TD TYRE RECYCLING FACILITY, JOHNSTOWN, CARMARTHEN

NOISE MANAGEMENT PLAN

Report Number 2161r7v1d1021

Permit reference:

Waste returns reference:

Operator:
TD Tyre Recycling Ltd

Site Address:
Plot 7, Cillefwr Road West, Alltycnap Road,
Johnstown,
Carmarthenshire SA31 3RB

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October 2021

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1 INTRODUCTION

The aim of this Noise Management Plan is to integrate the findings of a Noise Assessment undertaken for TD Tyres by Inacoustic. The document sets out the measures to be taken to ensure that noise continues to not cause problems or annoyance to potentially sensitive receptors. The site boundary and key aspects of the surrounding environment are identified on Figure 1.

The Noise Assessment undertaken by Inacoustic is provided in Appendix 1. This concluded that by switching from diesel power to a 3-phase electrical supply and replacing the tonal reverse alarms on the telehandler with broadband devices, the specific sound level of the activity is at or below the background sound level.

2 NOISE CONTROL MEASURES

TD Tyres recognises that preventing nuisance related to noise and vibration starts with good housekeeping, careful site management and layout and being a considerate neighbour. In this context, several preventative actions are integrated to the operation, as summarised in Table 2-1.

Table 2-1 Noise Control Measures

Potential activity/ noise source	Location on site	Control Measures
Vehicle Movements (e.g. delivery, collection, reversing)	Northern and central area during tyre delivery. Telehandler handling tyre bales in south, closest to most sensitive receptors	Noise reduction at source: Banksman to be used to avoid use of reversing alarm where safe and possible to do so Broadband reversing alarms to be used. Vehicle routes to be kept clean Staff to avoid unnecessary revving of engines
Use of baler to mechanically bale tyres	Under cover between shipping containers in central eastern area of site Inside building in top yard	Ensure baler powered by 3 phase electricity All plant and infrastructure subject to preventative maintenance and housekeeping Baler to be used for short periods intermittently

2.1 Abnormal Conditions

During normal operations, noise issues are not predicted to negatively affect off-site receptors. To ensure that abnormal conditions are identified, any change to on-site noise levels will be identified by site operatives and management. This will initially be done by subjective on-site assessment of noise levels based on experience and familiarity. As increased noise levels on-site could be indicative of failure of a control measure, the cause will be immediately investigated.

3 MONITORING AND COMPLAINTS

3.1 Complaints

TD recognises that complaints are never a substitute for comprehensive monitoring and waste management practices but they do offer a valuable indicator of potential offsite problems related to the waste activity. For this reason, all complaints will be logged and documented in accordance with existing management systems.

3.2 Monitoring

A Noise Level Assessment involving additional noise level monitoring and assessment may be necessary to assess and investigate complaints or changes in noise level identified at site.

3.3 Contingency Action Plans

Where observations, monitoring results or complaints indicate a potential noise problem, the contingency actions set out in Table 3-1 will be adopted.

Table 3-1 Contingency Action Plan

OBJECTIVE To initiate timely mitigation measures to prevent significant off-site noise problems	
Frequency of test	Following receipt of complaint related to noise or identification of significant rise in on-site noise levels
CONTINGENCY ACTION RESPONSES	**Response Time**
Step 1. Investigate Potential Sources Following detection of potential noise problem undertake detailed site inspection. If source of noise is obvious go to Step 2. If source cannot be identified go to Step 4.	Within 1 day or same day where feasible
Step 2. Remove noise source Review working practice and source of noise. Cease relevant operation and implement remedial actions where necessary. Go to Step 3.	Within 48 hrs of problem detection
Step 3. Continued Monitoring Repeat routine evaluation of site noise levels based on experience and familiarity once problem has been remedied. If problematic noise levels are still persistently detectable go to Step 4.	Within 1 week of problem initially being identified
Step 4. Further Investigation and Monitoring Ensure obvious noise problems have been remediated. Consider all available information including meteorological records, complaints history, other activities occurring at site / in surrounding area. Undertake detailed site inspections on-site and off-site for noise sources in accordance with H3 guidance. This will likely involve noise level assessment and monitoring at site and at receptor(s). Some operations may need to temporarily cease. **Outcome 1. Waste activity considered to be noise source.** Cease identified problematic activity and identify new mitigation measures. Go to Step 5. **Outcome 2. Waste activity not considered to be noise source.** Document investigations and return to normal operations.	Within 2 weeks of problem being identified
Step 5. Implement Mitigation Measures Review risks to off-site receptors. Implement relevant mitigation measures in consultation with NRW and noise advisors. This may involve temporarily ceasing operations.	Within 4 weeks of problem being identified

3.4 Receptor Notification

Following the identification of a significant noise problem, particularly following a noise complaint, TD will liaise with the persons affected. This is to ensure that they are informed of the investigations being undertaken, relevant findings and mitigation measures.

