



Baglan Way, Port Talbot

Noise Assessment for Planning Application

26th May 2022

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1. INTRODUCTION

1.1. Overview

inacoustic has been commissioned to assess the impact of noise from a proposed industrial development at Baglan Way, Port Talbot.

The following technical noise assessment has been produced to provide supporting information to accompany a planning application to Neath Port Talbot County Borough Council and is based upon environmental noise measurements undertaken at the site and a subsequent predictive exercise.

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 noise assessment can be summarised as follows:

- A sound monitoring survey was undertaken at a discrete locations representative of the closest noise-sensitive receptors to the Site;
- A 3-dimensional noise modelling exercise, in order to quantify the potential noise generation of the proposed site uses;
- An assessment of potential noise impacts with respect to the prevailing acoustic conditions at existing off-site receptors; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of BS4142:2014+A1:2019¹.

¹ British Standard 4142: 2014+A1:2019 *Method for rating and assessing commercial sound*. BSI

2. POLICY CONTEXT

2.1. National Policy

2.1.1. 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.

2.1.2. 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. Local Policy

2.2.1. Neath Port Talbot LDP

The Neath Port Talbot County Borough Council Local Development Plan (2011-2026), Adopted January 2016 is intended to guide the future development of the area and provide certainty with regard to the planning framework for the area.

Under the umbrella of Valuing our Environment, Objective OB16 states that the plan aims to “*Address air quality issues and minimise the adverse impacts from noise generating and polluting activities*”. Further to this, Policy EN 8, entitled Pollution and Land Sustainability, states:

Proposals which would be likely to have an unacceptable adverse effect on health, biodiversity and/or local amenity or would expose people to unacceptable risk due to the following will not be permitted:

- *Air pollution;*
- *Noise pollution;*
- *Light pollution;*
- *Contamination;*
- *Land instability;*
- *Water (including groundwater) pollution.*

Proposals which would create new problems or exacerbate existing problems detailed above will not be acceptable unless mitigation measures are included to reduce the risk of harm to public health, biodiversity and/or local amenity to an acceptable level.

This policy is further supported by Paragraph 5.3.46, which states “*In relation to noise, potentially noisy proposals should not be located close to sensitive uses (such as hospitals, schools and housing) and new noise-sensitive developments should not be located near to existing noisy uses (including industry and existing or proposed transport infrastructure) unless it can be shown that adverse effects can be dealt with through mitigation measures incorporated into the design. Where noise levels are likely to be a significant issue, developers may be required to provide information to show that no nuisance is likely to be caused through increased noise levels at sensitive locations if the development proceeds. Policy EN10 sets out policy relating to designated Quiet Areas*”.

3. ASSESSMENT CRITERIA

3.1.1. BS4142:2014+A1:2019

BS4142:2014² 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 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 $L_{A,r,Tr}$ '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 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."*

During the daytime, the assessment is carried out over a reference time period of 1-hour, with a reference period of 15-minutes used for the night-time assessment. 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.

² British Standard 4142: 2014 +A1:2019 Method for rating and assessing commercial sound. BSI

3.1.2. Relative Change in Ambient Noise Level

In circumstances where a noise environment may be altered by addition or removal of a noise source, considered to be largely anonymous or within the prevailing acoustic character of an area, for example, changes to traffic quantum or patterns, it is normal to consider the relative change in ambient noise level. The assessment, therefore, considers this phenomenon to add context.

The impact scale adopted in this assessment is shown in Table 1 below, which relates to established human responses to noise, in line with 'Table 7-12 Effect Descriptors' of the IEMA Guidelines.

TABLE 1: IMPACT SCALE FOR COMPARISON OF FUTURE NOISE AGAINST EXISTING NOISE

Noise Level Change dB(A)	Subjective Response	Significance
Less than 1.0	Not perceptible	Negligible
1.0 – 2.9	Barely perceptible	Minor impact
3.0 – 4.9	Noticeable	Moderate impact
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial impact
10.0 or more	More than a doubling or halving of loudness	Major impact

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the subjective perception of loudness. The difference between the minimum perceptible change and the doubling or halving of the loudness is split to provide greater definition to the assessment of changes in noise level. It is considered that the criteria specified in Table 1 provide a good indication as to the likely significance of changes in noise levels in this case and can be used to inform the context in which the sound occurs in order to assess the impact of noise from the proposed development.

4. SITE DESCRIPTION

4.1. Site and Surrounding Area

The site is located on a parcel of land located between Baglan Way and Moor Road, Port Talbot.

The Proposed Development area relative to significant off-site features in the area is shown in Figure 1, below.

The prevailing ambient sound environment throughout the area was noted to be dominated by road traffic noise arising from vehicles using the M4 motorway, with localised contributions arising from nearby industries and local road traffic.

FIGURE 1: APPLICATION SITE AND SURROUNDING AREA



4.2. Proposed Development Overview

The proposals comprise the redevelopment of the site for a glass manufacturing facility, within a new build steel portal frame, above masonry plinth building, comprising delivery and dispatch, manufacturing/production, clerical and staff welfare areas, plus on-site staff and visitor car parking.

The business is proposed to operate on a perpetual basis, with round-the clock production, but deliveries and dispatch activities only occurring during daytime hours.

The proposed development layout is shown in Figure 2, with ground and first floor layout plans shown in Figure 3 and Figure 4, respectively.

