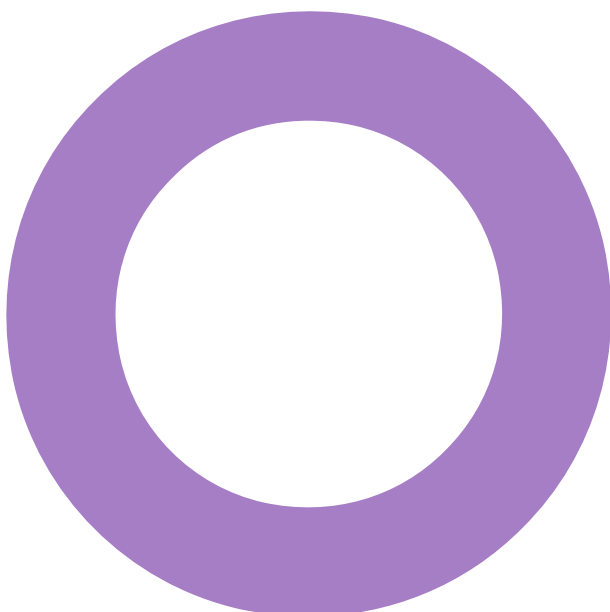


Observer Park, Arborfield. Reading. Tungsten Properties.

ACOUSTICS

NOISE IMPACT ASSESSMENT
PROPOSED COMMERCIAL DEVELOPMENT
REVISION 02 – 29 JANUARY 2026



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	14/11/2025	Initial Issue	AM	AP	PM
01	02/12/2025	Updated traffic flow data	AM	AM	PM
02	29/01/2026	Updated barrier fence details	AM	AM	PM

This document has been prepared for Tungsten Properties only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

Project number: 791-0424550

Document reference: REP-791-0424550-HL-Bridge Farm Noise Impact Assessment-Rev02.docx

Contents.

Audit sheet.	2
Executive summary.	4
1. Introduction.	5
2. Site context.	5
3. Policy and guidance.	6
National policy.	6
4. Environmental acoustic survey.	6
4.1 Methodology.	6
4.2 Survey results.	7
5. Control of noise emissions.	9
5.1 Plant Noise.	9
5.2 Noise break-out from the production buildings.	10
5.3 HGV Impact.	11
5.4 Assessment of maximum noise events.	13
5.5 Context.	13
5.6 Uncertainty.	14
6. Recommendations.	14
6.1 Building Envelopes.	14
6.2 Barrier screening.	14
6.3 Plant Noise.	14
7. Summary and conclusions.	14
Appendix A: Site Layout.	15
Appendix B: Acoustic survey equipment.	16
Appendix C: Time history charts.	17
Appendix D: Policy and Guidance.	18
National policy.	18
Appendix E: Glossary of acoustic terminology.	21

Executive summary.

Hoare Lea have been appointed by Tungsten Properties to undertake a Noise Impact Assessment to support the Reserved Matters Application for the proposed development known as Observer Park, located at Bridge Farm, Arborfield, Reading.

The site benefits from outline planning consent for up to 11 no. commercial units to provide 6,986sqm GIA commercial / employment development predominantly within Class B8 and/or Class E(g) uses.

The associated condition relating to noise states,

Condition 27

Before the development hereby permitted commences a Noise Assessment shall be submitted to and approved in writing by the local planning authority which specifies the provisions to be made for the control of noise emanating from the proposed units and the approved scheme shall be fully implemented prior to the occupation of the units.

The noise assessment shall be carried out by a suitably qualified acoustic consultant-engineer and shall consider the provisions of BS4142. The assessment shall identify all sources of noise including vehicles, plant or machinery and proposed operating times.

Reason: To protect the occupiers of the nearby property/dwellings from unreasonable noise levels and to ensure satisfactory noise attenuation measures are installed. Relevant Policy: NPPF Section 15 (Conserving and Enhancing the Natural Environment), Core Strategy Policies CP1 and CP3 and Managing Development Delivery Local Plan 2014 Policy CC06.

In addition to the above, there is an additional condition relating to plant noise as detailed below:

Condition 28

All fixed plant/machinery installed or operated in connection with the carrying out of this permission shall be enclosed and/or attenuated so that noise output does not exceed at any time a level of 5dB[A] below the existing background noise level when measures at a point one meter external to the nearest residential or noise sensitive property. Any recommended noise mitigation measures should be retained and maintained thereafter."

*Reason: To ensure that no nuisance or disturbance is caused to the occupiers of properties.
Relevant policy: Same as for Condition 27.*

The proposals comprise the development of four buildings which will be split into seven units of varying sizes. It is recognised that external noise emissions from any new plant associated with the development will need to be controlled as to protect the amenity of existing noise-sensitive uses nearby.

This report provides details of an environmental acoustic survey undertaken to determine the existing background and ambient noise levels at locations considered representative of the closest identified noise-sensitive receptors.

Background sound levels have been used to derive plant noise emission limits at the closest noise sensitive properties in line with BS 4142 and the requirements of Condition 28. Outline guidance has been provided on the type of acoustic mitigation measures that will likely be required to achieve the plant noise limits.