TD TYRE RECYCLING LTD
BESPOKE PERMIT

NOISE MANAGEMENT PLAN

Appendix 1
Inacoustic Noise Assessment

Report Number 2161r7v1d1021

TD Tyre Recylcing, Carmarthen

Noise Assessment for NRW Permit

23rd September 2021

inacoustic | **cymru**
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Version	Comments	Date	Authored By	Checked By	Project Number
1	Noise Impact Assessment for NRW	23rd September 2021	Neil Morgan MSc MIOA	Antony Best BSc (Hons) MIOA	17-207

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1. INTRODUCTION

1.1. Overview

inacoustic has been commissioned to prepare a Noise Assessment for the Tyre Recycling Operations at TD Tyre Recycling at land to the rear of Plot 5, Cillefwr Road West, Cillefwr Industrial Estate, Johnstown, Carmarthen, SA31 3RB, for submission to Natural Resources Wales (NRW) as part of a Permit Application.

This noise assessment is necessarily technical in nature; therefore a glossary of terms is included in Appendix A to assist the reader.

1.2. Scope and Objectives

The scope of the report is summarised as follows:

- Detailed sound measurements at the closest noise-sensitive receptors to the Site;
- A detailed assessment of the suitability of the Site, in accordance with the relevant policy; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the Noise and Vibration Management: Environmental Permits[1], and BS4142:2014+A1:2019[2].

[1] Environment Agency, 2021. Noise and Vibration Management: Environmental Permits.
[2] British Standards Institution, 2019. BS4142:2014+A1:2019: Method for Rating and Assessing Industrial and Commercial Sound.

2. Assessment Framework

2.1. National Policy

2.1.1. Noise and Vibration Management: Environmental Permits

Environmental permits have conditions that require operators to control pollution; this includes controlling noise and vibration. The Environment Agency have released guidance to help holders and potential holders of permits apply for, vary, and comply with their permits. The guidance covers:

- how the environment agencies will assess noise from certain industrial processes;
- what the law says you must do to manage noise and vibration; and
- advice on how to manage noise – in particular, how to carry out a noise impact assessment and what operators should include in a noise management plan.

This guidance replaces these documents which have been withdrawn:

- Environment Agency Horizontal Guidance for Noise (H3) parts 1 and 2.

It involves determining the appropriate controls for industry to protect the environment through a single permitting process. To gain a Permit, Operators have to show that they have systematically developed proposals to apply the 'Best Available Techniques' (BAT) and meet certain other requirements, taking account of relevant local factors.

In terms of noise specifically, the use of BAT has to be considered and balanced within the wider context of other releases to different media (air, land and water) and taking issues such as usage of energy and raw materials into account. Noise cannot therefore be considered in isolation from other impacts on the environment.

The definition of pollution includes *"emissions which may be harmful to human health or the quality of the environment, cause offence to human senses or impair or interfere with amenities and other legitimate uses of the environment"*. BAT is therefore likely to be similar, in practice, to the requirements of the Statutory Nuisance legislation which requires the use of *"best practicable means"* to prevent or minimise noise nuisance. In the case of noise, *"offence to human senses"* may be judged by the likelihood of complaints. However, the lack of complaint should not necessarily imply the absence of a noise problem. In some cases it may be possible, and desirable, to reduce noise emissions still further at reasonable costs and this may therefore be BAT for noise emissions.

Consequently, the aim of BAT should be to ensure that there is no reasonable cause for annoyance to persons beyond the installation boundary.

In summary, the aim of BAT should be to achieve the following:

- Underpinning of good practice, a basic level of which the operator should employ for the control of noise including adequate maintenance of any parts of plant or equipment whose deterioration may give rise to increases in noise. For example, this would include bearings, air handling plant, the building fabric as well as specific noise attenuation measures associated with plant, equipment or machinery;
- Noise levels should not be loud enough to give reasonable cause for annoyance for persons in the vicinity, which is a more appropriate environmental standard than that of Statutory Nuisance and is normally the aim of most planning or other conditions applied by Local Authorities; and

- Prevention of 'creeping background' (creeping ambient), which is the gradual increase in sound levels as industry expands and areas develop.

The indicative requirements apply to both new and existing activities but it is more difficult to justify departures from them in the case of new activities.

Indeed, because the requirements for noise are likely to be strongly influenced by the local environmental conditions, new installations are expected to meet BAT from the outset and to demonstrate that noise reduction or prevention has been built into the process design. For most existing plant, especially where there are no existing noise limits, the focus is on good practice (BAT) and the need to ensure that there is no reasonable cause for annoyance. In assessing any noise impact it is more normal to monitor existing levels and apply corrections and calculations, rather than rely on predictions.

The guidance refers to BS4142:2014+A1:2019 as the basis for the majority of noise impact assessments.

2.1.2. Planning Policy Wales

The Government's planning policies for Wales are contained in Planning Policy Wales (Edition 11, February 2021). The policy provides overarching requirements for developments to adequately control noise pollution, to provide appropriate soundscapes and to incorporate good acoustic design.

The policy is supplemented by the Noise and Soundscape Action Plan 2018-2023, which provides more detailed guidance on planning for a new development, but does not set out specific assessment methods or criteria. The guidance in this document has been used to inform a qualitative assessment of the effect the proposed development could have on the local soundscape.

