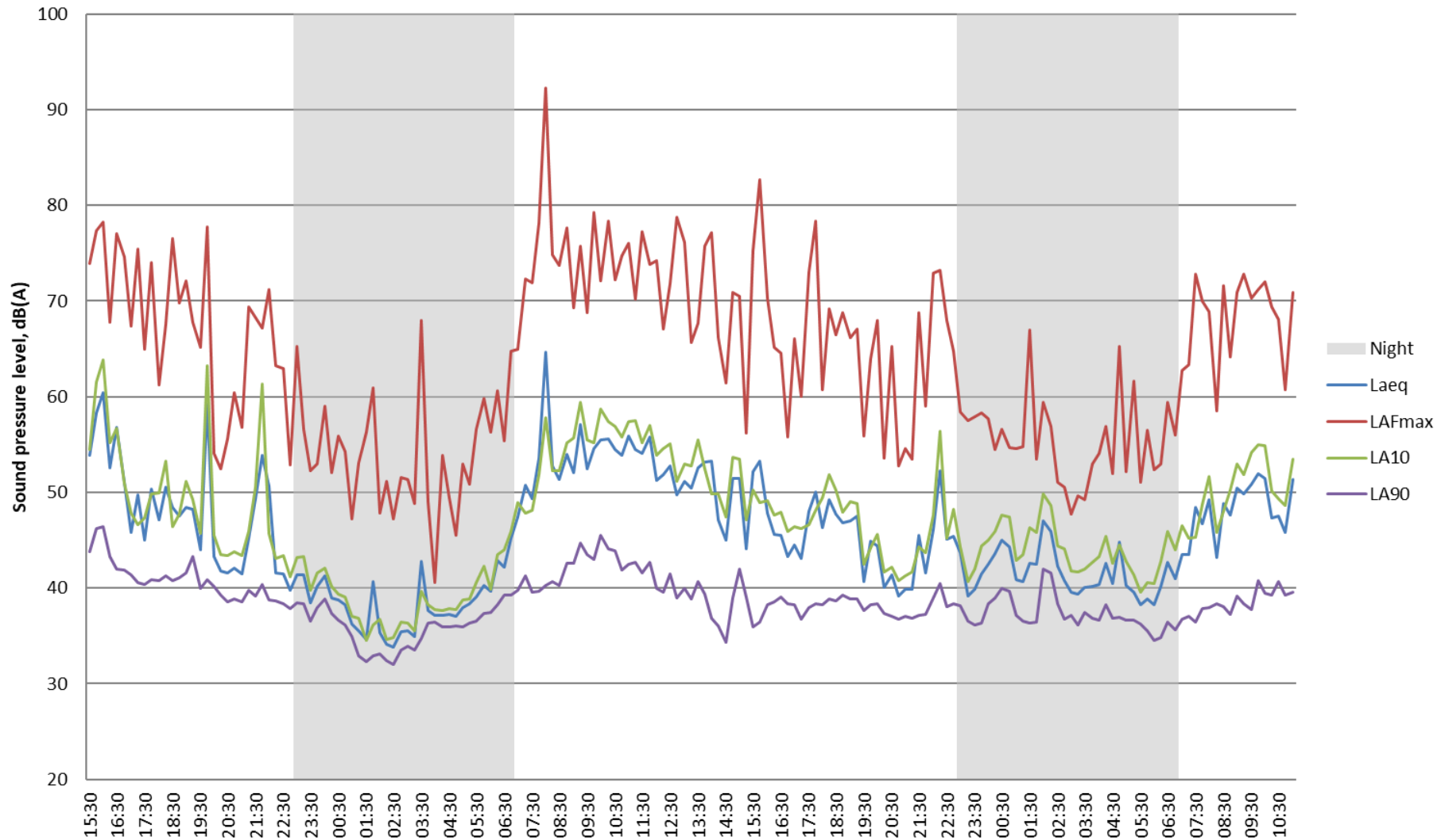
- D.6 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the installation and removal of the meter.

