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Acoustic Impact Assessment

Vacant Anaerobic Digester Plant, Ludlow Business Park, Coder Road, Ludlow. SY8 4XD.

24 January 2025

Report Reference: 433/BDC(Noise) v1.1

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Contents

Revision 1.1 Amendments to contents table.
Amendment to conclusion section 5.2 (inclusion of deliveries *and chipping*)

1 Introduction

BioDynamic Carbon Limited has commissioned Enviroconsult Limited to provide an assessment of the impact of noise in respect of the proposed development of a pyrolysis process at the vacant Anaerobic Digester Plant, Ludlow Business Park, Coder Road, Ludlow, SY8 4XD.

The layout for the BDC installation has been provided and is used to demonstrate acceptability of the site in acoustic terms based on the identified plant and equipment proposed.

Consultation with Shropshire Environmental Health noted that:

1. Monitoring of the site to produce representative residual and background sound levels for the area was required as part of a BS4142 assessment,
2. The dominant sources were noted to be road traffic, from the existing A49 main road and Parys Road. Industrial activity on the Ludlow Business Park was noted to be light engineering and low level industrial activities.
3. It was agreed that use of modelling to demonstrate existing sound levels in the area would be carried out using road traffic data from Department for Transport, and direct measurement supported by shortened CRTN would be verifiable.
4. The impact of the proposal would be determined by using data supplied by manufacturers from key plant, data for vehicle movements projected for the site, reference library data for vehicles from BS5228 and worst-case assessments of daytime and nighttime operations.
5. Impact assessments should be carried out using BS4142:2014+A1(2019) and comparison to accepted WHO and BS8233:2014 standards.

Compliance with the Shropshire Council planning policy referencing and referencing key policies would be required.

Enviroconsult has produced the report based on the following:

1. Road traffic AADT flow on the A49, supplemented by short duration road noise calculations for the Parys Road has been used to predict a calculated the residual noise level based on the National Physical Laboratory calculation tool.
2. The resulting L_{A10} measurements from 1. are then converted from $L_{A1018hour}$ to $L_{AEQ16hour}$ and $L_{AEQ8hour}$ using the TRL conversion to establish L_{day} and L_{night} levels and this verified against site based monitoring.
3. Sound power data for key plant has been used to evaluate the potential impact of plant on existing sensitive receptors near to the proposed development to the west.
4. A summary of results and the impact assessments has been provided along with the outcomes for the BS4142:2014 + A1(2019), BS8233:2014 and WHO impact assessments
5. Commentary linking result to planning policy and compliance criteria are also provided.

1.1 Statement of qualifications

Tony Higgins has over 30 years of regulatory and consultancy experience dealing with noise and nuisance issues and holds a Post Graduate Diploma in Acoustics and Noise Control. He is a Member of the Institute of Acoustics and is also an elected member of the IOA Measurement & Instrumentation Group. He has spoken at (and organised) many IOA training events considering the implementation of BS4142:2014 and the use of noise measurements in both planning and licensing appeals. Tony managed the Public Protection service at Telford and Wrekin Council, including the Licensing Service, noise and statutory nuisance service and the consultation responses to the planning service.

Tony has also prepared and delivered training materials for the EMAQ training package advising local authorities on the implementation of BS4142:2014. Tony has significant experience carrying out and evaluating data in determination of acoustic impact for complaints, licensing, and planning work, in formal and informal hearings as well as court.

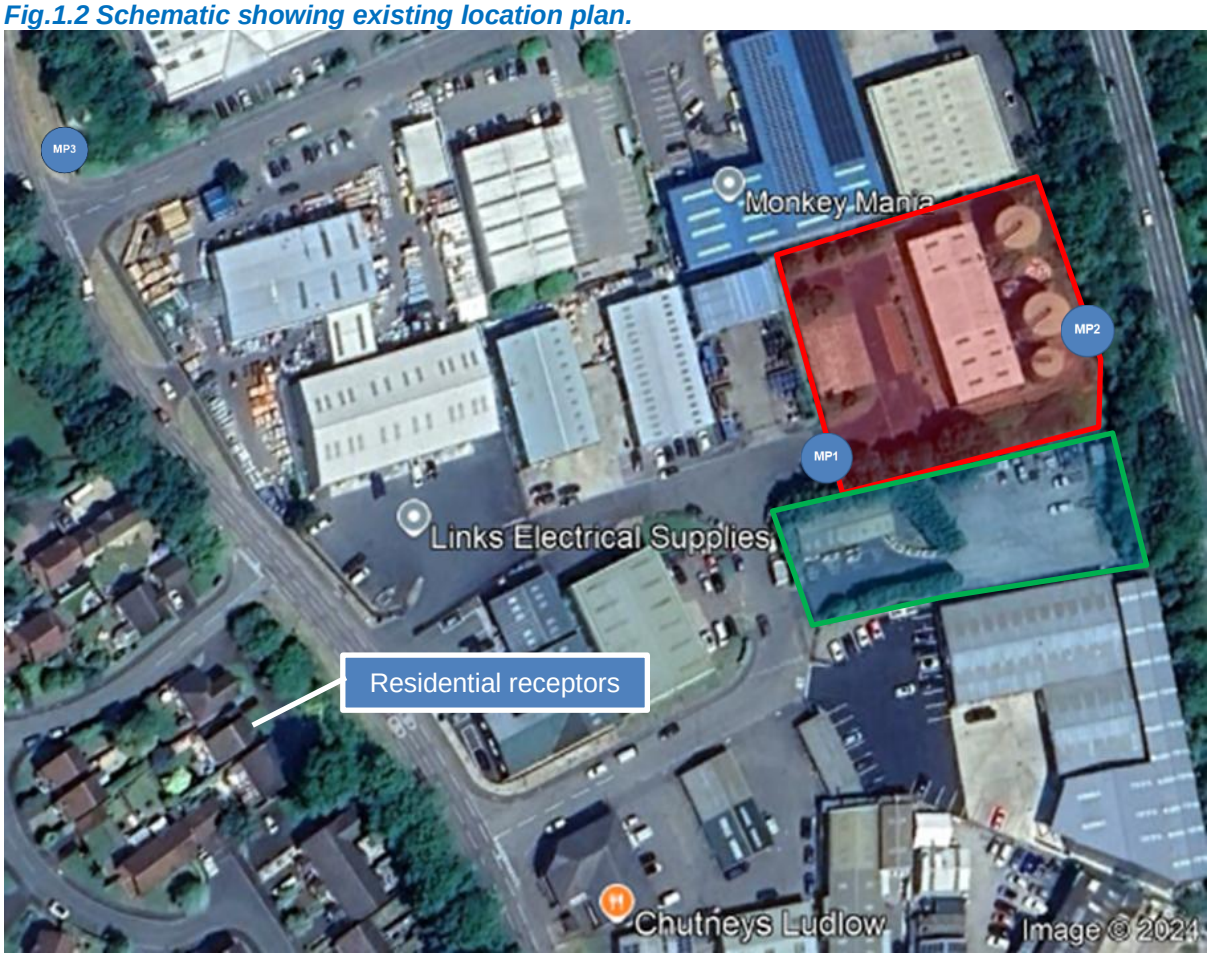
1.2 Site Description

The site is located on the eastern edge of the Ludlow Business Park with access off Coder Road. The site directly adjoins the A49 Ludlow by-pass to the east. The by-pass is on a raised embankment planted with trees. The Business Park comprises a mix of mainly B2 and B8 Uses.

The site is a Protected Employment Area.

The site is situated approximately 110 metres from the nearest residential property which lies to the west (off Parys Road).

Fig.1.2 Schematic showing existing location plan.



Courtesy of Google Earth Image (2024).

Site

Adjacent waste site (in council ownership)

MP* Noise Monitoring points

The site comprises a large area of hardstanding (a mix of concrete and tarmac) which occupies approximately 50% of the land to the west side of the site. The remaining land comprises a large 16m x 40m (630m^2 – 6700 sq. ft) industrial building and 4 large tanks (formerly part of the digestate storage and treatment system.)

The building is a modern construction typical of industrial buildings in the area. It is noted to be brickwork to 2m and then profiled steel overclad on steel framework. The structure is 8.5m to the ridge and 6.5m to the eaves.

The tanks vary in size from estimated 5,000L (the smallest) to 30,000L (the two largest). The two 'northern' tanks are to be removed to allow for the proposed pretreatment facility.

1.3 Proposed development

The proposed pyrolysis plant will be a facility specifically designed to convert organic waste or biomass materials into biochar through the process of pyrolysis.

Pyrolysis is the thermal breakdown of materials (in this case plant materials) in the absence of oxygen. The heat drives off volatile gasses and oil and what is left is mostly carbon in the form of char.

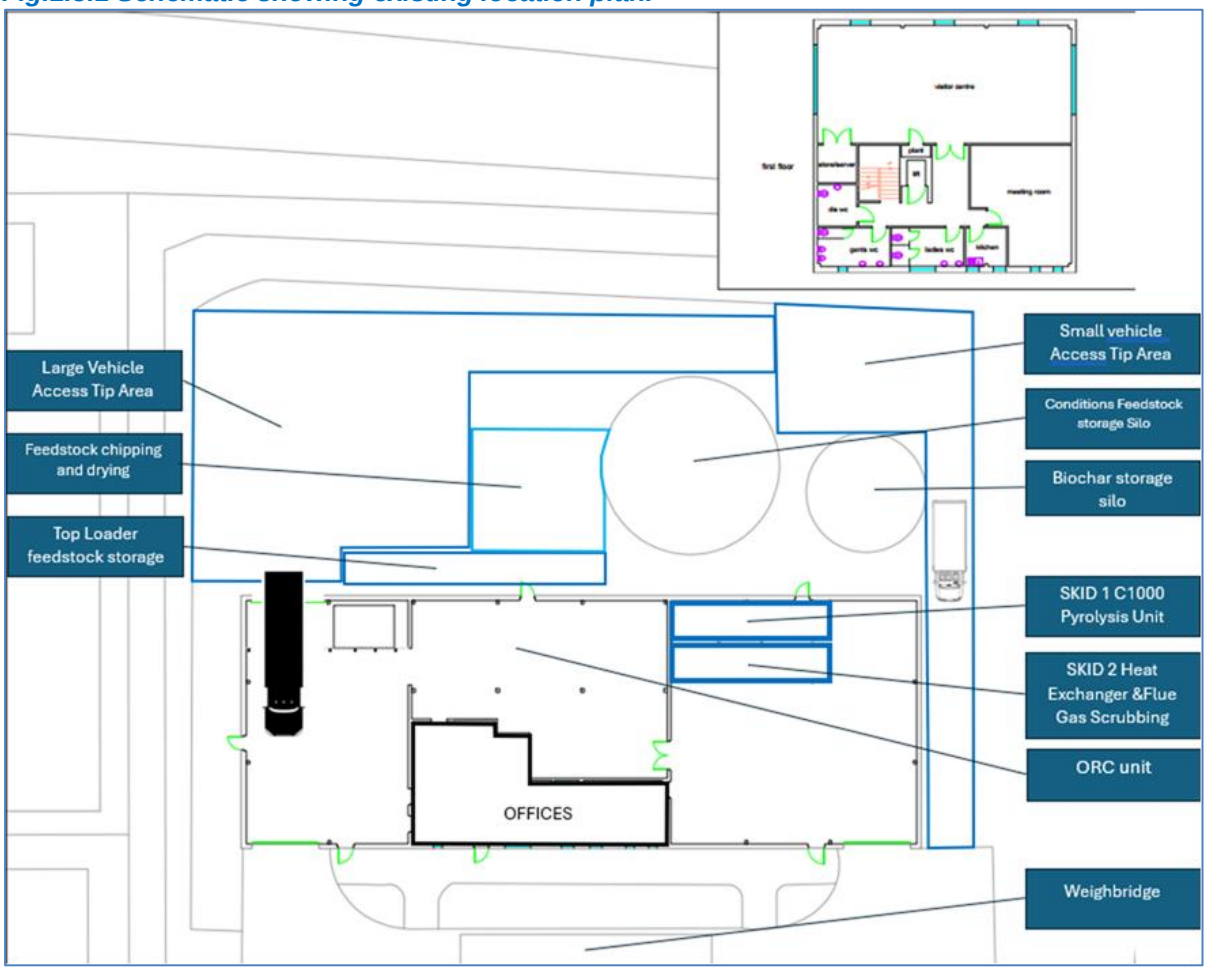
The site will accept ~ 12,500 tonnes of biomass, mainly virgin wood, arboricultural arisings, and compost oversize materials (feedstock). The feedstock will arrive wet (~ 50% moisture content) in vehicles ~26 tonnes with potential for smaller deliveries in vehicles ~7.5 tonnes.

It is anticipated that deliveries to the plant would comprise ~ 700 vehicles over a 12 month period (approximately 13 per week or 2-3 per weekday based on a 5 day working week – approximately 60 tonnes/day (wet)). The pyrolysis process takes the wet feedstock and processes it using a wood chipper, prior to drying. The dry feedstock is then ~10% moisture and has a lower volume which is then introduced into the pyrolysis plant and the thermal treatment is applied.

The pyrolysis gases are then combusted to provide the primary heat for the process (drying and energy generation), whilst the residual char is quenched and removed as a product. The Plant will produce approximately 1700 kW of heat energy, 70 kW of electrical energy and ~3 tonnes/day of biochar.

The layout in Fig.1.3.1 below shows the key locations for plant and machinery.

Fig.1.3.1 Schematic showing existing location plan.



The proposal is to install a pyrolysis plant using the PyroUnity system.

The PyroUnity system is used to convert wet biomass into biochar, associated carbon removal certificates and energy. The design has only two manual elements - the unloading of feedstock in the top loader and the collection of biochar at the end. The entire system has an automated monitoring and control system with a user-friendly Human Machine Interface (HMI).

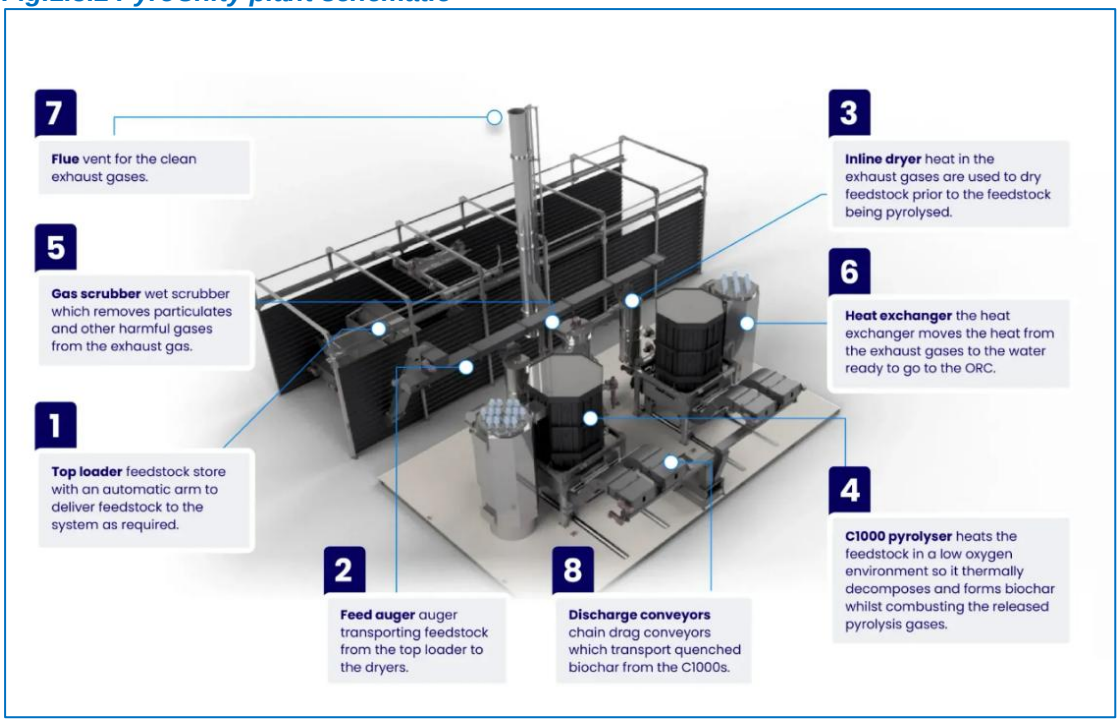
The throughput of the system can be increased or decreased by changing the number of pyrolysis reactors (called C1000s) at the heart of the process.

The entire process has the following key steps:

1. Feedstock is placed in the enclosed top loader where it is protected from the weather.
2. The top loader transports the feedstock in augers to the inline dryers.
3. The inline dryers reduce the moisture content of the feedstock to 10-15% and pre-heat the feedstock ahead of its delivery to the C1000 pyrolysis units.
    a. The dryers utilise recovered heat from the process avoiding the need for alternate heat sources.
4. The C1000 pyrolyser units thermally decompose the dry feedstock into biochar and syngas.
5. The syngas is used within the combustion plant to provide primary heat for the process (including drying) as well as generate electrical energy.
6. When complete, the biochar drops into a water bath where it is cooled and quenched to prevent fire risks.
7. The quenched biochar is then discharged via conveyors to a biochar bunker. The biochar moisture content is measured in the discharge conveyors and the weight is recorded for carbon calculations.
8. Meanwhile, the hot exhaust gases pass on to the Heat Exchangers, which capture the energy in the form of hot water.
9. This hot water is then passed on to the ORC machine, which converts the excess heat generated into electricity.
10. The exhaust gases are finally passed on to the gas condensing scrubber, which utilises the biochar-quenching water to scrub the emissions clean before releasing them into the atmosphere.

The following diagram showcases this process with all the steps described above.

Fig.1.3.2 PyroUnity plant schematic



The PyroUnity system can run continuously for up to 8,200 hrs per year and is fully automated requiring only manual loading of biomass and unloading of processed biochar, as necessary.

The plant operations during the day will include deliveries and transport of biochar, whilst operation at night will be restricted to plant operation.

The input and output figures vary depending on the properties of the feedstock and the number of C1000 reactors in use at any one time. The impact assessments assume all plant is operating at full production.

The acoustic impact assessment considers that all plant and activities operating as a worst case. The list of plant and activities is provided in Appendix 1 Source data.

1.4 Existing Acoustic Environment

The existing acoustic environment is substantively road noise. The main noise source is the A49, a busy main road running north to south on east side of the site. The other main source observed on site was the hum of industrial noise from the surrounding industrial units.

Additional road traffic noise from the Parys Road was evident during monitoring as was the sound of individual road traffic events of HGV's and buses using both Parys Road, Coder Road (and the industrial estate) and the main A49. It was also noted that Parys Road is a bus route with a bus stop at the corner of Parys Road and Blashfield Road (to the west of the proposed site).

Discrete acoustic events such as horns sounding, screech of tyres and brakes, dull thumps and crashes, as well as clangs and bangs occur routinely as road traffic and in particular HGV's traverse the road network. Various crashes and bangs, occasional whines and sounds of materials handling were noted from the TFM facility (Lingen Road) and more generally from the business park along the length of Parys Road.

Other noise sources included the sound of birds singing, dogs barking, and aircraft noise.

Observations around the site noted that it was perceptively dominated by road traffic.

2 Legislation and Guidance

2.1 Guidance

2.1.1 National Planning Policy Framework (NPPF) 2024

The National Planning Policy Framework sets out Governmental planning policies for England and how these are expected to be applied. It provides a framework within which local people can influence planning policy using distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. The NPPF requires that Local Planning Authorities develop their own specific planning policies, however, all local plans are required to have regard to the principle enshrined in the NPPF and sustainable development.

The NPPF 2024 replaces previous national planning policy and guidance originally issued in 2012 and modified in 2018, 2019, 2021, and two versions in 2023. The following paragraphs are of relevance for the acoustic assessment of the change of use application for the site.

Paragraph 187 outlines general requirements in terms of noise:

> *Planning policies and decisions should contribute to and enhance the natural and local environment by: ….*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and…" [emphasis added]*

Paragraph 198 provides additional detail:

> *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[72];*
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
> *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation." [emphasis added]*
>
> 72. See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).

Paragraph 201 states:

> *The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.*

The NPPF makes specific reference to the Noise Policy Statement for England 2010 (*NPSE*).