FIGURE 2: PROPOSED DEVELOPMENT LAYOUT

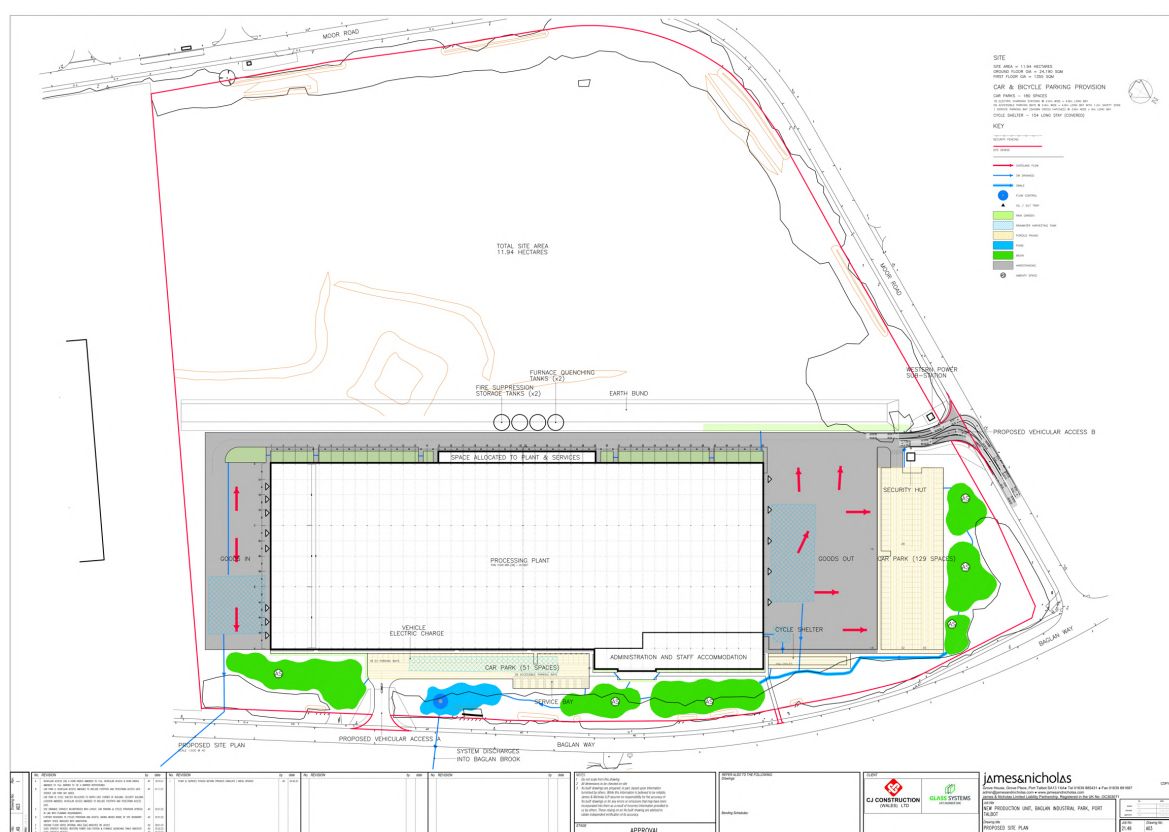


FIGURE 3: PROPOSED GROUND FLOOR LAYOUT



FIGURE 4: PROPOSED 1ST FLOOR LAYOUT



5. MEASUREMENT METHODOLOGY

5.1. General

The prevailing noise conditions in the area have been determined by an environmental noise survey conducted during both daytime and night-time periods between Tuesday 15th and Wednesday 23rd June 2021.

5.2. Baseline 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 7445³.

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672⁴. A full inventory of this equipment is shown in Table 2 below.

TABLE 2: INVENTORY OF SOUND MEASUREMENT EQUIPMENT

Unit	Make, Model & Description	Serial Number
MP1	Rion NL-31 Sound Level Meter	110055
	Rion NH-21 Preamplifier	00157
	Rion UC-53A Microphone	100648
MP2	Rion NL-32 Sound Level Meter	121396
	Rion NH-21 Preamplifier	36327
	Rion UC-53A Microphone	316715
Both	Cirrus CR:515 Acoustic Calibrator	72886

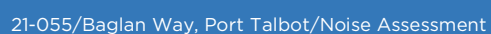
The sound measurement equipment used during the survey was field calibrated at the start and end of the measurement period. A calibration laboratory has calibrated the field calibrator used within the twelve months preceding the measurements. A drift of less than 0.1 dB in the field calibration was found to have occurred on the sound level meter.

The weather conditions during the survey were suitable for environmental noise measurement; being dry with low wind speeds, below 5ms⁻¹.

The microphone was fitted with a protective windshield for the measurements, which are described in Table 3, with an aerial photograph indicating their locations shown in Figure 5.

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.

FIGURE 5: MEASUREMENT POSITIONS

5.3. Summary Results

The summarised results of the environmental noise measurements are presented in Table 4, with the time history and statistical analyses 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	Day 23:00 - 07:00	54	45	54	67
	Night 23:00 - 07:00	50	43	51	66
MP2	Day 23:00 - 07:00	56	49	57	68
	Night 23:00 - 07:00	52	42	53	67

5.4. Source Noise Measurement Details

A source noise measurement exercise was undertaken at the Applicant's existing Glass Systems Port Talbot premises at Units 9, 19 and 21 Baglan Industrial Estate on Thursday 22nd July 2021.

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

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672. A full inventory of this equipment is shown in Table 5.

TABLE 5: INVENTORY OF SOUND MEASUREMENT EQUIPMENT

Make, Model & Description	Serial Number
Rion NL-52 Sound Level Meter	01009671
Rion NH-25 Preamplifier	09976
Rion UC-59 Microphone	18146
Cirrus CR:515 Acoustic Calibrator	72886

The sound measurement equipment used during the survey was field calibrated at the start and end of the measurement exercise. A calibration laboratory has calibrated the field calibrator used within the twelve months preceding the measurements. A drift of less than 0.2 dB in the field calibration was found to have occurred on the sound level meter.

The spectral measurements for each respective source are set out in Table 6. All measurements were undertaken at a height of 1.5 metres above local ground level and all external measurements were undertaken under free-field conditions.

TABLE 6: SOURCE MEASUREMENT RESULTS

Unit 9 – Internal Reverberant $L_{eq,T}$: Receipt & Cutting Area – 83.7 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
68.2	76.7	77.4	76.8	75.1	77.8	77.9	77.3	76.2	72.8	65.9
Unit 9 – Internal Reverberant $L_{eq,T}$: Cutting & Grinding Area – 85.7 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
72.2	78.8	83.0	81.6	81.1	81.7	79.5	78.8	77.3	73.6	69.1
Unit 9 – Internal Reverberant $L_{eq,T}$: Furnace & Cooling Area – 86.0 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
75.0	81.6	82.1	78.6	78.1	81.5	80.1	79.9	77.7	72.6	65.1
Unit 9 – Internal Reverberant $L_{eq,T}$: Finishing Line – 86.3 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
71.0	77.6	79.2	79.8	79.0	84.9	81.5	78.1	74.4	68.8	59.4
Unit 9 – Internal Reverberant $L_{eq,T}$: Storage, Dispatch and D/G Unit Manufacture – 79.8 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
66.1	73.1	73.8	70.8	71.5	74.8	74.0	73.7	71.4	66.2	62.1
Unit 9 – External $L_{eq,T}$: 5m from Open Dispatch Bay (with forklift) – 76.5 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
66.4	69.9	71.3	67.7	68.7	71.2	70.9	71.2	67.3	57.0	44.9
Unit 9 – External $L_{eq,T}$: 5m from Open Dispatch Bay (without forklift) – 72.9 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
68.2	70.6	70.9	64.4	65.9	68.3	67.3	67.0	64.4	57.5	44.6
Unit 9 – External $L_{eq,T}$: 2.5m from Waste Glass Tipping/Disposal (via forklift) – 85.9 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
63.0	66.9	70.8	71.8	71.8	74.6	80.5	78.4	79.8	77.9	69.2
Unit 9 – External L_{Max} : 2.5m from Waste Glass Tipping/Disposal (via forklift) – 105 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
70.5	79.1	82.9	89.4	89.0	93.8	100.7	97.0	98.3	95.9	86.9
Unit 19 – Internal Reverberant $L_{eq,T}$: Receipt & Storage Area – 79.8 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
71.9	73.3	85.0	79.8	78.9	77.0	73.3	72.7	69.0	63.9	53.3
Unit 21 – Internal Reverberant $L_{eq,T}$: Furnace & Cooling Area – 82.2 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
74.0	81.4	82.4	78.3	78.9	77.4	76.1	76.0	73.4	69.3	61.6
Unit 21 – Internal Reverberant $L_{eq,T}$: Dispatch Area – 78.3 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
76.5	78.4	77.9	74.7	76.1	73.8	71.3	71.5	70.1	68.0	58.3

Unit 21 – Internal Reverberant $L_{eq,T}$: Cutting Area – 84.5 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
73.1	78.6	79.5	74.5	78.7	80.6	80.6	77.9	71.9	70.5	63.8
Unit 21 – External $L_{eq,T}$: 5m from Furnace Heat Rejection Vent (Residual Duty) – 80.0 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
69.2	76.9	72.0	71.7	80.2	77.8	73.1	72.0	68.3	57.9	45.5
Unit 21 – External $L_{eq,T}$: 5m from Furnace Heat Rejection Vent (High Duty) – 84.0 dB(A)										
16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
70.0	82.4	74.6	73.6	84.0	83.3	76.8	73.7	70.1	59.8	47.7

6. NOISE ASSESSMENT

6.1. Noise Modelling

6.1.1. General

As precise plant details of the Proposed Development have not yet been finalised, the following assessment considers a replication of the existing activities observed and acoustically quantified at the current operational sites in the Baglan area, with appropriate upscaling.