An assessment is provided for the likely use of service yards and their impact on the nearest proposed dwellings to the east. Use of these yards if left unscreened is likely to result in a level of 'adverse impact' and as such, provision has been made for timber fencing between each of the units in order to reduce the level of noise impact to a level of 'low impact'.

1. Introduction.

Hoare Lea have been appointed by Tungsten Properties to undertake a noise assessment relating to the Reserved Matters planning application of the proposed development known as Observer Park located at Bridge Farm, Reading. The proposed development includes the erection of 4 buildings split between seven units of varying sizes.

An environmental acoustic survey has been undertaken to quantify the existing ambient and background sound levels at locations representative of the closest identified noise-sensitive receptors.

The survey data has been used to establish the design constraints on noise emissions from the operation of vehicles and fixed plant that will be associated with the proposed development.

Based on our understanding of the intended future use of the buildings, outline recommendations for noise control mitigation are provided.

This report summarises the survey and provides details of the above assessments. The report is suitable for submission alongside the Reserved Matters planning application for the development.

As this report contains technical terminology a glossary of terms is provided in Appendix E.

2. Site context.

The proposed development site is located within Arborfield, Oxfordshire at the Bridge Farm site on green field land.

The vehicle entrance to the Site is from Reading Road in the north which currently provides access to existing commercial and industrial buildings which are located to the north of the site.

The site is bounded to the east by the A327 Observer Way. On the far side of the road is a large area of open farmland.

To the east of the site is an area of woodland with Greensward Lane beyond with residential dwellings on the far side of the road. It is expected that these dwellings will be the nearest sensitive dwellings to the development site.

A boundary treatment plan which provides an indication of the provisional site layout is shown in Appendix A to this report. This plan includes details of the 3.0 metre high timber fence which will run along the eastern service yards to units 3, 5 and 6.

All units will be served by dedicated service yards and car parking, with two loading bays per unit. To the south of the site will be an amenity spaces whilst protected green spaces will line the northern and eastern boundaries.

Figure 1 below shows the indicative site boundary of the proposed development and the closest existing noise-sensitive receptors.

Figure 1: Satellite image showing the indicative site boundary and the closest noise-sensitive receptors.



The dominant noise source at the closest noise-sensitive receptors is road traffic noise from the local road network – both Reading Road to the north and Observer Way to the west. Birdsong was also noted during the site visit.

3. Policy and guidance.

Details of the policy and guidance documentation relating to this development are provided in Appendix D to this report.

National policy.

- *Noise Policy Statement for England.*
- *National Planning Policy Framework.*
- *Planning Practice Guidance.*
- *British Standard 4142:2014+A1:2019.*

4. Environmental acoustic survey.

4.1 Methodology.

An environmental acoustic survey was carried out at the site over a seven-day period from Thursday 30th October to Wednesday 5th November 2025. The purpose of the survey was to establish the typical baseline conditions for the site and surrounding noise sensitive receptors. Additional spot measurements were undertaken beyond the eastern site boundary close to dwellings located on the far side of Greensward Lane. The survey covered a duration considered to be representative of the nearest noise-sensitive receptors.

The survey measurement locations are highlighted in Figure 2 below.

Figure 2: Satellite image showing the acoustic survey measurement locations.



The microphones of the measurement locations were positioned at a height of approximately 1.5 metres above the local ground level.

The unattended measurement locations consisted of fifteen-minute duration samples of ambient residual sound levels ($L_{Aeq,15\text{ min}}$) and background sound levels ($L_{A90,15\text{ min}}$).

Weather conditions were monitored remotely. During the survey, weather conditions were generally suitable for noise survey measurements with wind speeds less than 5 m/s. Any increased noise levels thought to be due to adverse weather have been excluded from the acoustic assessments.

The survey equipment was field calibrated immediately before and immediately after the measurement period; no significant drift in level was found to have occurred. The measurement instrumentation used is listed in Appendix B.

4.2 Survey results.

A time history chart for both the unattended measurement locations are provided in Appendix C.

Residual sound levels.

The residual sound level is the ambient sound level (usually expressed as $L_{Aeq,T}$) in the absence of the specific sound source.

The measured residual sound levels at the unattended measurement locations are summarised in Table 1 below.

Date	Position L1 (west)	
	Daytime residual sound level, dB $L_{Aeq,16hr}$	Night-time residual sound level, dB $L_{Aeq,8\text{ hr}}$
30/10/2025	69	62
31/10/2025	70	62
01/11/2025	70	61
02/11/2025	70	62
03/11/2025	70	61
04/11/2025	69	62
05/11/2025	71	-

Table 1: Measured residual sound levels at the unattended measurement locations.

Based on the results summarised in Table 1, the residual sound levels were typically 70 dB $L_{Aeq,16\text{ hr}}$ during the daytime and 62 dB $L_{Aeq,8\text{ hr}}$ during the night-time at Location L1.

A summary of the noise levels undertaken at Position A are provided below.