2.1.3. Technical Advice Note (Wales) 11

This note provides advice on how the planning system in Wales can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.

It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources.

2.2. Assessment Criteria

2.2.1. BS4142:2014+A1:2019

BS4142:2014+A1:2019 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014+A1:2019 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

BS4142:2014+A1:2019 states: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs"*. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- *"Typically, the greater this difference, the greater the magnitude of the impact."*
- *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*
- *"A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."*
- *"The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

The periods associated with day or night, for the purposes of the Standard, are considered to be 07.00 to 23.00 and 23.00 to 07.00, respectively.

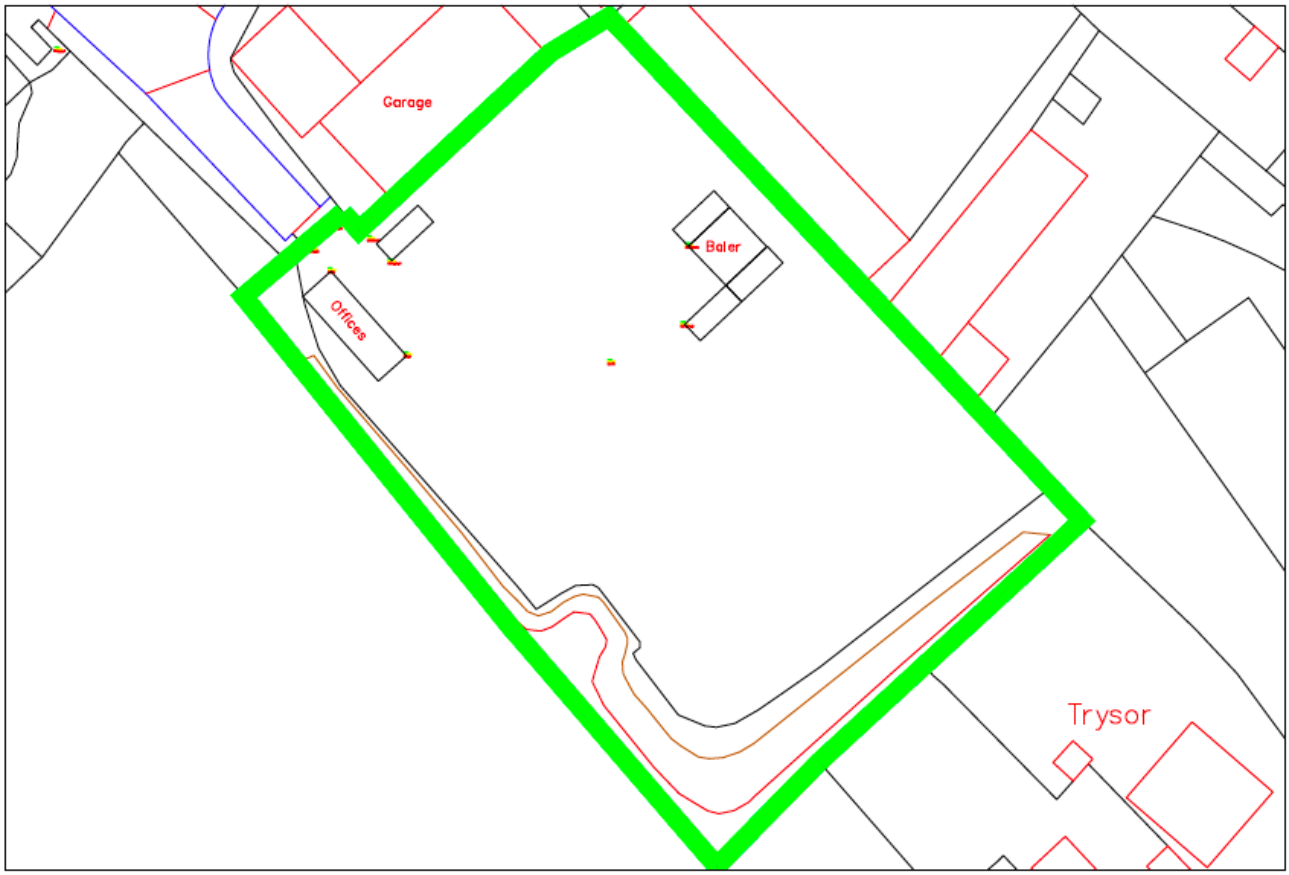
3. Site Description

3.1. Site and Surrounding Area

The site is situated to the rear of Plot 5 (Gordon's Garage), on Cillefwr Road West, Cillefwr Industrial Estate, Johnstown, Carmarthen, SA31 3RB. The sound environment across the area, including at the receptor location was influenced by activities associated with the wider industrial estate e.g., HGV movements, plant, forklift trucks, materials handling and music from radios within the Gordon's Garage premises.

The location of the site can be seen in Figure 1, with the location of the tyre baler unit marked.