Weather Conditions				
Measurement Location	Time/Date	Description	Beginning of Survey	End of Survey
As indicated on Appendix B	15.30 10 Nov - 11.15 13 Nov 2023	Temperature (°C)	17	14
Cloud Cover Symbol Scale in oktas (eighths)  0 Sky completely clear  1  2  3  4 Sky half cloudy  5  6  7  8 Sky completely cloudy  (9) Sky obstructed from view		Precipitation:	No	No
		Cloud cover (oktas – see guide)	2	3
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	Yes	Yes
		Wind Speed (m/s)	<1	1.4
		Wind Direction	E	W
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results

- D.7 The results of the survey are considered to be representative of the environmental sound levels in the area. During installation and removal of the meter, the noise climate at the survey location was predominantly due to distant road traffic, with intermittent local commercial noise sources occasionally audible. The results of the survey are presented in a time history graph overleaf.

Furniss Way Business Centre Friday 10 - Sunday 12 Nov 2023



Appendix E Outline plant noise calculations

Employment units - daytime

Receptor	Limiting source sound pressure level (each unit)		Distance from closest unit (m)	Correction (dB)	Directivity (dB)	Screening (dB)	BS4142 Feature (dB)	Cumulative correction (dB)*	Rating level at receptor (dB L _{Ar} , 1hr)
	dBA	at (m)							
R1	53	1	16	-24	0	0	3	+4	36
R2	53	1	19	-26	3	0	3	+4	37

**derived from individual calculations for each unit, including distance corrections to nearest part of receptor area*

Employment units – night-time

Receptor	Limiting source sound pressure level (each unit)		Distance from closest unit (m)	Correction (dB)	Directivity (dB)	Screening (dB)	BS4142 Feature (dB)	Cumulative correction (dB)*	Sound pressure level at receptor (dB L _{Aeq})
	dBA	at (m)							
R1	49	1	16	-24	0	0	n/a	+4	29
R2	49	1	19	-26	3	0	n/a	+4	30

**derived from individual calculations for each unit, including distance corrections to nearest part of receptor area*

Employment units – normal working hours

Receptor	Limiting source sound pressure level (each unit)		Distance from closest unit (m)	Correction (dB)	Directivity (dB)	Screening (dB)	BS4142 Feature (dB)	Cumulative correction (dB)*	Rating level at receptor (dB L _{Ar} , 1hr)
	dBA	at (m)							
R1	55	1	16	-24	0	0	3	+4	38
R2	55	1	19	-26	3	0	3	+4	39