Date	Position A (East)			
	$L_{Aeq,15\text{-min}}$	L_{Amaxr}	$L_{A10,15\text{-min}}$	$L_{A90,15\text{-min}}$
30/10/2025 14:00 – 14:15	57	62	60	54
30/10/2025 14:15 – 14:30	58	64	60	54
30/10/2025 14:30 – 14:45	57	63	59	54
Typical levels	58	62 - 64	60	54

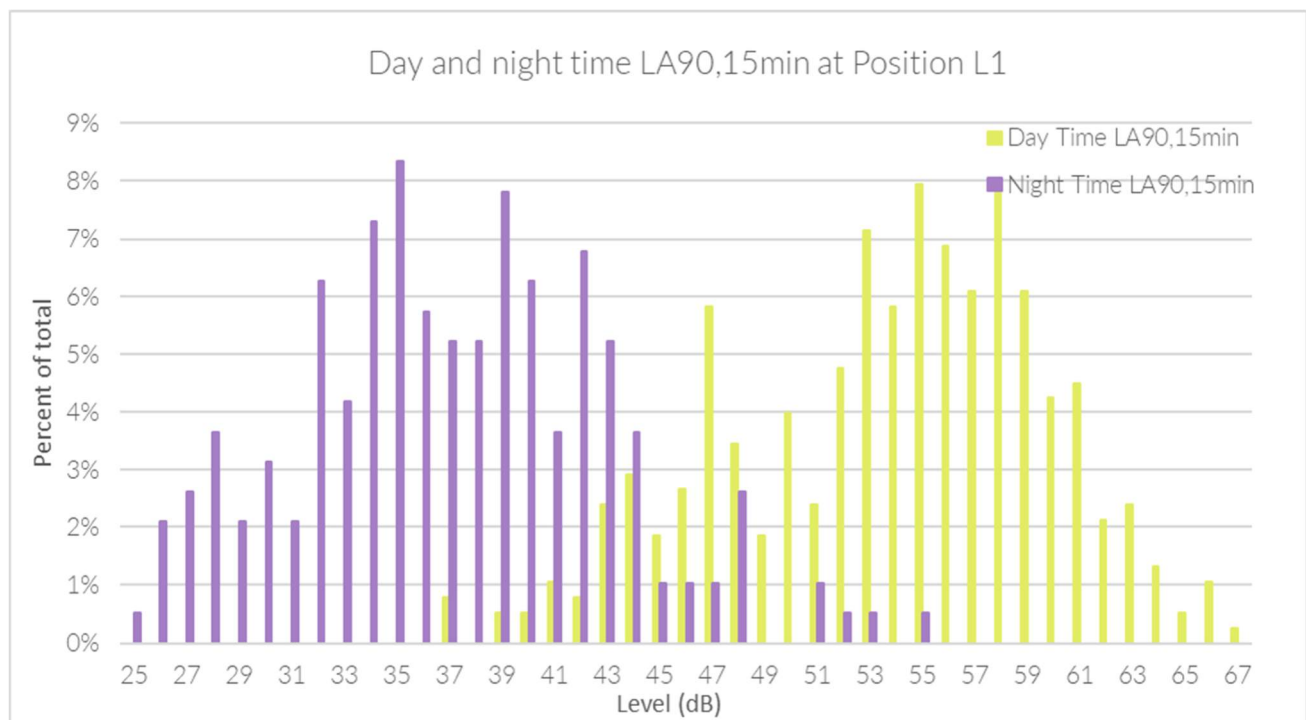
Table 2: Summary of sound levels at the attended measurement location A.

Background sound levels.

In line with the guidance given in BS 4142, in order to “quantify what is typical during particular time periods”, a statistical analysis of the measured background sound levels had been undertaken.

The periods of interest for this development are daytime and night-time. Daytime is taken as between the hours of 07:00 and 23:00. Night-time is taken as between the hours of 23:00 and 07:00.

The 15-minute duration background sound values measured during the day will never be higher than the $L_{A90,1\text{ hr}}$ for that period so represents a worst-case. The measured 15-minute values will be used in place of the daytime hour reference time interval required by BS 4142.

Figure 3: Statistical analysis of the background sound levels measured at unattended location L1.

From the above statistical analysis charts and the time history charts provided in Appendix C, given the context of the site, the following typical lower background sound levels have been determined as representative of the periods of interest at the closest noise-sensitive receptors:

Noise logger location	Typical lower background sound level	
	Daytime (07:00-23:00), dB LA90,1 hr	Night-time (23:00-07:00), dB LA90,15 min
Position L1	45	30

Table 3: Typical lower background sound level at the closest noise-sensitive receptors.

Noise levels measured simultaneously at Position A to the east of the site indicate that background noise levels away from the road were equivalent to those measured at Position L1. As such, it is deemed reasonable that the background noise levels above are representative of noise levels at the nearest sensitive dwellings to the development site.