6.1.2. Source Data and Operational Assumptions

The input data set out in Table 7 has been considered within the assessment:

TABLE 7: NOISE SOURCE ASSUMPTIONS

Source	Distance / Description	Operational Location	Noise Level - dB	
			L _{Aeq,T}	SEL
Production Area	Internal Reverberant Sound Level	Central area of building	85.0	-
Receipt & Cutting Area	Internal Reverberant Sound Level	South-eastern area of building	84.0	-
Dispatch, Storage & Manufacture Area	Internal Reverberant Sound Level	North-western area of building	80.0	-
Furnace Heat Rejection Plant Louvre (x5)	Mean Operational Level @5m	South-western facade of plant area	82.5	-
AHU Condensers (x5)	Operational Level @2m	North-eastern office facade	65.0 (Peak) 60.0 (Night)	-
HGV Passby	10 metres	Loading bays	-	77.0
HGV reversing (inc reverse alarm)	10 metres	Loading bays	-	82.0
LGV Passby	10 metres	Service area	-	68.0
Car Passby	10 metres	Car park	-	71.0
Car Reversing	10 metres	Car park	-	71.0

- 3x HGVs arriving and 3x departing during a 1-hour daytime period (no movements at night);
- 1x LGV arriving and 1x departing during a 1-hour daytime period (no movements at night);
- 90% of the parking bays being utilised within a 1-hour daytime period, with 50% being utilised within a 15-minute night-time period;
- AHU condensers to run at lower load, at night, with a 5 dB reduction in source noise; and
- Roller shutter doors typically maintained in a closed position during production operations.

The above input parameters are considered to represent a highly robust and worst-case basis for assessment, by replicating the use of old technology at the Proposed Development, which is currently used at a location where no noise-sensitive receptors are located nearby, meaning that noise attenuation is not a significant consideration.

These input parameters are intended to determine the likely sources of noise impact and areas where attenuation is likely to be required from the detailed design, such that acoustic feasibility is demonstrated for the purposes of planning consideration.

6.1.3. Building Envelope

In terms of the acoustic performance of the building envelope, the sound reduction statistics set out in Table 8 have been adopted.

TABLE 8: SOUND REDUCTION INDEX OF BUILDING COMPONENTS

Component	Type / Material	SRI - dB(A)
Wall to 1.5m Height	Brick/Blockwork & Cavity	52.0
Wall Cladding to Eaves	90mm Tata Trimapanel	28.9
Roof Cladding	120mm Tata Trisomet	28.5
Roller Shutter Door	Closed	18.0

It has been assumed that any proposed ventilation louvres or access doors will be of a design and fit that does not compromise the overall sound insulation performance of the building envelope.

6.1.4. Calculation Process

Calculations were carried out using Cadna/A, which undertakes its calculations in accordance with guidance given in ISO9613-1:1993 and ISO9613-2:1996.

6.1.5. Sound Data Assumptions

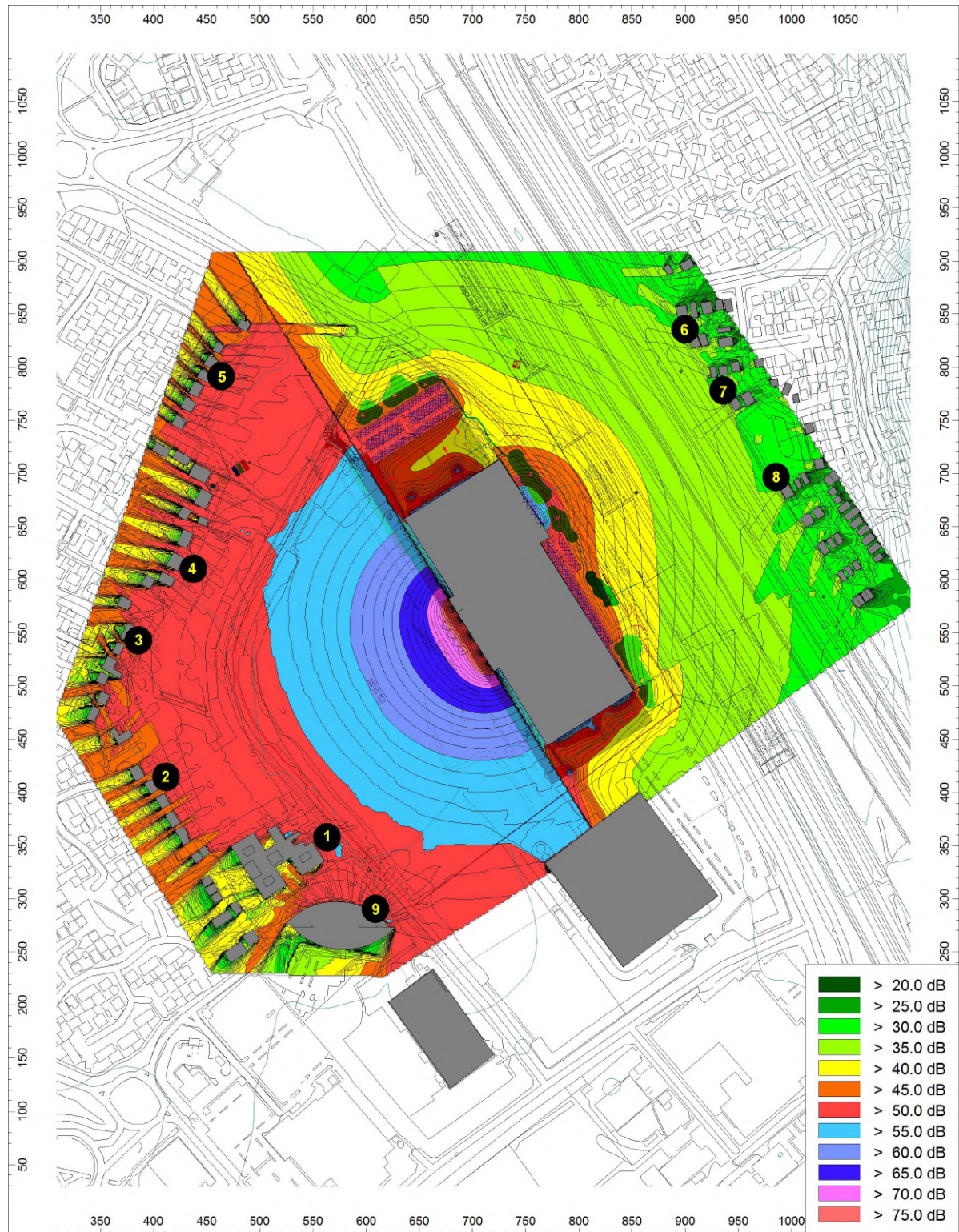
Given that the land between Proposed Development and nearest receptors is mixed, the ground factor has been set to 0.5 in the calculation software.

It has been assumed that all processes may occur simultaneously, representing a worst-case scenario.

6.1.6. Specific Sound Level Map

A sound map of the predicted daytime specific sound level arising from cumulative typical operations at the closest receptors to the Site can be seen in Figure 6.

FIGURE 6: SPECIFIC SOUND LEVEL MAP OF CUMULATIVE DAYTIME OPERATIONS



6.1.7. Specific Sound Level Summary

The predicted specific sound levels arising from operations at the closest receptors to the Site, as shown on Figure 6 can be seen below in Table 9.