Figure 1: Location of Site and Surrounding Area



The site area can be seen in Figure 1, above, which illustrates the proximity of the Site to the nearest noise-sensitive receptor; being Trysor, Alltycnap Road (E:239097 N:218856) to the south of the premises, the garden of which bounds the premises (NSR1). The closest residential receptor is a 2-storey building.

3.2. Operations Overview

The TD Tyre Recycling facility receives, bales and dispatches vehicle tyres that have reached the end of their operational lives, from tyre replacement centres in the area.

The site operates between the hours of 07:00 and 17:00 Monday to Friday during the spring and summer months, which reduces to 08:00 to 17:00 between October and February.

Tyres are received at the site via a fleet of owned LGVs, transported to bulk storage via a diesel-powered telehandler, from where they are brought via forklift to the covered baler compound for processing. The tyre bales are then stored at the site, ready for export.

3.3. Noise Generating Elements

The operations largely comprise storage activity, which is intrinsically quiet, however, there are two key noise-generating elements, both of which are summarised below in Table 1.

TABLE 1: SUMMARY OF NOISE-GENERATING ELEMENTS

Description	Location	Operational Profile	Grid Coordinates	
			Easting	Northing
Baler Engine	External/Covered Area	High Frequency	239052	218904
Diesel-Powered Telehandler	External	On Demand - Regular	239046	218892
Delivery/Export Vehicles	External	On Demand - Occasional	239046	218892

At present the baler is powered by a four-cylinder diesel engine and is operated beneath an open-ended weather-protection canopy. The engine was noted to be the dominant source of noise generation within the site, with the baler unit itself being hydraulic and not a significant noise generator.

The telehandler was also noted to operate with a tonal reverse alarm.

4. Measurement Methodology

4.1. General

The prevailing background noise conditions in the area have been determined by an environmental noise survey conducted during both daytime and night-time periods between Tuesday 24th and Friday 27th August 2021.

A spot measurement exercise was also undertaken at the site on Tuesday 24th August 2021, in order to quantify the source noise emission levels of the various noise-generating site activities.

4.2. Measurement Details

All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of BS 7445[3].

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672[4]. A full inventory of this equipment is shown in Table 2 below.

Table 2: Inventory of Sound Measurement Equipment

Position	Make, Model & Description	Serial Number	Calibration Certificate Number	Calibration Expiry Date
MP1	Svan 955 Sound Level Meter	23676	1108198	19/01/2023
	Svantek SV 12L Preamplifier	25615	1108198	19/01/2023
	ACO 7052E Microphone	49543	1108198	19/01/2023
Spots	NTi Audio XL2 Sound Level Meter	A2A-14636-E0	UCRT20/1750	05/08/2022
	NTi MA220 Preamplifier	7591	UCRT20/1750	05/08/2022
	NTi MC230A Microphone	A15872	UCRT20/1750	05/08/2022
All	Cirrus CR:515 Acoustic Calibrator	82501	1110254	12/03/2022

Measurement equipment used during the survey was field calibrated at the start and end of the measurement period. A calibration laboratory has calibrated the field calibrator used within the twelve months preceding the measurements.

The weather conditions during the survey were predominantly conducive to noise measurement; it being dry, with low wind speeds.

The microphone was fitted with a protective windshield for the measurement, which is described inTable 3, with an aerial photograph indicating their location shown in Figure 2.

[3] British Standard 7445: 2003: *Description and measurement of environmental noise*. BSI.
[4] British Standard 61672: 2013: *Electroacoustics. Sound level meters*. Part 1 *Specifications*. BSI.

Table 3: Measurement Position Description

Measurement Position	Description
MP1	A partially attended daytime and night-time measurement of sound under free-field conditions, at a height of 1.5 metres above local ground level within the rear garden of Trysor, Alltycnap Road. The sound environment was sustained by existing activities, plant and machinery within the TD Tyres site, with background sound sustained by road traffic noise, when non-operational.

Figure 2: Measurement Position

4.3. Summary Results

The summarised results of the environmental noise measurements are presented in Table 4, with a full time history and statistical analysis presented under Appendix B.

TABLE 4: SUMMARY OF NOISE MEASUREMENT RESULTS

Measurement Position	Period	Noise Level, dB			
		$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{AFmax}
MP1	Operational Daytime – 07:00-17:00	56.7	43.0	48.8	71.2
	Non-Operational Daytime – 17:00-18:00	47.4	41.0	47.1	66.9
Source Description	**Distance to Source (m)**	**Noise Level, dB**			
		$L_{Aeq,T}$		L_{AFmax}	
Delivery Vehicle - Idling	1	71.8		72.6	
Delivery Vehicle – Pulling Away	8	51.1		56.2	
Manitou Telehandler	1	76.4		77.7	
Baler Engine	3	81.5		88.1	

5. Operational Noise Assessment

5.1. Assessment Parameters

5.1.1. Specific Sound Level Summary

The specific sound level of the current operations has been obtained via subtraction of the residual sound level measured during the hour immediately following the cessation of daily operations (17:00-18:00) on 24th to 27th August 2021 from the ambient sound level measured during the operational period (07:00-17:00) of the TD Tyres operations on 24th to 27th August 2021.

This computation is summarised in Table 5.