5. Control of noise emissions.

5.1 Plant Noise.

5.1.1 Plant noise emission limits.

In line with the requirements of Condition 28, the proposed noise emission limit is for the rating level ($L_{Ar,Tr}$) of the combined proposed fixed plant items to be 5 dB below the typical background sound level. This would provide an indication of the specific sound source having a low impact, given the context, when assessed following the BS 4142 methodology.

Fixed plant noise emission limit (normal operation of plant):

$$\begin{array}{lll} \text{Rating level} & \leq & \text{Background sound level} - 5 \text{ dB} \\ L_{Ar,Tr} & \leq & L_{A90,Tr} - 5 \text{ dB} \end{array}$$

Based on the determined background sound levels in Table 3, the following design limits have been established for new building services associated with the proposed scheme. These limits apply to the cumulative free-field rating level assessed at one metre from the nearest noise-sensitive receptors in line with the requirements of Condition 28.

Noise-sensitive receptor	Period	Reference time interval	Background sound level, dB LA90,Tr	Rating sound level limit, dB LAr,Tr
Greensward Lane	Daytime (07:00-23:00)	1 hour	45	40
	Night-time (23:00-07:00)	15 minutes	30	25

Careful consideration shall be given to any readily identifiable acoustic characteristics with appropriate character corrections applied to the rating level as per the methodology of BS 4142.

5.1.2 Noise control strategy for plant.

At this relatively early stage of the design, plant selections are unknown. Ongoing acoustic advice shall be provided throughout the design development and the limits set out above shall form the basis of the design. This can also be controlled through a suitably worded planning condition.

It is anticipated that the plant noise limits can be achieved, and the following noise control measures will be considered within the scheme to meet the noise emission limits:

- Selecting low noise equipment.

- Any fan intake and exhaust connections (including any emergency smoke fans) fitted with induct sound attenuators.
- Acoustic attenuation packages to the heating and cooling plant units.
- Equipment provided with suitably rated anti-vibration mounts.
- Acoustic barrier screening to external plant compound area.

5.2 Noise break-out from the production buildings.

Sound transfer to outside from activity within each of the buildings will be determined by the sound reduction provided by the building fabric and by the distance between the building and the receptor.

It is understood that the main building fabric will be constructed from steel frame with an outer cladding. As a worst case, it is assumed that the outer cladding will be composite thermal panels with a minimum manufacturer's rated sound reduction of R_w 27 dB.

Measurement exercises carried out in several large manufacturing workshops indicate reasonably consistent levels in the range L_{Aeq} 75-77dB with an overall mean level of $L_{Aeq,1hr}$ 76dB and highest maximum levels in the range L_{Amax} 90-95dB. These levels are quite loud and would require shouted conversation for communication between two individuals 1m apart. For warehouse operations, a recent measurement exercise within an existing warehouse facility indicated that, over a one-hour period in an active section of the warehouse, typical sound levels were in the range $L_{Aeq,5-min}$ 50-64dB with an overall mean level of $L_{Aeq, 1-hour}$ 59dB. Short duration maximum levels were in the range L_{Amax} 80-82dB.

The assessment below has been based on the permitted lower warehouse sound levels. On this basis, the break-out sound level just outside the building, from standard theory, would be approximately L_{Aeq} 31dB.

For positions at a significant distance from the proposed building, there will be additional distance attenuation and an accepted method of determining noise breakout can be calculated in accordance with the principles of BS EN 12354-4.

The predicted break-out sound levels from each of the units based upon a nominal position mid-way along Greensward Lane with a 9 metre unit height is as follows:

<u>Dwellings to the east:</u>	Unit 3 eastern façade (171m ² , 90 metres offset): dB 12 $L_{Aeq,T}$
	Units 1-3 southern façade (819m ² , 125 metres offset): 17 dB $L_{Aeq,T}$
	Unit 5 eastern façade (216m ² , 67 metres offset): 16 dB $L_{Aeq,T}$
	Unit 6 eastern façade (216m ² , 75 metres offset): 15 dB $L_{Aeq,T}$
	Unit 7 northern façade (216m ² , 105 metres offset): 12 dB $L_{Aeq,T}$
	Unit 7 eastern façade (414m ² , 115 metres offset): 14 dB $L_{Aeq,T}$
	Total: 23 dB $L_{Aeq,T}$

An assessment of the calculated emission levels at the nearest dwellings in accordance with BS 4142 is shown below:

Table 4 BS4142 Assessment of break-out noise impact at nearest dwellings (East).

Parameter	Nearest dwellings	
	Day, dB	Night, dB
<i>Specific sound level, L_{Aeq}</i>	23	23
<i>Residual sound level, L_{Aeq}</i>	53 - 59	40 - 50
Acoustic feature correction (other)	+3	+3
<i>Rating level at nearest dwelling</i>	26	26

Background sound level, $LA_{90, T}$	45	30
Excess of rating over background sound level	-19	-4
BS4142 Assessment- impact	'Low impact'	'Low impact'

BS 4142 defines 'other sound characteristics' where, '*the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied*'.

The table above shows that the BS 4142 assessment at the nearest dwellings with B8 activity within the new warehouse buildings would fall into the category of 'low impact' at the nearest dwellings to the east at all times based upon the assumptions above.