The Noise Policy vision is to 'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'

The NPSE refers to the World Health Organisation guidance and deals with noise in the context of health. Health is defined as 'physical and mental well-being' and is quoted in terms of standards with 'observed' health impacts. Additionally, quality of life is also mentioned which is a subjective measure and can be considered to promote of amenity standards and in all cases, equate to prevention of nuisance. The NPSE makes reference is made to two concepts documented by the WHO, namely:

- No Observed Effect Level (*NOEL*): the level below which no effect can be detected
- Lowest Observed Adverse Effect Level (*LOAEL*): the level above which adverse effects on health and quality of life can be detected.

And (by extrapolation from WHO criteria), a further level,

- Significant Observed Adverse Effect Level (*SOAEL*): the level above which significant adverse effects on health and quality of life occur.

There is no specific definition of how these levels are to be calculated, however it is noted that methodologies comparing results (either measured or calculated) to background and ambient levels are considered appropriate.

The determination as to how these impacts are to be demonstrated will depend on the nature of the noise, acoustic properties of the noise, and the site-specific circumstance of design and construction of development locations in which the noise is present. In most cases the local council within whose area the application site exists will provide to provide additional guidance on what is required to determine impact in accordance with local policy that will, by definition, have regard to local conditions and circumstances.

2.1.2 Local Planning Policy

Shropshire Council Planning policy is divided into the Shropshire Local Development Framework Adopted Core Strategy 2011, and the Shropshire Council Site Allocations and Management of Development (SAMDev) Plan 2015. The policies relevant to noise are considered below:

Policy CS6 Sustainability and Development Principles of the Core Strategy advises that:

> *"To create sustainable places, development will be designed to a high quality using sustainable design principles, to achieve an inclusive and accessible environment which respects and enhances local distinctiveness, and which mitigates and adapts to climate change. This will be achieved by:*
>
> - *Requiring all development proposals, including changes to existing buildings, to achieve applicable national standards, or for water use, evidence based local standards as reflected in the minimum criteria set out in the sustainability checklist. This will ensure that sustainable design and construction principles are incorporated within new development, and that resource and energy efficiency and renewable energy generation are adequately addressed and improved where possible. The checklist will be developed as part of a Sustainable Design SPD*
>
> *;…*
>
> *And ensuring that all development:*
>
> *…*
>
> - *Contributes to the health and wellbeing of communities, including safeguarding residential and local amenity and the achievement of local standards for the provision and quality of open space, sport and recreational facilities." [emphasis added]*

Policy CS19 Waste Management Infrastructure of the Core Strategy advises that

> *"Sustainable waste management facilities and services will help to deliver greater resource efficiency for communities and businesses. This will be achieved by:*

- *Encouraging proposals for additional capacity to divert waste away from landfill in a way consistent with the waste hierarchy and the principles and targets of national, regional and local policies and strategies, including the principle of 'equivalent self-sufficiency' and an allowance for cross boundary waste flows;*
- *Identifying specific sites to deliver additional waste transfer, recycling and recovery facilities to address the capacity gap of about 150,000 tonnes/year identified in RSS. Sites will be allocated as part of the SAMDev DPD in accessible locations close to the main urban areas within the broad locations identified in Figure 9. Outside these broad locations, Shropshire Council will support applications for smaller scale waste facilities capable of meeting local needs in locations which are consistent with the principles and site identification criteria set out in national and regional policy*
- *Supporting the co-location of waste facilities and the integration of new waste facilities or space in the design of new development;*
- *Requiring applications for all types of development to include information about the management of waste during their construction and subsequent operation as part of the completion of the sustainability checklist required by Policy CS6;*
- *Ensuring that the continued operation of existing waste management facilities in locations which are consistent with the site identification criteria for new sites is safeguarded, including against the encroachment of incompatible uses, in a way consistent with Policy CS8 and national and regional guidance***"**

Policy MD2 of the SAMDev Sustainable design advises that:

"Further to Policy CS6, for a development proposal to be considered acceptable it is required to:

…

7. *Demonstrate how good standards of sustainable design and construction have been employed as required by Core Strategy Policy CS6 and the Sustainable Design SPD."*

A Supplementary Planning Document (SPD) on Sustainable Design references policy.

Policy MD8 of the SAMDev Infrastructure provision provides guidance on requirements for waste infrastructure as follows:

New Strategic Infrastructure

3. *Applications for new strategic energy, transport, water management and telecommunications infrastructure will be supported in order to help deliver national priorities and locally identified requirements, where its contribution to agreed objectives outweighs the potential for adverse impacts. Particular consideration will be given to the potential for adverse impacts on:*

   i. Residential and other sensitive neighbouring land uses;

   …

` *vi Noise, air quality, dust, odour and vibration;*

"4. The following infrastructure specific criteria will also apply: Renewable Energy Infrastructure

Renewable Energy Infrastructure

…

ii. In the case of biomass, anaerobic digestion and geothermal energy proposals, particular attention will also be paid to the potential for opportunities to recover heat and power;

…

Monitoring and Decommissioning

v. Where planning permission establishes performance standards, applicants will be expected to demonstrate compliance through the submission of regular monitoring reports;"

Policy MD14 Waste Management Facilities advises that:

"1. Further to Policy CS19, the development of waste transfer, recycling and recovery facilities will be supported where applicants can demonstrate that potential adverse impacts on the local community and Shropshire's natural and historic environment can be satisfactorily controlled. Particular consideration will be given (where relevant) to:

i. Measures to protect people and the environment from adverse effects, including visual; noise; vibration; dust; litter; vermin and birds; air and water pollution; odour; or traffic impacts;

ii. The site access and traffic movements, including the impact of heavy lorry traffic on the transport network, in particular the quality of the proposed access to the Primary Route Network."

Paragraph 201 of the NPPF supersedes the monitoring requirements of local policy as the proposed pyrolysis plant is subject to an environmental permit that regulates all environmental emissions including noise under an environmental permit. It is noted that the environmental permitting requirements differ from those applicable to planning in that a particular standard (BS4142) is required as the basis for permitting controls, whilst planning also includes other standards (see section 2.3 below)

The local policies complement the NPPF requirements and provide further context. The determination of how impacts should be determined is not provided, and there are no relevant Shropshire Council supplementary planning guidelines on determination of noise impact for industrial or waste sites. The general guidance on determining noise impact contained within the Planning Practice Guidance [link] is summarised in section 2.3 below.

Noise impact for planning is therefore considered in line with national guidance offered in the Planning Practice Guidance, (see section 2.3 below).

2.2 Environmental Permitting

2.2.1 Environment Agency (EA) Noise and Vibration Guidance (January 2022)

Environment Agency Guidance note H3 has been withdrawn following the issue of the revised EA guidance. That guidance is now an online reference document ref: Noise and vibration management: environmental permits [Link].

The guidance also embraces the concept of 'soundscape' which it defines as:

"To decide which sounds are appropriate for the environmental setting when assessing and predicting soundscape, you must consider:

- *the activities they may enable, for example, factory noise may symbolise local employment*
- *what emotions they may evoke*
- *what impact they may have*

In some places the existing soundscape may already be poor quality. Adding a further industrial source, even if its sound level is below a defined guidance level, may become a tipping point for an inappropriate soundscape or make it much harder to fix an existing problem.

In another place, due to an already dull soundscape and low emotional expectations, an additional industrial sound source may not be a burden, as its level may be well masked by other sounds (for example traffic)."

Perception of noise that is not currently present within the soundscape is open to significant interpretation, particularly in areas where there is a high existing level of noise. The potential observed impact within the soundscape is therefore estimated based on the impact assessments carried out and the nature of sounds. The EA guidance document references guidance ISO 12913 as a method that may be suitable where soundscape assessment is carried out. This document is acknowledged to be accepted in Wales, though has no formal standing in policy elsewhere other than as adopted terminology.

The revised EA guidance makes reference to the terminology used in existing environmental permits and acknowledges that they may use different terms depending on their age. For example, the conditions may say that the operator must not cause:

- nuisance
- annoyance
- offensive noises
- offence to human senses
- interference with amenities
- pollution
- exceeding a numeric limit

The guidance also notes that whatever metric is used, the intent is the same, the operator should prevent or minimise noise by using:

- Best Available Techniques (BAT)
- appropriate measures
- due diligence
- all reasonable precautions
- noise management or working plans

In demonstrating BAT, regard should be had to the BS4142 standard for assessing impact and ensuring that the outcome is placed into context in accordance with that standard.

In determination compliance with BAT, this should also avoid confusion or conflict between similarly required regulatory outcomes, for example, statutory nuisance and planning requirements. In assessing the BS4142 impact outcomes, context needs to be provided that may be inferred from other standards but only where the use of these standards is justified, and, bearing in mind the soundscape commentary within the guidance, it is noted that the interpretation of real life outcomes will also need to be stated.

Where required by the outcome of the assessment in accordance with EA guidance, it would be normal for permitted installations to demonstrate BAT compliance for noise by preparing a Noise Management Plan (NMP). The NMP (where necessary) addresses impact of the installation independent of other sources, and puts in place physical, operational and management controls exercised by the operator of the installation to comply with Best Available Techniques (BAT).

Assessment of the impact of a permitted installation therefore requires a baseline assessment in accordance with BS4142 supplemented with other observations or standards as justified in the determination of impact. The methodology and terminology are broadly similar to that listed in the Planning Practice Guidance (see section 2.3 below).

2.3 Noise Impact

The standards required to be met depend on the nature of the sound and the acoustic environment within which the sound is perceived. The Planning Practice Guidance recommends an approach on determining the impact of sounds as follows:

> *"**How to determine the noise impact?***
>
> *Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

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

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy."

The PPG also stipulates the appropriate actions in accordance with the likely response to noise exposure:

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 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 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

Source: Planning Practice Guidance [link]

Noise impact and the level of effect is normally determined by compliance with appropriate standards see section 2.4 below).

2.4 Standards

Standards for determination of impact are normally based on absolute fixed levels or derived values based on comparisons. They are normally divided into standards set externally to sensitive developments or internally for particular rooms/activities.

The particular standard(s) to be applied depends on the character of the noise to be assessed, the sensitives of the receptors and the intended use/design of the development.

2.4.1 External Standards

In order to determine the appropriate level of impact, the most appropriate metric for determination of that impact is required.

The **BS4142:2014** Method for rating and assessing industrial and commercial sound, provides a mechanism for evaluating the impact of a specified. The method requires that the level of the sound is averaged over set time periods and then corrections are applied in line with the prescribed acoustic features of the sound under evaluation. The resulting level is then comparing against the background LA90 sound level for the area. The assessment level is then reviewed against the criteria specified within the standard to help determine impact.

BS4142:2014 requires that any results are evaluated and placed into context so that the impact is properly characterised. A result of +10dB or more would indicate significant acoustic impact a result of +5 or more would indicate the potential for an adverse impact. It is normal for BS4142:2014 results to be used as indicators of required mitigation. Where mitigation cannot be carried out, it would be normal to try and prevent exposure to the impact.

BS8233:2014 Guidance on sound insulation and noise reduction for buildings, also provides guidance on external noise levels, in particular for amenity areas such as gardens. External noise levels for most development are suggested to not exceed 50dB $L_{Aeq,T}$, and noisier urban environments should not exceed the guideline value of 55 dB $L_{Aeq,T}$.

In this instance, this is an urban location with sensitive receptors a significant distance from the site.

The **World Health Organisation (WHO)** Guidelines on Community Noise is a document which specifies a number of absolute sound levels which seek to prevent health impacts, including the avoidance of noise and disturbance. The key external noise level standards quoted in the document are:

Specific environment	Critical health effect(s)	L_{Aeq} [dB]	Time base [hours]	$L_{AMax,fast}$ [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

As noted previously, this instance, this is an urban location with no outdoor amenity areas or balconies proposed.

2.4.2 Internal Standards

In addition to the above values, **BS8233:2014** gives guidance for noise levels *inside* habitable rooms based on their sensitivity. Table 1 Indoor ambient noise levels for dwellings lists the acceptable sound levels inside properties:

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00
Resting	Living Room	35 dBA $L_{Aeq,16hour}$	
Dining Room	Dining Room/Area	40 dBA $L_{Aeq,16hour}$	
Sleeping (daytime resting)	Bedroom	35 dBA $L_{Aeq,16hour}$	30 dBA LAeq,8hour

BS8233:2014 offers additional guidance in the form of notes appended to the above table. In particular:

> *NOTE 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.*

NOTE 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

The standard for long term LAEQ is consistent with the WHO guidelines on Community Noise standards However, WHO also recommends an LAMax standard to account for impulsive noise as shown below:

Specific environment	Critical health effect(s)	L_{Aeq} [dB]	Time base [hours]	$L_{Amax,fast}$ [dB]
Dwelling, indoors Inside bedrooms	Speech intelligibility and moderate annoyance, daytime and evening	35	16	45
	Sleep disturbance, night-time	30	8	

These standards are directly relevant to the proposed site.

2.4.3 General Increases in noise (IEMA)

The **IEMA Guidelines for Environmental Noise Impact Assessment (2014)** provides a method for assessing the relative impact of noise on receptors with particular reference to road noise. Table 7-12 Effect Descriptors advises as follows:

Table 7-12 Effect Descriptors

Change	Description
Very Substantial	Greater than 10 dB LAeq change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB LAeq change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB LAeq change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB LAeq change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB LAeq change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB LAeq change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB LAeq change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

IEMA guidance is only normally applicable where an existing sensitive receptor is impacted by changes in the environmental sound level from transport sources. In this case, the proposed change of use will add industrial noise to that of the existing industrial area dominated by road noise. Changes in sound level are therefore appropriate as a standard as they will inform noticeable for the new activities, and, when paired with the calculated absolute levels set for WHO and BS8233 above, will provide the basis for acceptability.

The change compared to existing, may be helpful in determining the significance of the impact of sources comparable to prevalent road traffic.

3 Assessment Strategy

3.1 Methodology

3.1.1 Background and residual noise survey

Monitoring to establish the typical sound levels in the area comprised a survey of current residual and background noise levels measured between 13th and 18th December 2024 using continuous monitoring in two locations MP1 and MP2, and separate attended monitoring in one location MP3. The monitoring included weekday and weekend levels.

The data from monitoring is used directly to produce statistically relevant background data for the area and establish the existing average noise levels as 15 minute, 1-hour, 8-hour and 16-hour averages to align with appropriate standards.

Attended measurements at offsite locations during the day 13th December 2024 supplemented the continuous monitoring used to provide context. Recordings were taken of individual events during the monitoring period to ensure that event noise could be characterised, in particular some industrial activities and road noise for Parys Road.

Monitoring is undertaken in accordance with BS7445:2003.

The details of the monitoring and the calculations are provided in Appendix 2.

3.1.2 Assessment methodology

As the impact assessment is for a development that has yet to be constructed, all impact assessments are calculated levels based on source noise data from reference material. Data for HGV's and deliveries, Loading shovels, condenser plant and other sources are drawn from Enviroconsult's library data or from referenced sources as indicated in Appendix 1 Source Data. All calculations are shown.

Measurements taken characterise typical background and residual sound levels that are subsequently used as a baseline for determination of impacts.

The traffic data is obtained from Department for Transport data on traffic flows expressed as AADT (Annual Average Daily Traffic) specifically count station 57854 [link]. The count data is then inserted into the calculator tool http://resource.npl.co.uk/acoustics/techguides/crtn/ to provide a predicted sound level.

An attended survey has also been undertaken at a minor road location (Parys Road) to help characterise the existing noise climate and ensure that the predictions used are appropriate. The monitoring locations selected (see Fig.1.2 above) verify levels from each of the existing sources.

The data is then modelled using dBMap [link] noise modelling software based on the calculated sound levels for the activities noted.

Calculations are provided to determine the maximum level of impact of proposed source noise on the *measured* background and residual data.

3.1.3 Impact assessments

Impact assessments have been produced using a dBMap acoustic model (see 3.2 below)

1. An existing baseline scenario (without the proposed new development) based on road traffic from the A49 and Parys Road
2. A scenario with the proposed development in full operation to provide a maximum level of daytime noise.
3. A scenario with typical levels for night time noise (excluding deliveries, loading and unloading, chipping) and only including the pyrolysis and ancillary operational plant.

Assessment 1 is used to predict current sound levels affecting the sensitive receptors surrounding the site. Assessments 2 & 3 introduces the proposed development and any necessary mitigation measures to ensure that sound levels meet acceptable standards for day and night.

Impact assessments are based on either measurement taken of specific sound sources or levels calculated based on source data obtained.

The impact assessment used depends on the standard applied. The number and type of measurements taken is dependent on the potential degree of impact and the level of assurance required.

3.2 dBMap Model

dBMap [link] is noise modelling software designed specifically to provide visual representations of noise level predictions. The model requires a natural topographical digital map to be overlaid with generic man-made feature data such as building heights and widths, roads, local barriers etc. The model is then updated to ensure that model 'surfaces' behave appropriately in respect of absorption and reflection of noise. Lastly noise sources are added, with known sound power or sound pressure levels and frequency spectra data (where available) as noted in Appendix 3. The model then calculates the resulting transit of sound from the source(s) to receptor(s) taking into account the various obstacles, reflections and absorption characteristics that would impede the propagation of sound through the environment.

dBMap is a model that is capable of using multiple different modelling techniques. This assessment (common to most assessments in the UK) utilises the calculation methods for ISO 9613 part 2. This is an internationally recognised standard for the modelling of noise and is accepted as suitable for assessment of industrial noise sources.

dBMap as a standard acoustic model, would be expected to provide an accuracy of ±3 dB for the modelling aspect, but overall uncertainty is heavily dependent on the quality of the data input. Uncertainty has been minimised by applying a worst-case approach, the results are therefore considered to be higher than may actually be the case, as the source data is conservative. (See section 3.3 for uncertainty assessment).

3.2.1 Model Assumptions

The results for modelling of site-based noise present three difference model scenarios as identified in paragraph 3.2.1 above.

The source data assumptions in respect of each noise model are noted in the Appendix 3 - modelling outputs.

The following assumptions apply to mitigated noise modelling based on the proposed layout plans provided by the client:

- All modelling is carried out with ground conditions as hard reflections to maintain a worst case.
- Existing noise from the industrial Estate has not been modelled. The monitoring results for MP2 provide a measure of existing levels based on road traffic noise actual residual levels may be higher.
- There is some slight variation in height between source and receptors that has been modelled using topographical data.
- Boundary mitigation effects for the modelled output to the east of the site include a significant woodland screen of about 15m in depth and is likely to have a slight barrier effect as noted in the prediction/measurements for MP1, however this has not been factored into the model.
- The calculation method used is that in ISO96132:2024
- 20°C Temperature and 70% Humidity has been assumed.
- Results are A-weighted.
- Results are rounded to the nearest whole number.
- Second order reflections are included.

- All façade levels have been modelled and displayed as free field results (reflection corrections are applied).
- ISO9613-2 barrier attenuation limit (20/25dB) is applied (where barrier effects are present)
- Vertical edges (lateral paths) are included.
- ISO17534-3 recommendation 5.2 has been applied and ground reflections are not screened (as recommended in ISO17534-3 paragraph 5.3).

3.3 Limitations & Uncertainty

The baseline noise level surveys used equipment and methods that generally would be expected to give results accurate to within ±1 dBA. The inherent uncertainty in measurement was minimised by ensuring measurements carried out complied with appropriate standards.

The monitoring carried out was noted to reflect the residual and background levels and are considered typical for the area, however, monitoring from residential locations was not possible as there were no secure sites available. The two continuous monitoring locations MP1 and MP2 were assessed and the quietest of this used as 'typical' results for LA90. Verification of modelled data for road traffic is therefore compared to (and verified by) MP1, MP2, and MP3 that was used to specifically predict the existing ambient levels at receptors for direct comparison.

Other sources of potential uncertainty were minimised by ensuring:

- Weather conditions were recorded as generally dry, with maximum wind speeds of approximately <5m/s.
- The ambient temperature during measurements was above 5°C.
- Measurement locations were located 1.5m above ground level and more than 3.5m away from reflective surfaces (see Fig.1.2 above and photographs below)
- Survey periods were carried out in accordance with approved standards and sufficiently characterise the sounds assessed.