Table 5: Derivation of Specific Sound Level

Ambient Sound Level (Operational Period) $L_{Aeq,T}$ - dB	Residual Sound Level (Non-Operational Period) $L_{Aeq,T}$ - dB	Specific Sound Level $L_{Aeq,T}$ - dB
56.7	47.4	**56.2**

5.1.2. Background Sound Level Summary

The background sound level has been derived from the hour immediately following the cessation of daily operations (17:00-18:00) on 24th to 27th August. Both the modal LA_{90} value and mean L_{A90} have been extracted, such that a robustly representative background sound level has been obtained.

This computation is summarised in Table 6.

Table 6: Derivation of Background Sound Level

Modal $L_{A90,5min}$ - dB	Mean $L_{A90,T}$ - dB	Adopted Background Sound Level $L_{A90,T}$ - dB
45	41	**41**

5.2. Assessment

5.2.1. Rating Penalty Principle

Section 9 of BS4142:2014+A1:2019 describes how the rating sound level should be derived from the specific sound level, by determining a rating penalty. BS4142:2014+A1:2019 states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Given that the Proposed Development is not operational, the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014+A1:2019, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142:2014+A1:2019 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

Tonality

A rating penalty of +2 dB is applicable for a tone which is *"just perceptible"*, +4 dB where a tone is *"clearly perceptible"*, and +6 dB where a tone is *"highly perceptible"*.

Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is *"just perceptible"*, +6 dB where it is *"clearly perceptible"*, and +9 dB where it is *"highly perceptible"*.

Other Sound Characteristics

BS4142:2014+A1:2019 states that where *"the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."*

Intermittency

BS4142:2014+A1:2019 states that when the *"specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference*

time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."

5.2.2. Rating Penalty Assessment

Considering the content of Section 5.2.1, an assessment of the various sound sources associated with the Proposed Development, in terms of whether any rating penalties are applicable, and has been detailed in Table 7 below.

TABLE 7: RATING PENALTY ASSESSMENT

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
Baler Engine	+2 dB	0 dB	0 dB	+3 dB	The baler operates reasonably continuously, when the site is operational, so is not considered to be intermittent. Its operation is not impulsive; however, there is a just audible low-frequency tonality at the receptor location, which is distinct from the residual sound environment, hence a +2 dB correction. Its operation is audibly distinct, hence a + 3dB correction.
Mobile Plant	+4 dB	0 dB	0 dB	0 dB	The operation of diesel powered vehicles is intrinsic to the character of the area, so is not considered to warrant a rating penalty; however, the tonal reverse alarm on the telehandler within the site was audibly tonal at the receptor location, hence a + 4dB correction.

BS4142:2014+A1:2019 does not require rating penalties to be linearly added, rather the dominant sound characteristic determined in the derivation. Consequently, a +5 dB acoustic feature correction has been applied with the assessment.

5.2.3. Uncertainty in Calculations

BS4142:2014+A1:2019 requires that the level of uncertainty in the measured data and associated calculations is considered in the assessment. The Standard recommends that steps should be taken to reduce the level of uncertainty.

Measurement Uncertainty

BS4142:2014+A1:2019 states that measurement uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

“ …

b) the complexity and level of variability of the residual acoustic environment;

…

d) the location(s) selected for taking the measurements;

…

g) the measurement time intervals;

h) the range of times when the measurements have been taken;

i) the range of suitable weather conditions during which measurements have been taken;

…

k) the level of rounding of each measurement recorded; and

l) the instrumentation used.”

Each of the measurement uncertainty factors outlined above have been considered and discussed in Table 8 below.

TABLE 8: MEASUREMENT UNCERTAINTY FACTORS

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Residual acoustic environment is relatively constant, hence no correction for a complex residual acoustic environment.
d)	0 dB	Measuring at a location representative of the closest affected receptors to the site has enabled the determination of robust background sound levels.
g)	0 dB	Measurement time intervals were set in accordance with BS4142:2014+A1:2019, hence no further correction needs to be made.
h)	0 dB	Measurements were undertaken over four consecutive days.
i)	0 dB	No periods of wind or precipitation were noted, they were removed from the dataset.
k)	0 dB	Measured values were rounded to 0.1 dB, therefore rounding would not have had a significant impact on the overall typical background sound levels.
l)	0 dB	The acoustic measurement equipment accorded with Type 1 specification of British Standard 61672.

In summary, a correction of 0 dB has been included in the assessment, to account for measurement uncertainty.

5.2.4. Rating Sound Level

Incorporating the rating penalties detailed in Section 5.2.2 with the derived specific sound level, as detailed in **Error! Reference source not found.**, the rating sound level has been derived and have been detailed in Table 9 below.

TABLE 9: RATING SOUND LEVELS

NSR	Specific Sound Level (dB)	Rating Sound Level (dB)
1	56	61

5.3. BS4142:2014+A1:2019 Assessment

The rating sound level, as calculated from the derived specific sound level, has been assessed in accordance with BS4142:2014+A1:2019, at the closest NSR.

The resultant assessment summary, during the daytime period, can be seen in Table 10 below.