5.3 HGV Impact.

Based upon the current proposed site layout shown in Appendix A, HGVs will enter the site from Reading Road in the north. Dwellings to the east of the development will not have a direct line-of-sight of HGVs for the majority of the access road due to the intervening buildings and 3.0 metre high barrier screening. Once vehicles turn into the service yards, they will travel between 60 and 110 metres.

The largest number of loading bays with an open aspect to the dwellings to the east will be the eight bays associated with Units 1 to 5. The section of access road in and out of the site with an open aspect to dwellings to the east will be typically be 85 metres in length. At 10mph, this section of road would take approximately 19 seconds to traverse.

The typical off-set distance to the nearest dwellings will be 128 metres (85 metres to 170 metres overall).

A Transport Assessment has been produced for the development by ADC Infrastructure in the Technical Note reference 'ADC3776-RPA' dated 23rd July 2025.

Paragraph 21 of the Note states that '*this Technical note has been prepared to support a flexible consent that includes Class E(G)iii, B2 and B8 use. The worst case scenario would be if the entire development was occupied by a tenant operating a B2 use*'.

Paragraph 22 states that 'the resultant HGV trip rates and traffic generation are shown in the table below'.

Class E(G)(iii) / B2 use – HGVs	Peak	Arrive	Depart	Two-way
Vehicle trips rates (per 100sqm)	AM	0.066	0.051	0.117
	PM	0.000	0.000	0.000
	Daily	0.572	0.578	1.150
Vehicle trips (6,982sqm)	AM	5	4	9
	PM	0	0	0
	Daily	40	40	80

An assessment of the noise from HGV movements at the nearest dwellings to the east has therefore, been based upon the following assumptions:

- 5 full movements per hour per unit during the AM peak daytime period.
- 80 / 24 ≈ 3 movements per hour at all other times ≈ 1 movement per 15-minutes.
- The typical vehicle traverse distances as detailed above.
- Source noise data from BS 5228-1
- Point source attenuation based upon a typical distances detailed above.
- 15 metres to reverse at a speed of 5mph equates to an on-time of 7 seconds.
- Barrier screening calculated in accordance with CRTN

With regard to the typical distances detailed above, these are calculated based upon the average distance of the vehicle from source to the most sensitive receiver as the vehicle travels along the access road. Although there

will be brief moments when vehicles are in marginally closer proximity, for the majority of the assessment period these distances will be significantly greater.

Table 5 Predicted HGV noise levels at nearest dwellings (east).

Parameter	Day, dB	Night, dB
Archive HGV noise level ($L_{Aeq,T}$ at 2m)	84	84
On time correction (19 + 7 + 19 seconds)	-19	-13
Specific Noise Level – $L_{Aeq,T}$ dB	65	71
movements in assessment period (dB)	+7 (5)	+0 (1)
Distance Attenuation (2/128m)	-36	-36
Barrier screening (3.0 metres)	-8	-8
Level at Dwelling - L_{Aeq}	28	27

Manufacturer's data indicates that, for tonal alarms, the most common rating level is SWL 96-98 dB.

Table 6 Predicted reversing alarm noise levels at nearest proposed dwellings (east).

Parameter	Day, dB	Night, dB
SWL (dB)	98	98
Alarm noise level (L_{Aeq} at 1m)	90	90
On time correction (7 seconds)	-27	-21
movements per assessment period (dB)	+7 (5)	+0 (1)
Distance Attenuation (1/85m)	-39	-39
Barrier Screening	-8	-8
Level at Dwelling - L_{Aeq}	23	22

From the above, the BS 4142 assessment for vehicle movements at the nearest proposed dwellings to the east can be calculated as follows:

Table 7 BS4142 Assessment of vehicle activity at nearest proposed dwellings (east).

Parameter	Day, dB		Night, dB	
	HGV	Alarm	HGV	Alarm
Specific sound level, $L_{Aeq,T}$	28	23	27	22
Residual sound level $L_{Aeq,T}$	53 - 59		40 - 50	
correction (intermittent +3, tonal +2)	+3	+5	+3	+5
Rating Level at dwelling - L_{Aeq}	31	28	30	27
Total Rating level (log sum)	33		32	
Typical lowest background	45		30	
Difference	-12		+2	
BS4142 Assessment	'low impact'		'low impact'	

In general, activity sound levels at the nearest dwellings are calculated to be below existing ambient levels and as such, specific characteristics will be less apparent than at the storage yard due to the masking effect of general ambient noise.

Under circumstances where characteristics are not 'clearly perceptible', BS4142 Section 9.2 indicates that a penalty of +2 for tonality and +3dB for impulsivity would be appropriate.

The calculated rating sound levels from vehicle movements at the nearest residential dwellings to the east indicate a BS 4142 condition of 'low impact' during the day and night time with the benefit of barrier screening.