Calculations using DRMB and CRTN methods are expected to be accurate to ±2 dB (ref: DMRB VOLUME 11 SECTION 3 PART 7 - HD 213/11 - NOISE AND VIBRATION, Table A4.1 though some reports indicate it may be more accurate compared to measured levels (ref: The Performance of CRTN Model in a Motorcycle City https://www.hindawi.com/journals/mpe/2015/369620/).

Modelling software compliant with ISO9613 is expected to be accurate to ±3 dB (ref: Paragraph 9 Table 5).

3.4 Measurement equipment and conditions

Noise measurements were taken with two Cirrus 171B Class 1 integrating sound level meters located at measurement point MP1 and MP2 as noted in 3.4 below):

- G071574
- G303651

The meters were field calibrated prior to measurements with Cirrus CR515 calibrators ref: 75350 and 98078 respectively. The meters were compliance checked after measurements; no significant drift was noted.

Copies of calibration certificates can be seen in Appendix 3 of this report.

3.5 Measurement location and times

Measurements were made at two locations as indicated on Fig 1.2 above below, as follows:

Position MP1: Location is approximately 10m from the A49 on the eastern part of the site. It is directly in line with (and 17.9m from) a fire door on the main building.

The monitoring location is 1.5m from ground level with no reflecting surfaces within 3.5m of the meter.

Position MP2: positioned on the west edge of the site attached to the perimeter fence. The measurement position is in line with the south edge of the main building and 1.5m from the access gate post.

The monitoring location is approximately 4m from ground level with no reflecting surfaces within 3.5m of the meter.

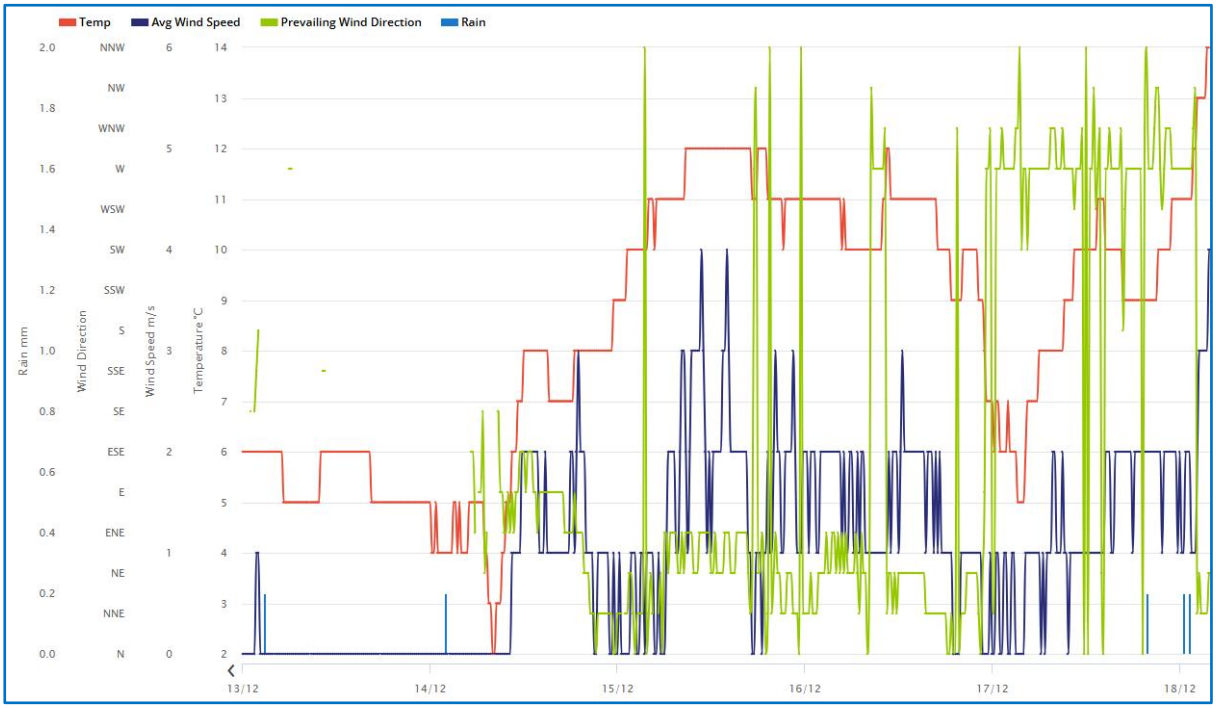
Position MP3: positioned on a tripod that is 5m from the highway on the grass.

The measurement position is in line with the path at the edge of the path.

The location is 1.5m from ground level with no *reflecting* surfaces within 3.5m of the meter. However, there was dense foliage approximately 1.5m from the meter which is likely to have negligible reflective effects.

3.6 Weather

Measurements and observations were taken on between 13th April and 17th December 2024, the weather conditions were recorded as follows at Ludlow Race Club, Bromfield, Ludlow, SY8 2BT (approximately 4 km north east of the monitoring site) noted as follows:



In general monitoring observed northeasterly winds (<5m/s) switching to westerly on 17th, with no precipitation, and temperature initially around 2ºC but increasing to generally >5ºC the rest of the monitoring periods.

The weather conditions were noted to be acceptable for sound level measurement, with no significant concern for uncertainty (see above).

Note: temperatures lower than 5°C were noted, but the observed measurements did not show any significant variation in results from the start of the period to the end of the period beyond normal diurnal change (comparison of night time low levels between individual days showed no significant changes).

4 Results

The monitoring results for locations MP1 – MP4 provided in the Tables in Appendix 1, the results and commentary are summarised below section 4.1, the calculated levels for operational noise are provided in Appendix 3 and are summarised along with commentary in 4.2 below.

The results for monitoring and each of the prediction scenarios can be summarised to help evaluate impact reported by the standards. The code colour is then used to highlight the significance of the impact, based on the measured/modelled levels at exposed facades for existing and proposed assessments.

Table 4 Exposed facades and acoustic treatment

Colour code	Criteria	Comments
	< 50 dB L_{Aeq} (daytime) (WHO) < 35 dB L_{Aeq} internal (daytime) (BS8233:2014) <30 dB L_{Aeq} internal (nighttime) <2.9 IEMA dB change	Levels are below both daytime WHO and BS8233 levels. No mitigation measures are necessary beyond principles of good acoustic design. Predicted levels of change are not significant
	< 55 dB L_{Aeq} (daytime) (WHO) Moderate annoyance < 40 dB L_{Aeq} internal (BS8233:2014) daytime < 35 dB L_{Aeq} internal (BS8233:2014) nighttime 3 – 4.9 IEMA dB change	Levels are below both daytime BS8233 levels and WHO guidelines. Mitigation measures may be advised to secure optimum noise performance, if necessary, after the principles of good acoustic design. Predicted levels of change are slight to moderate.
	>55 dB L_{Aeq} (daytime) WHO threshold for significant annoyance > 40 dB L_{Aeq} internal >5 dB IEMA dB change.	Predictions are above WHO and BS8233 levels. Mitigation measures are required. Principles of good acoustic design should be supplemented with necessary mitigation measures, which may include (but are not limited to): • Layout and Orientation of buildings away from sources • Design to present gable ends or non-habitable rooms to sources • Acoustic glazing, barriers, ventilation systems Predicted levels of change are substantial.

Note: the IEMA change is only applicable for existing facades.

4.1 Background and Residual Monitoring

Background and residual levels have been established through direct monitoring and by modelling based on data obtained.

A summary of monitoring results is presented in table 4.1 below alongside the modelled data to establish predicted existing levels at each sensitive receptor.

Table 4.1 Predicted existing LAeq levels

Receiver Name	Height (m)	Daytime (Existing)	Nighttime (existing)	Comments
Daytime				
MP1 A49	1.5	61.6	52.7	+1.3 dB good agreement
MP2 Gate	1.5	49.6	40.7	+6 dB local industrial noise
MP3 Road	1.5	49.7	41.7	+2.4 good agreement
1 Blashfield Rd	2.1	44.0		All predicted sound levels compliant with WHO guidelines
2 Blashfield Rd	2.1	45.0		
5 Blashfield Rd	2.1	44.6		
14 Blashfield Rd	2.1	46.4		
1 Langford Cl	2.1	35.9		

19 Langford Cl	2.1	45.1		All predicted sound levels compliant with WHO guidelines
HTL	1.5	61.5		
Nighttime				
1 Blashfield Rd	4.5		36.0	
2 Blashfield Rd	4.5		35.3	
5 Blashfield Rd	4.5		36.4	
14 Blashfield Rd	4.5		38.1	
1 Langford Cl	4.5		28.6	
19 Langford Cl	4.5		37.1	

**Note HTL is an industrial site and not a sensitive receptor*

All the receptors are modelled to show full compliance with both daytime and night time sound levels at the facades. The model assumes that road traffic noise is dominant. The measured level at MP3 indicates that measured local industrial noise at that location would be as significant as road noise. It is possible that existing residual levels at receptors are *up to 3 dB higher* than those predicted in the table above unfortunately no secure location for long term monitoring was found to provide real data for the receptors off Parys Road. The modelled predictions could be further *verified* by long term measurement from one of the receptor locations, however, use of the existing modelled outputs will provide a worst case scenario for impact assessment purposes as the comparisons will be lower than the actual existing.

MP1 Gate measurement is clearly anomalous as the modelled output for existing noise is 6 dB lower than the measured daytime average levels (and 5 dB lower for than the nighttime measured average levels. In both cases local intermittent noise from the industrial estate is noted to be present raising the average L_{Aeq}.

The modelling process is therefore considered verified against MP1 and MP3 to reflect road noise to model existing noise impacts, and MP2 was used to reflect an average background level for the area as the underlying sound levels were observed to be relatively unaffected by the industrial estate.

4.1.1 Background Sound level (BS4142)

Background LA90 levels would normally be drawn from long term monitoring of noise MP2 (onsite rather than at receptor locations) as an appropriate location site because it was accessible, secure and the background level LA90 is less affected by road traffic. However, MP2 may have evidence higher levels of industrial hum and an elevated background level due to proximity of industrial sources, hence MP3 daytime data and the calculation for road traffic noise have been used to establish the typical residual LAeq levels for day and night. The results note a very low background level consistent with rural locations and represent a worst case.

The data is reproduced below:

Average type	**Daytime (1hour)**			**Nighttime (15mins)**		
	Average L_{Aeq}	**Average L_{A90}**	**Std Deviation**	**Average L_{Aeq}**	**Average L_{A90}**	**Std Deviation**
Mode		50			26	
Median		50			27	
Mean	52.5*	46.3	2.8	44.6*	28.8	7.9

*MP3 calculated data

The average daytime LA90 was ~ 50 dB $L_{A901hour}$ mode and mean, with a 46.3 dB mean average low, and relatively low standard deviation. The nighttime was less noted mode median and mean levels within 2 dB, with the mean average being the highest due to a large standard deviation noting that the quietest parts of the night were much quieter than early morning/late evening. The detailed assessment of background noise is to be found in Appendix 2.

A conservative value of 46 dB is considered to be the typical daytime background sound level, and 26 dB $L_{A9015minute}$ the nighttime background level to ensure worst case.

The residual comparisons are predicted using the modelled output for existing day and nighttime as noted for each property in section 4.2 below

4.2 Predicted Sound Levels

The predicted sound levels for the application site are provided in Appendix 3 Modelled Data. The model provides results for each scenario as indicated in section 3.1.1 above.

4.2.1 Daytime Operation

Full daytime operation is modelled in Appendix 3. Full operation assumes deliveries, loading and unloading and use of the loading shovel and all plant are operation. Appendix 3 provides the model input data. The table below summaries the outputs for overall predicted daytime levels and compares them to the modelled existing levels. The table has been colour coded as per the criteria outlined in 4.1 above.

Table 4.2.1 Summary of Compliance for Full Daytime Operation

Receiver Name	Height (m)	Daytime (Existing)	all sources operational	chipping no deliveries	no chipping no deliveries
MP1 A49	1.5	61.6			
MP2 Gate	1.5	49.6			
MP3 Road	1.5	49.7			
1 Blashfield Rd	2.1	44.0	46.1	45.1	31.6
2 Blashfield Rd	2.1	45.0	47.4	44.5	33.9
5 Blashfield Rd	2.1	44.6	47.2	46.4	33.4
14 Blashfield Rd	2.1	46.4	48.2	46.6	35.9
1 Langford Cl	2.1	35.9	42.7	42.2	29.9
19 Langford Cl	2.1	45.1	45.2	45.0	31.4
HTL	1.5	61.5	79.9	79.9	69.5

Daytime levels at receptor locations vary dependent on the activities carried out and the scenario selected.

A worst case scenario is that a delivery arrives and is processes, whilst chipping is occurring, and the plant is in full operation. Whilst very unlikely this is possible. The worst affected receptor has ~48 dB (highlighted **blue** in the table above) of potential noise exposure but this is only likely for the short duration of time when a delivery is occurring, and the chipper is operational.

A more typical scenario would be no deliveries and operation of the chipping machine. This would give rise to levels of @ 47 dB as a worst case, indicating that chipping is the dominant source. Chipping could occur continuously for an hour or more providing feedstock is present but is likely to occur in 30 minute batches as feedstock needs to be moved to the chipper and this creates natural pauses in use.

The other (typical) daytime scenario is operation of the plant, and the manitou loader moving feedstock into possible (no chipping no deliveries). This scenario is significantly quieter.

Full operation of the installation would generate an increase in noise level of 3 – 8 dB depending on location of receptor which would be a moderate to significant increase in sound level according to IEMA guidelines. However, the absolute sound levels generated would be below the WHO guideline levels for daytime noise at the façade of receptor premises and are most likely to be masked by existing industrial noise in the area and road traffic.

The activities are intended to operate between 8am and 5.30pm daily Monday – Friday and a Saturday morning 9am to 1.30pm. The plant noise would operate continuously but as noted above is predicted to be significantly below existing sound levels for the area.

The BS4142 assessment for 14 Blashfield Road has been supplied based on the worst case level modelled 48 dB L_{Aeq}, and a background level of 45 dB L_{A90}.

4.2.2 Nighttime Operation

Nighttime operation is modelled in Appendix 3. Nighttime operation assumes that only fixed plant will operate, so no deliveries, loading/unloading or use of the loading shovel is expected, it is also expected that external doors would remain closed at night. The table below summaries the outputs for overall predicted daytime levels and compares them to the modelled existing. The table has been colour coded as per the criteria outlined in 4.1 above.

Receiver Name	Height (m)	Nighttime (Existing)	Night time plant only operation (dB)
1 Blashfield Rd	4.5	36.0	27.7
2 Blashfield Rd	4.5	35.3	28.8
5 Blashfield Rd	4.5	36.4	30.0
14 Blashfield Rd	4.5	38.1	25.9
1 Langford Cl	4.5	28.6	23.8
19 Langford Cl	4.5	37.1	27.2

Nighttime levels of activity on the site would be minimal and consist of low levels of broadband noise associated with fans, extraction systems and breakout from the building.

In all cases the predicted level of nighttime noise at sensitive receptors is <30 dB, which is well below the predicted existing residual levels. Site noise would be completely masked by the existing road traffic /industrial noise already present.

Given the above observation it is not surprising that IEMA increase in noise level is <1 dB for all receptors which is assessed as a low impact, this is also indicated by comparison of the combined sound levels for night time that indicate all receptors are < 40 dB (low impact) as defined by World Health Organisation Night Noise guidelines for Europe 2009.

The BS4142 assessments have been provided based on a source noise of 30 dB L_{Aeq} (worst case 5 Blashfield Road highlighted in **blue** on the table above) and a background level $L_{A90,T}$ of 26 dB.

The modelled levels for plant noise at night are very low. It is likely that there would be a LOW impact which in planning terms would be *present but not intrusive*.

4.3 BS4142:2014 assessment for Operational Noise

The following BS4142 is the full assessment for the most exposed receptors (highlighted in section 4.2 above.

Results	Daytime	Night time	Relevant BS4142 Clause	Comments
Calculated Specific Level	48	30	7.3.2	Based on the measurement taken
Acoustic feature correction	+2	+4	9.2	Some barely noticeable tonal components slightly more noticeable hum at night from continuous plant at night (+2/+4 dB) (worst case)

Rating level	50	34	9.2	
Background sound level	45	26	8.1.1 8.1.3 8.3	An assumed background level was taken from the rear elevation of the premises 10dB less than the front based on TIP observations
Excess of rating over background sound level	+5 dB	+6 dB	11	**Adverse Impact**
Assessment (context)	**11** The predicted levels of noise at the receptor location are based on worst case with all plant working continually. That may be the case rarely but is more likely that not all plant will be continuously operational for example a delivery will take 2-3mins to arrive and park, and then tip. The loading shovel will then load or unload for up to 5 mins. It is unlikely that more than one HGV delivery takes place in any one hour. Levels during the day could be 4-6 dB quieter. The predicted incident noise level at the façade of the closest receptor is 48 dB and very much a worst case. The sounds generated are almost identical to road traffic, HGV movements, and loading shovel operation some of which already occur on the industrial estate (deliveries to TFM Farm & Country Superstore Ltd etc.). It is very unlikely that the activities will be clearly distinguishable from existing ambient noise in the area. Moreover, the combined level is only a moderate increase on existing in IEMA terms (see calculations in Appendix 3. It is unlikely that any adverse impacts will be detected, and more likely that the site operations pass largely unnoticed. In the absence of HGV deliveries which are a significant contributor to the overall specific noise, plant noise will not increase the ambient noise of the area at the receptor location. Chipper noise may be audible periodically during the day but is unlikely to operate continuously for 1 hour. It is expected that only 1-2 hours of chipping per day would be sufficient to generate feedstock. Other receptors are less impacted the worst case and would have a low impact. Levels of noise generate by the chipper assume the chipper/drier/toploader building has an open door 5m high and has been modelled at 100& operation, Reducing the open area of the feedstock aperture will reduce the emitted sound by up to 5 dB at the worst affected receptor, as would reducing the operational time to reflect practical operation of the unit. In context it is expected that the impact is expected to be low.			

4.4 Change in sound levels by receptor (IEMA)

Whilst normally more appropriate for transport noise, use of the IEMA standard for change in level can help qualify potential impacts of new continuously operating sources in the environment.

The tables below for daytime and nighttime operation of the plant provide the cumulative levels of sound predicted at receptor locations for each mode of operation.

Interpretation of the IEMA comparison columns.
The columns compare the existing daytime sound levels with the predicted level to be contributed by the proposed activities. The additional noise from the proposed activities is logarithmically added to the existing modelled levels for each receptor location. The general increase in level is then calculated and assessed using the IEMA criteria in the table below.

Additionally, the cumulative level can be used to compare to WHO/BS8233 levels in order to provide context.

Cells shaded **red** indicate levels above the 55 dB L_{day}. Or 45 dB L_{night}. (significant adverse impacts)
Cells shaded **amber** indicate levels above 50 dB L_{day}. Or 40 dB L_{night}. (potential adverse impacts)
Cells shaded **green** are compliant with all standards

The interpretation of the IEMA standard is summarised in the table below:

Change	**IEMA Criteria**
Very Substantial	Greater than 10 dB LAeq change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB LAeq change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB LAeq change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB LAeq change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB LAeq change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB LAeq change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB LAeq change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

Table 4.4 IEMA/WHO/BS8233 comparison table

Receiver Name	Height (m)	Daytime (Existing)	Nighttime (existing)	All sources operational*	Difference	chipping no deliveries	Difference	no chipping no deliveries*	Difference	night time plant only*	Difference
daytime											
1 Blashfield Rd	2.1	44.0		48.2	4.2	47.6	3.6	44.2	0.2		
2 Blashfield Rd	2.1	45.0		49.4	4.4	47.8	2.8	45.3	0.3		
5 Blashfield Rd	2.1	44.6		49.1	4.5	48.6	4.1	44.9	0.3		
14 Blashfield Rd	2.1	46.4		50.4	4.0	49.5	3.1	46.8	0.4		
1 Langford Cl	2.1	35.9		43.6	7.7	43.1	7.2	36.8	1.0		
19 Langford Cl	2.1	45.1		48.2	3.1	48.0	3.0	45.3	0.2		
HTL	1.5	61.5		79.9	18.4	79.9	18.4	70.2	8.6		
Nighttime											
1 Blashfield Rd	4.5		36.0	46.5	10.5	45.4	3.7	36.3	0.3	36.6	0.6
2 Blashfield Rd	4.5		35.3	45.9	10.6	44.0	3.3	35.6	0.4	36.2	0.9
5 Blashfield Rd	4.5		36.4	47.4	11.1	46.0	3.8	36.7	0.3	37.3	0.9
14 Blashfield Rd	4.5		38.1	47.5	9.4	46.9	3.4	38.5	0.4	38.4	0.3
1 Langford Cl	4.5		28.6	43.0	14.4	42.3	6.5	29.4	0.8	29.8	1.3
19 Langford Cl	4.5		37.1	46.7	9.6	46.3	3.6	37.3	0.2	37.5	0.4

The assessment notes that an increase in level is expected where chipping or deliveries occur but that daytime levels do not exceed the WHO guideline of 55 dB at any location, and only 14 Blashfield Road exceeds the WHO guideline of 50 dB.