TABLE 10: DAYTIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Uncertainty (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
1	61	0	41	+20

It can be seen that the operation of the site in its current form gives rise to a *'significant adverse impact'* at the closest receptor to the site during the daytime period, meaning that acoustic mitigation measures are required.

6. MITIGATION

6.1. Determination of Dominant Noise Source

6.1.1. Simple Calculation at Receptor

In order to determine which sources require attenuation, a simple distance loss calculation to the closest receptor position at circa 50 metres, taking account of observed "on times" has been undertaken for the observed noise-generating activities on the site.

This computation is summarised in Table 11.

TABLE 11: DETERMINATION OF RELATIVE ACOUSTIC CONTRIBUTIONS AT RECEPTOR

Plant Item	Measured $L_{Aeq,T}$ (dB)	Distance to Source (m)	% On-Time	Resultant $L_{Aeq,1\text{-}hour}$ (dB)	Relative $L_{Aeq,1\text{-}hour}$ (dB) at NSR
Delivery Vehicle - Idling	71.8	1	2	54.8	20.8
Delivery Vehicle – Pulling Away	51.1	8	1	31.1	15.1
Manitou Telehandler	76.4	1	50	73.4	39.4
Baler Engine	81.5	3	75	80.2	55.7

Although the information presented in Table 11 is a simple calculation based on distance loss alone, using $20\log_{10}\left(\frac{D_1}{D_2}\right)$, from the source measurement distance to the receptor location; not taking account of intervening screening or absorption losses, it does provide a strong correlation with the measurement undertaken at the receptor and clearly identifies that the baler engine is the dominant source of noise generation within the site.

6.1.2. Methods of Mitigation

It is understood that the baler is powered by a 4-cylinder diesel engine, which generates almost all of the noise associated with this activity; with the baler itself being hydraulic and intrinsically quiet. Discussions with the operator have revealed that this engine can be replaced with a 3-phase electrical supply, that would remove almost all of its acoustic significance.

Furthermore; the tonal reverse alarms fitted to the Manitou, diesel-powered telehandler have also been identified as audibly distinct at the receptor position, so these should be replaced with broadband reverse alarms, which although still audible (as necessary to fulfil their health and safety function) would be less distinct within the acoustic environment of the area.

6.2. Residual Effects

Effectively removing the baler-attributed noise source from the site, by switching from diesel power to a 3-phase electrical supply and replacing the tonal reverse alarms on the telehandler with broadband devices, would reduce the specific sound level of the activity to at or below the background sound level of 41 dB(A) and remove the tonality rating penalty.

Given the relative simplicity of the collation, compaction, storage and distribution of tyres at the site, the above measures are considered to represent BAT and will therefore satisfy the permitting requirements, with regard to noise, at the site.

Consequently, these mitigation measures are considered sufficient to reduce the noise effects of the operations to within the *Low Impact* range of BS4142:2014+A1:2019.

7. CONCLUSION

inacoustic has been commissioned to prepare a Noise Assessment for the Tyre Recycling Operations at TD Tyre Recycling at land to the rear of Plot 5, Cillefwr Road West, Cillefwr Industrial Estate, Johnstown, Carmarthen, SA31 3RB, for submission to Natural Resources Wales (NRW) as part of a Permit Application.

When dealt with in the manner described in this report, the Site can be brought forward in compliance with the requirements of the Noise and Vibration Management: Environmental Permits, demonstrating BAT where possible, as outlined in Section 6.

In light of the above, it is considered that this report provides sufficient information to the grant the Application for a Permit for the Site.

8. APPENDICES

8.1. Appendix A – Definition of Terms

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20μPa ($20x10^{-6}$ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE 12: TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