Barrier screening has been calculated in accordance with the principles of CRTN for a range of barrier heights with the following assumptions:

- A source height of 1 metre.
- A receiver height of 4.5 metres (i.e. 1st floor windows).
- A typical distance of 20 metres from the activities within the service yard to the barrier.
- A typical distance of 65 metres from the barrier to the nearest residential dwellings.

On the basis of the above, a 3.0-metre-high barrier would provide in excess of 8 dB attenuation at the upper floor windows of the nearest dwelling, increasing to 10 dB at ground floor level.

5.4 Assessment of maximum noise events.

Highest noise levels are expected to be as a result of reversing beepers on the proposed service yard with maximum noise levels from other activities such as HGV manoeuvres, forklift truck manoeuvres and loading and unloading activities either operating at a lower level or operating at significantly greater distance.

The maximum measured noise levels of a reversing alarm is L_{Amax} 90 dB at a distance of 1 metre.

The calculated maximum noise level at the nearest residential dwellings can be calculated as follows:

Parameter	Existing dwellings to the east dB
Alarm Sound Level $L_{Amax,1m}$	90
Distance correction $20 \cdot \log(1/85)$	-39
Barrier correction (3.0 metres)	-8
Resultant External Noise Level, L_{Amax}	43
Attenuation through an open window	-15
Total noise level within Dwelling, L_{Amax}	28

BS 8233 advises that an open window provides a sound reduction of 15 dB and, together with distance and barrier attenuation, this would give a maximum internal noise level significantly below the derived limit of L_{Amax} 45dB, thus achieving the requirements of ProPG which advises that night time maximum sound levels in bedrooms at night should not normally exceed a level of L_{Amax} 45dB more than ten times over the course of the night.

5.5 Context.

It is noted that the proposals are changes to an existing site. There is already existing noise of a commercial / industrial nature on the site to the north and as such, the proposed units and storage yard areas do not introduce a new noise source into the local area. On this basis, it is considered that the use of the development site for B2 and B8 usage will generally be less noticeable than if it was a brand-new noise source to the local area.

Whilst there is the potential for cumulative noise impact, this should be controlled given that all items of plant and activities associated with the development site are shown to be below measured background noise levels if appropriate levels of mitigation are introduced. This ensures that noise levels do not slowly rise over time as additional processes are added to a development site.

5.6 Uncertainty.

It is acknowledged that within the assessment, there is possible variability of the factors used to contribute to the assessment.

The reduction of measurement error in terms of activity noise levels and noise in the local vicinity has been achieved through the use of calibrated class 1 type sound levels meters in all instances.

All measurements and calculations have been presented within the report in order that the assessment method and conclusions can be analysed. In each instance, representative noise levels have been chosen based around typical noise levels audible on the development site and assessed against typical background noise levels measured during times when works were known to not be operating. Where possible, source noise levels have been objectively measured rather than calculated all of which has been used to reduce the level of uncertainty in the assessment provided. However, there will be inherent variability in noise levels for these types of noise sources.

6. Recommendations.

6.1 Building Envelopes.

It is recommended that all elevations across the development achieve a minimum sound reduction value of R_w 27 dB.

6.2 Barrier screening.

Proposals for the site are for the eastern boundary of the service yards to Units 3,5 and 6 to be installed with a solid barrier in order to reduce the level of noise impact at the nearest proposed residential dwellings to the east.

The fencing element of the barrier should be continuous with no significant gaps and of minimum density of 15kg/m^2 . In practice, these requirements can be achieved with close boarded double leaf timber panels and concrete gravel boards.

6.3 Plant Noise.

It is recommended that all fixed external mechanical services plant associated with the new development be selected and specified to achieve the noise limit criteria derived at Section 5.1 of this report. It will be necessary to review plant selections and locations during the construction phase to ensure compliance with the criteria.

7. Summary and conclusions.

Hoare Lea have been appointed to undertake a Noise Impact Assessment for the proposed development site located at the Observer Park development site, Arborfield, Reading.

An environmental acoustic survey was undertaken to quantify the ambient and background sound levels representative of the closest noise-sensitive receptors. The background sound levels have been used to derive plant noise emission limits at the closest noise-sensitive receptors to the development site. Outline guidance has been provided on the type of mitigation measures that will likely be required to achieve the plant noise limits.

On the basis that the rating level from any new plant will be at least 5 dB below the lowest typical background sound levels, this indicates that the proposals will have a low impact upon existing noise-sensitive development. This is expected to satisfy the requirement of Condition 28.

An assessment is provided for the likely use of service yards and their impact on the nearest proposed dwellings to the east. Use of these yards is likely to result in a level of 'low impact' with the introduction of barrier screening as detailed in this report.



Appendix B: Acoustic survey equipment.

The equipment used for the survey are detailed in the tables below. All equipment was used within its respective dates of calibration. Calibration certificates are available upon request. All sound level meters and microphones were field-calibrated before and after the measurement periods and no significant calibration drift was observed.

Unattended Location L1.

Equipment	Type	Serial Number	Last Calibrated
Sound Level Meter	Rion NL-52	1010834	04/08/2024
Microphone	Rion UC-59	20471	04/08/2024
Pre-amplifier	Rion NH-25	11482	04/08/2024

Table 8: Survey equipment details – unattended location 2.