TABLE 9: PREDICTED SPECIFIC SOUND LEVEL SUMMARY

Position	Specific Sound Level at Façade dB(A)			
	Noise Breakout & Plant	HGV/LGV Movements	Car Park Vehicle Movements	Cumulative
Daytime				
1	53.7	25.6	19.8	53.7
2	51.4	22.8	20.1	51.4
3	52.4	24.6	22.1	52.4
4	54.1	25.8	27.0	54.1
5	52.6	25.5	28.5	52.7
6	33.9	18.6	26.0	34.6
7	34.4	16.0	26.1	35.0
8	34.2	8.6	25.4	34.8
9*	51.3	23.6	17.5	51.4
Night-time				
1	53.7	-	19.8	53.7
2	51.4	-	20.1	51.4
3	52.4	-	22.1	52.4
4	54.1	-	27.0	54.1
5	52.6	-	28.5	52.6
6	33.9	-	26.0	34.5
7	34.4	-	26.1	34.9
8	34.2	-	25.4	34.7
9*	51.3	-	17.5	51.3
*denotes non-residential receptor (Port Talbot Resource Centre)				

6.2. Assessment

6.2.1. 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”*.

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.”*

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.”*

6.2.2. Rating Penalty Assessment

Considering the content of Section 6.2.1, an assessment of the noise source associated with the Proposed Development, in terms of whether any rating penalties are applicable, has been detailed in Table 10.

TABLE 10: RATING PENALTY ASSESSMENT

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
Plant Noise / Noise Breakout	+2 dB (to south, only)	0 dB	0 dB	+3 dB	On the basis of the predicted results, which make robust allowances for plant noise, it is considered that such activities would be at a level typically regarded as clearly audible, relative to the background/residual sound environment, without mitigation to the south of the site (Residential Receptors 1 to 5), but much less audible to the north (Residential Receptors 6 to 8).
Vehicular Activities	0 dB	0 dB	0 dB	0 dB	On the basis of the predicted results, which make robust allowances for vehicular activity noise, it is considered that such activities would be at a level typically regarded as anonymous relative to the background/residual sound environment, which is already heavily characterised by on and off-site vehicle movements. Therefore, although operational details are not yet known, it is considered that no acoustic feature corrections would be required for this source.

In summary, a +5 dB rating penalty has been included in the assessment, for the residential properties to the south (Receptors 1 to 5) and +3 dB for the properties to the north (Receptors 6 to 8).

6.2.3. Uncertainty

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 11.

TABLE 11: 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	The measurements were undertaken at locations considered to be robustly representative of the closest noise-sensitive receptors to the site.
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	Background measurements were undertaken over continuous 10-day period.
i)	0 dB	The measurement was accompanied by the deployment of a weather station, which enabled detailed observations of the weather conditions.
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, and were deployed with appropriate wind shields.

In summary, no uncertainty budget has been included in the assessment, to account for measurement uncertainty.

Calculation Uncertainty

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

- “ ...
- b) uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels;*
 - c) uncertainty in the calculation method;*
 - d) simplifying the real situation to “fit” the model (user influence on modelling); and*
 - e) error in the calculation process.”*

Each of the calculation uncertainty factors outlined above have been considered and discussed in Table 12, below.

TABLE 12: CALCULATION UNCERTAINTY FACTORS

Calculation Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Sound levels for all sources/activities have been based on worst-case measured source levels from an existing site incorporating older technology, robust archive data and reasonable worst-case assumptions.
c)	0 dB	Calculations were undertaken in accordance with ISO 9613-2, which is considered a “ <i>validated method</i> ” by BS4142:2014+A1:2019.
d)	0 dB	The real situation has not been simplified for the purposes of this assessment.
e)	+1 dB	ISO 9613-2 indicates that there is a ± 3 dB accuracy to the prediction method, dependent upon input variables and propagation complexities.

In summary, a 1 dB uncertainty budget has been considered in the assessment, for calculation uncertainty.

The overall uncertainty is considered to be small enough that it would not affect the conclusions of the assessment.

6.2.4. Rating Sound Level

Incorporating the rating penalties detailed in Section 6.2.2 with the predicted specific sound levels, as detailed in Table 9, the rating sound levels have been derived and have been detailed in Table 13 below.

TABLE 13: RATING SOUND LEVELS

NSR	Cumulative Specific Sound Level (dB)		Rating Sound Level (dB)	
	Day	Night	Day	Night
1	54	54	59	59
2	51	51	56	56
3	52	52	57	57
4	54	54	59	59
5	53	53	58	57
6	35	35	40	40
7	35	35	40	40
8	35	35	40	40

6.2.5. BS4142:2014+A1:2019 Assessment

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

The resultant assessment summary, during the daytime period, can be seen in Table 14.

TABLE 14: DAYTIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
1	59	45	+14
2	56	45	+11
3	57	45	+12
4	59	45	+14
5	58	49	+9
6	40	49	-9
7	40	49	-9
8	40	49	-9

It can be seen that the Proposed Development, in its assessed form is likely to have a potentially '*significant adverse impact*' at the nearest noise-sensitive receptors to the south during the daytime period, with a '*low impact*' at the receptors to the north.

The resultant assessment summary, during the night time period, can be seen in Table 15.

TABLE 15: NIGHT TIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Night Time Background Sound Level (dB)	Excess of Rating over Night Time Background Sound Level (dB)
1	59	43	+16
2	56	43	+13
3	57	43	+14
4	59	43	+16
5	57	42	+15
6	40	42	-2
7	40	42	-2
8	40	42	-2

It can be seen that the Proposed Development, in its assessed form is likely to have a potentially *'significant adverse impact'* at the nearest noise-sensitive receptors to the south during the night-time period, with a *'low impact'* at the receptors to the north.

Consideration to acoustic mitigation and careful acoustic design is therefore required.

6.2.6. Effect on the Ambient Sound Environment – Non-Residential Receptors

The differential between the predicted specific noise level at the Port Talbot Resource Centre and the measured ambient $L_{Aeq,T}$ sound levels in the area would ensure that a minor increase in the prevailing ambient sound level would occur during the day, with a moderate increase occurring during the night.

7. MITIGATION & RESIDUAL EFFECTS

7.1. Determination of Dominant Noise Source

7.1.1. Relative Contributions at Receptors

The Cadna/A noise modelling process enables a partial level calculation that identifies the relative contribution of each noise source at each receptor position. From that exercise, we can ascertain that the heat rejection louvres on the south façade are predicted to be the overwhelmingly dominant source of noise at Receptors 1 to 5 (and the non-residential Receptor 9).

This site feature has been considered as an upscaled version of the external heat rejection plant louvre, measured in operation at Glass Systems' existing facility at Unit 21 and modelled as 5N^o 2.5m x 2.5m vertical planar sources, taking account of 50% peak and 50 % residual duty operation, giving rise to a sound power level of 105 dB(A) per louvre and a total sound power level of 112 dB(A).

It is important to note that the predicted sound impact levels also consider the rating penalties derived on the basis of the originally predicted specific sound levels, which will alter according to the specific sound level.

The considered noise levels therefore need to be considered in terms of a substantial overall reduction in considered noise level for the heat rejection louvres.

7.1.2. Mitigation

As the Proposed Development is new and will benefit from updated technology, the opportunity exists to mitigate sound at source.

Consequently, as the sound impacts associated with the majority of the Proposed Development are predicted to be relatively insignificant, by comparison to the assumptions employed for the heat rejection plant, attention beyond that already considered within the assessment, need only be focussed on this feature.