8.2. Appendix B – Full Measurement Results

FIGURE 3: MP1 - MEASURED TIME HISTORY

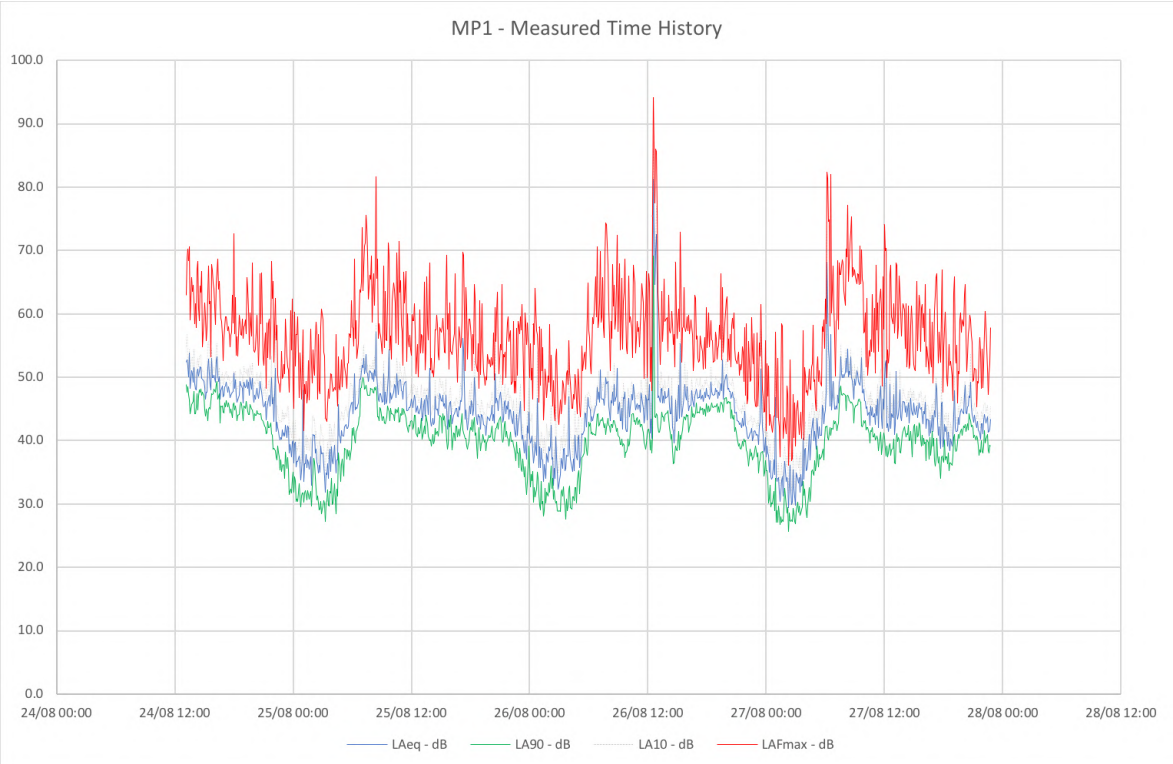
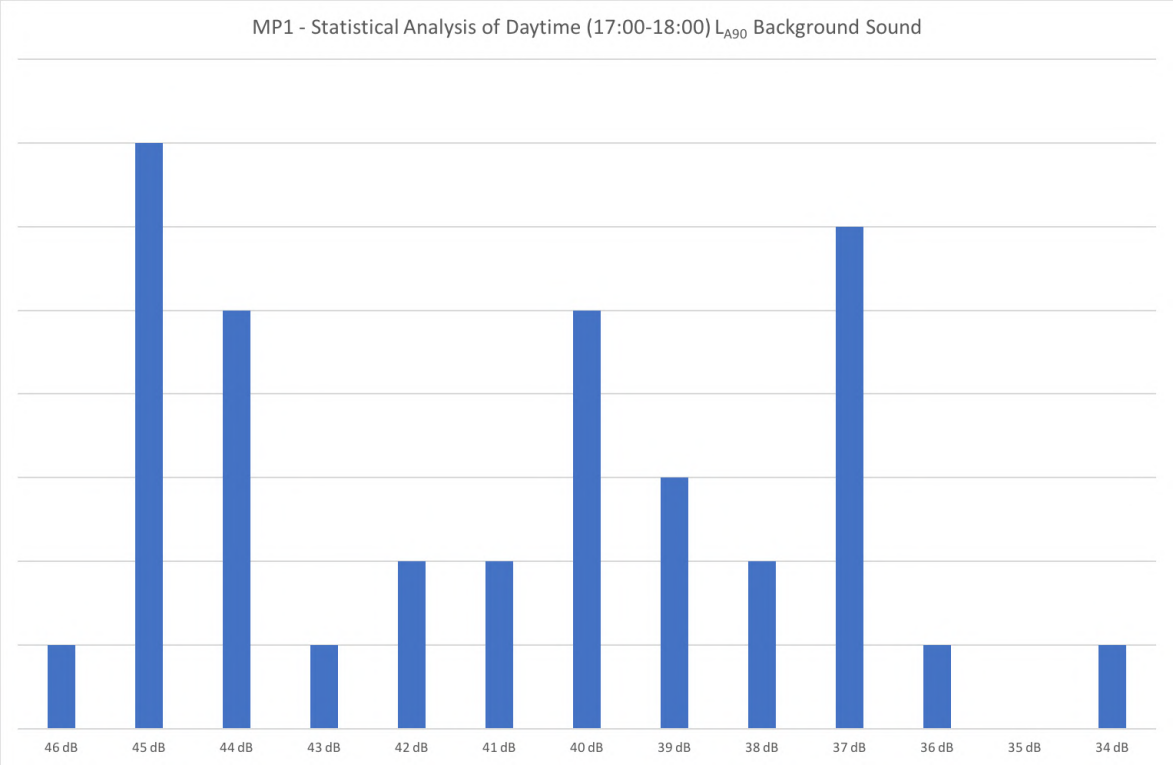


FIGURE 4: MP1 - STATISTICAL ANALYSIS OF L_{A90} BACKGROUND – DAYTIME



8.3. Appendix C – Qualifications etc

The company is directed and led by Antony Best BSc (Hons) MIOA and Neil Morgan MSc MIOA, who have a combined experience of over 30 years in the acoustic industry; covering a range of project types and assessment scenarios, including numerous submissions to the Environment Agency.