Appendix C: Time history charts.

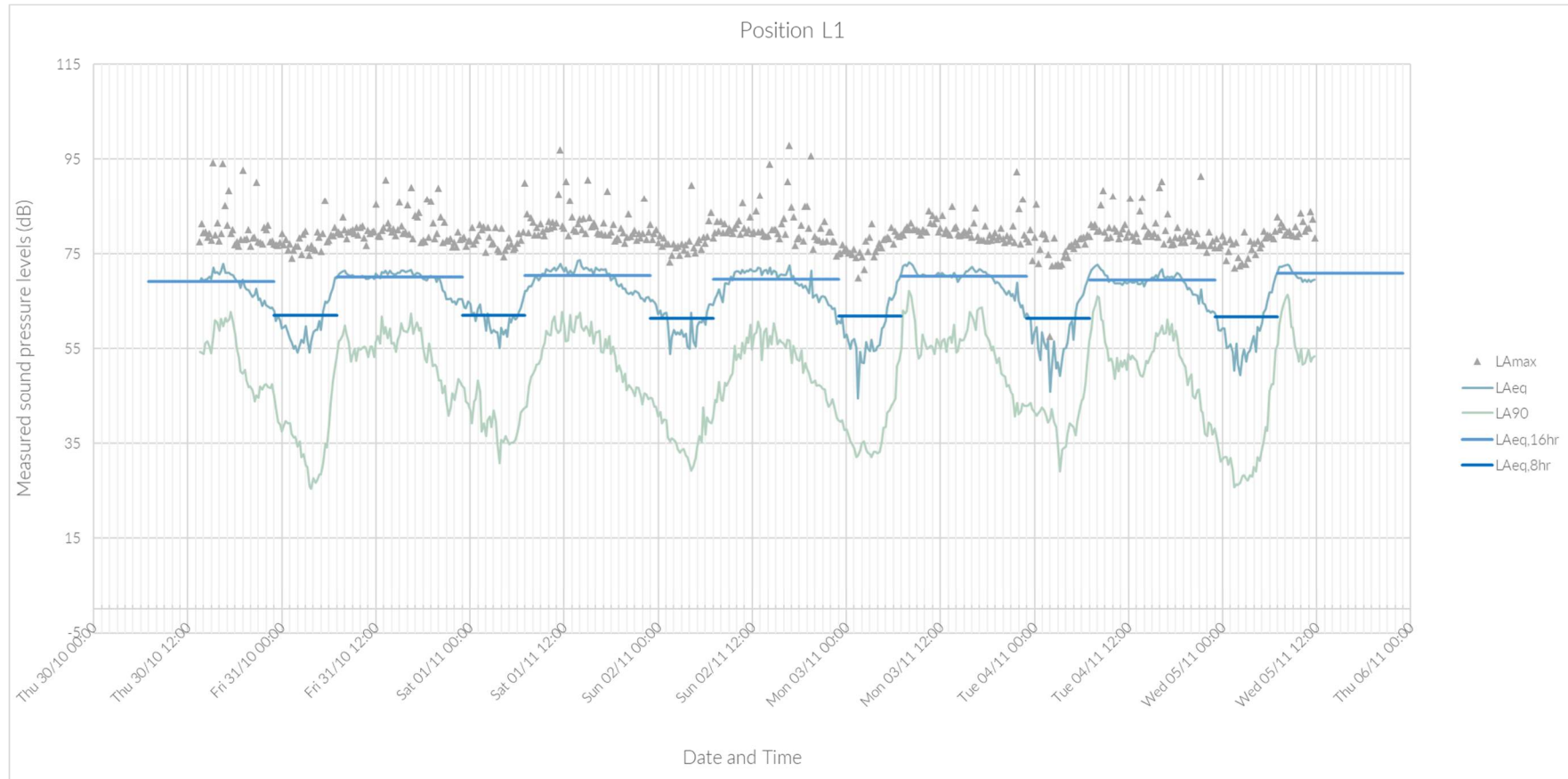


Figure 4: Time history for unattended measurement location 1.

Appendix D: Policy and Guidance.

National policy.

Noise Policy Statement for England.

The Noise Policy Statement for England (NPSE) advises that noise impacts should be assessed on the basis of adverse and significant adverse effects but does not provide any specific guidance on assessment methods or numerical noise limits.

Paragraphs 2.20 and 2.22 of NPSE introduce the concepts summarised in Table 9, which can be applied when considering the significance of noise impacts, as defined by the World Health Organization.

Paragraphs 2.15 of the document advises that it is not possible to have “a single objective noise-based measure that is... applicable to all sources of noise in all situations”. NPSE further advises in paragraph 2.22 that the sound level at which is an adverse effect occurs is likely to be “different for different noise sources, for different receptors at different times”.

Effect level	Description
No Observed Effect Level (NOEL)	This is the noise 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.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level above which adverse effects on health and quality of life can be detected.
Significant Observed Adverse Effect Level (SOAEL)	This is level above which significant adverse effects on health and quality of life occur.