**derived from individual calculations for each unit, including distance corrections to nearest part of receptor area*

Appendix F Noise break-out

		Unit						
		1 - S	1 - W	1 - E	1 - Roof	2 - W	2 - E	2 - Roof
Receptor R1 - façade								
Typical estimated reverberant sound pressure level	dB L _{Aeq}	70	70	70	70	70	70	70
Sound reduction of building envelope	dB R _w	35	25	35	35	25	35	35
Area of radiating building envelope	m2	27	14	56	154	14	42	112
Area correction	dB	14	11	17	22	11	16	20
Inside-outside correction	dB	-6	-6	-6	-6	-6	-6	-6
Sound power level of building envelope	dB(A)	43	50	46	51	50	45	49
Distance to receptor	m	24	31	18	23	31	18	23
Distance correction	dB	-22	-23	-21	-22	-23	-21	-22
Screening correction	dB	0	-15	0	0	-15	0	0
Directivity correction	dB	-3	0	0	-3	0	0	0
Resultant noise level at Receptor	dB(A)	18	12	25	26	12	24	27
Combined	dB(A)	32						
Receptor R1 - garden								
Typical estimated reverberant sound pressure level	dB L _{Aeq}	70	70	70	70	70	70	70
Sound reduction of building envelope	dB R _w	35	25	35	35	25	35	35
Area of radiating building envelope	m2	27	14	56	154	14	42	112
Area correction	dB	14	11	17	22	11	16	20
Inside-outside correction	dB	-6	-6	-6	-6	-6	-6	-6
Sound power level of building envelope	dB(A)	43	50	46	51	50	45	49
Distance to receptor	m	12	31	7	13	21	7	13
Distance correction	dB	-19	-23	-16	-19	-21	-16	-19
Screening correction	dB	0	-15	0	0	-15	0	0
Directivity correction	dB	-3	0	0	-3	0	0	0
Resultant noise level at Receptor	dB(A)	21	12	30	29	14	29	30
Combined	dB(A)	36						
Receptor R2 - façade								
Typical estimated reverberant sound pressure level	dB L _{Aeq}	70	70	70	70	70	70	70
Sound reduction of building envelope	dB R _w	35	25	35	35	25	35	35
Area of radiating building envelope	m2	27	14	56	154	14	42	112
Area correction	dB	14	11	17	22	11	16	20
Inside-outside correction	dB	-6	-6	-6	-6	-6	-6	-6
Sound power level of building envelope	dB(A)	43	50	46	51	50	45	49
Distance to receptor	m	19	24	31	25	35	40	35
Distance correction	dB	-21	-22	-23	-22	-23	-24	-23
Screening correction	dB	0	0	-10	-5	0	-15	-10
Directivity correction	dB	0	-3	0	-3	0	0	-3
Resultant noise level at Receptor	dB(A)	22	25	13	21	27	6	13
Combined	dB(A)	31						
Receptor R2 - Garden								
Typical estimated reverberant sound pressure level	dB L _{Aeq}	70	70	70	70	70	70	70
Sound reduction of building envelope	dB R _w	35	25	35	35	25	35	35
Area of radiating building envelope	m2	27	14	56	154	14	42	112
Area correction	dB	14	11	17	22	11	16	20
Inside-outside correction	dB	-6	-6	-6	-6	-6	-6	-6
Sound power level of building envelope	dB(A)	43	50	46	51	50	45	49
Distance to receptor	m	15	23	25	18	27	32	28
Distance correction	dB	-20	-22	-22	-21	-22	-23	-22
Screening correction	dB	0	0	-10	-5	0	-15	-10
Directivity correction	dB	0	-3	0	-3	0	0	-3
Resultant noise level at Receptor	dB(A)	23	25	14	22	28	7	14
Combined	dB(A)	31						

Appendix G Receipts and despatches

Receptor R1 – façade

Front of Unit 1	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	Resultant L _{Amax} at receptor (dB)	BS4142 feature corr'n	SEL + feature
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)					
Vehicle arrival / pass-by	66	68	2	3	33	-10	-15	44	43	3	47
Manoeuvring	65	58	1	0	33	-10	-15	40	33	3	43
Door open/close	60	68	2	3	30	-10	-15	38	43	6	44
Materials handling	51	59	4	6	33	-10	-15	32	34	6	38
Engine starts and departs	66	68	1	0	33	-10	-15	41	43	3	44
Combined								47			51
Overall feature correction											+4
L_{Aeq} (1hour)								12			
L_{Ar}, 1hr											15
Range of L_{Amax}									33-43		

Front of Unit 2	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	Resultant L_{Amax} at receptor (dB)	BS4142 feature corr'n	SEL + feature
	SEL @ 10m	L_{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)					
Vehicle arrival / pass-by	66	68	2	3	31	-10	-15	44	43	3	47
Manoeuvring	65	58	1	0	31	-10	-15	40	33	3	43
Door open/close	60	68	2	3	28	-9	-15	39	44	6	45
Materials handling	51	59	4	6	31	-10	-15	32	34	6	38
Engine starts and departs	66	68	1	0	31	-10	-15	41	43	3	44
Combined								48			51
Overall feature correction											+4
L_{Aeq} (1hour)								12			
L_{Ar}, 1hr											16
Range of L_{Amax}									33-43		
Combined $L_{Ar,Tr}$ (Units 1 and 2)											19