The table notes that chipping and delivery operations at night would be noticeable and would breach WHO guidance at most receptors. Clearly no such operations will take place.

The assessment notes that nighttime activities for plant only meets WHO 2009 guidance 40 dB indicating a LOW level of impact. In planning terms, the activities during the day and at night are likely to be *present but not intrusive*.

5 Conclusions

The site is located next to a noisy main road (A49). The observations and monitoring carried indicate that road traffic noise is the dominant source of noise for the area. Measurements and predictions of road noise indicate that facades of sensitive receptors in the area would be exposed to levels of noise that will likely mask activities proposed at the application site, therefore the implementation of a new pyrolysis in the area is unlikely to significantly impact affect existing noise levels.

The results of this assessment are summarised below and set the basis for mitigation of the noise levels to ensure that standards are met.

5.1 BS4142:2014

An assessment based on all identified noise generating activities operating has been provided as a worst case for both daytime and nighttime using British Standard 4142:2014+A1 (2019). The impact assessment standard is used to demonstrate the acceptability of the new process as it might affect sensitive residential receptors in the community. The assessment is summarised below.

Table 5.1 BS4142:2014 Assessment (worst case) for receptors
(see Section 4.3 for full assessment)

Activity	Specific Level (modelled)	Assessment Level (dB)	Comment
Daytime	48 dB	+5 dB	Adverse impact
Night Time	30 dB	+6 dB	Adverse impact

The predicted levels of noise during the day at the receptor locations are based on worst case with all plant working, deliveries taking place and loading shovel in use. The potential impact assumes that tonal noise and soft impacts are just noticeable at receptor locations.

It should be recognised that plant is unlikely to operate at the level predicted continually, for example, deliveries may occur up to 5 times a week (Monday – Friday,), and are likely to be during normal office hours where existing ambient levels are at their highest, so the likely specific level modelled could be up to 4 dB lower, equally the chipper is unlikely to be operational continually for an hour, and the reduction in time will reduce assessed levels. Similarly, it is unlikely that loading shovel activity and chipper will occur each hour, every hour and is likely to be used only during/immediately after deliveries or when loading vehicles with products (for the loading shovel). The duration of use will short and the use itself infrequent.

In context, at worst the receptors may hear occasion buzzing from the chipper, vehicle movements (reversing alarms), and soft clashes/thumps. In planning terms this would be *present but not intrusive*.

5.2 WHO/BS8233 assessment

As noted above the existing dominant noise source is road traffic noise. The predicted impact of noise from existing sources meets WHO criteria, and most receptors will not experience a significant increase in level, with the exception of 1 Longford Close that may notice some chipping or delivery activities as a worst case (see IEMA assessment above), but most are unlikely to be affected.

Implementation of the proposed pyrolysis plant will increase levels for all receptors between 2.8 and 7.2 dB, but all receptors remain compliant with WHO guideline levels, and most will remain compliant with the enhanced standard 50 dB during the daytime. As noted, this prediction is a worst case scenario as existing industrial noise affecting the receptors has not been measured for reasons of security of equipment, and the modelled road noise is therefore a low estimate of actual current ambient sound levels.

As noted above, at worst the receptors may hear occasion vehicle activity from the application site, faint reversing alarms, and soft clashes/thumps and might make out a broadband hum during the quietest parts of the night. In planning terms this would be *present but not intrusive*.

The layout and Mitigation measures are not necessary to achieve compliance with relevant standards. However, plant and equipment locations and specifications would need to be acoustically similar to that specified in the Appendix 1 Source data.

This assessment also assumes that no deliveries or chipping will take place during the nighttime. It is recommended that deliveries and chipping are restricted to normal office hours.

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Director

Glossary of terms

Sound – an acoustic effect perceived by an individual. Sound is perceived differently by individuals and is highly subjective. Acoustically for sound to be perceived it has to be above the threshold of hearing (typically taken to be 0dB) but this threshold varies between individuals.

Noise – noise is defined as unwanted sound. The level at which noise is present will indicate the potential impact. In order for a sound to become noise, it has to be perceivable by the individual. Technically noise can be described in terms of its acoustic profile, typically though noise at or below the ambient levels is rarely loud enough to be considered significant.

Acoustic environment sound from all sound sources as modified by the environment [BS ISO 12913-1:2013]

'A' Weighting – This function modifies the linear frequency response of the meter sound profile to attempts to simulate the characteristics of human hearing. Hence a dB(A) reading is a subjective evaluation of what we actually hear whereas dB(LIN) (now written dBZ), is an objective reading of what is actually present. A weightings are normally used in environmental and occupational measurements

Ambient – This is the general level of sound in an area. It is usually composed of sound from many sources near and far, that together make the 'average' noise for an area. Ambient noise is normally described using a long term average sound level (typically LAEQ).

Ambient sound – totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. *NOTE The ambient sound comprises the residual sound and the specific sound when present.*

ambient sound level, LAeq,T – equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, *T*. *NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.*

Attenuation – The loss in energy level of the sound usually used in relation to the loss due to sound passing through a structure or enclosure.

Background Noise Level – The underlying level of sound in the absence of the source is normally measured as an LA90, the level which is exceeded by 90% of sound present. This measurement effectively screens out transient noises. Occasionally LA99 is used which is the level which is exceeded by 99% of the sound present.

Background sound level, LA90,T – A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T*, measured using time weighting F and quoted to the nearest whole number of decibels

Decibel (dB) – a unit or level, derived from the logarithm of the ratio between the sound pressure measured and a reference value. For sound pressure level the reference quantity is 20µPa, 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 barely perceptible whilst a change of 10dB is considered significant. Sound pressure levels are noted as SPL, sound power can also be measured as a ratio of energy values, and is normally noted as SWL.

dB(A) (See A weighting above) – decibels measured on a sound level meter weighted by a scale which is designed to reflect the perception by the human ear. A noise meter incorporates a frequency weighting device to create this differentiation. Measurements in dB(A) broadly agree with people's assessment of loudness for broadband noise. 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 level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; a busy factory may have a level around 85dB(A); the level near a pneumatic drill about 100 dB(A).

Equivalent continuous A-weighted sound pressure level, LAeq,T – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t2 – t1$, has the same mean-squared sound pressure as a sound that varies with time. *NOTE The equivalent continuous A-weighted sound pressure level is normally quoted to the nearest whole number of decibels.*

Frequency – This is the number wavelengths passing a given point per second. The unit is the hertz (Hz). Frequency is the normal variation in pitch that most sounds have over time. Sound is normally made up of many different frequencies, and they behave differently within the environment. For example, moderate and high frequencies are damped out easily by barriers, screens or enclosures while low frequencies are more difficult to attenuate, which explains why loud music from a neighbour perceived through a wall often only sounds like a dull base thumping noise.

Impulse Noise – Single or repeated sound of short duration such as a bang or crash.

LA90 – The A weighted noise level exceeded for 90% of the specified measurement period. It is a statistical measurement. Used in BS 4142:2014 as the baseline for impact assessment and more generally it is used to define background noise level. Example, if a sound measurement carried out each second over 100 seconds the LA90 result would be the level representing the quietest 10% of the readings i.e. 10seconds.

LAeq – The equivalent continuous sound level - the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period. LAeq is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is obtained by continuously integrating ('adding up the energy of') a fluctuating sound signal and dividing by the elapsed time, to give the true mathematical average of any time varying signal. An Leq reading must always be related to a time period, it should not be read as an instantaneous value of sound pressure.

LAmax – The highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated. Almost all environmental measurements are 'Fast' weighted.

Logarithmic – A scale where the exponent indicating the power to which a fixed number, the base, must be raised to produce a given number. The base used in acoustics is 10. Thus, the logarithm of 10 = 1, the logarithm of 100 = 2 and the logarithm of 1000 = 3. Logarithms are used to convert very spans of pressure or energy measurements into usable scales.

Loudness – An observer's auditory impression of the strength of a sound. It is a subjective effect which is a function of the way we hear, and psychoacoustic response as well as the amplitude and frequency of the sound.

Masking – The process by which the threshold of hearing of one sound is reduced due to the presence of another which 'masks' the first.

Measurement Periods (T) – is the period over which the measurement is taken, normally varies between 5mins to an hour. More commonly 'real time' analysis and new data storage capabilities has allowed measurement times to be reduced to 1 second

Measurement time interval, Tm – total time over which measurements are taken. *NOTE This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.*

Meter response and time weightings – Sound Level Meters are provided with a sampling reference time weightings dependent on the sounds to be assessed. The variable time response control with settings are:- 'S' Slow; 'F' Fast; 'I' Impulse; 'P' Peak.

'S' Slow – meter response is over damped with a time constant of approximately 1000ms. The setting tends to average out variations in sound levels in the readings.

'F' Fast – meter responses sample over a response of 125ms. i.e. the measurement for variable sound will respond each 1/8th of a second showing a value.

'I' Impulse – uses a special electrical circuit with a time constant of about 35ms (of the same order as the response time of the human ear) to permit a very rapid response for investigating very sudden, short duration - impulsive - sounds. This setting incorporates a detector which in effect stores the signal for sufficient time to allow it to be displayed. Also a slow decay rate is incorporated with time response of approx. 1500ms to allow more easy reading of the maximum value as the indicator moves back relatively slowly.

Peak – Sound Level Meters often incorporate this setting which enables the **absolute peak** (as opposed to the rms) value of an impulsive waveform to be measured. A time constant of the order of 20 - 50 micro seconds is now involved to permit the following of very sharp impulsive events. Evidently electrical signal storage is also required to permit the meter to register the peak of such very fast events.

Rating Level – The specific noise level of a source when measured at receiver location (usually averaged over a time interval) plus any adjustment (penalty or weighting) for the characteristic features of the noise. It is used in BS4142 to rate the likelihood of complaints.

Reference time interval, Tr – specified interval over which the specific sound level is determined. *NOTE This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.*

Residual sound – ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound

Residual sound level, Lr = LAeq,T – equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, *T*

Specific sound level, Ls = LAeq,Tr – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *Tr*

Specific sound source – sound source being assessed

WHO – World Health Organisation

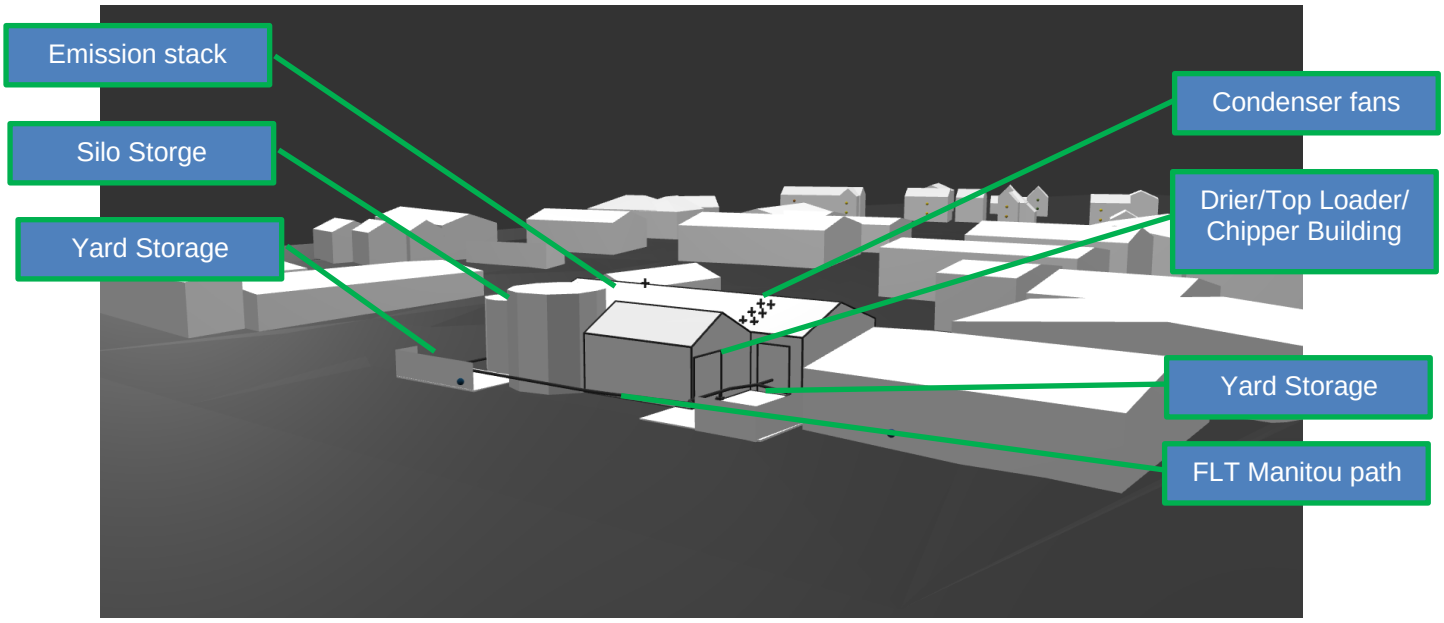
References

1. BS 7445-1:2003: Description and measurement of environmental noise. Guide to quantities and procedures
2. BS 4142:2014+A1(2019) Method for rating and assessing industrial and commercial sound
3. BS 8233:2014 Guidance on sound insulation and noise reduction for buildings
4. WHO Guidelines on Community Noise 1999
   http://www.who.int/docstore/peh/noise/guidelines2.html
5. WHO Noise Guidelines for Europe 2009
   http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf
6. WHO Environmental Noise Guidelines for the European Region (2018)
   www.euro.who.int/en/media-centre/sections/press-releases/2018/press-information-note-on-the-launch-of-the-who-environmental-noise-guidelines-for-the-european-region
7. The Calculation for Road Traffic Noise 1988
8. NPL road traffic calculation tool
   http://resource.npl.co.uk/acoustics/techguides/crtn/
9. Transport for London Converting the UK traffic noise index LA10,18h to EU noise indices for noise mapping 2002
   https://programmeofficers.co.uk/Aylesbury/CD/CD%209.11.pdf

Appendix 1 Source Data

Name	Source type	Height	Lw dB(A)	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	%age ontime
A49 daytime	Line	0.5	80	See Traffic noise calculation Appendix 2								100
A49 nighttime	Line	0.5	71.1									100
Parys Road daytime	Line	0.5	63.5	See CRTN measurements and calculation (Appendix 2)								100
Parys Road Nighttime	Line	0.5	55.6									100
HGV Movements (site)	Line	0.5	90.4	87.6	89.3	85.2	80.4	81.2	77.2	73		3
7.5 tonne movements	Line	0.5	70				75					10
Loading Shovel	Line	1.0	104	96.1	92.2	90.9	99.9	90	86.9	81.8		20
Condenser Fans	Point	1.0	76.1	75	67	60	64	49	48	45	48	100
Emission stacks	Point	12	76	Estimate based on high level extract								100
Main Building - Roof	Area	2530 m^2	45	Assumes sound reduction of 30 dB R_w and internal reverberant level of 75 dB (83 dB L_w area source) (see C1000 measurement in Appendix 2)								100
Main Building - facades	Area											
New extension	Area	459.1 m^2	65	Assumes sound reduction of 30 dB R_w and internal reverberant level of 87 dB (95 dB L_w area source) (see air drier + chipper measurement in Appendix 2)								
Main Door East	Area	20 m^2	83	Assumes open doors and free emission of sound area source (75 dB)								10
Main Doors West	Area	40 m^2	83									
Loading unloading	Point	1.0	104	JCB Manitou Loader sound power								20
Chipping Machine	Area	15 m^2	108	Based on Heizohack EM8 400 118 sound power reduced to 108 area source at entrance (directivity)								100*
Conveyors	Line	6.5 & 5.5	75	Based on research paper Analysis and Distribution of Conveyor Belt Noise Sources under Laboratory Conditions [link] 60.8 dB@ 4.1m								100
Drier & Walking floor/top loader	Area	15 m^2	91	Assumes inform sound reduction of 10 dB R_w orientation (91 dB L_w area source) (see Drier measurement in Appendix 2)								100

Note: Spectra are not available for some sources, model considers does not consider spectra.



Example wood shredder options (TBC):

Heizohack
https://www.heizomat.de/en/heizohack/crane-fed-woodchippers
HM 8-400 KF

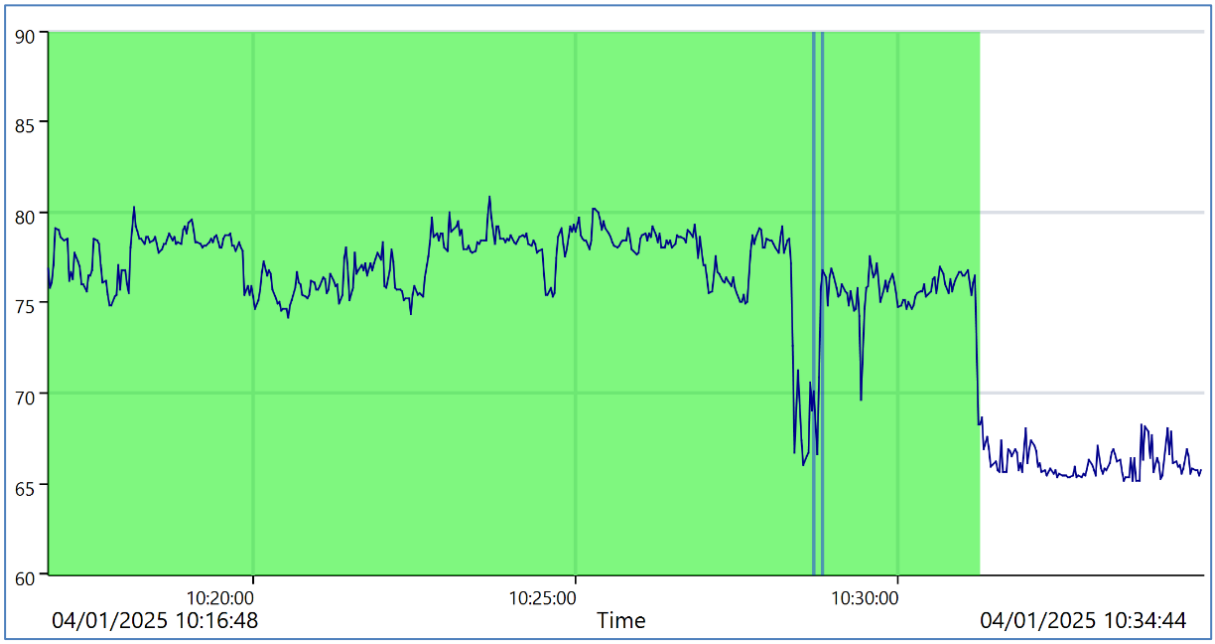
The electrically powered version of the Heizohack EM8 400 is approximately 8 dB quieter than the version used in the model but may not be available for installation.

*The chipping machine is also unlikely to operate continuously and a reduction in ontime to 50% is very likely. All sound levels at receptors are likely to be 1-3 dB lower than predicted as a result.