Table 9: NPSE observed effect levels.

National Planning Policy Framework.

National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2024) sets out the Government's planning policies and how these are expected to be applied. In relation to noise and vibration, NPPF section 15 paragraphs 187, 198, and 201 are presented below:

“187. 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 an unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution...”*

“198. 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...”*

“201. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community

facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the application (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Planning Practice Guidance.

Online Planning Practice Guidance (PPG) has been published to provide greater details in relation to the relevance of noise to the planning process following the introduction of NPPF and NPSE.

This guidance states, under the heading '*How can noise impacts be determined?*', that the following should be considered by local authorities:

- '*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 NPSE, this includes identifying where noise exposure is above or below the significant observed adverse effect level and the lowest observed adverse effect level for a given situation during the operation of the Proposed Development.

Further guidance on each of the various observed effect levels set out in NPSE is provided in the table contained within the section headed '*How can it be established whether noise is likely to be a concern?*' which is reproduced below in Table 10.

It is important to note that no specific noise parameters or target noise levels are defined in the text.

Under the heading '*What factors influence whether noise could be a concern?*', the subjective nature of noise is discussed. It is stated that the relationship between noise levels and the impact on those affected is not simple, as this depends on how various factors combine in particular situations.

British Standard 4142:2014+A1:2019.

The British Standard 4142 (British Standard Institution, 2019) provides an objective method for rating the significance of impact from industrial and commercial operations. It describes a means of determining sound levels from fixed plant installations and determining the background sound levels that prevail on a site.

The assessment of impacts is based on the subtraction of the pre-existing background sound level ($L_{A90,T}$) from the rating level ($L_{A,r,T}$).

The standard does not give a definitive method for determining the background sound level but instead, as a commentary, states that "*the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods*".

Clause 8.1.4, which discusses the monitoring duration, states "*there is no 'single' background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.*" As a note to this clause the following commentary is given on obtaining a representative background sound level:

"To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. 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."

The rating level is defined objectively as the specific source noise level in question (either measured or predicted) with graduated corrections for tonality (up to +6 dB), impulsivity (up to +9 dB), intermittency (+3 dB) and other sound characteristics (+3 dB) which may be determined either subjectively or objectively, if necessary.

The background sound level is subtracted from the rating level, and the difference is used to assess the impact of the specific noise source:

- A difference of around +10 dB is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- 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.

Perception	Example of outcomes	Increasing effect level	Action
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 changes in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a 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
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 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 Level	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

Table 10: PPG Observed Effects.

Appendix E: Glossary of acoustic terminology.

Sound.

Sound is physically a regular and order oscillation of air molecules that travels away from a source of vibration and creates fluctuating positive and negative acoustic pressure. When acoustic pressure acts on any solid object it causes microscopic deflections in the surface so that it can manifest in both air and structure.

Noise.

Noise is subjectively sound that evokes a feeling of displeasure in the environment in which it is heard and is therefore unwelcome to the receiver.

Sound pressure level.

Sound pressure level is stated on many of the charts herein. 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.

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.

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 band 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 and would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

A-weighting.

The 'A' weighting is a correction term applied to the frequency range in order to mimic the sensitivity of the human ear to noise. It is generally used to obtain an overall noise level from octave or third octave band frequencies. An 'A' weighted value would be written as dB(A).

Equivalent continuous sound pressure level.

The equivalent continuous sound pressure level (L_{eq}) is a parameter defined as the equivalent continuous sound pressure level. Over a defined time period 'T', it is the sound pressure level equivalent to the acoustic energy of the fluctuating sound signal. The $L_{eq,T}$ can be seen to be an "average" sound pressure level over a given time period (although it is not an arithmetic average). Typically, the $L_{eq,T}$ will be an 'A' weighted noise level in dB(A). It is commonly used to describe all types of environmental noise sources.

Frequency.

Frequency is a term that is regularly used. It is the number of acoustic pressure fluctuations per second (also know is the 'pitch' of a sound). Hertz (Hz) is the unit normally employed to measure the frequency of sound, equal to cycles per second of acoustic pressure fluctuations. The frequency limits of audibility of a healthy human ear are generally accepted as being from 20 Hz to 20,000 Hz.

Background noise level (L_{90}).

The $L_{90,T}$ is a parameter defined as the sound pressure level exceeded for 90% of the measurement period 'T'. It is a statistical parameter and cannot be directly combined to other acoustic parameters. It is generally used to describe the prevailing background noise level or underlying noise level.

Noise event level (L_{01}).

The $L_{01,T}$ is a parameter defined as the sound pressure level exceeded 1% of the measurement period 'T'. It is a statistical parameter and cannot be directly combined to other acoustic parameters. It is generally used to describe the prevailing event noise levels.



ADRIAN MCCORDICK

PRINCIPAL ACOUSTICS ENGINEER

+44 7814 691 337

adrianmccordick@hoarelealea.com

HOARELEA.COM

Billiards Building,
134 Edmund St,
Birmingham
B3 2ES