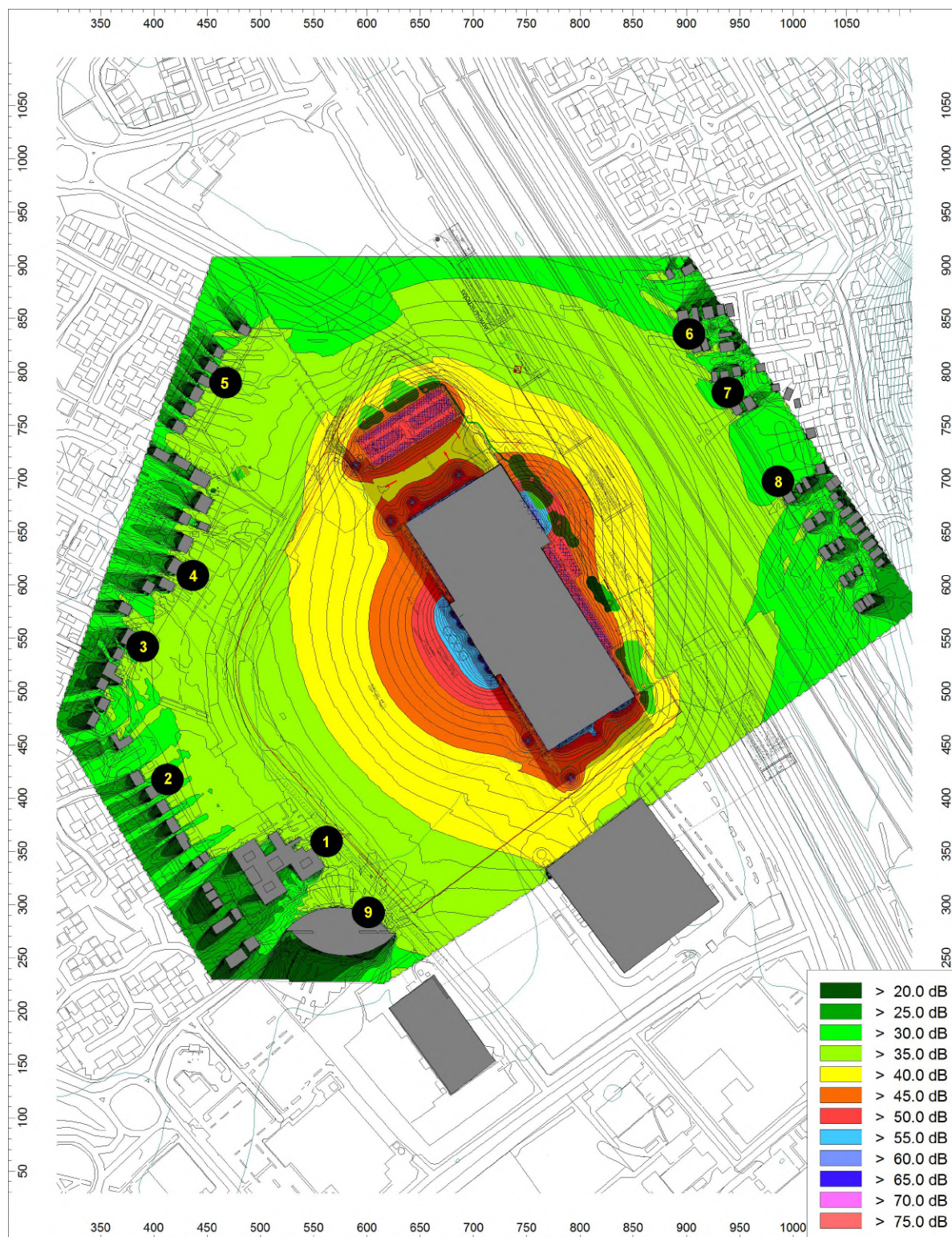
Consequently, a residual noise impact assessment has been undertaken, which takes account of a 17 dB reduction in source level of the external heat rejection louvres, resulting in a sound power level of 88 dB(A) per louvre and a total sound power level of 95 dB(A).

7.2. Residual Assessment

7.2.1. Residual Specific Sound Level Map

A sound map of the predicted daytime specific sound level arising from cumulative typical operations at the closest receptors to the Site can be seen in Figure 7.

FIGURE 7: RESIDUAL SPECIFIC SOUND LEVEL MAP OF CUMULATIVE DAYTIME OPERATIONS



7.2.2. Residual Specific Sound Level Summary

The predicted specific sound levels arising from operations at the closest receptors to the Site, as shown on Figure 7 can be seen below in Table 16.

TABLE 16: PREDICTED RESIDUAL SPECIFIC SOUND LEVEL SUMMARY

Position	Specific Sound Level at Façade dB(A)			
	Noise Breakout & Plant	HGV/LGV Movements	Car Park Vehicle Movements	Cumulative
Daytime				
1	37.4	24.9	20.6	37.8
2	35.1	23.2	20.4	35.5
3	36.2	24.5	22.2	36.6
4	37.8	25.8	26.1	38.3
5	36.3	25.6	27.6	37.2
6	33.4	18.8	26.8	34.3
7	33.9	18.5	27.1	34.6
8	33.7	17.3	26.8	34.3
9*	35.2	22.9	19.0	35.6
Night-time				
1	37.4	-	20.6	37.5
2	35.1	-	20.4	35.2
3	36.2	-	22.2	36.3
4	37.8	-	26.1	38.1
5	36.3	-	27.6	36.8
6	33.4	-	26.8	34.2
7	33.9	-	27.1	34.7
8	33.7	-	26.8	34.5
9*	35.2	-	19.1	35.3
*denotes non-residential receptor (Port Talbot Resource Centre)				

7.2.3. Rating Penalty Assessment

Considering the content of Section 6.2.1, an assessment of the noise source associated with the Proposed Development, in terms of whether any rating penalties are applicable, and has been detailed in Table 17.

TABLE 17: RESIDUAL RATING PENALTY ASSESSMENT

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
Plant Noise / Noise Breakout	0 dB	0 dB	0 dB	+3 dB	On the basis of the predicted results, which make robust allowances for plant noise, it is considered that such activities would be at a level typically regarded as just audible, relative to the background/residual sound environment, with mitigation in place.
Vehicular Activities	0 dB	0 dB	0 dB	0 dB	On the basis of the predicted results, which make robust allowances for vehicular activity noise, it is considered that such activities would be at a level typically regarded as anonymous relative to the background/residual sound environment, which is already heavily characterised by on and off-site vehicle movements. Therefore, although operational details are not yet known, it is considered that no acoustic feature corrections would be required for this source.

7.2.4. Residual Rating Sound Level

Incorporating the rating penalties detailed in Section 6.2.2 with the predicted specific sound levels, as detailed in Table 16, the rating sound levels have been derived and have been detailed in Table 18 below.

TABLE 18: RESIDUAL RATING SOUND LEVELS

NSR	Cumulative Specific Sound Level (dB)		Rating Sound Level (dB)	
	Day	Night	Day	Night
1	38	38	41	41
2	36	35	39	38
3	37	36	40	39
4	38	38	41	41
5	37	37	40	40
6	34	34	37	37
7	35	35	38	38
8	34	35	39	38

7.2.5. Residual BS4142:2014+A1:2019 Assessment

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

The resultant assessment summary, during the daytime period, can be seen in Table 19.