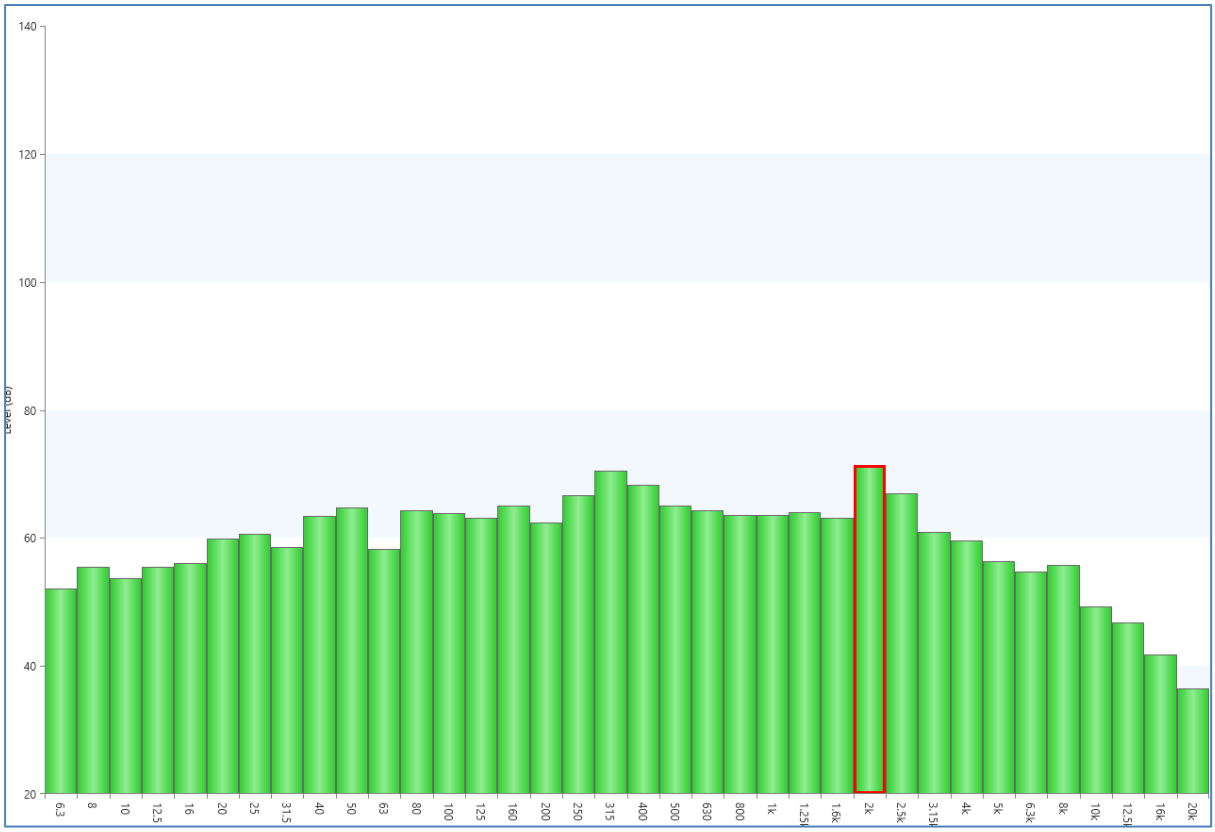
Appendix 2 Monitoring data

Source Measurements

C1000, Electrotherm and conveyor (reverberant field main building)

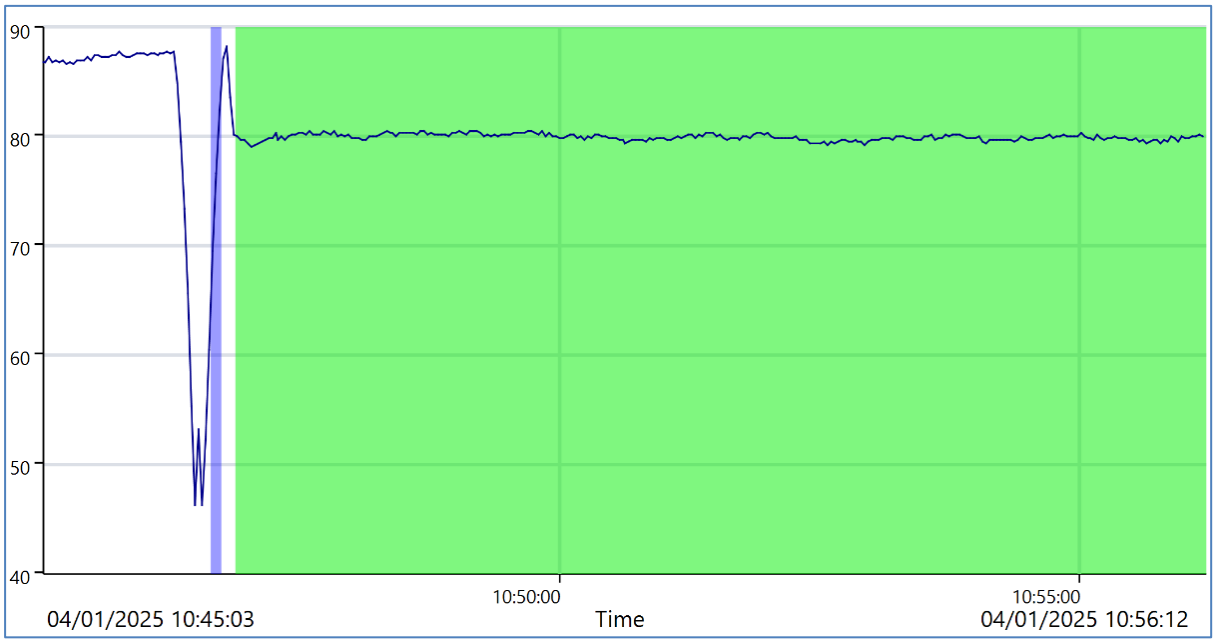


Time	Duration	LAeq (dB)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
04/01/2025	00:14:27	75.3	67.9	68.7	72.2	70.9	68.3	73	64	58.7

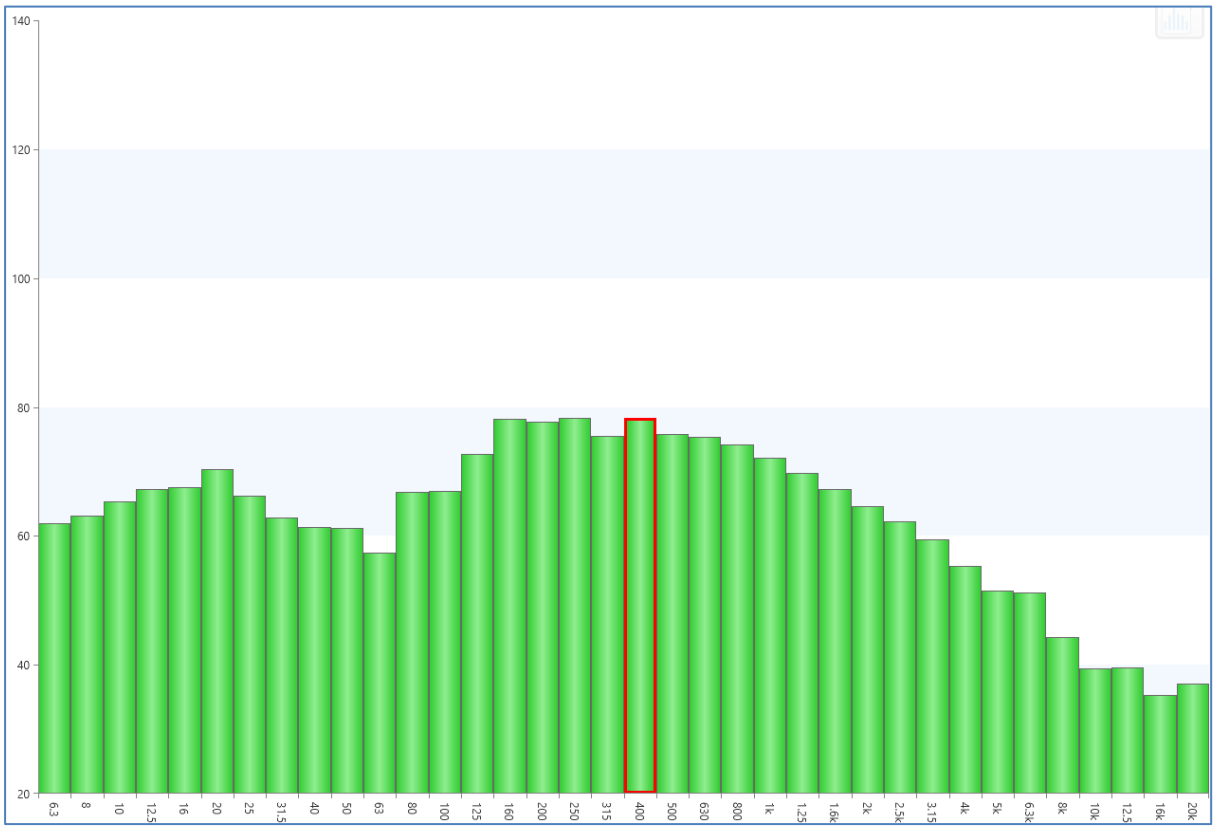


Slight tone at 2 kHz noted. Sound breakout through open doors and building not directional.

Drier & Walking floor (measured at 5m from fans)



Time	Duration	LAeq (dB)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
04/01/2025	00:09:44	79.8	68.1	79.3	81.9	81.3	77	69.8	61.2	52.1



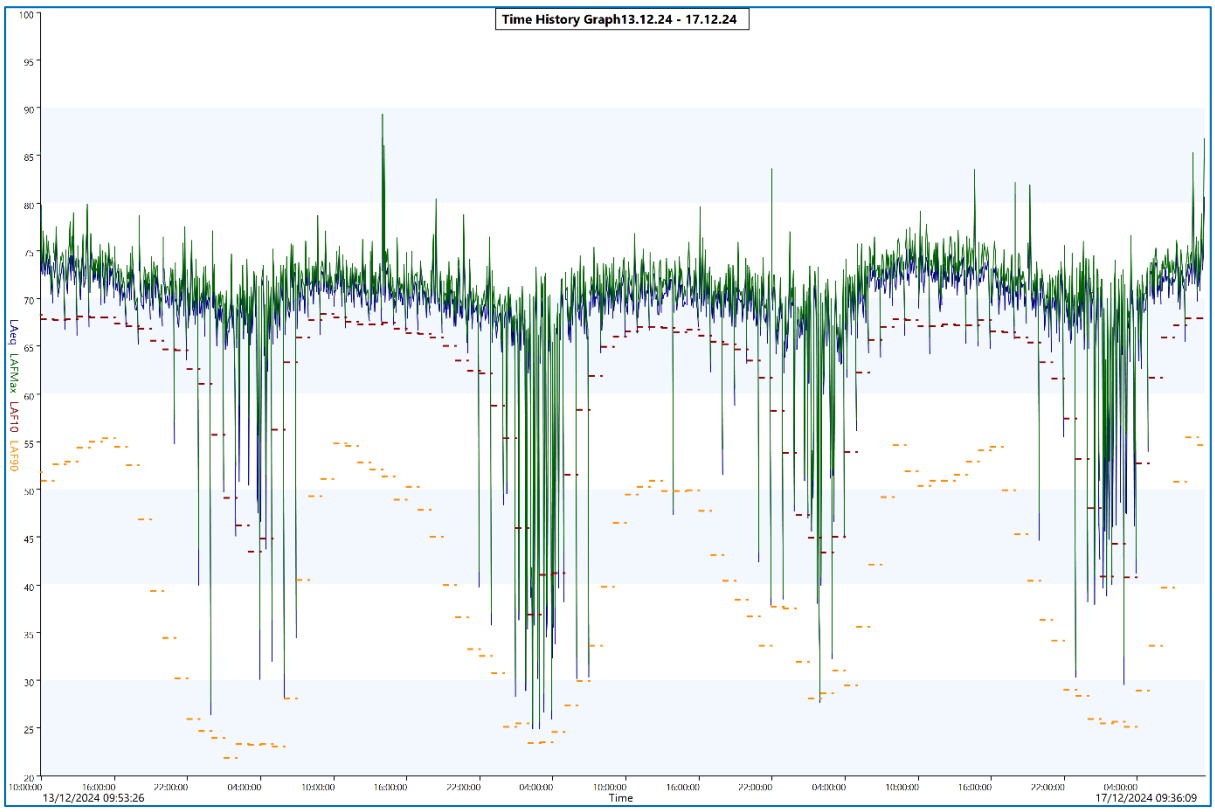
Broad spectrum hum. Slight tone at 400 Hz.

Drier is highly directional. Sound level maximum at fan end. 10 dB reduction for orientation.

Sound Power = 79.8 + 20 log(5) +8 = 101 dB

MP1 A49 Road Noise

Monitoring carried out at MP1 comprised road noise from the A49 with some potential industrial noise form adjacent sources. The A49 road noise was dominant during monitoring.



Daytime

Time	Duration	LAeq (dB)	LAFMax (dB)	LA10 (dB)	LA90 (dB)
13/12/2024 09:53	00:06:35	65.5	85.3	68.3	51.8
13/12/2024 10:00	01:00:00	64.4	79.8	67.8	50.9
13/12/2024 11:00	01:00:00	64.4	77.6	67.7	52.6
13/12/2024 12:00	01:00:00	64.7	79	67.8	52.9
13/12/2024 13:00	01:00:00	65.1	79.8	68.1	54.3
13/12/2024 14:00	01:00:00	65	76.8	68	55
13/12/2024 15:00	01:00:00	65	75.8	68	55.3
13/12/2024 16:00	01:00:00	64.5	75.5	67.4	54.4
13/12/2024 17:00	01:00:00	63.9	75.4	67.1	52.5
13/12/2024 18:00	01:00:00	63	78.7	66.8	46.8
13/12/2024 19:00	01:00:00	60.9	74.3	65.6	39.3
13/12/2024 20:00	01:00:00	59.4	76.4	64.7	34.4
13/12/2024 21:00	01:00:00	59.2	77.5	64.6	30.2
13/12/2024 22:00	01:00:00	57.4	76.1	62.6	25.9
14/12/2024 07:00	01:00:00	60.8	76	65.9	40.5
14/12/2024 08:00	01:00:00	63.6	78.7	67.7	49.3
14/12/2024 09:00	01:00:00	64.7	77.1	68.4	51.1
14/12/2024 10:00	01:00:00	64.9	75.4	68	54.8
14/12/2024 11:00	01:00:00	64.5	74	67.6	54.5
14/12/2024 12:00	01:00:00	64.1	76.1	67.3	52.8
14/12/2024 13:00	01:00:00	63.8	75.9	67.3	52.1
14/12/2024 14:00	01:00:00	64.7	89.3	67.5	51.4
14/12/2024 15:00	01:00:00	63.2	76.3	66.8	48.9
14/12/2024 16:00	01:00:00	63	74.9	66.4	50.3
14/12/2024 17:00	01:00:00	62.5	73.9	66.3	47.8
14/12/2024 18:00	01:00:00	61.7	80.4	65.9	45
14/12/2024 19:00	01:00:00	60	73.8	65	40
14/12/2024 20:00	01:00:00	58.2	78.8	63.5	36.6
14/12/2024 21:00	01:00:00	56.9	74.1	62.4	33.3

14/12/2024 22:00	01:00:00	56.8	76.4	62.1	32.5
15/12/2024 07:00	01:00:00	56.9	75.3	61.9	33.6
15/12/2024 08:00	01:00:00	59.8	73.7	64.9	39.8
15/12/2024 09:00	01:00:00	61.9	74.2	66	46.5
15/12/2024 10:00	01:00:00	62.9	76.8	66.6	49.5
15/12/2024 11:00	01:00:00	63.7	75.2	67	50.3
15/12/2024 12:00	01:00:00	63.8	74.8	67	50.9
15/12/2024 13:00	01:00:00	63.4	74.2	66.9	49.8
15/12/2024 14:00	01:00:00	62.9	74.3	66.5	49.8
15/12/2024 15:00	01:00:00	63.2	75.8	66.7	49.9
15/12/2024 16:00	01:00:00	62.7	79.6	66.1	47.7
15/12/2024 17:00	01:00:00	61.3	72.3	65.5	43.1
15/12/2024 18:00	01:00:00	60.6	73.5	65.2	40.4
15/12/2024 19:00	01:00:00	59.6	75.9	64.7	38.4
15/12/2024 20:00	01:00:00	58.1	73.4	63.5	36.7
15/12/2024 21:00	01:00:00	56.5	74.2	61.7	33.6
15/12/2024 22:00	01:00:00	56.3	83.6	58.2	37.7
16/12/2024 07:00	01:00:00	63.6	75.1	67	49.2
16/12/2024 08:00	01:00:00	64.9	76.2	67.8	54.6
16/12/2024 09:00	01:00:00	64.4	77.4	67.7	51.9
16/12/2024 10:00	01:00:00	63.8	79.1	67.1	50.4
16/12/2024 11:00	01:00:00	63.7	75.8	67.1	50.9
16/12/2024 12:00	01:00:00	63.9	76.5	67.3	50.9
16/12/2024 13:00	01:00:00	63.8	77.2	67.2	51.5
16/12/2024 14:00	01:00:00	64.1	83.5	67.2	52.9
16/12/2024 15:00	01:00:00	64.6	75.9	67.7	54.1
16/12/2024 16:00	01:00:00	63.6	76	66.6	54.4
16/12/2024 17:00	01:00:00	63.2	75.1	66.5	49.9
16/12/2024 18:00	01:00:00	62	82.1	65.9	45.3
16/12/2024 19:00	01:00:00	60.8	81.9	65.4	40.4
16/12/2024 20:00	01:00:00	58	73	63.3	36.3
16/12/2024 21:00	01:00:00	56.6	73.8	61.6	34.2
16/12/2024 22:00	01:00:00	54.8	75.6	57.4	29
17/12/2024 07:00	01:00:00	63.8	76.1	67.2	50.8
17/12/2024 08:00	01:00:00	65	85.2	67.9	55.4
17/12/2024 09:00	00:36:08	64.9	86.8	67.9	54.6
	Average	62.9	77.0	66.0	46.3
	Stdev	2.8	3.5	2.3	7.9

Nighttime

Start Time	Duration	LAeq (dB)	LAMax (dB)	L10 (LAeq)	LA90 (dB)
13/12/2024 23:00	00:15:00	56.6	70.8	61.9	25.1
13/12/2024 23:15	00:15:00	57.1	71.4	62.1	26
13/12/2024 23:30	00:15:00	56.2	71.9	60.8	27.4
13/12/2024 23:45	00:15:00	54.9	70.1	58.3	23
14/12/2024 00:00	00:15:00	55.4	75.7	57.8	23.8
14/12/2024 00:15	00:15:00	53.9	69.3	57	23.9
14/12/2024 00:30	00:15:00	52.7	69.3	53	24.3
14/12/2024 00:45	00:15:00	53.5	68.9	55.4	24.7
14/12/2024 01:00	00:15:00	53	68.4	54.7	22.8
14/12/2024 01:15	00:15:00	50.6	68.9	47.4	22.5
14/12/2024 01:30	00:15:00	52.7	72.4	51.7	21.6
14/12/2024 01:45	00:15:00	47	68.4	41.9	21
14/12/2024 02:00	00:15:00	49.7	68.8	47.1	25.9
14/12/2024 02:15	00:15:00	49	70.9	44.9	24.2
14/12/2024 02:30	00:15:00	51.9	72.1	49.2	23.6
14/12/2024 02:45	00:15:00	51.6	71.9	46.4	22.5
14/12/2024 03:00	00:15:00	47.7	68.7	43.1	23.5
14/12/2024 03:15	00:15:00	49.3	69.9	44.7	24
14/12/2024 03:30	00:15:00	53.6	72.1	48.8	23.8
14/12/2024 03:45	00:15:00	50.9	70.7	41.3	23.3
14/12/2024 04:00	00:15:00	51.2	71.5	44.1	22.6
14/12/2024 04:15	00:15:00	51.6	72.4	45.8	23.4
14/12/2024 04:30	00:15:00	47	70.9	36.8	23.7
14/12/2024 04:45	00:15:00	52.5	71.2	49.9	24.6
14/12/2024 05:00	00:15:00	54.9	73.2	55.9	25.2
14/12/2024 05:15	00:15:00	51	71	47.6	22.3
14/12/2024 05:30	00:15:00	55.8	72.4	60.2	22.1
14/12/2024 05:45	00:15:00	55.6	72	58.5	26.7
14/12/2024 06:00	00:15:00	55.2	73	58.1	26.2