Receptor R1 – garden

Front of Unit 1	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)		
Vehicle arrival / pass-by	66	68	2	3	22	-7	-15	47
Manoeuvring	65	58	1	0	22	-7	-15	43
Door open/close	60	68	2	3	22	-7	-15	41
Materials handling	51	59	4	6	22	-7	-15	35
Engine starts and departs	66	68	1	0	22	-7	-15	44
Combined								51
Correction for 20 activities / working day								+13
Correction for 10hr working day								-46
L_{Aeq,T} (working hours)								18

Front of Unit 2	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)		
Vehicle arrival / pass-by	66	68	2	3	22	-7	-15	47
Manoeuvring	65	58	1	0	22	-7	-15	43
Door open/close	60	68	2	3	22	-7	-15	41
Materials handling	51	59	4	6	22	-7	-15	35
Engine starts and departs	66	68	1	0	22	-7	-15	44
Combined								51
Correction for 20 activities / working day								+13
Correction for 10hr working day								-46
L_{Aeq,T} (working hours)								18
Combined L_{Aeq,T} (Units 1 and 2)								21

Receptor R2 – façade

Front of Unit 1	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	Resultant L _{Amax} at receptor (dB)	BS4142 feature corr'n	SEL + feature
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)					
Vehicle arrival / pass-by	66	68	2	3	27	-9	0	60	59	3	63
Manoeuvring	65	58	1	0	21	-6	0	59	52	3	62
Door open/close	60	68	2	3	26	-8	0	55	60	6	61
Materials handling	51	59	4	6	26	-8	0	49	51	6	55
Engine starts and departs	66	68	1	0	26	-8	0	58	60	3	61
Combined								64			68
Overall feature correction											+4
L_{Aeq} (1hour)								29			
L_{Ar}, 1hr											32
Range of L_{Amax}									51-60		

Front of Unit 2	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	Resultant L _{Amax} at receptor (dB)	BS4142 feature corr'n	SEL + feature
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)					
Vehicle arrival / pass-by	66	68	2	3	31	-10	0	59	58	3	62
Manoeuvring	65	58	1	0	25	-8	0	57	50	3	60
Door open/close	60	68	2	3	31	-10	0	53	58	6	59
Materials handling	51	59	4	6	31	-10	0	47	49	6	53
Engine starts and departs	66	68	1	0	31	-10	0	56	58	3	59
Combined								63			67
Overall feature correction											+4
L_{Aeq} (1hour)								27			
L_{Ar}, 1hr											31
Range of L_{Amax}									49-58		
Combined L_{Ar,Tr} (Units 1 and 2)											35

Receptor R2 – garden

Front of Unit 1	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)		
Vehicle arrival / pass-by	66	68	2	3	22	-7	0	62
Manoeuvring	65	58	1	0	18	-5	0	60
Door open/close	60	68	2	3	22	-7	0	56
Materials handling	51	59	4	6	22	-7	0	50
Engine starts and departs	66	68	1	0	22	-7	0	59
Combined								66
Correction for 20 activities / working day								+13
Correction for 10hr working day								-46
L_{Aeq} (working hours)								33

Front of Unit 2	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)
	SEL @ 10m	L _{Amax} @ 10m	No.	Corr'n (dB)	Distance (m)	Corr'n (dB)		
Vehicle arrival / pass-by	66	68	2	3	25	-8	0	61
Manoeuvring	65	58	1	0	25	-8	0	57
Door open/close	60	68	2	3	25	-8	0	55
Materials handling	51	59	4	6	25	-8	0	49
Engine starts and departs	66	68	1	0	25	-8	0	58
Combined								64
Correction for 20 activities / working day								+13
Correction for 10hr working day								-46
L_{Aeq} (working hours)								31
Combined L_{Aeq,T} (Units 1 and 2)								35