TABLE 19: RESIDUAL DAYTIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Daytime Background Sound Level (dB)
1	41	45	-4
2	39	45	-6
3	40	45	-5
4	41	45	-4
5	40	49	-9
6	37	49	-12
7	38	49	-11
8	39	49	-10

It can be seen that the Proposed Development, in its assessed, mitigated form is likely to have a '*low impact*', during the daytime.

The resultant assessment summary, during the night time period, can be seen in Table 20.

TABLE 20: RESIDUAL NIGHT TIME BS4142:2014+A1:2019 ASSESSMENT SUMMARY

NSR	Rating Sound Level (dB)	Night Time Background Sound Level (dB)	Excess of Rating over Night Time Background Sound Level (dB)
1	41	43	-2
2	38	43	-5
3	39	43	-4
4	41	43	-2
5	40	42	-2
6	37	42	-5
7	38	42	-4
8	38	42	-4

It can be seen that the Proposed Development, in its assessed, mitigated form is likely to have a '*low impact*', during the night-time.

7.2.6. Residual Effect on the Ambient Sound Environment – Non-Residential Receptors

The differential between the predicted specific noise level at the Port Talbot Resource Centre and the measured ambient $L_{Aeq,T}$ sound levels in the area would ensure that no significant increase in the prevailing ambient sound level would occur.

7.3. Discussion & Recommendations

7.3.1. Results Analysis

The assessment considers the currently proposed design and source noise levels based upon the existing operations at Units 9, 19 and 21 Baglan Industrial Estate.

On this basis, the assessment has identified a risk of adverse noise impact arising as a result of the furnace heat rejection louvres, which are anticipated to be required on the southern façade of the plant area, to the south side of the main manufacturing building.

All other activities, taking account of robust input parameters and operational assumptions are not predicted to give rise to significant impacts, so the design of the scheme will need to respond to the identified constraint and ensure that the opportunity is taken to acoustically attenuate the noise emissions to the environment, arising from external plant on the south side of the building, taking account of the recommended maximum noise levels set out within this report.

7.3.2. Planning Condition

As the assessment has considered and demonstrated the acoustic feasibility of the scheme, it is considered appropriate for noise to be controlled from the operation of the completed development by way of an appropriately worded planning condition, which is suggested below:

Noise arising from the Development shall not exceed the typical background sound level during the day or night at the closest residential receptors to the site, existing at the time of the approval of this planning permission, when assessed in accordance with the methodology and principles set out in BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

REASON: To protect the residential amenity of existing residential properties in the area.

8. CONCLUSION

inacoustic has been commissioned to assess the impact of noise from a proposed industrial development at Baglan Way, Port Talbot.

This technical noise assessment has been produced to provide supporting information to accompany a planning application to Neath Port Talbot County Borough Council and is based upon environmental noise measurements undertaken at the site and a subsequent predictive exercise.

The assessment considers the potential noise emissions arising from robust activity levels at the Proposed Development, taking account of the currently proposed design, and noise measurements and operational observations undertaken at the Applicant's existing premises.

The assessment has identified that noise levels arising as a result of probable operations at the site have the potential to give rise to a significant adverse impact at the closest off-site noise-sensitive receptors, in BS4142:2014+A1:2019 terms, so mitigation measures, in the form of acoustic performance criteria have been set.

The residual assessment has identified that noise levels arising as a result of probable operations at the site are likely to give rise to a low impact at the closest off-site noise-sensitive receptors, in BS4142:2014+A1:2019 terms, when mitigated in the manner described within this report, which is considered a robust demonstration of acoustic feasibility.

An appropriately worded planning condition has been proposed, which should be applied to the planning permission and will ensure that the detailed design of the scheme achieves the necessary acoustic performances.

In light of the above, it is considered that the potential noise impacts associated with the Proposed Development can be adequately controlled by the proposed design and the application of a suitably worded planning condition and that noise should not be considered a material constraint to the granting of planning permission for the proposals in their current form.

9. APPENDICES

9.1. 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 21: 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 $L_{A90,1\text{hour}}$ dB and $L_{A90,15\text{mins}}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