14/12/2024 06:15	00:15:00	55.8	69.2	60.3	30.1
14/12/2024 06:30	00:15:00	58.3	73.9	63.4	29.7
14/12/2024 06:45	00:15:00	60.9	72.7	65.8	40.3
14/12/2024 23:00	00:15:00	56	71.6	61.1	31.9
14/12/2024 23:15	00:15:00	53.8	67.6	58	31
14/12/2024 23:30	00:15:00	54.5	68.5	58.7	29.7
14/12/2024 23:45	00:15:00	52.7	68.3	55.5	30.3
15/12/2024 00:00	00:15:00	54.6	68.6	59.7	30.5
15/12/2024 00:15	00:15:00	53.4	70.1	55.9	25.8
15/12/2024 00:30	00:15:00	52.1	69.1	52.4	23.5
15/12/2024 00:45	00:15:00	51.1	67.4	50.9	24.8
15/12/2024 01:00	00:15:00	51.7	67.9	51.7	25.8
15/12/2024 01:15	00:15:00	49.3	68.4	43.7	25.7
15/12/2024 01:30	00:15:00	51.1	70.8	48.9	26.5
15/12/2024 01:45	00:15:00	47.5	67.7	38.5	24.9
15/12/2024 02:00	00:15:00	47.6	69	40.2	25.1
15/12/2024 02:15	00:15:00	39	63.2	29.2	23.1
15/12/2024 02:30	00:15:00	50.6	71.2	42.6	24.8
15/12/2024 02:45	00:15:00	43.6	65.4	31	23.1
15/12/2024 03:00	00:15:00	47.4	70.5	38.3	24.3
15/12/2024 03:15	00:15:00	51.3	71.1	47	23
15/12/2024 03:30	00:15:00	48.5	71.6	33.3	23.3
15/12/2024 03:45	00:15:00	48.2	69.2	39.8	24.4
15/12/2024 04:00	00:15:00	44.9	66.1	37.2	24.5
15/12/2024 04:15	00:15:00	45.4	66.5	33.8	24.3
15/12/2024 04:30	00:15:00	48.2	68.2	41.6	25.3
15/12/2024 04:45	00:15:00	51.7	70.8	48.7	25.9
15/12/2024 05:00	00:15:00	53.8	71.8	51.6	27.8
15/12/2024 05:15	00:15:00	48.6	68.1	40.4	26.3
15/12/2024 05:30	00:15:00	54.4	72.1	57.3	29.5
15/12/2024 05:45	00:15:00	53.6	72.2	52.2	28.3
15/12/2024 06:00	00:15:00	54.6	71.1	57.4	28.5
15/12/2024 06:15	00:15:00	55.7	73.1	58.8	29.6
15/12/2024 06:30	00:15:00	54.8	70.9	58.6	31.9
15/12/2024 06:45	00:15:00	54.6	69.7	59.1	30.4
15/12/2024 23:00	00:15:00	50.6	64.2	52.5	37.7
15/12/2024 23:15	00:15:00	52.5	69.1	55.5	41.1
15/12/2024 23:30	00:15:00	55.1	75.4	54.6	37.7
15/12/2024 23:45	00:15:00	52.9	70.8	51.1	36.2
16/12/2024 00:00	00:15:00	49.2	67.7	45.3	32
16/12/2024 00:15	00:15:00	49.9	67.9	43.7	30.8
16/12/2024 00:30	00:15:00	50.3	70.7	48.4	32.6
16/12/2024 00:45	00:15:00	49.4	69.5	48	32.9
16/12/2024 01:00	00:15:00	51.3	72.5	46.8	32.6
16/12/2024 01:15	00:15:00	41.2	53.5	44.9	32.5
16/12/2024 01:30	00:15:00	52.2	71.4	46	29
16/12/2024 01:45	00:15:00	49	71.9	38.6	25.8
16/12/2024 02:00	00:15:00	47.6	69.4	45.5	29.6
16/12/2024 02:15	00:15:00	47.5	69.4	39.2	26.9
16/12/2024 02:30	00:15:00	49.9	71.1	43.5	28.8
16/12/2024 02:45	00:15:00	48.5	69.2	44.1	31.3
16/12/2024 03:00	00:15:00	45.7	66.8	43.5	30.4
16/12/2024 03:15	00:15:00	50	70.7	46.2	32.4
16/12/2024 03:30	00:15:00	47.9	66.9	43.9	31
16/12/2024 03:45	00:15:00	51.6	71.8	48.6	30.8
16/12/2024 04:00	00:15:00	52.8	73.2	49.6	33.8
16/12/2024 04:15	00:15:00	53.6	71.1	52.7	26.9
16/12/2024 04:30	00:15:00	54	71.7	54.9	30
16/12/2024 04:45	00:15:00	55	71.4	58.3	35.1
16/12/2024 05:00	00:15:00	56.5	74.8	60.3	35.9
16/12/2024 05:15	00:15:00	57.6	75.1	61.9	34.2
16/12/2024 05:30	00:15:00	57.6	72.8	63.2	35.9
16/12/2024 05:45	00:15:00	57.9	72.3	63	37.5
16/12/2024 06:00	00:15:00	59.6	73.6	64	40.4
16/12/2024 06:15	00:15:00	61.5	72.9	65.9	43.2
16/12/2024 06:30	00:15:00	61.3	75.2	65.9	42.6
16/12/2024 06:45	00:15:00	61.8	72.2	65.9	45.6
16/12/2024 23:00	00:15:00	52.9	72.3	51.9	27.9
16/12/2024 23:15	00:15:00	54.2	71.4	56.6	30
16/12/2024 23:30	00:15:00	53.2	75	48.5	28.5
16/12/2024 23:45	00:15:00	54.2	72.8	54.1	28.3

17/12/2024 00:00	00:15:00	52.8	73.2	51.1	26
17/12/2024 00:15	00:15:00	53.3	70.3	52	26.7
17/12/2024 00:30	00:15:00	48.5	72.5	36.2	26.1
17/12/2024 00:45	00:15:00	51.6	71.1	47.4	25.2
17/12/2024 01:00	00:15:00	52	70.9	46.6	25.1
17/12/2024 01:15	00:15:00	48.7	70.9	42.1	25.7
17/12/2024 01:30	00:15:00	44.5	68.8	36.8	26
17/12/2024 01:45	00:15:00	48.6	70.1	38	25.6
17/12/2024 02:00	00:15:00	49.9	70.2	43.7	24.9
17/12/2024 02:15	00:15:00	50.7	72.8	44.7	27.4
17/12/2024 02:30	00:15:00	49.5	69.9	44.4	27.2
17/12/2024 02:45	00:15:00	51.1	71.6	45	26.1
17/12/2024 03:00	00:15:00	46.2	70.5	33.9	25.1
17/12/2024 03:15	00:15:00	48.7	68.5	41.8	25.9
17/12/2024 03:30	00:15:00	51.3	74.6	45	27.2
17/12/2024 03:45	00:15:00	48.6	70.2	41.3	24.5
17/12/2024 04:00	00:15:00	51.3	71.1	45.8	28.5
17/12/2024 04:15	00:15:00	50	70.1	43.8	28.5
17/12/2024 04:30	00:15:00	54.6	70.5	55.4	31.4
17/12/2024 04:45	00:15:00	56.2	72.5	59.1	30.9
17/12/2024 05:00	00:15:00	55.2	72.8	56.4	31.6
17/12/2024 05:15	00:15:00	56.3	72.5	60.6	32.8
17/12/2024 05:30	00:15:00	58.9	73.7	63.4	37.2
17/12/2024 05:45	00:15:00	58.1	72	63.1	36.6
17/12/2024 06:00	00:15:00	59.5	72.6	64.5	36.8
17/12/2024 06:15	00:15:00	61	73.3	65.7	40.2
17/12/2024 06:30	00:15:00	60.6	72.3	65.7	40.4
17/12/2024 06:45	00:15:00	62.7	72.2	66.9	45.2
	Average	55.3	70.6	50.6	28.8
	Stdev	4.2	2.7	8.9	5.4

The predicted levels for road traffic based on the CRTN calculation (see below), suggest 66.9 dB @ 10m for daytime from road traffic.

The measurement position was approximately 30m from the edge of the highway and approximately 10m from the rail line.

Measured levels at the MP1 position for road noise would be expected to be up to 4.5 dB quieter than measure than the predicted or ~62.4 dB.

Traffic Noise Calculation

Site number: 57854
Site details

Region	**West Midlands**
Local authority	Shropshire
Road name	A49
Road classification	'A' road
Managed by	Highways England
Road type	Major
Start junction	B4361
End junction	A4117
Link length	4.60km (2.86 miles)
Easting, northing	352584, 275187
Latitude, longitude	52.37266300, -2.69789310

Annual Average daily flow

Year	Count method	Pedal cycles	Two wheeled motor vehicles	Cars and taxis	Buses and coaches	Light goods vehicles	Heavy goods vehicles	All motor vehicles
2023	Estimated using previous year's AADF on this link	10	96	9303	5	3028	1302	13735
2022	Estimated using previous year's AADF on this link	12	98	9167	5	2931	1326	13527
2021	Estimated using previous year's AADF on this link	13	86	7947	5	2675	1297	12010
2020	Manual count	13	73	6923	4	2226	1138	10365
2019	Estimated using previous year's AADF on this link	10	118	9029	43	2899	945	13033
2018	Estimated using previous year's AADF on this link	9	117	8953	45	2909	948	12971
2017	Estimated using previous year's AADF on this link	9	111	8984	46	2778	935	12855
2016	Estimated using previous year's AADF on this link	9	110	8988	45	2608	904	12654
2015	Estimated using previous year's AADF on this link	8	106	8726	44	2415	870	12161
2014	Estimated using previous year's AADF on this link	8	106	8788	44	2218	836	11991
2013	Manual count	10	97	8810	42	2130	837	11916
2012	Estimated using previous year's AADF on this link	4	107	7401	71	2187	1061	10828
2011	Estimated using previous year's AADF on this link	4	116	7460	69	2115	1073	10833
2010	Estimated using previous year's AADF on this link	4	106	7505	67	2060	1103	10841
2009	Estimated using previous year's AADF on this link	4	118	7611	65	1998	1123	10915
2008	Estimated using previous year's AADF on this link	4	117	7634	63	2002	1208	11024
2007	Estimated using previous year's AADF on this link	4	111	7887	59	1928	1234	11219
2006	Estimated using previous year's AADF on this link	4	107	7824	54	1702	1172	10859
2005	Manual count	4	109	7824	50	1585	1162	10730
2004	Estimated using previous year's AADF on this link	2	65	8050	42	1548	1232	10937
2003	Estimated using previous year's AADF on this link	3	58	8041	50	1468	1195	10812
2002	Manual count	3	53	7938	55	1308	1186	10540

2001	Estimated using previous year's AADF on this link	0	86	8275	98	1194	1283	10936
2000	Manual count	0	83	7934	91	1179	1317	10604
	average	10.1	101.6	8692.5	29.8	2619.7	1030.7	12474.4
				%age HGV			8.3%	

10 year average

Stage 2 - Basic Noise Level

Calculate the basic noise level at a reference distance of 10m away from the nearside carriageway edge for each segment.

Time Period ☐ Hourly L_{10} ☑ 18 Hour L_{10}

Total Vehicle Flow 12474 (Veh/Hour : Veh/18 Hour) help

Speed 90 (km/h) - Estimated from the road class? ☐

Heavy Vehicles 8.3 (%)

Gradient 3.3 (%) ☑ Upward flow help

Road Surface Impervious help

Calculate 74.3 dB(A)

***For non motorway roads**:*

$L_{day} = 0.95 \times L_{A10,18h} + 1.44$ dB (4.9)

$L_{night} = 0.90 \times L_{A10,18h} - 3.77$ dB (4.11)

Daytime	**Night Time**
$L_{day} = 0.95 \times L_{A10,18h} + 1.44$ dB $L_{day} = 0.95 \times 74..3 + 1.44$ dB $L_{day} = 72$ dB @ 10m *This equates to a line source sound power of 80 dB L_w*	$L_{night} = 0.9 \times L_{A10,18h} - 3.77$ dB $L_{night} = 0.9 \times 74.3 - 3.77$ dB $L_{night} = 63.1$ @ 10m *This equates to a line source sound power of 71.1 dB L_w*

Note

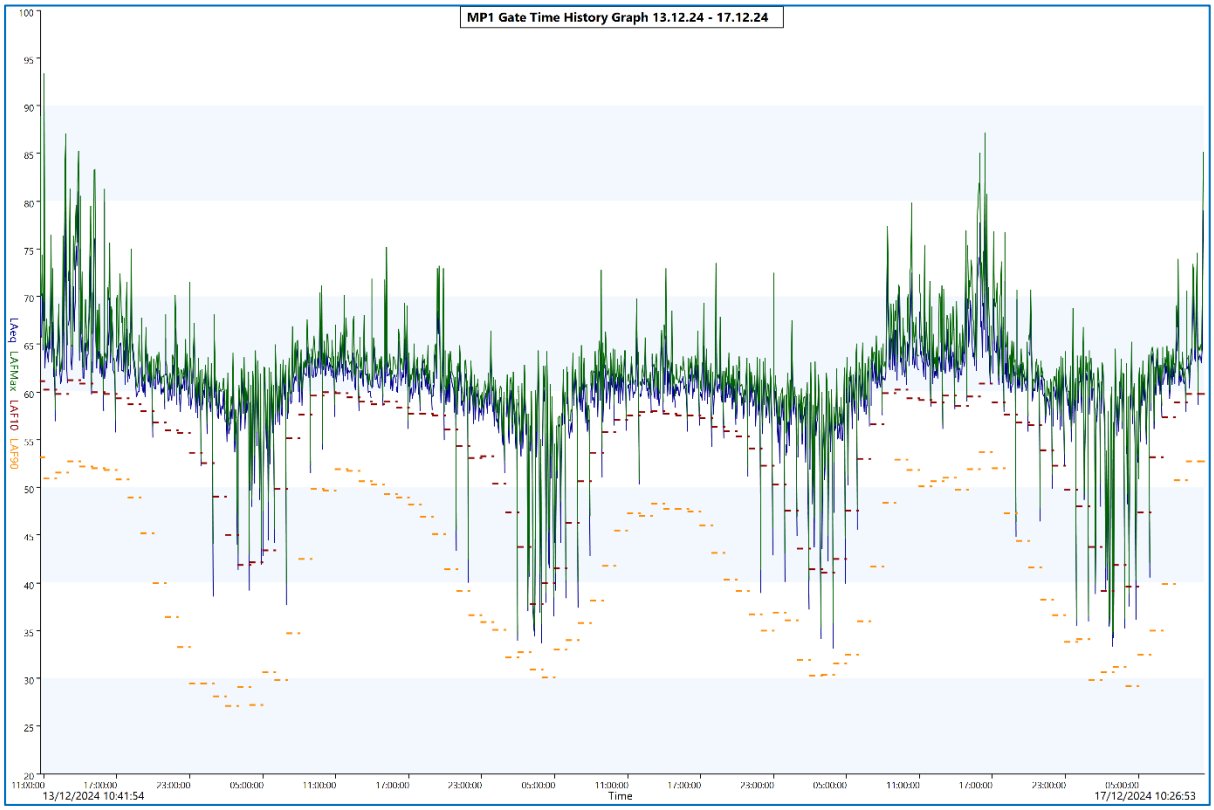
There is some variance in levels of traffic over the last 10 years. Whilst the trend is up, in terms of road vehicles, new low noise road surfaces are being introduced and will counter potential noise increase. The worst case scenario would potentially increase levels by 1.5 dB, typical levels would be lower. The worst case has been used for assessment.

The measured averages for daytime at MP1 are 63 dB L_{day}, and 55 dB L_{night} at a distance of 20m from the highway through the trees. Whilst the measured data is not direct verification of the A49 calculation when the distance correction of 3 dB and some mitigation from 15m of trees 2-3 dB is consistent with the calculated level.

The calculated level for road noise has been used in modelling.

MP2 Gate

Monitoring carried out at MP1 comprised distant road noise from the A49 and existing industrial noise form adjacent sources on the Ludlow Business Park. The A49 road noise was dominant during monitoring but less so than for MP1. The monitoring position was 4m above ground levels on the main gate.



Daytime

Time	Duration	LAeq (dB)	LAMax (dB)	LA10 (dB)	LA90 (dB)
13/12/2024 10:41	00:18:06	61.7	88.9	61.1	53.2
13/12/2024 11:00	01:00:00	58.5	93.4	60.2	50.9
13/12/2024 12:00	01:00:00	58	87	59.8	51.5
13/12/2024 13:00	01:00:00	59.1	85.2	61.2	52.7
13/12/2024 14:00	01:00:00	58.5	80.5	60.9	52.2
13/12/2024 15:00	01:00:00	58	83.3	60	52
13/12/2024 16:00	01:00:00	57.7	81.2	59.8	51.8
13/12/2024 17:00	01:00:00	56.8	72.4	59.3	50.8
13/12/2024 18:00	01:00:00	55.9	75	58.7	48.9
13/12/2024 19:00	01:00:00	54.6	67.8	58	45.2
13/12/2024 20:00	01:00:00	52.5	64.1	56.8	40
13/12/2024 21:00	01:00:00	51.6	70.1	56	36.4
13/12/2024 22:00	01:00:00	50.8	65.5	55.7	33.3
14/12/2024 07:00	01:00:00	50.8	66.8	55.2	34.7
14/12/2024 08:00	01:00:00	53.7	67.5	57.6	42.5
14/12/2024 09:00	01:00:00	56.3	71.1	59.6	49.8
14/12/2024 10:00	01:00:00	56.8	66.1	60	49.6
14/12/2024 11:00	01:00:00	57.4	70.1	59.9	51.9
14/12/2024 12:00	01:00:00	56.9	67.9	59.4	51.7
14/12/2024 13:00	01:00:00	56.3	68	59	50.6
14/12/2024 14:00	01:00:00	56	71.8	58.7	50.3
14/12/2024 15:00	01:00:00	56.2	75.2	59	49.3
14/12/2024 16:00	01:00:00	55.3	69.3	58.3	48.9
14/12/2024 17:00	01:00:00	54.8	65	57.7	48.2
14/12/2024 18:00	01:00:00	54.4	64.8	57.7	46.9
14/12/2024 19:00	01:00:00	54.1	73.2	57.5	45.1
14/12/2024 20:00	01:00:00	51.8	64.3	56.1	41.4

14/12/2024 21:00	01:00:00	50	64.9	54.3	39.1
14/12/2024 22:00	01:00:00	48.4	63.3	53.1	36.6
15/12/2024 07:00	01:00:00	47.1	64.8	50.6	35.8
15/12/2024 08:00	01:00:00	49.9	72.7	53.6	38.1
15/12/2024 09:00	01:00:00	51.7	66.3	55.8	41.8
15/12/2024 10:00	01:00:00	53.6	64.4	57.1	45.5
15/12/2024 11:00	01:00:00	54.3	69.7	57.5	47.3
15/12/2024 12:00	01:00:00	54.9	65.6	57.9	47
15/12/2024 13:00	01:00:00	55.2	66.5	58	48.3
15/12/2024 14:00	01:00:00	54.7	72.9	57.7	47.7
15/12/2024 15:00	01:00:00	54.4	63.6	57.5	47.7
15/12/2024 16:00	01:00:00	54.5	66.4	57.5	47.5
15/12/2024 17:00	01:00:00	54.2	69.3	57.2	46
15/12/2024 18:00	01:00:00	52.6	73.4	56.3	43.1
15/12/2024 19:00	01:00:00	51.8	64	55.9	40.3
15/12/2024 20:00	01:00:00	50.6	63.7	55.3	39.1
15/12/2024 21:00	01:00:00	49.4	63.6	54.1	36.7
15/12/2024 22:00	01:00:00	47.7	63.5	52.3	35
16/12/2024 07:00	01:00:00	52.5	65.9	56.6	41.7
16/12/2024 08:00	01:00:00	57.5	77.3	59.9	48.4
16/12/2024 09:00	01:00:00	57.8	71.2	60.2	52.9
16/12/2024 10:00	01:00:00	57	79.8	59.3	51.8
16/12/2024 11:00	01:00:00	56.5	75.4	59.1	50.1
16/12/2024 12:00	01:00:00	56.3	71.1	58.9	50.6
16/12/2024 13:00	01:00:00	56.8	70.7	59.6	51
16/12/2024 14:00	01:00:00	55.8	76.9	58.5	49.7
16/12/2024 15:00	01:00:00	57.2	81.9	59.5	51.9
16/12/2024 16:00	01:00:00	59.1	87.1	60.9	53.7
16/12/2024 17:00	01:00:00	56.6	76.8	58.9	52
16/12/2024 18:00	01:00:00	54.8	76.7	57.6	47.3
16/12/2024 19:00	01:00:00	53.3	70.7	56.8	44.4
16/12/2024 20:00	01:00:00	52.5	70.7	56.5	41.6
16/12/2024 21:00	01:00:00	49.4	63.2	53.9	38.2
16/12/2024 22:00	01:00:00	48	63.7	52.3	36.6
17/12/2024 07:00	01:00:00	53	64.7	57.3	39.9
17/12/2024 08:00	01:00:00	56.2	73.8	58.9	50.7
17/12/2024 09:00	01:00:00	57.6	74.6	59.8	52.7
17/12/2024 10:00	00:26:54	57.8	85.1	59.8	52.7
	Average	55.6	71.6	57.7	46.2
	stdev	3.2	7.4	2.3	5.8