Neil Morgan MSc MIOA produced this report, and it was reviewed by Antony Best BSc (Hons) MIOA.

Professional Qualifications for Neil Morgan

- MSc in Applied Acoustics from the University of Derby
- Institute of Acoustics Post Graduate Diploma in Acoustics and Noise Control, Institute of Acoustics, University of the West of England
- BSc (Hons) in Surveying for Resource Development from the University of Glamorgan
- Corporate Member of the Institute of Acoustics (MIOA)

Professional Experience for Neil Morgan

- 2017 to Present inacoustic (Director)
- 2013 to 2017 MLM Acoustics (Technical Director)
- 2009 to 2013 Innovate Acoustics (Associate Director)
- 2007 to 2009 SLR Consulting (Senior Consultant)
- 2006 to 2007 Grontmij (Senior Engineer)
- 1996 to 2006 Capita Symonds (Various Positions)

Professional Qualifications for Antony Best

- BSc (Hons) in Acoustics from the University of Salford
- Corporate Member of the Institute of Acoustics

Professional Experience for Antony Best

- 2015 to Present inacoustic (Director)
- 2013 to 2015 MLM Acoustics (Principal Acoustic Consultant)
- 2010 to 2013 Eddie Jewell Acoustics (Director)
- 2008 to 2009 Sandy Brown Associates LLP (Acoustic Technician)

8.4. Appendix D – Calibration Certificates

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

DATE OF ISSUE: 19 January 2021 CERTIFICATE NUMBER: **1108198**

BS EN ISO 9001:2015 APPROVED BY **LR**

CERT No 10045223

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Approved Signatory

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- ☐ P K CLARK
- ☐ J FRYER
- ☐ R J WADE
- ☐ M FOY
- ☐ M A FROST
- ☒ M S PARDOE

Customer	**INACOUSTIC**
Order No	**CAL21-SVAN955**
Equipment Description	**SOUND & VIBRATION METER**
Manufacturer	**SVANTEK**
Model	**SVAN 955**
Serial No	**23676**
Ident No	**NOT KNOWN**
Date Of Calibration	**19 JANUARY 2021**

INSTRUMENT CONDITION

Adjustments Made	**NO**
Repairs Made	**NO**

ENVIRONMENT

The instrument was placed in the laboratory environment for a minimum period of 4 hours and was operated prior to calibration.

Measurements were made in ambient conditions of 22ºC ± 3ºC and 45% ± 15% RH.

PROCEDURE

Measurements were performed in accordance with the in house laboratory procedure 7797
All equipment used has been calibrated/verified against measurement standards or reference equipment traceable to International or National Measurement Standards as specified in our control procedure WI64
The results attached to this certificate refer to measurements made at the time of test and not to the instrument's ability to maintain calibration.
The attached results are a true record of the levels required to return the instrument to the original stated manufacturer's specification and accuracy where known.

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 05 August 2020 **Certificate Number: UCRT20/1750**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	ABRW Associates Ltd t/a Inacoustic Unit 4 The Dry Mount Wellington Mine Chacewater Truro, Cornwall TR4 8RJ			
Order No.	STK-1/2020			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	NTi	Sound Level Meter	XL2-TA	A2A-14636-E0
	NTi	Firmware		4.03
	NTi	Pre Amplifier	MA220	7591
	NTi	Microphone	MC230A	A15872
	Larson Davis	Calibrator	CAL200	15314
		Calibrator adaptor type if applicable		N/A
Performance Class	1			
Test Procedure	TP 10. SLM 61672-3:2013 *Procedures from IEC 61672-3:2013 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2013	Yes *If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013*			
Date Received	04 August 2020		ANV Job No.	UKAS20/08426
Date Calibrated	05 August 2020			

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	02 August 2018	U29205	0789

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

DATE OF ISSUE: 12 March 2021 CERTIFICATE NUMBER: **1110254**

BS EN ISO 9001:2015 APPROVED BY **LR**

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- ☐ M FOY
- ☐ M A FROST
- ☒ M S PARDOE

Customer	**INACOUSTIC**
Order No	**CAL21-CR515-82501**
Equipment Description	**ACOUSTIC CALIBRATOR**
Manufacturer	**CIRRUS RESEARCH PLC**
Model	**CR:515**
Serial No	**82501**
Ident No	**NOT KNOWN**
Date Of Calibration	**12 MARCH 2021**

INSTRUMENT CONDITION

Adjustments Made	**NO**
Repairs Made	**NO**

ENVIRONMENT

The instrument was placed in the laboratory environment for a minimum period of 4 hours and was operated prior to calibration.

Measurements were made in ambient conditions of 22ºC ± 3ºC and 45% ± 15% RH.

PROCEDURE

Measurements were performed in accordance with the in house laboratory procedure 2124
All equipment used has been calibrated/verified against measurement standards or reference equipment traceable to International or National Measurement Standards as specified in our control procedure WI64
The results attached to this certificate refer to measurements made at the time of test and not to the instrument's ability to maintain calibration.
The attached results are a true record of the levels required to return the instrument to the original stated manufacturer's specification and accuracy where known.

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