9.2. Appendix B – Measurement Results

FIGURE 8: MEASURED TIME HISTORY – MP1

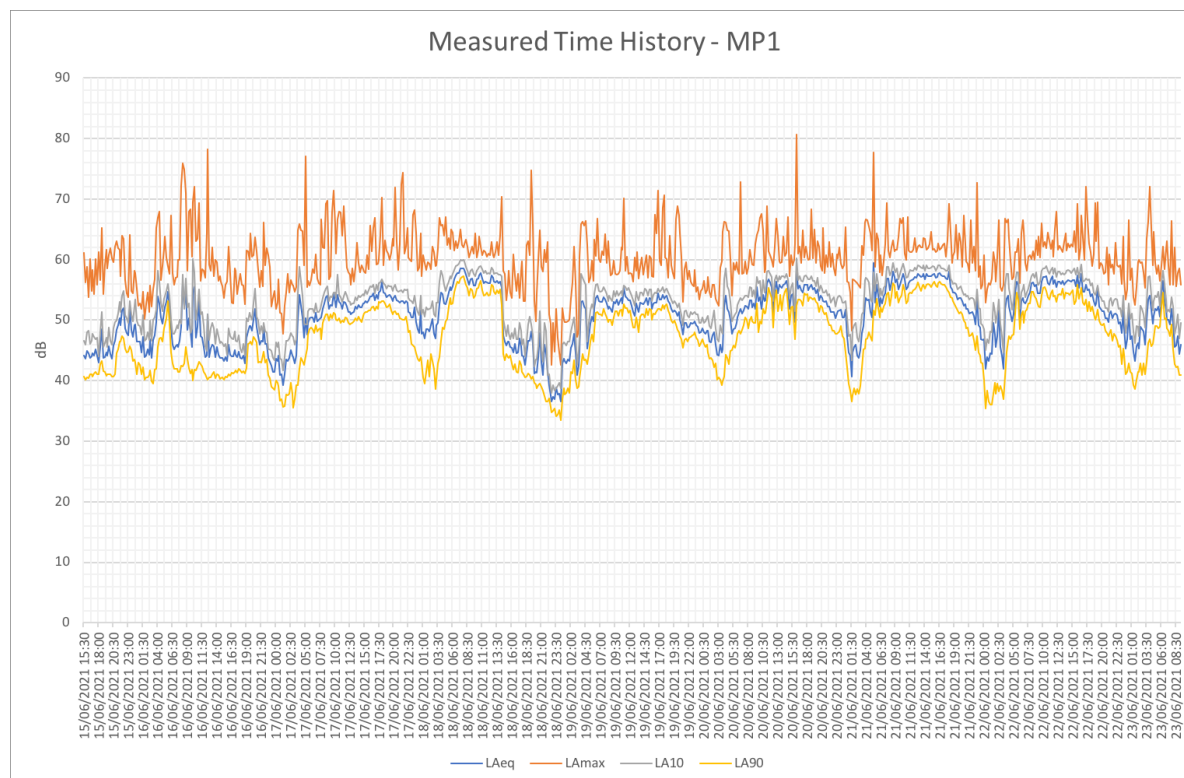


FIGURE 9: STATISTICAL ANALYSIS OF L_{A90} BACKGROUND – MP1 DAYTIME

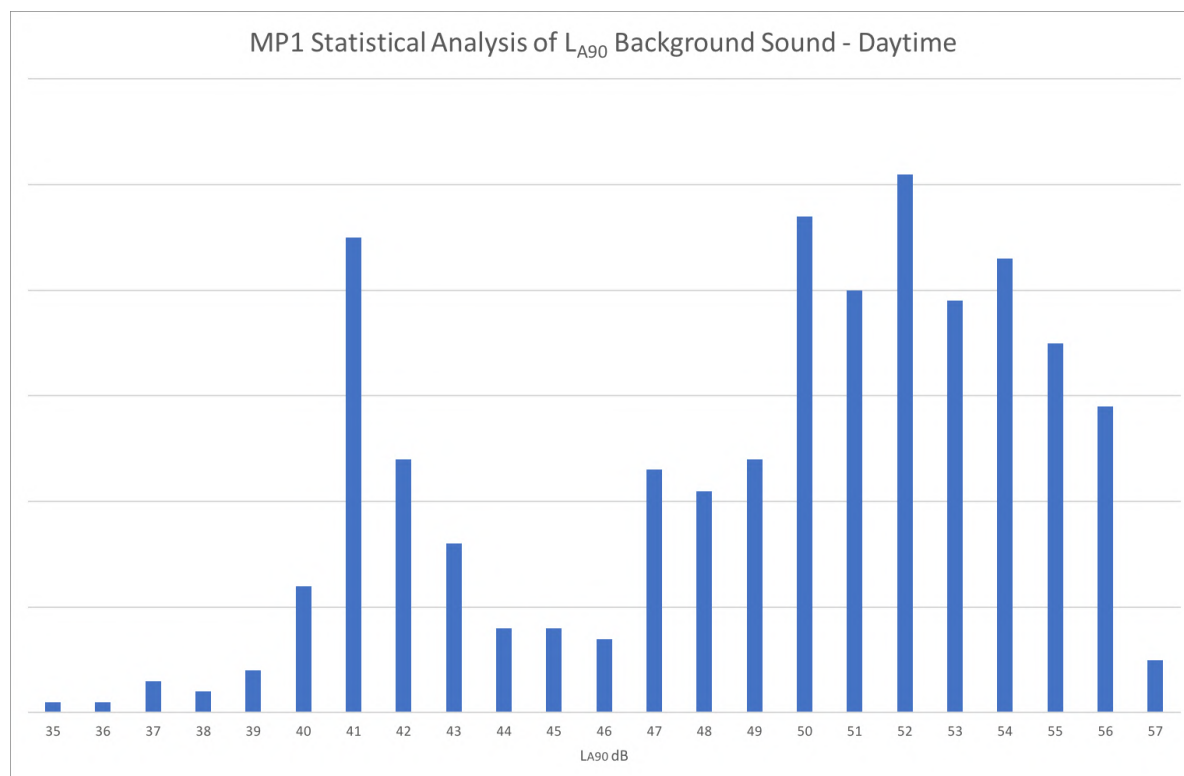


FIGURE 10: STATISTICAL ANALYSIS OF L_{A90} BACKGROUND – MP1 NIGHT-TIME

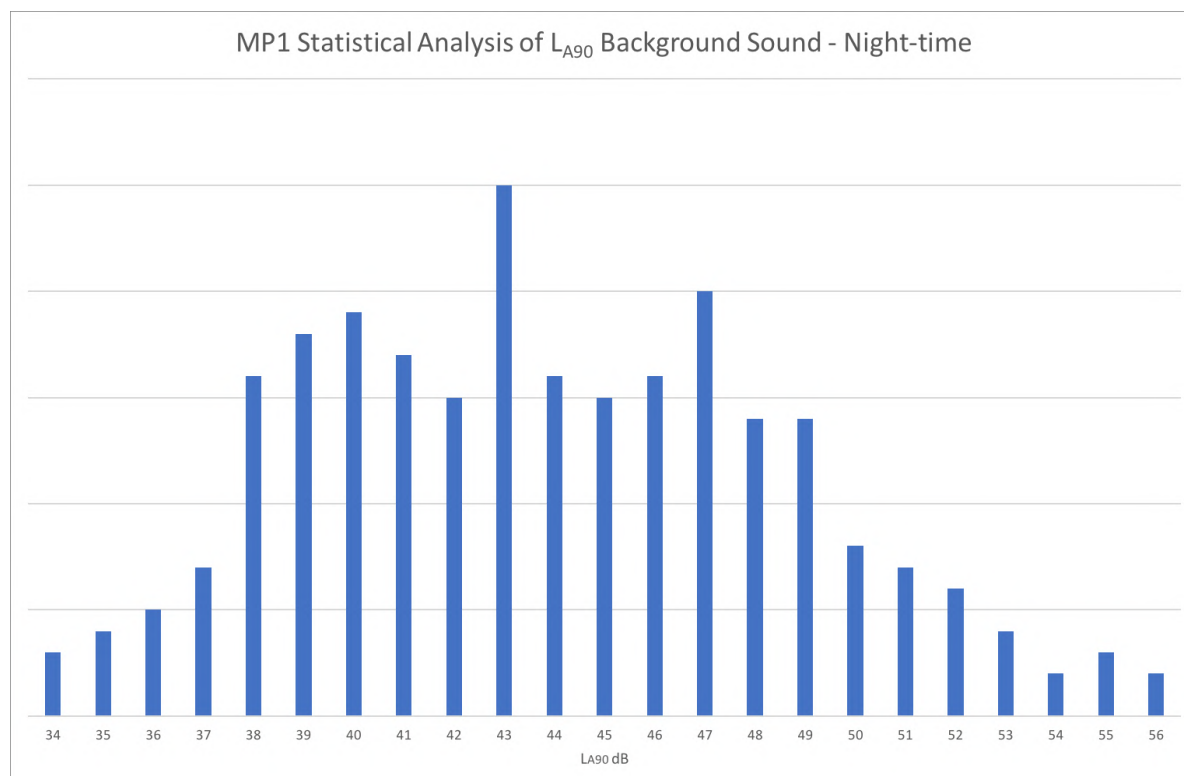