Nighttime

Start Time	Duration	LAeq (dB)	LAMax (dB)	LA10 (dB)	LA90 (dB)
13/12/2024 23:00	00:15:00	49	65.4	53.9	30.8
13/12/2024 23:15	00:15:00	48.4	65.6	52.9	26.7
13/12/2024 23:30	00:15:00	49.9	60.5	54.9	31.4
13/12/2024 23:45	00:15:00	48	61.1	52.5	31.3
14/12/2024 00:00	00:15:00	48	61	53.2	30
14/12/2024 00:15	00:15:00	48.7	62.1	53.5	31.6
14/12/2024 00:30	00:15:00	47.7	63	51.8	31.2
14/12/2024 00:45	00:15:00	46.6	61.8	51.1	27.3
14/12/2024 01:00	00:15:00	47	66.6	50.6	29.3
14/12/2024 01:15	00:15:00	45.9	60	50	30.1
14/12/2024 01:30	00:15:00	43.9	60.1	46.2	26.7
14/12/2024 01:45	00:15:00	45.3	60	49.2	27.9
14/12/2024 02:00	00:15:00	44.5	59.1	48	25.7
14/12/2024 02:15	00:15:00	42.4	60.2	43.6	27.5
14/12/2024 02:30	00:15:00	43.9	62.7	45.3	27.9
14/12/2024 02:45	00:15:00	41.3	57.7	43.7	27.4
14/12/2024 03:00	00:15:00	41.5	59.4	40.4	29.1
14/12/2024 03:15	00:15:00	41.4	61.6	39.7	29.5
14/12/2024 03:30	00:15:00	43.9	62	44.2	29.8
14/12/2024 03:45	00:15:00	42.6	61.2	42.4	28.3
14/12/2024 04:00	00:15:00	39.9	59.3	37.9	26.7
14/12/2024 04:15	00:15:00	41.8	60.8	42.1	27.1
14/12/2024 04:30	00:15:00	45.1	63.2	44	28.9
14/12/2024 04:45	00:15:00	43.5	62	41.9	28.5
14/12/2024 05:00	00:15:00	43.6	60.8	42.7	30.7
14/12/2024 05:15	00:15:00	42.7	61.6	41.1	30.1
14/12/2024 05:30	00:15:00	40.7	61.2	40.6	31.5
14/12/2024 05:45	00:15:00	44.7	60.8	46.7	32

14/12/2024 06:00	00:15:00	47.1	63.1	50.2	32.5
14/12/2024 06:15	00:15:00	43.2	60.2	44.5	28.9
14/12/2024 06:30	00:15:00	47.6	62	52.3	28.5
14/12/2024 06:45	00:15:00	47.1	61.7	50.5	33.6
14/12/2024 23:00	00:15:00	48.3	59.3	53.5	35
14/12/2024 23:15	00:15:00	47.1	59.8	51.6	35
14/12/2024 23:30	00:15:00	48.3	61.3	53.2	36.3
14/12/2024 23:45	00:15:00	49.9	65.1	54.3	39.1
15/12/2024 00:00	00:15:00	47.6	60.6	52	37.4
15/12/2024 00:15	00:15:00	46	57.2	50.5	35.3
15/12/2024 00:30	00:15:00	46	59.4	50.1	34.3
15/12/2024 00:45	00:15:00	45	58.8	49.3	34.8
15/12/2024 01:00	00:15:00	46.2	59.3	50.7	35.1
15/12/2024 01:15	00:15:00	44.5	60.1	47.8	32
15/12/2024 01:30	00:15:00	44.2	60.8	46.4	31.9
15/12/2024 01:45	00:15:00	42.6	57.8	44.7	32.1
15/12/2024 02:00	00:15:00	43.9	58.8	47.2	33
15/12/2024 02:15	00:15:00	41.7	59.8	42	33.3
15/12/2024 02:30	00:15:00	43	61.3	44	32.9
15/12/2024 02:45	00:15:00	40.8	57	40.8	32.3
15/12/2024 03:00	00:15:00	39.7	58.3	37.6	31.4
15/12/2024 03:15	00:15:00	34	53.1	34	30
15/12/2024 03:30	00:15:00	43	62.7	42.8	33.5
15/12/2024 03:45	00:15:00	37.1	56.8	35.8	31.3
15/12/2024 04:00	00:15:00	40	61	38	32.8
15/12/2024 04:15	00:15:00	44.2	62.7	43.9	30.4
15/12/2024 04:30	00:15:00	39.4	59.1	38.8	28.7
15/12/2024 04:45	00:15:00	40.3	58.3	40.5	32.9
15/12/2024 05:00	00:15:00	38.6	55.1	39.3	33.2
15/12/2024 05:15	00:15:00	39.5	56.5	40.3	33.1
15/12/2024 05:30	00:15:00	41	56.6	42.5	34
15/12/2024 05:45	00:15:00	43.5	61.2	43.6	33
15/12/2024 06:00	00:15:00	45	61.9	45.3	34.1
15/12/2024 06:15	00:15:00	41.2	56.7	41.6	33.1
15/12/2024 06:30	00:15:00	46.9	63.2	50.4	35.3
15/12/2024 06:45	00:15:00	45	61.7	46	36.5
15/12/2024 23:00	00:15:00	50.3	71.2	52.2	37.6
15/12/2024 23:15	00:15:00	47.4	60	50.6	40.1
15/12/2024 23:30	00:15:00	45.4	57.4	48.5	36.7
15/12/2024 23:45	00:15:00	46.6	59.6	50.2	35.9
16/12/2024 00:00	00:15:00	44.4	56.6	47.9	37.4
16/12/2024 00:15	00:15:00	45.9	60.3	48.2	38.1
16/12/2024 00:30	00:15:00	46.4	66.2	47.4	36.2
16/12/2024 00:45	00:15:00	44.3	59.5	46.1	35
16/12/2024 01:00	00:15:00	41.8	58.8	43.1	31.8
16/12/2024 01:15	00:15:00	41.4	58.6	41.2	31.6
16/12/2024 01:30	00:15:00	43	58.4	45.3	32.1
16/12/2024 01:45	00:15:00	42.1	59.8	43.7	33.1
16/12/2024 02:00	00:15:00	43.1	61.9	42.7	33.1
16/12/2024 02:15	00:15:00	38.5	56.7	40.2	31.5
16/12/2024 02:30	00:15:00	43.3	62.3	42.9	30.8
16/12/2024 02:45	00:15:00	40.1	61	36.7	29.4
16/12/2024 03:00	00:15:00	40	59.3	41.8	30.9
16/12/2024 03:15	00:15:00	39.5	60.7	37.1	29.5
16/12/2024 03:30	00:15:00	41.4	59.9	41.6	31
16/12/2024 03:45	00:15:00	40.4	59.2	41.4	31.3
16/12/2024 04:00	00:15:00	38.7	57	39.4	31.1
16/12/2024 04:15	00:15:00	42	61.1	43.3	32
16/12/2024 04:30	00:15:00	41.2	57.7	42.4	31.9
16/12/2024 04:45	00:15:00	42.8	61.3	43.5	31.9
16/12/2024 05:00	00:15:00	44.3	61.5	44.5	32.6
16/12/2024 05:15	00:15:00	44.9	61.6	46.8	31
16/12/2024 05:30	00:15:00	45.7	61.1	48.3	33.6
16/12/2024 05:45	00:15:00	47	62.4	49.7	35.7
16/12/2024 06:00	00:15:00	47.2	61.3	50.5	35.5
16/12/2024 06:15	00:15:00	48.8	63.3	53	35.5
16/12/2024 06:30	00:15:00	48.9	62.1	53.3	36.5
16/12/2024 06:45	00:15:00	49.6	62.2	54.1	37.4
16/12/2024 23:00	00:15:00	47.9	63.3	51.9	35.4
16/12/2024 23:15	00:15:00	46.2	59.8	50.4	34.7
16/12/2024 23:30	00:15:00	46.8	65.6	49.2	32

16/12/2024 23:45	00:15:00	44.4	59.5	45.8	33.6
17/12/2024 00:00	00:15:00	45.7	62.6	47.6	34.9
17/12/2024 00:15	00:15:00	46.3	62.7	49.5	35.3
17/12/2024 00:30	00:15:00	46	65.3	46.9	35.3
17/12/2024 00:45	00:15:00	46.2	61.9	48.2	32.6
17/12/2024 01:00	00:15:00	45.1	63.5	46.2	28.8
17/12/2024 01:15	00:15:00	45.7	61.3	46.7	30.4
17/12/2024 01:30	00:15:00	39.4	57.8	37.6	31.9
17/12/2024 01:45	00:15:00	43.5	61	43	29.1
17/12/2024 02:00	00:15:00	42.5	62.3	39.3	29.4
17/12/2024 02:15	00:15:00	41.3	61.6	40.3	31.2
17/12/2024 02:30	00:15:00	38.2	57.4	37.3	31.3
17/12/2024 02:45	00:15:00	41.1	59.6	38.9	31.2
17/12/2024 03:00	00:15:00	42.3	61.6	41.2	29
17/12/2024 03:15	00:15:00	43.2	63.4	42.2	32.5
17/12/2024 03:30	00:15:00	42.6	59.5	41.8	32.8
17/12/2024 03:45	00:15:00	43.6	62.7	42.4	33.2
17/12/2024 04:00	00:15:00	38.9	61.3	35.8	26.9
17/12/2024 04:15	00:15:00	40.8	58.7	39.3	31.7
17/12/2024 04:30	00:15:00	43.9	64.5	42.5	30.8
17/12/2024 04:45	00:15:00	38.9	57.2	36.8	29.8
17/12/2024 05:00	00:15:00	42.3	61.2	41.8	31.6
17/12/2024 05:15	00:15:00	43.6	61.1	43.5	34
17/12/2024 05:30	00:15:00	46.2	60.8	48.7	33.1
17/12/2024 05:45	00:15:00	48.5	62.6	52.6	33.2
17/12/2024 06:00	00:15:00	47	63.2	49.9	34.5
17/12/2024 06:15	00:15:00	48.2	63.9	52.4	34
17/12/2024 06:30	00:15:00	50.1	63.5	54.3	37
17/12/2024 06:45	00:15:00	50	62	54.8	37.3
	Average	45.2	60.8	45.6	32.2
	stdev	3.2	2.5	5.2	2.9

The measurement position was approximately 80m from the edge of the highway 4m above ground level.

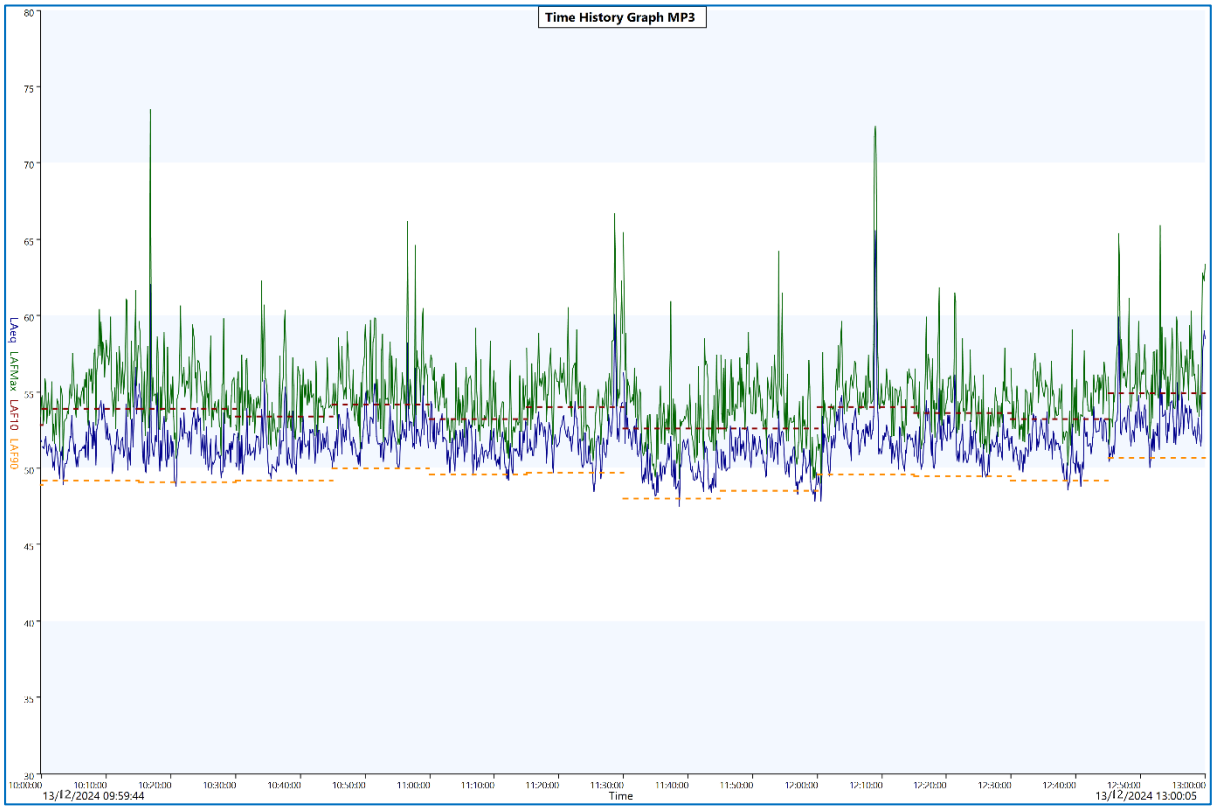
Measured levels at the MP2 position include some road noise road noise but would be expected to be up to 6 dB quieter than measurement point 1 if the dominant source were unabated. In fact the levels are 10 dB quieter than the MP1 location, probably as a result of the screening effect of industrial buildings preventing full exposure to an arc of road noise.

Daytime levels are closer to the expected reduction, but this is likely due simply to industrial activities in the area rather than A49 road traffic.

MP2 is therefore an indicator of existing sound levels at the business park and could be used as an indicator of increase in level generated by the site when it becomes operational.

MP3 Parys Road Noise

Monitoring on Parys Road was carried out 10m from the roadway in accordance with the requirements of CRTN. The monitoring was carried out for three consecutive hours.



Time	Duration	L_{Aeq} (dB)	L_{AFMax} (dB)	L_{A10} (dB)	L_{A90} (dB)
13/12/2024 10:00	01:00:00	52.1	73.5	53.9	49.2
13/12/2024 11:00	01:00:00	51.4	66.7	53.2	49.6
13/12/2024 12:00	01:00:00	52.6	72.4	54	49.6
	average	52.1	70.9	53.7	49.5
	stdev	0.6		0.4	0.2

The results are very consistent for the one hour averages

Paragraph xx of the Calculation for Road Traffic Noise advises that shortened method for determination of an 18hour LA10 can be determined by 3 x 1 hour LA10 measurements between 10am and 5pm and deducting 1 dB.

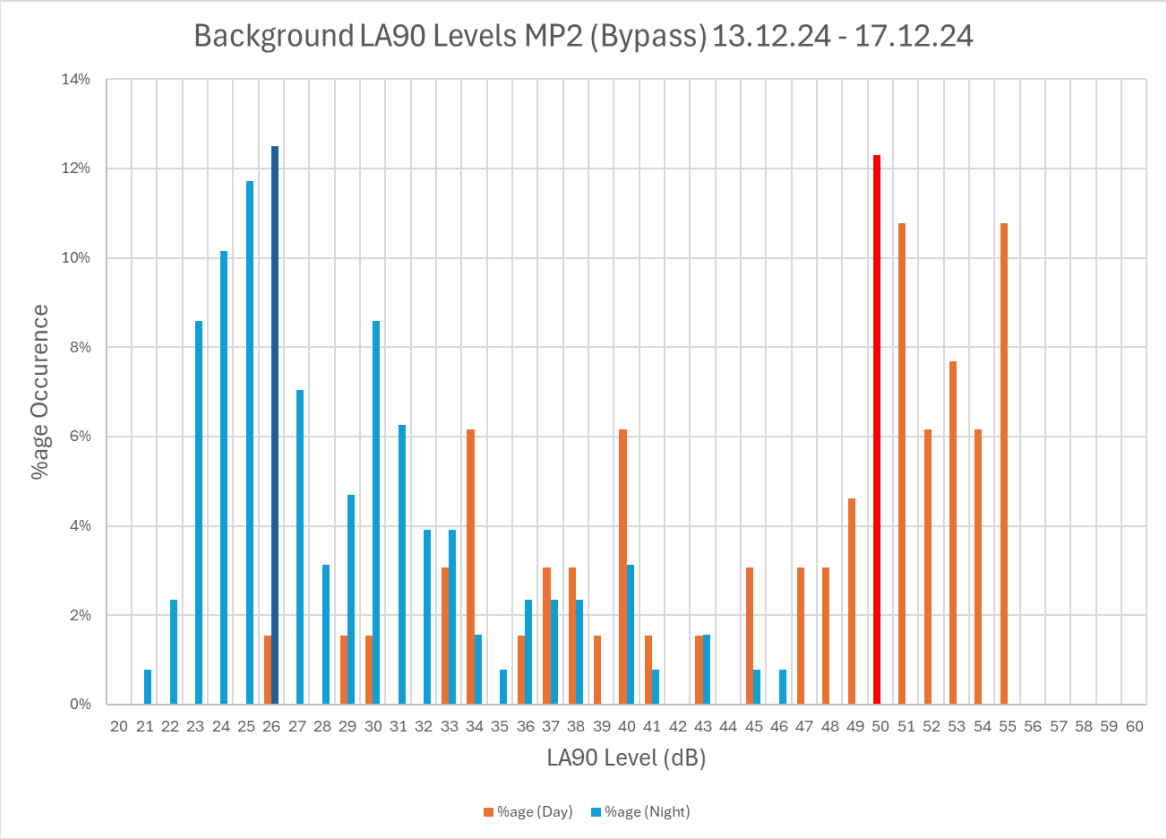
The calculated value is 52.7 dB $L_{A1018hour}$. This value can then be used to calculate the Lday and Lnight based on the Transport for London Converting the UK traffic noise index LA10,18h to EU noise indices for noise mapping 2002 conversion.

TRL conversion of LA1018hour to Lday/Lnight	
Day	Night
L_{day} = 0.95 x $L_{A1018hour}$ +1.44	L_{night} = 0.90 x LA1018hour -3.77
L_{day} = 0.95 x 52.7 +1.44	L_{night} = 0.9 x 52.7 -3.77
L_{day} = 52.5 dB @ 5m	L_{night} = 44.6 dB @ 5m
sound power = 63.5 dB	55.6 dB

This data has been used to predict existing sound levels for properties off Parys Road for daytime and nighttime.