FIGURE 11: MEASURED TIME HISTORY - MP2

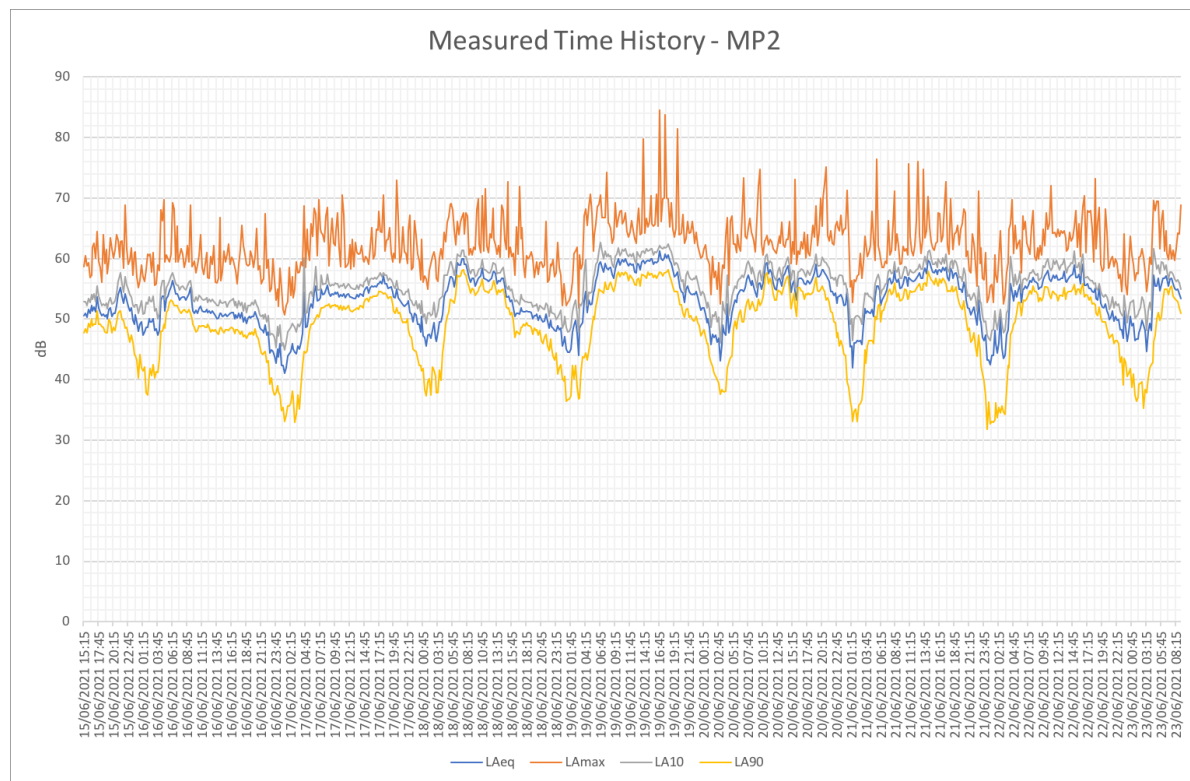


FIGURE 12: STATISTICAL ANALYSIS OF L_{A90} BACKGROUND - MP2 DAYTIME

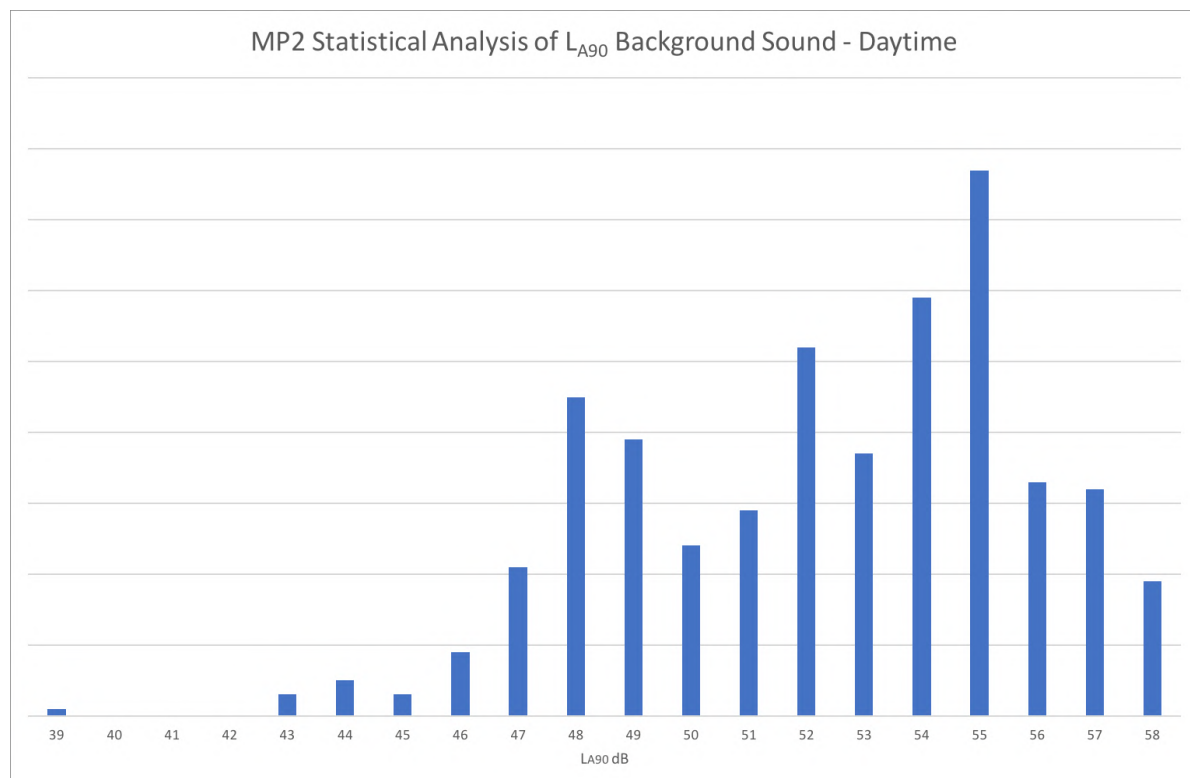
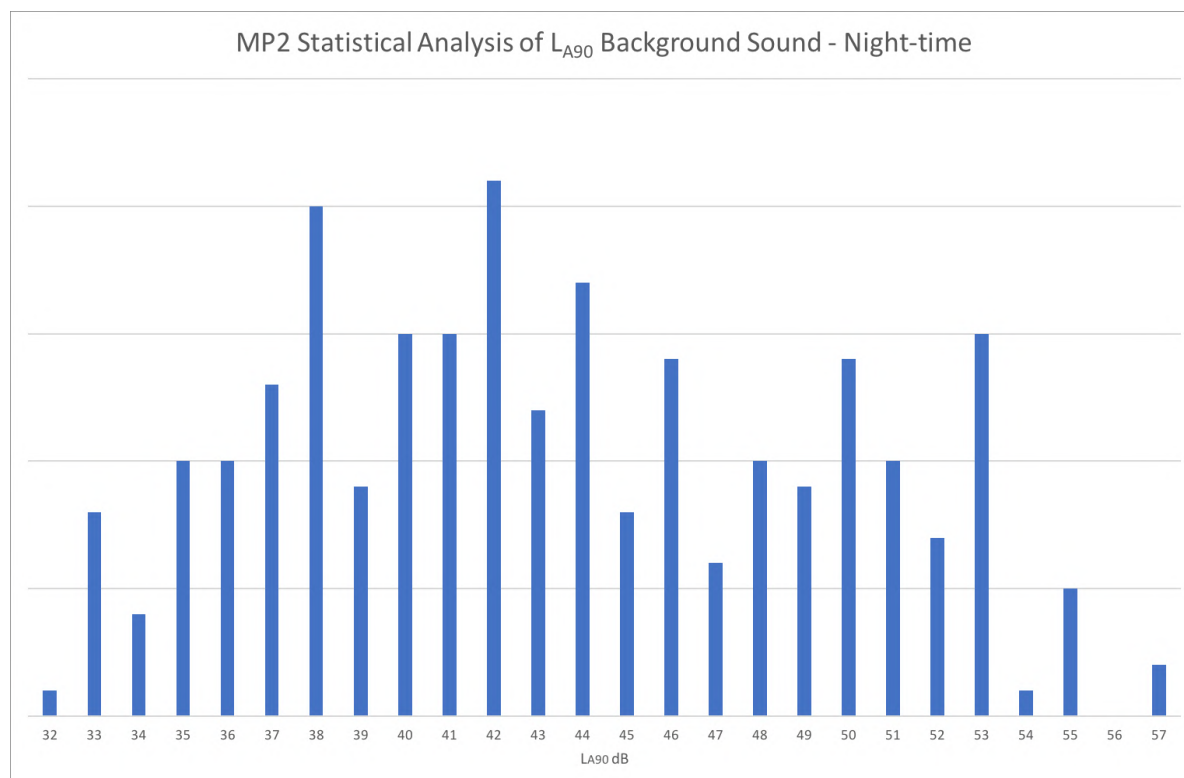


FIGURE 13: STATISTICAL ANALYSIS OF L_{A90} BACKGROUND – MP2 NIGHT-TIME



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