Background Level

The background level observed on the application site was noted to include industrial noise from local units. The underlying levels are reproduced in graphical form below:



The average levels measured onsite are reproduced below:

Average type	Daytime (1hour)			Nighttime (15mins)		
	Average L_{Aeq}	Average L_{A90}	Std Deviation	Average L_{Aeq}	Average L_{A90}	Std Deviation
Mode		50			26	
Median		50			27	
Mean	67.1	46.3	2.8	58.4	28.8	7.9

The average daytime LA90 was ~ 50 dB $L_{A901hour}$ mode and mean, with a 46.3 dB mean average low, and relatively low standard deviation. The nighttime was less noted mode median and mean levels within 2 dB, with the mean average being the highest due to a large standard deviation noting that the quietest parts of the night were much quieter than early morning/late evening.

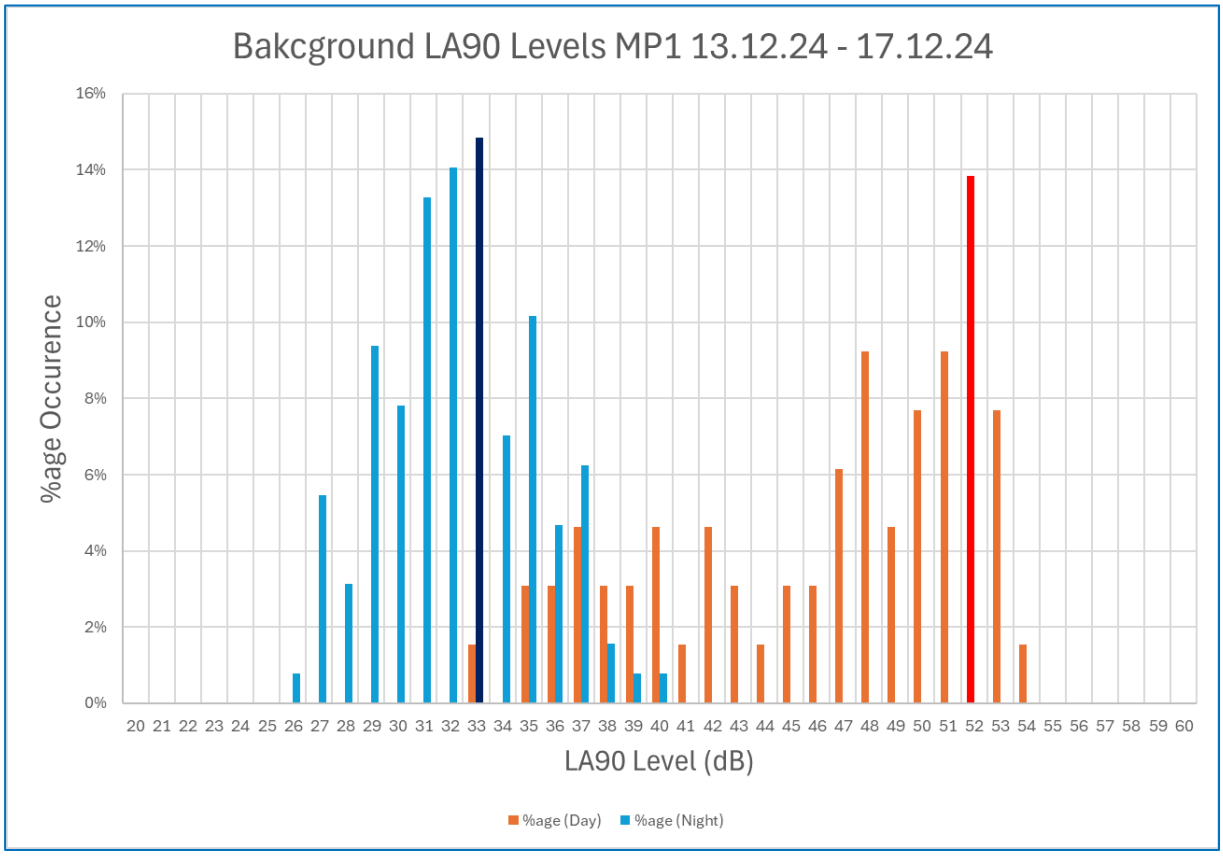
A conservative value of 46 dB is considered to be the typical daytime background sound level, and 26 dB $L_{A9015minute}$ the nighttime background level to ensure worst case.

It should be noted that where absolute background levels are measured below 30 dB that paragraph 8.1 of BS4142:2014+A1 2019) specifically advises that:

"Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which may be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system."

On analysis it was determined that typical LAeq and LA90 levels were representative.

Measured background levels at MP2 (gate) were higher than MP1 (see graphical results below) but are higher than MP1. These results were therefore considered representation of the middle of the industrial estate and not typical of levels likely at the boundary of the estate.

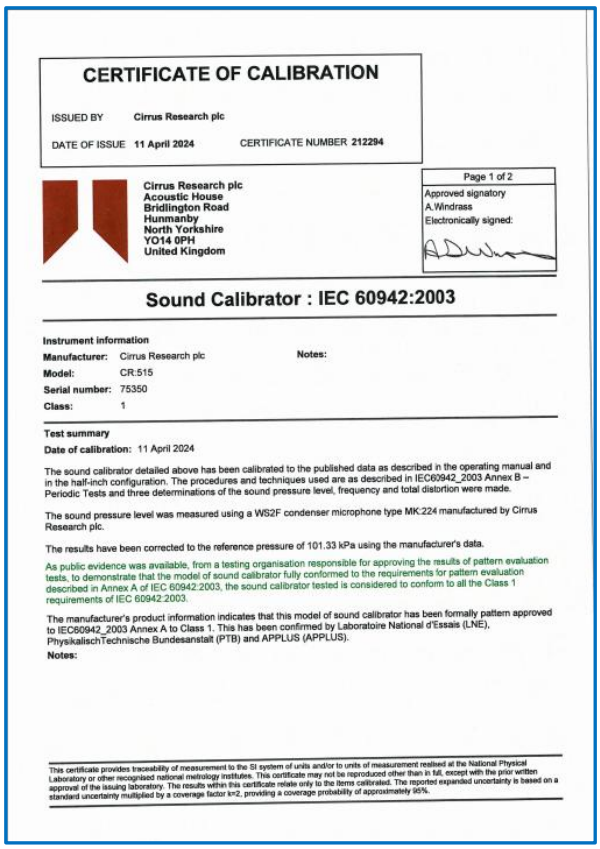


Average type	Daytime (1hour)			Nighttime (15mins)		
	Average L_{Aeq}	Average L_{A90}	Std Deviation	Average L_{Aeq}	Average L_{A90}	Std Deviation
Mode		52			33	
Median		48			32	
Mean	55.6	46.2	2.9	45.2	32.2	2.9

These levels are not included in the assessments to ensure worst case.

Appendix 3 Calibration Certificates

G079497 Cirrus 171C



CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 11 April 2024 CERTIFICATE NUMBER 212294

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
A.Windrass
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc
Model: CR:515
Serial number: 75350
Class: 1

Notes:

Test summary

Date of calibration: 11 April 2024

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

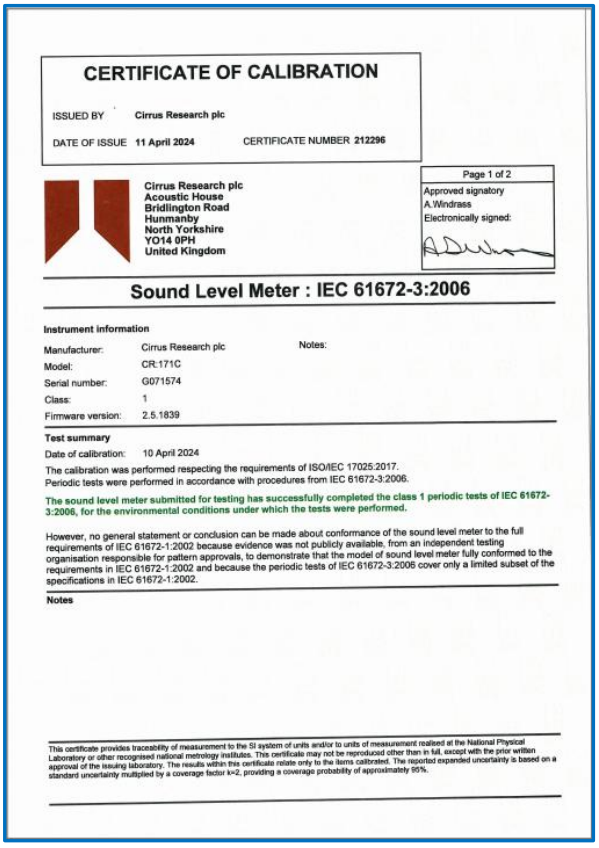
The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), PhysikalischTechnische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.



CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 11 April 2024 CERTIFICATE NUMBER 212296

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
A.Windrass
Electronically signed:

Sound Level Meter : IEC 61672-3:2006

Instrument information

Manufacturer: Cirrus Research plc
Model: CR:171C
Serial number: G071574
Class: 1
Firmware version: 2.5.1839

Notes:

Test summary

Date of calibration: 10 April 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2006.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

G303651 Cirrus 171C

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 11 April 2024 CERTIFICATE NUMBER 212299

Cirrus Research plc
Acoustic House
Bridlington Road
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YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
A.Windrass
Electronically signed:

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer: Cirrus Research plc Notes:
Model: CR:171C
Serial number: G303651
Class: 1
Firmware version: 5.8.3251

Test summary

Date of calibration: 10 April 2024

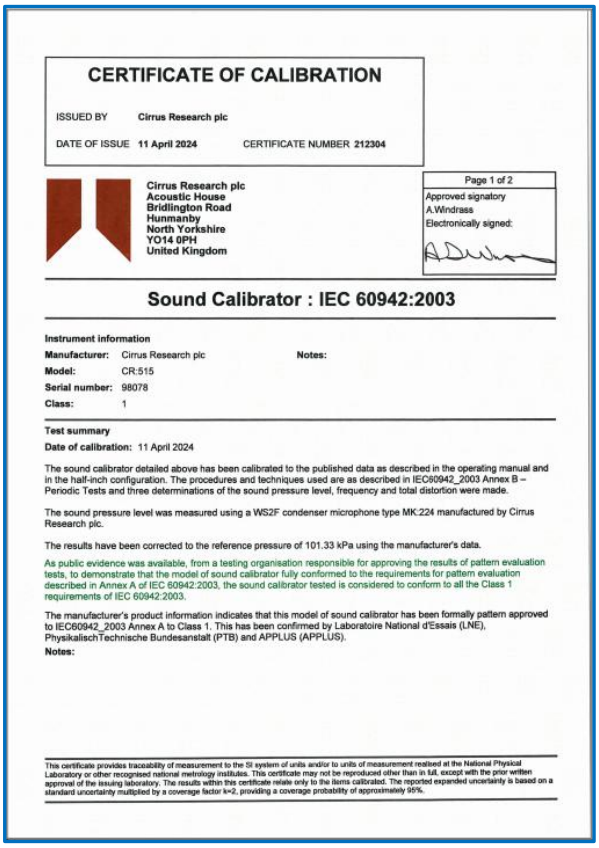
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.



CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 11 April 2024 CERTIFICATE NUMBER 212304

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
A.Windrass
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 98078
Class: 1

Test summary

Date of calibration: 11 April 2024

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), PhysikalischTechnische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

G300972 Cirrus 171C

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 12 June 2024 CERTIFICATE NUMBER 216172

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
T.Goodrich
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 74769
Class: 1

Test summary

Date of calibration: 12 June 2024

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), PhysikalischTechnische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 12 June 2024 CERTIFICATE NUMBER 216171

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
T.Goodrich
Electronically signed:

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer: Cirrus Research plc Notes:
Model: CR:171C
Serial number: G300972
Class: 1
Firmware version: 5.8.3251

Test summary

Date of calibration: 12 June 2024

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

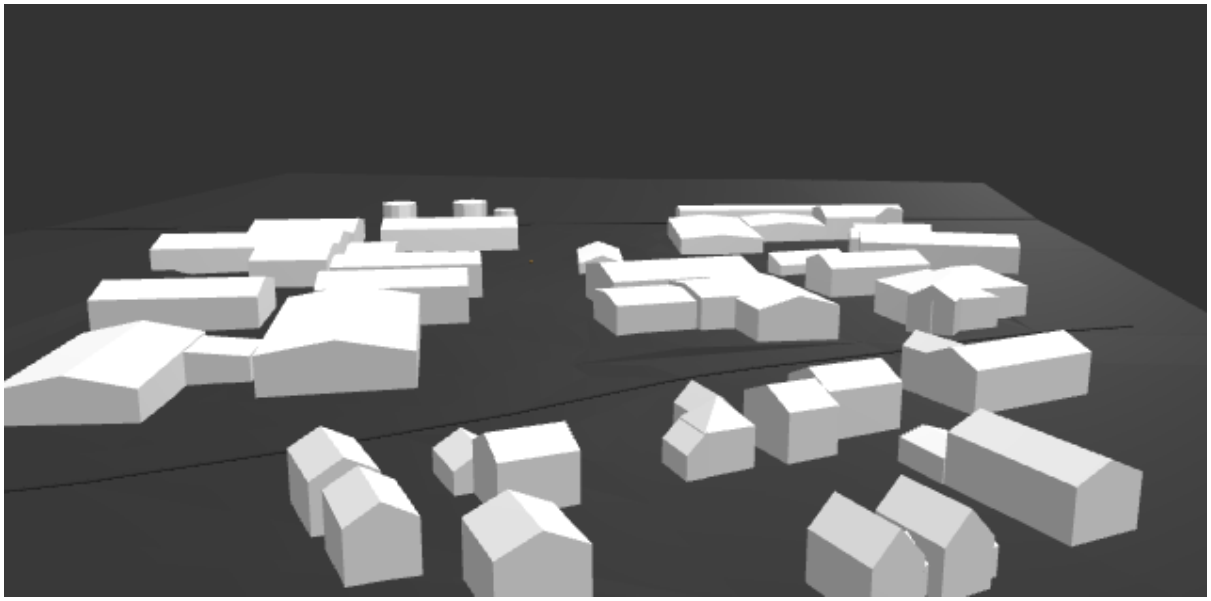
However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

Appendix 3 Modelling

Model Verification



The images below provide context to ensure that the relative shapes and sizes of buildings are reflected in the model.

The model may be interrogated using the following link https://dbmap.net/wm8z5 if further verification is required.

Image 1

Image 2

Image 3

Image 4

Model outputs

Existing Daytime

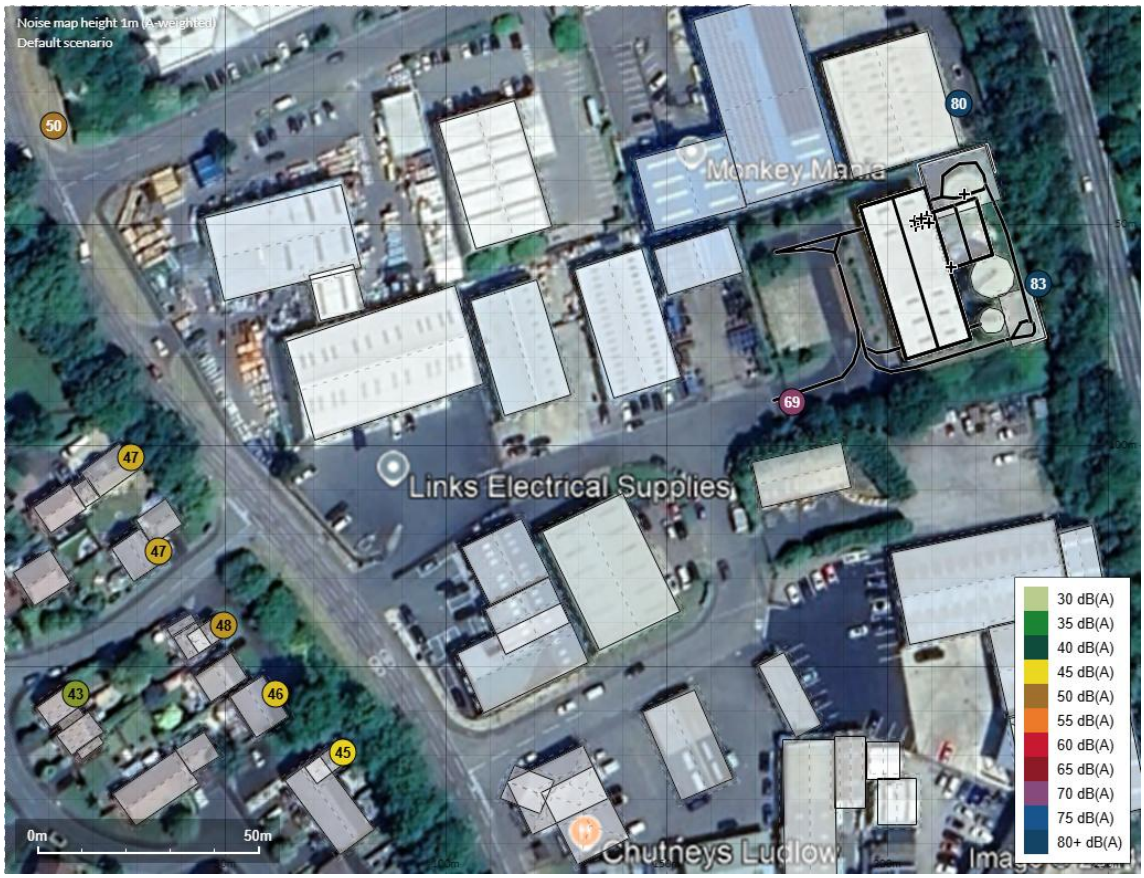
Existing Nighttime

MP1 measured average 62.9 dB daytime and 55.3 nighttime (good agreement with mode).
MP2 measured average 55.6 dB daytime and 45.2 dB nighttime good agreement with model. Both are around 4 dB higher than the predicted.
MP3 measured average 52.5 dB daytime and 44.6 dB nighttime; both are +3 dB compared to modelled outputs (again results likely to indicate existing industrial noise. significant variance from model (7dB higher)

.

The predicted levels at receptors are therefore likely to be conservative and represent a worst case.

Daytime Plant, Deliveries and Chipping



Daytime no deliveries with chipping

Daytime No Deliveries, no chipping

Nighttime Plant Only

Nighttime operation assumes no vehicle movements or loading shovel use, no use of chipper between 18:00hrs and 07:00hrs and doors closed, but with continuous operation of fixed plant. Daytime operation assumes plant and deliveries as per the model inputs.

Modelling Summary table

Receiver Name	Height (m)	Daytime (Existing)	Nighttime (existing)	all sources operational	chipping no deliveries	no chipping no deliveries	night time plant only
Daytime							
MP1 A49	1.5	61.6	52.7				
MP2 Gate	1.5	49.6	40.7				
MP3 Road	1.5	49.7	41.7				
1 Blashfield Rd	2.1	44.0		46.1	45.1	31.6	25.2
2 Blashfield Rd	2.1	45.0		47.4	44.5	33.9	30.9
5 Blashfield Rd	2.1	44.6		47.2	46.4	33.4	30.0
14 Blashfield Rd	2.1	46.4		48.2	46.6	35.9	24.2
1 Langford Cl	2.1	35.9		42.7	42.2	29.9	21.5
19 Langford Cl	2.1	45.1		45.2	45.0	31.4	23.1
HTL	1.5	61.5		79.9	79.9	69.5	44.0
Nightime							
1 Blashfield Rd	4.5		36.0	46.5	45.4	31.9	27.7
2 Blashfield Rd	4.5		35.3	45.9	44.0	32.8	28.8
5 Blashfield Rd	4.5		36.4	47.4	46.0	33.1	30.0
14 Blashfield Rd	4.5		38.1	47.5	46.9	36.3	25.9
1 Langford Cl	4.5		28.6	43.0	42.3	29.8	23.8
19 Langford Cl	4.5		37.1	46.7	46.3	31.9	27.2

Note: all values assume an adverse wind that will increase modelled levels by 3 dB

The table above verifies that operation of the chipper or deliveries will exceed relevant night time levels. Operation of the site will not exceed WHO criterial levels during the day and will have (at worst) a moderate impact in terms of change in sound level.

For those receptors with a level difference of more than 3 dB, it is likely that elements such as a soft buzzing sound of chipping or faint reversing bleepers will be noticeable during operation however this may be masked by other industrial activities (that have not been modelled in this assessment).

Clearly chipping and delivery at night would be noticeable and unacceptable as noted in the table above.

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